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**Merger and Acquisition: the Effect of Financial Constraint and  
Security Analysts on Bidder Abnormal Return**

*A thesis presented for the degree of  
Doctor of Philosophy*

YICHEN LI

Supervised by:  
Dr Michael (Jie) Guo  
Dr Li Ding

Durham University Business School  
Durham University  
September 2015

## **Abstract**

This thesis investigates to what extent financial constraint and financial disparity influence bidder merger performance, how analyst recommendation consensus relates to bidder announcement return, and whether divergence opinion and information asymmetry affect M&A abnormal returns.

First, this thesis examines the impact of financial constraint and the financial constraint disparity between bidder and target on bidder abnormal return. I find that a constrained acquirer outperforms an unconstrained bidder in both the long and short run; target financial constraint is significantly negatively related to bidder announcement return. Acquiring a financially constrained target tends to positively influence an acquirer's abnormal returns in the long run. In addition, disparity between acquirer target financial constraints (ATDKZ) is negatively related to bid premium.

Second, this paper investigates whether analyst recommendations affect merger and acquisition performance: whether recommendation consensus has the predicting power on acquisition performance, and if so, which type of recommendation consensus is more accurate than the others. The results suggest that recommendation consensus is positively related to acquirers' announcement return; acquirers with high recommendation consensus before announcement day outperform acquirers with low recommendation consensus in the short run; analysts can successfully predict the incoming M&A deals and adjust their recommendation accordingly; and the recommendation consensus estimated 90 days preceding deal announcement has the strongest predicting power. It suggests that analysts do have the superior skill.

Finally, this study estimates how the combination of analyst divergence opinion and information asymmetry influences bidder abnormal return by controlling bidder pre-merger performance. A low divergence opinion bidder outperforms a high divergence opinion bidder in both the long and short run. This effect is much stronger in

the sample of poorly performed bidders than well-performed bidders. For bidders with poor pre-merger performance, analyst divergence opinion has negative impact on announcement return. For bidders with good pre-merger performance, a positive relation has been found between information asymmetry and announcement return. These empirical results strongly support that bidder pre-merger performance is an important conditioning variable that we should take into consideration in examining the impact of divergence opinion and information asymmetry on bidder merger and acquisition performance.

Overall, this thesis provides new empirical evidence on how bidder M&A performance is related to financial constraint, financial constraint disparity, recommendation consensus, divergence opinion and information asymmetry. The results suggest that constrained bidders outperform unconstrained bidders, financial analyst do have superior skills, and pre-merger performance is an important controlling variable when we study divergence opinion and information asymmetry in the context of M&A abnormal return.

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## **Declaration**

No part of this thesis has been submitted elsewhere for any other degree or qualification in this or any other university. It is all my own work unless referenced to the contrary in the text.

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*To my beloved family*

## **Chapter 1: Introduction**

Mergers and acquisitions (M&A) are the fundamental activity in the market for corporate control. At the micro level, firms benefit from M&A in many ways. Acquirers can achieve rapid expansion or transfer their overvalued stock into a solid asset. For targets, it is one of the most efficient ways to cash out. At the macro level, M&A efficiently relocates limited resources within the economy. Jensen (1988) discusses many controversial issues related to the corporate control market in the 1980s. He points out that the corporate control market creates social and economic benefits because a highly active corporate control market indicates high efficiency of resource relocation and high market volatility. According to Thomson One Banker, the worldwide transaction value of M&A activity in 2011 reached \$2,400.67 billion, and the number of completed deals worldwide increased from 18,712 in 2009 to 31,380 in 2011. This figure suggests that the corporate control markets have been highly active since the financial crisis.

Due to the popularity and importance of the corporate control market, M&A has attracted much academic attention. Initially, this thesis examines how financial constraint influence bidder acquisition performance. The effect of financial constraint on merger and acquisition performance has been extensively studied in previous literature. The free cash flow hypothesis (Jensen, 1986) suggest that bidders with excess cash reserves tend to suffer from server agency cost – the conflict interest between managers and shareholders toward free cash flow distribution will force managers to make value-destroying acquisitions. The ‘hubris hypotheses’ (Roll, 1986) provides alternative views about aggregated merger gains. M&A are value destroying because CEOs’ overconfidence and the takeover mechanism. Overconfident CEOs overvalue a target and the potential synergies to be derived from that takeover. They therefore tend to overpay for the target and consequently suffer from the “winner’s curse” after the deal is completed. Malmendier and Tate (2005) find a strong and

positive relationship between CEO overconfidence and free cash flow. As a result, the majority of studies in this area conclude that financially constrained bidders outperform financially unconstrained bidders in the context of merger and acquisition performance (Jensen, 1988, Martin and McConnell, 1991, Smith and Kim, 1994, Harford, 1999, Lamont et al., 2001, Baker et al., 2002, Malmendier and Tate, 2005, Malmendier and Tate, 2008).

Although there are many papers in the literature that analyse the relation between bidder financial conditions and deal outcomes, there is a lack of research on to what extent target financial conditions can influence the outcome of M&A. It is a fact that a financially unconstrained target has more options in anti-merger activity than a financially constrained target. Acquiring targets with different financial constraints will generate different outcomes. The relationship between target financial constraints and merger outcome needs to be studied further.

Furthermore, there is a lack of research on how the financial constraint disparity between bidder and target influence M&A abnormal returns. Lang et al. (1989) and Servaes (1991) studied the relationship between Tobin's Q and takeover returns. They employ Tobin's Q as a proxy for management performance and argue that takeovers by well-managed (high Q) bidders for poorly managed (low Q) targets generate the largest announcement returns to bidders. They raise an interesting question: will a financially constrained bidder acquiring a financially unconstrained target receive a higher abnormal return than those acquiring a financially constrained target? How will the magnitude of the financial constraint disparity change bidders' abnormal returns in both the long and short run?

To answer these questions, Chapter 2 studies a sample of 1,622 US merger and acquisition deals announced over the period 1 January 1990 to 31 December 2009. In Chapter 2, financial constraint is measured by investment-cash flow sensitivities (Fazzari et al., 1987), the KZ index (Kaplan and Zingales, 1997) and WW

index(Whited and Wu, 2006). As results, Chapter 2 finds that a constrained acquirer outperforms an unconstrained bidder in both the long and short run; target financial constraint is significantly negatively related to bidder announcement return. Acquiring a financially constrained target tends to positively influence an acquirer's abnormal returns in the long run. In addition, Disparity between acquirer target financial constraints (ATDKZ) is negatively related to bid premium.

Chapter 3 examine how analysts' coverage will influence the outcome of M&A. Security analyst can influence market sentiment by issuing earning forecast and recommendations. Reputation concern hypothesis (Fama, 1980, Lazear and Rosen, 1979, Holmström, 1999) state that Security analyst reputation is a long career concern. This is because; Analyst's compensation rely on how many profitable recommendation they made for their clients (Trueman, 1994), Security analyst's reputation is based upon the forecast accuracy and length of forecasting record(Chen et al., 2002). Therefore, the investor gives extra credit to a security analyst with high reputation. Merger and acquisition (M&A) significantly changes bidder and target's stock performance. It can generate a huge amount of information in short period of time. To precisely process this information and provide accurate recommendations, analyst has to have superior information processing ability. On the other hand, Bank affiliation theory suggests that analysts tend to give optimistic recommendation to acquirers. Conflicts between broker and investor do exist. Analysts tend to give favorable recommendations to affiliate brokerage houses. It can be argued that career concerns will discipline such behavior. The empirical evidence regard to the reliability of analyst recommendation is inconclusive (Stickel, 1995, Womack, 1996, Barber et al., 2001, Barber et al., 2007, Malmendier and Shanthikumar, 2007, Hilary and Hsu, 2013, Malmendier and Shanthikumar, 2014).

Therefore, Chapter 3 examines whether analyst recommendations influence merger and acquisition performance and if analysts can successfully predict merger and acquisition performance and provide accurate recommendations. Furthermore, to



resolve the issue, Chapter 3 studies a sample of 8889 US Merger and Acquisition deals from 1993 to 2010, and finds that recommendation consensus and the changes in recommendation consensus have positive influence on acquirers' short-term performance; acquirers with high recommendation consensus before announcement day outperform acquirers with low recommendation consensus in the short run; analysts can successfully predict the incoming M&A deals and adjust their recommendation accordingly; trading with recommendation consensus is profitable. Moreover, acquirer short-term M&A performance directly links to adjustment of recommendation after announcement day. The effect of recommendation on acquirer's M&A short-term performance remains unchanged after the implementation of regulation fair disclosure. The results in Chapter 3 support the reputation concern theory.

Chapter 4 examines how analyst divergence opinion and information asymmetry influence bidder merger and acquisition performance. Divergence opinion theory (Miller, 1977) and information asymmetry theory (Travlos, 1987, Myers and Majluf, 1984) are vitally important when we study the influence of analyst on bidder merger and acquisition performance. Miller (1977)'s divergence of opinion theory assumes that investors have their own identical stock evaluation and the short selling is limited. If the divergence opinion is high, the most optimistic investor decides the stock price. In the scenario of merger and acquisition, a high pre-deal divergence opinion indicates overvalued stock. Therefore, a high divergence opinion will lead to negative bidders announcement return. On the other hand, asymmetry information theory implies that there is asymmetry of information between management and investors. Deal announcement will disclose more information to the market. The signalling effect will change bidders' abnormal return accordingly. For example, stock payment leads to negative abnormal return because it signals that bidder is overvalued. However, bidder will benefit from pre-merger overvaluation if the bidder is capable of maintaining the level of asymmetry of information until completion of the deal. Therefore, high information asymmetry is positively related to bidders' announcement

return. As discussed above, we have two competing theories and previous literature provides mixed results (Dierkens, 1991, Diether et al., 2002, Boehme et al., 2009, Chatterjee et al., 2012, Dionne et al., 2014, Golubov et al., 2015).

Chapter 4 argues that the mixed results are caused by the absence of bidders' pre-merger performance. According to the trading mechanism demonstrated in Miller (1977), low divergence opinion indicates that the firms stock price have already been fully realised by the optimistic investors available in the market, there is low trading activity and low investor recognition. No matter whether the stock price is high or low, there is lack of price movement. Poor past performance also shows the same problem. The lack of investor recognition shrinks the number of potential buyers. The declining stock price and fixed investment recognition demand firms to attract more attention. The investor recognition hypothesis (Merton, 1987) asserts that an exogenous event increases stock recognition, the company will lower the cost of raising capital and increase the investment opportunity; merger and acquisition is one of such exogenous event. Moreover, Miller (1977)'s view is that increase in stock recognition attracts more investors from the buying side. So the value of stock increases but the expected return will decrease. Bushee and Miller (2012) support that increase in public exposure helps a company attract more institutional investors that boost stock valuation in incoming years. Therefore, the deals conducted by bidders with low divergence opinion tend to be value enhancing. On the other hand, bidders with low divergence opinion and good past performance are more likely to conduct value-destroying deals; this is because these bidders are like the "glamour" bidder in Rau and Vermaelen (1998). As discussed in Chapter 2, they are associated with high P/E ratio, high free cash flow, overconfident CEO and high agency cost. Therefore, Chapter 4 highlights that pre-merger performance is an important conditioning variable in examining the impact of divergence opinion and information asymmetry on bidder merger gains.

To resolve this issue, Chapter 4 splits bidders into well-performed bidder and poorly performed bidder. By studying a sample of 7842 US M&A deals conducted from 1990

to 2013, Chapter 4 finds that a low divergence opinion bidder outperforms a high divergence opinion bidder in both the long and short run. This effect is much stronger in the sample of poorly performed bidders than well-performed bidders. For bidders with poor pre-merger performance, analyst divergence opinion has negative impact on announcement return. For bidders with good pre-merger performance, a positive relation has been found between information asymmetry and announcement return. These empirical results strongly support that bidder pre-merger performance is an important conditioning variable that we should take into consideration in examining the impact of divergence opinion and information asymmetry on bidder merger and acquisition performance.

Overall, this thesis suggests that financially constrained bidders outperform financially unconstrained bidders, and the financial disparity between acquirer and target has a positive and significant impact on acquirer's acquisition performance in the short run but not in the long run. Financial advisors do have superior skill, the recommendation consensus has positive impact on bidder announcement return. Pre merger performance is an important conditioning variable when we examine the impact of divergence opinion and information asymmetry on bidder abnormal return. The impact of analyst divergence opinion is more pronounced in poorly performed bidders, the impact of information asymmetry is more pronounced in well-performed bidders.

This thesis contributes to the M&A literatures in many aspects. First, this study provides new evidence on how financial constraint related to merger and acquisition performance. Different from previous literature, Chapter 2 sheds new light on the combined effects of acquirer and target financial constraints on acquirer short- and long-run abnormal returns. It provides empirical support to the hubris and cash flow hypotheses; financially constraint bidder outperform financially unconstrained bidder, financial disparity between acquirer and target has a positive and significant impact on acquirer's acquisition performance in the short run but not in the long run since high

financial disparity leads to lower premium.

Second, the existing literature does not explore how well the recommendation consensus can predict bidder announcement return. Due to the quality difference in analyst recommendation, it is necessary to identify which type of recommendation consensus can influence merger and acquisition performance. Chapter 3 suggest that recommendation consensus estimated within 90 days proceeding announcement day have the strongest predicting power. In addition, the predicting power of recommendation consensus has declined after the empowerment of Reg-FD.

Third, Chapter 3 provide new evidence on analyst reputation concern theory, by study the changes of recommendation and the timing of those changes, Chapter 3 suggest that analyst do have superior information processing ability, they can adjust their recommendation on time and those changes have significant impact on bidder announcement return.

Fourth, by controlling bidder pre-merger performance, Chapter 4 fully explores how divergence opinion and information asymmetry influence bidders merger performance. The empirical evidence suggest that bidder pre-merger performance is an important conditioning variable that we should put into consideration in examining the impact of divergence opinion and information asymmetry on bidder merger and acquisition performance.

The remainder of this thesis is organized as follows, Chapter 2 examines how finance constraint and financial disparity influence bidder merger and acquisition performance, Chapter 3 investigates the predicting power of recommendation consensus on bidder announcement return. Chapter 4 explores how divergence opinion and information asymmetry influence bidders merger performance. Chapter 5 draws the conclusion of the study, discussing the main findings, implication, limitation and future research.

# Chapter 2: Financial Constraint and M&A Returns

## 2.1. Introduction

M&A remains one of the most popular strategies for firms to achieve rapid growth. However, the question of whether bidders benefit from M&A remains inconclusive. We accept that M&A is value-enhancing. However, we argue that it can be value-destroying under certain conditions, especially for bidders with overconfident CEOs (Roll, 1986) and a high free cash flow (Jensen, 1986). In this Chapter, we examine what extent financial constraint and financial disparity influence bidder merger performance

Roll (1986) provides alternative views about aggregated merger gains by introducing the ‘hubris hypotheses’. He believes that M&A are value destroying because CEOs’ overconfidence and the takeover mechanism. Overconfident CEOs overvalue a target and the potential synergies to be derived from that takeover. They therefore tend to overpay for the target and consequently suffer from the “winner’s curse” after the deal is completed.

Malmendier and Tate (2005) find a strong and positive relationship between CEO overconfidence and free cash flow. Their result suggests that high free cash flow can significantly fuel CEO overconfidence. Smith and Kim (1994) suggest that a bidder

with high free cash flow tends to receive negative announcement abnormal returns, and that 'slack poor' bidders tend to achieve positive announcement abnormal returns. Moreover, Harford (1999) examines whether excess cash holdings stimulate top management to conduct takeover transactions, and whether these deals (made by cash-rich bidders) tend to be value-destroying. They find that cash-richness is significantly positively related to the probability of being a bidder, but is negatively related to bidder announcement returns. Additionally, post-merger, long-term abnormal operating performance for cash-rich bidders is significantly negative, but is not significantly different from zero for cash-poor bidders. In other words, cash-rich companies tend to conduct value-destroying takeovers. Malmendier and Tate (2008) find that bidders' financial conditions may significantly alter the outcome of M&A. Consequently; deals conducted by overconfident CEOs with high free cash flow are most likely to be value destroying.

Their findings support the 'free cash flow hypothesis' developed by Jensen (1986). He argues that bidders with excess cash reserves tend to suffer from server agency cost – the conflict interest between managers and shareholders toward free cash flow distribution will force managers to make value-destroying acquisitions. Thus, it is widely accepted that bidder's financial constraints is one of the most important factors influencing the outcomes of M&A.

Although there are many papers in the literature that analyse the relation between

bidder financial conditions and deal outcomes, there is lack of research on to what extent target financial conditions can influence the outcome of M&A. It is a fact that a financially unconstrained target has more options in anti-merger activity than a financially constrained target. Acquiring targets with different financial constraints will generate different outcomes. The relationship between target financial constraints and merger outcome needs to be studied further.

In this study, we use the KZ index as a measurement of financial constraint. This is not only because the KZ index focuses more on firms' accounting conditions but also because it is one of the most commonly used financial constraint measurements in the field of M&A. The KZ index is used to measure a firm's financial condition in Lamont et al. (2001), Baker et al. (2002), Malmendier and Tate (2005), Malmendier and Tate (2008). In addition, instead of measuring the actual financial resources held by a firm, the KZ index is more concerned about the firm's financial health. According to the calculation function, a financially constrained firm will have a positive KZ value. The larger this KZ value is, the more constrained the firm will be. We have estimated a KZ value for all of the bidders and targets in our sample. We define the financial disparity between bidder and target (ATDKZ) as the difference between bidder and target KZ value. A positive financial disparity indicates that those bidders are more financially constrained than the target.

Finally, we carry out univariate and multivariate tests to analyse the relationship

between bidders and target financial conditions and bidders' acquisition performance. We then analyse the relationship between the bidder/target financial constraint disparity and bidders' abnormal return in both the long and short run. Finally, we analyse to what extent bidders and targets' financial constraints and financial constraint disparity can alter the bid premium in M&A. For the univariate test, we divided the full sample into three subsamples on the basis of financial constraint disparity, namely, a constrained bidder acquiring a rich target (CBRT), Neutral (N), and an unconstrained bidder acquiring a poor target (UCBPT). This unique design enables us to carefully examine the difference in firms and deal characteristics among the different deal groups. For the multivariable test, the dependent variable is bidder abnormal return in both the long and short run. We use a cumulative abnormal return 3, 5 and 11 days surrounding the announcement day to measure bidder announcement return. We use buy and hold abnormal return 12, 24 and 36 months after the month of announcement to measure bidder abnormal return in the long run. The premium is estimated by the difference between the deal value and the target stock price four weeks prior to the announcement day divided by the target stock price four weeks prior to the announcement day. Key explanatory variables are bidder's financial constraint (AZK), target financial constraint (TKZ) and financial constraint disparity (ATDKZ).

In addition, we use a group of control variables to control other essential firm and deal characteristics. Previous papers identified several factors could potentially influence takeover outcome. Morck et al. (1988) use stock price Runup as the measure of bidder



pre-deal performance and find that bidder Runup is positively related to bidder announcement returns. In contrast, Rosen (2006) finds bidder Runup to be negatively related to both short-run and long-run abnormal returns for bidders. Maloney, Maloney et al. (1993) investigate the relationship between capital structure and M&A returns. They find that bidders with higher leverage gain higher announcement returns and argue that debt helps to alleviate agency problems and therefore improves the quality of M&A decision-making. Kohers and Kohers (2001) analyse takeovers of high-tech firms and find a positive relationship between ROE and long-run abnormal returns to bidders.

In addition, Travlos (1987) highlights the signalling effect caused by usage of stock payment in M&As. He shows that bidders that completed a deal by paying in stock face substantially lower announcement returns than others, as stock payment signals overvaluation of the bidder's share. Loughran and Vjih (1997) estimate how bidders' post-acquisition return is affected by the means of payment, via analysing 947 completed deals from 1970 to 1989. They found that mergers paid for in stock lead to a 25% reduction in bidders' abnormal returns within five years of the deal being completed, whereas a tender offer completed in cash leads to a 67% increase. Furthermore, Moeller et al. (2004) emphasise the size effect in M&As; they suggest that announcement returns for smaller bidders are 2% lower than those of bidders of average size. This finding holds constant after controlling for firm and deal characteristics.

Other deal-specific factors, including diversification and deal attitude, have also been found that could alter the deal outcome. Morck et al. (1990) suggest that bidders receive a lower abnormal return if they conduct diversifying deals. Villalonga (2004) applies data selected from the Business Information Tracking Series to study what actually happens to firms that diversify from their original establishment. He suggests that diversification premiums do exist and robust from different value and diversification measurement. However, it can be argued that Villalonga (2004) studies all diversification without specifying the diversification achieved through M&A. Servaes (1991) documented that hostile takeovers lead to an 8% reduction in bidders' gains. However, Schwert (2000) points out that a hostile takeover is the strategy chosen by bidders or targets' management in order to maximize transaction gains; however, there is no significant evidence regarding the relationship between hostility and bidders' abnormal returns.

Our results show that a constrained acquirer outperforms an unconstrained bidder in both the long and short run. For the short run, acquirers' KZ value (AKZ) is significantly positively related to acquirer cumulative abnormal return five days surrounding the announcement day. A one unit increase in the value of AKZ leads to a 2.08% increase in CAR[-2,2]. This suggests that more a constrained acquirer will achieve higher abnormal returns than a financially constrained bidder. For the long run, acquirer's financial constraint (AKZ value) is positively related to acquirer

long-term abnormal return, estimated by BHAR[0,24] and BHAR[0,36]. A one unit increase in acquirers' financial constraint will increase BHAR[0,24] by 10.4% and BHAR[0,36] by 15.31%. This is because deals conducted by constrained bidders tend to be value enhancing as targets are chosen more rationally than in deals involving unconstrained bidders. However, it can take time for bidders to realize the synergies created from M&A. The impact of bidders' financial constraint therefore appears some 24 and 36 months after the month of announcement. This result implies that constrained firms do not suffer from overconfidence. Rather, they choose their target and implement their acquisition strategy more elaborately and effectively than financially unconstrained bidders. Our results support the hubris hypothesis (Roll, 1986) and the cash flow hypothesis (Jensen, 1986).

We also find that target financial constraint is significantly negatively related to bidder announcement return three days surrounding the announcement day. A one unit increase in the TKZ value will cause CAR[-1,1] to decrease by 1.18%. An increase in the TKZ value means that the target becomes more financially constrained. These results indicate that acquiring a financially unconstrained target has a positive influence on bidders' abnormal returns in the short run. This is because acquiring a financially unconstrained target is a sign of cash inflow to the bidder. This positive signal raises the bidder's stock returns in the short run. Our results also show that a financially constrained acquirer acquiring a financially unconstrained target tends to have a substantially higher market-to-book ratio (4.889) than its target (3.623). A

financially constrained acquirer acquiring a financially unconstrained target uses more stock in means of payment (37.638%) than the average of the full sample (29.593%). This indicates that financially constrained acquirers tend to be overvalued by the market; the purpose of acquiring a financially unconstrained target is to transfer overvalued stock into a solid asset. The relation between bidder abnormal return and financial constraint disparity further proves this implication. Our results show that the financial condition disparity between acquirer and target has a positive and significant impact on acquirer's acquisition performance in the short run but not in the long run. A one unit increase in financial constraint disparity (ATDKZ) leads to 1.79% increase in CAR[-1,1] and 2.3% [-2,2].

On the other hand, acquiring a financially constrained target tends to positively influence an acquirer's abnormal returns in the long run. A one unit increase in TKZ will increase BHAR[0,12], BHAR[0,24] and BHAR[0,36] by 8.95%, 12.13% and 14.52% respectively. This is because a financially constrained target has less bargaining power in a merger deal. The bidder chooses the target rationally as a financially constrained target does not provide any extra cash inflow. The results from the univariable test suggest that financially constrained targets are less leveraged and have a lower market-to-book ratio than the acquirers. Acquiring financially constrained bidders are buying solid asset. Our result suggests that these assets tend to be productive in the long run.

Finally, bidder financial constraint has an insignificant impact on bid premium though the sign of the coefficient indicates a negative relation. Target financial constraint is positively related to bid premium. A one unit increase in the target KZ value results in an 8.77% increase in bid premium. Disparity between acquirer target financial constraints (ATDKZ) is negatively related to bid premium. The results suggest that a financially constrained bidder pays a lower premium when acquiring a financially unconstrained target. A one unit increase in financial constraint disparity (ATDKZ) causes a 9.63% decrease in bid premium.

This study contributes to the M&A literature in many respects. First of all, this study uses one of the most comprehensive samples, which covers the US M&A deals conducted from 1990 to 2009. Secondly, this study sheds new light on the combined effects of acquirer and target financial constraints on acquirer short- and long-run abnormal returns. It provides empirical support to the hubris and cash flow hypotheses. Finally, for the first time in the literature, the sample is sorted on the basis of differences in bidder and target financial condition. We define the financial constraint difference (ATDKZ) as bidders' KZ value minus targets' KZ value. The higher the KZ value, the more financially constrained the firm will be. The value of ATDKZ is positive when a financially constrained bidder is acquiring a financially unconstrained target. Financially constrained bidders acquiring financially constrained targets is categorised as CBRT. Financially constrained bidders acquiring financially unconstrained targets is categorised as UCBPT. Deals conducted by acquirers and targets with similar financial

conditions are categorised as Neutral. This unique design enables us to study where the disparity of acquirer and target financial conditions influences acquisition performance.

The remainder of this paper is organised as follows. In section 2, we provide a comprehensive literature review and construct the main hypothesis. Section 3 shows the data selection procedure, sample description and methodology. Section 4 includes the preliminary results and a robustness test. Furthermore, we outline the proposed thesis chapters and the time-line of the research and submission in section 5. Finally, we conclude this report in section 6.

## **2.2. Literature Review**

In this section, we systematically review previous papers in the literature related to merger gains, financial constraints and other essential factors that affect bidders' returns.

Previous studies suggest that merger gains are generated from different sources. Jensen and Ruback (1983) discuss many controversial issues related to the corporate control market in the 1980s. He points out that the corporate control market creates social and economic benefits because takeovers encourage industrial restructuring and improve firm efficiency. Martin and McConnell (1991) study the disciplinary function of the corporate control market by analysing 253 tender offers from 1958 to 1984.

Their results suggest that the disciplinary function of a corporate takeover is a significant deterrent of non-value-maximizing behaviour conducted by top managers. On the basis of motivation, takeovers can be partitioned into synergy-maximizing takeovers and disciplinary takeovers. Disciplinary takeovers do not require the physical combination of a bidder and a target firm. Rather, to complete a disciplinary takeover, a bidder just needs to remove the top management of a target firm. Thus, Martin and McConnell (1991) define a disciplinary takeover as a takeover where the target top management is removed shortly after deal completion. They find that the pre-acquisition performances of a disciplinary takeover are significantly lower than those of a non-disciplinary takeover. Although there is no significant difference in the returns of disciplinary and non-disciplinary takeovers, 41.9% of target top management is removed within 12 months after deal completion, giving a turnover rate of target top management 32% above the annual average. The results indicate that the top managers of an underperforming target are more likely to be overthrown after deal completion. In this case, the threat of becoming a takeover target encourages top managers to improve their firms' efficiency.

On the other hand, Houston et al. (2001) agree that M&A create value but the source of synergies is cost-saving rather than improvements in efficiency. To identify the sources of synergies, they collect a sample of 64 major bank acquisitions with a minimum deal value of \$400 million from 1985 to 1996. The sample is then regrouped by two managerial projections: cost-saving and revenue enhancing.

Synergies are defined as the positive stock returns received by a combined firm. Houston et al. (2001) document that the main projections of bank mergers in the 1980s were market expansions, whereas bank mergers in the 1990s focused on cost-saving. The different managerial projections generate different merger and acquisition outcomes; the result shows that the abnormal return of deals in the 1990s is significantly positive and higher than the abnormal return of deals in the 1980s. The result also shows that an overlap transaction has a higher abnormal return than a market expansion transition. An overlap transaction is defined as a deal where the bidder and target branches overlap. The higher the magnitude of overlapping, the higher the bidder's merger gains will be. This is because these overlapped branches give the bidder the opportunity of cost-saving. The announcement returns are significantly and positively related to managers' estimated cost savings. Their results also suggest that the motivation of a major bank acquisition is to pursue a synergy created by takeovers rather than empire-building. They also point out that managers are over-optimistic in anticipation of merger gains; bidders only receive 22% of the estimated merger gains on average. They also found the actual cost of a merger to be 24.3% higher on average than the managers had estimated.

By studying a sample of 264 large mergers involving less regulated industrial firms from 1980 to 2004, Devos et al. (2009) simultaneously examine the relative importance of three major synergy sources to merger gains. These are the tax shield, market power and efficiency improvement. The synergies are estimated by the



difference between the present values of the Value Line forecasts of the cash flow of the participants before the takeover and those of combined firms after takeover. Total synergy is divided into operating synergies and financial synergies. Operating synergies are classified as increased operating profit and savings from investment reduction. The result shows that the total synergies are significantly positive with an average of 10.03%. Merger gains are generated from efficiency improvement rather than tax reduction and market power. The result also shows that financial synergies and operating synergies are significant but financial synergies are much smaller than operating synergies. The main sources of operating synergies are cutbacks in investment. Operating synergy, which accounts for 83.53% of the total synergy created, is mainly the result of saving in investment expenditure rather than any improvement in profitability. In addition, this paper also compared the synergy created from focused and diversifying mergers deals, as the sample includes acquirers in 73 industries and targets in 74 industries. The result shows that focused mergers conducted by value bidders can achieve larger synergies than in diversifying deals.

On the other hand, Roll (1986) provides alternative views about aggregated merger gains by introducing their 'hubris hypotheses'. Roll (1986) suggests that the aggregated gains created by mergers are less than or equal to zero as a result of CEO overconfidence and the takeover mechanism. The takeover process could be divided into three steps: acquirer identifying potential target; evaluating target independently with all information available; and executing the deal when the target value is above

the current market price. If there are multiple bidders, the winner of the bid is the one who pays the highest price. Therefore, the winner will face the 'winner's curse'. The price paid is too high and exceeds the true value of the target and the potential growth of the combined firms.

Roll (1986) makes certain assumptions. These include the financial market having strong-form efficiency, whereby asset price is influenced by any information about the firm; products and labour markets are efficient, i.e. any increase in output or reduction in cost cannot create gains; and firm management is operating at maximum efficiency. The hubris hypothesis explains the takeover phenomenon when there are no gains in merger and tender offer. This is because the Market has systematic bias in pricing. Overconfident CEOs also tend to overvalue the target and the potential synergies to be created from a takeover. They therefore tend to overpay for the target and suffer from the "winner's curse" upon deal completion.

Under the assumptions that the bid occurs randomly and others cannot foresee it, there is no other the information about bidding apart from the bidding firm seeking to combine with the target firm. The hubris hypothesis predicts stock price changes for all merger participants around a takeover. Firstly, there will be decreases in the value of combined firms. Secondly, the price of bidding firms will initially decrease on the bidding announcement; information of forfeiting or losing the bid will raise the price. If the bid is successful, the price will eventually decline. Thirdly, for targeting firms,

the price will increase upon the announcement. The price will return to its original level when the bidding is withdrawn and there is no further bidding.

Jensen (1986) introduces the free cash flow hypothesis to explain the reasons why firms with excess cash reserves tend to make value-decreasing takeovers. Free cash flow is the surplus of financial resources after all investment opportunities available are fully funded. Firms with high free cash flow suffer from more serious agency cost than others. This is because shareholders and managers have conflicts of interest on how best to distribute the free cash flow. Shareholders prefer the free cash flow to be distributed as dividends. On the other hand, managers want to retain as much of the free cash flow as possible as managers' power and compensation are directly linked to the amount of financial resources they control. Managers of a firm with high free cash flow are therefore encouraged to spend the excess financial resources to grow the firm beyond the optimal size. As mentioned before, M&A is always one of the optimal choices to achieve rapid growth. However, managers of firms with high free cash flow conduct M&A to spend the cash rather than to maximise synergies. As a result, the top manager of firms with high free cash flow are more likely to conduct value-destroying investment. M&A conducted by managers in the oil industry in the 1980s is consistent with this free cash flow hypothesis. These firms received huge cash inflows as the price of crude oil increased tenfold from 1973 to the end of the decade. This excess financial capacity fuelled the merger and diversification program conducted by top manager of firms in the oil industry in 1980s. The outcome turned out to be

value-destroying, as suggested by the free cash flow hypothesis. Jensen (1986) also suggests that the disciplinary power of debt can substantially reduce the agency cost caused by free cash flow. Issuing debt enables shareholders to strictly monitor managers' performance. Through debt creation, shareholders are authorized to bring the firm into bankruptcy once managers fail to deliver the profit they promised. The managers are also under pressure to repay that debt and any interest it bears on time. As a result, managers in firms with debt tend to be more efficient than others.

By studying 177 tender offers conducted from 1980 to 1986, Smith and Kim (1994) provide empirical evidence to support the free-cash-flow hypothesis. Initially, they categorize bidders into high free cash flow and slack poor bidders by two accounting status: liquidity measured by operating income to total assets ratio ( $i/a$ ), and growth measured by earnings per share to price ratio ( $e/p$ ). Firms with high liquidity and low growth potential are considered as high free cash flow bidders. They are more likely to suffer from overinvestment problems. Firms with low liquidity and high growth potential are defined as slack poor bidders. They are more likely to suffer from underinvestment problems. By investigating the influence of free cash flow and financial slack on announcement abnormal returns, they find that high free cash flow bidders obtain significantly negative announcement abnormal returns (-1.61%), whereas slack poor bidders gain significantly positive announcement abnormal returns (1.69%). The result also suggests that acquiring a target with a high free cash flow leads to higher total returns than acquiring other firms. Slack poor bidders who

acquire targets with high free cash flow achieve the highest returns (16.88%) in all bidder-target pairs. High free cash flow bidders' returns are positively related to debt increases, liquidity reductions and slack poor targets. Slack poor bidders' returns are positively related to debt decreases, liquidity increases and high free cash flow targets. Smith and Kim's (1994) study, however, has two main limitations. Firstly, their sample only covers tender offers. The result may change if other modes of takeover were taken into consideration. Secondly, it is insufficient to measure merger participants' financial conditions with two accounting ratios. Firms' financial condition can be substantially altered by market valuation, the industry in which they operate, and payment of dividends.

In an inefficient market, it is beneficial for managers to maintain an amount of flexible internal finance. This is not only because the cost of external financing is high, but also because investment opportunities may be missed due to the delay while acquiring external financing. However, high cash reserves raise a series of problems in addition to their benefits, such as agency cost and overconfidence. Harford (1999) supports the free cash flow hypothesis (Jensen, 1986) by studying the effect of cash holding on the likelihood of conducting M&A. They initially use a baseline model to identify whether bidders are cash-rich, and then examine whether cash-rich top management are more likely to conduct takeover transactions, and whether these deals made by cash-rich bidders tend to be value-destroying. They find that cash-richness is significantly positively related to the probability of being a bidder; managers with

excess cash holdings are more likely to conduct diversifying deals. Thus cash-richness is found to have a significant but negative impact on bidder announcement returns. Additionally, post-merger long-term abnormal operating performance for cash-rich bidders is significantly negative, but that for cash-poor bidders is not significantly different from zero. In other words, cash-rich companies tend to conduct value-destroying takeovers.

By analysing the investment decisions and personal characteristics of Forbes' 500 CEOs, Malmendier and Tate (2005) reveal to what extent corporate investment distortions result from managerial overconfidence. Overconfident CEOs are overoptimistic about their company's future and their managerial skills; they persistently impose their personal influence on investment decision-making and risk assessment. More technically, Malmendier and Tate (2005) define overconfident CEOs as CEOs who continuously hold the stock after the value drops to 67% of original value, continuously hold the stock five years after option expiry date, and constantly pile up the firm's stock. After analysing a sample including 477 large publicly traded US firms from 1980 to 1994, their findings strongly support the hubris hypothesis. Their evidence shows that there is a strong and positive relation between CEO overconfidence and free cash flow. High cash reserves significantly fuel CEO overconfidence. Overconfident CEOs tend to overestimate investment returns and avoid adopting external funds. As a result, overconfident managers tend to overinvest when they have abundant internal funds but underinvest when they require external

financing. Consequently, deals conducted by overconfident CEOs with high free cash flow are most likely to be value destroying. This finding is consistent with Smith and Kim (1994). To analyse to what extent CEO overconfidence influences M&A decisions, Malmendier and Tate (2008) Malmendier and Tate (2008) extend their original study by dividing the sample into quintiles and find that overconfident CEOs in the most unconstrained quintiles tend to conduct takeover transactions, thereby leading to negative market reactions around the announcement. Nevertheless, in the most constrained quintile, the relationship between CEO overconfidence and the probability of making an acquisition is insignificant.

According to the literature mentioned above, it can be concluded that mergers do create value, except for bidders with overconfident CEOs and high free cash flow. Acquirers and targets' financial condition are essential for acquisition performance. Jensen (1986) introduces the free cash flow hypothesis and suggests that financially unconstrained acquirers, indicated by their higher cash reserves, are more likely to conduct value-destroying deals. Lang et al. (1991) find that high free cash flow leads to negative announcement returns for bidders with a low Tobin's Q ratio in the tender offer. Furthermore, Smith and Kim (1994) documented a negative relationship between high free cash flow and bidders' abnormal announcement returns. Malmendier and Tate (2005) divided the sample into quintiles on the basis of financial constraints and find that high free cash flow fuels CEO overconfidence and leads to value-destroying deals. It is widely accepted that firms with a lack of financial resources cannot act as bidders

in the corporate control market. However, deals conducted by bidders with excessive financial resources tend to be value-destroying. There is a lack of research on how the disparity of bidders' and targets' financial condition influences acquisition performance.

To reveal the relationship between firms' managerial performance and takeover returns, Lang et al. (1989) studied a sample of 87 tender offers conducted from 1968 to 1988. The firms' managerial performance is measured by the Tobin's Q ratio, which is defined as the firm's market value over the replacement cost. A high Tobin's Q ratio indicates good managerial performance. For the full sample, they find that the targets are poorly managed; they have a Tobin's Q ratio below one. Well-managed bidders (high Q bidders) can achieve positive gains from tender offers. These gains will be substantially higher if the target is poorly managed (low Q ratio) because low Q bidders have great improvement potential. On the other hand, a high Q target benefits less from a tender offer by a low Q bidder.

Servaes (1991) expands and reinforces Lang et al. (1989)'s research by using a sample including 704 complete takeovers between 1972 and 1987. The results show that Lang et al. (1989) findings are robust when takeover and other control variables are taken into consideration. Servaes (1991) categorises the sample into different subsamples on the basis of deal attitude, means of payment and multiple bidders, estimates the abnormal return in each subsample, and uses industrial average Tobin's Q ratios to



define good and poor managerial performance. A low Q indicates that the firm is poorly managed; a high Q indicates that the firm is well managed. The result shows that a low Q target acquired by low Q bidders gain a 32.7% abnormal return – 17% higher than that of a high Q target acquired by a low Q bidder. The bidder has a 6.36% increase in abnormal returns if its Q ratio is high. Bidders obtain an additional 4.44% increase if the target has a low Q ratio. This finding indicates that well-managed firms gain more when taking over a poorly managed target. In addition, for the control variables, using cash instead of stock in a takeover increases bidder abnormal returns by 11%. A hostile takeover decreases the abnormal return by 8%.

In contrast, by studying a sample of 3,169 mergers and 348 tender offers announced and completed between January 1980 and December 1991, Rau and Vermaelen (1998) examine to what extent bidder pre-merger stock performance, means of payment and merger type can influence bidder abnormal return. They rank each bidder as ‘glamour’, ‘neutral’ or ‘value’ bidder on the basis of their market-to-book ratio. The results show the post-merger long-run performance of glamour (high market-to-book) and value (low market-to-book) bidders and find that glamour bidders underperform in the long run. They explain the result as past good performance rendering managers overconfident, which in turn make the market to overestimate bidders’ capacities. Glamour bidders in mergers significantly underperform other glamour firms in the 36 months following the acquisition, earning negative bias-adjusted abnormal returns of -17% on average in our unrestricted sample. Glamour bidders in tender offers earn

statistically insignificant bias-adjusted abnormal returns of 4% in the three years after the acquisition. However, value acquirers outperform other firms with a similar size and book-to-market ratio by earning statistically significant positive bias-adjusted abnormal returns of 15.5% for tender offers and 7.64% for mergers. Glamour firms underperformed regardless of the payment method. Additionally, Dong et al. (2006) use market-to-book and market-to-residual income value as their measures of market valuation to examine both the Tobin's Q and misvaluation hypotheses. They find that highly valued bidders generally gain lower announcement returns.

There are many factors could potentially influence takeover outcome; these must therefore be controlled for in our research. Morck et al. (1990) use stock price runup as the measure of bidder pre-deal performance and find that bidder runup is positively related to bidder announcement returns. In contrast, Rosen (2006) finds that bidder runup is negatively related to both short-run and long-run abnormal returns for bidders. Maloney, McCormick and Mitchell (1993) investigate the relationship between capital structure and M&A returns. They find that bidders with higher leverage gain higher announcement returns and argue that debt helps to alleviate the agency problem and therefore improve the quality of M&A decision-making. Kohers & Kohers (2001) analyse takeovers of high-tech firms and find a positive relationship between ROE and long-run abnormal returns to bidders. In addition, Travlos (1987) highlights the signalling effect caused by the usage of stock as payment in M&As. He shows that bidders that completed their deal with stock payments faced substantially lower

announcement returns than others because stock payment signals overvaluation of the bidders' share. Loughran and Vijh (1997) estimate how bidders' post-acquisition return is affected by the means of payment, via analysing 947 completed deals from 1970 to 1989. They found that mergers paid for in stock led to 25% reductions in bidders' abnormal returns within five years of the deal completion, whereas tender offers completed in cash lead to a 67% increase. Furthermore, Moeller et al. (2004) emphasises the size effect in M&As; they suggest that announcement returns for smaller bidders are 2% less than those of bidders of average size. This finding holds constant after controlling for firms and deals characteristics.

Other deal-specific factors including diversification, and deal attitude have also been found that could alter deal outcome. Morck et al. (1990) suggested that bidders receive a lower abnormal return if they conduct diversifying deals. Villalonga (2004) applies data selected from the Business Information Tracking Series (BITS) to study what actually happens to firms that diversify away from their original business area. BITS define an establishment as 'a single physical location where business is conducted or where services or industrial operations are performed' However, it can be argued that Villalonga (2004) studied diversification without specifying diversification achieved through M&A. Servaes (1991) documented that hostile takeovers lead to an 8% reduction in bidders' gains. However, Schwert (2000) points out that hostile takeovers are used by a bidder or target's management to maximize transaction gains, and there is no significant evidence of a relationship between hostility and bidders' abnormal

returns.

Previous studies offer many approaches to estimate firms' financial constraints. In this section, we review investment–cash flow sensitivities (Fazzari et al., 1988), the KZ index (Kaplan and Zingales, 1997) and the WW index (Whited and Wu, 2006). Fazzari et al. (1988) estimate firms' financial constraints by categorizing firms based on their investment–cash flow sensitivities. A firm is considered as being financially constrained if it seeks external financial resource at a high cost of capital. Kaplan and Zingales (1997) pointed out the limitations of using investment–cash flow sensitivity to measure financial constraint. Instead, they introduced the KZ index. The KZ index is an estimation function which weighs firms' cash reserve to capital ratio, free cash flow to capital ratio, Tobin's Q, leverage to capital ratio and dividends to capital ratio. By studying a sample of 49 low-dividend firms from 1970 to 1984, Kaplan and Zingales' (1997) results show that relatively unconstrained firms exhibit higher investment-cash flow sensitivity than others. Whited and Wu (2006) argue that the estimation of financial constraints should take external factors into consideration, such as firm size and sales growth at both the firm and industry level. In this study, we use the KZ index as a measurement of financial constraint. This is not only because the KZ index is more focused on firms' accounting conditions but also because it is one of the most commonly used financial constraint measurements in the field of M&A research. The KZ index is used as a financial condition measurement, following in Lamont, Polk and Sa'a-Requejo (2001), Baker, Stein and Wurgler (2003), Malmendier and Tate (2005)

and Malmendier and Tate (2008).

Many studies focus on the factors that influence bidders return. However, these do not analyse how the financial condition of the acquirer and target will affect their acquisition performance. In addition, previous studies analyse bidders' returns in the short and long run separately, and do not analyse to what extent the disparity of acquirer and target financial condition influences acquisition performance.

### **2.3. Hypothesis Construction**

According to the literature reviewed above, firms with high free cash flow are more likely to conduct value-destroying takeovers. In contrast, financially constrained firms tend to make acquisition decisions elaborately, thereby achieving synergies. In this case, we construct the following hypotheses:

*H1a: Financially constrained bidders are more likely to obtain better short-term acquisition performance than unconstrained bidders.*

*H1b: Financially constrained bidders are more likely to obtain better long-term acquisition performance than unconstrained bidders.*

As stated in the previous literature, acquiring financially constrained targets gives a negative signal to the market. This is because bidder needs extra investment to boost target performance. However, financially constrained targets tend to be undervalued

firms with high growth potential. It takes time to fully realise its true value. We therefore construct the following hypotheses:

*H2a: Acquiring financially constrained target has negative effect on bidders' merger and acquisition performance in the short run.*

*H2b: Acquiring financially constrained target has positive effect on bidders' merger and acquisition performance in the long run.*

We define the difference between bidder and target financial constraint as the difference between bidders' and targets' KZ value. According to the cash flow hypothesis, negative abnormal returns are created when financially unconstrained bidders acquire financially constrained targets. A positive abnormal return is created when a financially constrained bidder acquires a financially unconstrained target. Therefore the greater the difference in financial constraint, the greater its influence on bidders' abnormal return will be. Based on the analyses and predictions above, we construct the following hypotheses:

*H3a: The difference between bidder and target financial constraint is positively related to bidders' abnormal return in the short run.*

*H3b: The difference between bidder and target financial constraint is positive related to bidders' abnormal return in the long run.*

Finally, bid premium is defined as the difference between the deal price and the target

stock price four weeks prior to the announcement day divided by the target stock price four weeks prior to announcement day. Bid premium measures how much the bidder has paid to complete the deal. Previous literature suggests that financially constrained bidders are less likely to suffer from overconfidence and conduct the deal carefully. As a result, financially constrained bidders tend to pay lower premiums than financially unconstrained bidders. Furthermore, an acquirer will pay a lower premium when acquiring a financially constrained target. This is because acquirers try to acquire financially constrained targets for the considerable growth potential that target may have, especially a target holding patents. These targets lack the financial resources to achieve further growth. In this case, a financially constrained target has less bargaining power than the acquirer. Finally, the disparity of bidder and target financial constraints may have a significant impact on the premium offered in M&A. For example, the more financially constrained a bidder is, the lower the premium it will pay. Financially unconstrained bidders, on the other hand, tend to overpay the target due to their overconfidence. Based on the analyses and predictions above, we construct the following hypotheses:

*H4a: Acquirer's financial constraint is negatively related to bid premium*

*H4b: Target's financial constraint is positively related to bid premium*

*H4c: Financial constraint disparity is negatively related to bid premium.*

## **2.4. Data and Methodology**

### **2.4.1 Sample Selection**

We use a sample of US merger and acquisition deals announced over the period 1 January 1990 to 31 December 2009 from Thomson One Banker. Both bidders and targets are US firms; the original sample includes 178,839 deals. Bidders are required to be public and targets are required to be public, private, or subsidiaries. Using these criteria gives us a sample of 97,343 deals. Takeover transaction values are required to be greater than or equal to \$1 million, yielding a sample of 53,646 deals. Because we study short- and long-run bidders' acquisition performance, all deals should be completed, which reduces the sample to 35,263 deals. Following the standard procedure, we exclude financial and utility firms with Standard Industrial Classification codes 6000–6999 and 4900–4999; these firms are in regulated industries. This leaves us with a sample of 25,099 deals. We also remove deals completed with the following merger and acquisition techniques: bankruptcy acquisitions, going-private transactions, leveraged buyouts, liquidations, repurchases, restructurings, reverse takeovers and privatizations. This produces a sample of 22,701 deals. To control for deal characteristics, we require that deal information, such as deal attitude, deal type and means of payment, be recorded by Thomson One Banker, yielding 14,195 deals. We use cumulative abnormal return and buy and hold abnormal returns to measure short-run and long-run acquisition performance respectively. The Center for Research in Security Prices (CRSP) database should have sufficient records about a bidder's stock price data, which reduces the sample to 7,682 deals. We require



bidder to have sufficient accounting information recorded by the Compustat database so that we can estimate firm characteristics, such as market-to-book ratio, price-to-earnings ratio and KZ index, leaving a sample of 5,150 observations. Since we analyse to what extent financial constraint can influence merger and acquisition performance, target financial information is also required, yielding a sample of 1,633 deals. Due to the small economic meaning, we remove 11 non-public listed targets, giving a final sample of 1,622 deals.

## **2.4.2 Methodology**

### *2.4.2.1 Univariate Test*

Both a univariate test and multivariate regression model are employed to analyse the impact of financial constraints on bidder's abnormal returns in the short and long run. We categorise the sample into three groups on the basis of financial constraint difference. The financial constraint difference (ATDKZ) is defined as bidder's KZ value minus target's KZ value. As mentioned before, the higher the KZ value, the more financially constrained the firm is. The value of ATDKZ is positive when a financially constrained bidder is acquiring a financially unconstrained target. We categorise the deals into three groups based on the difference in bidder and target KZ value difference. The highest third of deals ranked by ATDKZ, where ATDKZ is greater than 0.22, are the group of constrained bidders acquiring rich targets (CBRT). The lowest third of deals, where ATDKZ is lower than -2.02, is categorised as unconstrained bidders acquiring poor targets (UCBPT). The middle third of deals is classified as the neutral group.

In the univariate test, we compare the mean of the short-term and long-term abnormal returns obtained by each deal group. We use a different approach to estimate the abnormal return in the short run and long run. For the short run, we choose time windows of 3, 5 and 11 days to calculate CARS. CARS in each time window are estimated by the market model, market-adjusted model, Fama-French model and Carhart (1997) four-factor model separately. For the long run, we use market model and the size-adjusted model estimate BHAR. As mentioned before, we use two approaches to estimate size-adjusted BHAR. We also compare bidder and target firm characteristics. Run-up measures the pre-acquisition stock performance, defined as cumulative abnormal returns (CARs) to bidders over the window [-365, -6] before the acquisition announcement day. The returns are calculated based on the market-adjusted model. The market-adjusted model employs the CRSP value-weighted index and its parameters are estimated over 255 days, ending 366 days prior to the acquisition announcement.

The return on equity (ROE) ratio measures the bidder's profitability, and is defined as net income divided by common and preferred equity – COMPUSTAT Item18/(Item10+Item11); M/B, the market to book ratio, measures the market valuation of bidder's stock, and is defined as the annual closing price multiplied by the common shares outstanding and divided by the total common equity – COMPUSTAT Item24\*Item25/Item60; P/E, the price to earnings ratio, measures net income per share,

and is defined as the annual closing price divided by the earnings per share – COMPUSTAT Item24/Item58; cash flow/total assets, which is a ratio of cash flow over equity, measures the amount of free cash being held by a company, and is defined as the sum of a company's income before extraordinary items and depreciation minus dividends of common and preferred stock then divided by the total assets – COMPUSTAT(Item18+ Item14- Item19- Item21)/(Item6); debt/total asset, the debt over asset ratio, measures to what extent a company is leveraged, and is defined as long-term debt divided by total assets – COMPUSTAT Item9/Item6. We also include a leverage ratio, defined as COMPUSTAT (Item 9+Item34)/(Item 9+Item34+Item216), and both bidder and target KZ value.

For each group, we compare the deal-specified characteristics. Experience Bidder measures bidders who have conducted M&A in the past five years; Relative Transaction Value measures the relative size of the deal; Stock denote the percentage of deals completed with stock; and cash, which measures the percentage of deals completed with cash. Hostile measures the deal attitude, and Competing bid measures the percentage of deals involved multiple bidders. Diversification whether the bidder and the target share the same first two digits of primary SIC code. Tender offer measures deal type. For market environment, We use Yung et al. (2008)'s approach to estimate the market heat degree. We also use Bouwman et al. (2009) approach to measure the market valuation level.

#### *2.4.2.2 Multivariable Test*

Univariate tests are insufficient to reveal the true relationship between financial constraints and abnormal returns. It does not estimate the interactive relationship among firm characteristics, deal characteristics and market environment. Therefore, we use following multivariable regression model:

$$\begin{aligned}
 CAR_{it} = & \alpha_0 + \alpha_1 AKZ_{it} + \alpha_2 Runup + \alpha_3 Experienced Bidder + \alpha_4 Relative Transaction Value \\
 & + \alpha_5 Stock + \alpha_6 Hostile + \alpha_7 Competing Bid \\
 & + \alpha_8 Tender + \alpha_9 Diversification + \alpha_{10} Heat Degree + \alpha_{11} High + \alpha_{12} Low \\
 & + \varepsilon_{it}
 \end{aligned}$$

Regression model 1

$$\begin{aligned}
 CAR_{it} = & \alpha_0 + \alpha_1 TKZ_{it} + \alpha_2 Runup + \alpha_3 Experienced Bidder + \alpha_4 Relative Transaction Value \\
 & + \alpha_5 Stock + \alpha_6 Hostile + \alpha_7 Competing Bid \\
 & + \alpha_8 Tender + \alpha_9 Diversification + \alpha_{10} Heat Degree + \alpha_{11} High + \alpha_{12} Low \\
 & + \varepsilon_{it}
 \end{aligned}$$

Regression model 2

$$\begin{aligned}
 CAR_{it} = & \alpha_0 + \alpha_1 AKDKZ_{it} + \alpha_2 Runup + \alpha_3 Experienced Bidder \\
 & + \alpha_4 Relative Transaction Value + \alpha_5 Stock + \alpha_6 Hostile + \alpha_7 Competing Bid \\
 & + \alpha_8 Tender + \alpha_9 Diversification + \alpha_{10} Heat Degree + \alpha_{11} High + \alpha_{12} Low + \varepsilon_{it}
 \end{aligned}$$

Regression model 3

Regression models 1 to 3 measure the relationship between financial constraints and abnormal returns. Regression model 1 analyses the relationship between acquirers'

financial constraints and acquirers' abnormal returns. The key explanatory variable is acquirers' financial constraints ( $AKZ_{it}$ ) measured by the KZ index. Regression model 2 analyses the relationship between targets' financial constraints and acquirers' abnormal returns. The key explanatory variable is the target's financial constraints ( $TKZ_{it}$ ) measured by the KZ index. Regression model 3 analyses the relationship between financial constraint disparity and acquirers' abnormal returns. The key explanatory variable is the financial constraint difference ( $ATDKZ_{it}$ ), which is defined as the bidders' KZ value minus the targets' KZ value. As mentioned before, the higher the KZ value, the more financially constrained the firm will be. The value of  $ATDKZ$  is positive when a financially constrained bidder is acquiring a financially unconstrained target.

Previous literature suggests that firms characteristics, such as, Market to book, Leverage, Price to equity, and free cash flow to equity, affect M&A outcomes. However, these variables are used in the calculation of the KZ Value. Since the KZ value is an independent variable in the regression model, to avoid endogeneity, the control variables in the firm characteristics are RUNUP ratio and experienced bidder.

For deal characteristics, we use Relative Transaction Value to control deal size; Dummy variable Stock mark the means of payment; Hostile capture the deal attitude, Competing Bid highlight the deal which has more than one bidders. Tender offers present deal type. Diversification defines the deal that bidder and target oriented in the different industry. To control market environment, we estimate the market Heat

Degree and stock market valuation. Market Heat Degree controls the clustering effect of M&A deals. The stock market valuation is categorised by the dummy variables High and Low.

In order to analyse the impact of financial constraints on bidder's return in the long run, we rerun the regressions by replacing bidders' CAR with bidder's BHAR as a dependent variable. We use regression models 4, 5 and 6 shown below:

$$\begin{aligned}
 BHAR_{it} = & \alpha_0 + \alpha_1 AKZ_{it} + \alpha_2 Runup + \alpha_3 Experienced Bidder \\
 & + \alpha_4 Relative Transaction Value + \alpha_5 Stock + \alpha_6 Hostile \\
 & + \alpha_7 Competing Bid \\
 & + \alpha_8 Tender + \alpha_9 Diversification + \alpha_{10} Heat Degree + \alpha_{11} High + \alpha_{12} Low \\
 & + \varepsilon_{it}
 \end{aligned}$$

Regression model 4

$$\begin{aligned}
 BHAR_{it} = & \alpha_0 + \alpha_1 TKZ_{it} + \alpha_2 Runup + \alpha_3 Experienced Bidder \\
 & + \alpha_4 Relative Transaction Value + \alpha_5 Stock + \alpha_6 Hostile \\
 & + \alpha_7 Competing Bid \\
 & + \alpha_8 Tender + \alpha_9 Diversification + \alpha_{10} Heat Degree + \alpha_{11} High + \alpha_{12} Low \\
 & + \varepsilon_{it}
 \end{aligned}$$

Regression model 5

$$\begin{aligned}
BHAR_{it} = & \alpha_0 + \alpha_1 ATDKZ_{it} + \alpha_2 Runup + \alpha_3 Experienced Bidder \\
& + \alpha_4 Relative Transaction Value + \alpha_5 Stock + \alpha_6 Hostile \\
& + \alpha_7 Competing Bid \\
& + \alpha_8 Tender + \alpha_9 Diversification + \alpha_{10} Heat Degree + \alpha_{11} High + \alpha_{12} Low \\
& + \varepsilon_{it}
\end{aligned}$$

#### Regression model 6

The dependent variables of the buy and hold ratio (BHAR) measures bidders' abnormal returns in the long run. We have estimated three BHARs with the event window [0, 12], [0,24], [0,36], which measure bidders' abnormal returns in the first 12, 24 and 36 months after the month of announcement. We also include the same variable in regressions 1, 2, 3 to control for firm, deal, and market environment.

To examine the impact of bidder and target financial constraints and financial constraint disparity on bid premium, we run the regressions with bid premium as dependent variable.

$$\begin{aligned}
Premium_{it} = & \alpha_0 + \alpha_1 AKZ_{it} + \alpha_2 Runup + \alpha_3 Experienced Bidder \\
& + \alpha_4 Relative Transaction Value + \alpha_5 Stock + \alpha_6 Hostile \\
& + \alpha_7 Competing Bid \\
& + \alpha_8 Tender + \alpha_9 Diversification + \alpha_{10} Heat Degree + \alpha_{11} High + \alpha_{12} Low \\
& + \varepsilon_{it}
\end{aligned}$$

#### Regression model 7

$$\begin{aligned}
Premium_{it} = & \alpha_0 + \alpha_1 TKZ_{it} + \alpha_2 Runup + \alpha_3 Experienced Bidder \\
& + \alpha_4 Relative Transaction Value + \alpha_5 Stock + \alpha_6 Hostile \\
& + \alpha_7 Competing Bid \\
& + \alpha_8 Tender + \alpha_9 Diversification + \alpha_{10} Heat Degree + \alpha_{11} High + \alpha_{12} Low \\
& + \varepsilon_{it}
\end{aligned}$$

Regression model 8

$$\begin{aligned}
Premium_{it} = & \alpha_0 + \alpha_1 ATDKZ_{it} + \alpha_2 Runup + \alpha_3 Experienced Bidder \\
& + \alpha_4 Relative Transaction Value + \alpha_5 Stock + \alpha_6 Hostile \\
& + \alpha_7 Competing Bid \\
& + \alpha_8 Tender + \alpha_9 Diversification + \alpha_{10} Heat Degree + \alpha_{11} High + \alpha_{12} Low \\
& + \varepsilon_{it}
\end{aligned}$$

Regression model

#### 2.4.2.3 Measures of financial constraint

This paper uses the Kaplan–Zingales (KZ) index to measure financial constraint. Using a sample of 49 low-dividend firms from 1970 to 1984, Kaplan and Zingales (1997) introduced a comprehensive approach to measure firms' financial constraints. By analysing annual reports and management discussions, they identify constrained and unconstrained firms.

Further, they reveal that firm characteristics such as ratio of cash flow to capital, Tobin's Q, leverage, ratio of dividends to capital, and ratio of cash to capital are essential to financing constraints. They use these firm characteristics to estimate an



ordered logit regression. The KZ index is formulated by using the parameters of the regression, thereby measuring a firm's level of financial constraint (Lamont et al., 2001). A firm with a high KZ index indicates that the firm has a lower cash flow and dividends and higher debt compared with a low KZ firm; therefore, firms with a high KZ index are more financially constrained.

Following the aforementioned research, we calculate the KZ index using the following formula:

$$KZ_{it} = -1.001909 \times \frac{CF_{it}}{K_{it-1}} + 0.2826389 \times Q_{it} + 3.139193 \times Leverage_{it} \\ - 39.3678 \times \frac{Dividend_{it}}{K_{it-1}} - 1.314759 \times \frac{C_{it}}{K_{it-1}}$$

where  $CF_{it}/K_{it-1}$  is cash flow (Compustat item18+14) over lagged capital (Compustat item8),  $Q_{it}$  is Tobin's Q ratio (Compustat item (6+24×25-60-74)/6),  $Leverage_{it}$  is the leverage ratio (Compustat item (142+34)/(142+34+144));  $Dividend_{it}/K_{it-1}$  is dividends (Compustat item 21+19) over lagged capital (Compustat item 141), and  $C_{it}/K_{it-1}$  is cash (Compustat item 1) over lagged capital (Compustat item 141).

#### 2.4.2.4 Measure of short-term performance

We use cumulative abnormal returns (CAR) to measure bidder's short-term M&A performance. The market model defines cumulative abnormal return 2 days surrounding announcement day as:

$$CAR_{i,-2,2} = \sum_{t=-2}^2 [R_{it} - (\alpha_i + \beta_i R_{mt})]$$

Where  $R_{it}$  represent firms' daily return;  $R_{mt}$  represent daily market index return.  $(\alpha_i + \beta_i R_{mt})$  is the market return estimated by market model. Therefore, the Cumulative abnormal return (CAR) is the sum of bidder's daily abnormal return during the event window two days before and two days after the announcement day.

Bouwman et al. (2009) point out that bidders may conduct multiple deals within the sample period. To address this issue, we estimate the market-adjusted CAR. The market-adjusted CAR 2 days surrounding announcement day is defined as the sum of daily abnormal return within the event window [-2,2];

$$CAR_{i,-2,2} = \sum_{t=-2}^2 AR_{it}$$

$$AR_{it} = R_{it} - R_{mt}$$

Where  $AR_{it}$  is the daily abnormal return that is defined as firm's daily return minus value-weighted daily market return.

#### *2.4.2.5 Measure of long-term performance*

Bidders' acquisition performance in the long run is measured by buy-and-hold abnormal return (BHAR). Initially, we use the market adjust model to estimate bidder's buy-and-hold abnormal return (BHAR). But, Barber and Lyon (1997) and Lyon, Barber, and Tsai (1999) suggest that market adjusted BHAR has many biases, such as rebalancing bias, new-listing bias, and skewness bias. Moreover, Lyon, Barber, and Tsai (1999) and Bouwman, Fuller, and Nain (2009) believe that size-adjusted

BHAR is a more reliable indicator for bidder's long-term M&A performance. To address this issue, we estimate both Markets adjusted and Size adjusted buy-and-hold abnormal return (BHAR). Market adjusted Buy-and-hold abnormal return 36 month after deal announcement is defined as:

$$BHAR_{j,0,36} = \prod_{t=0}^{36} (1 + R_{jt}) - \prod_{t=0}^{36} (1 + R_{mt})$$

Where  $R_{jt}$  denotes firm's monthly stock return starting from the month of deal announcement.  $R_{mt}$  denotes the monthly value-weighted monthly return.

On the other hand, we use the function below to estimate Size-adjusted BHAR 36 months after deal announcement:

$$BHAR_{j,0,36} = \prod_{t=0}^{36} (1 + R_{jt}) - \prod_{t=0}^{36} (1 + R_{pt})$$

$R_{jt}$  denotes firm's monthly stock return starting from the month of deal announcement.  $R_{pt}$  denotes the return of size adjusted reference portfolio. To build the size-adjusted portfolio, all CRSP firms are sorted in descending order and separated into 10 groups by market capitalisation. Then, we sort each group by Market to book ratio and split each group into quintiles. Finally, we have 50 size adjusted reference portfolios. The portfolio return is shown below,

$$R_{pt} = \frac{1}{N} \sum_{j=1}^N R_{kt}$$

$R_{kt}$  denotes firm  $K$ 's monthly stock return.  $N$  denotes the number of firms in the reference portfolio to which firm  $K$  belongs. Therefore, the portfolio return  $R_{pt}$ , is the average return of all firms in the portfolio excluding firm  $K$ .

## 2.5 Results and Discussion

### 2.5.1 Summary Statistics

Table 1 shows summary statistics of bidders' abnormal returns in both the long and short run for the full sample and three subsamples, namely, CBRT, Neutral and UCBPT.

[Insert Table 2.1 here]

Panel A shows bidders' abnormal returns in the short run. To accurately calculate acquirers' cumulative abnormal returns, we use four different methods: the market model, market-adjusted model, Fama-French model and Carhart(1997) four-factor model. For the full sample, acquirers have positive abnormal returns in the short run. The highest cumulative abnormal return appears on the five days surrounding the announcement day – 1.069% for CAR[-5,5] estimated by the market-adjusted model. This is contributed by deals in the neutral group, which gain positive CARs. Deals in other groups have negative CARs in all event windows. The highest CARs appear in the neutral deal at 3.016%, 3.055%, 3.225% for CAR[-1,1], CAR[-2,2] and CAR[-5,5] respectively.

Panel A also shows the differences in acquirer announcement abnormal returns between deals completed by bidders in CBRT and bidders in neutral. Constrained acquirers acquiring rich targets (CBRT) receive significantly lower short-term returns than acquirers that acquire targets with similar financial constraints (NEUTRAL). The CAR[-2,2] difference shows that acquirers in the CBRT group underperform acquirers

in the neutral group by 4.028% ( $p = 0.000$ ). This result can be mainly attributed to the good performance of neutral acquirers and the bad performance of constrained acquirers. Specifically, constrained acquirers acquiring rich targets lead to a -0.974% cumulative abnormal return two days surrounding announcement day. Acquirers in the neutral group have 3.55% cumulative abnormal returns two days surrounding the announcement day. The results is robust in all three estimate methods.

Panel B shows the long-term performance (BHAR) for different estimate methods. We use the market-adjusted model and size-adjusted model to calculate buy and hold ratios in three different event windows (BHAR[0,12], BHAR[0,24], BHAR[0,36]). The figure suggests that bidders receive negative abnormal returns in the long run. The longer the time away from the month of announcement, the lower the BHAR will be. The lowest BHAR appears in month 36 after the month of announcement (-27.742% for BHAR[0,36]). Constrained acquirers acquiring rich targets (CBRT) receive significantly lower long-term returns than acquirers that acquire targets with similar financial constraints (NEUTRAL).

For BHAR estimated by the size-adjusted model, BHAR[0,36] for acquirers in the neutral group is -13.38%, compared with -36.049% for constrained acquirers acquiring rich targets (CBRT). Acquirers in neutral significantly outperform acquires in CBRT by 8.172% ( $p = 0.004$ ) 12 months after the month of announcement, 18.623% 24 months after the month of announcement ( $p = 0.000$ ) and 22.670% ( $p=0.000$ ) 36 months after

the month of announcement. The negative sign in front of a BHAR indicates that the bidder's abnormal return in the long run is negative. However, acquirers in neutral have less negative BHAR than acquirers in CBRT. Table 1 suggests that a constrained bidder acquiring a rich target tends to be value-destroying. A bidder acquiring a target with similar financial conditions is value-enhancing.

Table 2 presents statistics for firm characteristics for the full sample and three subsamples, namely, CBRT, Neutral and UCBPT.

[Insert Table 2.2 Here]

The average KZ value for acquirers is -9.686 over the sample period (1990–2009) and the average of the KZ value for all of the US firm–years is -7.7109. This result proves that acquirers are more unconstrained than other firms. There is no significant difference between the KZ value of bidders in CBRT and KZ value of bidders in neutral. This result indicates that the significant difference in acquirers' abnormal returns can be caused by target characteristics, such as target financial condition.

Furthermore, compared with acquirers in the Neutral group, constrained acquirers acquiring rich targets (CBRT) have a significantly higher market-to-book ratio and RUNUP ratio. This result suggests that bidders in CBRT have a higher market valuation and better stock performance. This result indicates that constrained acquirers will take the opportunity of high market valuation to acquire financially unconstrained targets. It

also indicate that bidders with high market-to-book ratio underperform bidders with low market-to-book ratio in the long run (Rau and Vermaelen, 1998). They explain the results as past good performance rendering managers overconfident and making the market overestimate bidders' capacities. Bidders in the CBRT group also have a significantly lower return-to-asset ratio (ROA) and lower cash flow to asset ratio (CF/TA) than bidders in neutral. A target firm's characteristics show that the target in the CBRT group tends to be undervalued by the market and has less debt than others. This is because targets in the CBRT group have a lower market-to-book ratio than targets in the neutral group. Although the difference is insignificant, the result indicates that targets in the CBRT group have the lowest market valuation in all of the samples. Targets in the CBRT group are also less leveraged than those in the neutral group. The debt to asset ratio of targets in the CBRT group averages 9.5% compared with 21.6% in neutral. The respective leverage ratios of the two groups are 12.1% compared with 35.9%.

Table 3 presents statistics for deal characteristics for the full sample and three subsamples, namely, CBRT, Neutral and UCBPT.

[Insert Table 2.3 here]

Acquirers in the CBRT group have more merger and acquisition experience than acquirers in neutral. Some 75.83% of acquirers in CBRT have previously conducted M&A deals compared to 70.795% of acquirers in Neutral. Acquirers in the CBRT group

tend to use more stock as their means of payment than acquirers in Neutral. Some 37.638% of deals in CBRT are completed using stock as the means of payment. Only 16.266% of deals in neutral are paid using stock. Some 57.116% of deals completed by acquirers in neutral are paid with cash. This result is associated with acquirers in CBRT having a higher market-to-book ratio than acquirers in neutral. In addition, deals completed by acquirers in CBRT tend to not to be tender offers, and are often more diversifying. For the market environment, we did not detect significant differences in terms of M&A heat degree or a high/low market.

Overall, constrained acquirers acquiring rich targets tend to be value-destroying; they have the lowest return in both the long and short run. This is because constrained bidders tend to buy solid assets with their overvalued stock. The figures in Table 1 show that constrained acquirers in CBRT have the highest market valuation. The market-to-book ratio of constrained bidders acquiring rich targets is significantly higher than that of bidders in the others group. This is consistent with Rau and Vermaelen (1998). They separated bidders into glamor and value bidders on the basis of their market-to-book ratio. By examining bidders' post-merger long-run performance, they highlight that bidders with a high market-to-book ratio (glamour bidders) underperform bidders with a low market-to-book ratio in the long run. They explain as past good performance rendering managers overconfident and making the market overestimate bidders' capacities. Constrained acquirers in CBRT also tend to use stock more as the means of payment for deals. This is another reason why constrained



acquirers have lower abnormal returns than others. Travlos (1987) highlights the signalling effect caused by the usage of stock as a means of payment in M&As. He shows that bidders that complete deals using stock payments face substantially lower announcement returns than others because paying in stock signals an overvaluation of the bidder's share. On the other hand, targets in the CBRT group tend to be less leveraged. The lower leverage ratio indicates that the target in CBRT is more likely to be a solid asset. In addition, the KZ values of bidders in CBRT are not significantly different from the KZ value of bidders in neutral. This result indicates that target financial conditions are essential for bidders' abnormal returns in both the long and short run.

Furthermore, unconstrained acquirers acquiring poor targets also generate negative abnormal returns in both the long and short run. This is because, as suggested by the cash flow and hubris hypotheses, unconstrained bidders tends to suffer from overconfidence and conduct value-destroying deal. Smith and Kim (1994) examine the influence of free cash flow and financial slack on announcement abnormal returns. Their study shows that high free cash flow bidders obtain significantly negative announcement abnormal returns, whereas slack poor bidders gain significantly positive announcement abnormal returns. The returns to bidders are highest in the acquisition of high free cash flow targets by slack poor bidders. Malmendier and Tate (2008) divide the sample into quintiles and find that overconfident CEOs in the most unconstrained quintiles tend to conduct takeover transactions, thereby leading to negative market

reaction around announcement. Nevertheless, constrained bidders are less likely to have CEO overconfidence and the probability of making an acquisition is insignificant.

All of these results suggest that constrained bidders may gain in merger and acquisition deals if they choose a target with similar financial constraints. Although a constrained bidder can take the opportunity of market overvaluation to pursue a less leveraged target, they will receive significant losses in both the long and short run.

### **2.5.2 Regression Results**

Due to the limitations of univariable tests, the results may be unreliable. Therefore, we carry out multivariate regressions. Initially, we examine the relation between acquirer financial constraint and abnormal returns in both the long and short run. Then we analyse how target financial constraint is related to bidders' short- and long-term abnormal returns. Finally, we estimate to what extent the difference in acquirer and target financial constraints can influence bidders' gains from mergers.

#### **Acquirer financial constraint and abnormal returns in the short run**

Table 4 presents the estimation results of regression model 1. Regressions 1 to 3 estimate the impact of acquirer financial constraints on acquirer cumulative abnormal returns in 3, 5 and 11-day event windows respectively. All of the CARs are estimated using the market-adjusted model.

[Insert Table 2.4 here]

The key independent variable in regressions 1 to 3 is AKZ value, which measures bidders' financial constraint. The results show that, for the regression of acquirer financial constraint and acquirer CARs [-2,2], the coefficient of acquirers' KZ value (AKZ) is significantly positive. A one-unit increase in AKZ will increase bidders' CAR[-2,2] by 2.08%. The results indicate that a more constrained acquirer will achieve higher abnormal returns. However, the significant value only appears on CARs[-2,2], which indicates that merger gains in the short run are heavily influenced by arbitrage. The deals conducted by constrained bidders tend to be value-enhancing opportunities for all investor. Experienced bidders, relative size, stock payment, hostile deal and diversification are significantly negative, while tender offer is significantly positive. These results suggest that a bidder tends to receive positive abnormal returns in the short run when it is financially constrained, when the deal has a smaller relative transaction value, when they use cash rather than stock as a means of payment, and when they make a tender offer and avoid diversification or hostile deals.

The results in Table 4 suggest that an acquirer's financial constraint is a determinant of achieving positive abnormal returns in the short run. Stock and relative size are significantly negative. In addition, the coefficients of stocks and relative size are much greater than the coefficient of AKZ. This indicates that constrained acquirers

will lose when they conduct large deals using overvalued stock. The positive effect of being a constrained bidder will therefore be offset.

Overall, more constrained acquirers tend to receive positive abnormal returns. These results suggest that constrained acquirers are rational in M&A deals because they are not suffering from overconfidence. This empirical evidence supports the hypothesis:

*H1a: Financially constrained bidders are more likely to obtain better short-term acquisition performance than unconstrained bidders.*

### **Target financial constraint and Acquirer's abnormal return in the short run**

Table 5 shows the results of the short-term multivariate analysis. Specifications 1 to 3 represent the regressions of CAR[-1,1], CAR[-2, 2], CAR[-5,5] on target financial constraint (TKZ) respectively.

[Insert Table 2.5 here]

Target KZ value – the key explanatory variable of the regressions in table 5 – is significantly negative in regression 1 but insignificant in regressions 2 and 3. The magnitude of the coefficient of TKZ is also much smaller in regression. The significant negative coefficient for TKZ in regression 1 indicates that acquiring a financially constrained target is value-destroying in the short run. A one-unit increase in TKZ will decrease CAR[-1,1] by 1.18%. This empirical evidence supports the hypothesis *H2a*:

*Acquiring financially constrained target has negative effect on bidders' merger and acquisition performance in the short run.*

In contrast, acquiring a financially unconstrained target increases bidder returns. Decreases in TKZ indicate that a target is less financially constrained. This is because acquiring a financially unconstrained target gives a positive signal to the market because the bidder has successfully transferred their overvalued stock into a solid asset. However, the effect only take places on the CARs three days surrounding the announcement day. This is because constrained bidders acquiring a rich target tend to have a high market-to-book ratio and use stock as means of payment.

For the control variables, experienced bidders result in a decrease in short-run abnormal returns of 1.69% for CAR[-1,1], 2.33 for CAR[-2,2] and 1.58% for CAR[-5,5]. The results suggest that a bidder that conducts multiple deals in a relatively short period of time will be less welcomed by the market. Acquiring a large target also leads to a decrease in short-term abnormal returns. The coefficient of relative transition value suggests that a 1% increase in a relative transaction value leads to a 1.37% decrease in CAR[-1,1] and a 1.6% decrease in CAR[-5,5]. Furthermore, stock payment has a negative impact on bidders' short-term abnormal returns, and leads to a 2.48% decrease in CAR[-1,1], a 2.66% decrease in CAR[-2,2] and a 2.41% decrease in CAR[-5,5]. Hostile deals reduce short-term abnormal returns CAR[-1,1], CAR[-2,2] and CAR[-5,5] by 1.9%, 2.47% and 2.69% respectively. The

coefficients of diversification are also significantly negative but the magnitude is less than 1%. Conducting a *tender offer* has a significantly positive impact on bidders' abnormal returns in the short run. Making a tender offer will increase CAR[-1,1], CAR[-2,2] and CAR[-5,5] by 3.52%, 3.22% and 3.53% respectively.

Experienced bidders, relative size, stock payment, a hostile deal and diversification are significantly negative, while tender offer is significantly positive. These results suggest that a bidder will increase their abnormal returns in the short run when they acquire a financially unconstrained target, when the deal has a smaller relative transaction value, when they use cash rather than stock as the means of payment, when they make a tender offer and when they avoid diversification or hostile deals.

### **Financial disparity and acquirer's abnormal return in the short run**

Table 6 presents the estimation results of regression model 3. Regressions 1 to 3 estimate to what extent the difference between acquirer and target financial constraints can influence acquirer cumulative abnormal returns in 3, 5 and 11-day event windows respectively. All of the CARs are estimated using the market-adjusted model.

[Insert Table 2.6 here]

The key independent variable is acquirer target KZ value difference (ATDKZ). As mentioned before, ATDKZ is defined as acquirer KZ value minus target KZ value. The higher the KZ value, the more financially constrained the firm will be. ATDKZ will be positive when a constrained bidder (high KZ value) acquires an unconstrained

target (low KZ value). ATDKZ will be negative when an unconstrained bidder acquires a constrained target. ATDKZ absolute value shows disparity in financial constraint between bidder and target.

The results show that financial constraint disparity (ATDKZ) is significantly positive in regressions 1 and 2. The results also suggest that a one-unit increase in financial constraint disparity (ATDKZ) will lead to an increase of 1.79% for CAR[-1,1] and 2.3% for CAR[-2,2]. These results indicate that a constrained acquirer will achieve higher abnormal returns when they acquire a financially unconstrained target. The larger the financially constrained disparity is, the larger bidder gain in the short run will be. The significant coefficient appears on both CARs [-1,1] and CARs [-2,2]; this indicates that the merger gain received by a constrained bidder acquiring a rich target is positive and robust. Constrained bidders will conduct value-enhancing deals if their target is less financially constrained than itself.

There are a number of factors that have a significant impact on bidder short-term abnormal return. If the bidder is classified as an experienced bidders, the short-run abnormal return CAR [-1,1], CAR[-2,2] and CAR[-5,5] by 1.81%, 1.70% and 2.39% respectively. We define experienced bidder as the acquirer having conducted three or more M&A deals in the five-year period before the acquisition in our sample. Our results suggests that the market downgrades a bidder who has conducted multiple deals in a relatively short period of time even though they have built takeover knowledge and

experience. Acquiring a large target also leads to a decrease in short-term abnormal return. The results suggest that a 1% increase in the relative transaction value will lead to a 1.36% decrease in  $CAR[-1,1]$  and a 1.58% decrease in  $CAR[-2,2]$ .

Furthermore, using stock as the means of payment will lead to a 2.39% decrease in  $CAR[-1,1]$  and a 2.33% decrease in  $CAR[-2,2]$ . A hostile deal reduces the short-term abnormal returns  $CAR[-1,1]$  and  $CAR[-2,2]$  by 1.95% and 2.27%. The coefficients of diversification are also significantly negative but the magnitude is small. Conducting a tender offer has a significantly positive impact on bidder abnormal return in the short run. Making a tender offer will increase  $CAR[-1,1]$ ,  $CAR[-2,2]$  and  $CAR[-5,5]$  by 3.51%, 3.50% and 3.23% respectively. These results suggest that a bidder tends to receive positive abnormal returns in the short run when it is financially constrained, when the deal has a smaller relative transaction value, when cash is used rather than stock as the means of payment, when a tender offer is made, and when diversification or hostile deals are avoided.

The results in Table 6 suggest that the positive disparity between acquirer financial constraint and target financial constraint is a determinant of whether or not a positive abnormal return will be achieved in the short run. This is consistent with the cash flow hypothesis. Financially unconstrained bidders tend to conduct value-destroying deals as they choose their target unwisely and suffer from overconfidence. Alternatively, constrained bidders receive cash inflows when they acquire a financially unconstrained target. It can be argued that constrained bidders need to pay a high



premium when acquiring unconstrained bidders. However, the results in the univariable test suggest that constrained bidders acquiring a rich target tend to have overvalued stock and thus do not hesitate to use their stock as a means of payment to complete the deal.

Overall, constrained acquirers tend to receive positive abnormal returns when acquiring a financially unconstrained target. These results also suggest that the larger the disparity between acquirer and target financial constraint, the higher bidders' abnormal returns in the short run will be. This empirical evidence supports hypothesis *H3a: the difference between bidder and target financial constraint is positive related to bidders' abnormal return in the short run.*

### **Acquirer financial constraint and abnormal return in the long run**

Table 7 presents the estimation results of the regression model 4. Regressions 1 to 3 estimate the impact of acquirers' financial constraints on acquirers' buy and hold ratio (BHAR) in event windows of 12, 24 and 36 months after the month of announcement. All of the BHAR figures are estimated using the size-adjusted model.

[Insert Table 2.7 here]

The key variable – acquirers' KZ value (AKZ) – is insignificant in regression 1 but significant in regressions 2 and 3 with an increasing coefficient. The results show that

a one-unit increase in an acquirer's KZ value will raise bidders' long-term abnormal return – BHAR[0,24] and BHAR[0,36] – by 10.4% and 15.31% respectively. The results indicate that a more constrained acquirer will achieve a higher abnormal return in the long run. However, the significant value only appears on BHAR[0,24] and BHAR[0,36]. This is because the deals conducted by constrained bidders tend to be value-enhancing as management are more rational when choosing a target than for unconstrained bidders. However, it take time for a bidder to realize any synergies from M&A deals. Therefore the impact of bidders' financial constraint will appear 24 and 36 months after the month of announcement.

The RUNUP ratio has a negative impact on bidders' abnormal returns in the long run. The coefficients are increasing with time eclipse. A one-unit increase in the RUNUP ratio will reduce BHAR[0,24] by 11.36% and BHAR[0,36] by 18.07%. These increasing RUNUP coefficients indicate that bidders with good pre-merger stock performance will suffer from a negative abnormal return in the long run. As suggested by Rosen (2006), a bidder can take advantage of stock overvaluation in the short run but the price will eventually back to its fundamental value in the long run. In this case, such bidders may not choose a synergy-maximizing target as they tend to complete the deal when their stock price still high. This is also supported by the regression results for stock payment, which are significant negative with a high magnitude coefficient. The results show that using stock as the means of payment will lead to a 10.3% decrease in BHAR[0,24] and a 13.23% decrease in BHAR[0,36]. In addition,

diversification is significantly negative. A diversifying deal causes BHAR[0,12], BHAR[0,24] and BHAR[0,36] to decrease by 6.02%, 12.52% and 15.18% respectively. These results suggest that a bidder tends to receive positive abnormal returns in the long run when it is financially constrained, avoids using stock as the means of payment, and avoids conducting diversifying deals.

Overall, the results in Table 7 suggest that the acquirer's financial constraint is a determinant of whether or not they will achieve a positive abnormal return in the long run. More constrained acquirers tend to receive a positive abnormal return in the long run. These results suggest that constrained acquirers are rational in M&A deals as they are not suffering from overconfidence. Using stock as the means of payment has a negative impact on long-term abnormal return. The coefficient of the Run-up ratio indicates that a constrained acquirer will lose when it conducts a large deal using overvalued stock. The positive effect of being a constrained bidder will therefore be offset. This empirical evidence supports the hypothesis *H1b: Financially constrained bidders are more likely to obtain better long-term acquisition performance than unconstrained bidders.*

### ***Target financial constraint and long-term performance***

Table 8 shows the results of regression model 5, which analyses how target financial constraint influences bidder long-term abnormal return. Regressions 1 to 3 represent the regression of BHAR[0,12], BHAR[0, 24], BHAR[0,36] on target financial

constraint (TKZ), respectively.

[Insert Table 2.8 here]

Target KZ value – the key explanatory variable of regressions in Table 8 – is significantly positive for all regressions. The results show that a one unit increase in the TKZ value leads to a 8.95% increase in BHAR[0,12], a 12.13% increase in BHAR[0,24] and a 14.52% in BHAR[0,36]. The magnitude of the coefficient of TKZ increases when the long-term return is estimated 12, 24 and 36 months after the month of announcement. These results indicate that acquiring a financially constrained target is value-enhancing in the long run. In contrast, acquiring a financially unconstrained target decreases bidder's return. This is because a financially constrained target has less bargaining power in a merger deal. The bidder chooses the target rationally as a financially constrained target does not provide extra cash inflow. As shown in the univariable test, a financially constrained target is less leveraged and has a lower market-to-book ratio than the acquirer. Acquiring a financially constrained bidder therefore means buying a solid asset. Our result suggests that these assets tend to be productive in the long run. This empirical evidence supports hypothesis *H2b*: *Acquiring financially constrained bidders has positive effect on bidders' merger and acquisition performance in the long run.*

A positive coefficient in the RUNUP ratio suggests that a bidder with good past stock performance tends to receive negative abnormal returns. The coefficient of the RUNUP ratio only appears as significant in regressions 2 and 3. The result suggests that a 1% increase in bidders' past stock performance will cause an 11.05% decrease in

BHAR[0,24] and a 17.76% decrease in BHAR[0,36]. Using stock as the means of payment also has a negative impact on bidders' long-term abnormal returns. Using stock as the means of payment leads to a 10.43% decrease in BHAR[0,24] and a 13.6% decrease in BHAR[0,36]. Using stock as the means of payment signals that the bidder stock is overvalued. The market will therefore bring the bidder's stock price back to its fundamental value. Diversifying deals are harmful for a bidder's long-term abnormal returns. The results shows that diversification causes BHAR[0,12], BHAR[0,24] and BHAR[0,36] to decrease by 5.56%, 11.89% and 14.45% respectively. This is consistent with Morck et al. (1990). Their result suggests that a bidder will receive a lower abnormal return if they conduct diversifying deals. Although acquiring a financially constrained target tends to be value-enhancing in the long run, a bidder should avoid stock payment and diversifying deals.

### **Financial disparity and acquirer's abnormal return in the long run**

Table 9 presents the estimation results of regression model 6. Regressions 1 to 3 estimate to what extent the difference between acquirer and target financial constraints can influence acquirer abnormal returns in the long run. Regressions 1 to 3 represent the regression with the dependent variable BHAR[0,12], BHAR[0,24] and BHAR[0,36] respectively. All the BHARs are estimated using the size-adjusted model.

[Insert Table 2.9 here]

The key independent variable is acquirer target KZ value difference (ATDKZ). The

results in Table 9 suggest that the disparity between acquirers' and targets' financial constraint is insignificant to bidders' abnormal return in the long run. This is consistent with the results of the univariable test. The deals in the neutral group generate the highest bidder abnormal returns in both the long and short run. Financially constrained bidders can benefit from acquiring a financially unconstrained target in the short run but not in the long run. This is because it is initially positive news for the market, as acquiring an unconstrained target indicates cash inflow to the bidder. However, the positive impact of a acquiring target with large financial constraint disparity will soon vanish as the market will bring the price back to its fundamental value. This result is similar to that of Rau and Vermaelen (1998). They separate bidders into glamor and value bidders on the basis of their market-to-book ratio. By examining bidders' post-merger long-run performance, they highlight that bidders with a high market-to-book ratio (glamour bidders) underperform bidders with a low market-to-book ratio in the long run. As mentioned before, acquirers in the CBRT group have a higher market-to-book ratio than average.

Bidders' long-term abnormal returns are determined by the productivity of the combined firm. On the other hand, the free cash flow and hubris hypotheses suggest that unconstrained bidders tend to be irrational in M&A deals. It takes great effort to transform a financially constrained target into a profitable and productive asset. An unconstrained bidder suffering from overconfidence tends to make value-destroying deals when acquiring a constrained target.

Overall, a constrained bidder acquiring a constrained target will have a positive impact on bidder long-term returns. This causes the coefficient of disparity between acquirer and target financial constraints (ATDKZ) to be insignificant. This empirical evidence there does not supports the hypothesis *H3b: The difference between bidder and target financial constraint is positive related to bidders' abnormal return in the long run.*

Table 10 presents the estimation results of regression models 7 to 9. Regression 1 estimates to what extent the acquirer's financial constraint can influence bid premium. Regression 2 analyses the effect of target financial constraint on bid premium. Regression 3 shows to what extent the financial constraint disparity between acquirer and target can alter bid premium. Regressions 1 to 3 represent the regression with the dependent variable bid premium, which measures how much an acquirer has paid to complete the deal, and the independent variables AKZ, TZK and ATDKZ, which measure acquirer and target financial constraint and financial constraint disparity respectively.

[Insert Table 2.10 here]

The key independent variable in regression 1 is acquirer target KZ value (AKZ). The results of regression 1 suggest that a more financially constrained bidder will pay a lower premium; the coefficient of AKZ suggests that a one-unit increase in acquirer KZ value leads to a 0.9% decrease in the premium paid. Although this result is

statistically insignificant, the negative sign indicates the negative relationship between acquirer financial constraint and bid premium.

The results of regression 2 suggest that a bidder has to pay a higher premium when acquiring a financially constrained target. The coefficient of TKZ shows that a one-unit increase in the target KZ value results in an 8.77% increase in bid premium.

This results support hypothesis *H4b: Target's financial constraint are positively related to bid premium.*

A financially constrained target tends to receive a high premium. This is because the market, as shown in Table 2, undervalues financially constrained targets. The average market-to-book ratio of targets (3.623) is lower than the average market-to-book ratio of acquirers (4.257). This undervaluation indicates the high potential stock price growth of financially constrained targets in the future. Such undervaluation gives targets extra bargaining power in M&A. It can be argued that the market values the target correctly but that the target is financially constrained by its poor performance. The average return-to-asset ratio of a target is negative. However, financially unconstrained bidders tend to overpay the target, especially in deals where a financially unconstrained bidder is acquiring a constrained target. The average premium paid by a financially unconstrained bidder when acquiring a constrained target is 51.630%, which is significantly greater than the average premium paid by a financially constrained bidder (43.568%).



The results of regression 3 show that the disparity between an acquirer's financial constraint and a target's financial constraint (ATDKZ) is significantly and negatively related to the bid premium paid. The coefficient suggests that a one-unit increase in the financial constraint disparity (ATDKZ) causes a 9.63% decrease in bid premium. These results strongly support the hypothesis *H4c: The financial constraint disparity are negatively related to bid premium.*

According to the definition of ATDKZ, a one-unit increase in ATDKZ indicates that a bidder is more financially constrained than a target. This indicates that the more constrained a bidder is, the lower the premium it will pay. This is consistent with the free cash flow and hubris hypotheses. The free cash flow hypothesis predicates that a bidder with a large cash reserve tends to conduct value-destroying deals. As the hubris hypothesis suggests, bidders with a large cash reserve suffer from overconfidence and tend to overpay for targets.

A number of factors have a significant impact on bid premium. It will rise by 5.39% if the relative transaction value increases by one unit. A bidder will also pay more when acquiring a larger target. The appearance of multiple bidders will increase the bid premium by 22.14%. It is a fact that a competing bid will raise the bargaining power of the target and consequently the bid premium as the winner will be the participant that offers the highest bid. Furthermore, the bid premium rises by 10.2% if the deal is

diversifying. Bidders will pay a higher bid premium for a diversifying deal because they may overvalue the target due to a lack of operating experience in the target industry. If a bidder makes a tender offer, the bid premium decreases by 4.9%. A tender offer eases the resistance from the target. Bidders who complete deals in a high market valuation period will pay a 9.79% lower premium. This is because bidders are fully aware that their target is overvalued so make a discounted offer. In turn, the target is aware that the overvaluation will soon revert back to its fundamental value, and they tend to accept the discounted offer before the market returns to a low valuation period.

Overall, a bidder's financial constraint has an insignificant impact on bid premium, though the sign of the coefficient indicates a negative relationship. Furthermore, target financial constraint is positively related to bid premium. A one-unit increase in the target KZ value results in an 8.77% increase in bid premium. Finally, the results show that the disparity between acquirer target financial constraints (ATDKZ) is negatively related to bid premium. The results also suggest that a financially constrained bidder will pay a lower premium when acquiring a financially unconstrained target. A one-unit increase in the financial constraint disparity (ATDKZ) causes a 9.63% decrease in the bid premium. In addition, relative transaction value, competing bid and diversification significantly raise bid premium. A high market valuation and making a tender offer substantially reduce the premium paid.

### **2.5.6 Robustness Test**

The main finding of this paper is that a constrained bidder outperforms an unconstrained bidders in both the long and short run. Acquiring a financially unconstrained target will therefore increase an acquirer's announcement return but acquiring a financially constrained target tends to maximize the acquirer's abnormal return in the long run. Financial disparity between the acquirer and target is positively related to acquirer abnormal return in the short run. The results suggest that a constrained acquirer acquiring a financially unconstrained target will receive a higher abnormal return than one acquiring a financially constrained target. However, due to signalling effect and time eclipse, the deal in the neutral group generates the highest abnormal return for the acquirer.

To test the robustness of our results, we use different ways to define firms' financial constraint. We replace the KZ value with free cash flow and the free cash flow to total asset ratio. The results are robust. We also test for robustness via replacing the KZ index (continuous variable) with a dummy variable of financial constraint. Specifically, the unconstrained (constrained) dummy equals one when the KZ index of the bidder is smaller (greater) than the median KZ index of all of the firm-years (extracted from Compustat) over the period 1990–2009. The results remain unchanged, which shows that a constrained bidder outperforms an unconstrained bidder in both the long and short run.

## 2.6 Conclusion

By using one of the most comprehensive samples, which covers US M&A deals conducted from 1990 to 2009 and makes use of detailed acquirer and target financial information, this paper sheds new light on how acquirers and targets' financial conditions affect acquisition performance in both the long and short run. Following the measurement of financial condition in Lamont, Polk and Sa'a-Requejo (2001), Baker, Stein, and Wurgler (2003), Malmendier and Tate (2005) and Malmendier and Tate (2008), we use the KZ index (Kaplan and Zingales, 1997) to measure acquirer and target financial constraint. In order to study how the disparity of acquirer and target financial conditions can influence acquisition performance, we sort our sample on the basis of differences in bidder and target financial condition. Financially constrained bidders acquiring a financially constrained target are categorised as CBRT. Financially constrained bidders acquiring a financially constrained target are categorised as UCBPT. Deals conducted by an acquirer and target with similar financial conditions are categorised as neutral.

We find that a constrained bidder outperforms an unconstrained bidders in both the long and short run. Acquirers' KZ value (AKZ) is significantly positively related to acquirer cumulative abnormal return five days surrounding the announcement day. A one-unit increase in the AKZ value leads to a 2.08% increase in CAR[-2,2]. This result suggests that a more constrained acquirer will achieve a higher abnormal return than a financially constrained bidder. This result is consistent with Smith and Kim

(1994), Harford (1999), Malmendier and Tate (2005) and Malmendier and Tate (2008). The result implies that constrained firms do not suffer from overconfidence. Rather, they choose their target and implement their acquisition strategy more carefully and effectively than financially unconstrained bidders. This is supported by the empirical results regarding the relationship between financial constraint and long-term acquisition abnormal returns. We found that a more constrained acquirer will achieve a higher abnormal return in the long run. Acquirer's financial constraint (AKZ value) is positively related to acquirer long-term abnormal return, estimated by BHAR[0,24] and BHAR[0,36]. A constrained bidder will receive a 15.31% higher long-term abnormal return (BHAR[0,36]) than an unconstrained bidder. This is because the deals conducted by constrained bidders tend to be value-enhancing as they are more rational when choosing a target than unconstrained bidders. However, it takes time for a bidder to realize any synergies from M&A deals. The impact of bidders' financial constraints therefore appears 24 and 36 months after the month of announcement. This empirical evidence supports the hubris hypothesis (Roll, 1986) and the cash flow hypothesis (Jensen, 1986).

We also find that target financial constraint is significantly negatively related to bidders' announcement return three days surrounding the announcement day. A one-unit increase in the TZK value will decrease CAR[-1,1] by 1.18%. This result indicates that acquiring a financially unconstrained target has a positive influence on bidders' abnormal return in the short run. This is because acquiring a financially

unconstrained target is a sign of cash inflow to the bidder. This positive signal raises bidders' stock return in the short run. Our results also show that a financially constrained acquirer acquiring a financially unconstrained target has a substantially higher market-to-book value than the full sample average. This indicates that a financially constrained acquirer tends to be overvalued by the market. The purpose of acquiring a financially unconstrained target is to transfer overvalued stock into a solid asset. On the other hand, acquiring a financially constrained target tend to positively influence an acquirers' abnormal return in the long run. A one-unit increase in TKZ will increase BHAR[0,12], BHAR[0,24] and BHAR[0,36] by 8.95%, 12.13% and 14.52% respectively. This is because a financially constrained target has less bargaining power in a merger deal. The bidder chooses the target rationally as a financially constrained target does not provide extra cash inflow. As shown in the univariable test, a financially constrained target is less leveraged and has a lower market-to-book ratio than the acquirer. Therefore acquiring a financially constrained bidder means buying a solid asset. Our results suggest that these assets tend to be productive in the long run.

Finally, we define financial constraint disparity between acquirer and target (ATDKZ) as bidder KZ value minus target KZ value. As mentioned earlier, the higher the KZ value, the more financially constrained the firm will be. The value of ATDKZ is positive when a financially constrained bidder is acquiring a financially unconstrained target. Our result suggests that the financial condition disparity between acquirer and

target (ATDKZ) has a positive and significant impact on acquirer's acquisition performance in the short run, but not in the long run. Financially constrained bidders can benefit from acquiring a financially unconstrained target in the short run. This is because it is positive news for the market when a bidder acquires an unconstrained target as it indicates cash inflow to the bidder. The positive impact of acquiring a target with large financial constraint disparity will soon vanish as the market will bring the price back to its fundamental value. Bidders' long-term abnormal return is determined by the productivity of the combined firm post the deal. On the other hand, the free cash flow and hubris hypotheses suggest that unconstrained bidders tend to be irrational in M&A. It also takes a great deal of effort to transform a financially constrained target into a profitable and productive asset. An unconstrained bidder suffering from overconfidence tends to make value-destroying deals when acquiring a constrained target.

In addition, bidder financial constraint has an insignificant impact on bid premium though the sign of the coefficient indicates a negative relationship. Target financial constraint is positively related to bid premium. A one-unit increase in target KZ value results in 8.77% increase in bid premium. Disparity between acquirer and target financial constraint (ATDKZ) is negatively related to bid premium. The results suggest that a financially constrained bidder pays a lower premium when acquiring a financially unconstrained target. A one-unit increase in the financial constraint disparity (ATDKZ) causes a 9.63% decrease in the bid premium. Experienced bidders,

relative size, stock payment, hostile deal and diversification are significantly negative, while tender offer is significantly positive. These results suggest that a bidder tends to receive positive abnormal returns in the short run when it is financially constrained, when the deal has a smaller relative transaction value, when they use cash rather than stock as means of payment, when they make a tender offer, and when they avoid diversification or hostile deals.

Overall, this paper finds that a constrained acquirer outperforms an unconstrained bidder in both the long and short run. Acquiring a financially unconstrained target is found to increase acquirers' announcement return but acquiring a financially constrained target tends to maximise acquirers' abnormal return in the long run. Financial disparity is positively related to acquirer abnormal return in the short run. The results suggest that a constrained acquirer acquiring a financially unconstrained target will receive a higher abnormal return than an acquirer acquiring a financially constrained target. The influence of bidder financial constraint on acquisition performance can only be realized in the long run. This is because a financially constrained bidder does not suffer from overconfidence and therefore conduct deals more diligently than unconstrained bidders. However, it takes time to assimilate the synergies generated from M&A and improve bidder performance. Our results support the free cash flow hypothesis, which states that firms with high free cash flow tend to conduct value-destroying deals.



## Appendix

*Table 2.1 Summary statistics for acquirer short-and long-term Abnormal Return.*

Table 1 represent acquirer's short- and long-term abnormal returns for the full sample and the subsample of The Constraint Bidder Acquiring Rich Target (CBRT), natural (N) and Unconstraint Bidder Acquiring Poor Target (UCBPT). Panel A reports short-term abnormal return CAR[-1,1], CAR[-2, 2] CAR[-5,5] are the 3-day, 5-day and 11days cumulative abnormal returns around announcement. We use Market Model, Market Adjusted Model, Fama-French Model and Carhart(1997) four-factor model to estimate acquirers CARs. Panel B represent acquirer's performance in the long run. Long-term abnormal returns is measured by Buy and hold ratio, BHAR[0,12], BHAR[0,24], BHAR[0,36] are the post-merger 12-month, 24-month, 36-month buy-and-hold abnormal returns. We use two different approaches to estimate Size Adjusted BHAR and Market Adjusted BHAR For the full sample, all continuous variables are winsorized at the 1% and 99% levels.

Variable	ALL		CBRT		NEUTRAL		UCBPT		Difference (CBRT-NEU)	
	Obs	Mean	Obs	Mean	Obs	Mean	Obs	Mean	Mean	Pro
<b>Panel A</b>										
Market Model										
CAR[-1,1]	1622	0.181%	542	-1.288%	541	2.932%	539	-1.104%	-4.220%	0.000%
CAR[-2,2]	1622	0.011%	542	-1.478%	541	2.893%	539	-1.383%	-4.372%	0.000%
CAR[-5,5]	1612	0.247%	540	-1.529%	537	3.383%	535	-1.106%	-4.913%	0.000%
Market Adjusted										
CAR[-1,1]	1622	0.361%	542	-0.956%	541	3.016%	539	-0.981%	-3.972%	0.000%
CAR[-2,2]	1622	0.350%	542	-0.973%	541	3.055%	539	-1.035%	-4.028%	0.000%
CAR[-5,5]	1612	1.069%	540	-0.506%	537	3.705%	535	0.014%	-4.211%	0.000%
Fama-French										
CAR[-1,1]	1622	0.158%	542	-1.301%	541	2.870%	539	-1.098%	-4.171%	0.000%
CAR[-2,2]	1622	-0.032%	542	-1.461%	541	2.785%	539	-1.422%	-4.246%	0.000%

CAR[-5,5]	1612	0.133%	540	-1.611%	537	3.225%	535	-1.209%	-4.836%	0.000%
Fama-French-M										
CAR[-1,1]	1622	0.192%	542	-1.291%	541	2.881%	539	-1.017%	-4.172%	0.000%
CAR[-2,2]	1622	0.047%	542	-1.374%	541	2.856%	539	-1.343%	-4.230%	0.000%
CAR[-5,5]	1612	0.248%	540	-1.446%	537	3.317%	535	-1.123%	-4.763%	0.000%
<b>Panel B</b>										
Size Adjusted 1										
BHAR[0,12]	1622	-2.572%	542	-3.595%	541	0.153%	539	-4.278%	-3.748%	20.020%
BHAR[0,24]	1622	-7.788%	542	-13.053%	541	0.009%	539	-10.318%	-13.063%	0.190%
BHAR[0,36]	1622	-10.986%	542	-17.359%	541	-1.779%	539	-13.819%	-15.580%	0.510%
Size Adjusted 2										
BHAR[0,12]	1622	-7.928%	542	-10.658%	541	-2.486%	539	-10.645%	-8.172%	0.420%
BHAR[0,24]	1622	-18.265%	542	-25.486%	541	-6.863%	539	-22.449%	-18.623%	0.000%
BHAR[0,36]	1622	-27.742%	542	-36.049%	541	-13.380%	539	-33.805%	-22.670%	0.000%
Market Adjusted										
BHAR[0,12]	1622	0.034%	542	-1.523%	541	3.849%	539	-2.230%	-5.371%	7.540%
BHAR[0,24]	1622	-1.889%	542	-7.462%	541	6.923%	539	-5.131%	-14.385%	0.110%
BHAR[0,36]	1622	-1.048%	542	-7.965%	541	9.745%	539	-4.926%	-17.710%	0.180%

*Table 2.2 Summary statistics for acquirer and targets firms characteristics*

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Table 2 present acquirer and target firm characteristics for the full sample and the subsample of The Constraint Bidder Acquiring Rich Target (CBRT), Neutral (N) and Unconstraint Bidder Acquiring Poor Target (UCBPT). KZ Index is Kaplan and Zingales Index measured at the fiscal year end before the announcement. RUNUP is measured as market-adjusted CARs over the [-365, -28] window prior to announcement. M/B, the market to book ratio measures market valuation of bidder's stock, is defined as annual price close multiply common share outstanding divided by total common equity, COMPUSTAT Item24\*Item25/Item60; P/E, the price to earnings ratio measures the net income per share, is defined as annual price close divided by earnings per share, COMPUSTAT Item24/Item58; Cash flow/Total asset, the Cash flow over equity ratio measures the amount of free cash holding by the company, is defined as the sum of income before extraordinary item and depreciation minus dividends of common and preferred stock then divided by total asset, COMPUSTAT(Item18+ Item14- Item19- Item21)/(Item6); Debt/Total Asset, the debt over asset ratio measures to what extent the company is leveraged, is defined as long term debt divided by total asset, COMPUSTAT Item9/Item6; we also include leverage ratio defined as defined as COMPUSTAT (Item 9+Item34)/( Item 9+Item34+Item216).

Variable	ALL		CBRT		NEUTRAL		UCBPT		Difference (CBRT-NEUTRAL)	
	Obs	Mean	Obs	Mean	Obs	Mean	Obs	Mean	Mean	Pro
<u>Acquirer Characteristics</u>										
KZ value	1622	-9.686	542	-3.583	541	-3.770	539	-21.761	0.187	86.750%
Runup	1622	0.153	542	0.204	541	0.072	539	0.183	0.132	0.000%
M/B	1622	4.257	542	4.889	541	2.444	539	5.442	2.446	0.000%
P/E	1618	22.283	540	23.708	541	17.201	537	25.970	6.507	67.440%
ROA	1622	0.027	542	0.011	541	0.038	539	0.031	-0.027	0.700%
D/TA	1622	0.174	542	0.185	541	0.203	539	0.136	-0.018	10.630%
CF/TA	1622	0.058	542	0.057	541	0.077	539	0.039	-0.020	3.590%
Leverage	1622	0.293	542	0.313	541	0.338	539	0.229	-0.025	16.870%
<u>Target Characteristics</u>										
KZ value	1622	-9.829	542	-24.416	541	-3.203	539	-1.813	-21.212	0.000%
Runup	901	0.073	264	0.076	393	0.036	244	0.130	0.039	27.760%
M/B	1622	3.623	542	2.766	541	4.129	539	3.975	-1.363	52.750%
P/E	1620	14.239	542	13.899	540	18.575	538	10.228	-4.676	40.730%
ROA	1622	-0.074	542	-0.032	541	0.011	539	-0.201	-0.043	1.690%
D/TA	1622	0.170	542	0.095	541	0.216	539	0.200	-0.121	0.000%
CF/TA	1622	-0.030	542	-0.004	541	0.055	539	-0.142	-0.059	0.080%
Leverage	1622	0.305	542	0.121	541	0.359	539	0.435	-0.239	0.000%

*Table 2.3 Summary statistics for acquirer and targets deal characteristics and market environment.*

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Table 3 present deal characteristics and market environment for the full sample and the subsample of The Constraint Bidder Acquiring Rich Target (CBRT), Neutral (N) and Unconstraint Bidder Acquiring Poor Target (UCBPT). RUNUP is measured as market-adjusted CARs over the [-365, -28] window prior to announcement. Experience bidder denotes whether bidders have conducted M&A deals in the past five years; Relative transaction value denotes the relative size of the deal, and is defined as the proportion of deal value over bidders market value; Stock denote that the deal is paid by 100% stock; and Cash for 100% cash payment. Hostile measures deal attitude. Competing bid indicate the appearance of multiple bidders. Diversification indicates bidder and target oriented in different industry. Tender offer denote the deal type is tender offer. For market environment, Heat Degree is defined as the quarterly moving average of deals conducted over the average quarter frequency of deals conducted from 1990 to 2009. Dummy variable High and Low represent whether the deal announced in the High or Low market valuation period. Bid premium denote the percentage of bidder overpayment on the basis target stock price one month before the deal announcement. For the full sample, all continuous variables are winsorized at the 1% and 99% levels.

Variable	ALL		CBRT		NEUTRAL		UCBPT		Difference (CBRT-NEUTRAL)	
	Obs	Mean	Obs	Mean	Obs	Mean	Obs	Mean	Mean	Pro
Experienced	1622	72.935%	542	75.830%	541	70.795%	539	72.171%	5.035%	6.110%
Relative Size	1622	29.703%	542	30.206%	541	32.945%	539	25.943%	-2.738%	28.010%
STOCK	1622	29.593%	542	37.638%	541	16.266%	539	34.879%	21.372%	0.000%
CASH	1622	42.663%	542	36.716%	541	58.226%	539	33.024%	-21.510%	0.000%
Hostile	1622	2.035%	542	1.845%	541	2.588%	539	1.670%	-0.743%	40.690%
Competing Bid	1622	3.453%	542	3.321%	541	2.773%	539	4.267%	0.548%	60.000%
Tender	1622	33.724%	542	21.033%	541	57.116%	539	23.006%	-36.083%	0.000%
Diversification	1622	31.258%	542	37.269%	541	19.617%	539	37.106%	17.753%	0.000%
Heat Degree	1622	149.005%	542	148.962%	541	150.228%	539	147.665%	-12.654%	47.040%
High	1622	27.497%	542	28.044%	541	26.580%	539	28.015%	1.464%	58.96%
Low	1622	23.181%	542	22.878%	541	24.163%	539	22.263%	-1.290%	61.89%
Bid Premium	1468	43.332%	542	43.568%	541	35.130%	539	51.630%	8.440%	0.110%

*Table 2.4 OLS regression results impact of acquirer financial constraints on acquirer short run abnormal returns*

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The table shows OLS regression results for the impact of acquirer financial constraints on bidders short run abnormal returns. The sample includes acquisitions conducted by US public bidders from January 1<sup>st</sup>, 1990 to December 31<sup>st</sup>, 2009. The sample data is selected from Thomson Financial SDC Mergers and Acquisitions Database. Dependent variables is CAR[-1,1], CAR[-2,2], CAR[-5,5] which are the cumulative abnormal returns estimated by 3, 5, 11 days surrounding announcement day. Independent variables are AKZ value measures bidders' financial constraints; RUNUP is measured as market-adjusted CARs over the [-365, -28] window prior to announcement. Experience bidder denotes whether bidders have conducted M&A deals in the past five years; Relative transaction value denotes the relative size of the deal, and is defined as the proportion of deal value over bidders market value; Stock denote that the deal is paid by 100% stock; Hostile measures deal attitude. Competing bid indicate the appearance of multiple bidders. Tender offer denote the deal type is tender offer. Diversification indicates bidder and target oriented in different industry. For market environment, Heat Degree is defined as the quarterly moving average of deals conducted over the average quarter frequency of deals conducted from 1990 to 2009. Dummy variable High and Low represent whether the deal announced in the High or Low market valuation period. The year fix effect is controlled for all regressions. Figures in parentheses refer to T-statistic adjusted by controlling heteroskedasticity and bidder clustering. The number of observations (N) for all regressions is also shown in this table.

	CAR[-1,1]	CAR[-2,2]	CAR[-5,5]
AKZ Value	0.0103 (0.132)	0.0208** (0.022)	0.0078 (0.512)
RUNUP	-0.0106* (0.074)	-0.0090 (0.186)	-0.0052 (0.535)
Experienced_Bidder	-0.0181*** (0.000)	-0.0177*** (0.001)	-0.0242*** (0.000)
Relative Transaction Value	-0.0138* (0.054)	-0.0159** (0.041)	-0.0049 (0.572)
STOCK	-0.0234*** (0.000)	-0.0220*** (0.000)	-0.0257*** (0.000)
Hostile	-0.0200** (0.049)	-0.0282** (0.021)	-0.0254* (0.088)
Competing Bid	-0.0094 (0.327)	-0.0111 (0.295)	-0.0218 (0.206)
Tender	0.0356*** (0.000)	0.0357*** (0.000)	0.0325*** (0.000)
Diversification	-0.0079* (0.051)	-0.0085* (0.063)	-0.0066 (0.221)
Heat Degree	0.0006 (0.987)	-0.0067 (0.879)	-0.0785 (0.151)
High	-0.0068 (0.362)	-0.0064 (0.456)	-0.0065 (0.559)
Low	0.0056 (0.525)	0.0094 (0.385)	0.0444*** (0.000)
Constant	0.0128 (0.763)	0.0143 (0.763)	0.0906 (0.124)
Obs	1622	1622	1612
R-sq	0.153	0.136	0.095

p-values in parentheses = \* p<0.1, \*\* p<0.05, \*\*\*p<0.001



*Table 2.5 OLS regression results impact of Target financial constraints on bidders short run abnormal returns.*

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The table shows OLS regression results for the impact of Target financial constraints on bidders short run abnormal returns. The sample includes acquisitions conducted by US public bidders from January 1<sup>st</sup>, 1990 to December 31<sup>st</sup>, 2009. The sample data is selected from Thomson Financial SDC Mergers and Acquisitions Database. Dependent variables is CAR[-1,1], CAR[-2,2], CAR[-5,5] which are the cumulative abnormal returns estimated by 3, 5, 11 days surrounding announcement day. Independents variables are TKZ value measures Target' financial constrains; RUNUP is measured as market-adjusted CARs over the [-365, -28] window prior to announcement. Experience bidder denotes whether bidders have conducted M&A deals in the past five years; Relative transaction value denotes the relative size of the deal, and is defined as the proportion of deal value over bidders market value; Stock denote that the deal is paid by 100% stock; Hostile measures deal attitude. Competing bid indicate the appearance of multiple bidders. Tender offer denote the deal type is tender offer. Diversification indicates bidder and target oriented in different industry. For market environment, Heat Degree is defined as the quarterly moving average of deals conducted over the average quarter frequency of deals conducted from 1990 to 2009. Dummy variable High and Low represent whether the deal announced in the High or Low market valuation period. The year fix effect is controlled for all regressions. Figures in parentheses refer to T-statistic adjusted by controlling heteroskedasticity and bidder clustering. The number of observations (N) for all regressions is also shown in this table.

	CAR[-1,1]	CAR[-2,2]	CAR[-5,5]
TKZ Value	-0.0118* (0.083)	-0.0070 (0.486)	-0.0090 (0.248)
RUNUP	-0.0114* (0.056)	-0.0058 (0.490)	-0.0098 (0.153)
Experienced_Bidder	-0.0169*** (0.001)	-0.0233*** (0.000)	-0.0158*** (0.004)
Relative Transaction Value	-0.0137* (0.057)	-0.0049 (0.578)	-0.0160** (0.041)
STOCK	-0.0248*** (0.000)	-0.0266*** (0.000)	-0.0241*** (0.000)
Hostile	-0.0190* (0.060)	-0.0247* (0.096)	-0.0269** (0.028)
Competing Bid	-0.0094 (0.320)	-0.0219 (0.204)	-0.0118 (0.270)
Tender	0.0352*** (0.000)	0.0322*** (0.000)	0.0353*** (0.000)
Diversification	-0.0087** (0.035)	-0.0071 (0.193)	-0.0092** (0.049)
Heat Degree	0.0001 (0.998)	-0.0792 (0.147)	-0.0079 (0.858)
High	-0.0076 (0.306)	-0.0071 (0.524)	-0.0075 (0.388)
Low	0.0068 (0.438)	0.0453*** (0.000)	0.0114 (0.291)
Constant	0.0113 (0.790)	0.0899 (0.126)	0.0131 (0.784)
OBS	1622	1622	1612
R-sq	0.154	0.131	0.095

p-values in parentheses = \* p<0.1, \*\* p<0.05, \*\*\*p<0.001

*Table 2.6 OLS regression results impact of financial constraints disparity on bidders short run abnormal returns.*

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The table shows OLS regression results for the impact of financial constraints disparity on bidders short run abnormal returns. The sample includes acquisitions conducted by US public bidders from January 1<sup>st</sup>, 1990 to December 31<sup>st</sup>, 2009. The sample data is selected from Thomson Financial SDC Mergers and Acquisitions Database. Dependent variables is CAR[-1,1], CAR[-2,2], CAR[-5,5] which are the cumulative abnormal returns estimated by 3, 5, 11 days surrounding announcement day. Independents variables are ATDKZ value measures disparity of Acquirer and Target' financial constrains The financial constraint difference (ATDKZ) is defined as bidders KZ value minus target KZ value; RUNUP is measured as market-adjusted CARs over the [-365, -28] window prior to announcement. Experience bidder denotes whether bidders have conducted M&A deals in the past five years; Relative transaction value denotes the relative size of the deal, and is defined as the proportion of deal value over bidders market value; Stock denote that the deal is paid by 100% stock; Hostile measures deal attitude. Competing bid indicate the appearance of multiple bidders. Tender offer denote the deal type is tender offer. Diversification indicates bidder and target oriented in different industry. For market environment, Heat Degree is defined as the quarterly moving average of deals conducted over the average quarter frequency of deals conducted from 1990 to 2009. Dummy variable High and Low represent whether the deal announced in the High or Low market valuation period. The year fix effect is controlled for all regressions. Figures in parentheses refer to T-statistic adjusted by controlling heteroskedasticity and bidder clustering. The number of observations (N) for all regressions is also shown in this table.

	CAR[-1,1]	CAR[-2,2]	CAR[-5,5]
ATDKZ Value	0.0179*** (0.005)	0.0230*** (0.006)	0.0080 (0.453)
RUNUP	-0.0113* (0.059)	-0.0099 (0.143)	-0.0056 (0.508)
Experienced_Bidder	-0.0181*** (0.000)	-0.0170*** (0.002)	-0.0239*** (0.000)
Relative Transaction Value	-0.0136* (0.058)	-0.0158** (0.044)	-0.0049 (0.576)
STOCK	-0.0239*** (0.000)	-0.0233*** (0.000)	-0.0262*** (0.000)
Hostile	-0.0195* (0.055)	-0.0272** (0.026)	-0.0250* (0.093)
Competing Bid	-0.0087 (0.359)	-0.0106 (0.314)	-0.0217 (0.209)
Tender	0.0351*** (0.000)	0.0350*** (0.000)	0.0323*** (0.000)
Diversification	-0.0088** (0.029)	-0.0097** (0.034)	-0.0070 (0.195)
Heat Degree	0.0014 (0.970)	-0.0061 (0.889)	-0.0784 (0.151)
High	-0.0071 (0.343)	-0.0071 (0.416)	-0.0067 (0.545)
Low	0.0062 (0.478)	0.0108 (0.315)	0.0450*** (0.000)
Constant	0.0108 (0.798)	0.0117 (0.804)	0.0897 (0.126)
OBS	1622	1622	1612
R-sq	0.157	0.137	0.095

p-values in parentheses =\* p<0.1, \*\* p<0.05, \*\*\*p<0.001

*Table 2.7 OLS regression results impact of acquirer financial constraints on acquirer long run abnormal returns*

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The table shows OLS regression results for the impact of acquirer financial constraints on bidders long run abnormal returns. The sample includes acquisitions conducted by US public bidders from January 1<sup>st</sup>, 1990 to December 31<sup>st</sup>, 2009. The sample data is selected from Thomson Financial SDC Mergers and Acquisitions Database. Dependent variables are BHAR[0,12], BHAR[0,24], BHAR[0,36], which are the post-merger 12-month, 24-month, 36-month buy-and-hold abnormal returns. Independent variables are AKZ value measures bidders' financial constraints; RUNUP is measured as market-adjusted CARs over the [-365, -28] window prior to announcement. Experience bidder denotes whether bidders have conducted M&A deals in the past five years; Relative transaction value denotes the relative size of the deal, and is defined as the proportion of deal value over bidders market value; Stock denote that the deal is paid by 100% stock; Hostile measures deal attitude. Competing bid indicate the appearance of multiple bidders. Tender offer denote the deal type is tender offer. Diversification indicates bidder and target oriented in different industry. For market environment, Heat Degree is defined as the quarterly moving average of deals conducted over the average quarter frequency of deals conducted from 1990 to 2009. Dummy variable High and Low represent whether the deal announced in the High or Low market valuation period. The year fix effect is controlled for all regressions. Figures in parentheses refer to T-statistic adjusted by controlling heteroskedasticity and bidder clustering. The number of observations (N) for all regressions is also shown in this table.

	BHAR[0,12]	BHAR[0,24]	BHAR[0,36]
AKZ Value	0.0820 (0.114)	0.1040* (0.068)	0.1531** (0.015)
RUNUP	-0.0270 (0.496)	-0.1136** (0.019)	-0.1807*** (0.003)
Experienced_Bidder	0.0131 (0.692)	-0.0086 (0.853)	-0.0174 (0.773)
Relative Transaction Value	-0.0420 (0.271)	-0.0490 (0.386)	-0.0169 (0.823)
STOCK	-0.0430 (0.199)	-0.1030** (0.025)	-0.1323** (0.033)
Hostile	0.0244 (0.730)	0.1407 (0.213)	0.2239 (0.258)
Competing Bid	-0.0405 (0.402)	-0.0296 (0.724)	0.0169 (0.897)
Tender	0.0130 (0.657)	0.0597 (0.155)	0.0527 (0.334)
Diversification	-0.0602** (0.021)	-0.1252*** (0.001)	-0.1518*** (0.003)
Heat Degree	-0.0600 (0.815)	0.0011 (0.997)	0.3760 (0.293)
High	-0.0162 (0.772)	0.0497 (0.512)	-0.0171 (0.844)
Low	-0.0865 (0.199)	-0.1406 (0.128)	-0.1369 (0.302)
Constant	-0.0052 (0.985)	-0.0481 (0.879)	-0.4450 (0.228)
Obs	1622	1622	1622
R-sq	0.032	0.058	0.057

p-values in parentheses ="\* p<0.1, \*\* p<0.05, \*\*\*p<0.001

*Table 2.8 OLS regression results impact of target financial constraints on bidders long run abnormal returns.*

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The table shows OLS regression results for the impact of acquirer financial constraints on bidders long run abnormal returns. The sample includes acquisitions conducted by US public bidders from January 1<sup>st</sup>, 1990 to December 31<sup>st</sup>, 2009. The sample data is selected from Thomson Financial SDC Mergers and Acquisitions Database. Dependent variables is BHAR[0,12], BHAR[0,24], BHAR[0,36] which are the post-merger 12-month, 24-month, 36-month buy-and-hold abnormal returns. Independents variables are TKZ value measures Target' financial constrains; RUNUP is measured as market-adjusted CARs over the [-365, -28] window prior to announcement. Experience bidder denotes whether bidders have conducted M&A deals in the past five years; Relative transaction value denotes the relative size of the deal, and is defined as the proportion of deal value over bidders market value; Stock denote that the deal is paid by 100% stock; Hostile measures deal attitude. Competing bid indicate the appearance of multiple bidders. Tender offer denote the deal type is tender offer. Diversification indicates bidder and target oriented in different industry. For market environment, Heat Degree is defined as the quarterly moving average of deals conducted over the average quarter frequency of deals conducted from 1990 to 2009. Dummy variable High and Low represent whether the deal announced in the High or Low market valuation period. The year fix effect is controlled for all regressions. Figures in parentheses refer to T-statistic adjusted by controlling heteroskedasticity and bidder clustering. The number of observations (N) for all regressions is also shown in this table.

	BHAR[0,12]	BHAR[0,24]	BHAR[0,36]
TKZ Value	0.0895*** (0.007)	0.1213*** (0.003)	0.1452*** (0.006)
RUNUP	-0.0248 (0.537)	-0.1105** (0.023)	-0.1776*** (0.004)
Experienced_Bidder	0.0173 (0.596)	-0.0034 (0.940)	-0.0089 (0.881)
Relative Transaction Value	-0.0456 (0.229)	-0.0538 (0.341)	-0.0231 (0.760)
STOCK	-0.0444 (0.189)	-0.1043** (0.024)	-0.1360** (0.029)
Hostile	0.0238 (0.737)	0.1395 (0.218)	0.2237 (0.260)
Competing Bid	-0.0475 (0.330)	-0.0387 (0.644)	0.0046 (0.972)
Tender	0.0146 (0.618)	0.0620 (0.139)	0.0552 (0.312)
Diversification	-0.0555** (0.034)	-0.1189*** (0.002)	-0.1445*** (0.005)
Heat Degree	-0.0666 (0.797)	-0.0073 (0.980)	0.3640 (0.313)
High	-0.0151 (0.785)	0.0513 (0.497)	-0.0160 (0.853)
Low	-0.0822 (0.226)	-0.1353 (0.146)	-0.1282 (0.333)
Constant	0.0054 (0.984)	-0.0336 (0.915)	-0.4279 (0.250)
OBS	1622	1622	1622
R-sq	0.033	0.059	0.057

p-values in parentheses ="\* p<0.1, \*\* p<0.05, \*\*\*p<0.001



*Table 2.9 OLS regression results impact of financial constraints disparity on bidders long run abnormal returns.*

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The table shows OLS regression results for the impact of acquirer financial constraints on bidders long run abnormal returns. The sample includes acquisitions conducted by US public bidders from January 1<sup>st</sup>, 1990 to December 31<sup>st</sup>, 2009. The sample data is selected from Thomson Financial SDC Mergers and Acquisitions Database. Dependent variables is BHAR[0,12], BHAR[0,24], BHAR[0,36] which are the post-merger 12-month, 24-month, 36-month buy-and-hold abnormal returns.. Independents variables are ATDKZ value measures disparity of Acquirer and Target' financial constrains The financial constraint difference (ATDKZ) is defined as bidders KZ value minus target KZ value; RUNUP is measured as market-adjusted CARs over the [-365, -28] window prior to announcement. Experience bidder denotes whether bidders have conducted M&A deals in the past five years; Relative transaction value denotes the relative size of the deal, and is defined as the proportion of deal value over bidders market value; Stock denote that the deal is paid by 100% stock; Hostile measures deal attitude. Competing bid indicate the appearance of multiple bidders. Tender offer denote the deal type is tender offer. Diversification indicates bidder and target oriented in different industry. For market environment, Heat Degree is defined as the quarterly moving average of deals conducted over the average quarter frequency of deals conducted from 1990 to 2009. Dummy variable High and Low represent whether the deal announced in the High or Low market valuation period. The year fix effect is controlled for all regressions. Figures in parentheses refer to T-statistic adjusted by controlling heteroskedasticity and bidder clustering. The number of observations (N) for all regressions is also shown in this table.

	BHAR[0,12]	BHAR[0,24]	BHAR[0,36]
ATDKZ Value	-0.0125 (0.803)	-0.0216 (0.722)	-0.0306 (0.661)
RUNUP	-0.0285 (0.479)	-0.1153** (0.018)	-0.1832*** (0.003)
Experienced_Bidder	0.0203 (0.534)	0.0009 (0.984)	-0.0035 (0.953)
Relative Transaction Value	-0.0436 (0.250)	-0.0512 (0.364)	-0.0201 (0.790)
STOCK	-0.0493 (0.146)	-0.1110** (0.016)	-0.1441** (0.022)
Hostile	0.0279 (0.694)	0.1451 (0.200)	0.2304 (0.245)
Competing Bid	-0.0452 (0.357)	-0.0359 (0.670)	0.0078 (0.953)
Tender	0.0126 (0.667)	0.0593 (0.156)	0.0521 (0.340)
Diversification	-0.0602** (0.021)	-0.1250*** (0.001)	-0.1515*** (0.003)
Heat Degree	-0.0665 (0.799)	-0.0075 (0.980)	0.3633 (0.316)
High	-0.0190 (0.734)	0.0461 (0.543)	-0.0223 (0.798)
Low	-0.0793 (0.241)	-0.1314 (0.157)	-0.1234 (0.351)
Constant	-0.0044 (0.987)	-0.0464 (0.885)	-0.4427 (0.237)
OBS	1622	1622	1622
R-sq	0.029	0.055	0.054

p-values in parentheses ="\* p<0.1, \*\* p<0.05, \*\*\*p<0.001

*Table 2.10 OLS regression results for the impact of financial constraints on premium.*

This table shows OLS regression results for the impact of acquirers/target financial constraints and financial constraint disparity on bid premium. The sample includes acquisitions conducted by US public bidders from January 1<sup>st</sup>, 1990 to December 31<sup>st</sup>, 2009. The sample data is selected from Thomson Financial SDC Mergers and Acquisitions Database. Dependent variables are bid premium, which denote the percentage of bidder overpayment on the basis target stock price one month before the deal announcement. Independent variables are AKZ which is acquirer's financial constraint measured by acquirers KZ value, TZK which is target's financial constraint measured by Target KZ value; ATDKZ value measures disparity of Acquirer and Target' financial constraints. The financial constraint difference (ATDKZ) is defined as bidders KZ value minus target KZ value; RUNUP is measured as market-adjusted CARs over the [-365, -28] window prior to announcement. Experience bidder denotes whether bidders have conducted M&A deals in the past five years; Relative transaction value denotes the relative size of the deal, and is defined as the proportion of deal value over bidders market value; Stock denote that the deal is paid by 100% stock; Hostile measures deal attitude. Competing bid indicate the appearance of multiple bidders. Tender offer denote the deal type is tender offer. Diversification indicates bidder and target oriented in different industry. For market environment, Heat Degree is defined as the quarterly moving average of deals conducted over the average quarter frequency of deals conducted from 1990 to 2009. Dummy variable High and Low represent whether the deal announced in the High or Low market valuation period. The year fix effect is controlled for all regressions. Figures in parentheses refer to T-statistic adjusted by controlling heteroskedasticity and bidder clustering. The number of observations (N) for all regressions is also shown in this table

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AKZ	-0.0093		
	(0.859)		
TKZ		0.0877**	
		(0.011)	
ATDKZ			-0.0963**
			(0.021)
RUNUP	0.0326	0.0356	0.0340
	(0.368)	(0.325)	(0.343)
Experienced Bidder	0.0189	0.0165	0.0227
	(0.515)	(0.564)	(0.425)
Relative Transaction Value	0.0539*	0.0522*	0.0519*
	(0.087)	(0.098)	(0.099)
STOCK	0.0083	0.0132	0.0078
	(0.805)	(0.693)	(0.815)
Hostile	0.0766	0.0715	0.0753
	(0.296)	(0.332)	(0.306)
Competing Bid	0.2214***	0.2185***	0.2155***
	(0.004)	(0.004)	(0.005)
Tender	-0.0490*	-0.0464	-0.0470
	(0.094)	(0.114)	(0.107)
Diversification	0.1020***	0.1072***	0.1063***
	(0.000)	(0.000)	(0.000)
Heat Degree	0.3182	0.3202	0.3069
	(0.157)	(0.153)	(0.168)
High	-0.0979**	-0.0954**	-0.0992**
	(0.038)	(0.041)	(0.034)
Low	0.0673	0.0640	0.0681
	(0.453)	(0.475)	(0.449)
Constant	0.2499	0.2570	0.2628
	(0.301)	(0.289)	(0.275)

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N	1468	1468	1468
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# **Chapter 3: Recommendation Consensus and M&A Returns**

## **3.1. Introduction**

We have estimated to what extent financial constraints can influence the outcomes of mergers and acquisitions. The results show that financially constrained firms outperform financially unconstrained firms in M&As. In chapter 2, we try to explore how analysts' coverage will influence the outcome of M&As.

The reputation-concern hypothesis (Lazear and Rosen, 1979, Fama, 1980, Holmström, 1999) states that security analyst reputation is a career-long concern. Investors give extra credit to security analysts with a high reputation. A security analysts' reputation is based on the accuracy of their forecasts and the length of their forecasting record. To maintain a high reputation, security analysts should possess superior information-processing abilities. Herding may exist but experienced security analysts give forecasts earlier than inexperienced analysts (Hong et al., 2000). According to the theory, we believe that security analysts have superior information processing abilities. Therefore, they can successfully predict M&A performance and give recommendations accordingly. By studying a sample of 8,889 US M&A deals from 1993 to 2010, we firstly examine to what extent recommendation consensus can influence an acquirer's short-term abnormal return. To prove that analysts have superior information-processing abilities, we estimate the relationship between the changes in recommendation consensus before deal announcement and acquirer short-term M&A performance. We also reveal how analysts respond to acquirers' short-term abnormal returns after the deal announcement. Regulation Fair Disclosure (Reg-FD) (2000) is a game-changing regulation and has limited selective disclosure. Bagnoli et al. (2008) argue that analysts' superior performance in issuing correct recommendations and earnings forecast is due to strong links between analysts and

management. To reveal the true power of a security analyst, we examine to what extent their recommendations can affect bidders' short-term abnormal returns after the enforcement of Regulation Fair Disclosure (2000)

Previous literature suggests that the true influence of analyst recommendations on stock prices remains inconclusive. According to Trueman (1994) model, analysts' compensation relies on how many profitable recommendations they make for their clients. Chen et al. (2005) suggest that investors use two indicators to assess analysts: analysts' forecasting performance and the length of analysts' forecast record. Investors will favour analysts who provide more accurate forecasts and have a longer forecasting record. Investors will also continue to upgrade their opinions about analysts with high forecasting accuracy as the length of their forecasting records increases. Analyst's reputations – a career-long concern – will force analysts to provide the most precise recommendations they can. McNichols and O'Brien (1997) suggest that analysts tend to cover firms for which they predict a good performance. Therefore, we estimate whether analyst recommendations affect bidders' short-term abnormal returns.

Furthermore, analysts issue stock recommendations and earning forecast for the firms they cover. According to their own assessment of firm performance, analysts will upgrade or downgrade their recommendation level. M&A significantly changes bidder and targets' stock performance. It can generate huge portions of information in a short period of time. To precisely process this information and provide accurate recommendations, analysts have to have superior information-processing abilities. In this paper, we examine whether analyst recommendations influence M&A performance and whether analysts can successfully predict M&A performance and provide accurate recommendations. We conjecture that acquirer analysts will issue the right recommendations before the announcement day of a pending deal if they can foresee the forthcoming M&A deal and accurately forecast the outcomes of the

transaction. Therefore, changes in recommendation level three months before the announcement day affect bidders' short-term abnormal return.

Hilary and Hsu (2013) suggest that analysts maintain their consistency by applying a low-ball strategy. In essence, analysts can maintain their consistency if they always give optimistic forecasts. Malmendier and Shanthikumar (2014) suggest that analysts give pessimistic earnings forecast so that management can meet their targets. According to the analyst reputation-concern theory, if analysts do have superior information-processing abilities, to maximum their clients' interests they will not only provide accurate recommendations but also update their recommendations on time. Thus, analysts will change their recommendations based on bidders' short-term abnormal returns shortly after announcement day.

Previous studies suggest that accurate recommendations result from selective disclosure. There was a strong linkage between analysts and management before the year 2000 and recommendations given before the introduction of Reg-FD mainly resulted in selective disclosure. However, after the enforcement of Regulation Fair Disclosure (Reg-FD) in October 2000 by the Securities and Exchange Commission (SEC), the gap between public accessible information and private information communicated among professional investors narrowed. Bagnoli et al. (2008) suggest that Reg-FD builds up a more efficient competitive environment by removing analysts' privilege of accessing private information. Even though some analysts' success was rooted in selective disclosure before year 2000, we believe that analysts have superior information-processing abilities regardless of the impact of Reg-FD. Therefore, the true influence of analyst recommendations on bidder abnormal returns should remain unchanged after the enforcement of Regulation Fair Disclosure.

This paper contributes to the existing literature in many respects. Stickel (1995) and Womack (1996) measure how prices respond to changes in recommendation. They document that changes in recommendation prompt converse returns at

recommendation announcement day. Our interest focuses on how acquirers' short-term abnormal returns are related to analyst recommendations. Berchar and Juergens (2007) find that a positive recommendation leads to positive acquirer returns. However, they estimate the influence of positive announcements and negative recommendations on acquirer performance separately. The potential existence of selection bias may alter the result. In this paper, we trace all acquirers' recommendations one year before deal announcement and estimate the recommendation consensus. This recommendation consensus is more reliable to reveal the true power of analysts' recommendation. Barber et al. (2001) study how prices react to the recommendation consensus. However, they focus on portfolio returns rather than M&A returns.

We also study whether analysts update their recommendations on time. The bank affiliation theory suggests that analysts tend to give optimistic recommendations to acquirers. The conflict between brokers and investors does exist. Analysts tend to give favourable recommendations to affiliate brokerage houses. It can be argued that career concern will discipline such behaviour. Empirical evidence regarding the reliability of analyst recommendations is inconclusive. From the investors' perspective, we estimate whether analysts have a superior trading ability and whether trading in accordance with analyst recommendations brings a profit. Reg-FD creates a more efficient competitive environment by removing analysts' privilege of accessing private information. Instead of using earnings forecasts, we use consensus recommendations to estimate how analysts' performance regarding predictions for acquirer announcement return changed after the implementation of Reg-FD.

This paper analyses the extent to which recommendation consensus influences acquirer M&A performance in both the long and short run by studying a sample of US M&A deals from 1992 to 2010. Instead of using general recommendation consensus, we use one-year time intervals surrounding the deal announcement day to estimate the recommendation consensus. This enables us to estimate the power of security analysts'



recommendations more precisely. Our results show that acquirers with high recommendation consensus before announcement day outperform acquirers with low recommendation consensus in the short run. Analysts are therefore found to successfully predict incoming M&A deals and adjust their recommendations accordingly, supporting the reputation concern theory. Moreover, our results suggest that acquirer short-term M&A performance is directly linked to adjustments in recommendations after announcement day. The effect of recommendations on acquirers' M&A short-term performance remains unchanged after the implementation of Regulation Fair Disclosure.

This paper's main finding is that recommendation consensus has a positive influence on acquirers' short-term performance. Changes in recommendation consensus before announcement day are positively related to acquirer short-term performance, and trading in line with recommendation consensus is found to be profitable, supporting the reputation concern theory.

Acquirers with a high recommendation consensus before announcement day outperform acquirers with a low recommendation consensus in the short run. A one-unit increase in recommendation consensus from 365 to 0 days before announcement day increases bidders CAR[-5,5] by 1.19%. Acquirers' short-term abnormal returns increase if analysts issue more buy or strong buy recommendations.

This is because analysts are considered to have superior information-processing abilities as they are more rational and skilful when valuing acquirer performance. However, analyst recommendations can be biased, therefore a recommendation consensus is more accurate and influential than a recommendation from a single analyst. This result suggests that even though an analyst may suffer from affiliation, recommendation consensus still reflects the true growth potential of an acquirer. Our results support the reputation concern hypothesis

Furthermore, changes in recommendation consensus before announcement day are positively related to acquirer short-term performance. More information is available when the deal is due to be announced. Given their concern for their reputation, analysts will carefully process this information and give more accurate recommendations to the public. This indicates that analysts adjust their recommendations in accordance with their most recent assessment of an acquirer's growth potential. Our results suggest that a one unit increase in recommendation consensus 90 days before announcement day increases bidders' CAR[-5,5] by 1.71%. These results prove that a recommendation consensus close to the announcement day has a stronger influence than others. This supports the conjecture that acquirer analysts issue the right recommendation if they foresee forthcoming M&A deals and accurately forecast M&A outcomes.

On the other hand, our results also reveal how analysts respond to acquirer short-term abnormal returns. Acquirers' short-term abnormal returns are positively related to recommendation consensus. Analysts are more likely to upgrade their recommendations towards a strong buy rating for an acquirer that achieves positive short-term abnormal returns. This is because to maintain their reputation, analysts will quickly respond to changes in the market as they can update their recommendations quickly.

Finally, analysts' recommendation consensus is still positively related to acquirers' short-term performance after the implementation of Reg-FD. Our results shows that a one-level upgrade in recommendation consensus (Rec365) increases acquirers' short-term abnormal returns by approximately 1.18%. Even though Reg-FD is a game-changing regulation, the true influence of analyst recommendations on bidder abnormal return should remain unchanged after the enforcement of the regulation. For the control variables, acquirers will achieve a better short-term abnormal return if relative-size is larger and deal type is a tender offer. A negative short-term performance may produce an abnormal return if the deal is diversifying and the target is a publicly listed firm.

The rest of this chapter is organized as follows. In section 2, we provide a comprehensive literature review and construct the main hypothesis. Section 3 shows the data selection procedure, sample description and methodology. Section 4 includes univariate and multivariate results. Section 5 presents a robustness test. Section 6 sets out our conclusion for the chapter.

## 3.2. Literature Review

We have estimated to what extent financial constraints can influence the outcomes of M&A deals. The results show that financially constrained firms outperform financially unconstrained firms in M&As. In chapter 2, we try to explore how analysts' coverage influence the outcome of M&A. To be more specific, we tend to compare the magnitude of analysts' influence with that of firms' financial conditions on M&A outcomes.

Barber et al. (2007) estimate the impact of NASD 2711 on the financial market. Due to the extreme distribution of buy and hold/sell stock rating from investment banks and brokerage firms, NASD 2711 was imposed on 7 February 2002. NASD Rule 2711 requests all investment banks and brokerage firms to disclose their stock rating distributions. By using a sample of over 438,000 recommendations issued by 463 brokerage firms on more than 12,000 different firms from January 1996 to June 2003, Barber et al. (2007) confirm that recommendation profitability can be predicted by broker's rating distribution. Following the implementation of NASD 2711, buy recommendations fell by 5.4% and holds/sells increased by 6.6%. This result proves that NASD 2711 has had a statistically significant impact on the decline of buy recommendations. Before the implementation of NASD 2711, banks sanctioned under the Global Research Analyst Settlement offered 1.7% more buy recommendations than non-sanctioned firms. After the implementation of NASD 2711, sanctioned banks' buy recommendations fell 13% more than those of non-sanctioned banks. Brokers' stock rating distributions can be used to predict the profitability of analyst recommendations, especially for the time after the implementation of NASD 2711. However, the predictability of the distribution is diminishing in the quarters after the implementation of these regulations.

Ryan and Taffler (2004) prove that there is a strong linkage between large price movements to information shocks. An information proxy can be constructed by using

larger price movements. Following Ryan and Taffler (2004), Conrad et al. (2006) study a sample of 81,939 return events to study how analysts' recommendations respond to public information shocks. They firstly construct three hypotheses then estimate empirical models of recommendation levels, conditioned on the sign of the information shock, to determine which hypothesis is most consistent with the data.

Conrad et al. (2006) constructs the hypothesis under two main assumptions: first, analysts' recommendations are based on price-to-value comparisons; second, the market is information-efficient. Under these two main assumptions, the first hypothesis states that analysts do not have any information privilege that other market participants do not have. Their recommendations are unbiased. A large stock price movement will therefore have no effect on the probability of a change in an analyst's recommendation level. The second hypothesis states that analysts have private information that others cannot access, so they downgrade (upgrade) in response to positive (negative) price shocks. This is because positive price shocks lead to market overvaluations, analysts who can access private information can more accurately estimate fundamental values. They tend to downgrade in response to a positive price shock and vice-versa. There is a symmetrical relationship between recommendation change and market shock. Finally, based on the assumptions of H2, conflicts of interest between analysts and their employers do exist so that recommendations given by analysts will be biased. Under H3, analysts may downgrade their recommendations for negative price shocks. There will be an asymmetrical relationship between recommendation change and market shock.

Conrad et al. (2006) tests these hypotheses by carrying out univariate and multivariate tests. If the results support H1 and H2, no conflict of interest exists. There will be a symmetric reaction between analyst recommendation and subsequent positive and negative information shocks. On the other hand, if the results support H3, there is a conflict of interest with the asymmetric response. They document that analyst recommendations change with large price shocks. There is an asymmetrical

movement between recommendation changes and stock prices during both bull and bear markets. Analysts are equally likely to upgrade in a bull market. However, they are more likely to downgrade in a bear market. The results indicate that a conflict between analysts and their employers does exist.

Conrad et al. (2006) also provide empirical evidence to support the herding theory. 'Herding' is defined as individual market participants conducting similar trading strategies at the same time. Trueman (1994) suggests that analysts' compensation relies on how many profitable recommendations they make for their clients. Thus, analysts making unprofitable recommendations tend to herd with those who make profitable recommendations regardless of the information received. Jegadeesh and Kim (2009) introduce a new approach to analyse the herding phenomenon that appears when sell-side analysts give stock recommendations. Herding results from all trading participants making the correct reaction based on receiving the same information. However, due to analysts' optimistic bias, some are unwilling to downgrade their recommendations even if the firm covered performs poorly.

Bagnoli et al. (2008) reveal a strong linkage between analysts and management before 2000. Recommendations given before the introduction of Reg-FD are mainly the result of selective disclosure; Regulation Fair Disclosure (Reg-FD), introduced by the Securities and Exchange Commission (SEC) in October 2000, aims to eliminate the gap between publicly accessible information and private information communicated among professional investors. During the first year of imposing Reg-FD, turnover of Institutional Investor (I/I) ranking intensified, with only 68.16% of I/I ranked analysts remaining ranked after Reg-FD compared with 79.27% before Reg-FD. The changes in turnover of I/I indicate that Reg-FD builds up a more efficient competitive environment by removing analysts' privilege of accessing private information. Mark Bagnoli et al. (2008) conclude that Reg-FD has seriously changed the trading behaviour of institutional investors, hedge funds and financial analyst, especially for I/I rankings. Thus, we estimate whether the effect of recommendations on bidder

abnormal return is changed by Reg-FD. In addition, Conrad et al. (2006) do not directly estimate the relationship between information shocks and recommendation changes. Alternatively, they construct a proxy for new information shock by changes in price. This may lead to biased results as a change in price is driven by different factors.

Conflicts of interest between analysts and employers do exist. A reluctance to make changes to recommendations is proved by Barber et al. (2007). They examine the recommendation performance of independent research firms and investment banks from January 1996 to June 2003. The results show that buy recommendations from independent research firms outperform those from investment bank. Simultaneously, the hold and sell recommendations from independent research firms underperform those of investment banks. By using a sample of 335,000 recommendations issued on more than 11,000 companies by 409 securities firms from first call, Barber et al. (2007) compare the recommendation performance of sanctioned banks and non-sanctioned banks and conclude that the Global Research Analyst Settlement may be unjustified. They acknowledge that there is a reluctance to downgrade stock during bear markets, as addressed in the Global Research Analyst Settlement. However, the recommendation performance of sanctioned and non-sanctioned banks shows that the buy recommendations of each investment-banking category significantly underperform those of the independent research firms. Buy recommendations of independent research firms outperform those of investment banks by an average of 3.1 basis points per day and 6.9 basis points daily during a bear market. It therefore takes time for analysts to change their recommendation; this delay should be marked.

Engelberg and Parsons (2011) study the relationship between media coverage and stock market reactions by analysing investors' behaviour as a result of differences in access to information. By using a comprehensive sample matching earnings announcements, local media coverage and trading volumes of retailing investors, Engelberg and Parsons (2011) conduct several series of regressions and reveal the

relationship between media coverage and trading volume. To begin with, they firstly estimate to what extent household trading can be influenced by media coverage. The results show that local media coverage has a positive and statistically significant effect on long-dollar trading volume. This result is robust after controlling for firm size, earnings surprise and local media coverage. The result also revealed an intuitive finding: the more extreme an earnings surprise is, the more trading volumes will fluctuate. They push the research further by dividing the sample into buy-side and sell-side. The results shows that local media coverage has a significant impact on trading volume in both the sell side and buy side, but trading volume on the selling side is slightly lower than that of the buying side. To estimate the pure effect of media coverage, Engelberg and Parsons (2011) control local trading, pre-existing demand and 'home biases'. The result shows that the pure effects of media coverage on trading volume are around 28%. To reveal the causality effect, they identify high frequency variation. As the information distribution relies on physical delivery during the sample period, they controls for extreme weather conditions using weather data collected from the National Climatic Data Centre. The result shows that the interaction between extreme weather and media coverage has a significant negative effect on trading volume. This impact is large enough to offset the positive impact of media coverage on trading volume. The results indicate that there is no positive correlation between media and pre-existing relations.

They conclude that the causality effect between trading volume and local media coverage does exist. The market reaction for given earnings announcements is heavily dependent on local media coverage. Based upon the intensity of local media coverage, daily trading volume will surge from 8% to 50%. This effect remains for both buying and selling activity. However, Engelberg and Parsons (2011) do not directly estimate the causality effect between media coverage and trading volume. They reveal the causal impact by removing co-existing impacts such as pre-existing relations, local media coverage, home bias and high frequent variation. Furthermore, the content of media reports should be more specified. For instance, the impact of media reports that



cover firms' detailed financial conditions on trading volume may be different from the impact of reports that only relate general stories. Engelberg and Parsons (2011) analyse the impact of local media on local trading volume; the results may be varied if we take the whole market into consideration. Finally, we ask how analysts react to media coverage, whether they will alter their recommendation level based on volume of media coverage.

By developing a model which links managerial skill to managers' reliance on public information (RPI), Kacperczyk and Seru (2007) directly estimate the relation between changes in stock holding and returns. To analyse the same question, previous studies have firstly estimated which type of information leads to changes in stock holding, then move to the relation between changes in stock holding and returns. By using this unique design, Kacperczyk and Seru (2007) estimate the relation between traditional performance measures and managerial skills. They believe that the magnitude of reliance on public information is related to managerial skills. The model implies that skilled managers are less likely to change their portfolio holding in response to public information. Therefore, skilled managers will exhibit low RPI.

By analysing a comprehensive sample that covers 1,696 actively managed US equity funds over the period 1993 to 2002, Kacperczyk and Seru (2007) find that traditional performance measurement may not fully reflect managerial skill, as investors tend to chase funds with low reliance on public information (RPI). After controlling for market, size, value and momentum, Kacperczyk and Seru (2007) find that mutual funds with a lower *RPI* tend to obtain significantly higher returns. This is because funds with superior information-processing skills exhibit a superior stock-picking ability. they also find that funds with a low *RPI* are rewarded with higher money flows after controlling for past fund performance and other fund-specific characteristics. Funds with a high *RPI* face higher systematic and idiosyncratic risk than funds with low *RPI*. The results imply that institutional investors should disclose more information about the magnitude of RPI when there is

a lack of transparency. RPI may be useful in setting new portfolio managers' rewarding system as the abnormal performance rewarding system is biased.

The ability to time the market is the main reason why informed hedge fund managers outperform others. Engelberg (2008) considers the type of information used in financial research rather than merely focusing on agent type. Tetlock (2007) developed General Inquirer (GI) to estimate the qualitative content of financial media. It counts the frequency at which words appear in text and classifies the words into categories determined by the Harvard IV-4 psychological dictionary. Negative fraction is defined as total negative words from firm I on day T divided by the total words for firm I on day T. By using a unique design – negative fraction – to measure the textural data, they estimate the relation between the role of information-processing cost and post-earnings announcement drift (PEAD). Engelberg (2008) divides the data into qualitative information (information distributed in text) and quantitative information (information spread in data form). Soft information is text-based information such as news reports and earnings statements. Hard information is data-based, such as accounting information and market returns.

By studying a sample containing 51,207 earnings announcements from 4 January 1999 to 18 November 2005 by 4,700 unique firms, Engelberg (2008) reveals that qualitative information has more predictive power than quantitative information. The qualitative information embedded in the DJNS contains more information than standardized unexpected earnings (SUE); this information needs time to diffuse into the market. Qualitative information has more power concerning predicting returns at longer horizons. By estimating the profit from five trading strategies based on negative fraction, Engelberg (2008) finds that a trading strategy combining SUE and negative fraction leads to additional profit. Negative fraction's influence on CAR[2,81] declines institutional ownership increases. This is because institutional investors are better information processors and access to newswires is costly. Engelberg (2008) also uses a baseline regression model to estimate how the CAR of high-tech firms react to

negative fraction. The results shows that the coefficient of NF is -0.5893 for high-tech firms and -0.0606 for non-high tech firms.

Engelberg (2008) gives a detailed map on how to use textural data in financial research. He not only introduces negative fraction in research but also uses NLP to capture reports' characteristics. He also provides very comprehensive research on the predictability of soft information and hard information. His research deals with multiple aspects on this topic, such as: comparing the predictability of soft and hard information; how institutional investors and analysts react to soft and hard information; and how negative influences high-tech firms' abnormal returns. Engelberg (2008) suggests that analyst may have different attitudes regarding the predictability of soft information on future returns, as soft information can be used to make predication on future earnings. However, processing soft information is costly and complex. He points out that researchers should take information type into account when exploring the effect of agent type on asset pricing.

Chen et al. (2005) introduce a model to study how investors estimate the predictive ability of analysts. The result suggests that investors rely on two indicators: analysts' forecasting performance and the length of analysts' forecast record. The analyst forecast record is referred to as analysts' series of forecast errors. According to the model provided by Chen et al. (2005), investors will give more weight to an analyst who provides more accurate forecasts and less weight when forecast error is revealed (Bayesian learning). The length of forecasting record is also important for investors to estimate analysts' predictive ability. Investors will upgrade their views on analysts with high forecasting accuracy in their record as the length of the record increases. Chen et al. (2005) empirical result suggests that analysts' reputation is a career-long concern and that it seriously influences their behaviour.

By analysing a sample including 5,941 analysts and 20,239 analyst year observations from 1993 to 2005, Emery and Li (2009) estimate how sell-side analysts are ranked

by Institutional Investor magazine and the Wall Street Journal (WSJ) and what the determining factors of analyst rankings are. They also estimate the performance of analysts after having achieved their star rankings from I/I or the WSJ and compared the performance of star analysts and non-star analysts. To avoid industry-by-industry bias in the star rankings, industry benchmarks are chosen to estimate analyst performance. Analyst performance is measured using information ratios and accuracy. Accuracy is defined as the relative accuracy of an analysts' earnings forecasts, which was originally developed by Hong and Kubik (2003). To reveal the true determinant force of star ranking, Emery and Li (2009) controlled for analyst aggressiveness, boldness and past ranking record. Broker size and firm size were also included.

Emery and Li (2009) suggest that recommendation performance has an insignificant impact on the possibility of becoming a star analyst but that it is important for an analyst to retain their star ranking. Accuracy has a small effect on star ranking but it is more significant for analysts to move up the I/I ranking list. The statistical significance and pronounced effects of IISTAR (212.26%), BROKERSIZE (40.02%), IPOREP (27.24%), WSJSTAR (24.04%), and TOP300 (16.55%) are consistent with the idea that recognition is the dominating aspect of being an I/I star.

To retain the star ranking, the industry-adjusted performance of investment recommendations is statically significant in WSJ rankings. However, the recommendation performance of a repeated star is worse than others; to be ranked as a WSJ star analyst, recommendation performance is vitally important, as the WSJ is performance-focused. Emery and Li (2009) result suggested that INFORATIO is statically significant for all regressions, which indicates that in the WSJ ranking system, recommendation performance is the main determinant of being a WSJ star and moving up or down the WSJ ranking list, especially for a repeating WSJ star ranking. However, it also suggested that variables measuring recognition are also significant in the WSJ ranking. Recognition is a critical factor in meeting WSJ's eligibility requirements and, as such, recognition is a driving force in the WSJ's

rankings, albeit only for non-WSJ stars.

The recommendation performances of star analysts are not significantly different from those of non-star analysts. There is no significant improvement in analysts' performance after becoming an I/I star. On the other hand, WSJ star performance is found to worsen after obtaining a star ranking. I/I and WSJ stars are less biased in their investment recommendations than non-stars. Simultaneously, however, the investment banking business reduces the relative objectiveness of star analysts. The results provide additional evidence that star analysts may trade their compensation from having a better personal reputation for higher compensation as a result of promoting investment-banking deals. Overall, Emery and Li (2009) provide overall broad picture of the determinants of the star analyst ranking system, and their empirical results suggest that star rankings for both I/I and the WSJ are rely heavily on recognition.

There are two types of analysts: the first is the analyst who makes consistent forecast errors; the second is the analyst with higher stated accuracy. Hilary and Hsu (2013) estimate to what extent stock price can be affected by forecasts given by these two types. They document that the first type of analyst has a greater capability to affect price than the second. Consistency of forecasting error is better than stated accuracy, because investors can use consistent errors from analysts as a benchmark for their own stock valuation.

Hilary and Hsu (2013) find that consistency increases forecast informativeness rather than accuracy. Their findings imply that: first, consistent analysts are less likely to be downgraded and more likely to be nominated as an all-star analyst. Consistency improves the likelihood of being ranked as an I/I star, which is 10% higher than that of accuracy. Consistency also significantly decreases the likelihood of being demoted, which is much stronger than accuracy. Secondly, analysts can manipulate their consistency by strategically giving downward-biased forecasts. Thirdly, institutional

investors favour analysts with a high consistency and trading strategy. Hilary and Hsu (2013) show that consistent analysts are rewarded by I/I rankings. However, Emery and Li (2009) suggest that I/I ranking mainly relies on analyst recognition. It remains inconclusive as to how I/I ranks analysts with high consistency but low recognition and what the combined effect of these two factors is.

Furthermore, Hilary and Hsu (2013) suggest that analysts maintain their consistency by applying a low-ball strategy. They can maintain their consistency by always giving optimistic forecasts. Conrad et al. (2006) suggest that recommendations provided by analysts tend to be sticky in response to major news (interest conflict). Malmendier and Shanthikumar (2014) suggest that analysts give pessimistic earnings forecast so that management can meet targets (strategic distortion). Questions arise regarding how analyst maintain their consistency when there is institutional interference.

Kim et al. (1997) study the trading mechanism of the NYSE/AMEX and NASDAQ and find that a highly centralized call market takes relatively shorter time to reflect private information in stock prices than a competitive but fragmented dealer market. The trading mechanism of the NYSE/AMEX involves floor brokers and specialists. The specialists set up an order execution price for each stock by studying the volume of limit orders and market-on-open orders. They also have the duty of maintaining price stability and continuity. After the market opens, there will be continued auctions on given stocks. In this case, NYSE/AMEX is known as a call market. The main advantage of a call market is that both public and private information is efficiently reflected by execution price at market opening. It takes approximately five minutes to realize the value of private information in a call market. The trading mechanism of the NASDAQ involves a number of dealers who equally assess the market. They simultaneously quote the bid and ask price and competing by given utility maximizing price. The main feature of the NASDAQ is that competing and fragmented dealers conduct trading. It thus takes approximately 15 minutes for stock prices to reflect private information.

The Dow Jones News Wire (DJNW) has recorded the time of news releasing. The records show that VIPs of brokerage houses can possess recommendations from analysts before they are publicly announced. In this case, VIPs of brokerage houses are considered informed traders as they have private information. By studying a sample of 87 observations, Kim et al. (1997) suggest that initial coverage and buy recommendations push stock prices up by approximately 4% for the NYSE/AMEX and 7% for the NASDAQ. These results indicate that buy recommendations given by analysts in brokerage houses have a positive effect on firms' stock price. In this case, as long as the profit generated by the initial coverage can offset the cost of initial covering, managers are willing to pay analysts just to give the right recommendations at the right time.

Furthermore, information asymmetry caused by initial coverage and information leakage before the market opens lead to strong positive reactions in stock prices. According to their evidence, private information has more influential power than public information. The release of public information has no effect on stock price. The NYSE/AMEX – the call market – is more efficient at incorporating private information into stock price than the NASDAQ (a dealer market). The effect of private information is concentrated on opening trade. Informed traders obtain most of the gains at the initial trade; gains from subsequent trading barely cover the transaction cost. Although the NASDAQ tends to be less efficient at reflecting private information into stock prices, informed traders have approximately 3% gains after the opening trades. It takes less than 15 minutes after the opening transactions in each market for private information to be incorporated into stock prices. The competition among informed traders is the reason why private information takes effect so fast. This is because the market rewards the first informed traders who complete the deal with the highest price. The competition among informed traders shortens the time needed for private information to be incorporated into stock prices. Kim et al. (1997) suggest that DJNW records the times that VIP brokers access private information and

the public release of the same information. The timing of recommendation delivered should therefore be taken into consideration when evaluating analyst recommendation ability.

There are two types of views on short-sellers' trading advantage. One group of literature believes that information asymmetry does exist, and that short-sellers are informed traders. The second group believes that there is no information asymmetry but rather market participants interpret public news differently. By combining the corporate news archive and daily short-selling information, Engelberg et al. (2012) reveal the root of short-sellers' trading advantages. Short-sellers have superior information-processing abilities, which is the reason why they can achieve abnormal returns in their trades. There is no evidence to support the claim of short-sellers manipulating news or spreading rumours. Their result also suggests that the timing of short-selling on news day is approximately the same as for other participants, i.e. the ratio of short volume to total volume is 0.196, which drops to 0.177 on negative news days and rises to 0.208 on days with positive news. During the days up to news day, the ratio is smaller or the same under the conditional mean. During the days after news day, the ratio increases. This proves that short-sellers trade on or after news release dates. They also found that the magnitude of a negative relationship between short sales and future returns is doubled on news day and four times as large as on negative news days.

By analysing a sample of 216 jobs changes among I/I star analyst, Clarke et al. (2007) estimate to what extent analyst behaviour can be influenced by bank relationship and whether analyst behaviour affects investment banking deal flow.

By studying the changes of analysts' behaviour around job-changing periods, Clarke et al. (2007) directly examine to what extent investment banks can influence analysts to give favourable recommendations. Their evidence shows that investment banks do not influence analysts' recommendations. Clarke et al. (2007) show that a star



analyst's choice of firm coverage is influenced by the investment bank's relationship with the firm. The possibility of being covered by a star analyst is high for firms with a prior investment banking relationship, particular for underwriting or M&A advisory. Analyst reputation has statistically significant effects on investment banking deal flow but the effect only appears in equity transactions. The bank hiring the star analyst significantly increases its market share in the industry covered by the analyst relative to the bank losing the star analyst. There is no evidence that the optimistic earnings forecasts or recommendations affect investment banking deal flow.

After job changes, analysts may choose to only cover stocks that generate profit for their new employer and provide more optimistic reports during job changes. However, Clarke et al. (2007) suggest that analysts are less likely to change their optimism levels and recommendation ratings for the firms they cover at the new bank; their level of optimism remains unchanged after changing job. The relationship between investment bank and firm as well as job changes therefore do not influence analysts' earnings forecasts; neither star nor non-star analysts upgrade their recommendation levels around job-changing periods.

Malmendier and Shanthikumar (2014) study a sample of analyst recommendations, annual earnings forecasts, the corresponding earnings-per-share realization, information related to analyst identities and brokerage firms from February 1994 to 2002. They estimate whether analysts give different recommendations and earnings forecasts for different audiences, and whether recommendations and earnings forecast distortion result from the trading strategy among firms, institutional investors and analysts.

By sorting analysts into affiliated analysts and non-affiliated analysts by their relationship with large investment institutions, Malmendier and Shanthikumar (2014) find that affiliated analysts give more positive recommendations than those that are unaffiliated. When consensus is chosen as a benchmark, affiliated analysts give less

optimistic earnings forecast. Both large and small investors take symmetric reactions in response to changes in recommendation grade. Small traders ignore the content of forecasts and tend to exert buy pressure for forecast updates; large investors tend to make symmetric reactions towards positive/negative earnings forecast. The over-optimism expressed by unaffiliated analysts remains unchanged for their recommendation and earnings forecast. On the other hand, affiliated analysts show over-optimism in their recommendations and pessimism in their earnings forecasts. This proves that strategic distortion determines the behaviour of affiliated analysts, and strategic distortions are found to exist in the recommendations and forecasts given by both unaffiliated and affiliated analysts. Studying such distortions can help investors to assess the quality of the recommendations and earnings forecast given by particular analysts.

Strategic distortion is defined as the disparity between the recommendations and forecasts given by one analyst for the same stock. The results show that non-strategic distorters give optimistic recommendations and earnings forecasts but strategic distorters give optimistic recommendations and pessimistic earnings forecasts. This disparity is extended to affiliated analysts too. In addition, the distortion is persistent for all analysts.

Malmendier and Shanthikumar (2014) did not estimate the characteristics of recommendations and earnings forecasts given by analysts, but they can be separated into consistency and accuracy. Hilary and Hsu (2013) show that analysts who constantly give downwards recommendations tend to have more predictability than those with high accuracy. Malmendier and Shanthikumar (2014) prove that analysts speak in two tongues. They ignore the fact that the different information-processing skills among investors play a strong role in their investment behaviour. However, using investment size to classify investors is not efficient enough to reveal the true effect.

Teo and Chung (2011) reveal the relationship between hedge funds, sell-side analysts and star analyst rankings. They indicate that sell-side analysts are commission-driven. The researchers find that sell-side analysts tend to provide favourable recommendations on stocks held by hedge funds. In turn, hedge funds support biased analysts to be ranked as star analysts. Teo and Chung (2011) therefore suggest that star rankings fail to give unbiased rankings for analysts. The strong cooperation between hedge funds and analysts will lead to market failure in the future.

The paper's results shows that analysts are 14.8% more likely to issue buy and strong buy recommendations (upgrade) for stocks that are held or being increasing held by hedge funds, and 13.3% more likely to issue sell and strong sell recommendations (downgrade) for stocks sold or being decreasing held by hedge funds. Sell-side analysts tend to provide flattering buy and strong buy recommendations to stock that are held by hedge funds. This result is consistent with Boni and Womack (2003).

This is because sell-side analysts' incentives come from brokerage commissions. Hedge funds will short their stock holdings when the sell-side analysts' buy and strong buy recommendations open up trading opportunities. The results of the study show that when the mean analyst consensus for a stock is equal to or greater than a buy, hedge funds are 11.1% more likely to offload the recommended stock. *Ceteris paribus*, others are 25.2% less likely to sell a stock. Sell-side analysts tend to upgrade and downgrade their recommendations based on this trading mechanism.

Teo and Chung (2011) also suggest that high dollar-turnover hedge funds can get their most wanted recommendations more easily than others as sell-side analysts are commission-driven. Finally, giving biased recommendations may damage sell-side analysts' reputation. However, hedge fund will compensate biased analysts by voting for or supporting them to be ranked as an all-star analyst. As stated earlier, this ill trading mechanism may lead to market failure in the future.

Teo and Chung (2011) do not cover how individual investors and other institutional investors respond to analyst recommendations. Individual investors have their own judgments on analyst recommendation. Investor trading behaviour may be influenced by analyst recommendations. However, the magnitude of that influence is unknown.

**Main theory: Reputation concern theory**

Security analysts' reputation is a career-long concern. Investors give extra credit to security analysts with a high reputation. Their reputation is based on their forecast accuracy and length of forecasting record. To maintain a high reputation, security analysts must possess superior information-processing abilities. Herding may exist but experienced security analysts give forecasts earlier than inexperienced (Hong et al., 2000). According to the theory, we believe that security analysts have superior information-processing abilities. Therefore, they can successfully predict merger and acquisition performance and give recommendations accordingly.

### 3.3. Hypothesis Construction

Previous studies suggest that the true influence of analyst recommendations on stock prices remains inconclusive. According to Trueman (1994)'s model, analysts' compensation relies on how many profitable recommendations they make for their clients. Chen et al. (2005) suggest that investors use two indicators to assess analysts: the analysts' forecasting performance and the length of their forecast record. Investors will favour an analyst who provides more accurate forecasts and has a longer forecasting record. Investors will also upgrade their views on an analyst who has a high forecasting accuracy in their record. Analysts' reputation therefore forces them to provide the most precise recommendations possible. McNichols and O'Brien (1997) suggest that analysts tend to cover firms for which they predict good performance. Therefore, we hypothesise that analyst recommendations have an impact on bidders' short-term abnormal returns.

*H1: Analyst recommendation has statistically significant impact on bidder short-term abnormal return.*

Analysts issue stock recommendations and earnings forecast for the firms they cover. According to their own assessment of firm performance, analysts will upgrade or downgrade their recommendations. M&A significantly change bidders' and targets' stock performance. It can generate huge portions of information in a short period of time. To precisely process this information and provide accurate recommendations, analysts must have superior information-processing abilities. In this paper, we examine whether analyst recommendations influence M&A performance and whether analysts can successfully predict M&A performance and provide accurate recommendations. We conjecture that acquirer analysts will issue the right recommendations before the announcement day if they can foresee forthcoming M&A deals and accurately forecast their outcomes. We hypothesise that:

*H2: Changes in recommendation level three months before announcement day affect bidders' short-term abnormal return.*

Hilary and Hsu (2013) suggest that analysts maintain their consistency by applying the low-ball strategy. This consistency can be maintained if analysts always give optimistic forecasts. Malmendier and Shanthikumar (2014) suggest that analysts give pessimistic earnings forecasts so that management can meet their targets. According to the analyst reputation concern theory, if analysts have superior information-processing abilities, to maximum their clients' interests they will not only provide accurate recommendations but also update their recommendations on time. Therefore, we hypothesise that:

*H3: Analysts will change their recommendations based on bidders' short-term abnormal return within a three-month period after announcement day.*

Previous studies suggest that accurate recommendations result from selective disclosure. There was a strong linkage between analysts and management before the introduction of Regulation Fair Disclosure in 2000. Recommendations prior to Reg-FD mainly resulted in selective disclosure (Bagnoli et al., 2008); however, after the enforcement of Reg-FD, the gap between publicly accessible information and private information communicated among professional investors narrowed. Bagnoli et al. (2008) conclude that Reg-FD has built up a more efficient competitive environment by removing analysts' privilege of accessing private information. Although some analysts' success is rooted in their performance prior to 2000, we believe that they continue to have superior information-processing abilities. Therefore, the true influence of analyst recommendations on bidder abnormal return should remain unchanged after the enforcement of Regulation Fair Disclosure. We hypothesise that:

*H4: Analyst recommendations affect bidders' short-term abnormal return after the enforcement of Regulation Fair Disclosure (2000).*

## **3.4. Data and Methodology**

### **3.4.1 Sample Selection**

In this paper, we estimate the relationship between bidders' short-term returns and analyst recommendations. Therefore, we need to combine the deal sample and recommendation sample. The initial deal sample includes 281,335 US M&A deals. We require all deals to have been announced over the period 1 January 1992 to 31 December 2010 from Thomson One Banker. Both bidders and targets must be US firms, thus the original sample yielded 175,027 deals. Bidders are also required to be public companies; targets can be public, private or subsidiaries. This reduces the sample to 94,387 deals. Takeover transaction values must be greater than or equal to \$1 million, lowering the sample to 52,273 deals. Following the standard procedure, we exclude financial and utility firms with Standard Industrial Classification codes 6000–6999 and 4900–4999 as these firms are in regulated industries. This leaves us a sample of 36,758 deals. We also remove deals completed using the following M&A techniques: bankruptcy acquisitions, going-private transactions, leveraged buyouts, liquidations, repurchases, restructurings, reverse takeovers, and privatisations. This reduces the sample to 25,645 deals. As we study bidders' short-term acquisition performance, all deals should be completed, which reduced the sample further to 35,263 deals.

We collect all of the available analyst recommendations from the Institutional Brokers' Estimate System (I/B/E/S). The recommendation recordings range from 29 October 1993 to 18 April 2013. IBES ranks recommendations by a numerical system using the IBES recommendation code: 1=strong buy, 2=buy, 3=hold, 4=sell, 5=strong sell. To ease the potential confusion, we use Jegadeesh et al.'s (2004) approach to reverse the code into: 5=strong buy, 4=buy, 3=hold, 2=sell, 1=strong sell. To estimate the effect of recommendations on bidder performance, we need to match the recommendation with bidders' firm characteristics and deal characteristics. Therefore, we collect

company name, analyst name and estimator ID. To guarantee data accuracy, we obtain both recommendation announcement day and review day. The initial recommendation sample includes 2,205,401 observations, which covers 58,263 companies and 21,658 analysts. These two samples are matched by deal number, analyst name, company name and recommendation announcement day. As one acquirer will receive many recommendations from different analysts, after the combination, the sample yields to 463,046 observations. Furthermore, analysts will upgrade or downgrade their recommendations over time. A strong buy recommendation given two years ago has a limited impact on bidder performance today. Therefore, we introduce a time variable gap. This gap is defined as the calendar day difference between the recommendation announcement day and deal announcement day. We keep the recommendation given 365 days before the deal announcement and 365 days after the deal announcement day, which yields 318,320 observations. Nonetheless, we estimate the recommendation consensus and drop all duplicate deals, reducing our sample to 25,645 observations.

To control deal characteristics, we require that deal information, such as deal attitude, diversification, deal type and means of payment, be recorded by Thomson One Banker, yielding 18,782 deals.

To control for firms' characteristics, we require that The Center for Research in Security Prices (CRSP) database has sufficient recorded information about bidder stock price data. We use cumulative abnormal return 3, 5 and 11 days surrounding the announcement day to measure bidders' short-term abnormal return, which reduces the sample to 15,803 deals. We require that bidders have sufficient accounting information, as recorded by the Compustat database, so that we can estimate firm characteristics such as leverage ratio, run-up ratio, market to book ratio, price to earnings ratio and relative size, leaving a sample of 10,666 observations. Since we analyse to what extent financial recommendations influence M&A performance, recommendation censuses are also required, yielding a sample of 9,649 deals. To estimate the post-merger recommendation changes, we require all deals to have been



completed, and thus remove 760 uncompleted deals, giving a final sample of 8889 deals.

### **3.4.2 Methodology**

#### *3.4.2.1 Univariate Test*

Both univariate tests and multivariate regression models are employed to analyse the impact of recommendation consensus on bidders' short-term abnormal returns. We categorise the sample into two groups on the basis of deal announcement day. To estimate whether recommendation consensus can influence bidder short-term abnormal returns, we need to use the recommendations given before the announcement day. We define the recommendation consensus before the announcement day as the average recommendation level given from 365 days to 0 days before the deal announcement day. We define the recommendation consensus after the announcement day as the average recommendation level given from 0 day to 365 days after the deal announcement day.

In the univariate test, we further categorize the sample using the recommendation consensus. We define a group of deals as having a Buy recommendation if the acquirers' recommendation consensus is greater than 2; the rest of the sample is labelled as Hold or Sell. We then compare the mean of bidders' short-term abnormal returns obtained by acquirer's recommendation consensus level. We use different approaches to estimate abnormal returns in short run. For the short run, we choose 3, 5 and 11-day time windows to calculate CARs. CARs in each time window are estimated using the market model and the market-adjusted model.

Bidders' firm-specified characteristics used are:

- (i) Runup, which measures bidders' past performance and is defined as market adjusted cumulative abnormal return 365 to 6 days before deal announcement;
- (ii) ROE, which measures bidders' profitability and is defined as net income divided by common and preferred equity – COMPUSTAT  
 $\text{Item18}/(\text{Item10}+\text{Item11})$ ;

- (iii) M/B, the market to book ratio, which measures the market valuation of a bidder's stock, and is defined as annual price close multiplied by the number of common shares outstanding divided by the total common equity –  $\text{COMPUSTAT Item24} * \text{Item25} / \text{Item60}$ ;
- (iv) P/E, the price to earnings ratio, which measures net income per share and is defined as the annual price close divided by earnings per share –  $\text{COMPUSTAT Item24} / \text{Item58}$ ;
- (v) Cash flow/total assets, which is the cash flow over the equity ratio, measures the amount of free cash held by a company and is defined as the sum of income before extraordinary items and depreciation minus dividends of common and preferred stock, divided by the total asset –  $\text{COMPUSTAT}(\text{Item18} + \text{Item14} - \text{Item19} - \text{Item21}) / (\text{Item6})$ ;
- (vi) Debt/equity (debt over asset ratio), which measures to what extent the company is leveraged, and is defined as long-term debt divided by total assets –  $\text{COMPUSTAT Item9} / \text{Item6}$ ;
- (vii) We also include the leverage ratio, which is defined as the total liabilities divided by the total assets – defined as  $\text{COMPUSTAT}(\text{Item 9} + \text{Item34}) / (\text{Item 9} + \text{Item34} + \text{Item216})$ .

For each group, we compare the deal-specific characteristics. 'Relative transaction value' denotes the relative size of the deal, and is defined as the proportion of deal value over bidders' market value; 'tender offer' denotes the type of deal. 'Hostile' measures deal attitude. 'Diversification' indicates bidder and target oriented in different industries. 'Stock' denotes that the deal is paid by 100% stock; 'public' denotes a publicly listed target.

#### *3.4.2.2 Multivariable test*

Univariate tests are insufficient to reveal the true relationship between recommendation consensus and acquirers' short-term abnormal returns. To reveal the true relationship,

we need to control for the interactive effect among firm characteristics and deal characteristics. As mentioned before, the first hypothesis states that ‘*Analyst recommendation has a statistically significant impact on bidder short-term abnormal return.*’ To test hypothesis 1, we carry out multivariable tests as shown in the following regression model.

$$CAR_{it} = \alpha_0 + \alpha_1 REC_{it} + \alpha_t Controls + \varepsilon_{it}$$

#### Regression model 1

Regression model 1 measures the relationship between recommendation consensus and acquirer abnormal return. The key explanatory variable is recommendation consensus ( $REC_{365_{it}}$ ) measured by average recommendation given 365 days before deal announcement day. There will be more information available on the deal announcement day. We conjecture that the recommendations given close to the deal announcement day have a stronger impact than others. Therefore, in regression 2, we recalculate recommendation consensus by the average of the recommendations given 90 days before the announcement day. The key explanatory variable is recommendation consensus ( $REC_{90_{it}}$ ).

Regression model 2 analyses the relationship between changes in recommendation and acquirers’ abnormal return. We conjecture that acquirer analysts will issue the right recommendations before announcement day. More information is disclosed on the actual announcement day. Analysts can foresee forthcoming M&A deals and accurately forecast their outcomes and change or update their recommendations accordingly. The second hypothesis is that: *Changes in recommendation level three months before announcement day affect bidder’s short-term abnormal return.* We carry out multivariable tests as shown in the following regression model.

$$CAR_{it} = \alpha_0 + \alpha_1 Changes\_REC_{it} + \alpha_t Controls + \varepsilon_{it}$$

#### Regression model 2

The key explanatory variable is changes in recommendation consensus ( $Changes\_REC_{it}$ ). To estimate  $Changes\_REC_{it}$ , we initially divide the pre-deal announcement day recommendation sample into two groups by different calendar day, recommendations given from 365 to 90 days before announcement day, and recommendations given from 90 days to 0 days before announcement days. We then match the sample by deal number, acquirer ID and analyst ID and calculate the recommendation consensus. Next, we use the recommendation consensus 90 days before announcement day and subtract the recommendation 365 to 90 days before announcement day. We therefore define the changes in recommendation ( $Changes\_REC_{it}$ ) as the difference between the recommendation consensus 90 days before announcement day and recommendation 365 to 90 days before announcement day.

Regression model 3 analyses how analyst recommendations respond to acquirers' short-term abnormal return. The third hypothesis is that analysts will change their recommendation based on bidders' short-term abnormal return within three months after the announcement day. We use a probit model to carry out multivariable tests, as shown in following regression model 3.

$$RECLVL = \alpha_0 + \alpha_1 CAR_{it} + \alpha_t Controls + \varepsilon_{it}$$

Regression model 3.

The dependent variable: recommendation level (RECLVL) in regression model 3 is a dummy variable, equal to 1 if the recommendation level is buy or strong buy. The key explanatory variable is the cumulative abnormal return, which is estimated at 3, 5 and 11 days surrounding the announcement day. As mentioned before, analysts respond to acquirers' short-term abnormal return, and will adjust their recommendation in time. We look for a positive relationship between acquirers' post-acquisition abnormal return and RECLVL.

In order to analyse the impact of REG-FD on the relation between recommendation and bidders' return in the short run, we rerun the regressions by adding a dummy variable REG-FD; REG-FD is equal to 1 if the deal announcement day is after 2000 when REG-FD was implemented. We use regression model 4 to carry out the regression shown below:

$$CAR_{it} = \alpha_0 + \alpha_1 REC_{it} + \alpha_2 REG\_FD + \alpha_t Controls + \varepsilon_{it}$$

#### Regression Model 4

The key explanatory variables are the recommendation consensus ( $REC_{it}$ ) and the dummy variable REG-FD. As mentioned before, REG-FD has substantially limited the accessibility of private information. Therefore, we expect the dummy variable to have a negative impact on bidders' abnormal return. If analysts perform well due their superior information-processing abilities rather than as a result of inside trading, their recommendations should continue to affect bidders' short-term abnormal returns after the implementation of REG-FD.

For each regression model, we have a number of control variables that affect acquirer returns; The *RUNUP* ratio, which measures past stock return, market-to-book ratio (*M/B*), price-to-earnings ratio (*P/E*), leverage (*Leverage*), and cash flow-to-equity ratio (*Cash flows/Equity*). The deal specified variable are Relative Transaction Values, which measures relative size; Stock, is a dummy variable, denote 100% stock payment; tender offers, where the dummy variable measures deal type; and diversification, where the dummy variable measures whether the deal is diversifying deal.

#### ***Short-term performance***

We use cumulative abnormal returns (CAR) to measure bidder short-term M&A performance. The market model defines Cumulative abnormal return 5 days surrounding announcement day as:

$$CAR_{i,-5,5} = \sum_{t=-5}^5 [R_{it} - (\alpha_i + \beta_i R_{mt})]$$

where  $R_{it}$  represent firms' daily return;  $R_{mt}$  represent daily market index return.  $(\alpha_i + \beta_i R_{mt})$  is the market return estimated by market model. Therefore, the Cumulative abnormal return (CAR) is the sum of bidder daily abnormal return during the event window two days before and two days after the announcement day.

Bouwman et al. (2009) point out that bidder may conduct multiple deals within the sample period. To address this issue, we estimate the market-adjusted CAR. The market-adjusted CAR 5 days surrounding announcement day is defined as the sum of daily abnormal return within the event window [-5,5];

$$CAR_{i,-5,5} = \sum_{t=-5}^5 AR_{it}$$

$$AR_{it} = R_{it} - R_{mt}$$

Where  $AR_{it}$  is the daily abnormal return that is defined as firm's daily return minus value-weighted daily market return. We also use the Fama-French three-factor model and the Carhart (1997) four-factor model in CAR estimation.

## 3.5. Results and Discussion

### 3.5.1 Summary Statistics and Univariate Test

Table 1 shows the summary statistics. The sample includes acquisition deals conducted by US public bidders and analyst recommendation consensus from 1 January 1992 to 31 December 2010. Deal Covered BA represents all of the deals that acquirers' recommendation consensus estimate by recommendation received 365 to 0 days before announcement day. We also categorise all deals by the recommendation level that the acquirers receive. BUY2+ is defined as acquirers receiving an all buy and strong buy recommendation consensus. HOLD is defined as all acquirers receiving hold to strong sell recommendation consensus.

[Insert Table 3.1 Here]

Panel A reports acquirer short-term abnormal returns, which is measured by cumulative abnormal returns 3, 5 and 11 days surrounding the announcement day. We use the market-adjusted model to estimate acquirer CARs, denoted as  $CAR[-1,1]$ ,  $CAR[-2,2]$ , and  $CAR[-5,5]$  respectively. The result in Panel A show that acquirers that receive buy and strong buy recommendations before the deal announcement day tend to outperform acquirers that received hold or sell recommendations. The average cumulative abnormal return –  $CAR[-1,1]$ ,  $CAR[-2,2]$ , and  $CAR[-5,5]$  – for acquirers in group BUY2+ is 0.7%, 0.9% and 1.14% higher than that of the acquirers in the Hold group. Acquirers that received buy and strong buy recommendations after the deal announcement day have the highest cumulative abnormal returns. The short-term abnormal return for acquirers that received buys and strong buy recommendations after the deal announcement day is significantly higher than those in the Hold group. The results indicate that analysts react to short-term M&A outcomes and will upgrade their recommendations for acquirers with better short-term merger performance.

Panel B shows firm characteristics. The results shows that acquirers with buy and



strong buy recommendations have a higher Runup ratio, market-to-book ratio and price-to-earnings ratio. Runup measures acquirers' past stock performance. Acquirers in the Buy2+ group are 23.18% higher than acquirers the Hold group. The market-to-book ratio and price-to-earnings ratio indicate acquirers' market valuation. The market-to-book ratio for acquirers in the Buy2+ group is 1.92 higher than those of the acquirers in the Hold group. The price-to-equity ratio for acquirers in the Buy2+ group is also 6.67 higher than those of acquirers in the Hold group. The results indicate that analysts prefer acquirers with high market valuations. This result is consistent in both subsamples.

Panel C reports deal characteristics. Relative transaction value is measured as the transaction value divided by the acquirer market value of equity four weeks before the announcement. The result shows that the relative size for acquirers in the Buy2+ group is 16.63%, which is 1.61% larger than acquirers in the Hold group. 28% of deals conducted by acquirers in Buy2+ use stock as the means of payment – 13.34% higher than the acquirers in Hold. Some 6.9% of deals in Buy2+ are tender offers compared to 8.94% in Hold. Some 18.76% of deals in Buy2+ are acquisitions of public targets compared to 24.85% in Hold. The result indicates that analysts favour market-overvalued acquirers who uses stock to acquire non-public targets. This result is consistent in both subsamples.

Panel D shows recommendation consensus, which is defined as the average recommendation level given by all analysts covering the same deal. We use the reversed recommendation scale: 5 =strong buy to 1=strong sell. The results suggest that the analyst gives average recommendations of 3.8764 for all M&A deals. This indicates that analysts favour M&A deals.

In Table 2, we categorise the Deals Covered BA and Deals Covered AA by acquirers' cumulative abnormal returns five days surrounding the announcement day.

[Insert Table 3.2 Here]

One third of deals with the highest CAR[-5,5] are named good deals. The bottom third with the lowest CAR[-5,5] are named bad deals; the rest are neutral. By dividing the deals by the acquirers' CAR, we can identify the determinants of high short-term abnormal returns for acquirers. The univariate results show that for Deals Covered BA, acquirers in the group High CAR[-5,5] are more leveraged than acquirers in the group Low CAR[-5,5]. The leverage ratio is 27.39% for high CAR acquirers, which is 2.47% higher than the leverage ratio of Low CAR acquirers. In addition, the cash flow to equity ratio of High CAR acquirers is significantly higher than that of Low CAR acquirer. This indicates that financially constrained bidders are more likely to achieve a better performance in M&A. To gain short-term abnormal return, the univariate test shows that deal characteristics are also essential. Acquirers are more likely to achieve better short-term performance if the size is relatively large. This corresponds to 18.79% of the High CAR acquirers and only 16.24% of the Low CAR acquirers. Deal type should be tender offer; acquirers should use less stock as the means of payment; and they avoid acquiring public targets. Furthermore, acquirers that achieve a high short-term performance have high recommendation consensus. High CAR acquirers' recommendation consensus reaches 3.9234, which is significantly higher than Low Car acquirers. The results indicate that recommendation consensus have a significant impact on acquirers' short-term performance. The second part of Table 2 shows univariate tests for Deals Covered AA. The results indicate that recommendation consensus will increase if acquirers achieve a better short-term abnormal return. The recommendation consensus reaches 4.02 for High CAR acquirers, which is significantly higher than that of Low CAR acquirers. The results indicate that acquirers' short-term abnormal returns will influence analysts' recommendations.

### **3.5.2 Multivariate Test**

The univariate test has many limitations. It does not include the effect of control variables. The results may be unreliable. Therefore, we perform multivariable tests to reveal the true relationship between acquirers' short-term abnormal return and recommendation consensus. First of all, we examine to what extent acquirers' short-term abnormal return can be influenced by the recommendation consensus. We then examine how the changes in recommendation consensus before announcement day relate to acquirers' short-term abnormal returns. Furthermore, we estimate how recommendation consensus responds to acquirers' short-term abnormal return after the announcement day. Finally, we study the effect of the implementation of Reg-FD on the relationship between recommendation consensus and acquirer short-term abnormal return.

#### **Recommendation consensus and acquirers' short-term abnormal return**

Table 3 presents the regression results of regression model 1. Regressions 1 to 4 estimate the impact of recommendation consensus on acquirer cumulative abnormal return 5 days surrounding announcement day. We add additional control variables for each regression. All of the CARs are estimated using the market-adjusted model.

[Insert Table 3.3 here]

The key independent variable in the regressions is the Rec365 value, which measures acquirers' analyst recommendation consensus, which is estimated by recommendations received from 365 to 0 days before announcement day. The results show that the coefficient of Rec365 is positively related to acquirers' short-term abnormal return, measured by CAR[-5,5]. The recommendation consensus, denoted as Rec365, is a continuous variable. Therefore, a one-unit increase in recommendation consensus will increase bidders' CAR[-5,5] by 1.19%. Acquirers' short-term abnormal return would increase if an analyst issues more buy or strong buy recommendations.

These results suggest that acquirers tend to receive higher short-term abnormal returns when analysts give positive recommendations.

The results also suggest that deal characteristics have a stronger influence on acquirers' short-term abnormal return than firm characteristics. All control variables related to firm characteristics are statistically insignificant. However, relative size and tender offer are positively related to acquirers' CAR, while diversification and public target are significantly negative.

Overall, a higher recommendation consensus leads to higher acquirer short-term abnormal return. These results suggest that recommendation consensus is one of the determinants that affects acquirer merger and acquisition performance. This empirical evidence supports hypothesis *H1: Analyst recommendation has a statistically significant impact on bidder short-term abnormal return.*

Following the same research design as in Table 3, Table 4 presents the regression results that estimate the impact of recommendation consensus 90 days before announcement on acquirer short-term abnormal return. We add an additional control variable for each regression. All of the CARs are estimated using the market-adjusted model.

[Insert Table 3.4 here]

The key independent variable in regressions is recommendations consensus, measured 90 to 0 days before announcement day (Rec90). The results show that the coefficient of Rec90 is positively related to acquirers' short-term abnormal return measured by CAR[-5,5]. The coefficient for recommendation consensus (Rec90) is 0.0171; after controlling for all firm characteristics, the coefficient drop to 0.016. However, the coefficients for Rec90 are much higher than the coefficient of Rec360. The results suggest that a one-unit increase in recommendation consensus 90 days before announcement day will increase bidders' CAR[-5,5] by 1.71%. These results prove

that a recommendation consensus close to the announcement day has a stronger influence than at other times. This is because more information will be released before the announcement day.

The results also suggest that deal characteristics are the determinants of acquirers' short-term abnormal returns rather than firm characteristics. All control variables related to firm characteristic are statistically insignificant. However, acquirers conducting a deal with a high relative size and in the form of a tender offer are more likely to achieve high acquirers' CAR, while diversification deals and acquisitions of public targets are value-destroying.

Overall, these results support the view that a higher recommendation consensus leads to higher acquirer short-term abnormal returns. The recommendation consensus 90 days before announcement day is more powerful than others. These results indicate that analyst recommendations can influence acquirer merger gain in the short run. This empirical evidence also supports hypothesis *H1: Analyst recommendations have a statistically significant impact on bidder short-term abnormal return.*

In Table 5, we examine whether changes in recommendation consensus will affect acquirers' short-term abnormal return. We use the subsample Deal Covered BA, the key explanation variable is Change\_REC.

[Insert Table 3.5 here]

We define Change\_REC as the difference between the recommendation consensus 90 days before announcement day and recommendation consensus 365 to 90 days before announcement day. For instance, analysts' recommendation consensus for acquirer A was a strong sell or score 1 in the recommendation level 365 to 90 days before announcement day. Due to incoming M&A deals, analysts upgrade their recommendation consensus to strong buy or score 5 in recommendation levels 90

days before announcement day. The Change\_Rec for acquirer A will be 4. When the announcement day is near, there will be more information available for the market. We believe that analysts have superior information-processing abilities that enable them to foresee incoming events and evaluate the true impact of deals on acquirer stock price. They will upgrade or downgrade their recommendation accordingly. By studying the changes in recommendation consensus (Change\_Rec), we can examine whether analysts can foresee incoming M&A deals. The result shows that the coefficient for Change\_Rec is positively related to acquirers' CAR[-5,5]. If the recommendation consensus is upgraded by one level or Change\_rec is equal to one, acquirers' short-term abnormal return will increase by 0.22%.

For the control variables, firm characteristics are measured by five main accounting ratios, which are statistically insignificant. However, the control variable for deal characteristics suggests that value-enhancing deals tend to be of a large relative size. Deal type should be tender offer. Acquiring a public target is also more likely to bring a higher acquirer CAR.

Overall, this supports the view that acquirer analysts will issue the right recommendations if they can foresee forthcoming M&A deals and accurately forecast their outcomes. This empirical evidence also supports hypothesis *H2: Changes in recommendation level three months before announcement day affect bidder's short-term abnormal return.*

Previous studies suggest that analysts may give biased recommendations or earnings forecasts. Analyst recommendations tend to be overoptimistic because they apply a low-ball strategy to maintain recommendation consistency (Hilary and Hsu, 2013). Analysts may also give recommendations that favour management if they have strong links with them. Malmendier and Shanthikumar (2014) suggest that analysts give pessimistic earnings forecast so that management can meet their targets. The reputation-concern theory suggests that analysts have career-long concerns about their

reputation, and that analysts with superior information-processing abilities will maximise their clients' interests. Therefore, they will only react to the market, provide accurate recommendations, and update their recommendations on time.

[Insert Table 3.6 here]

Table 6 shows regression results that reveal how quickly recommendation consensus respond to acquirers' short-term abnormal returns. The dependent variable is RECLVL, which is a dummy variable, equal to 1 if the recommendation consensus 365 days after the announcement day is buy or strong buy. The key explanation are CAR[-1,1] CAR[-2,2] and CAR[-5,5] and acquirer short-term abnormal returns for regression 1 to 3 respectively. Acquirers' CARs are measured using the market-adjusted model. The results show that analysts are more likely to upgrade their recommendations towards strong buy for acquirers that achieve positive short-term abnormal returns. A one-percent increase in CAR[-1,1] , CAR[-2,2], and CAR[-5,5] raises the probability of issuing buy and strong buy ratings by 1.15%, 1.18% and 1.26%, respectively. Run-up ratio, which measures firm past stock performance, is negatively related to the probability of issuing buy and strong buy recommendations. Analysts will issue buy and strong buy recommendations to acquirers with a high cash flow to equity ratio. It is more possible to receive buy and strong buy recommendations if the deal is a tender offer and relatively small in size.

Overall, these results support the conjecture that acquirer analysts will react to the market. Analysts will upgrade their recommendations based on acquirers' short-term acquisition performance.

It can be argued that recommendation consensus is estimated by all recommendations that acquirers receive one year after the deal announcement day. The results may be biased as analysts issue recommendations based on events other than the M&A deals themselves. To overcome the problem, we rerun the probit model using

recommendation consensus 90 days after the announcement day. The results are shown in Table 7.

[Insert Table 3.7 here]

In Table 7, the dependent variable is RECLVL, which is a dummy variable, equal to 1 if the recommendation consensus 90 days after the announcement day is a buy or strong buy. The key explanation variables are acquirer market-adjusted cumulative abnormal returns estimated at 3, 5, 11 days surrounding the announcement day. The results show that cumulative abnormal returns are positively related to the probability of a recommendation upgrade. This result is consistent with Table 6. However, Table 7 shows that the probability of a recommendation being upgraded is more sensitive to acquirer short-term abnormal return. The negative coefficient for Run-up ratio, which measures firm past stock performance, suggests that analysts are not in favour of glamour acquirers. The positive coefficient for cash flow to equity ratios suggests that analysts prefer acquirers with good financial health, especially with a high cash inflow. Acquirers are more likely to receive a buy or strong buy recommendations if the deal is completed using stock as the means of payment. This empirical evidence also supports hypothesis *H3: Analysts will change their recommendation based on bidders' short-term abnormal return within three month after announcement day.*

Table 8 shows to what extent the implementation of Reg-FD can influence analyst recommendation consensus effect on acquirers' short-term abnormal returns.

[Insert Table 3.8 here]

Bagnoli et al. (2008) argue that there was a strong linkage between analysts and management before 2000. The recommendations given before the implementation of Reg-FD mainly resulted in selective disclosure. However, after the enforcement of Regulation Fair Disclosure (Reg-FD), the gap between public accessible information



and private information communicated among professional investors narrowed. Bagnoli et al. (2008) concludes that Reg-FD builds up a more efficient competitive environment by removing analysts' privilege of accessing private information. We believe that analysts may benefit from selective disclosure; however, they do have superior information-processing abilities. To examine the impact of Reg-FD, we use a dummy variable equal to 1 if the deal is announced one year after the implementation of Reg-FD. The results show that the coefficient for Reg-FD is negatively related to acquirers' short-term abnormal return. The result indicates that for all analysts' covered deals, there was a 4.83% drop in acquirers' short-term abnormal return after the implantation of Reg-FD.

On the other hand, analysts' recommendation consensus is positively related to acquirers' short-term performance after the implementation of Reg-FD. Table 8 shows that a recommendation consensus (Rec365) upgrade by one level increases acquirers' short-term abnormal return by approximately 1.18%. We can conclude that even though Reg-FD is a game-changing regulation, the true influence of analyst recommendations on bidders' abnormal return should remain unchanged after the enforcement of Regulation Fair Disclosure. For the control variables, acquirers will achieve better short-term abnormal returns if the relative size of the deal is larger and if the deal type is a tender offer. A negative short-term performance means that abnormal returns may occur if the deal is diversifying and the target is a publicly listed firm. Overall, the result supports hypothesis *H4: Analyst recommendations affect bidders' short-term abnormal return after the enforcement of Regulation Fair Disclosure (2000)*.

It can be argued that the recommendation consensus is estimated by all recommendations 365 day to 0 day before the announcement day. However, it may be biased as the estimation period is so long that many events can alter analyst

recommendations within that period. To overcome this problem, we estimate the recommendation consensus from 90 to 0 days before the announcement day (Rec90).

[Insert Table 3.9 here]

The result in Table 9 show that the penalty for Reg-FD is also smaller than in Table 8. After the implementation of Reg-FD, acquirers covered by analysts 90 days before announcement day receive a 3.74% drop in short-term abnormal return. However, analyst recommendation consensus is positively related to acquirers' abnormal return. The coefficient for Rec90, which is 0.018, suggests that a one-level increase in Rec90 raises acquirers' abnormal returns by 1.8%. This figure is stronger than that for Rec365 in Table 8. It indicated that Rec90 has stronger influential power than that of Rec 365 on acquirers' abnormal return. This is reasonable as there will be more information released before the deal announcement day. The recommendation close to the deal announcement day can therefore be more accurate and influential.

For the control variables, relative-size and tender offer are positively related to acquirers' abnormal return. Public target is the only significant variable that has a negative coefficient. Overall, the result supports hypothesis *H4: Analyst recommendations affect bidders' short-term abnormal returns after the enforcement of Regulation Fair Disclosure (2000)*

### **3.5.3 Robustness Test**

By studying a sample of 8,889 US M&A deals from 1992 to 2010, the main finding is that analysts have superior skills in issuing recommendations and that they can foresee incoming M&A deals. The recommendation consensus has a positive impact on acquirers' M&A performance in the short run. Instead of using general recommendation consensus, we use a one-year time interval surrounding the deal announcement day to estimate the recommendation consensus.

To test the robustness of our results, we use two different ways to define analyst recommendation consensus. We change the time interval used in calculating recommendation consensus, which confirms that the results are robust. We also test robustness via replacing recommendation consensus with a dummy variable for recommendation level. Specifically, the recommendation dummy equals one when the mean of acquirer recommendation is greater or equal to 3 (Hold). The results remain unchanged, which shows that analysts' buy or strong buy recommendations have a positive impact on acquirer abnormal return. We also use different event windows and method to estimate short and long-term performance.

To control endogeneity, we initially perform Hausman test and the results suggest IV (2SLS) regression.

[Insert Table 3.10 here]

we choose 52 week high, which is known as the reference point, as the instrument variable. The key explanatory variable is REC365. The IV regression results suggest that our results are robust.

### 3.6. Conclusion

This paper analyses the extent to which recommendation consensus influence acquirers' M&A performance in both the long and the short run by studying a sample of US M&A deals from 1992 to 2010. Instead of using general recommendation consensus, we use a one-year time interval surrounding the deal announcement day to estimate the recommendation consensus. Applying this setting enables us to estimate the power of security analysts' recommendations more precisely. Our results show that acquirers with high recommendation consensus before announcement day outperform acquirers with low recommendation consensus in the short run; and that analysts can successfully predict incoming M&A deals and adjust their recommendations accordingly, supporting the reputation-concern theory. Moreover, our results suggest that acquirer short-term M&A performance is directly linked to the adjustment of recommendations after announcement day. The effect of recommendation on acquirers' M&A short-term performance remains unchanged after the implementation of regulation fair disclosure.

This paper's main finding is that recommendation consensus has a positive influence on acquirers' short-term performance. The changes in recommendation consensus before announcement day are positively related to acquirers' short-term performance; trading in line with analysts' recommendation consensus is therefore profitable, supporting the reputation-concern theory.

Acquirers with a high recommendation consensus before announcement day outperform acquirers with a low recommendation consensus in the short run. A one-unit increase in the recommendation consensus from 365 to 0 days before announcement day increases bidders' CAR[-5,5] by 1.19%. Acquirers' short-term abnormal return increases if analysts issue more buy or strong buy recommendations.

This is because analysts have superior information-processing abilities, since they are more rational and skilful when valuing acquirer performance. However, analyst recommendations can be biased, such that recommendation consensus is more accurate and influential than recommendations from a single analyst. This result suggests that even analysts may suffer from affiliation; however, recommendation consensus can still accurately reflect the true growth potential of acquirers. Our results support the reputation-concern hypothesis.

Furthermore, the changes in recommendation consensus before announcement day are positively related to acquirers' short-term performance. There will be more information available when the deal is due to be announced. Given analysts reputation concern, they will process this information carefully and give more accurate recommendations to the public. This result indicates that analysts adjust their recommendations according to their newest assessment on acquirers' growth potential. Our results suggest that a one-unit increase in recommendation consensus 90 days before announcement day will increase bidders' CAR[-5,5] by 1.71%. These results prove that a recommendation consensus close to the announcement day has a stronger influence than others. This result supports the conjecture that acquirer analysts will issue the right recommendations if they can foresee forthcoming M&A deals and accurately forecast their outcomes. This empirical evidence also supports hypothesis *H2: Changes in recommendation level three month before announcement day affect bidders' short-term abnormal return.*

On the other hand, our results also reveal how analysts respond to acquirer short-term abnormal return. Acquirers' short-term abnormal return is positively related to recommendation consensus. Analysts are more likely to upgrade their recommendations towards strong buy for acquirers that achieve positive short-term abnormal return. This is because, to maintain their reputation, analysts will quickly respond to changes in the market and they can update their recommendation on time. Our evidence also supports hypothesis *H3: Analysts will changes the recommendation*

*based upon bidders' short-term abnormal return within three months after the announcement day.*

Finally, analysts' recommendation consensus is still positively related to acquirers' short-term performance after the implementation of Reg-FD. Our results show that recommendation consensus (Rec365) upgrades by one level increase acquirers' short-term abnormal return by approximately 1.18%. Even though Reg-FD is a game-changing regulation, the true influence of analyst recommendations on bidders' abnormal return should remain unchanged after the enforcement of Regulation Fair Disclosure. For the control variables, acquirers will achieve better short-term abnormal return if the deal is of a relatively larger size and the deal type is a tender offer. Negative short-term performance may cause abnormal return if the deal is diversifying and the target is a publicly listed firm. Overall, the results support hypothesis *H4: Analyst recommendations affect bidder's short-term abnormal return after the enforcement of Regulation Fair Disclosure (2000).*

## Appendix

*Table 3.1 Summary Statistics-- Univariate Test—recommendation consensus oriented*

This table presents summary statistics for the full samples. The full sample includes acquisitions deals conducted by US public bidders and analyst recommendation consensus from 1 January 1992 to 31 December 2010. The full sample is divided into two subsamples; analyst recommendation consensus before announcement day (Deal Covered BA) and analyst recommendation consensus after announcement day (Deal Covered AA). We also categorize the each subsample by the recommendation level. BUY2+ is defined as all the acquirer received buy and strong buy recommendation consensus. HOLD is defined as all the acquirer received hold to strong sell recommendation consensus. Diff is the difference between BUY+2 and Hold. Panel A reports Acquirer short-term abnormal returns, which is measured by Cumulative Abnormal return, 3, 5 and 11 days surrounding announcement day. We use Market Adjusted model to estimate acquirer CARs, denoted as CAR[-1,1] CAR[-2,2],and CAR[-5,5] respectively. Panel B report firms' characteristics, which include leverage ratio defined as total liability divided by total asset. Runup is measured as market-adjusted CARs over the [-365, -28] window prior to announcement. M/B, the market to book ratio measures market valuation of bidder's stock, is defined as annual price close multiply common share outstanding divided by total common equity; P/E, the price to earnings ratio measures the net income per share, is defined as annual price close divided by earnings per share; ROE, the return on equity ratio measures the bidder's profitability, is defined as net income divided by common and preferred equity; Debt/Total Equity, the debt over asset ratio measures to what extent the company is leveraged, is defined as long term debt divided by total asset; Cash flow/Equity, the Cash flow over equity ratio measures the amount of free cash holding by the company, is defined as the sum of income before extraordinary item and depreciation minus dividends of common and preferred stock then divided by total asset; Panel C reports deal characteristics. Relative transaction value denotes the relative size of the deal, and is defined as the proportion of deal value over bidder's market value; Tender offer denote the deal type is tender offer. Diversification indicates bidder and target oriented in different industry. Stock denotes that the deal is paid by 100% stock; Public denotes public listed target. Panel D. Rec is recommendation consensus, which is defined as the average recommendation level given by all analysis covering same deal; we use the reversed recommendation scale. 5 =strong buy to 1=strong sell N stands for the number of observations. For all continuous variables are winsorised at the 5% and 95% levels

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Deal Covered BA	BUY2+	Hold	Diff	Pro	Deal Covered	BUY2+	Hold	Diff	Pro
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Variable	Mean	Mean	Mean			AA Mean	Mean	Mean		
<i>Panel A</i>										
CAR[-1,1]	0.0114	0.0157	0.0079	0.0078	0.0003	0.0140	0.0197	0.0081	0.0116	0.0000
CAR[-2,2]	0.0131	0.0186	0.0086	0.0099	0.0001	0.0185	0.0266	0.0099	0.0167	0.0000
CAR[-5,5]	0.0157	0.0220	0.0106	0.0114	0.0004	0.0210	0.0320	0.0096	0.0223	0.0000
<i>Panel B</i>										
Leverage	0.2692	0.2726	0.2665	0.0062	0.4309	0.2812	0.2852	0.2771	0.0081	0.3883
RUNUP	0.1806	0.3092	0.0775	0.2318	0.0000	0.2605	0.3721	0.1437	0.2284	0.0000
M/B	5.2384	6.3067	4.3814	1.9253	0.0000	5.4192	6.4679	4.3214	2.1465	0.0000
P/E	23.7500	27.4523	20.7800	6.6723	0.0096	19.9127	19.9321	19.8923	0.0398	0.9890
ROE	0.0102	0.0119	0.0088	0.0031	0.3074	0.0123	0.0092	0.0156	-0.0064	0.0514
Debt/Equity	0.2129	0.1921	0.2295	-0.0375	0.0007	0.2136	0.1995	0.2284	-0.0289	0.0279
Cash/Equity	0.0404	0.0367	0.0433	-0.0066	0.0281	0.0438	0.0354	0.0526	-0.0172	0.0000
<i>Panel C</i>										
Relative-Size	0.1574	0.1663	0.1503	0.0161	0.0284	0.1743	0.2037	0.1437	0.0600	0.0000
Tender Offer	0.0690	0.0435	0.0894	-0.0459	0.0000	0.0583	0.0464	0.0709	-0.0245	0.0016
Diversification	0.3758	0.3851	0.3683	0.0168	<b>0.2134</b>	0.3760	0.3795	0.3722	0.0073	0.6473
STOCK	0.2061	0.2801	0.1467	0.1334	0.0000	0.2268	0.2809	0.1702	0.1107	0.0000
Public	0.2214	0.1876	0.2485	-0.0609	0.0000	0.2069	0.1796	0.2355	-0.0559	0.0000
<i>Panel D</i>										
Rec	3.8764	4.2790	3.5534	0.7256	0.0000	3.9506	4.3060	3.5786	0.7274	0.0000
Obs	5221	2324	2897			3668	1876	1792		



*Table 3.2 Summary Statistics and Univariate Test —Acquirer short-term abnormal return oriented*

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This table presents summary statistics for the subsample of Deal Covered BA and Deal Covered AA. We define Deal Covered BA as the deal that acquirer's analyst recommendation consensus is estimated by recommendations before announcement day. Deal Covered AA is defined as the deals that acquirer's analyst recommendation consensus is estimated by recommendations after announcement day. The subsample includes acquisitions deals conducted by US public bidders and analyst recommendation consensus from 1 January 1992 to 31 December 2010. We categorize the each subsample by acquirer's cumulative abnormal return 5 days surrounding announcement day. One third of deals with highest CAR[-5,5] are named as good deal. Last one third with lowest CAR[-5,5] are named as bad deal. Neutral for the rest of deals. PART ONE is for the Deal Covered BA, PART TWO is for the Deal Covered BA. Panel A report firms' characteristics, which include leverage ratio, defined as total liability divided by total asset. Runup is measured as market-adjusted CARs over the [-365, -28] window prior to announcement. M/B, the market to book ratio, measures market valuation of bidder's stock, is defined as annual price close multiply common share outstanding divided by total common equity; P/E, the price to earnings ratio measures the net income per share, is defined as annual price close divided by earnings per share; ROE, the return on equity ratio measures the bidder's profitability, is defined as net income divided by common and preferred equity; Debt/Total Equity, the debt over asset ratio measures to what extent the company is leveraged, defined as long term debt divided by total asset; Cash flow/Equity, the Cash flow over equity ratio measures the amount of free cash holding by the company, is defined as the sum of income before extraordinary items and depreciation minus dividends of common and preferred stock then divided by total asset; Panel c reports deal characteristics. 'Relative transaction value' denotes the relative size of the deal and is defined as the proportion of deal value over bidder's market value. 'Tender offer' denote the type of deal. 'Diversification' indicates bidder and target oriented in different industries. 'Stock' denotes that the deal is paid by 100% stock; 'public' denotes a publicly listed target. Panel D. Rec is recommendation consensus, which is defined as the average recommendation level given by all analysis covering same deal; we use the reversed recommendation scale. 5 =strong buy to 1=strong sell N stands for the number of observations. All continuous variables are winsorized at the 1% and 95% levels

PART ONE						
Variable	DEAL COVER BA Mean	HIGH CAR[-5,5] Mean	NEUTRAL Mean	LOW CAR[-5,5] Mean	diff	Pro
<b>Panel A</b>						
Leverage	0.2692	0.2739	0.2846	0.2492	0.0247	0.0104
RUNUP	0.1806	0.2167	0.1362	0.1890	0.0277	0.1445
M/B	5.2384	5.6092	4.7614	5.3443	0.2649	0.5275
P/E	23.7500	23.8671	27.5918	19.7911	4.0760	0.1847
ROE	0.0102	0.0062	0.0247	-0.0003	0.0065	0.1171
DEBT/Equity	0.2129	0.2298	0.2121	0.1966	0.0331	0.0197
Cash flow/Equity	0.0404	0.0383	0.0515	0.0312	0.0071	0.0771
<b>Panel B</b>						
Relative-Size	0.1574	0.1879	0.1219	0.1624	0.0255	0.0069
Tender offer	0.0690	0.0770	0.0730	0.0569	0.0201	0.0178
Diversification	0.3758	0.3601	0.3828	0.3845	-0.0243	0.1375
STOCK	0.2061	0.2051	0.1724	0.2408	-0.0358	0.0113
Public	0.2214	0.1976	0.2241	0.2425	-0.0449	0.0014
<b>Panel C</b>						
Rec	3.8764	3.9246	3.8479	3.8567	0.0679	0.0000
Obs	5221	1741	1740	1740		

## PART TWO

Variable	DEAL COVER AA Mean	HIGH CAR[-5,5] Mean	NETURAL Mean	LOW CAR[-5,5] Mean	Diff	Pro
<b>Panel D</b>						
Leverage	0.2812	0.2806	0.2993	0.2638	0.0167	0.1483
RUNUP	0.2605	0.2936	0.1998	0.2883	0.0053	0.8216
M/B	5.4192	5.5702	4.7840	5.9036	-0.3334	0.5484
P/E	19.9127	17.6127	23.0055	19.1180	-1.5053	0.6843
ROE	0.0123	0.0072	0.0225	0.0073	-0.0001	0.9876
Debt/Equity	0.2136	0.2305	0.2235	0.1869	0.0436	0.0082
Cash flow/Equity	0.0438	0.0408	0.0532	0.0373	0.0035	0.4163
<b>Panel E</b>						
Relative-Size	0.1743	0.2184	0.1358	0.1689	0.0494	0.0001
Tender offer	0.0583	0.0614	0.0638	0.0499	0.0115	0.2151
Diversification	0.3760	0.3707	0.3802	0.3769	-0.0062	0.7500
STOCK	0.2268	0.2512	0.1709	0.2584	-0.0072	0.6850
Public	0.2069	0.1579	0.2134	0.2494	-0.0914	0.0000
<b>Panel F</b>						
Rec	3.9506	4.0290	3.8877	3.9352	0.0938	0.0000
Obs	3668	1222	1223	1223		

**Table 3.3 OLS regression of acquirer's short-term performance to Recommendation Consensus 365**

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This table presents the OLS regression results that reveal the relation between Recommendation Consensus 365 days before announcement day (Rec365) and acquirer's short-term abnormal return. We use Deal Covered BA subsample that includes acquisitions deals conducted by US public bidders and analyst recommendation consensus from 1 January 1992 to 31 December 2010. Rec365 is acquirer's analyst recommendation consensus, which is estimated by recommendations received from 365 to 0 days before announcement day. Control variables include Cash flow/Equity, the Cash flow over equity ratio measures the amount of free cash holding by the company, is defined as the sum of income before extraordinary item and depreciation minus dividends of common and preferred stock then divided by total asset; M/B, the market to book ratio measures market valuation of bidder's stock, is defined as annual price close multiply common share outstanding divided by total common equity; Runup is measured as market-adjusted CARs over the [-365, -28] window prior to announcement. P/E, the price to earnings ratio measures the net income per share, is defined as annual price close divided by earnings per share; Debt/Total Equity, the debt over asset ratio measures to what extent the company is leveraged, is defined as long-term debt divided by total asset; 'Relative transaction value' denotes the relative size of the deal, and is defined as the proportion of deal value over bidder's market value; 'tender offer' denotes the type of deal. 'Diversification' indicates bidder and target oriented in different industries. 'Stock' denotes that the deal is paid by 100% stock; 'public' denotes a publicly listed target. All continuous variables are winsorised at the 1% and 95% levels

	(1)	(2)	(3)	(4)
	CAR[-5,5]	CAR[-5,5]	CAR[-5,5]	CAR[-5,5]
Rec365	0.0119*** (0.001)	0.0119*** (0.001)	0.0117*** (0.001)	0.0113*** (0.002)
CashFlow/Equity		0.0014 (0.973)	0.0087 (0.839)	0.0094 (0.827)
Market To Book			0.0003 (0.467)	0.0002 (0.596)
RUNUP				0.0019 (0.665)
Return On Equity	0.0380 (0.163)	0.0369 (0.400)	0.0317 (0.472)	0.0312 (0.480)
Debt To Equity	0.0009 (0.875)	0.0008 (0.898)	0.0012 (0.858)	0.0013 (0.847)
Relative-size	0.0373*** (0.000)	0.0373*** (0.000)	0.0381*** (0.000)	0.0382*** (0.000)
Tender offer	0.0317*** (0.000)	0.0317*** (0.000)	0.0318*** (0.000)	0.0319*** (0.000)
Diversification	-0.0056* (0.051)	-0.0056* (0.051)	-0.0055* (0.051)	-0.0055* (0.052)
STOCK	-0.0022 (0.609)	-0.0022 (0.611)	-0.0027 (0.532)	-0.0028 (0.509)
Public	-0.0217*** (0.000)	-0.0217*** (0.000)	-0.0218*** (0.000)	-0.0218*** (0.000)
Constant	0.0446*** (0.000)	0.0446*** (0.000)	0.0426*** (0.000)	0.0416*** (0.000)
N	5221	5221	5221	5221
R-sq	0.021	0.021	0.021	0.021

p-values in parentheses =\* p<0.1, \*\* p<0.05, \*\*\*p<0.001

**Table 3.4 OLS regression of acquirer's short-term performance to Recommendation Consensus 90**

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This table presents the OLS regression results that reveal the relation between Recommendation Consensus 90 days before announcement day (Rec90) and acquirer's short-term abnormal return. We use Deal Covered BA subsample that includes acquisitions deals conducted by US public bidders and analyst recommendation consensus from 1 January 1992 to 31 December 2010. Rec90 is acquirer's analyst recommendation consensus, which is estimated by recommendations received from 90 to 0 days before announcement day. Control variables include Cash flow/Equity, the Cash flow over equity ratio measures the amount of free cash holding by the company, is defined as the sum of income before extraordinary item and depreciation minus dividends of common and preferred stock then divided by total asset; M/B, the market to book ratio measures market valuation of bidder's stock, is defined as annual price close multiply common share outstanding divided by total common equity; Runup is measured as market-adjusted CARs over the [-365, -28] window prior to announcement. P/E, the price to earnings ratio measures the net income per share, is defined as annual price close divided by earnings per share; Debt/Total Equity, the debt over asset ratio measures to what extent the company is leveraged, is defined as long term debt divided by total asset; 'Relative transaction value' denotes the relative size of the deal, and is defined as the proportion of deal value over bidder's market value; 'tender offer' denotes the type of deal. 'Diversification' indicates bidder and target oriented in different industries. 'Stock' denotes that the deal is paid by 100% stock; 'public' denote a publicly listed target. All continuous variables are winsorised at the 1% and 95% levels

	(1)	(2)	(3)	(4)
	CAR[-5,5]	CAR[-5,5]	CAR[-5,5]	CAR[-5,5]
Rec90	0.0171** (0.037)	0.0174** (0.034)	0.0172** (0.035)	0.0160* (0.052)
CashFlow/Equity		0.0437 (0.557)	0.0727 (0.342)	0.0735 (0.335)
Market To Book			0.0010 (0.183)	0.0008 (0.286)
RUNUP				0.0057 (0.563)
Return On Equity	0.0373 (0.564)	0.0020 (0.979)	-0.0144 (0.854)	-0.0125 (0.873)
Debt To Equity	-0.0013 (0.926)	-0.0043 (0.778)	-0.0031 (0.842)	-0.0032 (0.833)
Relative-size	0.0490** (0.011)	0.0480** (0.012)	0.0513*** (0.008)	0.0511*** (0.008)
Tender offer	0.0309** (0.021)	0.0306** (0.023)	0.0305** (0.025)	0.0306** (0.024)
Diversification	-0.0142** (0.023)	-0.0142** (0.022)	-0.0144** (0.021)	-0.0143** (0.022)
STOCK	-0.0015 (0.866)	-0.0012 (0.893)	-0.0030 (0.742)	-0.0034 (0.705)
Public	-0.0218** (0.012)	-0.0218** (0.012)	-0.0222** (0.011)	-0.0223** (0.011)
Constant	0.0815*** (0.001)	0.0812*** (0.001)	0.0750*** (0.002)	0.0720*** (0.004)
N	1133	1133	1133	1133
R-sq	0.047	0.047	0.049	0.050

p-values in parentheses =\* p<0.1, \*\* p<0.05, \*\*\*p<0.001

***Table 3.5 OLS regression of changes in recommendation consensus and Acquirer's announcement return***

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This table shows regression results that reveal the relation between changes in recommendation consensus and acquirer's short-term abnormal return. We use Deal Covered BA subsample that includes acquisitions deals conducted by US public bidders and analyst recommendation consensus from 1 January 1992 to 31 December 2010. Change REC is changes in analyst recommendation consensus before announcement day, which is defined by the difference between the recommendation consensus 90 days before announcement day and recommendation consensus 365 to 90 days before announcement day. CAR[-5,5] are Acquirer's Market adjusted Cumulative Abnormal Return, 11 days surrounding announcement day. Control variables include Cash flow/Equity, the Cash flow over equity ratio measures the amount of free cash holding by the company, is defined as the sum of income before extraordinary item and depreciation minus dividends of common and preferred stock then divided by total asset; M/B, the market to book ratio measures market valuation of bidder's stock, is defined as annual price close multiply common share outstanding divided by total common equity; Runup is measured as market-adjusted CARs over the [-365, -28] window prior to announcement. P/E, the price to earnings ratio measures the net income per share, is defined as annual price close divided by earnings per share; Debt/Total Equity, the debt over asset ratio measures to what extent the company is leveraged, is defined as long term debt divided by total asset. 'Relative transaction value' denotes the relative size of the deal, and is defined as the proportion of deal value over bidder's market value; 'tender offer' denotes the type of deal. 'Diversification' indicates bidder and target oriented in different industries. 'Stock' denotes that the deal is paid by 100% stock; 'public' denotes a publicly listed target. All continuous variables are winsorized at the 1% and 95% levels.



	(1)	(2)	(3)	(4)
	CAR[-5,5]	CAR[-5,5]	CAR[-5,5]	CAR[-5,5]
Change_Rec	0.0022*	0.0021*	0.0021*	0.0022*
	(0.084)	(0.089)	(0.089)	(0.078)
Cash Flow To Equity		-0.0707	-0.0683	-0.0690
		(0.220)	(0.243)	(0.239)
Market To Book			0.0001	0.0002
			(0.779)	(0.723)
RUNUP				-0.0013
				(0.846)
Return On Equity	0.0347	0.0932	0.0909	0.0915
	(0.452)	(0.131)	(0.142)	(0.140)
Debt To Equity	0.0169	0.0222*	0.0224*	0.0223*
	(0.110)	(0.053)	(0.051)	(0.053)
Relative-size	0.0374***	0.0377***	0.0380***	0.0381***
	(0.009)	(0.009)	(0.008)	(0.008)
Tender Offer	0.0231***	0.0234***	0.0234***	0.0233***
	(0.002)	(0.002)	(0.002)	(0.002)
Diversification	-0.0052	-0.0054	-0.0054	-0.0055
	(0.300)	(0.274)	(0.273)	(0.270)
STOCK	-0.0017	-0.0021	-0.0026	-0.0024
	(0.813)	(0.775)	(0.724)	(0.744)
Public	-0.0199***	-0.0199***	-0.0199***	-0.0199***
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-0.0399***	-0.0383***	-0.0390***	-0.0393***
	(0.001)	(0.002)	(0.002)	(0.002)
N	4438	4438	4438	4438
R-sq	0.025	0.026	0.026	0.027

p-values in parentheses ="\* p<0.1, \*\* p<0.05, \*\*\*p<0.001

***Table 3.6 How recommendation consensus 365 response to acquirer's CAR after the deal announcement***

---

This table shows regression results that reveal how recommendation consensus response to acquirer's short-term abnormal return. We use Deal Covered AA subsample that includes acquisitions deals conducted by US public bidders and analyst recommendation consensus from 1 January 1992 to 31 December 2010. RECLVL is the dummy variable, which is equal to 1 if the recommendation consensus 365 days after announcement day is buy and strong buy. CAR[-1,1] CAR[-2,2],and CAR[-5,5] are Acquirer short-term abnormal returns, which is measured by Market adjusted Cumulative Abnormal Return, 3, 5 and 11 days surrounding announcement day respectively. Control variables includes Cash flow/Equity, the Cash flow over equity ratio measures the amount of free cash holding by the company, is defined as the sum of income before extraordinary item and depreciation minus dividends of common and preferred stock then divided by total asset; M/B, the market to book ratio measures market valuation of bidder's stock, is defined as annual price close multiply common share outstanding divided by total common equity; Runup is measured as market-adjusted CARs over the [-365, -28] window prior to announcement. P/E, the price to earnings ratio measures the net income per share, is defined as annual price close divided by earnings per share; Debt/Total Equity, the debt over asset ratio measures to what extent the company is leveraged, is defined as long term debt divided by total asset. 'Relative transaction value' denotes the relative size of the deal, and is defined as the proportion of deal value over bidder's market value; 'tender offer' denotes the type of deal. 'Diversification' indicates bidder and target oriented in different industries. 'Stock' denotes that the deal is paid by 100% stock; 'public' denotes a publicly listed target. All continuous variables are winsorised at the 1% and 95% levels.

	(1)	(2)	(3)
	RECLVL	RECLVL	RECLVL
CAR[-1,1]	1.1520*** (0.002)		
CAR[-2,2]		1.1806*** (0.000)	
CAR[-5,5]			1.2686*** (0.000)
RUNUP	-0.6399*** (0.000)	-0.6399*** (0.000)	-0.6450*** (0.000)
Market To Book	0.0070 (0.292)	0.0070 (0.297)	0.0066 (0.328)
Debt To Equity	0.1605 (0.173)	0.1678 (0.155)	0.1714 (0.147)
Cash Flow To Equity	1.5962*** (0.001)	1.5820*** (0.001)	1.6125*** (0.001)
Relative-Size	-0.8286*** (0.000)	-0.8278*** (0.000)	-0.8073*** (0.000)
Tender Offer	0.2717*** (0.009)	0.2692*** (0.010)	0.2705*** (0.009)
Diversification	-0.0384 (0.441)	-0.0410 (0.412)	-0.0388 (0.438)
STOCK	0.0456 (0.471)	0.0516 (0.416)	0.0474 (0.455)
Constant	-0.9048*** (0.000)	-0.9054*** (0.000)	-0.9234*** (0.000)
N	3668	3668	3668

p-values in parentheses = \* p<0.1, \*\* p<0.05, \*\*\*p<0.001

***Table 3.7 How recommendation consensus 90 response to acquirer's CAR after the deal announcement***

---

This table shows regression results that reveal how recommendation consensus response to acquirer's short-term abnormal return. We use Deal Covered AA subsample that includes acquisitions deals conducted by US public bidders and analyst recommendation consensus from 1 January 1992 to 31 December 2010. RECLVL is the dummy variable, which is equal to 1 if the recommendation consensus 90 days after announcement day is buy and strong buy. CAR[-1,1], CAR[-2,2], and CAR[-5,5] are Acquirer short-term abnormal returns, which is measured by Market adjusted Cumulative Abnormal Return, 3, 5 and 11 days surrounding announcement day respectively. Control variables includes Cash flow/Equity, the Cash flow over equity ratio measures the amount of free cash holding by the company, is defined as the sum of income before extraordinary item and depreciation minus dividends of common and preferred stock then divided by total asset; M/B, the market to book ratio measures market valuation of bidder's stock, is defined as annual price close multiply common share outstanding divided by total common equity; Runup is measured as market-adjusted CARs over the [-365, -28] window prior to announcement. P/E, the price to earnings ratio measures the net income per share, is defined as annual price close divided by earnings per share; Debt/Total Equity, the debt over asset ratio measures to what extent the company is leveraged, is defined as long term debt divided by total asset. 'Relative transaction value' denotes the relative size of the deal and is defined as the proportion of deal value over bidder's market value; 'tender offer' denotes the type of deal. 'Diversification' indicates bidder and target oriented in different industries. 'Stock' denotes that the deal is paid by 100% stock; 'public' denotes a publicly listed target. All continuous variables are winsorised at the 1% and 95% levels

	(1)	(2)	(3)
	RECLVL	RECLVL	RECLVL
CAR[-1,1]	0.8807 (0.182)		
CAR[-2,2]		1.3122** (0.019)	
CAR[-5,5]			1.2029*** (0.009)
RUNUP	-0.7701*** (0.000)	-0.7716*** (0.000)	-0.7782*** (0.000)
Market To Book	0.0146 (0.217)	0.0158 (0.181)	0.0155 (0.189)
Debt To Equity	0.0748 (0.725)	0.0946 (0.656)	0.1010 (0.638)
Cash Flow To Equity	2.6254*** (0.001)	2.5942*** (0.001)	2.6147*** (0.001)
Relative-Size	-0.3175 (0.181)	-0.2955 (0.214)	-0.2828 (0.238)
Tender Offer	0.2564 (0.221)	0.2506 (0.236)	0.2405 (0.255)
Diversification	-0.0971 (0.296)	-0.0971 (0.297)	-0.0940 (0.313)
STOCK	0.2186* (0.070)	0.2200* (0.069)	0.2349* (0.052)
Constant	-0.8250*** (0.000)	-0.8097*** (0.000)	-0.8113*** (0.000)
N	1010	1010	1010

p-values in parentheses = \* p<0.1, \*\* p<0.05, \*\*\*p<0.001

**Table 3.8 The impact of Reg-FD on recommendation consensus 365 and acquirer's CAR.**

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This table shows regression results that reveal how the relation between recommendation consensus and acquirer's short-term abnormal return has been changed by Reg-FD. We use Deal Covered BA subsample that includes acquisitions deals conducted by US public bidders and analyst recommendation consensus from 1 January 1992 to 31 December 2010. Rec365 is acquirer's analyst recommendation consensus, which is estimated by recommendations received from 365 to 0 days before announcement day. Reg-FD is the dummy variable, which is equal to 1 if the deal is announced after the implementation of Reg-FD. CAR[-5,5] are Acquirer's Market adjusted Cumulative Abnormal Return, 11 days surrounding announcement day Control variables includes Cash flow/Equity, the Cash flow over equity ratio measures the amount of free cash holding by the company, is defined as the sum of income before extraordinary item and depreciation minus dividends of common and preferred stock then divided by total asset; M/B, the market to book ratio measures market valuation of bidder's stock, is defined as annual price close multiply common share outstanding divided by total common equity; Runup is measured as market-adjusted CARs over the [-365, -28] window prior to announcement. P/E, the price to earnings ratio measures the net income per share, is defined as annual price close divided by earnings per share; Debt/Total Equity, the debt over asset ratio measures to what extent the company is leveraged, is defined as long term debt divided by total asset. 'Relative transaction value' denotes the relative size of the deal, and is defined as the proportion of deal value over bidder's market value; 'tender offer' denotes the type of deal. 'Diversification' indicates bidder and target oriented in different industries. 'Stock' denotes that the deal is paid by 100% stock; 'public' denotes a publicly listed target. All continuous variables are winsorised at the 1% and 95% levels.

	(1)	(2)	(3)	(4)
	CAR[-5,5]	CAR[-5,5]	CAR[-5,5]	CAR[-5,5]
Rec365	0.0118*** (0.005)	0.0117*** (0.005)	0.0116*** (0.005)	0.0116*** (0.007)
Reg-FD	-0.0483*** (0.003)	-0.0483*** (0.003)	-0.0483*** (0.003)	-0.0483*** (0.003)
Cash Flow To Equity		-0.0171 (0.594)	-0.0157 (0.626)	-0.0158 (0.625)
Market To Book			0.0002 (0.428)	0.0002 (0.436)
Runup				-0.0003 (0.956)
Return On Equity	0.0036 (0.862)	0.0178 (0.593)	0.0163 (0.624)	0.0165 (0.621)
Debt To Equity	0.0059 (0.232)	0.0070 (0.201)	0.0073 (0.185)	0.0072 (0.186)
Relative-size	0.0283*** (0.000)	0.0284*** (0.000)	0.0288*** (0.000)	0.0288*** (0.000)
Tender offer	0.0366*** (0.000)	0.0367*** (0.000)	0.0368*** (0.000)	0.0368*** (0.000)
Diversification	-0.0056* (0.093)	-0.0056* (0.093)	-0.0056* (0.093)	-0.0056* (0.092)
Stock	-0.0027 (0.600)	-0.0029 (0.576)	-0.0035 (0.502)	-0.0035 (0.507)
Public	-0.0229*** (0.000)	-0.0229*** (0.000)	-0.0229*** (0.000)	-0.0229*** (0.000)
Constant	0.0930*** (0.000)	0.0932*** (0.000)	0.0921*** (0.000)	0.0923*** (0.000)
N	5221	5221	5221	5221
R-sq	0.019	0.019	0.020	0.020

p-values in parentheses ="\* p<0.1, \*\* p<0.05, \*\*\*p<0.001

**Table 3.9 The impact of Reg-FD on recommendation consensus 90 and acquirer's CAR**

---

This table shows regression results that reveal how the relation between recommendation consensus and acquirer's short-term abnormal return has been changed by Reg-FD. We use Deal Covered BA subsample that includes acquisitions deals conducted by US public bidders and analyst recommendation consensus from 1 January 1992 to 31 December 2010. Rec90 is acquirer's analyst recommendation consensus, which is estimated by recommendations received from 90 to 0 days before announcement day. Reg-FD is the dummy variable, which is equal to 1 if the deal is announced after the implementation of Reg-FD. CAR[-5,5] are Acquirer's Market adjusted Cumulative Abnormal Return, 11 days surrounding announcement day Control variables includes Cash flow/Equity, the Cash flow over equity ratio measures the amount of free cash holding by the company, is defined as the sum of income before extraordinary item and depreciation minus dividends of common and preferred stock then divided by total asset; M/B, the market to book ratio measures market valuation of bidder's stock, is defined as annual price close multiply common share outstanding divided by total common equity; Runup is measured as market-adjusted CARs over the [-365, -28] window prior to announcement. P/E, the price to earnings ratio measures the net income per share, is defined as annual price close divided by earnings per share; Debt/Total Equity, the debt over asset ratio measures to what extent the company is leveraged, is defined as long-term debt divided by total assets. 'Relative transaction value' denotes the relative size of the deal and is defined as the proportion of deal value over bidder's market value; 'tender offer' denotes the type of deal. 'Diversification' indicates bidder and target oriented in different industries. 'Stock' denotes that the deal is paid by 100% stock; 'public' denotes a publicly listed target. All continuous variables are winsorised at the 1% and 95% levels.



	(1)	(2)	(3)	(4)
	CAR[-5,5]	CAR[-5,5]	CAR[-5,5]	CAR[-5,5]
Rec90	0.0180*	0.0178*	0.0177*	0.0159
	(0.072)	(0.075)	(0.078)	(0.125)
Reg_FD	-0.0374**	-0.0372**	-0.0375**	-0.0379**
	(0.038)	(0.039)	(0.039)	(0.036)
Cash Flow To Equity		-0.0349	-0.0299	-0.0281
		(0.536)	(0.597)	(0.616)
Market To Book			0.0004	0.0003
			(0.346)	(0.443)
Runup				0.0076
				(0.490)
Return On Equity	0.0127	0.0394	0.0350	0.0346
	(0.796)	(0.511)	(0.560)	(0.560)
Debt To Equity	0.0100	0.0119	0.0129	0.0130
	(0.437)	(0.393)	(0.354)	(0.350)
Relative-size	0.0396**	0.0400**	0.0414**	0.0417**
	(0.029)	(0.027)	(0.023)	(0.021)
Tender offer	0.0398***	0.0403***	0.0402***	0.0403***
	(0.010)	(0.009)	(0.010)	(0.009)
Diversification	-0.0117	-0.0117	-0.0124	-0.0122
	(0.128)	(0.128)	(0.107)	(0.111)
Stock	-0.0019	-0.0021	-0.0034	-0.0045
	(0.861)	(0.847)	(0.755)	(0.689)
Public	-0.0281***	-0.0280***	-0.0282***	-0.0282***
	(0.009)	(0.009)	(0.008)	(0.009)
Constant	0.1234***	0.1238***	0.1222***	0.1168***
	(0.000)	(0.000)	(0.000)	(0.001)
N	1133	1133	1133	1133
R-sq	0.045	0.046	0.048	0.049

p-values in parentheses ="\* p<0.1, \*\* p<0.05, \*\*\*p<0.001

**Table 3.10 IV regression of acquirer's short-term performance to Recommendation Consensus 365**

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This table presents the Two Stage Least Square Regression (IV Regression) results that that reveals the relation between Recommendation Consensus 365 days before announcement day (Rec365) and acquirer's short-term abnormal return. We use Deal Covered BA subsample that includes acquisitions deals conducted by US public bidders and analyst recommendation consensus from 1 January 1992 to 31 December 2010. Rec365 is acquirer's analyst recommendation consensus, which is estimated by recommendations received from 365 to 0 days before announcement day. Instrument variable is 52 weeks high. Control variables includes Cash flow/Equity, the Cash flow over equity ratio measures the amount of free cash holding by the company, is defined as the sum of income before extraordinary item and depreciation minus dividends of common and preferred stock then divided by total asset; M/B, the market to book ratio measures market valuation of bidder's stock, is defined as annual price close multiply common share outstanding divided by total common equity; Runup is measured as market-adjusted CARs over the [-365, -28] window prior to announcement. P/E, the price to earnings ratio measures the net income per share, is defined as annual price close divided by earnings per share; Debt/Total Equity, the debt over asset ratio measures to what extent the company is leveraged, is defined as long term debt divided by the total assets. 'Relative transaction value' denotes the relative size of the deal and is defined as the proportion of deal value over bidder's market value; 'tender offer' denotes the type of deal. 'Diversification' indicates bidder and target oriented in different industries. 'Stock' denotes that the deal is paid by 100% stock; 'public' denotes a publicly listed target. All continuous variables are winsorised at the 1% and 95% levels.

	Stage one	Stage two
Rec365		0.035*
		(0.098)
Cash Flow To Equity	0.132	-0.029
	(0.313)	(0.260)
Market To Book	0.000	0.000
	(0.991)	(0.183)
Runup	-0.065***	0.011***
	(0.000)	(0.000)
Return On Equity	0.131	0.053**
	(0.320)	(0.046)
Debt To Equity	-0.043**	0.003
	(0.028)	(0.456)
Relative-size	-0.040***	0.004
	(0.003)	(0.109)
Tender offer	0.002	0.028***
	(0.910)	(0.000)
Diversification	0.014	-0.004***
	(0.146)	(0.024)
Stock	-0.059***	0.004
	(0.000)	(0.112)
Public	0.058***	-0.031***
	(0.000)	(0.000)
52-Weeks-High	-0.001***	
	(0.000)	
Constant	2.223	-0.059
	(0.000)	(0.207)
N	5221	5221

p-values in parentheses = \* p<0.1, \*\* p<0.05, \*\*\*p<0.001

## **Chapter 4: Divergence Opinion, Information**

### **Asymmetry and M&A Returns**

#### **4.1 Introduction**

This chapter investigates how analyst divergence opinion related to bidder abnormal return in both short run and long run. By adding bidder's pre-merger performance into consideration, this chapter further explores the true impact of divergence opinion and information asymmetry on bidder merger and acquisition performance.

Analyst earning forecast has been investigated in many previous literature. It is widely acknowledged that Divergence opinion theory and information asymmetry hypothesis (Miller, 1977, Myers and Majluf, 1984, Travlos, 1987) are vitally important when we study the influence of analyst on bidder merger gain. Miller (1977)'s divergence of opinion theory assumes that investors have their own identical stock evaluation and the short selling is limited. If the divergence opinion is high, the most optimistic investor decides the stock price. In the scenario of merger and acquisition, the high pre deal divergence opinion indicates overvalued stock. Therefore, high divergence opinion will lead to negative bidders announcement return. This is supported by number of literatures: Diether et al. (2002) study the return of stocks with different analyst divergence opinion, and confirm that high divergence opinion stock has less return than others similar stocks, they finds evidence that stock past performance enhance the impact of divergence opinion on stock return. Moeller et al. (2007) also

found negative relation between bidder announcement return and divergence opinion, after controlling means of payment and target public status, They reveal that the negative relation only exist in the deal that stock is the solo payment rather than cash payment. Alexandridis et al. (2007) examine how pre-merger divergence opinion affect bidders abnormal return, they found that bidder with high pre-merger divergence opinion are overvalued by the market. Bidder with high divergence opinion underperform bidder with low divergence opinion in both short run and long run. To contrary with the literature above, Chatterjee et al. (2012) shows that not all the firms follow Miller (1977)'s implication: they found that bidder will achieve better post-merger abnormal return (Mark-up) if the target have high divergence opinion. This is because target with high pre announcement divergence opinion received high premium: it will deter bidders from completing the deal. However, the deal will only be completed if value-maximizing bidders truly believe that merger synergy is greater than the cost of acquiring target with high divergence opinion. the true impact of divergence opinion on bidder abnormal return remain unresolved.

In this study, we estimate whether the impact of divergence opinion and information asymmetry on bidder abnormal return changes with bidder pre-merger performance. Our results suggest that we need put pre-merger performance into consideration when we examine how divergence opinion and information asymmetry affect bidders abnormal return. The rational is shown below: According to the trading mechanism demonstrated in Miller (1977), low divergence opinion indicates that the firm's stock

price has already been fully realised by the optimistic investors available in the market, there is low trading activity and low investor recognition. No matter whether the stock price is high or low, there is lack of price movement. The poor past performance also shows the same problem. The lack of investor recognition shrinks the number of potential buyers. The declining stock price and fixed investment recognition demand firms to attract more attention. Investor recognition hypothesis (Merton, 1987) address that an exogenous event increases stock recognition, the company will lower the cost of raising capital and increase the investment opportunity, Merger and acquisition is one of such exogenous event. Moreover, Miller (1977)'s view, Increase in stock recognition attracts more investors from the buying side. So the value of stock increases but the expected return will decrease. Bushee and Miller (2012) support that increase in public exposure helps the company to attract more institutional investors that boost stock valuation in incoming years. Therefore, the deals conducted by bidders with low divergence opinion tend to be value-enhancing.

On the other hand, bidders with high divergence opinion and high pre-merger performance receive negative returns. These bidders are like the 'glamour' bidder in Rau and Vermaelen (1998). They are associated with high P/E ratio, high free cashflow, overconfident CEO and high agency cost. Bidders with high cash flow have poor acquisition performance. Jensen's (1986) free cashflow hypothesis indicates that agency cost in cash rich firms force managers to conduct value-destroying deals. Smith and Kim (1994) propose that cash-rich bidders receive negative announcement

abnormal returns and 'slack-poor' bidders gain positive announcement abnormal returns. Harford (1999) suggests that bidder with high cash reserves are more likely being a bidder but negatively related to bidder abnormal return in both short run and long run. Moreover, High divergence opinion and good past performance indicates that the price reach the highest bidding possible in the market. They are more likely to be overvalued. The overvalued bidder tends to overpay their target and suffer serious governance problems. The deals conducted by such bidders tend to be value-destroying (Fu et al., 2013). Overall, bidders with high divergence opinion and good past performance tend towards value-destroying deals.

The literature discussed above explored how divergence opinion affects bidder announcement return. In contrast, asymmetry of information theory implies that there is asymmetry of information between management and investors. Deal announcement will disclose more information to the market. The signalling effect will change bidders' abnormal return accordingly. Stock payment leads to negative abnormal return because it signals that the bidder is overvalued. Moreover, when more information becomes available in the market through time, the level of asymmetry information declines, the stock price drops. In the scenario of merger and acquisition, Dionne et al. (2014) study the impact of information asymmetry on premium, by investigating 1026 US deals from 1990 to 2006, they find that well-informed bidders pay lower premiums. Armstrong et al. (2011) reveal that there are tradeoffs between cost of capital and information asymmetry. Firms may choose to maintain high-level

information asymmetry to maximise their benefit. Louis (2002) shows that negative long-term merger performance is caused by pre-merger information asymmetry. We have mixed empirical results about the effect of information asymmetry on bidder merger performance. In addition, to the best of the author's knowledge, no paper has directly examined the combined effect of divergence opinion and information asymmetry on merger gain of bidders with different pre-merger performances. Although Moeller, Moeller et al. (2007) have carried out a similar study, they only focus on controlling means of payment and public status.

Motivated by the unresolved issues above, and by using one of the most comprehensive samples, which covers US M&A deals conducted from 1990 to 2013 and makes use of detailed analyst earning forecast, idiosyncratic volatility and pre-merger performance, this paper sheds new light on how divergence opinion and information asymmetry affect acquisition performance in both the short and long run.

In this study, following the measurement of divergence opinion in previous literature (Dierkens, 1991, Alexandridis et al., 2007, Moeller et al., 2007, Boehme et al., 2009), we use the analyst forecast dispersion (DIVO) to measure divergence opinion; Idiosyncratic volatility measures information asymmetry. In order to study how bidder past performance can change the impact of divergence opinion and information asymmetry on acquisition performance; we sort our sample on the basis of differences in bidder past performance. Bidders with positive Runup ratio are categorised as



well-performed bidder. Bidders with negative Runup ratio are categorised as poorly performed bidders

We find that a low divergence opinion bidder outperforms a high divergence opinion bidder in both the long and short run. Analyst forecast dispersion is significantly negatively related to bidder cumulative abnormal return five days surrounding the announcement day. A one-unit increase in the Divo value leads to a 16.94% decrease in CAR[-2,2]. However, this effect is weakened in bidders with good past performance, which is a 5.94% decrease in CAR[-2,2]. This result suggests that bidders' past performance substantially alters the impact of divergence opinion on bidders' short-term abnormal return. The result implies that Low Divo bidders are undervalued, and a merger and acquisition deal, as an exogenous event, attracts more potential buyers and lowers the capital cost. This is supported by the empirical results regarding investor recognition theory.

We also found that a high idiosyncratic volatility bidder will achieve a higher abnormal return in the short run. Bidder's idiosyncratic volatility (Sigma value) is positively related to bidder short-term abnormal return. A high idiosyncratic volatility bidder will receive a 30.34% higher short-term abnormal return (CAR[-2,2]) than a low idiosyncratic volatility bidder. This is because high idiosyncratic volatility indicates a high level of information asymmetry between management and investors. High pre-deal idiosyncratic volatility shows the bidder is overvalued by the market. It

can help bidders achieve high short-term merger gain but it will sacrifice the long-term return. A one-unit increase in idiosyncratic volatility leads to a 43.03% decrease in bidders long-term abnormal return BHAR [0,24].

Overall, for bidders with poor pre merger performance, analyst divergence opinion has negative impact on their announcement return. For bidders with good pre merger performance, a positive relation has been found between information asymmetry and announcement return. These empirical results strongly support that bidder pre merger performance is an important conditioning variable that we should put into consideration in examining the impact of divergence opinion and information asymmetry on bidder merger and acquisition performance.

This study contributes to the existing literature in many ways; first, this chapter sheds new light on puzzling empirical evidence on how the combinations of divergence opinion and information asymmetry affect bidder merger performance. Different from previous literature, this paper argues that the effect of divergence opinion is stronger than information asymmetry if the bidder has negative pre merger performance. For well-performed bidders, the effect information asymmetry is more impotent than divergence opinion.

Second, previous literature does not distinguish bidder pre merger performance, By

simultaneously analysing bidders with different pre merger performance, this chapter provide new evidence on the impact of divergence opinion and information asymmetry on bidder merger gain. This chapter emphasis that divergence opinion have stronger negative impact on poorly performed bidder than well-performed bidder. Information asymmetry has stronger positive impact on well-performed bidder's announcement return than poor performed bidder. In the long run, high information asymmetry is associated with negative return regardless pre merger performance.

The remainder of this chapter is organised as follows, literature review in Section 2. Hypothesis construction in Section 3, Data and methodology are presented in Section 4. Section 5 show empirical results and robustness test; Section 6 for Conclusion.

## 4.2 Literature review

### *The investment value of analysts' research*

There is extensive literature that studies the investment value of analysts' research, most of which concentrates on the quality of analyst earning forecast and recommendation. Many previous studies suggest that the consensus of analyst earning forecast can be considered as a measure of market expectation (Brown and Rozeff, 1978, Fried and Givoly, 1982, O'brien, 1988). The evidence shows that analysts' forecast are less biased and the magnitude of accuracy will increase as more information will release when it close to the actual earning announcement. They conclude that analysts are less optimistic as analysts tend to underestimate the actual earning. The market price change has little impact on analyst earning forecast, By studying the formulation of analyst earning forecast, Abarbanell (1991) acknowledge that analyst don't take prior price change as an important factor in analyst's forecast formulation process: they confirm that analyst forecast is superior to time series model in term of earning forecasting accuracy.

On the other hand, De Bondt and Thaler (1990) argue that severe agency problems force analysts to issue overoptimistic recommendations and earning forecasts. Francis and Philbrick (1993)'s model demonstrates that analyst will issue forecasts in favour of management to access extra information if the compensation exceeds the reputation

damage. Conflicts of interest among financial analysts, management and investor do exist.

Lin and McNichols (1998) study to what extent analysts' growth forecast and recommendation is effected by the underwriting relationship with investment bank.

The results indicate that affiliated analyst's recommendations are more in favour of investment bank clients rather than growth forecast. Investment bank and management give more incentive for analyst offer more optimistic analyst. Similar results are found in Hansen and Sarin (1996), by study analyst forecast error surround the seasoned equity offering, they find that forecast error are not significantly different between affiliated and unaffiliated analyst.

Dechow et al. (2000) find that sell-side analyst growth forecast tend to be overoptimistic around common equity offer, more optimistic forecast are found in the group of affiliated analyst. Affiliated analyst get more compensation if they offer more optimistic growth forecast. However, highest growth forecast issued by affiliated analyst is associated with the worse post-offering performance. In addition, Dechow et al. (2000) also suggest that growth stock, defined as stock with high P/E ratio and growth rate, received more optimistic forecast and recommendation from affiliated analysts. This is because; both management and analyst are benefit from issuing biased forecast. Overoptimistic forecast or recommendation boost the price of growth stock so that the cost of raising external capital will be substantially reduced.

In turn, management provide more underwriting fee to the affiliated analyst. In this case, the unaffiliated analyst may also provide overoptimistic recommendation to attract new client.

Chan and Karceski (2003) examine the quality of analyst earning forecast by studying analyst behavior in the bull market of 1990s, their results suggest the conflict of interest make analyst issue biased earning forecast in order to gain favour of investment bank client. Empirical evidence suggest that analyst incentives increase when they server more institutional investor.

Most of the literature mentioned above concludes that the quality of analyst research has poor investment value. Furthermore, Liu and Song (2001) study the analyst performance surround the Internet bubble burst in 2000. They divided the analyst into two groups, unaffiliated and affiliated analyst. They define affiliated analyst as the analysts who have underwriting relation with Internet Company. The results find that unaffiliated analyst issues more optimistic forecast than affiliate analyst before the bubble burst. Then, analysts in both group issue pessimistic forecasts after the bubble burst. However, these biased forecasts are less notable in the subgroup of independent analysts. These results indicate that even many analysts are affiliated with intuitional investor, less biased forecast still available in the public. These results also indicate that no matter how strong the conflict is, divergence opinion does exist among analyst.

To contrary with literatures above, many literatures have found that analyst forecast quality is determined by many factors such as firm size, brokerage house ownership, working experience and reputation (Clement, 1999, Jacob et al., 1999, Cowen et al., 2006, Groysberg and Lee, 2008, Fang and Yasuda, 2009).

The reputation concern theory states that analyst's reputation is based upon issuing accurate forecast and recommendation on the right time. Analyst compensation is relying on their reputation. The long career concern disciplines analyst from activities that damage their reputation. Fang and Yasuda (2009) study the impact of conflict interest on star and non-star analyst's earning forecast and recommendations. They confirm that the long career reputation concern have strong disciplinary power. But, the discipline power of bank reputation are different when take analyst personal reputation as a proxy. The accuracy level of recommendations and earning forecast issued by non-reputational analyst are negatively related to their employers' reputation. Non-reputational analyst who hired by top-tier investment bank issue more biased recommendation and earning forecast. Discipline power of personal reputation is stronger for reputational analyst working for top tier investment bank than the non-reputational colleague. Consequently, analyst reputation concern is one of the determinants of forecast accuracy.

Ljungqvist et al. (2006) find that providing accurate forecasts will benefit both analysts and the institution they work for. Accurate forecasts build analysts a long career

reputation and increase the credibility of their brokerage house. Thus, high credibility will boost the brokerage house's revenue. In addition, Pacelli (2015) indicates that corporate culture is one of the significant determinants of analyst forecast quality. Analysts play a key role in financial markets. The service they provide not only represents the general market expectation but reduces the information asymmetries between firms and investor.

However, individual investors and institutional clients have different attitudes toward analysts' accurate forecast. Individual investor expect highly accurate forecast and recommendation because analyst research could be the determinants in their decision making process. On the other hand, institutional investor expects the 'right' forecast rather than forecast accuracy. Bradshaw (2011) suggest that earning forecast accuracy is not the major concern for institutional investor compare with "management access" and "accessibility". Empirical evidence from Brown et al. (2015) and Groysberg et al. (2011) suggest that there is no statistically significant relation between analyst compensation and earning forecast accuracy. As a result, analyst can issue biased earning forecast to meet their clients' immediate need, especially in the case of short-term profit maximizing. Michaely and Womack (1999) find optimistic bias is for those clients who want to boost stock price or promote underwriting. Hilary and Hsu (2013) find pessimistic bias is for those clients who want to lower their recent earning target. Overall, analyst forecast accuracy is not related to their compensation, is not the major concern of institutional clients. Thus, analyst forecast are more likely to be



biased in the favor of management and investment bank rather than individual investor. Hong and Kubik (2003) find that brokerage house reward optimistic analyst more than accurate analyst. To gain more underwriting fee, brokerage house even encourage analyst to issue overoptimistic forecast and recommendation. Therefore, the disciplinary power of long career concern is weak.

Overall, previous literatures have mixed results about the true investment value of analyst earning forecast and recommendation. However, after reviewing previous literature, we can acknowledge that analyst forecast can represent the market expectation, it is more accurate than the forecast generated from time series model. Analyst do have conflict interest, they tend to issue biased forecast in the favour of management and institutional investor. It can be argue that the reputation concern theory does encourage analyst to issue accurate earning forecast, reputation concern do have discipline power for analyst with high reputation even through the power is week for analyst with low reputation. The accurate and independent earning forecast is available in the public. Thus, no matter how strong the conflict of interest is, how serious analyst herding behaviour is, divergence opinions among analyst always exist. Analyst dispersion represents the market expectation for one company. In this paper, we use analyst divergence opinion, measured by standard deviation of analyst earning forecast, to examine bidder and target performance.

### ***Divergence Opinion Theory versus Merger & Acquisition***

Miller (1977)'s model show that the demand curve for stock with divergence opinion has downward slope, the higher divergence opinion is, and the steeper the slope will be. An increase in stock supply will drop the stock price, as less optimistic investor will absorb the extra supply. Miller (1977) 's divergence opinion theory imply that bidder with high divergence opinion will receive negative future return as the stock float has been increased by merger and acquisition deal. Many empirical evidence support Miller (1977)'s theory, Diether et al. (2002) shows that stock with high dispersion in analyst earning forecast generate lower future return than stock with low dispersion. Similar results are found in bidders announcement return, Moeller et al. (2007) suggest high divergence opinion about acquirer's price lead to negative announcement return when stocks are used as means of payment. Based upon Miller (1977)' theory, stock price drop when stock supply increases. Using stock as means of payment increase the bidders float. Therefore, negative announcement return is expected. However, It is difficult to distinguish whether the negative return is caused by divergence of opinion or signaling effect. Travlos (1987) shows that signaling effect leads negative return for bidder using stock as means of payment. Loughran and Vijh (1997) shows stock payment leads to negative abnormal return in the long run. Because, Bidder gain advantage by using overvalued stock as mean of payment in merger and acquisition. However, Stock payment signal that bidders stock are overvalued. Consequently, bidders stock price drop as investor short bidders stock. The relation between bidders short run abnormal returns and pre-announcements

divergence opinion remains unclear. Moeller et al. (2007) found an insignificant result for the short run.

Miller (1977)'s divergence of opinion theory also implies that investors have their own identical stock evaluation. The stock price will firstly setup by the most optimistic investor, and then the price will decline through time as uncertainty become certainty as more information available. Many literatures support this implication. Alexandridis et al. (2007) examine how divergence of opinion about bidders stock price before announcement related to bidder post acquisition abnormal return. They find that acquirer in the high divergence opinion group gain less than the acquirer in the low divergence opinion group. Acquirers with high divergence opinion before announcement receive negative abnormal return in the long run.

Duchin and Schmidt (2013) study the quality analyst research and level of uncertainty surround merger and acquisition announcement during and outside merger wave. They conclude that the quality of analysis surrounding acquisitions changes during the wave and outside the wave. The quality of analyst research is greater outsider the wave than during the wave.

In this paper, we examine the relation between bidder abnormal return and pre announcement divergence opinion further by adding bidders past performance as one extra proxy. Previous literature suggests that bidder with high growth potential, high P/E ratio underperform bidder with lower P/E ratio in both short run and long run.

According to Miller (1977) theory, stock with low divergence opinion implies that the stock price is set by less optimistic investors, it is close to the fundamental price. Therefore, We conjecture that high P/E bidder attract more analyst following, the increase in the number of analyst following will increase level of divergence opinion. High divergence opinion will leads to negative abnormal return in both short run and long run.

Financial analyst face new challenge in issuing accurate earning forecast for firms involved in merger and acquisition. This is because merger and acquisition substantially change the earning time series for bidder and target. Accurately forecasting earnings for the combined firm will be even more challenging. Haw et al. (1994) document that merger and acquisition leads to significant increase in analysts' absolute earnings forecast errors in the year after deal completion. It will take approximately 4 years to regain the pre-merger accuracy level. In addition, diversifying deal also cause substantial increase in the earning forecast error(Dunn and Nathan, 1998), Erwin and Perry (2000) show that, comparing with firms conduct focus preserving deals, higher forecast error for firms conduct focus-decreasing deals within 5-year after deal completion.

Merger and acquisition deal alter firm's fundamental characteristics, such as size, financial health, capital structure. Profitability and growth rate, Kinney (1971) believe these fundamental changes increase analyst earning forecast error. Although there are more information available for bidder and target before merger and acquisition,

analysis has lack information regard to the new firm created by the merger deal.

Consequently, the earning forecast for the combined firm will be less accurate.

Furthermore, Scharfstein and Stein (1990)'s career concern theory states that Security analyst's reputation is base up the forecast accuracy and length of forecasting record.

Security analysts' compensation and career rely on how influential and accurate their

recommendation and earning forecast will be. For the long career concern, security

analyst earning forecast should be as accurate as possible. Hilary and Hsu (2013)

argue that earning forecast consistency is more important than accuracy. There are

two types of analysts, the first type is the analyst who made consistent forecast error,

and the second type is the analyst with higher stated accuracy. They document that the

first type of analyst has greater capability of affecting price than the second type.

Consistent analyst has lower possibility of being downgraded and higher possibility of

being nominated All Star analysts. Institutional investors favour analyst with high

consistency and trading strategy.

Lang and Lundholm (1996) and Gleason and Lee (2003) propose that the greater the

amount of information available in the market about the firm, the more accurate

analysts' earnings forecasts will be. In the same vein, we propose that if the M&A

increases the richness of the information environment of the merging firms, this

should enhance the ability of analysts to forecast more accurately. Consequently,

analyst forecast errors are expected to decline after the merger.

Scheinkman et al. (2004) show that the price of stock with high divergence opinion will drop if the volumes of stock float increase. Supply curve shift to the right as shown in Miller (1977) model. There are many ways to increase stock float, Moeller et al. (2007) shows that stock swap in merger and acquisition deal will increase the stock float and cause negative future return for bidders. Baker et al. (2007) argue that target shareholder are less sensitive, it take time for market to absorb the new issues. Moreover, newly issued shares may partially trade in the market. For instance, fundamental investor tends to hold the share for a long time period. In this case, for a given increase in the supply of shares, we would expect the bidder abnormal return to fall in bidder diversity of opinion and in the proportion of target shareholders who are not sleepy. Moreover, the lock up agreement may deter new issues to hit the market immediately after deal completion. Geczy et al. (2002) also show that the short selling for bidders tend to limited as the high borrowing cost and low availability of acquirer's stock. To examine how increase in stock float will affect analyst forecast accuracy and bidders abnormal return, we conjecture that stock payment increase post deal completion earning forecast accuracy. As increase the stock supply bring the stock price toward its fundamental value, since the stock price is set up by less optimistic investors. Bidder's long-term abnormal returns are negatively related to stock payment or increase in stock float.

Following previous literature, earning volatility is measured by the standard deviation of earnings per share for the past three years. The earnings volatility of merging firms

will increase due to merger and acquisition. High earning volatility lowers the earning predictability of bidder and target.

Finally, Pacelli (2015) concludes that, due to the conflict of interest, analysts maximize their own benefit when issuing the earning forecast. The earning forecast is highly likely to be analyst's optimal choice after balances all stakeholder's interest rather than the most accurate forecast they can make. This is because: it is extremely difficult to distinguish whether analyst issue biased earning forecast intentionally, due to the earning forecast making process. Although there are many regulations that promote analyst independence, the discipline power still is weak. However, the effect of regulations, such as Global Settlement and regulations fair disclosure are proved to be effective.

### 4.3 Hypothesis Construction

The literature shows that there are mixed results in regard of how asymmetry information and divergence opinion affect bidder's abnormal return. We argue that the mix results are caused by the obscure of firm's pre announcement performance and stock recognition. Our hypothesis rational begins with Miller (1977)'s divergence opinion theory. Based upon Miller (1977)'s assumption, we draw the demand curve for stock A (see diagram one). The slope of demand curve AOB shows the original level of divergence opinion. The original price is P0. Next, the divergence opinion increases so that the demand curve becomes steeper. We get demand curve COD and EOF. The stock price will increase simultaneously from P0 via P1 to P2. The cumulative abnormal return will be the sum of R1 and R2.

Then, we draw the original demand curve GOH for stock B, we emphasis that the slope of demand curve GOH is steeper than any demand curve of stock A. according to Miller's theory, the divergence opinion of stock B is greater than the divergence opinion of stock A. Next, the slope of demand curve GOH increases, we get demand curve IOJ and KOM. The stock price will increase from P3, via P4 to P5. We get stock return R3 and R4. In the diagram will can see, the sum of R1 and R2 is greater than the sum of R3 and R4. If we assume the stock price took 365 days to increase from P0 to P2 or P3 to P5. The divergence opinion steadily increase, the slope of the demand curve get steeper day by day, draw the daily demand curve, we will have the



daily return. The sum of the daily return is the run-up ratio.

According to the trading mechanism demonstrated in Miller (1977), we conjecture that stock with low divergence opinion and low past performance, e.g. stock A in diagram one, are more willing to conduct merger and acquisition deal. This is because Low divergence opinion indicate that the firms stock price have already been fully realized by the optimistic investor available in the market, there is low trading activity and low investor recognition. No matter the stock price is high or low, there is lack of price movement. The poor past performance also shows the same problem. The lack of investor recognition shrinks the number of potential buyers. The declining stock price and fixed investment recognition demand firms to attract more attention. Investor recognition hypothesis (Merton, 1987) address that an exogenous event increases stock recognition, the company will lower the cost of raising capital and increase the investment opportunity, Merger and acquisition is one of such exogenous event. Moreover, Miller (1977)'s view, Increase in stock recognition attracts more investors from the buying side. So the value of stock increase but the expected return will decrease. Therefore, the deals conducted by bidder with low divergence opinion tend to be value enhancing.

Furthermore, in the scenario of merger and acquisition, we conjectures bidder with high divergence opinion and high past performance (stock B in diagram one) receive negative return. The rational is that these bidders are like "Glamour" bidder. They are associated with high P/E ratio, high free cash flow, overconfident CEO and high

agency cost. Bidders with high cash flow have poor acquisition performance. Moreover, High divergence opinion and good past performance indicates that the price reach the highest bidding possible in the market. They are more likely to be overvalued. The overvalued bidder tends to overpay their target and suffer serious governances problem. The deal conducted by such bidder tend to be value destroying. Overall, Bidder with high divergence opinion and good past performance tend to value destroying deal. We hypothesise that

***H1a: Analyst Divergence opinion controlling bidder's past performance negatively related to Bidder short-term abnormal return***

Furthermore, as stated in Scharfstein and Stein (1990)'s career concern theory, security analyst should update their earning forecast on time. Therefore, the Divergence opinion one-year proceeding deal announcement has no impact on bidder abnormal return in the long run.

In contrary, Asymmetry information model imply that there are asymmetry information between management and investors. Deal announcement will disclosure more information to the market. The signaling effect will change bidder's abnormal return accordingly. Stock payment lead to negative abnormal return because it signals that bidder is overvalued. Moeller et al. (2007) also consider asymmetry information as the uncertainty of future growth. In this paper, we measure information asymmetries by idiosyncratic volatility (Sigma). It also known as a measurement of

idiosyncratic risk and the uncertainty about future growth, Furthermore, Divergence opinion theory and investor recognition hypothesis imply that increase the visibility of stock will increase the stock price. Merton's investor recognition hypothesis indicates that increase in public awareness lower the company's financing cost increase the investment opportunity, so the value of stock increase but the expected return will decrease. In other words, high idiosyncratic volatility ( $\Sigma$ ) implies high market valuation before deal announcement. In addition, the effect of investor recognition will boost by high idiosyncratic volatility. We conjecture that bidder with high idiosyncratic volatility will trigger stronger investor recognition effect. A bidder with high idiosyncratic volatility achieves positive abnormal return in the short run. Therefore, we hypothesis that

***H2a: Idiosyncratic volatility positively related to Bidder short-term abnormal return***

However, the effect of information symmetry will perish in the long run. Because, more information will be disclosed and the stock price will back to it's fundamental value. Therefore, we hypothesis that

***H2b: Idiosyncratic volatility negatively related to Bidder long-term abnormal return***

## **4.4.Data and Methodology**

### **4.4.1 Sample Selection**

In this paper, we examine how divergence opinion one year before deal announcement effect bidders and target abnormal return in both short run and long run. Therefore, we combine deal data from Thomas one and analyst earning forecast from The Institutional Brokers' Estimate System (I/B/E/S). We collect the deal sample from Thomas one; the initial deal sample includes 299,048 US merger and acquisition deals. We require that all deal should be announced over the period 1 January 1980 to 1 January 2015. Both bidders and targets are US firms, the original sample yield to 196031 deals. Bidders are required to be public and targets are required to be public, private, or subsidiaries. Because we study bidders and target short/long-term acquisition performance, all deals should be completed deal. Using these criteria give us a sample of 89199 deals. Following the standard procedure, we exclude financial and utility firms with Standard Industrial Classification codes 6000–6999 and 4900–4999; these leave us a sample of 63720 deals. Takeover transaction values are required to be greater than or equal to \$1 million, yielding a sample of 33274 deals. We also remove deals completed with following Merger and acquisition technique: Bankruptcy acquisitions, going-private transactions, leveraged buyouts, liquidations, repurchases, restructurings, reverse takeovers, and privatizations, produce a sample of 28649 deals.

We collect all available analyst-earning forecast from the Institutional Brokers' Estimate System (I/B/E/S). The earning forecast sample is ranged from 1<sup>st</sup> January 1990 to 31<sup>st</sup> December 2015. To guarantee the data accuracy, we obtain both recommendation announcement day and review day. Our sample include 11,016,157 earning forecast made by 20289 analyst from 919 financial institutions. We match the earning forecast sample, firm characteristics and deal characteristics by deal number, Analyst Name, Company Name and earning forecast announcement day. Because, bidders have multiple analysts following before and after deal announcement, and analyst will review their earning forecast through time. To estimate the analyst divergence opinion one year before deal announcement, we introduce a time variable Gap. Gap is defined as the calendar day difference between earning forecast announcement day and deal announcement day. We keep the earning forecast given 365 days before the deal announcement and 365 days after the deal announcement day, the sample yield to 1,758,295 earning forecast record. Following Hassan, Zhao and Zhu (2014), we use annual earnings forecasts 365 days before the deal announcement day to estimate pre deal divergence opinion. To estimate post deal earning forecast error, we need actual earnings in the fiscal year of deal completion and earning forecast one fiscal year after the deal completion. Nonetheless, we estimate the analyst divergence opinion and drop all the duplicate deals, our sample drop to 28609 deals.

Finally, we combine bidder and target abnormal return in both short run and long run

with analyst divergence opinion, deal characteristics and firm characteristics. We use Cumulative Abnormal Return 3 m 5 and 11 days surrounding announcement day to measure bidders short-term abnormal return, BHAR 12 , 24 , 36 month to measure long term abnormal return. After drop all missing observation in bidder's CAR and BHAR, the sample yield to 18,707, we further match the sample with analyst divergence opinion toward bidder, the sample yield to 14,010. To control deal characteristics, We require that deal information, such as relative transaction value, deal attitude, diversification, deal type and means of payment, should recorded by Thomson One Banker, yielding 9910 deals.

To control firms' characteristics, we require that The Center for Research in Security Prices (CRSP) database should have sufficient record about bidder stock price data. We require that bidder should have sufficient accounting information recorded by Compustat database so that we can estimate firm characteristics, such as leverage ratio, run-up ratio, market to book ratio, price to earning ratio, return on equity ratio, debt to equity ratio and cash flow to equity ratio, leaving a sample of 7843 observations.

#### **4.4.2 Methodology**

##### *4.4.2.1 Univariate Test*

Both a univariate test and multivariate regression model are employed to analyse the impact of divergence opinion and information asymmetry on bidder's abnormal returns in the short and long run. We categorise the bidder into three groups on the basis of divergence opinion. The High Divo bidders is the bidders who is in the highest third of

bidder ranked by analyst earning forecasting dispersion, where Divo is greater than 1.1385. The lowest third of bidders, where Divo is lower than 0.2454, is categorised as Low Divo bidders. The middle third of deals is classified as the neutral group.

In the univariate test, we compare the mean of the short-term and long-term abnormal returns obtained by each deal group. We use a different approach to estimate the abnormal return in the short run and long run. For the short run, we choose time windows of 3, 5 and 11 days to calculate CARS. CARS in each time window are estimated by the market model and market-adjusted model separately. For the long run, we use market model and the size-adjusted model to estimate Buy and Hold ratio (BHAR)

We also compare bidder firm characteristics. Run-up measures the pre-acquisition stock performance, defined as market cumulative abnormal returns (CARs) to bidders over the window [-365, -28] before the acquisition announcement day. The returns are calculated based on the market-adjusted model. The market-adjusted model employs the CRSP value-weighted index and its parameters are estimated over 255 days, ending 366 days prior to the acquisition announcement.

The return on equity (ROE) ratio measures the bidder's profitability, and is defined as net income divided by common and preferred equity – COMPUSTAT Item18/(Item10+Item11); M/B, the market to book ratio, measures the market

valuation of bidder's stock, and is defined as the annual closing price multiplied by the common shares outstanding and divided by the total common equity – COMPUSTAT  $\text{Item24} * \text{Item25} / \text{Item60}$ ; P/E, the price to earnings ratio, measures net income per share, and is defined as the annual closing price divided by the earnings per share – COMPUSTAT  $\text{Item24} / \text{Item58}$ ; cash flow/Equity, which is a ratio of cash flow over equity, measures the amount of free cash being held by a company, and is defined as the sum of a company's income before extraordinary items and depreciation minus dividends of common and preferred stock then divided by the total assets – COMPUSTAT  $(\text{Item18} + \text{Item14} - \text{Item19} - \text{Item21}) / (\text{Item6})$ ; debt/total Equity, the debt over asset ratio, measures to what extent a company is leveraged, and is defined as long-term debt divided by total assets – COMPUSTAT  $\text{Item9} / \text{Item6}$ . Leverage ratio defined as defined as COMPUSTAT  $(\text{Item 9} + \text{Item34}) / (\text{Item 9} + \text{Item34} + \text{Item216})$ .

For each group, we compare the deal-specified characteristics. These include: relative size, which measures the relative size of the deal, and is defined as the ratio of the transaction value from Thomas One Banker over the bidder's market value four weeks before the announcement from CRSP; stock, which measures the percentage of deals completed with stock payment; and cash, which measures the percentage of deals completed with cash. Diversification measures diversification deals, which is defined as the bidder and the target not having the same first two digits of primary SIC code. Tender offer measures the deal type. For market environment, we estimate the market



heat degree. The number of analysts following is a proxy for a firm's information environment.

#### 4.4.2.2 Multivariable Test

We split the full sample into two groups on the basis of bidders pre merger performance.

The well-performed bidders are defined as bidders with positive Runup ratio. The poorly performed bidders are defined as bidders with negative Runup ratio.

Univariate tests are insufficient to reveal the true relationship between divergence opinion and abnormal returns. It does not estimate the interactive relationship among firm characteristics and deal characteristics. We therefore carry out multivariable tests as shown in the following regression model:

$$CAR_{it} = \alpha_0 + \alpha_1 Divo_{it} + \alpha_t controls + \varepsilon_{it}$$

Regression model 1

$$CAR_{it} = \alpha_0 + \alpha_1 Divo_{it} + \alpha_2 DivoRun_t + \alpha_t controls + \varepsilon_{it}$$

Regression model 2

$$CAR_{it} = \alpha_0 + \alpha_1 Divo_{it} + \alpha_2 DivoRun_t + \alpha_3 Stock + \alpha_t controls + \varepsilon_{it}$$

Regression model 3

$$CAR_{it} = \alpha_0 + \alpha_1 Divo_{it} + \alpha_2 DivoRun_t + \alpha_3 Cash + \alpha_t controls + \varepsilon_{it}$$

Regression model 4

Regression models 1 measure the relationship between divergence opinion and abnormal returns. The key explanatory variable is acquirers' divergence opinion ( $Divo_{it}$ ) measured by the standard deviation of analyst earning forecast dispersion. Regression model 2 includes interaction variable  $DivoRun_t$  which captures bidders past performance. Regression model 3 and 4 highlight the effect of means of payment by add dummy variable Stock and Cash respectively.

To reveal the true relationship between information asymmetry and abnormal return, we carry out multivariable tests as shown in the regression model 5 to 8:

$$CAR_{it} = \alpha_0 + \alpha_1 Sigma_{it} + \alpha_t controls + \varepsilon_{it}$$

Regression model 5

$$CAR_{it} = \alpha_0 + \alpha_1 Sigma_{it} + \alpha_2 SigmaRun_t + \alpha_t controls + \varepsilon_{it}$$

Regression model 6

$$CAR_{it} = \alpha_0 + \alpha_1 Sigma_{it} + \alpha_2 SigmaRun_t + \alpha_3 Stock + \alpha_t controls + \varepsilon_{it}$$

Regression model 7

$$CAR_{it} = \alpha_0 + \alpha_1 Sigma_{it} + \alpha_2 SigmaRun_t + \alpha_3 Cash + \alpha_t controls + \varepsilon_{it}$$

Regression model 8

Regression models 1 measure the relationship between information asymmetry and abnormal returns. The key explanatory variable is acquirers' idiosyncratic volatility ( $\text{Sigma}_{it}$ ) measured by the standard deviation of the residuals from a market model regression calculated from 365 days to 28 days preceding deal announcement. Regression model 2 includes interaction variable  $\text{SigmaRun}_t$  which captures bidders past performance. Regression model 7 and 8 highlight the effect of means of payment by add dummy variable Stock and Cash respectively.

To estimate the combined effect, we carry out regression model 9:

$$\begin{aligned} \text{CAR}_{it} = & \alpha_0 + \alpha_1 \text{Divo}_{it} + \alpha_2 \text{DivoRun}_t + \alpha_3 \text{Sigma}_{it} + \alpha_4 \text{SigmaRun}_t \\ & + \alpha_t \text{controls} + \varepsilon_{it} \end{aligned}$$

In order to analyse the impact of divergence opinion on bidder's return in the long run, we rerun the regressions by replacing bidders' CAR with bidder's BHAR as a dependent variable. We use regression models 10, 11 and 12 shown below:

$$\text{CAR}_{it} = \alpha_0 + \alpha_1 \text{Divo}_{it} + \alpha_t \text{controls} + \varepsilon_{it}$$

Regression model 10

$$\text{CAR}_{it} = \alpha_0 + \alpha_1 \text{Sigma}_{it} + \alpha_t \text{controls} + \varepsilon_{it}$$

Regression model 11

$$\begin{aligned} \text{CAR}_{it} = & \alpha_0 + \alpha_1 \text{Divo}_{it} + \alpha_2 \text{DivoRun}_t + \alpha_3 \text{Sigma}_{it} + \alpha_4 \text{SigmaRun}_t + \alpha_5 \text{Stock} \\ & + \alpha_t \text{controls} + \varepsilon_{it} \end{aligned}$$

Regression model 12

$$CAR_{it} = \alpha_0 + \alpha_1 Divo_{it} + \alpha_2 DivoRun_t + \alpha_3 Sigma_{it} + \alpha_4 SigmaRun_t + \alpha_5 Cash$$

$$+ \alpha_t controls + \varepsilon_{it}$$

### Regression model 13

The dependent variable is the buy and hold ratio (BHAR), which measures bidders' abnormal returns in the long run. BHARs measure bidders' abnormal returns in the first 24 months after the month of announcement. We also include the same variable in regressions 1 to 9 to control for firm, deal, and market environment.

For each regression model, we have control variables that affect acquirer returns. *Runup* ratio measures past stock return; market-to-book ratio (*M/B*) measures market valuation, and leverage (*Leverage*) measures rate of leverage. Deal specified control variables are: relative transaction values, which measures relative size; Stock is a dummy variable, which denote 100% stock payment; Tender offers denote whether the deal type is tender offer, Diversification is a dummy variable that measures diversifying deals. This paper controls for M&A market heat (*M&A Heat Degree*).

#### 4.4.2.3 Measuring Short-term Performance

We use cumulative abnormal returns (CAR) to measure bidder's short-term M&A performance. The market model defines cumulative abnormal return 2 days surrounding announcement day as:

$$CAR_{i,-2,2} = \sum_{t=-2}^2 [R_{it} - (\alpha_i + \beta_i R_{mt})]$$

Where  $R_{it}$  represent firms' daily return;  $R_{mt}$  represent daily market index return.  $(\alpha_i + \beta_i R_{mt})$  is the market return estimated by market model. Therefore, the Cumulative abnormal return (CAR) is the sum of bidder's daily abnormal return during the event window two days before and two days after the announcement day.

Bouwman et al. (2009) point out that bidders may conduct multiple deals within the sample period. To address this issue, we estimate the market-adjusted CAR. The market-adjusted CAR 2 days surrounding announcement day is defined as the sum of daily abnormal return within the event window [-2,2];

$$CAR_{i,-2,2} = \sum_{t=-2}^2 AR_{it}$$

$$AR_{it} = R_{it} - R_{mt}$$

Where  $AR_{it}$  is the daily abnormal return that is defined as firm's daily return minus value-weighted daily market return.

#### 2.4.2.5 Measure of long-term performance

Bidders' acquisition performance in the long run is measured by buy-and-hold abnormal return (BHAR). Initially, we use the market adjust model to estimate bidder's buy-and-hold abnormal return (BHAR). But, Barber and Lyon (1997) and Lyon, Barber, and Tsai (1999) suggest that market adjusted BHAR has many biases, such as rebalancing bias, new-listing bias, and skewness bias. Moreover, Lyon, Barber, and Tsai (1999) and Bouwman, Fuller, and Nain (2009) believe that size-adjusted BHAR is a more reliable indicator for bidder's long-term M&A performance. To address this issue, we estimate both Markets adjusted and Size adjusted buy-and-hold abnormal return (BHAR). Market adjusted Buy-and-hold abnormal return 24 month after deal announcement is defined as:

$$BHAR_{j,0,24} = \prod_{t=0}^{24} (1 + R_{jt}) - \prod_{t=0}^{24} (1 + R_{mt})$$

Where  $R_{jt}$  denotes firm's monthly stock return starting from the month of deal announcement.  $R_{mt}$  denotes the monthly value-weighted monthly return.

On the other hand, we use the function below to estimate Size-adjusted BHAR 24 months after deal announcement:

$$BHAR_{j,0,24} = \prod_{t=0}^{24} (1 + R_{jt}) - \prod_{t=0}^{24} (1 + R_{pt})$$

$R_{jt}$  denotes firm's monthly stock return starting from the month of deal announcement.

$R_{pt}$  denotes the return of size adjusted reference portfolio. To build the size-adjusted portfolio, all CRSP firms are sorted in descending order and separated into 10 groups

by market capitalisation. Then, we sort each group by Market to book ratio and split each group into quintiles. Finally, we have 50 size adjusted reference portfolios. The portfolio return is shown below,

$$R_{pt} = \frac{1}{N} \sum_{j=1}^N R_{kt}$$

$R_{kt}$  denotes firm  $K$ 's monthly stock return.  $N$  denotes the number of firms in the reference portfolio to which firm  $K$  belongs. Therefore, the portfolio return  $R_{pt}$ , is the average return of all firms in the portfolio excluding firm  $K$ .

#### *4.4.2.4. Measure Divergence Opinion and Information Asymmetry*

In this paper, following previous literature, we use analyst earnings forecast dispersion to measure divergence opinion which is defined as the standard deviation of analyst forecast for a bidder 365 days to 28 days before deal announcement. This measurement is widely used because it can bypass many disturbances such as firm's financial conditions, trading costs and size.

Previous literature suggests that idiosyncratic volatility can be used as an appropriate measurement of information asymmetries. Chen et al. (2005) also suggest that idiosyncratic volatility can be used as a measure of information uncertainty. Idiosyncratic volatility can explain the reasons why bidders have low long-term abnormal returns. This is consistent with the view of Ang et al. (2006) that stocks subject to high past firm-level volatility have low future returns. The idiosyncratic volatility is defined as the standard deviation of the residuals from a market model regression calculated from 365 days to 28 days before the announcement event window.



To estimate idiosyncratic volatility of single stock, we follow the main assumption of Capital Asset Pricing Model; the stock return is affected by a common factor and firm's specified shock; daily stock returns are also estimated.

$$(1) R_{i,t} - r_{f,t} = \beta_{i,t}(R_{m,t} - r_{f,t}) + \varepsilon_{i,t}$$

Where  $R_{i,t}$  is stock return,  $R_{m,t}$  is the market return,  $r_{f,t}$  is the risk-free rate, and  $\varepsilon_{i,t}$  is the idiosyncratic return. The idiosyncratic volatility of stock  $i$  is the standard deviation of the residuals

$$\text{The idiosyncratic volatility} = \sqrt{\text{VAR}(\varepsilon_{i,t})}$$

To avoid market bias, Boehme et al. (2009) estimate idiosyncratic volatility by using the event window of 100-day period preceding the acquisition announcement. In this chapter, we use an event window 365 to 28 days preceding the deal announcement so that we can study the bidder with different past performances.

## 4. 5 Results and Discussion

### 4.5.1 Summary statistics and Univariate Test

Table 1 shows summary statistics for the full sample. The full sample contains 7842 acquisition deals conducted by US public bidders from January 1<sup>st</sup>, 1990 to December 31<sup>st</sup>, 2013. Since this paper examine how divergence opinion and information asymmetry effect bidders abnormal return in both short run and long run, the full sample is divided into three subsamples by the degree of analyst divergence opinion about bidders (Divo), namely, Low Divo, Neutral and High Divo.

*Insert Table 4.1 Here*

Panel A shows bidders cumulative abnormal returns (CAR) 3, 5, 11 days surrounding announcement day, Market model are use in the CAR estimation. For the full sample, bidders in all groups have positive abnormal return in short run. Column Low-High shows the short-term abnormal return differences between Low Divo and High Divo bidders. The results show that Low Divo Bidders outperform High Divo bidder in the short run. Low Divo Bidders cumulative abnormal returns (CAR) are significantly greater than that of High Divo bidders in all event windows. The highest cumulative abnormal return appears in Low Divo group. Its cumulative abnormal returns 5 days surrounding announcement day CAR [-5,5] reach 1.17%, which is twice as much as that of High Divo group. The lowest CARs, which is 0.017% CAR [-5,5], are found in High Divo group.

Market-adjusted and size-adjusted Buy and Hold Ratio (BHAR) measure the long-term performance. We estimate the Buy and hold ratio, 12, 24 36 month after the month of deal announcement. The figure suggests that all bidders make lose in the long run. As shown in the table, all BHAR Ratio is negative. However, the BHAR for Low Divo Bidders are much lower than the full sample average and other groups. The highest return is made by Low Divo bidder 12 month after deal announcement, which is -0.89% for market adjusted BHAR [0, 12]. Although the figure is negative but it close to break even. The difference between Low and High Divo bidder's long-term abnormal return clearly shows that Low Divo Bidders outperform High Divo bidders in the long run.

Table 1 suggest that bidder with high divergence opinion tend to conduct value destroying deals. Deal conducted by Low Divo Bidders is value enhancing. Overall bidders with low divergence opinion outperform High Divo bidders in both short run and long run. This is consistent with *H1: Analyst Divergence opinion negatively related to Bidder short-term abnormal return*. Low divergence opinion indicate that the firms stock price have already been fully realized by the optimistic investor available in the market, there is low trading activity and low investor recognition. An exogenous event, such as merger and acquisition, will attract more investors from the buying side. Divergence opinion theory and investor recognition hypothesis imply that increase in the number of investors in the buying side increase stock price.

Panel B presents statistics for firm characteristics for bidders in all groups. As

mentioned before, Analyst Divergence opinion (Divo), as known as, Analyst forecast dispersion, is defined as the standard deviation of analyst forecast for a bidder 365 days to 28 days before deal announcement. Because we divided the full sample by Analyst Divergence opinion about the bidder, it is not surprise that the average Divo of Low Divo Bidders is 0.1017, the figure reach 6.1735 for the High Divo Bidders. However, we find interesting result for information asymmetries measurement. We measure information asymmetries by the idiosyncratic volatility (Sigma), which is defined as the standard deviation of the residuals from a market model regression calculated from 365 days to 28 days before the announcement event window. Sigma in Low Divo group is 0.0333 that is significantly higher than the Sigma of High Divo group. The results suggest that Low Divo bidder have higher degree of information asymmetry than the High Divo bidders. Investors of Low Divo bidder face more uncertainty than the others so investments for Low Divo bidder tend to be more risky than others. Miller (1977) believes that the effect of investor recognition will boost by high idiosyncratic volatility. It indicates that the significant difference in Bidders' abnormal return is caused by the magnitude information asymmetries. This results is consistent with *H2a: Idiosyncratic volatility negatively related to Bidder short term abnormal return.*

Panel B also shows that Low Divo Bidders have significantly higher RUNUP ratio. It suggests that Low Divo Bidders have better stock performance one year before the deal announcement than high Divo Bidders. Next, Low Divo Bidders have significantly

lower leverage ratio and Debt to Total Equity ratio. Furthermore, Low Divo group has lower market to book ratio than that of High Divo Bidders though the difference is insignificant; nevertheless, on average, one Low Divo bidders are covering by 9.8281 analysts. This number is far smaller than the number of analyst covering High Divo Bidders that is 24.68 analysts per High Divo Bidders. These figures indicate that bidders Low Divo Bidders have better operating performance than the High Divo bidders but they have less public exposure and recognition. Therefore, the market undervalues Low Divo Bidders.

Panel C presents statistics for deal characteristics for the full sample and all three Divo subsamples. Market Heat Degree measures the deal clustering effect within the sample period. It indicates whether the deal is conduct on the merger wave. The result shows that Low Divo Bidders have lower market heat degree than High Divo bidders. It suggests that Low Divo bidders tend to conduct the deal when merger and acquisition is less popular in the market.

Furthermore, the Relative Size shows that Low Divo Bidders acquire larger target than High Divo Bidders. For the means of payment, Low Divo Bidders tend to use less stock than High Divo Bidders. 21.08% of deals conducted by Low Divo Bidders are completed with stock payment, 23.57% for High Divo Bidders.

Cash payment are more popular than Stock payment, 45.68% of deals completed by High Divo Bidders are paid with cash, compare with 40.59% in Low Divo Bidders. Low Divo Bidders tend to make less tender offer and conduct less diversifying deals. The target public status also shows that Low Divo bidders are more interesting in acquiring private target. 58.19% of deals conducted by Low Divo bidders are acquiring private target, 42.58% for the High Divo bidders. High Divo bidders acquire more public listed target than Low Divo bidders. 29.88% of deals conducted by High Divo bidders are acquiring public target that is twice as much as the number of public target acquiring by Low Divo bidders.

Overall, Figures in table 1 shows that Low Divo Bidders outperform High Divo bidder in merger and acquisition. This is consistent with divergence opinion theory and previous literature that stock with high dispersion generate lower future return than stock with low dispersion; acquirer in the high divergence opinion group gain less than the acquirer in the low divergence opinion group. On the other hand, Low Divo bidders have higher idiosyncratic volatility (Sigma) than high Divo bidders. This results indicate that Low Divo bidder have higher magnitude information asymmetry. Its stock return within 365 to 28 days proceeding deal announcement are more intensely fluctuated than the return of High Divo bidders. Therefore, Low Divo bidders bear more uncertainty about future growth and are more risky than other. As Miller (1977) suggested high idiosyncratic volatility will trigger stronger investor

recognition effect. The high abnormal returns are the reward for investor who is willing to bear the extra risk. Therefore, bidder with high idiosyncratic volatility tends to conduct value-enhancing deals.

High Divo Bidders also tend to use more stock in the means of payment. Travlos (1987) confirms that using stock payment in M&As will trigger signalling effect. Stock payment signals overvaluation of bidder's share. It reduces the information asymmetry in the market. Therefore, the deals with stock payment face substantially lower announcement return than others. According to divergence opinion theory, High Divo bidders are more likely to be overvalued. As the stock prices of High Divo Bidder are set by the most optimistic investors. This will strengthen the signalling effect. This is another reason why High Divo Bidders has lower abnormal return than other. This is consistent with Moeller et al. (2007). They suggest high divergence opinion about bidder lead to negative announcement return when stocks are used as means of payment.

On the other hand, comparing Low Divo and High Divo Bidders, only few firm characteristics are significantly different. Low Divo Bidders tend to have better past performance, less leveraged than High Divo Bidders. However, High Divo Bidders have more analysts following. Number of analyst following is used as a proxy for the richness of a firm's information environment. Fang and Peress (2009) use the number of analyst following as a measure of media coverage. High number of analyst

following indicates higher public exposure and more information disclosure. If the bidder has poor past performance, the high number of analyst following will spread the information efficiently. Therefore, High Divo bidders are more likely received negative return. From the deal characteristic comparison, it is clear that Low Divo bidder and High Divo Bidder has completely different perception about the target and timing. Low Divo bidder tends to conduct the deal when there is less deal clustering in the market. Although Low Divo Bidder prefers private target rather than public target, they make less tender offer and acquiring target with higher relative size. Over 40.59% deals are paid with 100% cash. Only 21.8% deals use stock as means of payment. As we discuss above, the stock price of Low Divo Bidders tend to be less active than the stock price of High Divo bidders. The deal conducted by Low Divo Bidders is the exogenous events states in Miller (1977) investor recognition hypothesis. The deal will attract more potential buyer and have high growth potential. Therefore, Low Divo bidder doesn't prefer stock payment.

All these results suggest that Low Divo bidder outperform High Divo bidders. Analyst divergence opinions are negatively related to bidder return. Idiosyncratic volatility is positively related to bidders abnormal return. In addition, the firm characteristics suggest that the Low bidders with good past performance conduct value enhancing deals.



#### **4.5.2 Multivariate Test**

Due to the limitation of univariable test, The results from table 1 could be biased. Therefore, we carry out multivariate regressions. First of all, we examine the relation between analyst divergence opinion (Divo) and abnormal return in both short run and long run. Then, we analyse how Idiosyncratic volatility is related to bidders short- and long-term abnormal returns. Finally, we estimate the combined effect of analyst Divergence opinion (Divo) and Idiosyncratic volatility on bidders merger gain. So that we can identify which factor has the stronger influential power.

##### **Analyst Divergence opinion (Divo) and Bidders's abnormal return in the short run**

Table 2 presents the regression results that reveal how analyst Divergence opinion (Divo) related to acquirer's short-term abnormal return. Regression 1 estimates the impact of analyst Divergence opinion on Bidders cumulative abnormal return in 5 days surrounding announcement day. We add an interaction variable Divorun into Regression 2. DivoRun is the interaction variable measured by Divo multiply Runup ratio. Therefore, we can put bidder past performance into account, when we estimates the impact of analyst Divergence opinion on Bidders short-term return. Regression 3 and 4 examine whether the impact of Divergence opinion changes if we put different means of payment into consideration. All the CARs are estimated by marke model.

### *Insert Table 4.2 Here*

The key independent variable in regression 1 is Divo value that measures analyst divergence opinion. We define Divo is the standard deviation of analyst forecast for a bidder 365 days to 28 days before deal announcement. The results show that, the coefficient of Divo is insignificant and it has a positive sign. It suggests Divo has no impact on bidder return. However, we argue that this result is caused by mixed impact of Divo on bidders with different past performance. This is one of the reasons why we introduce the interaction variable DivoRun. Results from regression 2 suggest a negative relation between DivoRun and Bidders CARs [-2,2], the coefficient of DivoRun is significantly negative. One unit increase in DivoRun will increase bidders CAR[-2,2] by 9.08%. The results indicate that bidders with high divergence opinion and good past performance will conduct value destroying deal. Even though the significant level is 10%, this result implies that we should put past performance into consideration when we study the impact of divergence opinion on short-term merger gains. Therefore, we split the full samples into two subsamples, subsample one include the bidder with negative past performance only. Subsample two contain the bidders with positive past performance. All the results will be report in table 4 and 5.

For the control variables, Relative Size and tender offer are significantly positive. These results suggest that acquiring larger target have positive impact on bidder short term abnormal return. This is because acquiring large target gain more public exposure and attract more potential buyers. However, acquiring public target tend to be value destroying. Public listed company have more option to deter threat of being

takeover. This is why Low Divo bidder acquire more private target as stated in table 1.

Results In table 2 suggest that the analyst divergence opinion (Divo) have insignificant impact on bidders abnormal return in short run. However, we found negative relation Divorun and Bidders CAR[-2,2]. These results the impact of divergence opinion on bidder return can be altered by bidders past performance. this encourage us to further examine the true impact of divergence opinion on the return of bidders with difference past performance.

Table 3 shows the relation between idiosyncratic volatility (Sigma) and bidders short-term abnormal return. Regression 1 estimates the impact of idiosyncratic volatility (Sigma) on Bidders cumulative abnormal return in 5 days surrounding announcement day. Regression 2 includes an interaction variable SigmaRun. SigmaRun is measured by Divo multiply Runup. Regression 3 and 4 reveal the impact of means of payment by adding dummy variable STOCK and Cash. All the CARs are estimated by market model.

***Insert Table 4.3 Here***

Idiosyncratic volatility (Sigma), the key explanatory variable of regressions in table 3, is highly significantly in all regression. The positive coefficient of Sigma indicates that one unit increase in idiosyncratic volatility (Sigma) will increase CAR [-2,2] by

17.52%. This empirical evidence supports the hypothesis *H2a: Idiosyncratic volatility positively related to Bidder short-term abnormal return.*

Idiosyncratic volatility (sigma) as a measurement of idiosyncratic risk shows the uncertainty of bidders future growth. It also used to measure the magnitude of Asymmetry information between management and investors. High level of information asymmetry before the deal announcement has positive impact on bidders merger again in the short run. This is because bidders with high information asymmetry pay lower premium(Dionne et al., 2014). Deal announcement will disclosure more information to the market. The signaling effect will change bidders abnormal return accordingly. Furthermore, Miller (1977) bidder with high idiosyncratic volatility will trigger stronger investor recognition effect. Therefore. Bidder with high idiosyncratic volatility tends to conduce value-enhancing deals.

After adding the interaction variable into regression 2, the impact of Sigma is even stronger. One unit increase in idiosyncratic volatility (Sigma) will increase CAR [-2,2] by 28.11%. The coefficient of SigmaRun is also highly significant. The negative sign suggest that bidders with high idiosyncratic volatility (sigma) and good past performance conduct value destroying deal. This is because high idiosyncratic volatility (Sigma) and high past performance indicate that the bidder is more riskier than others. High past performance put the market expectation into the highest position, high idiosyncratic volatility (Sigma) indicates high price fluctuation range

and high information asymmetry. Therefore, they are more sensitive to negative information. Unfortunately, These bidders are like “Glamour” bidder in Rau and Vermaelen (1998). They are more likely to associated with high P/E ratio, high free cash flow, overconfident CEO and high agency cost. All the factors have negative impact on bidder short term abnormal return.

Regression 3 and 4 shows the impact of means of payment. Stock payment signifies the overvaluation of bidders stock. The Signalling effect has negative impact on announcement return. The result shows that Bidder short-term abnormal return will be down by 0.58% if the deal is paid by 100% stock. Bidders return will increase by 0.52% for 100% cash payment.

For the control variables, Negative coefficient in the RUNUP ratio also suggest that bidder with good past stock performance tend to receive negative abnormal return. This is consistent with Rosen (2006). They find that bidder Runup is negatively related to both short run and long run abnormal returns for bidders. The coefficient of relative size suggests that 1% increase in relative size will leads to 2.31 increase in CAR [-2,2]. Furthermore, Conducting *tender offer* has significantly positive impact on bidder abnormal return in short run. Marking tender offer will increase the CAR CAR[-2,2] by over 3% on average. In addition, acquiring public target lead to a 2.69% loss in short-term abnormal return.

### **The combined effect of Divo and Sigma on Bidders's abnormal return**

Table 4 regression results the combined effect of divergence opinion and idiosyncratic volatility (sigma) on acquirer's short-term abnormal return. Regression 1 estimates the impact of divergence opinion on Bidders cumulative abnormal return in 5 days surrounding announcement day. Regression 2 estimates the impact of idiosyncratic volatility (Sigma) on Bidders short-term abnormal return. Regression 3 and 4 show the combined effect of divergence opinion and idiosyncratic volatility (sigema) on acquirer's short-term abnormal return. Both interaction variable DivoRun and SigmaRun are included. Regression 3 and 4 also reveal the impact of means of payment by adding dummy variable STOCK and Cash respectively. All the CARs are estimated by market model.

*Insert Table 4.4 Here*

For the full sample, as shown in regression 1 and 2, idiosyncratic volatility (sigema) have significant impact on bidder short-term abnormal return. As discussed before, due to the influence of past performance, the effect of Divo is not pronounced. Regression 3 and 4 shows that the idiosyncratic volatility (Sigema) has stronger influence on bidder short term abnormal return than Divergence opinion.

The results show that idiosyncratic volatility (sigema) is significantly positive in the regression 3 and 4. The results suggest that one unit increase in idiosyncratic volatility

(sigma) will lead to an increase of 30.13% and 32.12% for CAR [-2,2] respectively. These results indicate that Bidders with high idiosyncratic volatility (sigma) will achieve higher abnormal return. In other words, the higher information asymmetry before deal announcement, the larger bidder short-term abnormal return will be. The significant coefficient of SigmaRun appears in regression 3 and 4 with a negative sign. The negative relation indicates that idiosyncratic volatility (sigma) have different impact on bidders merger again if we put bidders past performance into consideration. The results suggest that bidders with high information asymmetry and good past performance tend to conduct value destroying deal.

There are number of factors that has significant impact on bidder short-term abnormal return. Our result suggests that acquiring large target also leads to increase in short-term abnormal return. The results suggest that 1% increase in relative transaction value will leads to 2.44% increase in CAR [-2,2]. Furthermore, Using stock payment will leads to 0.56%% decrease in CAR [-2,2], an 0.51% increases for cash payment. *Tender offer* increase the CAR[-2,2] by 3.11%. These results suggest that bidder tends to receive positive abnormal return in short run when its idiosyncratic volatility is high but good past performance will reverse the impact.

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### **The effect of divergence opinion on merger gain of poorly performed bidder**

As mention above, the regressions in table one do not full reveal the puzzle effect of divergence opinion on bidder's short-term abnormal return since the disturbance of bidder's past performance. Therefore, we split the bidder into poorly performed and good performed bidder. Poorly performed bidder is marked with negative Runup and good performed bidders with positive Runup. Table 5 presents the regression results that reveal how analyst Divergence opinion (Divo) related to poorly performed bidder's short-term abnormal return.

Regression 1 estimates the impact of analyst Divergence opinion on Bidders cumulative abnormal return in 5 days surrounding announcement day. Then, adding interaction variable Divorun into Regression 2. Regression 3 and 4 estimate the impact of different means of payment. All the CARs are estimated by market model.

#### ***Insert Table 4.5 Here***

The key independent variable in regression 1 is divergence opinion (Divo ) which is the standard deviation of analyst forecast for a bidder 365 days to 28 days before deal announcement. Regression 2 shows that, the coefficient of Divo is highly significant and it has a negative sign. It suggests Divo has negative impact on poorly performed bidder's short-term abnormal return. One unit increase in divergence opinion (Divo)



leads to 17% decrease in bidder abnormal return, this results is robust after controlling bidders past performance and means of payment. This results support H1: Analyst Divergence opinion negatively related to Bidder abnormal return in both short run.

Results from regression 2 suggest a negative relation between DivoRun and Bidders CARs [-2,2]; the coefficient of DivoRun is significantly negative. One unit increase in DivoRun will decrease bidders CAR [-2,2] by 58.60%. The results imply that, for bidders with poor past performance, high divergence opinion will leads to value destroying deal. This is because, stock with high divergence opinion indicate that the stock price is setup by the most optimistic buyer in the market. The further raise in stock price is heavily relying on the higher maker expectation. However, the poor past performance indicate that the market expectation for the firm will decline. Furthermore, from investor recognition theory, firms with Low divergence opinion and poor past performance are more likely suffer from the problem of low investor recognition. The lack of investor recognition shrinks the number of potential buyers. Therefore, low recognition has negative impact on bidders stock return. Merger and acquisition can put the firm under spotlight, it all attracts new potential buyers and lower the capital cost. So that, deal conduct by bidder with low divergence opinion and poor past performance are more likely be value enhancing. This effect may not be available for bidders with high divergence opinion because they have already been very recognized.

For the control variables, Relative Size and tender offer are significantly positive. These results suggest that 1% increase in the relative size will lead to 1.68% increase in bidder short-term abnormal return. This is because acquiring large target gain more public exposure and attract more potential buyers. However, acquiring public target tend to be value destroying. Bidder short-term abnormal return will drop by 2.33% if the target is Public listed company. This is because public target have more option to deter threat of being takeover. More detail information will be disclosed that may ruin the investor recognition effect. This is why Low Divo bidder acquire more private target as stated in table 1.

Results In table 5 suggest that the impact of divergence opinion on bidder return can be altered by bidders past performance. For bidders with poor past performance, the analyst divergence opinion (Divo) have significant negative impact on bidders abnormal return in short run. However, it is remain unknown for the impact of idiosyncratic volatility (sigema) on bidders with poor performance. . This encourages us to further examine the true impact of idiosyncratic volatility (sigema) on bidders with poor performance. The results are shown in table 6.

Table 6 shows regression results that reveal the combined effect of Analyst Dispersion (Divo) and Idiosyncratic Volatility (Sigma) on short-term abnormal return of poorly performed bidder.

*Insert Table 4.6 Here*

Regression 1 estimates the impact of divergence opinion on Bidders cumulative abnormal return in 5 days surrounding announcement day. Regression 2 estimates the impact of idiosyncratic volatility (Sigma) on Bidders short-term abnormal return. Regression 3 and 4 show the combined effect of divergence opinion and idiosyncratic volatility (sigma) on acquirer's short-term abnormal return. Both interaction variable DivoRun and SigmaRun are included. Regression 3 and 4 also reveal the impact of means of payment by adding dummy variable STOCK and Cash respectively. All the CARs are estimated by market model.

The results show that the coefficient of divergence opinion (Divo) and DivoRun are significantly negative in the regression 3 and 4. The results suggest that one unit increase in divergence opinion (Divo) will leads to an decrease of 15.94 % and 54.45% % for CAR [-2,2] respectively. The coefficient of divergence opinion (Divo) and Sigma in regression 1 and 2 are insignificant. These results indicate that Bidders with high divergence opinion will receive low abnormal return. In other words, the higher analyst forecast dispersion before deal announcement, the lower bidder short-term abnormal return will be. The insignificant coefficient of Sigma and SigmaRun appears in all regression suggest that the impact of divergence opinion have stronger influence on the merger gain of poorly performed bidders than the idiosyncratic volatility (sigma). The negative relation between divergence opinion

and bidders merger gains suggest that bidders with high divergence opinion and good past performance tend to conduct value destroying deal.

For the control variables, significant coefficient appears on relative size, target public status, tender offer and diversification. The results suggest that 1% increase in relative size will leads to 1.59% increase in CAR [-2,2]. Furthermore, Using stock payment will leads to 0.98% increase in CAR [-2,2], an 0.64% increases for cash payment. *Tender offer* increase the CAR [-2,2] by 3.40%. These results suggest that bidder tends to receive positive abnormal return in short run when the bidder has low divergence opinion and poor past performance.

Table 7 shows regression results that reveal how idiosyncratic volatility (Sigma) related to bidders' short-term abnormal return.

***Insert Table 4.7 Here***

All bidders have well past performances that are marked with positive Runup ratio. Idiosyncratic volatility (Sigma), the key explanatory variable of regressions in table 7, is statistically significant with a positive sign in regression 3 and 4. The positive coefficient of Sigma indicates that one unit increase in idiosyncratic volatility (Sigma) will increase CAR [-2,2] by over 27% and 30.34% respectively. This empirical evidence supports the hypothesis ***H2: Idiosyncratic volatility positively related to Bidder abnormal return in short run***

For the bidders with good past performance, the higher Idiosyncratic volatility (sigma) is, the better short-term abnormal return they will receive. This because: As a measurement of the uncertainty of future growth (Moeller, Schlingemann and Stulz 2006), idiosyncratic volatility shows the range of fluctuation of bidder's stock return. The good past performance indicate that the stock return have high growth potential and the stock is currently on the growth track. Furthermore, Idiosyncratic volatility is a measurement of Asymmetry information between management and investors. High level of information asymmetry before the deal announcement has positive impact on bidders merger again in the short run. This is because bidders with high information asymmetry pay lower premium (Dionne, La Haye and Bergeres 2014). Deal announcement will disclosure more information to the market. The signaling effect will change bidders abnormal return accordingly. Regression 4 shows that cash payment will increase bidder abnormal return by 0.5%. Using cash instead of stock will signal the market that the bidders are undervalued. Miller (1977) suggests that stronger investor recognition effect appears on bidder with high idiosyncratic volatility. Therefore, deal conducted by bidder with high idiosyncratic volatility and good past performance are value enhancing.

The coefficients of SigmaRun, the interaction variable between idiosyncratic volatility and Runup, are highly significant in regression 2, 3, and 4. One unit increase in idiosyncratic volatility (Sigma) will decrease CAR [-2,2] by 48.89%. The negative sign

suggest that bidders with high idiosyncratic volatility ( $\sigma$ ) and good past performance conduct value destroying deal. This is because; an over average high past performance put the market expectation into the highest position, high idiosyncratic volatility ( $\sigma$ ) indicates high price fluctuation range and high information asymmetry. Therefore, they are more sensitive to negative information. More information will be disclosed before deal announcement. Therefore, an over high past performance and high idiosyncratic volatility ( $\sigma$ ) signal the market that bidder stock price have reach its peak and begin declining.

For the control variables, Negative coefficient in the RUNUP ratio also suggest that bidder with good past stock performance tend to receive negative abnormal return. This is consistent with Rosen (2006). They find that bidder Runup is negatively related to both short run and long run abnormal returns for bidders. The coefficient of relative size suggests that 1% increase in relative size will leads to 1.68% increase in CAR [-2,2]. Furthermore, Conducting *tender offer* has significantly positive impact on bidder abnormal return in short run. Marking tender offer will increase the CAR CAR[-2,2] by over 3.5 % on average. In addition, acquiring public target lead to over 2% loss in short-term abnormal return.

Table 8 shows regression results that reveal the combined effect of Analyst Dispersion (Divo) and Idiosyncratic Volatility (Sigma) on short-term abnormal return of well-performed bidder. All bidders have positive Runup Ratio.

*Insert Table 4.8 Here*

Regression 1 estimates the impact of divergence opinion (Divo) on Bidders cumulative abnormal return in 5 days surrounding announcement day. Regression 2 estimates the impact of idiosyncratic volatility (Sigma) on Bidders short-term abnormal return. Regression 3 and 4 show the combined effect of divergence opinion and idiosyncratic volatility (sigma) on acquirer's short-term abnormal return. Both interaction variable DivoRun and SigmaRun are included. Regression 3 and 4 also reveal the impact of means of payment by adding dummy variable STOCK and CASH respectively. All the CARs are estimated by market model.

The results show that the coefficient of divergence opinion (Divo) is significantly negative in the regression 1. The results suggest that one unit increase in divergence opinion (Divo) will leads to an decrease of 5.94% for the short-term abnormal return of well performed bidders. This results support H1 Divergence opinion have negatively related to bidder short-term abnormal return.

The coefficient of divergence opinion (Divo) regression 3 and 4 are insignificant. The significant coefficient appears in Sigma and SigmaRun. These results indicate that, for bidders with positive past performance, impact of idiosyncratic volatility (Sigma) is stronger than the impact of divergence opinion (Divo). Bidders with high

idiosyncratic volatility (Sigma) will receive high abnormal return. In other words, the higher information asymmetry before deal announcement, the higher bidder short-term abnormal return will be.

For the control variables, significant coefficient appears on relative size, target public status, tender offer and diversification. The results suggest that 1% increase in relative size will lead to 2.84% increase in CAR [-2,2]. Furthermore, Using cash payment will lead to 0.49% increase in CAR [-2,2], *Tender offer* increase the CAR [-2,2] by 2.8%. These results suggest that bidder with positive past performance tends to receive positive abnormal return in short run when the bidder has low divergence opinion or have high divergence opinion (Divo).



## **Divergence opinion, idiosyncratic volatility (Sigma) and Bidders' long-term abnormal return**

Table 9 presents the estimation results of the OLS regression among Divergence opinion, idiosyncratic volatility (Sigma) and Bidders' long-term abnormal return. Regression 1 estimates the impact of divergence opinion on Bidders Buy and Hold Ratio. Regression 2 estimates the impact of idiosyncratic volatility (Sigma) on Bidders long-term abnormal return. Regression 3 and 4 show the combined effect of divergence opinion and idiosyncratic volatility (sigma) on acquirer's long-term abnormal return. Both interaction variable DivoRun and SigmaRun are included. Regression 3 and 4 also reveal the impact of means of payment by adding dummy variable STOCK and Cash respectively. All the BHARs are market adjusted BHARs

*Insert Table 4.9 Here*

In the long run, Bidders' divergence opinion has no impact on bidders long-term abnormal return, insignificant coefficient is found in all regression. This is because, the divergence opinion are estimated by Analyst earning forecast dispersion (Divo), which is the standard deviation of analyst forecast for a bidder 365 days to 28 days before deal announcement. Scharfstein and Stein (1990)'s career concern theory states that Security analyst's reputation is base up the forecast accuracy and length of forecasting record. Security analysts' compensation and career rely on how influential and accurate their recommendation and earning forecast will be. For the long career

concern, security analyst should update their earning forecast on time. However, we estimate bidder long-term abnormal return by the Buy and hold ratio two year after the deal announcement. Therefore, the Divergence opinion one-year proceeding deal announcement has no impact on bidder abnormal return in the long run. Furthermore, Weeber et al. (2002) point out that financial analyst face more challenge in issuing accurate earning forecast for firms involved in merger and acquisition. This is because, firstly, Merger and acquisition deal alter firm's fundamental characteristics, such as size, financial health, capital structure, Profitability and growth rate. More importantly, merger and acquisition substantially change the structure of bidder/Target earning time series. Kinney (1971) believe these fundamental changes increase analyst earning forecast error. Haw et al. (1994) found significant increase in analysts' absolute earnings forecast errors in the year after deal completion. Secondly, changes in information environment affect the quality of earning forecast. Although there are more information available for bidder and target before merger and acquisition, analysis has lack information regard to the new firm created by the merger deal. Consequently, the Divergence opinion one-year proceeding deal announcement has no impact on bidder abnormal return in the long run.

The results also show that Idiosyncratic Volatility (Sigma) have significant negative impact on bidders abnormal return in the long run. One unit increase in Idiosyncratic Volatility (Sigma) will lead 43.03% drop to the bidder long-term abnormal return. The results indicate that Bidders with high Idiosyncratic Volatility (Sigma) make lose in

the long run. This is because, high Idiosyncratic Volatility (Sigma) measure the level of information asymmetry and the uncertainty of future growth. High information asymmetry before deal announcement has positive effect on bidders return in short-run as the events will attract more optimistic investor or risk loving investors. After the deal completion, more information will be released. The level of information asymmetry will drop. The stock price will back to its fundamental level. Therefore, the higher information asymmetry the bidder has before deal announcement, the lower long-term abnormal return will be. Therefore, the deals conducted by bidders with high Idiosyncratic Volatility (Sigma) are tending to be value destroying.

For the control variable, RUNUP ratio, Market to book ratio and Market Heat degree has negative impact on bidder abnormal returns in the long run. One unit increase in RUNUP ratio will reduce BHAR [0,24] by 12.78%. One unit increase in M/B ratio will reduce BHAR [0,24] by 0.43%. One unit increase in Market Heat degree will reduce BHAR [0,24] by 23.03%. This result indicates that bidders with good pre merger stock performance will suffer from negative abnormal return in the long run. This is consistent with Rosen (2006), bidder can take the advantage of stock overvaluation in the short run, but the price will eventually back to its fundamental value in the long run.

Overall, Results In table 9 suggest that Idiosyncratic Volatility (Sigma) is a determinant of bidders abnormal return in long run. Bidders with high Idiosyncratic

Volatility (Sigma) tend to receive negative abnormal return in the long run. Using *Stocks* as means of payment has negative impact on long term abnormal return though it is insignificant in our sample. Using Cash payment will raise bidder's long-term abnormal return. This empirical evidence supports the hypothesis *H1b*: Idiosyncratic Volatility (Sigma) *negatively related to bidders long-term abnormal return*.

### **4.5.3 Robustness Test**

The main finding of this paper is that divergence opinion negatively related to the short-term abnormal return of poorly performed bidders. Bidders with low divergence opinion and poor past performance tend to conduct value-enhancing deals. Because, the merger and acquisition deal conducted by bidders with low divergence opinion and poor past performance will trigger the strongest investor recognition effect. The announcement return will increase, as the deal, as an exogenous event, will attract more potential buyers.

Secondly, the idiosyncratic volatility is positively related to bidder's abnormal return in both short and long run. The results suggest that high idiosyncratic volatility have positive impact on bidder's abnormal return. This is because, high idiosyncratic volatility indicate bidders' high growth potential and the high level of information asymmetry before deal announcement.

Finally, bidder's past performance substantially changes the impact of divergence opinion and idiosyncratic volatility on merger gain. The short-term abnormal return of bidder with poor past performance, signified by negative Runup ratio, have significantly negatively related to the analyst divergence opinion. The idiosyncratic volatility have no impact on the merger gain of bidders with poor past performance. However, for the bidders with good past performance, signified by positive Runup ratio, a strong positive relation between idiosyncratic volatility and short term abnormal return has been found. The analyst divergence opinion have no impact on the merger gain of bidders with good past performance.

To test the robustness of our results, we use different event window to define analyst divergence opinion, such as 730 days to 90 days before deal announcement; 180 days to 28 days to deal announcement, the results are robust. We also we test the robustness by changing the estimation time period of idiosyncratic volatility and using dummy variable to distinguish High and Low Divo or Sigma Bidders. The results remain

unchanged which shows Low Divo bidders outperforms high Divo bidders in short run if the bidder have poor past performance; High Sigma bidders outperform Low Sigma bidder if the bidder have good past performance.

In addition, to examine the influence of outliers, we winsorise the data by 3% and 5% separately. The results are slightly changed when we use different even windows. However, it is robust for different estimation methods. To overcome the problem of Endogeneity, we initially perform a Hausman test and the results suggest IV (2SLS) regression.

*Insert Table 4.10 Here*

We use the reference point 52 week high and the number of days 52-week high preceding deal announcement day as instrument variables to rerun the test. The results are robust.

## 4.6. Conclusion

By using one of the most comprehensive samples, which covers US M&A deals conducted from 1990 to 2013 and makes use of detailed analyst earning forecast and bidder stock return, this paper sheds new light on how divergence opinion and information asymmetry affect acquisition performance in both the long and short run.

Following previous literature (Alexandridis et al., 2007, Boehme et al., 2009, Dierkens, 1991, Moeller et al., 2007), we use the analyst forecast dispersion (DIVO) to measure divergence opinion; Idiosyncratic volatility measure information asymmetry. In order to study how bidder past performance can change the impact of divergence opinion and information asymmetry on acquisition performance; we sort our sample on the basis of differences in bidder past performance. Bidders with positive Runup ratio are categorised as well-performed bidder. Bidders with negative Runup ratio are categorised as poorly performed bidders

We find that a low divergence opinion bidder outperforms a high divergence opinion bidder in both the long and short run. Analyst forecast dispersion is significantly negatively related to bidder cumulative abnormal return five days surrounding the announcement day. A one-unit increase in the Divo value leads to a 16.94% decrease in CAR[-2,2]. However, this effect is weakened in bidders with good past performance, which is 5.94% decrease in CAR[-2,2]. This result suggests that bidders past performance substantially alter the impact of divergence opinion on bidders short-term abnormal return. The result implies that Low Divo bidder are undervalued, merger and acquisition deal, as an exogenous event, attract more potential buyers and lower the capital cost. This is supported by the empirical results regarding investor recognition theory.

We also found that a high idiosyncratic volatility bidder will achieve a higher abnormal return in the short run. Bidder's idiosyncratic volatility (Sigma value) is

positively related to bidder short-term abnormal return. A high idiosyncratic volatility bidder will receive a 30.34% higher short-term abnormal return (CAR[-2,2]) than an low idiosyncratic volatility bidder. This is because high idiosyncratic volatility indicates high level of information asymmetry between management and investor. High pre deal idiosyncratic volatility shows that bidder's overvalued by the market. It can help bidder achieve high short-term merger gain but it will sacrifice the long-term return. A one-unit increase in idiosyncratic volatility leads to a 43.03% decrease in bidders long-term abnormal return BHAR [0,24].

Overall, Different from well-performed bidders, analyst divergence opinion has negative impact on the short-term abnormal return of poorly performed bidders. A positive relation has been found between pre-merger information asymmetry and short-term abnormal return of well-performed bidder.



## Appendix

*Table 4.1 Summary Statistics of Bidder Abnormal Return*

This table presents summary statistics for the samples of acquisitions conducted by US public bidders from January 1<sup>st</sup>, 1990 to December 31<sup>st</sup>, 2013. The full sample is divided into 3 subsamples by the level of divergence opinion about bidders one year preceding deal announcement. Low Divo is the bidder with low divergence opinion who's the divergence opinion is in the first one third of Divo. Neutral is the middle third of Divo. High Divo is the final third and represent the bidder with highest divergence opinion. Panel A reports bidder short-term and long term abnormal returns. Bidders short-term abnormal return is measured by Cumulative Abnormal Returns. Both Market adjusted model and Market Model is used in CAR estimation. We estimate the CAR for 3, 5 and 11 days surrounding announcement day, CAR [-1,1], CAR [-2, 2] CAR [-5,5] respectively. Bidders Long-term abnormal return that is captured by The post-merger 12-month, 24-month, 36-month Buy and hold ratio, BHAR [0,12], BHAR [0,24], BHAR [0,36] respectively. Both Size Adjusted BHAR and Market Adjusted BHAR are estimated. Panel B presents summary statistics of bidder Firm Characteristics. Analyst divergence opinion (Divo) is defined as the standard deviation of analyst forecast for a bidder 365 days to 28 days before deal announcement. The idiosyncratic volatility (Sigma) as a measure of information asymmetries is the standard deviation of the residuals from a market model regression calculated from 365 days to 28 days before the announcement event window. Leverage ratio, defined as total liability divided by total asset. RUNUP is measured as market-adjusted CARs over the [-365, -28] window prior to announcement. M/B, the market to book ratio measures market valuation of bidder's stock, is defined as annual price close multiply common share outstanding divided by total common equity; P/E, the price to earnings ratio measures the net income per share, is defined as annual price close divided by earnings per share; ROE, the return on equity ratio measures the bidder's profitability, is defined as net income divided by common and preferred equity; Debt/Total Equity, the debt over asset ratio measures to what extent the company is leveraged, is defined as long term debt divided by total asset; Cash flow/Equity, the Cash flow over equity ratio measures the amount of free cash holding by the company, is defined as the sum of income before extraordinary item and depreciation minus dividends of common and preferred stock then divided by total asset; Analysts is the number of analyst who has cover the bidder for at least 1 years before deal announcement. Panel C report deal characteristics, Market Heat is measured as the quarterly moving average of deals conducted over the average quarter frequency of deals conducted from 1990 to 2013. Relative Size denotes the relative size of the deal, and is defined as the proportion of deal value over bidders market value; Tender offer denote the deal type is tender offer. Diversification indicates bidder and target oriented in different industry. Tender offer denote the deal type is tender offer. Stock denotes that 100% stock; and Cash pay the deal for 100% cash payment. Public Private and Subsidiary measures target public status.

Variable	Full Sample Mean	Low Divo Mean	Neutral Mean	High Divo Mean	Low-High	Pro
Panel A						
Market Adjusted						
CAR [-1,1]	0.0110	0.0142	0.0114	0.0073	0.0069	0.0006
CAR [-2,2]]	0.0131	0.0176	0.0129	0.0089	0.0086	0.0002
CAR [-5,5]	0.0153	0.0214	0.0146	0.0099	0.0115	0.0001
Market Model						
CAR [-1,1]	0.0084	0.0107	0.0095	0.0052	0.0055	0.0060
CAR [-2,2]]	0.0091	0.0117	0.0096	0.0058	0.0058	0.0124
CAR [-5,5]	0.0059	0.0086	0.0075	0.0017	0.0069	0.0241
Size Adjusted						
BHAR [0,12]	-0.0637	-0.0305	-0.0914	-0.0691	0.0386	0.0089
BHAR [0,24]	-0.1374	-0.1001	-0.1641	-0.1480	0.0479	0.0185
BHAR [0,36]	-0.1651	-0.1203	-0.2007	-0.1742	0.0540	0.0368
Market Adjusted						
BHAR [0,12]	-0.0402	-0.0089	-0.0695	-0.0422	0.0333	0.0270
BHAR [0,24]	-0.0873	-0.0562	-0.1221	-0.0836	0.0274	0.1852
BHAR [0,36]	-0.0923	-0.0570	-0.1345	-0.0856	0.0286	0.2714
Panel B						
Divo	2.2704	0.1017	0.5362	6.1735	-6.0718	0.0000
Sigma	0.0296	0.0333	0.0269	0.0286	0.0048	0.0000
Leverage	0.2636	0.2214	0.2903	0.2792	-0.0578	0.0000
RUNUP	0.1910	0.2677	0.1378	0.1676	0.1000	0.0000
M/B	4.8040	5.1606	3.8705	5.3810	-0.2205	0.2653
P/E	24.9346	25.6882	23.5619	25.5537	0.1345	0.9589
ROE	0.0170	0.0112	0.0265	0.0132	-0.0020	0.4940
Debt/Total Equity	0.2138	0.1812	0.2502	0.2100	-0.0288	0.0064
Cash flow/Equity	0.0485	0.0422	0.0593	0.0439	-0.0017	0.5396
Analysts	16.7104	9.8281	15.6150	24.6877	-14.8596	0.0000
Panel C						
Market Heat	1.4270	1.4331	1.3431	1.5047	-0.0715	0.0000
Relative Size	0.1536	0.1615	0.1648	0.1344	0.0271	0.0001
Tender	0.0723	0.0451	0.0811	0.0907	-0.0455	0.0000
Diversification	0.3676	0.3393	0.3630	0.4005	-0.0612	0.0000
STOCK	0.2003	0.2108	0.1546	0.2357	-0.0249	0.0309
CASH	0.4529	0.4059	0.4962	0.4568	-0.0509	0.0002
Public	0.2288	0.1511	0.2364	0.2988	-0.1477	0.0000
Private	0.4974	0.5819	0.4847	0.4258	0.1561	0.0000
Subsidiary	0.2738	0.2670	0.2789	0.2754	-0.0084	0.4938
Obs	7842	2614	2614	2614		

***Table 4.2 OLS Regression of analyst divergence opinion and acquirer's short-term abnormal return***

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This table shows regression results that reveal how Analyst divergence opinion (Divo) related to acquirer's short-term abnormal return. The sample includes acquisitions conducted by US public bidders from January 1<sup>st</sup>, 1990 to December 31<sup>st</sup>, 2013. Independent variable, Analyst divergence opinion (Divo) is the standard deviation of analyst forecast for a bidder 365 days to 28 days before deal announcement. DivoRun is the interaction variable measured by Divo multiply Runup ratio. Dependent variable, Acquirer short-term abnormal returns, which is measured by Market adjusted Cumulative Abnormal Return 5 days surrounding announcement day CAR [-2,2]. Stock denotes that 100% stock; and Cash pay the deal for 100% cash payment. Control variables include; RUNUP is measured as market-adjusted CARs over the [-365, -28] window prior to announcement. M/B, the market to book ratio measures market valuation of bidder's stock, is defined as annual price close multiply common share outstanding divided by total common equity; leverage ratio is defined as total liability divided by total asset. Relative Size denotes the relative size of the deal, and is defined as the proportion of deal value over bidders market value; Public denote target public status. Market Heat is measured as the quarterly moving average of deals conducted over the average quarter frequency of deals conducted from 1990 to 2013. Tender offer denote the deal type is tender offer. Diversification indicates bidder and target oriented in different industry.

	(1)	(2)	(3)	(4)
	CAR [-2,2]	CAR [-2,2]	CAR [-2,2]	CAR [-2,2]
Divo	-0.0296 (0.323)	0.0018 (0.958)	0.0041 (0.906)	0.0035 (0.921)
DivoRun		-0.0901* (0.071)	-0.0906* (0.070)	-0.0913* (0.068)
STOCK			-0.0045 (0.131)	
CASH				0.0036* (0.063)
RUNUP	-0.0168*** (0.000)	-0.0143*** (0.000)	-0.0139*** (0.000)	-0.0138*** (0.000)
M/B	0.0001 (0.751)	0.0001 (0.630)	0.0001 (0.503)	0.0001 (0.590)
Leverage	0.0020 (0.629)	0.0020 (0.620)	0.0015 (0.708)	0.0016 (0.695)
Relative Size	0.0244*** (0.000)	0.0246*** (0.000)	0.0245*** (0.000)	0.0259*** (0.000)
Public	-0.0279*** (0.000)	-0.0279*** (0.000)	-0.0271*** (0.000)	-0.0277*** (0.000)
Market Heat Degree	-0.0056 (0.363)	-0.0054 (0.379)	-0.0055 (0.367)	-0.0055 (0.371)
Tender	0.0318*** (0.000)	0.0318*** (0.000)	0.0306*** (0.000)	0.0305*** (0.000)
Diversification	-0.0029 (0.130)	-0.0029 (0.127)	-0.0028 (0.134)	-0.0029 (0.120)
Constant	0.0186** (0.014)	0.0175** (0.020)	0.0178** (0.018)	0.0153** (0.047)
N	7842	7842	7842	7842
R-sq	0.038	0.039	0.039	0.039

p-values in parentheses ="\* p<0.1, \*\* p<0.05, \*\*\*p<0.001

***Table 4.3 OLS Regression of idiosyncratic volatility and acquirer's short-term abnormal return***

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This table shows regression results that reveal how idiosyncratic volatility (Sigma) related to acquirer's short-term abnormal return. The sample includes acquisitions conducted by US public bidders from January 1<sup>st</sup>, 1990 to December 31<sup>st</sup>, 2013. Independent variable, The idiosyncratic volatility (Sigma) as a measure of information asymmetries is the standard deviation of the residuals from a market model regression calculated from 365 days to 28 days before the announcement event window. SigmaRun is the interaction variable measured by Sigma multiply Runup ratio. Dependent variable, Acquirer short-term abnormal returns, which is measured by Market adjusted Cumulative Abnormal Return 5 days surrounding announcement day CAR [-2,2]. Stock denotes that 100% stock; and Cash pay the deal for 100% cash payment. Control variables include; RUNUP is measured as market-adjusted CARs over the [-365, -28] window prior to announcement. M/B, the market to book ratio measures market valuation of bidder's stock, is defined as annual price close multiply common share outstanding divided by total common equity; leverage ratio is defined as total liability divided by total asset. Relative Size denotes the relative size of the deal, and is defined as the proportion of deal value over bidders market value; Public denote target public status. Market Heat is measured as the quarterly moving average of deals conducted over the average quarter frequency of deals conducted from 1990 to 2013. Tender offer denote the deal type is tender offer. Diversification indicates bidder and target oriented in different industry.

	(1)	(2)	(3)	(4)
	CAR [-2,2]	CAR [-2,2]	CAR [-2,2]	CAR [-2,2]
Sigma	0.1752*	0.2811***	0.3057***	0.3248***
	(0.087)	(0.009)	(0.005)	(0.003)
SigmaRun		-0.4154***	-0.4213***	-0.4286***
		(0.006)	(0.005)	(0.004)
STOCK			-0.0058*	
			(0.055)	
CASH				0.0052***
				(0.009)
RUNUP	-0.0176***	0.0005	0.0010	0.0014
	(0.000)	(0.936)	(0.869)	(0.816)
M/B	0.0000	0.0001	0.0002	0.0001
	(0.849)	(0.572)	(0.413)	(0.514)
Leverage	0.0032	0.0034	0.0029	0.0031
	(0.434)	(0.403)	(0.472)	(0.450)
Relative Size	0.0231***	0.0231***	0.0228***	0.0247***
	(0.000)	(0.000)	(0.000)	(0.000)
Public	-0.0269***	-0.0269***	-0.0258***	-0.0264***
	(0.000)	(0.000)	(0.000)	(0.000)
Market Heat Degree	-0.0051	-0.0049	-0.0050	-0.0049
	(0.406)	(0.418)	(0.412)	(0.423)
Tender	0.0320***	0.0326***	0.0311***	0.0307***
	(0.000)	(0.000)	(0.000)	(0.000)
Diversification	-0.0025	-0.0025	-0.0024	-0.0025
	(0.181)	(0.194)	(0.216)	(0.194)
Constant	0.0127	0.0085	0.0081	0.0040
	(0.108)	(0.282)	(0.304)	(0.623)
N	7842	7842	7842	7842
R-sq	0.039	0.041	0.041	0.041

p-values in parentheses ="\* p<0.1, \*\* p<0.05, \*\*\*p<0.001

**Table 4.4 OLS regression of the combined effect of Analyst divergence opinion (Divo) and Idiosyncratic Volatility (Sigma) on acquirer's short-term abnormal return**

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This table shows regression results that reveal the combined effect of Analyst divergence opinion (Divo) and Idiosyncratic Volatility (Sigma) on acquirer's short-term abnormal return. The sample includes acquisitions conducted by US public bidders from January 1<sup>st</sup>, 1990 to December 31<sup>st</sup>, 2013. Independent variable, Analyst divergence opinion (Divo) is the standard deviation of analyst forecast for a bidder 365 days to 28 days before deal announcement. DivoRun is the interaction variable measured by Divo multiply Runup ratio. The idiosyncratic volatility (Sigma) as a measure of information asymmetries is the standard deviation of the residuals from a market model regression calculated from 365 days to 28 days before the announcement event window. SigmaRun is the interaction variable measured by Sigma multiply Runup ratio. Dependent variable, Acquirer short-term abnormal returns, which is measured by Market adjusted Cumulative Abnormal Return 5 days surrounding announcement day CAR [-2,2]. Stock denotes that 100% stock; and Cash pay the deal for 100% cash payment. Control variables include; RUNUP is measured as market-adjusted CARs over the [-365, -28] window prior to announcement. M/B, the market to book ratio measures market valuation of bidder's stock, is defined as annual price close multiply common share outstanding divided by total common equity; leverage ratio is defined as total liability divided by total asset. Relative Size denotes the relative size of the deal, and is defined as the proportion of deal value over bidders market value; Public denote target public status. Market Heat is measured as the quarterly moving average of deals conducted over the average quarter frequency of deals conducted from 1990 to 2013. Tender offer denote the deal type is tender offer. Diversification indicates bidder and target oriented in different industry.

	(1)	(2)	(3)	(4)
	CAR [-2,2]	CAR [-2,2]	CAR [-2,2]	CAR [-2,2]
Divo	-0.0296 (0.323)		-0.0107 (0.756)	-0.0120 (0.728)
Sigma		0.1752* (0.087)	0.3013*** (0.005)	0.3212*** (0.003)
DivoRun			-0.0674 (0.173)	-0.0678 (0.171)
SigmaRun			-0.3990*** (0.008)	-0.4064*** (0.007)
STOCK			-0.0056* (0.062)	
CASH				0.0051*** (0.009)
RUNUP	-0.0168*** (0.000)	-0.0176*** (0.000)	0.0019 (0.760)	0.0023 (0.706)
M/B	0.0001 (0.751)	0.0000 (0.849)	0.0002 (0.318)	0.0002 (0.395)
Leverage	0.0020 (0.629)	0.0032 (0.434)	0.0029 (0.472)	0.0031 (0.450)
Relative Size	0.0244*** (0.000)	0.0231*** (0.000)	0.0228*** (0.000)	0.0247*** (0.000)
Public	-0.0279*** (0.000)	-0.0269*** (0.000)	-0.0258*** (0.000)	-0.0264*** (0.000)
Market Heat Degree	-0.0056 (0.363)	-0.0051 (0.406)	-0.0046 (0.450)	-0.0045 (0.462)
Tender	0.0318*** (0.000)	0.0320*** (0.000)	0.0311*** (0.000)	0.0307*** (0.000)
Diversification	-0.0029 (0.130)	-0.0025 (0.181)	-0.0023 (0.220)	-0.0024 (0.198)
Constant	0.0186** (0.014)	0.0127 (0.108)	0.0080 (0.313)	0.0039 (0.636)
N	7842	7842	7842	7842
R-sq	0.038	0.039	0.042	0.042

p-values in parentheses = \* p<0.1, \*\* p<0.05, \*\*\*p<0.001



***Table 4.5 The impact of divergence opinion (Divo) on bidders with negative pre merger performance***

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This table shows regression results that reveal how Analyst forecast dispersion (Divo) related to acquirer's short-term abnormal return. The sample includes acquisitions conducted by US public bidders from January 1<sup>st</sup>, 1990 to December 31<sup>st</sup>, 2013. The bidders runup ratio is negative. Independent variable, Analyst divergence opinion (Divo) is the standard deviation of analyst forecast for a bidder 365 days to 28 days before deal announcement. DivoRun is the interaction variable measured by Divo multiply Runup ratio. Dependent variable, Acquirer short-term abnormal returns, which is measured by Market adjusted Cumulative Abnormal Return 5 days surrounding announcement day CAR [-2,2]. Stock denotes that 100% stock; and Cash pay the deal for 100% cash payment. Control variables include; RUNUP is measured as market-adjusted CARs over the [-365, -28] window prior to announcement. M/B, the market to book ratio measures market valuation of bidder's stock, is defined as annual price close multiply common share outstanding divided by total common equity; leverage ratio is defined as total liability divided by total asset. Relative Size denotes the relative size of the deal, and is defined as the proportion of deal value over bidders market value; Public denote target public status. Market Heat is measured as the quarterly moving average of deals conducted over the average quarter frequency of deals conducted from 1990 to 2013. Tender offer denote the deal type is tender offer. Diversification indicates bidder and target oriented in different industry.

	(1)	(2)	(3)	(4)
	CAR [-2,2]	CAR [-2,2]	CAR [-2,2]	CAR [-2,2]
Divo	0.0279 (0.632)	-0.1694** (0.047)	-0.1700** (0.046)	-0.1702** (0.046)
DivoRun		-0.5860** (0.012)	-0.5949** (0.011)	-0.5911** (0.011)
STOCK			-0.0088* (0.097)	
CASH				0.0055* (0.091)
RUNUP	-0.0481*** (0.000)	-0.0334*** (0.002)	-0.0335*** (0.002)	-0.0341*** (0.002)
M/B	-0.0003 (0.474)	-0.0002 (0.692)	-0.0001 (0.834)	-0.0001 (0.750)
Leverage	-0.0031 (0.654)	-0.0036 (0.592)	-0.0040 (0.550)	-0.0040 (0.553)
Relative Size	0.0168** (0.038)	0.0168** (0.038)	0.0167** (0.038)	0.0184** (0.025)
Public	-0.0233*** (0.000)	-0.0230*** (0.000)	-0.0215*** (0.000)	-0.0227*** (0.000)
Market Heat Degree	0.0085 (0.408)	0.0095 (0.356)	0.0093 (0.362)	0.0090 (0.379)
Tender	0.0363*** (0.000)	0.0360*** (0.000)	0.0339*** (0.000)	0.0341*** (0.000)
Diversification	-0.0060* (0.056)	-0.0061* (0.052)	-0.0060* (0.053)	-0.0061* (0.051)
Constant	0.0013 (0.922)	0.0030 (0.810)	0.0034 (0.786)	-0.0005 (0.969)
N	2782	2782	2782	2782
R-sq	0.049	0.053	0.054	0.054

p-values in parentheses ="\* p<0.1, \*\* p<0.05, \*\*\*p<0.001

***Table 4.6 The impact of the combined effect on bidder with negative pre merger performance***

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This table shows regression results that reveal the combined effect of Analyst Dispersion (Divo) and Idiosyncratic Volatility (Sigma) on acquirer's short-term abnormal return. The sample includes acquisitions conducted by US public bidders from January 1<sup>st</sup>, 1990 to December 31<sup>st</sup>, 2013. The bidders runup ratio is negative. Independent variable, Analyst divergence opinion (Divo) is the standard deviation of analyst forecast for a bidder 365 days to 28 days before deal announcement. DivoRun is the interaction variable measured by Divo multiply Runup ratio. The idiosyncratic volatility (Sigma) as a measure of information asymmetries is the standard deviation of the residuals from a market model regression calculated from 365 days to 28 days before the announcement event window. SigmaRun is the interaction variable measured by Sigma multiply Runup ratio. Dependent variable, Acquirer short-term abnormal returns, which is measured by Market adjusted Cumulative Abnormal Return 5 days surrounding announcement day CAR [-2,2]. Stock denotes that 100% stock; and Cash pay the deal for 100% cash payment. Control variables include; RUNUP is measured as market-adjusted CARs over the [-365, -28] window prior to announcement. M/B, the market to book ratio measures market valuation of bidder's stock, is defined as annual price close multiply common share outstanding divided by total common equity; leverage ratio is defined as total liability divided by total asset. Relative Size denotes the relative size of the deal, and is defined as the proportion of deal value over bidders market value; Public denote target public status. Market Heat is measured as the quarterly moving average of deals conducted over the average quarter frequency of deals conducted from 1990 to 2013. Tender offer denote the deal type is tender offer. Diversification indicates bidder and target oriented in different industry.

	(1)	(2)	(4)	(5)
	CAR [-2,2]	CAR [-2,2]	CAR [-2,2]	CAR [-2,2]
Divo	0.0279 (0.632)		-0.1594* (0.068)	-0.1599* (0.067)
Sigma		0.1554 (0.390)	0.0186 (0.938)	0.0248 (0.918)
DivoRun			-0.5445** (0.022)	-0.5409** (0.024)
SigmaRun			-0.6133 (0.283)	-0.6078 (0.286)
STOCK			-0.0098* (0.067)	
CASH				0.0064* (0.055)
RUNUP	-0.0481*** (0.000)	-0.0452*** (0.000)	-0.0077 (0.689)	-0.0085 (0.660)
M/B	-0.0003 (0.474)	-0.0003 (0.473)	-0.0001 (0.786)	-0.0002 (0.696)
Leverage	-0.0031 (0.654)	-0.0023 (0.742)	-0.0032 (0.641)	-0.0031 (0.646)
Relative Size	0.0168** (0.038)	0.0159* (0.052)	0.0159* (0.052)	0.0179** (0.032)
Public	-0.0233*** (0.000)	-0.0227*** (0.000)	-0.0208*** (0.000)	-0.0222*** (0.000)
HeatDegree	0.0085 (0.408)	0.0094 (0.363)	0.0101 (0.327)	0.0098 (0.344)
Tender	0.0363*** (0.000)	0.0365*** (0.000)	0.0340*** (0.000)	0.0342*** (0.000)
Diversification	-0.0060* (0.056)	-0.0056* (0.075)	-0.0057* (0.072)	-0.0057* (0.069)
Constant	0.0013 (0.922)	-0.0026 (0.848)	0.0034 (0.809)	-0.0013 (0.929)
N	2782	2782	2782	2782
R-sq	0.049	0.049	0.056	0.056

p-values in parentheses ="\* p<0.1, \*\* p<0.05, \*\*\*p<0.001

***Table 4.7 The Impact of idiosyncratic volatility on bidders with positive pre merger performance***

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This table shows regression results that reveal how idiosyncratic volatility (Sigma) related to acquirer's short-term abnormal return. The sample includes acquisitions conducted by US public bidders from January 1<sup>st</sup>, 1990 to December 31<sup>st</sup>, 2013. Independent variable, The idiosyncratic volatility (Sigma) as a measure of information asymmetries is the standard deviation of the residuals from a market model regression calculated from 365 days to 28 days before the announcement event window. SigmaRun is the interaction variable measured by Sigma multiply Runup ratio. Dependent variable, Acquirer short-term abnormal returns, which is measured by Market adjusted Cumulative Abnormal Return 5 days surrounding announcement day CAR [-2,2]. Stock denotes that 100% stock; and Cash pay the deal for 100% cash payment. Control variables include; RUNUP is measured as market-adjusted CARs over the [-365, -28] window prior to announcement. M/B, the market to book ratio measures market valuation of bidder's stock, is defined as annual price close multiply common share outstanding divided by total common equity; leverage ratio is defined as total liability divided by total asset. Relative Size denotes the relative size of the deal, and is defined as the proportion of deal value over bidders market value; Public denote target public status. Market Heat is measured as the quarterly moving average of deals conducted over the average quarter frequency of deals conducted from 1990 to 2013. Tender offer denote the deal type is tender offer. Diversification indicates bidder and target oriented in different industry.

	(1)	(2)	(3)	(4)
	CAR [-2,2]	CAR [-2,2]	CAR [-2,2]	CAR [-2,2]
Sigma	-0.0113 (0.935)	0.2547 (0.125)	0.2741* (0.100)	0.3034* (0.070)
SigmaRun		-0.4840** (0.016)	-0.4889** (0.015)	-0.5046** (0.012)
STOCK			-0.0048 (0.189)	
CASH				0.0050** (0.045)
RUNUP	-0.0112** (0.028)	0.0096 (0.285)	0.0100 (0.268)	0.0108 (0.231)
M/B	0.0001 (0.835)	0.0001 (0.575)	0.0002 (0.464)	0.0002 (0.528)
Leverage	0.0054 (0.279)	0.0061 (0.219)	0.0056 (0.262)	0.0057 (0.252)
Relative Size	0.0287*** (0.000)	0.0282*** (0.000)	0.0279*** (0.000)	0.0299*** (0.000)
Public	-0.0296*** (0.000)	-0.0292*** (0.000)	-0.0283*** (0.000)	-0.0287*** (0.000)
Market Heat Degree	-0.0152** (0.048)	-0.0154** (0.044)	-0.0156** (0.043)	-0.0153** (0.047)
Tender	0.0280*** (0.000)	0.0285*** (0.000)	0.0271*** (0.000)	0.0266*** (0.000)
Diversification	-0.0010 (0.671)	-0.0009 (0.718)	-0.0008 (0.749)	-0.0009 (0.703)
Constant	0.0232** (0.015)	0.0136 (0.163)	0.0134 (0.170)	0.0090 (0.371)
N	5060	5060	5060	5060
R-sq	0.037	0.039	0.039	0.039

p-values in parentheses ="\* p<0.1, \*\* p<0.05, \*\*\*p<0.001

***Table 4.8 The impact of combined effect on acquirer with positive pre merger performance***

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This table shows regression results that reveal the combined effect of Analyst Dispersion (Divo) and Idiosyncratic Volatility (Sigma) on acquirer's short-term abnormal return. The sample includes acquisitions conducted by US public bidders from January 1<sup>st</sup>, 1990 to December 31<sup>st</sup>, 2013. The bidders runup ratio is negative. Independent variable, Analyst divergence opinion (Divo) is the standard deviation of analyst forecast for a bidder 365 days to 28 days before deal announcement. DivoRun is the interaction variable measured by Divo multiply Runup ratio. The idiosyncratic volatility (Sigma) as a measure of information asymmetries is the standard deviation of the residuals from a market model regression calculated from 365 days to 28 days before the announcement event window. SigmaRun is the interaction variable measured by Sigma multiply Runup ratio. Dependent variable, Acquirer short-term abnormal returns, which is measured by Market adjusted Cumulative Abnormal Return 5 days surrounding announcement day CAR [-2,2]. Stock denotes that 100% stock; and Cash pay the deal for 100% cash payment. Control variables include; RUNUP is measured as market-adjusted CARs over the [-365, -28] window prior to announcement. M/B, the market to book ratio measures market valuation of bidder's stock, is defined as annual price close multiply common share outstanding divided by total common equity; leverage ratio is defined as total liability divided by total asset. Relative Size denotes the relative size of the deal, and is defined as the proportion of deal value over bidders market value; Public denote target public status. Market Heat is measured as the quarterly moving average of deals conducted over the average quarter frequency of deals conducted from 1990 to 2013. Tender offer denote the deal type is tender offer. Diversification indicates bidder and target oriented in different industry.

	(1)	(2)	(4)	(5)
	CAR [-2,2]	CAR [-2,2]	CAR [-2,2]	CAR [-2,2]
Divo	-0.0594*		-0.0559	-0.0566
	(0.092)		(0.254)	(0.248)
Sigma		-0.0113	0.2838*	0.3135*
		(0.935)	(0.088)	(0.061)
DivoRun			-0.0035	-0.0038
			(0.953)	(0.948)
SigmaRun			-0.4900**	-0.5055**
			(0.015)	(0.012)
STOCK			-0.0045	
			(0.219)	
CASH				0.0049**
				(0.049)
RUNUP	-0.0113**	-0.0112**	0.0100	0.0108
	(0.010)	(0.028)	(0.270)	(0.233)
M/B	0.0001	0.0001	0.0002	0.0002
	(0.728)	(0.835)	(0.397)	(0.445)
Leverage	0.0053	0.0054	0.0055	0.0056
	(0.290)	(0.279)	(0.267)	(0.259)
Relative Size	0.0284***	0.0287***	0.0276***	0.0296***
	(0.000)	(0.000)	(0.000)	(0.000)
Public	-0.0295***	-0.0296***	-0.0282***	-0.0286***
	(0.000)	(0.000)	(0.000)	(0.000)
HeatDegree	-0.0146*	-0.0152**	-0.0150*	-0.0147*
	(0.059)	(0.048)	(0.051)	(0.056)
Tender	0.0279***	0.0280***	0.0272***	0.0266***
	(0.000)	(0.000)	(0.000)	(0.000)
Diversification	-0.0010	-0.0010	-0.0007	-0.0008
	(0.693)	(0.671)	(0.771)	(0.727)
Constant	0.0236**	0.0232**	0.0136	0.0094
	(0.011)	(0.015)	(0.163)	(0.353)
N	5060	5060	5060	5060
R-sq	0.037	0.037	0.040	0.040

p-values in parentheses = \* p<0.1, \*\* p<0.05, \*\*\*p<0.001



**Table 4.9 The combined effect of Analyst Dispersion (Divo) and Idiosyncratic Volatility (Sigma) on acquirer's long-term abnormal return**

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This table shows regression results that reveal the combined effect of Analyst Dispersion (Divo) and Idiosyncratic Volatility (Sigma) on acquirer's long-term abnormal return. The sample includes acquisitions conducted by US public bidders from January 1<sup>st</sup>, 1990 to December 31<sup>st</sup>, 2013. Independent variable, Analyst divergence opinion (Divo) is the standard deviation of analyst forecast for a bidder 365 days to 28 days before deal announcement. DivoRun is the interaction variable measured by Divo multiply Runup ratio. The idiosyncratic volatility (Sigma) as a measure of information asymmetries is the standard deviation of the residuals from a market model regression calculated from 365 days to 28 days before the announcement event window. SigmaRun is the interaction variable measured by Sigma multiply Runup ratio. Dependent variable, Acquirer long-term abnormal returns, which is measured by Market adjusted Buy and Hold ratio 24 month after announcement day BHAR [0,24]. Stock denotes that 100% stock; and Cash pay the deal for 100% cash payment. Control variables include; RUNUP is measured as market-adjusted CARs over the [-365, -28] window prior to announcement. M/B, the market to book ratio measures market valuation of bidder's stock, is defined as annual price close multiply common share outstanding divided by total common equity; leverage ratio is defined as total liability divided by total asset. Relative Size denotes the relative size of the deal, and is defined as the proportion of deal value over bidders market value; Public denote target public status. Market Heat is measured as the quarterly moving average of deals conducted over the average quarter frequency of deals conducted from 1990 to 2013. Tender offer denote the deal type is tender offer. Diversification indicates bidder and target oriented in different industry.

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(1)

(2)

(4)

(5)

	BHAR [0,24]	BHAR [0,24]	BHAR [0,24]	BHAR [0,24]
Divo	0.1008 (0.775)		0.3387 (0.382)	0.3412 (0.380)
Sigma		-0.4303*** (0.000)	-0.4110*** (0.000)	-0.3860*** (0.000)
DivoRun			-0.4150 (0.325)	-0.4171 (0.322)
SigmaRun			-0.9481 (0.411)	-1.0249 (0.373)
STOCK			-0.0087 (0.774)	
CASH				0.0340* (0.068)
RUNUP	-0.1278*** (0.000)	-0.1076*** (0.000)	-0.0534 (0.279)	-0.0481 (0.330)
M/B	-0.0046** (0.034)	-0.0043** (0.042)	-0.0040* (0.054)	-0.0039* (0.062)
Leverage	0.0896** (0.048)	0.0603 (0.185)	0.0600 (0.188)	0.0585 (0.198)
Relative Size	-0.0186 (0.615)	0.0144 (0.700)	0.0157 (0.676)	0.0265 (0.486)
Public	0.0290 (0.227)	0.0056 (0.815)	0.0067 (0.787)	0.0084 (0.725)
HeatDegree	-0.2303*** (0.000)	-0.2472*** (0.000)	-0.2479*** (0.000)	-0.2475*** (0.000)
Tender	0.0546* (0.099)	0.0504 (0.129)	0.0500 (0.141)	0.0401 (0.229)
Diversification	-0.0089 (0.689)	-0.0171 (0.413)	-0.0172 (0.402)	-0.0174 (0.400)
Constant	0.1494** (0.041)	0.2853*** (0.000)	0.2702*** (0.000)	0.2411*** (0.002)
N	7842	7842	7842	7842
R-sq	0.059	0.064	0.065	0.065

p-values in parentheses ="\* p<0.1, \*\* p<0.05, \*\*\*p<0.001

***Table 4.10 IV Regression of analyst divergence opinion and acquirer's short-term abnormal return***

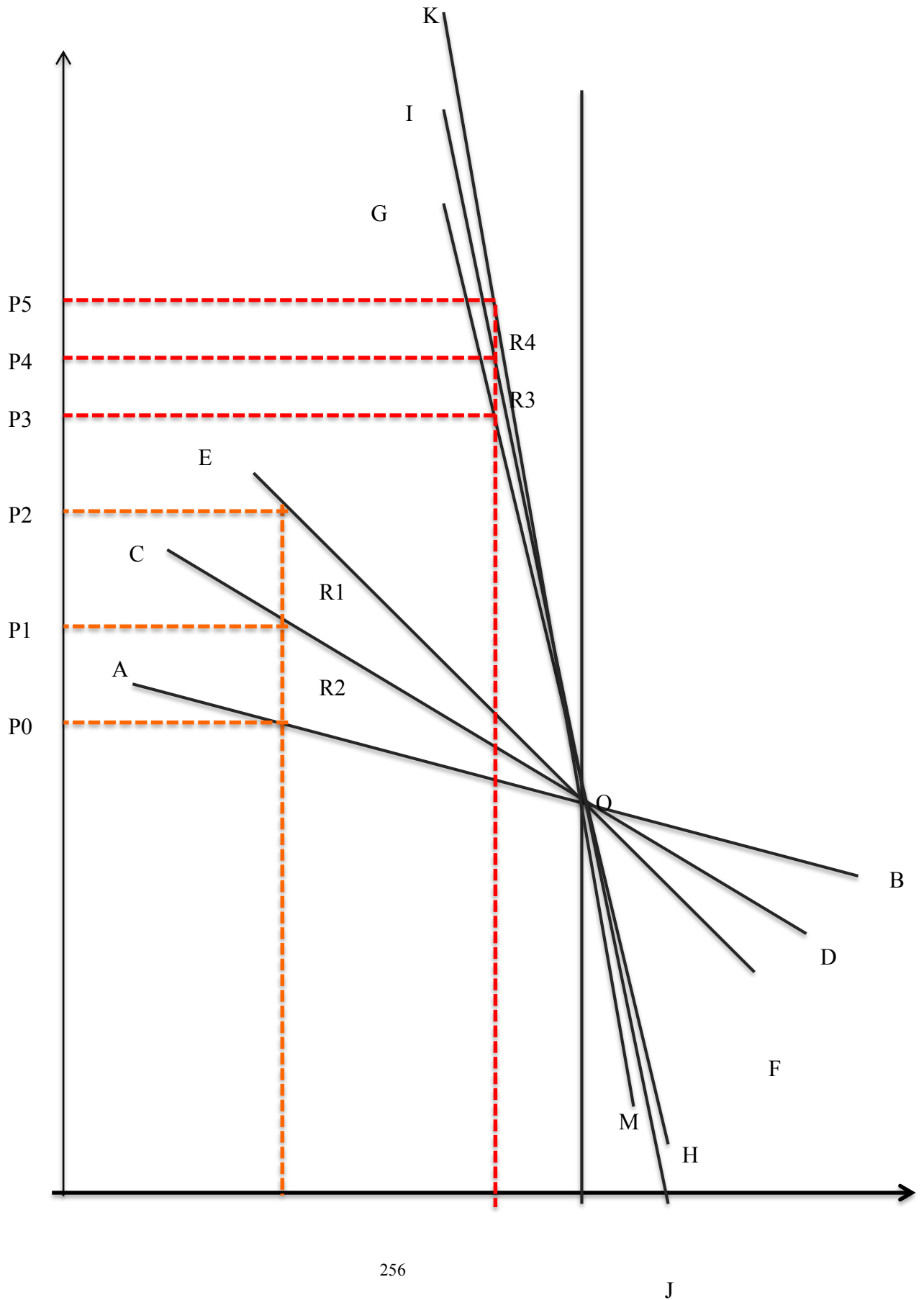
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This table shows Two Stage Least Square Regression (IV Regression) results that reveal how Analyst divergence opinion controlling bidder past performance (DivoRun) is related to acquirer's short-term abnormal return. The sample includes acquisitions conducted by US public bidders from January 1<sup>st</sup>, 1990 to December 31<sup>st</sup>, 2013. Independent variable, Analyst divergence opinion (Divo) is the standard deviation of analyst forecast for a bidder 365 days to 28 days before deal announcement. DivoRun is the interaction variable measured by Divo multiply Runup ratio. 52-weeks-High is the instrument variable. Dependent variable, Acquirer short-term abnormal returns, which is measured by Market adjusted Cumulative Abnormal Return 5 days surrounding announcement day CAR [-2,2]. Control variables include; RUNUP is measured as market-adjusted CARs over the [-365, -28] window prior to announcement. M/B, the market to book ratio measures market valuation of bidder's stock, is defined as annual price close multiply common share outstanding divided by total common equity; leverage ratio is defined as total liability divided by total asset. Relative Size denotes the relative size of the deal, and is defined as the proportion of deal value over bidders market value; Public denote target public status. Market Heat is measured as the quarterly moving average of deals conducted over the average quarter frequency of deals conducted from 1990 to 2013. Tender offer denote the deal type is tender offer. Diversification indicates bidder and target oriented in different industry.

	First Stage	Second Stage
DivoRun		-0.098*** (0.018)
Runup	270.795*** (0.000)	3.099*** (0.008)
M/B	3.286*** (0.014)	0.075*** (0.018)
Leverage	0.816 (0.964)	0.324 (0.496)
Relative Size	24.834** (0.038)	2.537*** (0.000)
Public	-13.971 (0.186)	-2.779*** (0.000)
Market Heat Degree	48.086*** (0.006)	-0.165 (0.802)
Tender	2.345 (0.792)	3.073*** (0.000)
Diversification	-1.058 (0.885)	-0.282 (0.160)
52-Weeks-High	1.059*** (0.000)	
Constant	-104.838*** (0.001)	0.877 (0.284)
N	7842	7842

p-values in parentheses = \* p<0.1, \*\* p<0.05, \*\*\*p<0.001

Diagram 4.10 Divergence opinion and pre merger performance



## **Chapter 5: Conclusion**

### **5.1 Summary**

This thesis investigates how financial constraint and financial analysts affect US bidder M&A performance. Previous literature investigates how M&A abnormal return related to free cash flow, market valuation and analyst recommendation and earning forecast. This paper extends existing literature and provides new empirical evidence. Chapter 2 examines to what extent financial constraint and disparity can effect bidder merger performance; Chapter 3 investigates whether analyst recommendations affect merger and acquisition performance: Whether recommendation consensus have the predicting power on bidders' announcement return, if so, which recommendation consensus has the strongest predicting power. Chapter 4 extensively analyzed the combined effect of divergence opinion and information asymmetry on bidder abnormal return in both short run and long run, via controlling bidder pre-merger stock performance.

The impact of financial constraint on merger and acquisition performance has extensively studied in the previous literature. Both The free cash flow hypothesis (Jensen, 1986) and Hubris Hypothesis (Roll, 1986) predict that bidders with high free cash flow more likely conducted value-destroying deal. Different from previous literature, this thesis firstly uses more comprehensive methods to estimate the financial constraint, e.g., KZ Index, WW Index, and SA Index, to reveal the impact of financial constraint on bidder M&A performance;

Second, we put both bidder/target financial constraint and disparity into consideration. I find that a constrained bidder outperforms an unconstrained bidder in both the long and short run; target financial constraint is significantly negatively related to bidder

announcement return. The results suggest that acquiring a financially unconstrained target has a positive influence on bidders' announcement return. Moreover, Our results also show that target has a substantially lower market-to-book value than bidders. This result indicates that all bidder tends to be overvalued by the market. The purpose of acquiring a financially unconstrained target is to transfer overvalued stock into a substantial asset. More importantly, the financial disparity is positively related to acquirer abnormal return in the short run but not in the long-term. This because: it is positive news for the market when a bidder acquires an unconstrained target as it indicates cash inflow to the bidder. The positive impact of acquiring a target with significant financial constraint disparity will soon vanish as the market will bring the price back to its fundamental value. Besides, the financial disparity (ATDKZ) is negatively related to bid premium.

Chapter 3 investigates the role of analyst recommendation in the context merger and acquisition performance. There is a lengthy discussion regard to the quality of analyst recommendation. Chapter 3 focus on whether recommendation consensus can predict bidders M&A performance, if so, which type of recommendation consensus are more accurate than the others. We find that recommendation Consensus positively related to bidders announcement return; acquirers with high recommendation Consensus before announcement day outperform acquirers with low recommendation consensus in the short run: analyst can successfully predict the incoming M&A deals and adjust their recommendations accordingly, the recommendation consensus estimated 90 days preceding deal announcement have the strongest predicting power. It suggests that analyst do have the superior skill. Also, we examine the influence of implementation of Reg-FD.

Divergence opinion theory (Miller, 1977) and information asymmetry hypothesis (Travlos, 1987, Myers and Majluf, 1984) are vitally important when we study the

influence of analyst on bidder merger and acquisition performance. By controlling bidder pre-merger performance, Chapter 4 estimate how the combination of the analyst divergence opinion and information asymmetry influences bidder abnormal return. The results suggest that a low divergence opinion bidder outperforms a high divergence opinion bidder in both the long and short run. This effect is much stronger in the sample of poorly performed bidders than well-performed bidder. For bidders with poor pre-merger performance, analyst divergence opinion has a negative impact on announcement return. For bidders with good pre merger performance, a positive relation has been found between information asymmetry and announcement return. These empirical results strongly support that bidder pre merger performance is an important conditioning variable that we should put into consideration in examining the impact of divergence opinion and information asymmetry on bidder merger and acquisition performance.

Overall, this thesis provides new empirical evidence on how bidder M&A performance are related to financial constraint, financial constraint disparity, recommendation consensus, divergence opinion and information asymmetry. The results suggest that constrained bidder outperform unconstraint bidder, financial analyst do have superior skills, and pre merger performance is an impotent controlling variable when we study divergence opinion and information asymmetry in the context of M&A abnormal return.



## 5.2 Implications

This thesis has many implications for both research and practice. First, this thesis provides new evidence to resolve the puzzling results in previous literature regard to financial constraint and bidder M&A performance. Existing literature concentrates on examines the impact of bidder financial constraint on bidder abnormal return. This thesis addresses this issue from a different aspect, target financial constraint, and financial disparity. This study reveals the fact that constraint bidder achieves high announcement return by acquiring unconstraint target. The financial disparity negatively related to the premium paid.

Furthermore, this thesis directly examines predicting the power of recommendation consensus on acquisition performance; The results suggest that analyst do have superior skill, they can successfully predict the incoming M&A deals and adjust their recommendation accordingly. For the investor, the thesis suggests that recommendation consensus is more reliable than recommendation given by individual analyst, and trading with recommendation consensus is profitable, but one should choose the right estimation event window. For US M&A deals, the recommendation consensus estimated 90 days proceeding deal announcement have the strongest predicting power.

This study further estimates the combined effect divergence opinion and information asymmetry on bidder performance, for the researcher, this thesis suggests that bidder pre-merger performance can substantially alter the results when we study the impact of divergence opinion and information asymmetry on M&A performance. For the investor, analyst divergence opinion is a reliable indicator for stock selection. However, it is equally important to put past performance into consideration. A bidder with a high divergence opinion are likely to conduct value-destroying deal, but it is misleading if the bidder has positive pre-merger performance. The idiosyncratic volatility is a more appropriate indicator for such bidders.

### **5.3 Limitations and future research**

This thesis can improve in many aspects. First, chapter 2 observed that bidder with neutral financial constraint receives an above average abnormal return in both short run and long run. These results are results from other determinant factors rather than financial constraint or financial disparity. Furthermore, chapter 3 do not distinguish analyst by their ranks, e.g., Star or Non-star analyst, in the estimation of recommendation consensus. There are mixed results regard to the analyst ranking quality; it is worth to investigate further the predicting power of recommendation consensus estimated from recommendation issued by a star or non-star analyst. Finally, studying analyst forecast error and its changes before and after the deal announcement could push our knowledge about the role of the analyst in M&A into a new level.

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