Merger Means of Payment and Analyst Biases around Merger Announcement Date

By

Yiling Zhang

Presented to the Faculty of the Graduate School of

The University of Texas at Arlington in Partial Fulfillment

Of the Requirement

for the Degree of

Doctor of Philosophy

The University of Texas at Arlington

March 2016

Dedication

To Jesus Christ, my father, Zhang Qing and my mother, Gong Shufang, my little boy, Samuel Lewis Zhang and my wife, Li Zhifang who have given me consistent encouragement and support.

Acknowledgements

It is my pleasure to have Dr. Diltz, Dr. Rakowski, Dr. Hao, Dr. Adams and Dr. Smallwood on my dissertation Committee. I would like to thank my dissertation chair Dr. Diltz for constantly inspiring and motivating me and also for his great advice during my Ph.D. study. I would also thank all professors including Dr. Rakowski, Dr. Hao, Dr. Adams and Dr. Smallwood who have served on my committee and have given me numerous valuable suggestions and comments.

I also extend my appreciation to the Department of Finance and Real Estate at the University of Texas at Arlington. The department has prepared me well for research by engaging my work with knowledgeable librarian Ruthie Brock. In addition, the department has provided me with great financial support for travel to research conferences. I would thank department staff Debbie Maxey and Teresa Sexton for their help with paper work for travel funds, the Enhanced Graduate Teaching Assistantship and registering for classes. Their help has reduced my worries, allowing me to concentrate on my research and study.

I am very grateful to business librarians Ruthie Brock and Carol Byrne. For they have given their time generously and have helped greatly with databases. Their help has saved me a tremendous amount of time and has made my research more efficient and productive. I want to give my special thanks to Ruthie Brock, she has helped me more than I ask for. Especially, she helped me improve my presentation and publication skills. I also want to thank Dr. Rakowski for taking time to talk about my research ideas and

giving me great comments on the research direction I should focus on. I am thankful to Dr. Sarkar for his advice on how to be a great professor.

Finally, I want to thank my Lord Jesus Christ for shaping me as a resilient person and for giving me courage and strength when I get discouraged in the program. I also want to thank him for giving me a supportive family. Thank my parents for their consistent financial and emotional support. I thank my wife for taking good care of my little boy and help me concentrate on my finance Ph.D. study.

March 2016

Abstract

I find strong evidence that analysts report downward-biased earnings estimates on acquiring firms when the earnings announcement date is within a 60-day window prior to the merger and acquisition (M&A) announcement date. Acquiring firm stocks have a greater positive realized forecast error in cash only transactions on the earnings announcement date compared to acquirers involved in pure stock transactions. In addition, analysts are more likely to upgrade their recommendations of acquirer stocks in cash only transactions compared to pure stock transactions within a 90 day window of the M&A announcement date. Finally, an increase in the market-to-book ratio leads to a decrease in realized target stock forecast error between the merger announcement date and the merger effective date, or between the merger announcement date and the merger withdrawal date. Changes in the average realized forecast error associated with large market-to-book ratios are greater under pure stock transactions between the merger announcement date and the merger effective date, or between the merger announcement date and the merger withdrawal date. This study highlights the significant impact of M&A transaction characteristics of M&A transactions on the near term analysts' realized forecast errors around the merger announcement date.

JEL Classification: G12, G14, G24, G34

Keywords: Analyst bias, Merger means of payment, Analysts' conflict of interest, Analyst recommendation change, Initial target price ratio, Realized Forecast Errors

Table of Contents

Dedication iii
Acknowledgements iv
Abstract vi
Table of Contents vii
List of Tables x
List of Figures xii
Chapter 1 Introduction 1
Chapter 2 Relevant Literature Review 5
2.1 Analyst Biases & Analysts' Conflict of Interest 5
2.2 Analysts Biases & Manager's Guidance 6
2.3 Analyst Biases and Stock Valuation 7
Chapter 3 Merger Means of Payment and Analyst Forecast Bias before Merger Announcement Date 9
3.1 Introduction 9
3.2 Motivation and Hypothesis Development 12
3.3 Data and Variable Description 15
3.3.1 M&A Deals 16
3.3.2 Merging Deals with Forecast 16
3.3.3 Merging Deals with Compustat 16
3.3.4 Time Window Selection 17
3.3.5 Analyst Affiliation 18
3.3.6 Descriptive Statistics 19
3.4 Panel Fixed Effect Analysis of Analyst Forecast Bias 22
3.5 Event Study and Instrumental Analysis of Cumulative abnormal Return 26
3.6 Conclusions 28
Chapter 4 Merger Means of Payment and Analyst Recommendation Change 39
4.1 Introduction 39
4.2 Data and Variable Descriptions 43
4.2.1 M&A Deals 43
4.2.2 Merging deals with CRSP 43
4.2.3 Merging deals with analyst recommendation changes 43

4.2.4 Merging deals with analyst forecasts 44
4.2.5 M&A descriptive statistics 45
4.2.6 Descriptive Statistics on Analyst Recommendation and Forecast 45
4.3 Probit Analysis of Analyst Recommendation Change 46
4.4 Event Study and Instrumental Analysis of Cumulative abnormal Return 51
4.5 Summary and Conclusions 54
Chapter 5 Merger Means of Payment and Analyst Biases between the Merger Announcement Date and the Merger Effective (Withdrawn) Date 68
5.1 Introduction 68
5.2 Hypothesis Development 71
5.3 Data and Variable Description 72
5.3.1 M&A Deals 72
5.3.2 Merging Deals with Forecast 73
5.3.3 Merging Deals with Compustat 73
5.3.4 Time Window Selection 74
5.3.5 A model of realized forecast error 75
5.3.6 Data and Descriptive Statistics 76
5.4 Frequency and timing of analysts' near term forecast 78
5.4.1 Timeline of Analysts' near term forecast 78
5.4.2 Timeline of Analysts' near term forecast 80
5.5 Realized Forecast Error 82
5.6 Panel Fixed Regression Analysis of Realized Forecast Error at Firm Level 85
5.7 Relationship between Stock Price Reaction and Realized Forecast Error 87
5.8 Summary and Conclusion 89
Chapter 6 Merger Means of Payment and Analyst Forecast Inefficiency around the Merger Announcement Date 104
6.1 Introduction 104
6.2 Hypothesis Development 109
6.3 Data and Variable Description 112
6.3.1 M&A Deals 112
6.3.2 Merging Deals with Forecast 113
6.3.3 Merging Deals with Compustat 113
6.3.4 Merging with CRSP 113

6.3.5 Time Window Selection 114
6.3.6 Data and Descriptive Statistics 115
6.3.7 Timeline of analysts' near term forecast 116
6.4 Empirical Analysis of Near Term Analysts Forecast Inefficiency around the Merger Announcement Date 118
6.4.1 The Change of Information Uncertainty and Near Term Analysts' Forecast Inefficiency around the Merger Announcement Date 118
6.4.2 Target Stock Misvaluation and Near Term Analysts' Forecast Inefficiency around the Merger Announcement Date 121
6.4.3 Merger Means of Payment and Near Term Analysts' Forecast Inefficiency around the Merger Announcement Date 122
6.4.4 What Causes the Near Term Analysts' Forecast Inefficiency 123
6.5 Portfolio Analysis 130
6.6 Summary and Conclusion 132
References 146

List of Tables

Table 3.1 Forecast Biases around the Merger Announcement Date 31

Table 3.2 Number of Merger and Acquisitions by Calendar Year 32

Table 3.3 Analysts' Realized Forecast Errors 33

Table 3.4 Descriptive Statistics 34

Table 3.5 Variable Definitions 35

Table 3.6 Merger Means of Payment on Analyst Forecast Bias 36

Table 3.7 Analysts' Affiliation on Analyst Forecast Bias 37

Table 3.8 Cumulative Abnormal Returns around the Earnings Announcement Date 38

Table 4.1 Descriptive Statistics on Deal Value 56

Table 4.2 Descriptive Statistics on Number of Acquisitions 57

Table 4.3 Descriptive Statistics on Deal Value 58

Table 4.4 Descriptive Statistics on Analyst Recommendation Change 60

Table 4.5 Variable Definitions 61

Table 4.6 Variable Descriptive Statistics 62

Table 4.7 Merger Means of Payment's Impact on Analyst Recommendation Change 63

Table 4.8 Time Impact on Analyst Recommendation Change 64

Table 4.9 Analysts' Previous Dispersion Impact on Analyst Recommendation Change 65

Table 4.10 Three Day Cumulative Abnormal Returns around the Merger Announcement Date 66

Table 4.11 Analyst Recommendation Change Impact on Cumulative Abnormal Return 67

Table 5.1 Sample Descriptive Statistics 91

Table 5.2 Whole Sample Realized Forecast Error 96

Table 5.3 Realized Forecast Error by Trade Month Relative to MAD 97

Table 5.4 Realized Forecast Error by Trade Month Relative to MED or MWD 98

Table 5.5 Variable Definitions 99

Table 5.6 Descriptive Statistics for Full Sample and Two Subsamples 100

Table 5.7 Realized Forecast Errors and Misvaluation Ratios 101

Table 5.8 Cumulative Abnormal Returns around New Forecast Date 102

Table 5.9 Realized Forecast Error impact on Cumulative Abnormal Return 103

Table 6.1 Sample Descriptive Statistics 133

Table 6.2 Variable Definitions and Descriptive Statistics 135

Table 6.3 Change of Information Uncertainty and Near Term Analysts' Forecast Inefficiency 137

Table 6.4 Change of Information Uncertainty and Near Term Analysts' Forecast Inefficiency 138

Table 6.5 Target Stock Misvaluation and Near Term Analysts' Forecast Inefficiency 139

Table 6.6 Merger Means of Payment and Near Term Analysts' Forecast Inefficiency 140

Table 6.7 Target Stock Volumes and Near Term Analysts' Forecast Inefficiency 141

Table 6.8 Analysts' Weighting Behavior 142

Table 6.9 Impact of Trading Volume on Analysts' Weighting Behavior 144

Table 6.10 Cumulative Abnormal Return for Double Sorting Portfolios 145

List of Figures

Figure 3.1 Historical Distribution of Final Sample 29

Figure 3.2 Near Term Forecast Bias around the Merger Announcement Date 30

Figure 4.1 Mean Deal Value of Categorized Payment by Calendar Year 59

Figure 5.1 Frequency of Near Term Analysts' Forecast Relative to MAD 92

Figure 5.2 Weekly observations of Analysts Forecast within First 42 Trade Days Post MAD 93

Figure 5.3 Histogram of Near Term Analysts Forecast Relative to MED or MWD 94

Figure 5.4 Monthly observations of Near Term Analysts Forecast Prior to MED or MWD 95

Figure 6.1 Average Trading Volume of Target Stock Shares around the Merger Announcement Date .. 136

Chapter 1 Introduction

Analyst bias refers to analysts' forecast errors or analysts' recommendation preferences that systematically favor some outcomes over others. This dissertation examines whether analysts, during the period around merger announcements, bias their opinions based on the characteristics of merger and acquisition characteristics such as merger means of payment and valuation ratios.

Examination of analyst near term bias around the merger announcement dates is important for two reasons. First, analysts' near term bias is frequently associated with a short term stock price reaction. Gu and Wu [1] find that larger realized forecast errors lead to larger stock price reactions around the earnings announcement dates. Understanding near term analyst bias and its impact on stock prices may allow limited arbitrage opportunities. Second, near term analyst bias around the merger announcement dates provides important information regarding their expectations of the success of a proposed merger.

This dissertation consists of four essays. These essays examine analysts' near term biases in a timely order around merger announcement dates. The first essay examines whether analysts bias their opinions to create positive earnings surprises for acquirers in cash only (pure stock) transactions on the earnings announcement date within 60 days prior to the merger announcement date. This research increases our understanding of the analyst's conflict of interest impact on near term analyst behavior prior to the merger announcement. This work supports Michaely and Womack [2]s' analyst conflict of interest hypothesis, suggesting that analyst's earnings forecasts prior

to the merger announcement are influenced by their desire to help their investment banking‘s clients complete an M&A transaction.

The second essay examines whether analysts bias their opinions in favor of acquirers with cash only payment within a 90 day window of the merger announcement date. This essay extends the merger means of payment hypothesis of Shleifer and Vishny [3]. The merger means of payment hypothesis predicts that cash only payment produces a positive long run abnormal return, and pure stock payment generates a negative long run abnormal return for acquirer stocks. This work extends current research by showing that cash only transactions receive a more favorable short-term outcome from analysts to upgrade their recommendations about the acquirer stocks, in contrast to pure stock transactions. The market reacts to this difference, resulting in a significant positive cumulative abnormal return for acquirer stocks in cash only transactions and a significant negative cumulative abnormal return for acquirer stocks in pure stock transactions. Second, findings complement Mitchel et al. [4]’s results concerning short term arbitrage opportunities around the merger announcement date. Mitchel et al. [4] find that merger arbitrage short selling causes a short run downward price pressure in acquirer stock financed mergers around the merger announcement date. My findings show that cash only payment (pure stock payment) associated with analyst recommendation changes for acquirers’ stocks generates a 1.06% (-1.05%) cumulative abnormal return for the acquirer stock during a three day window around an M&A announcement. This suggests that there is a positive (negative) analyst recommendation change resulting from cash only (pure stock) payment creating an

upward (downward) price pressure toward acquirer stocks around the merger announcement date.

The third essay examines the analyst forecast bias in a time window between the merger announcement date and the merger effective date, or between the merger announcement date and the merger withdrawal date. This paper is among the first studies to extend the mis-valuation hypothesis by examining the impact of target mis-valuation ratios, such as the initial target price ratio and market to book ratio, on analyst bias in the context of merger and acquisition activity. I find that an increase in market to book ratios will lead to a decrease in realized forecast errors following the merger announcement date. The magnitude of decrease in realized forecast error associated with increase in market to book ratio is larger for pure stock transactions, compared to cash only transactions. In addition, the initial target price ratio has a similar impact on the realized forecast errors within first two trading months after the merger announcement date. This study extends the literature on the inefficiency of analyst forecasts by emphasizing analyst forecast timing as well as the magnitude of analysts' reactions to stock valuation ratios with regard to merger means of payment.

The fourth essay examines the relationship between analysts' forecast inefficiency and changes in information uncertainty around the merger announcement date. I find strong evidence that the impact of biased near term analysts' forecast on target stock trading volumes becomes larger when information uncertainty increases around the merger announcement date. I also find that analysts systematically mis-react to target stock mis-valuation, and this empirical finding is associated with near term analysts' forecast inefficiency around the merger announcement date. Moreover, I observe that analysts

issue more optimistic earnings forecasts for target stocks when the change of information uncertainty increases around the merger announcement date. This can be explained by the analysts' incentive to generate trading commissions around the merger announcement date. My research uses a Bayesian approach in modeling the analysts' weighting behavior, and I analyze its subsequent association with near term forecast inefficiency. I use portfolio analysis to examine the impact of near term analyst forecast inefficiency on the target stock cumulative abnormal returns. The impact of this forecast inefficiency becomes larger with the increase in information uncertainty. My research adds to the analysts' conflict of interest literature in the context of corporate control. This work is among the first attempts to explain near term analysts' weighting behaviors around the merger announcement date.

This dissertation is organized as follows. Chapter 2 reviews relevant literature. Chapter 3 presents the essay, "Merger Means of Payment and Analyst Forecast Bias before the Merger Announcement Date". Chapter 4 presents "Merger Means of Payment and Analyst Recommendation Change". Chapter 5 presents "Merger Means of Payment and Analyst Bias between the Merger Announcement Date and the Merger Effective (Withdrawn) Date". Chapter 6 presents the fourth essay, "Merger Means of Payment and Analysts' Forecast Inefficiency around the Merger Announcement Date".

Chapter 2 Relevant Literature

2.1 Analyst Biases & Analysts' Conflict of Interest

Over past two decades, researchers have studied extensively analysts' biases related to the impact of analysts' conflicts of interest. Most of this work has concentrated on the association between the investment banking corporate division and the underwriting of Initial Public Offerings (IPOs) and Seasonal Equity Offerings (SEOs). Underwriting fees are normally tied to the transaction value of those equity offerings. According to Juergens[5] ,part of analysts' compensation comes from a portion of aggregate investment banking fees and brokerage commissions' fees, and Michaely and Womack [2] show that analysts may be pressured to issue or maintain a positive recommendation toward their current or potential investment banking clients, creating a the conflict of interest. Analysts affiliated with their investment bank corporate division are more likely to exhibit a positive bias toward those IPO firms and SEO firms. For example, Dugar and Nathan [6] demonstrate that analysts affiliated with their investment bank issue more optimistic recommendations on the firms for which their investment bank underwrite the securities for than analysts without affiliation. Lin and McNichols [7] state that co-underwriter analysts tend to issue more favorable long-term growth forecasts and recommendations toward firms of underwriting brokerage firms than analysts without affiliation of underwriting brokerage house. Michaely and Womack [2] find that within two months of the IPO date, co-underwriter analysts issue more frequent buy recommendations toward IPO clients of underwriting brokerage firms than analysts without affiliation of underwriting brokerage firms.

Little research has examined analysts' biases in the context of corporate control activity, including mergers and acquisitions (M&A). Kolasinski and Kothari [8] find that analysts affiliated with an acquirer M&A advisor are more likely to upgrade their recommendation for the acquiring firm stock around the merger announcement date. According to Juergens[5] , analysts affiliated with an M&A advisor exhibit positive bias toward acquirers around merger in order to complete the transaction. My dissertation extends the study of analysts' conflict of interests in the context of M&A by examining whether analysts form a near term bias about brokerage-affiliated acquirer stocks by merger means of payment prior to the merger announcement date.

2.2 **Analysts Biases & Manager's Guidance**

Another study regarding analysts' biases focuses on manager guidance. For example, Francis and Pilbrick [9] show that analysts are willing to sacrifice their earnings forecast accuracy to win the favor of managers. Soffer et al. [10] find that managers are selective in disclosing information to analysts prior to earnings announcements, and they succeed in leading analysts to issue beatable forecast earnings. Lim [11] indicates that managers can intentionally misguide analysts due to the analysts' dependence on their disclosure information. Hutton [12] finds that active managers' guidance can lead analysts to reduce near term bias toward stocks. Richardson, Teoh and Wysocki [13] show that managers manipulated earnings guidance to benefit net insider stock sales within a 20-day period after earnings announcement. This guidance usually leads analysts to issue pessimistic near term forecasts for stocks prior to the earnings announcement date. An acquisition can be financed by acquirer shares when the merger means of payment is pure stock. Acquirers' managers have strong motivation

to induce analysts' forecasts a downward biased level before the merger announcement date. In this case, the acquirers' stock price can be raised on the earnings announcement date to help acquirers achieve the goal issuing the minimum amount of stock to acquire the target firm.

2.3 Analyst Biases and Stock Valuation

Research has documented an empirical relation between analysts' bias and stock price reactions. Abarbanell [14] shows that analysts' forecasts underreact to information regarding previous stock price changes. Gu and Wu [1] state that larger earnings surprise or larger forecast errors lead to larger market price reaction around the earnings announcement date. Dechow et al. [15] and Livnat et al. [16] show that stock valuation is positively correlated with analysts' forecast of earnings and stock valuation change resulting from analyst bias. Brav and Lehavy [17] show that target price ratios, or ratios of analysts' target price to the stock price affect analysts' estimates of expected firm value, and analysts form optimistic biases over stocks with high target price ratios. James and Karceski [18] show that high target price ratios are generally associated with a high likelihood of receiving strong recommendations in Initial public offerings.

There are few studies regarding market price reaction to analysts' near term bias. My essay narrows this gap in the context of mergers and acquisitions. In an informationally efficient market, the unexpected earnings surprise led by merger and acquisition transaction characteristics such as valuation ratios and means of payment should lead to an immediate short window stock price reaction. My dissertation examines the impact of M&A transactions characteristics on analysts' near term biases based upon

realized forecast error. I then examine how analysts' near term biases are affected by the stock valuation ratio. This dissertation extends the literature regarding analyst forecast inefficiency by highlighting the importance of the analyst forecast timing as well as the magnitude of analysts' reactions to stock valuation ratio with regard to merger means of payment. Previous literature regarding analyst forecast inefficiency mainly discusses the analyst underreaction in magnitude by testing the serial correlation in analyst forecast errors. Abarbanell and Bernard [19] show that the underreactions in analysts' forecasts explain at most half magnitude of post earnings announcement drifts. My empirical findings suggest analysts react to the stock valuation ratio instantaneously, and the magnitude of analysts' reaction toward stock valuation ratio vary with the merger means of payment.

Chapter 3 Merger Means of Payment and Analyst Forecast Bias before Merger Announcement Date

3.1 Introduction

Investment banks' major sources of income are generated from corporate financing, brokerage services, and proprietary trading. Corporate financing involves securities issuance and merger advisory services. Brokerage services involve equity research and analyst forecasting and stock recommendations. When a corporate finance division tries to complete a merger or acquisition for an acquirer, its incentive is to avoid acquirer earnings disappointments before the merger announcement. However, a brokerage service division provides a timely and presumably unbiased estimate. These two objectives conflict when a single investment banker's corporate finance division and brokerage service division serve the acquirer. This conflict results from the compensation structure of analysts. According to Raghavan [20], a large portion of analyst compensation is determined by how well their research reports facilitate the corporate financing business. Conflicts of interest may lead analysts to bias downward their estimates of acquirers to avoid earnings disappointment and generate positive earnings surprises prior to the merger announcement.

This paper examines whether analysts bias their opinions to create positive earnings surprises for acquirers in cash only (pure stock) transactions on the earnings announcement date within 60 days window prior to the merger announcement date. I believe this examination will help to understand analyst conflict of interest impacts on analysts' short-term behavior prior to the merger announcement. My research

complements Michaely and Womack[2]s' analyst conflict of interest hypothesis, suggesting analyst's earnings forecasts promptly before the merger announcement are influenced by their desire to help their investment banking clients to complete an acquisition.

Kolasinski and Kothari [8] finds merger and acquisition (M&A) relations have an insignificant impact on analysts' objectivity with respect to near term earnings forecast. However, I find merger means of payment has significant impact on analysts' near term earnings forecast bias right before the merger announcement date. My empirical result is different from Kolasinski and Kothari [8] because I focus on the near term analyst forecast bias within 60 days prior to the merger announcement. Kolasinski and Kothari [8] focus on the near term analyst forecast within 90 days of the merger announcement. This 90-day may include days followig the merger announcement. I argue that analysts' conflicts of interest appear prior to the merger announcement. In order to complete the merger, there will be added pressure to avoid earnings disappointment for acquirer stocks immediately in advance of the merger announcement. Both investment bank corporate finance managers and analysts face urgency to facilitate moderate expectations of acquirer stocks prior to the merger announcement. Analysts are more likely to lower their near term earnings forecast and trigger a positive earnings surprise for acquirer stocks on the earnings announcement date prior to the merger announcement date. This forecast bias will be more likely to help corporate finance division to win the M&A advisory business prior to the merger announcement date as well as help analysts receive greater compensation. However their economic motivation to lower near term forecast will disappear soon after the merger

announcement because the acquirer will find its M&A advisor prior to the merger announcement date.

I find that analysts' predisposition to create a positive surprise on the earnings announcement date within 60 days prior to the merger announcement is likely to be more pronounced for cash only acquirers than pure stock acquirers. This is because cash only acquirers may engage more frequently in mergers and acquisitions than pure stock acquirers. This in turn is due to the fact that cash only transaction value is often much less than pure stock deal value. As a result, analysts and investment bank corporate finance managers have greater economic incentives to avoid earnings disappointment for cash only deal acquirers than for pure stock deal acquirers within 60 days prior to the merger announcement. In addition, I provide results for the sample partitioned into cash only deal acquirers and pure stock deal acquirers. My results show that a higher positive earnings surprise affects cash only acquirers compared to stock transaction acquirers in this 60-day window.

Prior research documents similar empirical evidence. Thiagarajan and Walther [10] find that managers are selective in disclosing pre-announcement earnings information to analysts, leading analysts to issue pessimistic forecasts. Matsumoto [21] states that because of managers' increasing manipulation of earnings and forecasts, analysts were led to issue more frequent pessimistic forecasts. Richardson, Teoh and Wysocki [13] show that managers lead analysts to issue pessimistic near term forecasts prior to the earnings announcement date to benefits the firm's new equity issuance and insider sale of equity through a positive earnings surprise. My research distinguishes from previous research in hypothesizing that analysts' near term forecast bias results from the

analysts' affiliation with their investment banking M&A advisor. However, I find analyst affiliation has little impact on their near term forecast bias in a 60-day window prior to the merger announcement date, when the acquisition occurs within 60 days after the earnings announcement date. This empirical finding complements Kolasinski and Kothari [8] in that analyst conflict of interest has no significant impact on near term analysts' forecast bias.

3.2 Motivation and Hypothesis Development

In the past two decades, researchers have studied extensively analysts' biases given the potential impact of analyst conflicts of interest. Most analyst conflict of interest research has concentrated in the investment banking corporate division with underwriting of Initial Public Offerings (IPO) and Seasoned Equity Offerings (SEO). Underwriting fees are usually tied to the transaction value of those equity offerings. According to Juergens [5], part of analysts' compensation comes from a portion of aggregate investment banking fees and brokerage commissions' fees. Michaely and Womack [2] examine the analysts' conflict of interest in the context of IPOs. They find that analysts affiliated with their investment bank corporate divisions will be more likely to issue pessimistic earnings forecasts toward those IPO firms which have a business relationship with investment bank corporate divisions. In addition, Dugar and Nathan [6] examine the analysts' conflict of interest in the context of SEOs. They find analysts affiliated with their investment bank corporate divisions issue optimistic recommendation toward those SEO firms which have a business relationship with investment bank corporate divisions. Lin and McNichols [7] state that co-underwriter analysts tend to issue more favorable long term growth forecasts and recommendations toward firms of

underwriting brokerage firms than analysts without affiliation of underwriting brokerage house. Michaely and Womack[2] find that within two months of the IPO date, co-underwriter analysts issue much more frequent buy recommendations toward IPO clients of underwriting brokerage firms than analysts without affiliation of underwriting brokerage firms.

However, there is little research about analysts' biases under the impact of analysts' conflict of interest in the area of corporate control. Because (M&A) advisory activities have a very different fee structure from underwriting activities, many M&A advisory fees are composed of a flat fee plus a contingent fee that depends on the completion of the M&A. Interestingly, advisory fees are negotiated prior to the merger announcement. But the underwriting fee is based solely on the value of transaction or the value of underwriting IPO or SEO. Therefore, to help gain higher M&A advisory fees, analysts are motivated to exhibit bias that facilitates the completion of the acquisition rather than maximizing transaction value. According to Juergens [5], analysts affiliated with an M&A advisor will give pessimistic earnings forecasts toward acquirers around merger in order to complete the deal. Rhodes-Kropf et al. [22] show that an acquirer uses stock as acquisition currency and the higher acquirer stock value prior to the merger, the more it is likely the success of the acquisition. Therefore, I suspect that analysts will be more likely to issue a positive bias toward their affiliated M&A advisory clients around the merger announcement date. Analyst bias can take two forms. The first is through analyst recommendation. Analysts issue favorable recommendations toward their affiliated M&A advisory clients around the merger announcement. For example, Kolasinski and Kothari [8] find that find that analysts affiliated with an M&A advisor that

work alongside with acquirer will be more likely to upgrade their recommendation for acquirer stock around the merger announcement date.

The second form is through analyst forecasts. Little research has been done in this field. According to Chan et al. [23], analysts tend to issue a near term pessimistic forecast over the stocks that they have affiliations with prior to the earnings announcement in order to help avoid earnings disappointment. Similarly, according to Louis [24], to help bidders look attractive to target firms and win the bid before the merger announcement date, the bidder stock price needs to be raised. Driven by the economic interests, M&A advisors will pressure their affiliated analysts to issue a near term pessimistic earnings forecast toward their bidder clients in order to generate a positive acquirer stock earnings surprise on the earnings announcement date that falls into a short time frame prior to the merger announcement date. This behavior is consistent with their purpose in increasing the acquirer stock price prior to the merger announcement date and facilitating M&A deal completion. Richardson, Teoh and Wysocki [13] provide ah good estimated time window on behaviors before earnings announcement. They argue that net insider stock sales within 20 day period after the earnings announcement has a significant positive impact on guiding analysts to issue a pessimistic near term forecast prior to the earnings announcement date. Ivkovic and Jegadeesh [25] offer good time frame guidance between the actual earnings announcement date and the merger announcement date. They state that there are on average 63 trading days between two consecutive earnings announcement dates. I also exclude a 3-day price drift window after earnings announcement date. Therefore, I choose the earnings announcement date that falls into a 60 day window prior to the merger announcement date. Based on

research conducted on the two forms of analyst bias, my first hypothesis is that analysts will be more likely to issue near term pessimistic forecast in order to generate a positive earnings surprise at the actual earnings announcement date which falls into a 60 day period before the merger announcement date. In addition, cash only acquirers may engage more frequently in mergers and acquisitions than pure stock acquirers due to the fact that cash only transaction value is often much smaller than pure stock transaction value. Therefore, analysts will have a greater economic incentive to bias cash only acquirer stock than pure stock acquirer stock. According to Betton, Eckbo and Thorburn [26] the probability of M&A completion is higher when the initial bidder has a toehold in the target and when the initial bid is all-cash instead of pure stock. Driven by the economic interests, M&A advisors will be more likely pressure their affiliated analysts to issue more pessimistic earnings forecasts toward cash only acquirers than pure stock acquirers. Therefore, cash transactions have a higher probability completion than pure stock transactions. Therefore, my second hypothesis is that analysts predisposition to attempt to cause a positive surprise on the earnings announcement date within 60 days prior to the merger announcement is likely to be more pronounced for cash only acquirers than pure stock acquirers. Analyst near term forecast bias is tied to a conflict of interest. My third hypothesis is that compared to analysts without affiliation of M&A advisor, analysts affiliated with M&A advisor will be more likely to issue a more pessimistic forecast toward clients of M&A advisor prior to the earnings announcement date which is within 60 day period before the merger announcement date.

3.3 Data and Variable Description

3.3.1 M&A Deals

I obtain U.S. domestic M&A transaction data from Securities Data Corporation (SDC) Platinum for years 1993 to 2013. My sample consists of statutory mergers and acquisitions of assets. I include cash only and stock only completed unconditional deals. I exclude from my sample buybacks, acquisitions of certain assets, acquisitions of partial interest, recapitalizations, spin-offs, split-offs, exchange offers, and acquisitions of remaining interest. I require that target and acquirer are both publicly traded firms, and at least one advisor has been retained by the target or the acquirer. Finally, to make sure the merger and acquisition is a significant, I exclude those deals in which target market value is less than 5% of combined acquirer and target market value. After applying data filters, 9,609 transactions covering 6,023 unique acquirer CUSIPS are available for analysis.

3.3.2 Merging Deals with Forecast

I upload the 6,023 unique acquirer CUSIPs into I/B/E/S detail history database and select the entire database period from January 1961 to June 2014. I choose the near term quarterly EPS observation (Q(6)). This procedure yields 3,551 unique full acquirer CUSIPS out of the 6,023 original codes. I focus on analysts' near term EPS forecasts because Chan et al. [23] shows that near term EPS forecasts play an important role in capturing the analyst forecast bias prior to the merger announcement date.

3.3.3 Merging Deals with Compustat

I upload the 3,551 remaining CUSIPs into the Compustat North America database and select the entire database period from January 1961 to March 2015, collecting the

fundamental quarterly observations. This leaves 2,386 unique full acquirer CUSIPs covering 5,143 of the original 9,609 transactions.

3.3.4 Time Window Selection

I upload the sample 2,386 unique CUSIPs to obtain the final forecast sample and final compustat sample. I employ the Richardson, Teoh and Wysocki [13] sorting method to examine near term analyst forecast bias, and I select analyst forecast observations made 14 days prior to the earnings announcement date over the quarterly horizon. I calculate a consensus earnings per share (EPS) forecast for each firm using the median of individual analyst forecasts within a time window of 14 days prior to the earnings announcement date. Therefore, this consensus is a near term EPS forecast consensus. Following Gu and Wu [1], I define forecast error as actual EPS minus the 14-day consensus divided by the stock price at the beginning of the quarter. The stock price denominator is to avoid potential spurious relations resulting from cross sectional scale differences in earnings per share. A negative forecast error indicates a near term negative earnings surprise or a near term optimistic analyst's forecast before the earnings announcement. A positive forecast error indicates a near term positive earnings surprise or a near term pessimistic analyst's forecast before the earnings announcement. The following formula defines my forecast error.

$$\mathrm{FERR}_{\mathrm{jt}} = \frac{(\text{actual } \mathrm{EPS}_{\mathrm{jt}} - \text{analyst forecast consensus } \mathrm{EPS}_{\mathrm{jt}})}{\mathrm{Price}_{\mathrm{jt-1}}}$$

Where subscript j indexes the firm and t indexes the quarter. The deflator $\mathrm{Price}_{\mathrm{jt-1}}$ is the stock price for firm j at quarter t-1, and the first forecast is available in I/B/E/S detail history for firm j and quarter t. Analyst Forecast Consensus $\mathrm{EPS}_{\mathrm{jt}}$ is the median value of

all individual forecast within a time window of 14 days prior to the earnings announcement date for firm j at quarter t. I obtain the quarterly actual earnings per share actual EPS_{jt}through the I/B/E/S detail history and stock price at the beginning of the quarter Price_{jt-1} through Compustat. After merging the final compustat, final forecast, SDC database by cusip and quarter, I then select the window of the forecast date that is within 14 days prior to the earnings announcement date. There are 1,494 transactions left from the original 9,609.

Richardson, Teoh and Wysocki [13] developed a method to determine whether post earnings announcement date activity has a significant impact on the near term analyst forecast bias prior to the earnings announcement date by identifying whether this post earnings activity will occur within a short time period after the earnings announcement date. In order to examine whether near term analyst forecast bias is related to the merger activity that happened shortly after the earnings announcement date, I select a window for the merger announcement date within 60 days after the earnings announcement date. Following this window selection, 926 transactions remain, of which 642 are cash only and 284 are pure stock.

3.3.5 Analyst Affiliation

After deleting the observations that contain either an empty M&A acquirer advisor name or the M&A acquirer advisor name with “No Investment Bank Retained,” I have obtained acquirer advisor name information from SDC platinum database for 926 transactions from the original 9,609. Because the I/B/E/S academic database does not provide the broker names for each individual analyst since 2006, I use the Thomson One Investext

Research database to hand collect the broker name for each deal since this data base and I/B/E/S database come from the same provider, Thomson-Reuters. I define analyst affiliation during a time window on an individual analyst level. I select my 14-day time window between analysts' forecast date and the earnings announcement date defined in the step 3.3.4. During this time frame, if at least one analyst's contributor name in Thomson One Investext Research database matches the M&A acquirer advisor name, then there is at least one analyst affiliated with acquirer advisor. I define the analyst affiliation dummy variable to be one if there is at least one analyst affiliated with an acquirer. Otherwise, the analyst affiliation dummy is equal to zero. In most instances, the contributor name in Thomson One Investext Research database is qualitatively the same as the M&A acquirer advisor name and can be matched by sight. However, the contributor name in the Thomson One Investext base may be a subsidiary of an M&A acquirer advisor in the SDC platinum base or vice-versa and the names of the contributor and advisor bear no similarities. To solve this matching issue, I follow the Kolasinski and Kothari [8] affiliation matching method by looking up each Thomoson One Investext Research database contributor name in Hoovers online, the Directory of Corporate Affiliations, Lexis-Nexis, and corporate webpages. This search will helps to match the contributor names from Thomoson One Investext research database having subsidy or parent names that match the SDC platinum database M&A acquirer advisor name.

3.3.6 Descriptive Statistics

I define days as length between the merger announcement date and the earnings announcement date. If days value is positive, then the merger announcement date is

after the earnings announcement date. If days value is negative, then the merger announcement date is before the earnings announcement date. Figure 3.1 shows a histogram distributed by days for my 1,494 transaction sample, which is in the time window of the forecast date that is within 14 days prior to the earnings announcement date. I have observed over 90% observations fall in to a time window of the merger announcement date that is within 60 days after the earnings announcement date.

I define pure stock deal with a dummy variable equal to zero and cash only equal to one. Days is the number of days between the merger announcement date and the earnings announcement date. Figure 3.2 exhibits a general positive forecast bias toward pure stock deals in a time window of the earnings announcement date that is within 60 days before the merger announcement date. This is consistent with my prediction in my second hypothesis. In addition, I observe a general positive forecast bias toward cash only deal deals within the same time frame. Cash only deals have either strong positive bias or strong negative bias, and pure stock deals have a mild positive bias in the time frame of the earnings announcement that is within 60 days after the merger announcement. Most important, I observe that analysts form a near term forecast bias within a short time frame around the merger announcement date. This near term forecast bias is captured by the merger means of payment.

From Figure 3.2, I have divided my sample into two subgroups. The first group falls into a time frame of the merger announcement date that is within 60 days after the earnings announcement date. The second group falls into a time frame of the merger announcement date that is within 60 days prior to the earnings announcement date. I examine the mean value of forecast bias within those two groups for both pure stock

deals and cash only deals. My first null hypothesis is that analysts will be more likely to issue a near term pessimistic forecast in a time frame of the earnings announcement date that is within a 60 day period before the merger announcement date. Table 3.1 exhibits the results for t-tests for the forecast bias within the two subgroups. I define [0, 60] as the time frame of the merger announcement date that is within 60 days after the earnings announcement date. I also define [-60, 0] as the time frame of the merger announcement date that is within 60 days prior to the earnings announcement date.

As Table 3.1 shows, analysts issue a positive near term forecast bias (good news for acquirer stock) or a near term pessimistic forecast for pure stock acquirer stock in a time frame of merger announcement date within 60 days after the earnings announcement date. The positive acquirer stock price reaction toward acquirer stock around the earnings announcement will raise acquisition currency for pure stock deals and facilitate the completion of pure stock deals. This validates my prediction that analysts will be more likely to issue a near term forecast bias to facilitate the completion of merger and acquisition.

I am interested in exploring whether merger means of payment has significant influence on the near term analyst forecast bias in a short time frame of the merger announcement date within 60 days after the earnings announcement date. In addition, I am interested in examining whether the analyst affiliation has significant influence on the near term analyst forecast bias in the same time frame. Table 3.2 demonstrates the number of mergers and acquisitions by calendar year. Cash only acquirers engage more frequently in mergers and acquisitions than pure stock deal acquirers in a time window of the merger announcement date within 60 days after the earnings

announcement date. Therefore, analysts and investment bank corporate finance managers have a greater economic incentive to avoid earnings disappointments for cash only deal acquirers than for pure stock deal acquirers within 60 days prior to merger announcement, and I expect analysts to give a higher positive forecast error for cash only deals than pure stock deals for this short time window. In addition, there are no deals that meet time frame selection for the years 1993 and 1994.

Table 3.3 reveals that analysts are more likely to issue a near term negative forecasts or a near term positive forecast error toward cash only transactions than pure stock transactions in the time frame of the merger announcement date within 60 days after the earnings announcement date. This is consistent with my prediction that analysts' have a predisposition for a larger positive surprise on the earnings announcement date within 60 days prior to merger announcement for cash only than pure stock acquirers. I am interested in examining whether merger means of payment has significant influence on analysts' predispositions to positive earnings surprise within 60 days prior to the merger announcement date.

3.4 Panel Fixed Effect Analysis of Analyst Forecast Bias

In this section, I use a panel fixed effect model to analyze the short term dynamic link between merger means of payment and analyst forecast bias over the acquirer stocks in a short time window. In all cases, I compute standard errors by clustering calendar days to ensure the robustness to heteroscedasticity.

My second hypothesis is that analysts' predisposition to positive surprise on the earnings announcement date within 60 days prior to merger announcement is likely to

be larger for cash only than pure stock acquirers. My hypothesis focuses on the relation between merger means of payment and analyst forecast bias. Thus, I group acquirer firms by merger means of payment and compare their characteristics in table 3.4.

Table 3.4 indicates that cash only deal acquirers receive a higher positive near term mean forecast error or a more negative near term analysts' forecast than pure stock deal acquirers. This is consistent with the prediction of my second hypothesis. In addition, the cash only transaction value on average is much less than that of stock only transactions. Cash only acquirers receive more analyst coverage at the merger announcement date quarter than stock only acquirers. Analysts cast more various opinions on cash only acquirer stocks than pure stock acquirer stocks in the quarter prior to merger announcement date quarter. The difference between the merger announcement date and the earnings announcement date is smaller for cash only deals than pure stock deals. Table 3.5 presents the variables definitions.

According to Kolasinski and Kothari [8] as well as Gu and Wu[1], variables deal value, analyst coverage at current merger announcement quarter, market size and analysts previous dispersions over the acquirer stocks are key control variables for the analyst forecast bias. In addition, I project the days between the merger announcement date and the earnings announcement date to also have a significant impact on near term analyst forecast bias because the shorter the days, the higher analysts' conflict of interest. Therefore, I estimate a probit model as the following model 3.1

$$\ln(ferr_{jt}) =$$

$$constant + \beta_1 \mathrm{Dummy}_{jt} + \beta_2 \ln(\mathrm{deal}value_{jt}) + \beta_3 \ln(Size_{jt}) + \beta_4 \ln(dispersion_{jt-1}) +$$

$$\beta_5 \ln(Following_{jt}) + \beta_6 \ln(Days_{jt}) + \varepsilon_{jt} \quad (3.1)$$

Dependent variable $\ln(ferr_{jt})$ is the natural logarithm of forecast error for deal j at merger announcement quarter t. Dummy_{jt} indicates the merger means of payment for deal j at merger announcement quarter t. If the merger deal j at merger announcement quarter t is paid by cash only, then$\mathrm{Dummy}_{jt} = 1$, otherwise$\mathrm{Dummy}_{jt} = 0$. $\ln(\mathrm{deal}value_{jt})$ is the natural logarithm of deal transaction value for deal j at merger announcement quarter t, including all cash, securities, and assumed debt on the deal announcement date. $\ln(dispersion_{jt-1})$ measures the natural logarithm of analysts' forecast dispersion for acquirer stock j one quarter prior to merger announcement quarter t. $\ln(Size_{jt})$ measures the natural logarithm of the nominal market capitalization of acquirer stock j on merger announcement quarter t. $\ln(Following_{jt})$ is the number of analysts issuing forecast about acquirer stock j at merger announcement quarter t. $Days_{jt}$ is the number of days between the merger announcement date and the latest earnings announcement date prior to the merger announcement date and ε_{jt} is the time series cross sectional error term.

Table 3.6 reports the panel fixed effect test for the cross sectional determinants of forecast error to evaluate the influence of merger means of payment on the forecast error. I test my second hypothesis examining the significance of the corresponding dummy variable. The significant positive dummy variable coefficient shown in table 3.6, suggests analysts' predisposition to positive surprise on the earnings announcement

date within 60 days prior to merger announcement is likely to be more pronounced for cash only than pure stock acquirers. This validates my second hypothesis.

My third hypothesis is that compared to analysts without affiliation to an M&A advisor, analysts affiliated with an M&A advisor will be more likely to issue a more pessimistic forecast toward clients of an M&A advisor prior to the earnings announcement date within a 60 day period before the merger announcement date. I specify model 3.2 and model 3.3 to examine my third hypothesis,

$$\ln(ferr_{jt}) = constant + \beta_1 \text{Dummy}_{jt} + \beta_2 Affiliation\text{dummy}_{jt} + \beta_3 \ln(\text{deal}value_{jt}) + \beta_4 \ln(Size_{jt}) + \beta_5 \ln(dispersion_{jt-1}) + \beta_6 \ln(Following_{jt}) + \beta_7 \ln(Days_{jt}) + \varepsilon_{jt} \quad (3.2)$$

$$\ln(ferr_{jt}) = constant + \beta_1 \text{Dummy}_{jt} + \beta_2 Affiliation\text{dummy}_{jt} + \beta_3 \text{Dummy}_{jt} \times Affiliation\text{dummy}_{jt} + \beta_4 \ln(\text{deal}value_{jt}) + \beta_5 \ln(Size_{jt}) + \beta_6 \ln(predispersion_{jt}) + \beta_7 \ln(Following_{jt}) + \beta_8 \ln(Days_{jt}) + \varepsilon_{jt} \quad (3.3)$$

All Variables are defined in model 3.1 except $Affiliation\text{dummy}_{jt}$. $Affiliation\text{dummy}_{jt}$ indicates analysts' affiliation with acquirers' M&A advisor for deal j at merger announcement quarter t. If there is at least one analyst affiliated with acquirers' M&A advisor in the time frame between analysts' forecast date and the merger announcement date for deal j at merger announcement quarter t, then $Affiliation\text{dummy}_{jt} = 1$, otherwise$Affiliation\text{dummy}_{jt} = 0$.

Table 3.7 reports the panel fixed effect test for the cross sectional determinants of forecast error to evaluate the influence of analysts' affiliation with acquirer M&A advisor on the forecast error. To examine my third hypothesis, I am testing whether or not coefficient estimates of affiliation dummy variable is significantly different from zero.

Model 3.2 and 3.3 coefficient estimates suggest that analysts' affiliation with acquirer M&A advisor has no significant impact on near term analysts' forecast bias. I am not able to reject the null with respect to my third hypothesis.

3.5 Event Study and Instrumental Analysis of Cumulative abnormal Return

Tables 3.6 and 3.7 disclose that compared to pure stock transactions, cash only transactions lead analysts to issue near term forecast biases that generate a more pronounced positive earnings surprise toward acquirer stocks on the earnings announcement date within 60 days prior to the merger announcement date. I am interested in examining whether this near term forecast bias caused by different merger means of payment will be reflected in a short term market reaction. Therefore, I conduct an event study to examine the short term cumulative abnormal return of cash only deal and that of pure stock deals separately within three days window of the earnings announcement date, which is within a 60 day period prior to the merger announcement date.

To better measure the short term abnormal return, I employ the common technique of calculating cumulative abnormal return relative to a beta benchmark. To calculate abnormal returns based on market beta, I use the procedures documented in Boehmer et al [27]. According to Mitchel et al. [4], to disentangle price pressure and information effects, I use a 3 day cumulative abnormal return around the deal announcement date t. To be consistent with Mitchel et al. [4], market model parameters are estimated over a 150 day window beginning 21 days after the deal announcement date, where value

weighted CRSP included dividends index proxies for market portfolio. After a deal announcement date for acquirer stock j, I compute 3 day buy-and-hold abnormal returns $ABR_i(t-1, t+1)$ as model 3.4

$$ABR_i(t-1, t+1) = \prod_{\tau=t-1}^{t+1}\left(1 + R_{i,\tau}\right) - \prod_{\tau=t+21}^{t+171}(1 + R_{m,\tau})$$

$$CAR_i(t-1, t+1) = \sum_{t-1}^{t+1} average(ABR_i) \quad (3.4)$$

Where $R_{i,\tau}$ and $R_{m,\tau}$ are the return on acquirer stock j and the value-weighted index return, respectively.

Specifically, I choose [-1 1] or from one day prior to one day after the deal announcement date for the event window. I choose [21 171] or from 21 days to 171 days after the deal announcement date as my market estimation window. Market portfolio returns are collected from value weighted CRSP including dividends index returns from CRSP. These returns within [21 171] are then used as benchmarks to calculate the abnormal performance. Abnormal returns are calculated for each firm relative to its beta benchmark in [-1 1] time frame. Cumulative abnormal returns are calculated by averaging across acquirer firms every day and then summing those averages over time.

Table 3.8 reports cumulative abnormal returns for cash only deals and pure stock deals within a 3 days window of the earnings announcement date [-1 1] whereas the earnings announcement date is within 60 days prior to the merger announcement date. A 3-day window can disentangle the merger means of payment impact on short term abnormal return of acquirer stocks from other impacts. As presented in table 3.8, I can clearly see

cash only deals deliver a significant positive cumulative abnormal return, or 0.71% for acquirer stocks, and pure stock deals deliver an insignificant positive cumulative abnormal return, or 0.43% for acquirer stocks. This finding validates my second hypothesis that analysts' predisposition to positive surprise is likely to be more pronounced for cash only deal acquirer stocks than pure stock acquirer stocks on an earnings announcement date within 60 days prior to the merger announcement date. The market immediately adjusts to this near term forecast bias difference in various means of merger payment. The cumulative abnormal return difference reflects that a positive market price reaction toward acquirer stock j is more pronounced for cash only deals than pure stock deals in this specific time frame mentioned above.

3.6 Conclusions

Analysts appear more likely to issue near term pessimistic forecasts or generate a positive earnings surprise around an earnings announcement date within a 60-day period before the merger announcement date. Analysts' predisposition to generate positive surprises on an earnings announcement date within a 60-day window prior to a merger announcement is likely to be more pronounced for cash only acquirers than pure stock acquirers. This significant merger means of payment impact on near term forecast bias translates into 0.71% cumulative abnormal return for cash only acquirer stock while it is 0.43% for pure stock acquirer stock in a three day window around the earnings announcement date within 60 days prior to the merger announcement date. Finally, analysts' affiliation with acquirer M&A advisor has no significant impact on the near term forecast bias in a time frame of the earnings announcement date that is within a 60 day period before the merger announcement date.

Figure 3.1
Historical Distribution of Final Sample

Figure 3.1 demonstrates a histogram distributed by days for my 1,494 deals sample, which is in the time window of the forecast date that is within 14 days prior to the earnings announcement date. The variable Days is the number of days between the merger announcement date and the earnings announcement date.

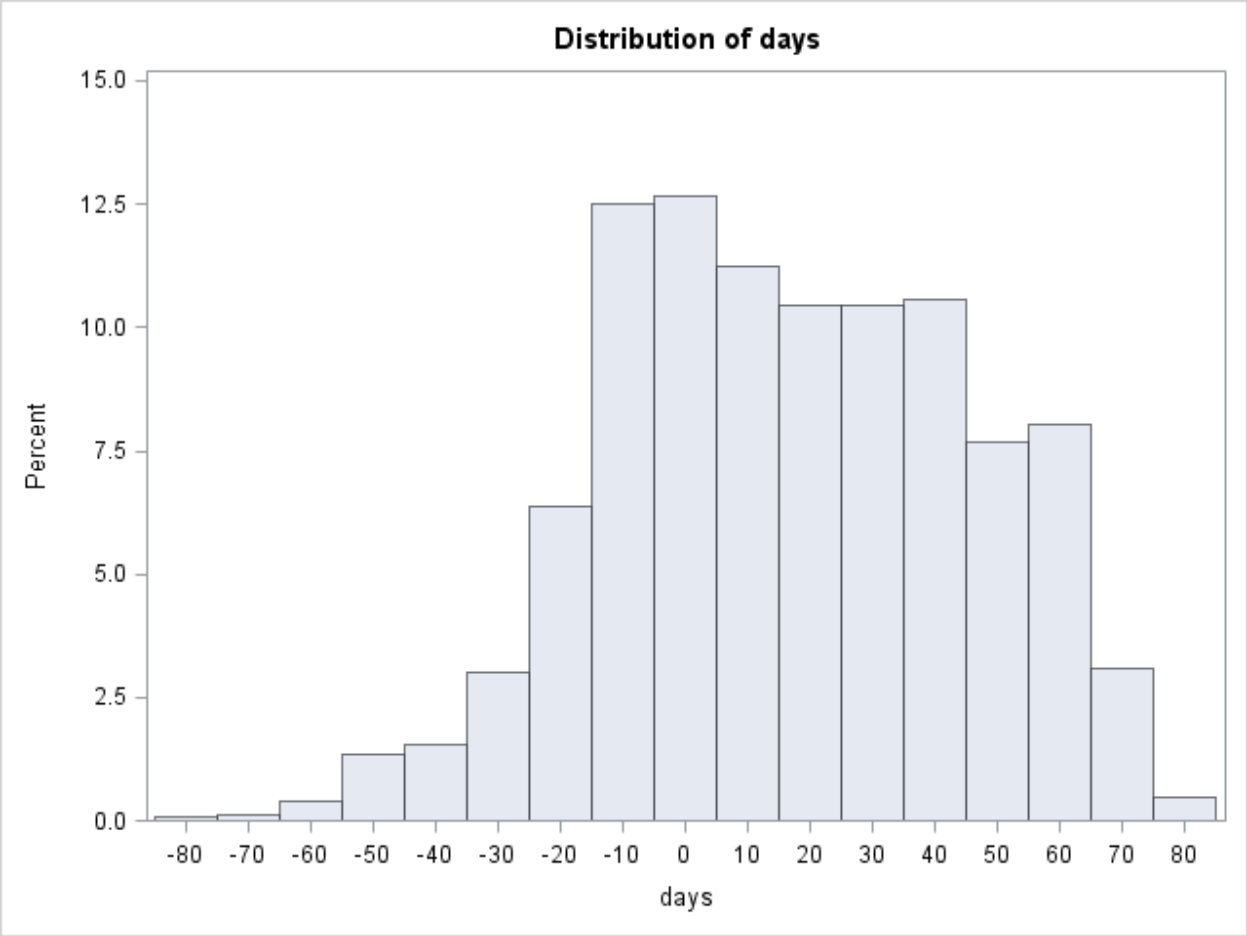


Figure 3.1 Historical Distribution of Final Sample

Figure 3.2
Near Term Forecast Bias around the Merger Announcement Date

Figure 3.2 reveals a near term forecast bias by two payment methods in a time window of the earnings announcement date that is within 60 days before merger announcement date. The red line is the realized forecast errors for cash only payment. The blue line is the realized forecast errors for pure stock payment. The realized forecast error is the difference between actual earnings and forecast scaled by the previous quarter stock price. The variable "Days" represents the number of days between the merger announcement date and the earnings announcement date.

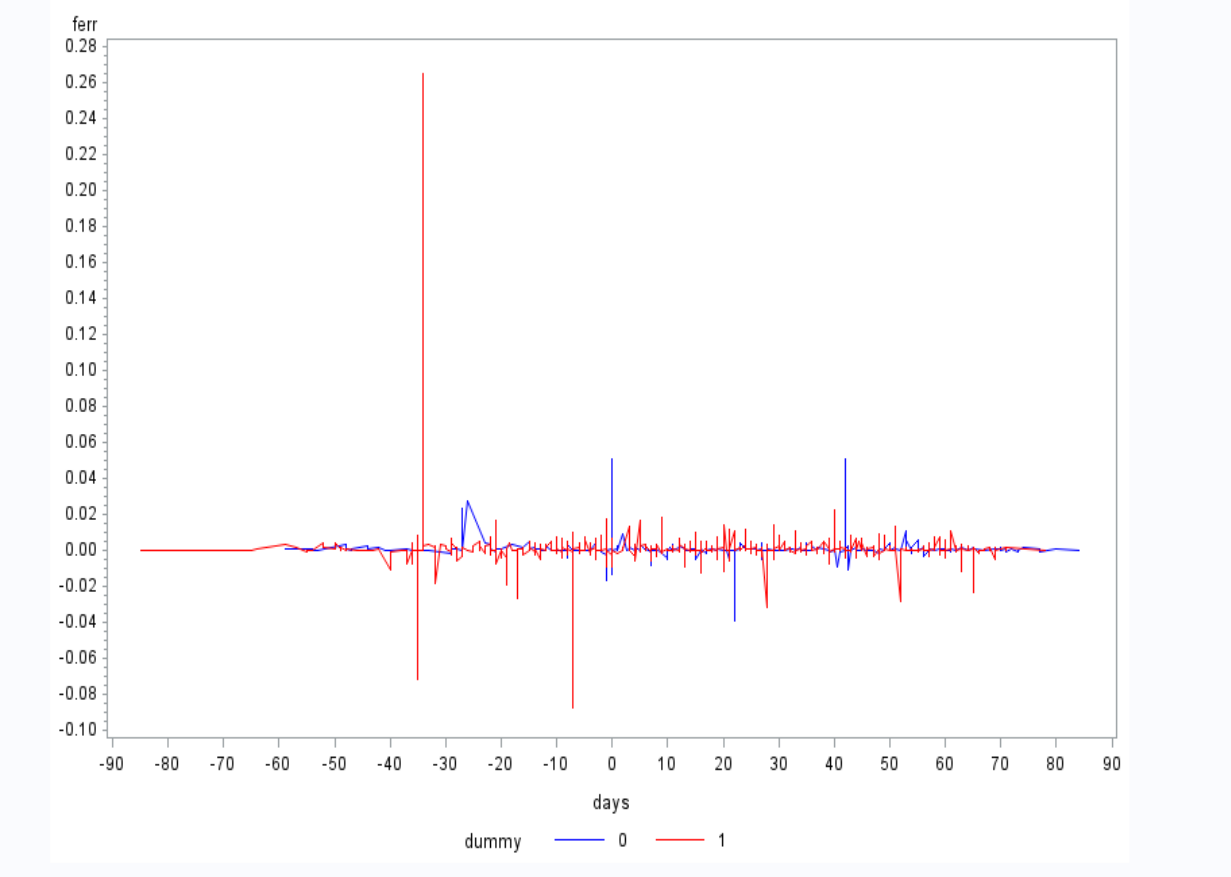


Figure 3.2 Near Term Forecast Bias around the Merger Announcement Date

Table 3.1
Forecast Biases around the Merger Announcement Date

Table 3.1 presents the near term analyst forecast bias by two different payment methods around merger announcement. I use realized forecast errors to represent my near term forecast analyst forecast bias. The realized forecast error is the difference between actual earnings and forecast scaled by the previous quarter stock price. [-60 0] indicates the earnings announcement date fall within a 60 day window before the merger announcement date. [0 60] indicates the earnings announcement date fall within a 60 day window after the merger announcement date. Mean indicates the average value of realized forecast errors for this subgroup.

	[-60 0]	[0 60]
Cash Only Deal:		
Observations	381	639
Mean	0.00066	0.00076
Std Error	(0.00078)	(0.00014)***
Pure Stock Deal:		
Observations	144	283
Mean	0.000921	0.00056
Std Error	(0.00050)*	(0.00032)*

Table 3.1 Forecast Biases around the Merger Announcement Date

Notes: *** indicates standard error is significant at 1% significance level
** indicates standard error is significant at 5% significance level
* indicates standard error is significant at 10% significance level

Table 3.2
Number of Merger and Acquisitions by Calendar Year

Table 3.2 presents the number of Merger and Acquisitions by calendar year and the mean value of forecasts errors for all deals by calendar year. My sample is selected from the year 1993 to 2013. However, my criteria is limited to the period in which an earnings announcement date falls within a 60 day window before the merger announcement date, there are no deals meeting the conditions in year 1993 and year 1994 because of the limited criteria. Therefore, my sample starts from year 1995 until 2013.

Year	Number of Cash Deals	Number of Pure Stock Deals	Total Number of All Deals	Mean Value of Forecast Error for All Deals
1995	19	29	48	0.00006
1996	27	27	54	0.00019
1997	36	37	73	0.00052
1998	29	46	75	-0.00017
1999	18	30	48	0.00037
2000	18	42	60	-0.00022
2001	20	12	32	0.00018
2002	34	11	45	0.00019
2003	45	4	49	0.00072
2004	47	8	55	0.00061
2005	30	6	36	-0.00002
2006	44	6	50	0.00114
2007	39	3	42	0.00073
2008	33	5	38	0.00248
2009	28	3	31	0.00328
2010	53	5	58	0.00199
2011	33	3	36	0.00117
2012	49	3	52	0.00054
2013	37	3	40	0.00119
Total	642	284	926	

Table 3.2 Number of Merger and Acquisitions by Calendar Year

Table 3.3
Analysts' Realized Forecast Errors

Table 3.3 presents the analysts' realized forecast errors on my final sample within a 60 day window prior to the merger announcement date. I present realized forecast errors in percentage of all observations in positive, percentage of all observations in zero, and percentage of all observations in negative. The table is divided into final sample, cash only, and pure stocks groups. The positive realized forecast errors indicate pessimistic analyst forecast bias in the stated time frame. The negative realized forecast errors indicate optimistic analyst forecast bias in the stated time frame.

	N	% Positive	% Zero	% Negative
Final Sample	926	63.50%	16.31%	20.19%
Cash Only	642	64.17%	15.73%	20.10%
Pure Stocks	284	61.97%	17.61%	20.42%

Table 3.3 Analysts' Realized Forecast Errors

Table 3.4
Descriptive Statistics

Table 3.4 presents the descriptive statistics for firms with cash only payment and pure stock payment within a 60 day window prior to the merger announcement date. The data set is a pooled time-series cross-sectional sample of 926 firm-quarter observations for the period 1993-2013. The statistics are presented in average value for each variable.

Variable	Cash Only Deals(Dummy=1)	Pure Stock Deals (Dummy=0)
$ferr_{jt}$	0.00076	0.00056
	(0.00014)***	(0.00032)*
$\text{deal}value_{jt}$	652.43118	2124.84567
	(56.44012)***	(501.97301)***
$Size_{jt}$	15200.20680	13240.89210
	(1421.36432)***	(1886.40459)***
$Following_{jt}$	2.53271	2.17606
	(0.09254)***	(0.11695)***
$dispersion_{jt-1}$	0.03070	0.01975
	(0.00451)***	(0.00279)***
$Days_{jt}$	27.01947	28.02113
	(0.68004)***	(1.10758)***

Table 3.4 Descriptive Statistics

Notes: *** indicates standard error is significant at 1% significance level
** indicates standard error is significant at 5% significance level
* indicates standard error is significant at 10% significance level

Table 3.5
Variable Definitions

Table 3.5 presents the definitions of variables in the empirical tests conducted in models 3.1, 3.2 and 3.3. Those variables include $ferr_{jt}$, Dummy_{jt} , $\text{deal}value_{jt}$, $Size_{jt}$, $Following_{jt}$, $dispersion_{jt-1}$, $Days_{jt}$ and$\text{Affiliationdummy}_{\text{jt}}$. Those variables are all firm level variables. All variables are obtained from the Securities Data Company Platinum (SDC Platinum), Center for Research in Securities (CRSP), Institutional Brokers Estimate System (I/B/E/S) and Standard & Poor's COMPUSTAT databases.

$ferr_{jt}$	Forecast error defined as actual EPS minus the14 day median of analysts' forecast EPS divided by the stock price at the beginning of the quarter. A negative forecast error indicates a near term negative earnings surprise or a near term optimistic analysts' forecasts before the earnings announcement. A positive forecast error indicates a near term positive earnings surprise or a near term pessimistic analysts' forecasts before the earnings announcement.
Dummy_{jt}	If Dummy=1, then it is cash only deal, and if Dummy=0, then it is pure stock deal.
$\text{deal}value_{jt}$	Total nominal consideration the acquirer paid for the transaction.
$Size_{jt}$	Nominal market capitalization of the acquirer on the merger announcement date.
$Following_{jt}$	Number of analysts issuing forecast about the acquirer in the same deal announcement calendar quarter.
$dispersion_{jt-1}$	Analysts' forecast dispersion about the acquirer stock a quarter prior to the merger announcement date.
$Days_{jt}$	Number of days between the merger announcement and the earnings announcement date.
$\text{Affiliationdummy}_{jt}$	Affilationdummy=1 then it is analyst's research department is affiliated with M&A advisor and Dummy=0 then analyst's research department is not affiliated with M&A advisor.

Table 3.5 Variable Definitions

Table 3.6
Merger Means of Payment on Analyst Forecast Bias

Table 3.6 presents the regression of natural logarithm of analyst forecast error on the merger means of payment in a time window of the earnings announcement that is within 60 days prior to the merger announcement date. The data set is a pooled time-series cross-sectional sample of 926 firm quarter forecast observations for period 1993-2013.

Dependent Variable: $\ln(ferr_{jt})$	Model:3.1
Constant	-2.951
	(0.533)***
Dummy_{jt}	0.359
	(0.160)**
$\ln(\text{deal}value_{jt})$	0.091
	(0.045)**
$\ln(Size_{jt})$	-0.195
	(-0.057)***
$\ln(dispersion_{jt-1})$	0.64
	(0.060)***
$\ln(Following_{jt})$	0.049
	(0.139)
$\ln(Days_{jt})$	-0.192
	(-0.078)***

Table 3.6 Merger Means of Payment on Analyst Forecast Bias

Notes: *** indicates standard error is significant at 1% significance level
** indicates standard error is significant at 5% significance level
* indicates standard error is significant at 10% significance level

Table 3.7

Analysts' Affiliation on Analyst Forecast Bias

Table 3.7 presents the regression of natural logarithm of analyst forecast error on the analysts' affiliation in a time window of an earnings announcement that is within 60 days prior to the merger announcement date. The data set is a pooled time-series cross-sectional sample of 602 firm quarter forecast observations for period 1993-2013.

Dependent Variable:$\ln(ferr_{jt})$	Model:3.2	Model:3.3
Constant	-2.935	-3.005
	(0.734)***	(0.738)***
Dummy_{jt}	0.528	0.686
	(0.206)**	(0.271)***
$Affiliation\text{dummy}_{jt}$	0.041	0.361
	(0.168)	(0.356)
$\text{Dummy}_{jt} \times Affiliation\text{dummy}_{jt}$		-0.425
		(0.413)
$\ln(\text{deal}value_{jt})$	0.098	0.105
	(0.067)	(0.067)
$\ln(Size_{it})$	-0.219	-0.236
	(-0.080)***	(-0.081)***
$\ln(dispersion_{jt-1})$	0.653	0.641
	(0.085)***	(0.086)***
$\ln(Following_{jt})$	-0.032	-0.019
	(0.157)	(0.158)
$\ln(Days_{jt})$	-0.163	-0.161
	(0.109)	(0.110)

Table 3.7 Analysts' Affiliation on Analyst Forecast Bias

Notes: *** indicates standard error is significant at 1% significance level
** indicates standard error is significant at 5% significance level
* indicates standard error is significant at 10% significance level

Table 3.8
Cumulative Abnormal Returns around the Earnings Announcement Date

Table 3.8 reports cumulative abnormal returns for cash only deals and pure stock deals within a three days window of the earnings announcement date [-1 1]. There are 642 cash only deals and 284 pure stock deals reported in this test.

Period	Cash only (N=642)	Stocks (N=284)
[−1 1]	0.71%	0.43%
	(2.54)**	(0.92)

Table 3.8 Cumulative Abnormal Returns around the Earnings Announcement Date

Notes: *** indicates standard error is significant at 1% significance level
** indicates standard error is significant at 5% significance level
* indicates standard error is significant at 10% significance level

Chapter 4 Merger Means of Payment and Analyst Recommendation Change

4.1 Introduction

Loughran and Vijh [28] find that acquirers earn a significant positive long run abnormal return following cash financed merger transactions. Acquirers earn significant negative long run abnormal returns following stock financed merger transactions. Rau and Vermaelen [29] and Agrawal and Jaffe [30], support Loughran and Vijh's results by finding the same patterns of returns for acquirer stocks in cash tender offers and stock only mergees after controlling for the size and book-to-market factors per Fama and French [31]. Shleifer and Vishny [3] developed a simple model of acquisition to support the empirical evidence described above. They advance the means of payment hypothesis' two conditions: (1) From the acquiring firm managers' perspective, if the acquirer stock is overpriced over the long run, then the acquirer will finance acquisition with stock; (2) if the acquirer stock is undervalued over the long run, then the acquirer will finance acquisition with cash. This hypothesis indicates why the pure stock merger earns the acquirer a negative abnormal return over the long run, but the cash only merger earns the acquirer a positive abnormal return over the long run.

As I have seen, merger means of payment has a significant impact on acquirer stock abnormal returns over the long run, leading us to the question of whether analyst recommendation changes regarding acquirer stocks would cause differential reactions to cash versus stock financed acquisitions.

This chapter provides evidence concerning the question of whether means of payment will create short term mispricing opportunities through differential impacts from analyst recommendation changes. My answer provides an extension to the merger means of payment hypothesis by Shleifer and Vishny [3]. Cash financing is more likely than stock financing to be associated with analyst upgrades on acquirer stocks in the short run. The market reacts immediately to this difference, resulting in a significant positive cumulative abnormal return for acquirer stocks in cash only acquisitions and a significant negative cumulative abnormal return for acquirer stocks in pure stock acquisitions. My empirical finding complements Mitchel et al. [4] who find that merger arbitrage short selling causes short run downward price pressure for acquirer in stock financed mergers around the merger announcement period. I show that the cash only payment (pure stock payment) impact from analyst recommendation changes for acquirer stock is a 1.06% (-1.05%) cumulative abnormal return during the three day window around the merger announcement, suggesting a positive (negative) analyst recommendation change for a cash only (pure stock) acquirer creates upward (downward) price pressure on acquirer stocks around the merger announcement date.

Two scenarios can occur in this analysis: (1) If analysts capture a cash only payment that creates a positive long run value for acquirer stocks, then they will upgrade acquirer stocks with cash only payment once deal announcement is made. (2) If the analyst captures pure stock payment that delivers a long run negative value for acquirer stocks, then they will downgrade acquirer stocks with pure stock payment once deal announcement is made. Therefore, I will observe that cash only payment compared to pure stock payment will more likely lead analysts to upgrade acquirer stocks. If analyst

recommendation upgrade represents favorable news for acquirer stocks, I would expect market will respond to analyst recommendation upgrade leading to a higher cumulative abnormal return for acquirer stocks with cash only payment than those for acquirer stocks with pure stock payment.

Merging data from the Securities Data Corporation (SDC) platinum US domestic Merger and Acquisitions data with data from the Institutional Brokers' Estimate System (I/B/E/S) analyst recommendation consensus and also with data from the Center for Research in Security Prices (CRSP)' equity variables and COMPUSTAT accounting data, I document a significant likelihood for increase of analyst recommendation upgrade on acquirer stocks given cash financing. In addition, I document significant positive cumulative abnormal returns for acquirer stocks around the acquisition announcement and show that this positive cumulative abnormal return is increasing in the degree of the analyst recommendation upgrade. Stickel [32] and Womack [3], show that stock prices drift away from their fundamental value after recommendation and earnings forecast changes. Motivated by this explanation, I examine event abnormal returns. I find that merger means of payment contains information about future abnormal returns beyond that which is conveyed in previous recommendations for acquirer stocks. Evidence in this paper shows that acquirer stock prices tend to drift away from their fundamental values after analyst recommendation changes, driven by the means of payment. This finding reinforces the belief that merger means of payment contains valuable information.

Further evidence on the link between analyst recommendation change and the merger means of payment is provided by a probit model analysis of the short term co-

movement of the two. According to the merger means of payment hypothesis, merger means of payment gives information about acquirers' expectation regarding the future stock price. Subsequently I argue that means of payment may be linked to underlying fundamental value of the acquirer, and it is immediately reflected by the change of analyst recommendation I/B/E/S score. Therefore, the merger means of payment is more likely to play an important role in influencing the change of analyst recommendation I/B/E/S score. Finally I examine the short term dynamics that links the merger means of payment with the change of analyst recommendation I/B/E/S score.

The paper proceeds as follows: Section 4.2 describes the data. Section 4.3 describes the probit model to examine the short term co-movement of merger means of payment and analyst recommendation change. Section 4.4 describes a 3-day window event study for the merger means of payment and a 2SLS instrumental variable analysis of the short term cumulative abnormal returns associated with analyst recommendation change. I offer my conclusions in section 4.5.

4.2 Data and Variable Descriptions

4.2.1 M&A Deals

I obtain U.S. domestic M&A transaction data from Securities Data Corporation (SDC) Platinum for years 1993 to 2013. I follow Kolasinski and Kothari [8] to select my data. My sample consists of statutory mergers and acquisitions of assets. I include cash only, pure stock, and cash & stock combination transactions that are completed and unconditional in my sample. I exclude from my sample buybacks, acquisitions of certain assets, acquisitions of partial interest, recapitalizations, spin-offs, split-offs, exchange offers and acquisitions of remaining interest. I require both target and acquirer to be publicly traded firms, and at least one advisor has been retained by the target or the acquirer. Finally, ensure that the merger or acquisition is a significant; I exclude those deals whose target market value was less than 5% of the combined acquirer and target market value. After applying all these criteria, I analyze 11,863 transactions.

4.2.2 Merging deals with CRSP

To obtain the full 9 digit CUSIPs for the acquirer stocks, I start by obtaining 6,973 NCUSIPs of acquirer stocks from the 11,863 deals in the SDC platinum database. Then I use those unique NCUSIPs to merge with the CRSP monthly stock entire database which dates from December 1925 to December 2013. I obtain 3,594 unique full 9 digit acquirer stock CUSIPs which cover 8,071 of the original 11,863 transactions.

4.2.3 Merging deals with analyst recommendation changes

I upload the 3,594 unique CUSIPs into the I/B/E/S recommendation detail database and select the database period from December 1992 to June 2014. I obtain 2,751 unique full acquirer stock CUSIPSs, covering 5,978 of the original 11,863 transactions. I focus on analyst recommendation changes because Womack [3] suggested that analyst recommendation changes are economically meaningful. For each analyst, I obtain all available current analyst recommendation scores (ranged from 1 to 5, 1 indicates strong buy and 5 indicates strong sell) for acquirers issued within a 90-day time window following the M&A announcement date and take the average of those scores. Then, I obtain the latest available recommendation scores issued within a 90- day window prior to the M&A announcement date and take the average of those scores. I define a dummy variable, upgrade, equal to 1 if the current recommendation score is less than the last recommendation score and 0 if current recommendation score is greater or equal to the last recommendation score. I discard observations for which I cannot compute Upgrade due to a missing last analyst recommendation score. The resulting sample contains 5,978 recommendation changes.

4.2.4 Merging deals with analyst forecasts

I upload the 2751 unique full acquirer stock CUSIPSs from the previous step into I/B/E/S detail history database and select the entire database period from January 1970 to June 2014. I select the observations with a long term growth forecast. This yields 1,541 unique full acquirer stock CUSIPs which cover 4,028 out of 11,863 original transactions. I focus on analysts long term growth forecasts because Lin and McNichols [7] indicated that these forecasts play an important role in influencing the investment recommendation.

4.2.5 M&A descriptive statistics

Table 4.1 presents descriptive statistics on the value and number of the M&A transactions from 1993 to 2013 in the full sample as described in I A. I define the variable VALUE as the total nominal amount of consideration paid by the acquirer. The transactions are categorized into three methods of payment: cash only, pure stock and mixed cash and stocks. Stock transactions are usually larger than cash only deals. The number of cash only deals is greater than that of stocks financed deals.

Table 4.2 describes the number of acquisitions and aggregate value of all deals by calendar year. Table 4.3 describes the mean deal value of categorized payments (cash only, stocks and mixed) deals by calendar year.

Figure 4.1 shows the nominal mean deal value of the categorized payments (cash only, pure stock and mixed) by calendar year.

As I can see from Figure 4.1, mean value of cash only has a general increasing pattern over 21 years and a relative lowest volatility among three. Mean value of stocks and mean value of mixed have a relative larger volatility than mean value of cash only. Those reflect the patterns that mean value of mixed is highest among three and mean of stocks and mean of mixed have a relative larger volatility than mean of cash shown in the Table 4.1.

4.2.6 Descriptive Statistics on Analyst Recommendation and Forecast

Because I are more interested in determining whether cash only transactions are viewed more favorably than pure stock transactions with respect to analyst upgrades

within the 90-day window of M&A announcement dates, I exclude the mixed subsample. Table 4.4 present the analyst recommendation changes on my final cash and pure stock subsamples.

Table 4.4 suggests that in the final sample consisting of cash only and pure stock financing, analysts tend to upgrade acquirer stocks more often than they tend to downgrade them. In addition, it shows cash only transactions are viewed more favorably than stock financed transactions with respect to analyst recommendation upgrades within the 90-day window of M&A announcements.

4.3 Probit Analysis of Analyst Recommendation Change

I use probit analysis to examine the short term dynamic link between merger means of payment and analyst recommendation changes of acquirer stocks around the M&A announcement date. In all cases, I compute standard errors by clustering errors based on calendar month to ensure the robustness to heteroscedasticity and ensure arbitrary cross-sectional and intra-month serial correlation errors.

My first probit model tests whether cash only financing is are more likely to lead analysts to upgrade their recommendations on acquirer stocks than stock financing.

My first hypothesis is that cash only deals will more likely lead the analysts to upgrade their recommendations than is the case with stock financed transactions within a 90 day window of the M&A announcement date. According to Kolasinski and Kothari [8], relevant control variables for a model of analyst forecast change include transaction value, days between the analyst recommendation change date and the deal announcement date, analyst experience covering stocks, and market size of the

acquirer stocks. According to Luo et al. [33], analysts' previous dispersion about stock recommendations has played an important role in influencing analyst recommendation changes. Combining the key controlle variables from the analyst recommendation change literature, I specify the following probit model that I identify as model 4.1:

$$\mathrm{P}(\mathrm{upgrade}_{\mathrm{jt}}) = \beta_0 + \beta_1 \mathrm{Dummy}_{\mathrm{jt}} + \beta_2 \ln(\mathrm{value}_{\mathrm{jt}}) + \beta_3 \ln(\mathrm{dispersion}_{\mathrm{jt-1}}) + \beta_4 \ln(\mathrm{size}_{\mathrm{jt}}) + \beta_5 \ln(\mathrm{experience}_{\mathrm{jt}}) + \beta_6 \ln(\mathrm{following}_{\mathrm{jt}}) + \beta_7 \ln(\mathrm{days}_{\mathrm{jt}}) + \varepsilon_{\mathrm{jt}} \quad (4.1)$$

Variable$\mathrm{P}(\mathrm{upgrade}_{\mathrm{jt}})$ takes the value one if the analyst upgrades the acquirer stock at the M&A announcement quarter t, and zero otherwise. D_{it} is a dummy variable for acquirer stock i that takes on the value one on the M&A announcement date if the merger deal is financed cash only and zero otherwise. In addition $\mathrm{value}_{\mathrm{jt}}$ is the total nominal consideration the acquirer i paid for the transaction, including all cash, securities, and assumed debt at deal announcement quarter t.
Additionally $\mathrm{dispersion}_{\mathrm{jt-1}}$ measures the analysts' dispersion of recommendations about the acquirer stock j within 90 days prior to the deal announcement date. $\mathrm{size}_{\mathrm{jt}}$ measures the nominal market capitalization of the acquirer j at deal announcement quarter t. $\mathrm{Experience}_{\mathrm{jt}}$ is the number of years between the deal announcement date and the analyst's first recommendation date in I/B/E/S. $\mathrm{Following}_{\mathrm{jt}}$ is the number of analysts covering acquirer stock j in the same calendar month as deal announcement month. r $\mathrm{Days}_{\mathrm{jt}}$ is number of days between the date of the first recommendation date after the deal announcement and the deal announcement date. Finally $\varepsilon_{\mathrm{jt}}$ is the cross sectional error term at deal announcement quarter t. Tables 4.5 and 4.6 provide descriptive statistics and variable definitions.

Table 4.7 presents the results for model 4.1. I model the probability that an analyst will upgrade the acquirer stock recommendation within a 90-day window of the deal announcement date as a function of the merger means of payment and other controlled variables exhibited in Table 4.6.

Table 4.7 shows that compared to pure stock deals, the cash only deals will have a 2% greater chance to lead analysts to upgrade their recommendations about acquirer stocks within 90 days of the deal announcement date. This strongly indicates that the merger means of payment has a significant impact on the analyst recommendation change within 90 days of the deal announcement date. I see cash only deals viewed more favorably than pure stock deals with regard to analyst recommendation upgrades ont the acquirer stocks.

According to Kolasinski and Kothari [8], analyst recommendation change is sensitive to the length of the time between the deal announcement date and the analyst's first recommendation after the deal announcement date. It is important to examine day length impact, cash dummy impact, and their interaction impact on the analyst recommendation change. Therefore, I carry out model 4.2 to examine these impacts. Model 4.2 is identical to model 4.1 except model 4.2 includes the day dummy and interaction between day dummy and merger means of payment dummy.

$$\mathrm{P}(\mathrm{upgrade}_{\mathrm{jt}}) = \beta_0 + \beta_1 \times \mathrm{Daydummy}_{\mathrm{jt}} + \beta_2 \times \mathrm{D}_{\mathrm{it}} + \beta_3 \times (\mathrm{D}_{\mathrm{it}} \times \mathrm{Daydummy}_{\mathrm{jt}}) + \beta_4 \times \ln(\mathrm{value}_{\mathrm{jt}}) + \beta_5 \times \ln(\mathrm{dispersion}_{\mathrm{jt-1}}) + \beta_6 \times \ln(\mathrm{Size}_{\mathrm{jt}}) + \beta_7 \times \ln(\mathrm{Experience}_{\mathrm{jt}}) + \beta_8 \times \ln(\mathrm{Following}_{\mathrm{jt}}) + \varepsilon_{\mathrm{i}} \quad (4.2)$$

I define $\mathrm{Daydummy_{jt}}$ in two cases. In a 7 day case, I require$\mathrm{Daydummy_{jt}}$=1 if $\mathrm{Days} \leq 7$, otherwise $\mathrm{Daydummy_{jt}}$=0. In a 30 day case, I require $\mathrm{Daydummy_{jt}}$=1 if $\mathrm{Days} \leq 30$, otherwise $\mathrm{Daydummy_{jt}}$=0. All other variables are defined in Table 4.7.

As Table 4.8 shows, in the 7 day case, the impact of cash only payment on analyst recommendation change is 1.57%-3.13%× $\mathrm{Daydummy_{jt}}$. In this case, I can see as the $\mathrm{Daydummy_{jt}}$varies from 0 to 1, impact of cash only payment on analyst recommendation change varies from 1.57% to 4.70%. However, in a 30 day case the impact of cash only payment on analyst recommendation change is 0%-2.74%× $\mathrm{Daydummy_{jt}}$. In this case, I can see $\mathrm{Daydummy_{jt}}$ varies from 0 to 1 and the impact of cash only payment on analyst recommendation change varies from 0% to 2.74%. Therefore, the impact of cash only payment on analyst recommendation change is sensitive to the length of time between the first recommendation date after deal announcement and its deal announcement date.

According to Loh and Stulz[34], recommendation changes are more likely to be influential when examining a high forecast dispersion firm. Therefore, it is important to examine the previous dispersion impact, cash only payment impact and the interaction impact on the analyst recommendation change. I estimate model 4.3 to examine these impacts. Model 4.3 is identical to model 4.1 except model 4.3 includes the previous dispersion dummy and interaction between previous dispersion dummy and merger means of payment dummy.

$$P(\text{upgrade}_{jt}) = \beta_0 + \beta_1 \times \text{dispersiondummy}_{jt-1} + \beta_2 \times \text{Dummy}_{jt} + \beta_3 \times (\text{Dummy}_{jt} \times \text{Daydummy}_{jt}) + \beta_4 \times \ln(\text{Value}_{jt}) + \beta_5 \times \ln(\text{dispersion}_{jt-1}) + \beta_6 \times \ln(\text{Size}_{jt}) + \beta_7 \times \ln(\text{Experience}_{jt}) + \beta_8 \times \ln(\text{Following}_{jt}) + \varepsilon_{jt} \quad (4.3)$$

According to Jegadeesh and Kim [35], 0.75 is roughly the average dispersion in a general sample. Therefore, I define $\text{dispersiondummy}_{jt-1}$=1 if $\text{dispersion}_{jt-1} > 0.75$, otherwise $\text{dispersiondummy}_{jt-1}$ =0.

Table 4.9 presents analyst's previous dispersion impact on analyst recommendation change. As Table 4.9 shows in a pure stock deal group, dispersion of analysts' recommendation will have 3.16% negative impact on analyst recommendation change if the dispersion occurs within 90 days prior to the deal announcement date and it is greater than 0.75. This indicates that for pure stock deals, analysts are less likely to upgrade the recommendation about the acquirer stocks when there is above average dispersion across the analyst opinions at one quarter prior to previous quarter. This is consistent with Jegadeesh and Kim's [35] finding that analysts are less likely to herd when there is a large dispersion across analysts' opinion. In addition, the impact of cash only payment on analyst recommendation change is 5.08%-4.69%× $\text{dispersiondummy}_{jt-1}$. In this case, I can see $\text{dispersiondummy}_{jt-1}$ varies from 0 to 1, impact of cash only payment on analyst recommendation change varies from 5.08% to 0.39%. Therefore, the impact of cash only payment on analyst recommendation change is sensitive to the analyst recommendation dispersion about the acquirer stocks that occurs within 90 days prior to the deal announcement date.

4.4 Event Study and Instrumental Analysis of Cumulative abnormal Return

As Table 4.7 shows us, within 90 days of the deal announcement date, cash only deals will have a higher chance than pure stocks to lead analysts to upgrade their recommendations about acquirer stocks. It is important to examine whether different merger means of payment has significant impact on short term market reaction. Therefore, I conducted an event study to examine the short term cumulative abnormal return of cash only deals and that of pure stock deals separately within a three days window of the deal announcement.

To better measure the short term abnormal return, I employ the common technique of calculating cumulative abnormal return relative to a beta benchmark. To calculate abnormal returns based on market beta, I use the procedures documented in Boehmer et al [27]. According to Mitchel et al. [4], to disentangle price pressure and information effects, I will use three day cumulative abnormal return around the deal announcement date t. To be consistent with Mitchel et al. [4], market model parameters are estimated over a 150 day window beginning 21 days after the deal announcement date, where value weighted CRSP included dividends index proxies for market portfolio. After a deal announcement date for acquirer stock I, I computed three day buy-and-hold abnormal returns $\mathrm{ABR_j}(\mathrm{t}-1,\mathrm{t}+1)$as model 4.4:

$$\mathrm{ABR_j}(\mathrm{t}-1,\mathrm{t}+1)=\prod_{\tau=\mathrm{t}-1}^{\mathrm{t}+1}\left(1+\mathrm{R_{j,\tau}}\right)-\prod_{\tau=\mathrm{t}+21}^{\mathrm{t}+171}\left(1+\mathrm{R_{m,\tau}}\right)$$

$$\mathrm{CAR_j}(\mathrm{t}-1,\mathrm{t}+1)=\sum_{\mathrm{t}-1}^{\mathrm{t}+1}\mathrm{average}(\mathrm{ABR_j}) \qquad (4.4)$$

Where $R_{j,\tau}$ and $R_{m,\tau}$ are the return on acquirer stock j and the value-weighted index return, respectively.

Specifically, I choose the [-1 1] or from one day prior to one day after the deal announcement date for the event window. I choose the [21 171] or from 21 days to 171 days after the deal announcement date as my market estimation window. Market portfolio returns are collected from value weighted CRSP including dividends index proxies returns from CRSP. These returns within [21 171] are then used as benchmarks to calculate the abnormal performance. Abnormal returns are calculated for each firm relative to its beta benchmark in [-1 1] time frame. Cumulative abnormal returns are calculated by averaging across acquirer firms every day and then summing those averages over time.

Table 4.10 reports cumulative abnormal returns for cash only and pure stock deals within a three day window of the M&A announcement date [-1 1]. A three day window can disentangle merger means of payment impact on short term abnormal return of acquirer stocks from other impacts. As presented in Table 4.10, cash acquirers have a significant cumulative abnormal return of +1.06%, and pure acquirers have a significant cumulative abnormal return of -1.05%. This cumulative abnormal return difference reflects market preference for cash only deals ovr pure stock deals within a short time after the deal announcement. This difference may be explained by the analyst recommendation change. If so, then merger means of payment impacts on analyst recommendation change will be translated into a short term abnormal return for acquirers.

Next, I examine the relationship between analyst recommendation change and short term cumulative abnormal return for acquirer stocks. To avoid the endogeneity problem, I employ a 2SLS model to test the relationship. The variable, "analyst previous recommendation dispersion for acquirer stocks", $\mathrm{dispersion}_{jt-1}$ is significantly correlated with analyst recommendation change (Tables 15 and 17), but it is uncorrelated with unobserved explanatory factors of abnormal returns in the error term ε_i in model 4.5. I use the cash dummy variable as an instrument for 2SLS estimation. The 2SLS model is described in model 4.5 format as follows:

Step1: $\mathrm{P}(\mathrm{upgrade}_{jt}) = \beta_0 + \beta_1 \times \ln(\mathrm{dispersion}_{jt-1}) + \mu_{jt}$

Then $\mathrm{P}(\widehat{\mathrm{upgrade}}_{jt}) = \mathrm{P}(\mathrm{upgrade}_{jt}) - \mu_{jt}$

Step2: $\mathrm{CAR}_j(t-1, t+1) = C_0 + C_1 \times \mathrm{P}(\widehat{\mathrm{upgrade}}_{jt}) + \varepsilon_{jt}$ (4.5)

The null hypothesis is that analyst recommendation change will have no impact on the cumulative abnormal return within a three day window of the M&A announcement date.

Table 4.11 presents the short term dynamic relationship between analyst recommendation change and short term cumulative abnormal return for acquirer stocks within a three day window of the M&A announcement date. Panel A shows the regression in step 1, and Panel B shows the relationship in step 2. Table 4.11 shows that if there is a high probability of analysts upgrading the acquirer stock by 1% within a three day window of the M&A announcement date then the cumulative abnormal return will increase by 0.0861%.

Table 4.7 shows that, merger means of payment has a significant impact on analyst recommendation change within a 90-day window around M&A announcement. The impact of cash only payment on the analyst upgrades is 2% more than the impact in pure stock financing arrangements within the 90-day window of M&A announcement.

This evidence, combined with results from Tables 4.10 and 4.11, I conclude that merger means of payment has a significant impact on analyst recommendation change within a short time frame of the M&A announcement, and the market reacts quickly to this impact.

4.5 Summary and Conclusions

Cash only financed transactions appear to be viewed more favorably than stock financed transactions based upon my analysis of analyst upgrades. I find that the impact of cash only payment on analyst recommendation change is sensitive to the length of time between the first recommendation date post-transaction announcement and its announcement date. The impact of cash only payment on analyst recommendation change is sensitive to the analysts' dispersion over recommendations for the acquirer stocks within a 90-day window prior to the deal announcement date.

Analyst recommendation changes that result from different means of payment have a significant positive impact on the short term cumulative abnormal return for the acquirer stocks within three day window around the deal announcement date. Event study and 2SLS instrumental variable tests shows that cash only payment helps explain a significant cumulative abnormal return of +1.06%, and pure stock payment helps explain

a significant cumulative abnormal return of -1.05% for acquirer stocks three days window around the merger announcement date.

My results indicate that merger means of payment has a direct impact on analyst recommendation change and market reacts quickly to this impact.

Table 4.1
Descriptive Statistics on Deal Value (Billions of Dollars)

Table 4.1 presents descriptive statistics on the value and number of the M&A deals from year 1993 to year 2013. I define the VALUE as the total nominal amount of consideration paid by the acquirer. Those deals are categorized into three methods of payment: cash only, pure stock and mixed. The mixed subset includes all the acquisitions in which payment is stock and cash combination.

	N	Mean	Std. Dev	Min	25% Pctl	Median	75% Pctl	Max
Cash Only	6,584	0.3800	1.2200	0.0008	0.0318	0.1000	0.2950	41.0050
Stock	3,025	0.8700	5.2700	0.0004	0.0281	0.0785	0.2869	164.7240
Mixed	2,254	1.2300	4.6700	0.0002	0.0383	0.1370	0.6149	72.6710

Table 4.1 Descriptive Statistics on Deal Value

Table 4.2
Descriptive Statistics on Number of Acquisitions

Table 4.2 describes the number of acquisitions and aggregate value of all deals in billions of dollars by calendar year. Aggregate value of all deals simply sums up all deal value by calendar year.

Number of Acquisitions by Calendar Year					
Year	Number of Cash Deals	Number of Stock Deals	Number of Mixed Deals	Total Number of All Deals	Aggregate Value of All Deals (Billions of $)
1993	204	136	59	399	94.3
1994	235	250	91	576	137.7
1995	259	259	81	599	204.8
1996	293	267	116	676	285.4
1997	344	367	192	903	475.2
1998	333	382	157	872	854.3
1999	306	337	155	798	748.8
2000	293	327	141	761	836.7
2001	279	150	139	568	396.4
2002	306	63	114	483	188.4
2003	383	56	97	536	225.9
2004	355	67	102	524	326.7
2005	377	58	135	570	499.5
2006	454	49	142	645	465.9
2007	395	44	110	549	335.4
2008	271	30	73	374	308.6
2009	210	49	58	317	334.2
2010	334	34	60	428	275.6
2011	326	38	61	425	343.3
2012	333	30	87	450	242.8
2013	294	32	84	410	300.0
Total	6,584	3,025	2,254	11,863	7,879.9

Table 4.2 Descriptive Statistics on Number of Acquisitions

Table 4.3
Descriptive Statistics on Deal Value

Table 4.3 describes the mean deal value of categorized payments (cash only, stocks and mixed) deals by calendar year. Mean deal value stands for the average deal value of all deals in one specific payment method by calendar year.

Panel B:Mean Deal Value by Merger Means of Payment (Billions of Dollars $)

Year	Mean value of Cash Deals	Mean Value of Stock Deals	Mean Value of Mixed Deals
1993	0.118	0.257	0.596
1994	0.285	0.159	0.34
1995	0.22	0.423	0.473
1996	0.243	0.47	0.765
1997	0.326	0.525	0.888
1998	0.322	1.308	1.576
1999	0.384	0.968	1.968
2000	0.382	1.541	1.567
2001	0.309	0.676	1.502
2002	0.236	1.307	0.298
2003	0.241	1.32	0.617
2004	0.445	1.917	0.747
2005	0.361	1.658	1.979
2006	0.398	1.659	1.436
2007	0.542	0.508	0.899
2008	0.629	2.594	0.828
2009	0.332	0.448	4.181
2010	0.441	1.181	1.471
2011	0.537	0.884	2.205
2012	0.431	0.594	0.937
2013	0.668	0.797	0.931

Table 4.3 Descriptive Statistics on Deal Value

Figure 4.1
Mean deal value of Categorized Payment by Calendar Year

Figure 4.1 presents a comparison of the average deal value of all deals in three specific payment methods by calendar year. The blue column stands for the average deal value of all deals in cash only payment. The orange column stands for the average deal value of all deals in pure stock payment. The grey column stands for the average deal value of all deals in mixed payment. The time horizon is from year 1993 until 2013.

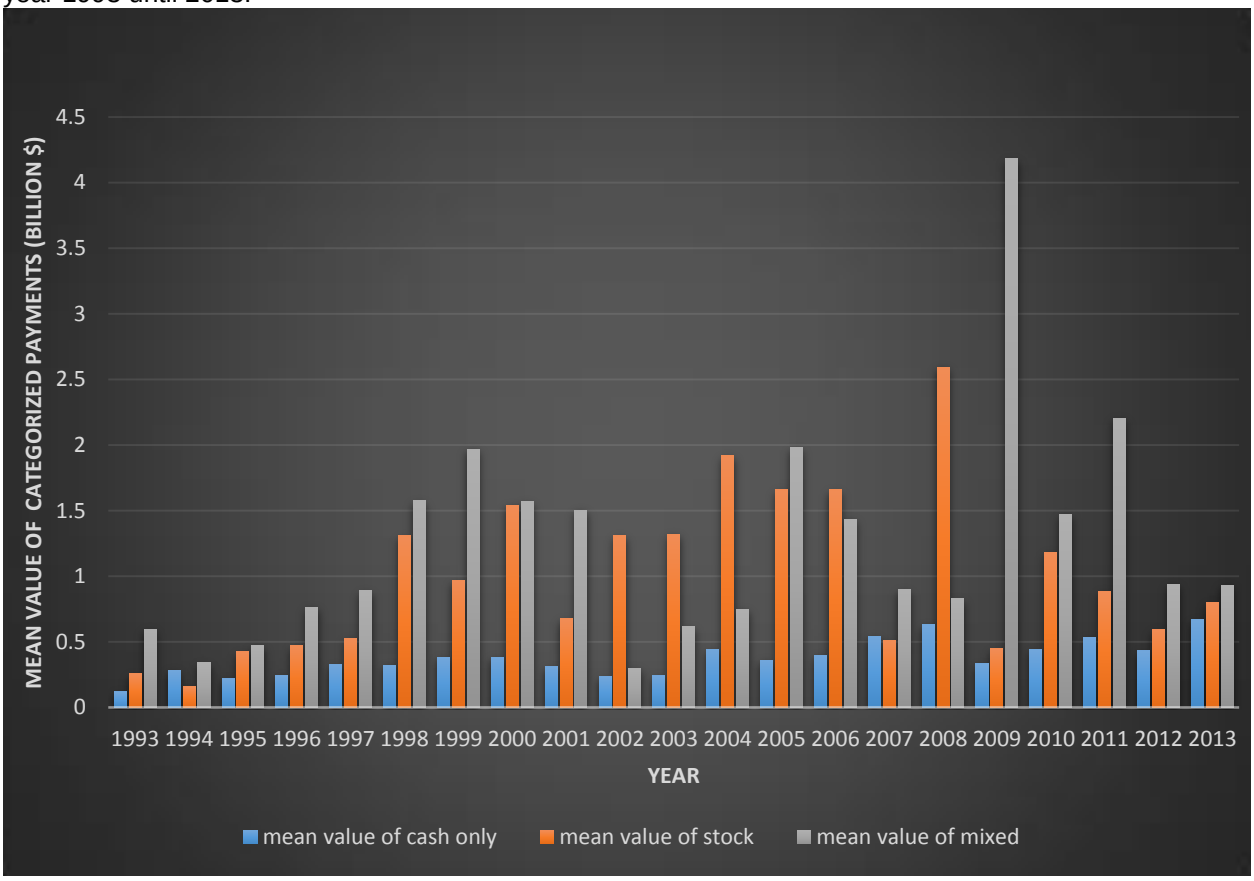


Figure 4.1 Mean Deal Value of Categorized Payment by Calendar Year

Table 4.4
Descriptive Statistics on Analyst Recommendation Change

Table 4.4 presents the analyst recommendation change on my final sample. I present analyst recommendation change in percentage of all observations in upgrade, percentage of all observations in flat and percentage of all observations in downgrade. The table is divided into final sample, cash only and pure stocks groups.

	N	% Upgrade	% Flat	% Downgrade
Final Sample	25,601	35.03%	32.07%	32.90%
Cash Only	16,133	35.97%	30.38%	33.65%
Pure Stocks	9,441	33.39%	35.01%	31.63%

Table 4.4 Descriptive Statistics on Analyst Recommendation Change

Table 4.5
Variable Definitions

Table 4.5 presents the definitions of variables in the empirical tests conducted in Models 4.1, 4.2 and 4.3. Those variables include$ferr_{jt}$, Dummy_{jt}, Experience_{jt} $value_{jt}$, $Size_{jt}$, $Following_{jt}$, $dispersion_{jt-1}$, $Days_{jt}$, those variables are all firm level variables. All variables are obtained from the Securities Data Company Platinum (SDC Platinum), Center for Research in Securities (CRSP), Institutional Brokers Estimate System (I/B/E/S) and Standard & Poor's COMPUSTAT databases.

$P(upgrade_{jt})$	1 if the analyst upgrades the acquirer stock 0 if the analyst downgrades or leaves the recommendation unchanged at quarter t.
$Dummy_{jt}$	Indicates whether deal is cash only deal or pure stock deal
$Value_{jt}$	Total nominal consideration the acquirer j paid for the transaction
$dispersion_{jt-1}$	Analysts' dispersion of recommendation about the acquirer stock j within 90 days prior to the deal announcement date
$Size_{jt}$	Nominal market capitalization of the acquirer j on the deal announcement date
$Experience_{jt}$	Number of years between the deal announcement date and the analyst j's first recommendation date in I/B/E/S
$Following_{jt}$	Number of analysts covering acquirer stock j in the same calendar month as deal announcement month
$Days_{jt}$	Number of days between the first recommendation date after deal announcement date.

Table 4.5 Variable Definitions

Table 4.6
Variable Descriptive Statistics

Table 4.6 provides the descriptive statistics on the variable definitions in the empirical model 4.1. Descriptive statistics of variables are in the natural logarithm.

	Mean	Std dev	Min	25% Pctl	Median	75% Pctl	Max
$P(upgrade_{jt})$	0.350	0.477	0.000	0.000	0.000	1.000	1.000
$Dummy_{jt}$	0.631	0.483	0.000	0.000	1.000	1.000	1.000
$\ln(value_{jt})$	5.648	1.661	-2.590	4.544	5.561	6.798	11.398
$\ln(dispersion_{jt-1})$	-0.233	0.181	-1.903	-0.306	-0.235	-0.132	1.039
$\ln(size_{jt})$	16.543	1.825	10.731	15.204	16.634	18.110	20.025
$\ln(experience_{jt})$	7.125	1.061	1.099	6.494	7.286	7.964	8.907
$\ln(following_{jt})$	3.634	1.061	0.000	2.944	3.829	4.554	4.984
$\ln(days_{jt})$	3.229	1.031	0.000	2.639	3.526	4.060	4.499

Table 4.6 Variable Descriptive Statistics

Table 4.7
Merger Means of Payment's Impact on Analyst Recommendation Change

Table 4.7 presents the regression of Analyst recommendation upgrade on the merger means of payment with a 90 day window around the merger announcement date. The data set is a pooled time-series cross-sectional sample of 1,788 firm quarter forecast observations for period 1993-2013.

(Dependent Variable: $P(upgrade_{jt}) = 1$ if upgrade or $= 0$ if downgrade or unchange	
Constant	0.2433
	(6.21)***
$Dummy_{it}$	0.0199
	(2.85)***
$\ln(Value_{it})$	0.0049
	(2.22)**
$\ln(dispersion_{jt-1})$	-0.0997
	(-5.60)***
$\ln(Size_{it})$	-0.0048
	(-1.87)*
$\ln(Experience_{jt})$	0.0227
	(7.43)***
$\ln(Following_{it})$	0.0142
	(3.43)***
$\ln(Days_{jt})$	-0.0221
	(-6.96)***

Table 4.7 Merger Means of Payment's Impact on Analyst Recommendation Change

Notes: *** indicates standard error is significant at 1% significance level
** indicates standard error is significant at 5% significance level
* indicates standard error is significant at 10% significance level

Table 4.8
Time Impact on Analyst Recommendation Change

Table 4.8 presents the days' impact on analyst recommendation change with a 90 day window around the merger announcement date. 7 days indicates if the first analyst recommendation is made within the first seven days after the merger announcement date, then daydummy is one, otherwise daydummy is zero. 30 days indicates if the first analyst recommendation is made within the first thirty days after the merger announcement date, then daydummy is one, otherwise daydummy is zero The data set is a pooled time-series cross-sectional sample of 1,788 firm quarter forecast observations for period 1993-2013.

	7days	30days
Constant	0.1255	0.121
	(3.46)***	(3.32)***
D_{it}	0.0157	0.0083
	(2.09)**	(0.89)
$Daydummy_{it}$	0.0152	0.0346
	(1.16)	(3.32)***
$Daydummy_{it} \times D_{it}$	0.0313	0.0274
	(1.87)**	(2.10)**
$\ln(Value_{it})$	0.0041	0.0041
	(1.91)*	(1.90)*
$\ln(dispersion_{jt-1})$	-0.1114	-0.1112
	(-6.33)***	(-6.30)***
$\ln(Size_{it})$	-0.0031	-0.0019
	(-1.22)	(-0.77)
$\ln(Experience_{jt})$	0.0250	0.0243
	(8.36)***	(8.15)***
$\ln(Following_{it})$	0.0145	0.0114
	(3.61)***	(2.81)***

Table 4.8 Time Impact on Analyst Recommendation Change

Notes: *** indicates standard error is significant at 1% significance level
** indicates standard error is significant at 5% significance level
* indicates standard error is significant at 10% significance level

Table 4.9
Analysts' Previous Dispersion Impact on Analyst Recommendation Change

Table 4.9 presents analyst's previous dispersion impact on analyst recommendation change within a 90 day window around the merger announcement date. I define $\text{dispersiondummy}_{\text{jt}-1}$=1 if $\text{dispersion}_{\text{jt}-1} > 0.75$, otherwise $\text{dispersiondummy}_{\text{jt}-1}$ =0. The data set is a pooled time-series cross-sectional sample of 1,788 firm quarter forecast observations for period 1993-2013.

Constant	0.3088
	(7.79)***
D_{it}	0.0508
	(4.17)***
$dispersiondummy_{it-1}$	-0.0316
	(-2.73)***
$dispersiondummy_{it-1} \times D_{it}$	-0.0469
	(-3.23)***
$\ln(Value_{it})$	0.0048
	(2.19)**
$\ln(Size_{it})$	-0.0059
	(-2.29)**
$\ln(Experience_{jt})$	0.0222
	(7.28)***
$\ln(Following_{it})$	0.0166
	(4.00)***
$\ln(days_{jt})$	-0.0234
	(-7.40)***

Table 4.9 Analysts' Previous Dispersion Impact on Analyst Recommendation Change

Notes: *** indicates standard error is significant at 1% significance level
** indicates standard error is significant at 5% significance level
* indicates standard error is significant at 10% significance level

Table 4.10
Three Day Cumulative Abnormal Returns around the Merger Announcement Date

Table 4.10 reports cumulative abnormal returns for cash only deals and pure stock deals within a three days window of the deal announcement date [-1 1]. There are 2,700 cash only deals and 1,213 pure stock deals reported in this test.

Period	Cash Only (N=2,700)	Stocks (N=1,213)
[-1 1]	1.06%	-1.05%
	(0.0012)***	(0.0027)***

Table 4.10 Three Day Cumulative Abnormal Returns around the Merger Announcement Date

Notes: *** indicates standard error is significant at 1% significance level
** indicates standard error is significant at 5% significance level
* indicates standard error is significant at 10% significance level

Table 4.11
Analyst Recommendation Change Impact on Cumulative Abnormal Return

Table 4.11 presents the short term dynamic relationship between analyst recommendation change and short term cumulative abnormal return about acquirer stocks within a three days window of the deal announcement date. My instrumental variable here is $\ln(\text{dispersion}_{jt-1})$. The data set is a pooled time-series cross-sectional sample of 1,788 firm quarter forecast observations for period 1993-2013. $\text{P}(\widehat{\text{upgrade}}_{jt})$ is a fitted value of $\text{P}(\text{upgrade}_{jt})$.

Panel A: 2SLS Step1 $P(upgrade_{jt}) = \beta_0 + \beta_1 \times \ln(dispersion_{jt-1}) + \mu_{it}$	
Dependent Variable: $P(upgrade_{jt})$	
Constant	0.6663
	(5.48)***
$dispersion_{jt-1}$	-0.4195
	(-2.83)***
$P(\widehat{upgrade}_{jt}) = P(upgrade_{jt}) - \mu_{it}$	
Panel B: 2SLS Step2 $CAR_i(t-1, t+1) = C_0 + C_1 \times P(\widehat{upgrade}_{jt}) + \varepsilon_{it}$	
Dependent Variable: $CAR_i(t-1, t+1)$	
Constant	-0.0576
	(-3.59)***
$P(\widehat{upgrade}_{jt})$	0.0861
	(1.78)*

Table 4.11 Analyst Recommendation Change Impact on Cumulative Abnormal Return

Notes: *** indicates standard error is significant at 1% significance level
** indicates standard error is significant at 5% significance level
* indicates standard error is significant at 10% significance level

Chapter 5 Merger Means of Payment and Analyst Biases between the Merger Announcement Date and the Merger Effective (or Withdrawal) Date

5.1 Introduction

This chapter examines analyst forecast bias in a window between merger announcement date and merger effective date or between merger announcement date and merger withdrawal date. I have documented the empirical relation between market mis-valuation of a target firm and analyst forecast bias as well as the empirical relation between merger means of payment and analyst forecast bias. I test two alternative hypotheses for analyst bias, one based on target stock market mis-valuation and the other based on the merger means of payment. I employ merger means of payment as a proxy for analyst bias and the initial target price ratio as proxies for investor mis-valuation of target firm and analyst bias.

Merger announcements generally lead to a target stock price increases. The initial target price ratio is the ratio of closing target firm stock price on the first day after merger announcement to initial offer price. Little research has explored the initial target price ratio in the context of M&A. Jindra and Waling [36] show that speculation spread, i.e., one minus initial target price ratio, predicts revision of offer prices. Bessembinder and Zhang [37] show that the initial target price ratio is a direct measure of investor optimism regarding the eventual outcome. Following them, I interpret this ratio as a near term mis-valuation ratio of target firm. I assume that the initial offer price is the fair

market value of the target stock estimated by the acquiring firm. The difference between closing target firm stock price one day dafter merger announcement date and initial offer price is the near term mis-valuation of target firm fair value.

Market mis-valuation is an important factor in deciding merger means of payment in M&A activity. According to Shleifer and Vishny's [3] mis-valuation hypothesis, the acquirer is able to profit by buying undervalued targets with use of cash only payment at a price below the target's fundamental value. In addition, the acquirer is able to profit by financing with stock when its stock is overvalued. Consistent with this hypothesis, Dong et al [38] argue that the target mis-valuation has an impact on the merger means of payment as well as bid premium because target's expropriation opportunities and management incentives can be affected by target mis-valuation measures.

Previously, many scholars have examined the relationship between misevaluation and analyst bias. For example, Brav and Lehavy [17] show that target price ratios, or ratios of analysts' target price to stock price, help measure analysts' estimate of expected firm value well. Moreover, James and Karceski [18] show that high target price ratios are usually associated with a high likelihood of receiving strong recommendations in a context of Initial public offering scenario. But there is little research regarding misevaluation and analyst bias in the field of merger and acquisition.

This study is among the first to extend the mis-valuation hypothesis by examining the impact of target misevaluation on analyst bias in the context of corporate control.

To the extent that initial offer price is the proxy for the fair value of target firm. Initial target price ratios are proxies for the degree of target firm overvaluation. This ratio is

used as a target firm misevaluation measure in both Jindra and Waling [36] and Bessembinder and Zhang [37]. The initial offer price contains short term forward looking price information from the acquirer's perspective. Extant literature has documented that manager guidance on earnings has a significant impact on the analysts' near term forecasts. Thiagarajan and Walther [10] and Matsumoto [21] show that manager guidance on earnings leads analysts to issue frequent pessimistic near term earnings forecast in order to boost the firm's stock price. According to Richardson, Teoh and Wysocki [13], managers induce analysts to issue pessimistic near term forecasts in order to benefit insider equity sales through a positive earnings surprise. Similar to this view, I believe the acquirer's guidance in terms of initial offer price has a significant impact on analysts' bias. In addition, the closing target price on the first day after the M&A announcement date reflects a degree of momentum for the target price around merger announcement. According to Ivkovic and Jegadeesh [25], sell side analysts generally recommend positive momentum stocks. Therefore, this price can have significant impact on analysts' bias. In the real world, analysts are more likely to consider both initial offer price and closing target price on the first day following the M&A announcement date when they form the near term earnings forecast.

The primary goal of this paper is to evaluate the importance of the initial target price ratio and market to book ratio on the analysts' near term earnings per share forecast bias with respect to means of payment around merger announcement dates as well as around merger effective (withdrawn) dates. I test the information content of analysts' one quarter forecast earnings per share ahead released at various time points relative to merger announcement date as well as to merger effective (withdrawn) date. I find

evidence that high initial target price ratios or small market to book ratios are associated with small realized forecast errors for target stocks in both cash only deal and pure stock transactions. The magnitude of decrease in realized forecast error associated with increases in market to book ratio is larger for pure stock than cash only financing.

5.2 Hypothesis Development

Two components compris the initial target price ratio, the closing target stock price one day after merger announcement date and the initial offer price The former reflects the degree of investor overreaction toward target firm initial offer price, and the latter reflects the fair value of target firm on merger effective date from the acquirer firm's perspective. My focus in this paper is how analysts view the initial target price ratio. According to Dechow et al. [15]'s residual income valuation model, stock valuation is positively correlated with analysts forecast of earnings. Livnat et al. [16] describe realized forecast error as the difference between actual earnings and analysts' forecast of earnings divided by current stock price, and the realized forecast error is negatively related to analyst earnings forecasts. In other words, a low stock valuation around merger announcement is associated with a large analyst forecast of earnings or an indication of small realized forecast error. Therefore my first hypothesis is that an increase of initial target price ratio leads to a decrease of realized forecast error around M&A announcement.

In the M&A context, compared to cash only payment, pure stock payment is likely to deliver a higher bid premium for the target firm around M&A announcement when the acquirers' stock is more overpriced than the targets' stock. Rhodes-Kropf and

Viswanathan [39] show that acquirers succeed in selling their overpriced stock to less overpriced targets when targets rationally accept more bids from overvalued acquirers during market valuation peaks. If market to book is a proxy for market overvaluation of the acquirer stock, according to Rhodes-Kropf et al. [22], the propensity of all stock offers increase with market to book ratios. As target shareholders have cognitive dissonance bias toward pure stock payment, they think they can receive a higher bid premium from pure stock payment during a stock overvaluation period. It is more likely for analysts to consider this psychological bias. Compared to cash only payment, another market overvaluation proxy, market to book ratio for target firm, is likely to drive a larger bias toward target stock under stock payment around M&A announcement. My second hypothesis is that an increase in market to book ratio will lead to a decrease of realized forecast error. My third hypothesis is that compared to cash only payment, the magnitude of change of average realized forecast error associated with the increase of market to book ratio is larger under pure stock payment around M&A announcement.

5.3 Data and Variable Description

5.3.1 M&A Deals

I obtain U.S. domestic M&A transaction data from Securities Data Corporation (SDC) Platinum for years 1986 to 2013. My sample consists of all mergers (SDC deal form 'M") and acquisitions of majority interest ("AM"). I include cash only, stock only deals under completed status, or withdrawn status in my sample. To calculate the initial offer price ratio, I require the accessibility of the initial offer price in SDC and the closing target stock price on the first day following the M&A announcement date in CRSP. In addition,

I exclude closing target stock prices on the first day following the merger announcement date below $5. This is to exclude penny stocks that drive up price volatility. I exclude any M&A announcement day that is not a trading day, and I exclude the initial target price ratio either below 0.2 or above 5. The initial target price ratio is the closing target stock price on the first day following the merger announcement date over the initial offer price. My final sample consists of 3,634 such mergers and acquisitions.

5.3.2 Merging Deals with Forecast

I upload 3,634 unique target stock CUSIPs into the I/B/E/S detail history database and select the entire database period from January 1961 to June 2013, choosing the near term quarterly EPS observation (Q(6)). This yields 3,269 unique full target stock CUSIPs out of 3,634 original codes. I focus on analysts' near term EPS forecasts because Ivkovic and Jegadeesh [25] show that one quarter ahead earnings per share forecasts play an important role in capturing the analyst forecast bias after the earnings announcement date. I select the criteria that forecast announcement date falls between the merger announcement date and the merger effective date or between the merger announcement date and the merger withdrawn date. This yields 3,106 full unique target CUSIPs.

5.3.3 Merging Deals with Compustat

I upload the 3,106 unique full target stock CUSIPs into the Compustat North America database and select the entire database period from January 1961 to March 2015, with fundamental quarterly observations. This yields 3069 unique full acquirer stock CUSIPs which cover 7,184 quarterly individual analyst forecast observations for target firms.

5.3.4 Time Window Selection

I upload 3,069 unique CUSIPs to obtain the final forecast sample and final compustat sample. I use Richardson, Teoh and Wysocki [13]s' sorting method to examine near term analyst forecast bias, and I select compustat observations one quarter prior to the earnings announcement date over the quarterly horizon. I calculate the consensus earnings per share (EPS) forecast for each firm using the median of individual analyst forecasts within current quarter. Following Livnat et al. [16], I define forecast error as actual EPS minus the consensus divided by the stock price at the end of the quarter. The stock price denominator is to avoid potential spurious relations resulting from cross sectional scale differences in earnings per share. A negative forecast error indicates a near term negative earnings surprise or a near term optimistic analysts' forecast before the earnings announcement. A positive forecast error indicates a near term positive earnings surprise or a near term pessimistic analysts' forecast before the earnings announcement. The following formula defines my forecast error.

$$\mathrm{FERR_{ijt}} = \frac{\text{actual EPS}_{\mathrm{jt}} - \text{analyst forecast EPS}_{\mathrm{ijt}}}{\mathrm{P_{jt}}} \tag{5.1}$$

where subscript i indicates individual analyst and the j indicates firm j and t indicates quarter t. The first forecast is available in I/B/E/S detail history for firm j and quarter t. $\text{analyst forecast EPS}_{\mathrm{ijt}}$ is the individual analyst i's forecast about firm j at quarter t. I obtain the quarterly actual earnings per share $\text{actual EPS}_{\mathrm{ijt}}$through I/B/E/S detail history and stock price at the end of the quarter $\mathrm{P_{jt}}$ through Compustat. I merge the final compustat, final forecast, SDC database by CUSIP and quarter and select my time window of the forecast date falls between the merger announcement date and merger

effective date or between the merger announcement date and the merger withdrawn date. There are 7,184 quarterly individual analyst forecast observations for target firms.

5.3.5 A model of realized forecast error

This section presents a simple model I use to conduct the empirical tests. Following So [40]'s characteristic approach, I form my earnings forecast and realized forecast error based on the firm characteristics.

Suppose the firm j's actual earnings at quarter t can be determined by a series of firm's public characteristics. I can rewrite my realized earnings as:

$$E_{j,t} = \sum_{M=1}^{K} \beta_M X_{Mj,t-1} + \delta_{j,t} \quad (5.2)$$

where $X_{1j,t-1}$….. $X_{Kj,t-1}$ are the observable public characteristics of firm at quarter t-1.

$\delta_{j,t}$ is the factor that has no correlation with those observable public characteristics and also can help explain the realized earnings $E_{j,t}$

Individual analyst i's earnings per share forecast for firm j at quarter t-1 can be written as a function of both observable public characteristics and private characteristics:

$$AF_{ij,t} = \sum_{M=1}^{K} \theta_{iM} X_{Mj,t-1} + \sum_{M=1}^{s} \rho_{iM} Z_{Mj,t-1} + \omega_{j,t-1} \quad (5.3)$$

where $X_{1j,t-1}$……$X_{Kj,t-1}$ are observable public characteristics and $Z_{1j,t-1}$……$Z_{Kj,t-1}$

are those private characteristics of the firm that the individual analyst has been able to collect.

I have used the mean of individual analyst i's earnings per share forecast as the analyst forecast at firm level.

$$AF_{j,t} = \text{Median value of } AF_{ij,t} \quad (5.4)$$

Therefore, my realized forecast error is written as followings:

$$FE_{j,t} = E_{j,t} - AF_{j,t} \quad (5.5)$$

whereas $P_{j,t-1}$ is the firm j's stock price at quarter t-1.

My main focus is whether the public observable characteristics, such as initial target price ratio or ITP and merger means of payment, significantly impact on the realized forecast error, as well as the cumulative abnormal return of target firms around the merger announcement date. Therefore, I carry out a 2SLS instrumental variable test to examine the empirical relationship between those two characteristics and cumulative target firms' returns around th new forecast date.

5.3.6 Data and Descriptive Statistics

I construct my sample from three sources. I obtain sell side analysts' earnings forecasts for the period from January 1986 to December 2013. The I/B/E/S detail files give the analysts' earnings forecast, forecast date, actual earnings, actual earnings announcement date information. In addition, I focus on the one quarter ahead analysts' earnings forecast (Q6). Moreover, I obtain the merger announcement date, the merger effective date as well as the merger withdrawal date from the SDC platinum database. I include cash only and stock only deals under completed status or withdrawn status. I retrieve quarterly accounting data such as book equity and the earnings announcement date from COMPUSTAT. Finally, the daily stock return data and value weighted index return data are from CRSP. I restrict my sample selection within a time frame for which the analysts' forecast date falls between the merger announcement date and the

merger effective date or between the merger announcement date and the merger withdrawn date.

Table 5.1 presents descriptive statistics for the number of deals followed by target analysts, the number of deals in cash only payment as well as in pure stock payment for each year, the number of target analysts following the deals for each year and mean, median number of target analysts covering each firm for each year. A target analyst enters the sample in a given year if he or she makes at least one forecast for target firm and if his or her earnings forecast date falls between the merger announcement date and the merger effective date or between the merger announcement date and the merger withdrawn date in that year. An M&A deal enters the sample in a given year if there is at least one target analyst whose forecast date falls between the merger announcement date and the merger effective date or between the merger announcement date and the merger withdrawn date covering this firm in this year. An M&A deal is either announced to be merged with use of cash only payment or with use of pure stock payment.

The number of deals followed by target analysts in the time between the merger announcement date and the merger effective date or between the merger announcement date and the merger withdrawn date in I/B/E/S database stays flat from year 1986 to 1993. It generally increases quickly from year 1994 to 1999. Then it declines from year 2000 to 2003. It subsequently increases from year 2004 to 2007. It decreases sharply in 2008 and 2009 and reverses its trend from 2010 to 2013. The number of target analysts followed a similar pattern. These figures show the extent of target analysts' coverage for the M&A transactions greatly increased during the sample

period. This trend suggests an increasingly important role played by target analysts in the process of disseminating real target firm value between the merger announcement date and the merger effective date or between the merger announcement date and the merger withdrawn date.

5.4 Frequency and timing of analysts' near term forecast

5.4.1 Timeline of Analysts' near term forecast

I first examine the timing of analysts' near term forecasts relative to the merger announcement date (MAD). For each analyst's one quarter ahead earnings forecast post MAD, I compute the number of trading days between individual analysts' forecast date and current MAD. I want to see whether the corporate event or M&A announcement will have significant impact on analysts' near term forecast as well as the analysts' realized forecast error between the merger announcement date and the merger effective date (MED) or between the merger announcement date and the merger withdrawn date (MWD). I define my timeline relative to the MAD as well as relative to the MED or the MWD in the following:

t=0 (=MAD), 1, 2….., 42

t=0(=MED or MWD), -1,-2…..-42

Suppose AFD is short for the analysts' forecast date. I define the number of trading days as follows:

$$t = (\mathrm{AFD} - \mathrm{MAD}) - t_{\mathrm{weekendsAFDMAD}} - t_{\mathrm{holidaysAFDMAD}} \quad (5.6)$$

$$t = (\mathrm{AFD} - \mathrm{MED}) - t_{\mathrm{weekendsMEDAFD}} - t_{\mathrm{holidaysMEDAFD}}$$

or $t = (AFD - MWD) - t_{weekendsMWDAFD} - t_{holidaysMWDAFD}$ (5.7)

Whereas $t_{weekendsAFDMAD}$ is the number of weekend days that falls into the time frame between the merger announcement date and analysts' forecast date. $t_{holidaysAFDMAD}$ is the number of holidays listed by New York Stock Exchange that falls into the time frame between the merger announcement date and analysts' forecast date. $t_{weekendsMEDAFD}$ is the number of weekend days that falls into the time frame between analysts' forecast date and the merger effective date. $t_{holidaysMEDAFD}$ is the number of holidays listed by New York Stock Exchange that falls into the time frame between analysts' forecast date and the merger effective date. $t_{weekendsMWDAFD}$ is the number of weekend days that falls into the time frame between analysts' forecast date and the merger withdrawn date. $t_{holidaysMWDAFD}$ is the number of holidays listed by New York Stock Exchange that falls into the time frame between analysts' forecast date and the merger withdrawn date

This timeline captures either a two month period post MAD or a two month period before MED or a two month period before MWD. The test will be conducted in two scenarios. In the first scenario, I examine how the M&A announcement impacts analysts' near term forecasts within next two months post MAD and its consequent influence on realized forecast error. In the second scenario, I examine how analysts revise their forecast within two months before MED or MWD according to their prediction of deal completion based on target characteristics and its subsequent consequence on the realized forecast error. In particular, I measure the analysts' realized forecast error when revised forecasts are within 2 months post MAD and 2 months prior to MED or a two month period before MWD. For data reasons, the analysts' realized forecast error are measured during the first month (21 trading days) after one day post MAD, the first

two months (42 trading days) after one day post MAD. Analysts' realized forecast error is measured during the last trade month (21 trading days) prior to MED or MWD, the last two trade months (42 trading days) prior to MED or MWD. On MAD, analysts receive the public information about the initial offer price for the target firm, merger means of payment, and potential MED. I anchor the event days around MAD, MED, MWD. This is because I want to examine whether analysts form a near term forecast bias for targets based on the target stocks' mis-valuation characteristics such as initial target price ratio and market to book ratio around those event dates above.

5.4.2 **Timeline of Analysts' near term forecast**

Analysts issue a total of 7,184 one quarter ahead near term forecasts that fall into both the time frame between MAD and MED and the time frame between MAD and MWD. There are 4,125 observations of one quarter ahead near term forecasts issued to targets with cash only payment. The remaining 3,069 observations are issued to targets with pure stock payment. My findings indicate that analysts are more likely to issue new near term forecasts to cash payment targets than pure stock payment targets in the time frame under consideration.

Figure 5.1 presents analysts' new near term forecast by trade days relative to MAD. I find a sharply higher frequency of new near term forecasts within 42 days post MAD than other periods. For example, I observe 45.11% of the total new near term analyst forecasts falls within 42 trade days post MAD.

Figure 5.2 presents analysts' new near term forecast by trade weeks within 42 trade days post MAD. Because I want to examine how the mis-valuation ratio initial target

price ratio impact on the near term analysts' forecast and initial target price ratio can be obtained one day post MAD. Therefore, my 42 trade day sample period starts from one day post MAD. The frequency of new near term forecasts within the first trade week is much higher than that of other trade weeks. In addition, analysts issue more near term forecasts for the targets with cash only payment than for targets with pure stock payment in most trade weeks.

Figure 5.3 presents analysts' new near term forecast by trade days relative to MED or MWD. I find a sharply higher frequency of new near term forecasts within 84 trade days prior to MED or MWD than other periods. I observe 43.21% of the total new near term analyst forecasts fall within 84 trade days prior to MED or MWD.

Figure 5.4 presents analysts' new near term forecasts within the last 4 trade months prior to MED or MWD. I examine how the mis-valuation ratio initial target price ratio impact on the near term analysts' forecast prior to MED or MWD. The frequency of new near term forecasts decline sharply when approaching MED or MWD. In addition, analysts issue more near term forecasts for the targets with cash only payment than for targets with pure stock payment in most trade weeks.

Overall, merger announcement events drive a large portion of new near term analyst forecasts. This is consistent with previous finding that informative manager disclosures attract large analysts' coverage. For instance, Lang and Lundholm [41] find that firms with more informative disclosures have larger analyst following. Usually, merger announcement events contain informative acquirer managers' disclosures about mergers and acquisitions, such as initial offer price, merger means of payment and the potential merger effective date. Subsequently, analysts will update their expectation of

future earnings on the basis of those new disclosures. Therefore, it is not surprising to see analysts' coverage about the target concentrate around the merger announcement date especially in the first trade week after one day post MAD. In addition, when it is getting closed to the merger effective date or the merger withdrawl date, analysts' coverage about the target firms drops sharply. This is because analysts avoid revising forecasts prior to merger deal completion or deal withdrawal announcement. This is similar to the Stickel [32]'s finding that analysts avoid revising forecasts prior to the earnings announcement.

5.5 Realized Forecast Error

I compare current near term analysts' forecasts with next quarter actual earnings. The difference quantifies the accuracy of analysts' near term forecasts relative to MAD.

Table 5.2 presents average realized forecast errors for the entire sample that has analysts' near term forecast date fall between one day post MAD and MED or between one day post MAD and MWD. The sample covers the target firms whose stocks have been covered by at least one analyst. The sample is sorted into two market to book groups and into two initial target price ratio groups. For pure stock financing, the average realized forecast errors of individual analysts who cover target firms with small market to book ratio is usually significantly larger than average realized forecast errors of individual analysts who cover target firms with large market to book ratio. Either small initial target price ratio or small market to book ratio indicates overvaluation of target firms indicating that, analysts give more pessimistic near term forecasts to

undervalued target firms when stock financing. Cash only financing has no such influence.

Consistent with Bessembinder and Zhang [37], low target firm valuation ratios are associated with a high probability of transaction completion. A high completion probability is more likely be associated with a positive earnings surprise for target firms, which will ultimately lead analysts to give pessimistic near term forecasts to targets. However with cash finance, the probability of completion does not depend on the valuation of target firms. It only depends on acquirer's free cash flow and its ability to raise cash.

I choose trade months instead of weeks or days for data reasons. Most near term analyst forecast observations concentrate on the first two trade months. Therefore, studying the average realized errors by trade months is desirable.

Table 5.3 presents the average realized forecast errors of first trade month and first two trade months relative to MAD. Data support the first hypothesis. Significant positive differences exist between average realized forecast errors of individual analysts who cover target firms with small initial target price ratios. Average realized forecast errors of individual analysts who cover target firms with large initial target price ratios exist in both cash only and pure stock payment cases. This table is also consistent with the second hypothesis that the increase of market to book is associated with a decrease of realized forecast error. Evidence from Tables 5.2 through 5.4 support the second hypothesis.

The third hypothesis that compared to cash only payment, the change in average realized forecast error associated with the increase of market to book ratio is larger under pure stock payment. I observe a larger realized forecast error difference associated with market to book ranks in pure stock payment. This observation validates the second hypothesis. This observation indicates that analysts will have larger dispersion when interpreting the degree of market to book ratio's influence on target near term earnings in pure stock payment method. This dispersion difference may be due to the fact that pure stock payment create a larger upward price pressure for target firms around merger announcement. This is consistent with Mitchel et al. [4]'s finding that compared to cash only payment, target firms have a higher price jump under pure stock payment around the M&A announcement date.

Table 5.4 presents the average realized forecast errors of last trade month and last two trade months prior to MED or MWD. Consistent with Table 5.2 and 5.3 results, small market to book ratio or an indication of undervaluation of target firms' stocks still lead analysts to issue a more pessimistic near term forecast for target stocks.

Overall, a small initial target price ratio or undervaluation of target firms more likely lead analysts to issue a more pessimistic near term forecasts and generate a relatively larger realized forecast error around M&A announcement. This ratio does not significantly influence analysts' near term forecasts in a subsample that is closed to M&A completion or the withdrawal date as well as in the full sample. This is because the initial target price ratio is obtained on the first day post MAD, and this ratio is not updated over time. Analysts view this ratio as important around MAD. This ratio cannot serve is not accurate in determining the valuation of target firms closed to MED or MWD. On the

contrary, small market to book ratio or another identification of undervaluation of target firms imposes significant influences in the full sample as well as in the two subsamples. This may cause ratio updated.

5.6 Panel Fixed Regression Analysis of Realized Forecast Error at Firm Level

In this section, I use panel fixed regression model to analyze the dynamic link among merger means of payment, initial target price ratio, market to book ratio and realized forecast error over the target stocks in the full sample period as well as two subsample periods. In all cases, I compute standard errors by clustering errors based on calendar day to ensure the robustness to heteroscedasticity and make sure there exists arbitrary cross sectional and intra-day serial correlation errors.

The model tests whether valuation ratios such have a significant influence on the near term earnings forecasts.

My third hypothesis is that cash only deals are more likely than pure stock deals to lead analysts to issue a more pronounced optimistic near term earnings forecasts when the date is between MAD and MED or between MAD and MWD. According to Kolasinski and Kothari [8], variables including deal value, the number of analysts covering stocks and market size for the target stocks are key controlled variables for the analysts' forecast. I add the control variables initial target price ratio, market to book ratio, the number of trading days. In addition, I follow So [40] to obtain these variables at the firm level. I follow the steps from section 5.4 to generate a realized firm level forecast error. I estimate the following (model 5.8):

$$\ln(\text{ferr}_{jt}) = \beta_0 + \beta_1 D_{jt} + \beta_2 \ln(\text{ITP}_{jt}) + \beta_3 \ln(\text{MB}_{jt}) + \beta_4 \ln(\text{dispersion}_{jt}) + \beta_5 \ln(\text{value}_{jt}) + \beta_6 \ln(\text{size}_{jt}) + \beta_7 \ln(\text{following}_{jt}) + \varepsilon_{jt} \quad (5.8)$$

Variable ferr_{jt} measures the average of individual analyst's realized forecast error about target stock j, and D_{it} is a dummy variable equal to one for the target stock j on the deal announcement date if the merger deal is paid by cash only and zero otherwise. In addition, ITP_{jt} measures the initial target price ratio for target firm j on the first day post-merger announcement. MB_{jt} is equivalent to market to book ratio for target firm j at quarter t. Additionally dispersion_{jt} measures the dispersion of analysts' near term forecasts about the target stock j at quarter t. Value_{jt} is the total nominal consideration paid for target firm j, including all cash, securities, and assumed debt at quarter t. Moreover, size_{jt} measures the nominal market capitalization of the target stock j at quarter t. Following_{jt} is the number of analysts covering target stock j at quarter t. Finally ε_{jt} is the cross sectional error term at quarter t. Table 5.6 provide descriptive statistics for full sample and two subsamples. Similar to Figures 5.1 and 5.3, the observations are concentrated within first 42 trading days post MAD and decline sharply when it is getting closed to MED or MWD

Table 5.7 shows that the increase of initial target price ratio does not have an impact on realized forecast error over the full sample period as well as the period that is closed to MED or MWD. But the initial target price ratio has a positive impact on the realized forecast error within first 42 trading days around MAD. In addition, the increase of market to book ratio is associated with the decrease of realized forecast error in all three tests. This table again supports my second hypothesis.

5.7 Relationship between Stock Price Reaction and Realized Forecast Error

This section examines the relation between realized forecast error and stock price reaction. The stock price reaction is the percentage cumulative abnormal return over a three-day window comprising the day before analysts' new earnings announcement date after the merger announcement date and the following two days. Realized forecast errors are defined as the difference between actual earnings and analysts' new near term forecast divided by the share price of target firm at current forecast quarter. Realized forecast errors are obtained on the actual earnings announcement date one quarter after current forecast quarter. A positive realized forecast error indicates a relatively pessimistic near term analysts' forecast on the forecast date. A negative realized forecast error indicates a relatively optimistic near term analyst forecast on the forecast date. The number of trade days is the difference between analysts' forecast date and the merger announcement date minus the number of weekend days minus the number of holidays listed in New York Stock Exchange.

To better measure the short term abnormal return, I employ the common technique of calculating cumulative abnormal return relative to a beta benchmark. To calculate abnormal returns based on market beta, I use the procedures documented in Boehmer et al [27]. According to Mitchel et al. [4], to disentangle price pressure and information effects, I will use three-day cumulative abnormal returns around analysts' latest earnings announcement date t after the merger announcement date. To be consistent with Mitchel et al. [4], market model parameters are estimated over a 150 day window beginning 41 days after last day of the event date, where value weighted CRSP

included dividends index proxies for market portfolio. After the deal announcement date for target stock j, I computed three day buy-and-hold abnormal returns $\mathrm{ABR_j}(\mathrm{t}-1,\mathrm{t}+1)$ as model 5.9:

$$\mathrm{ABR_j}(\mathrm{t}-1,\mathrm{t}+1)=\prod_{\tau=\mathrm{t}-1}^{\mathrm{t}+1}\left(1+\mathrm{R_{j,\tau}}\right)-\prod_{\tau=\mathrm{t}+41}^{\mathrm{t}+191}\left(1+\mathrm{R_{m,\tau}}\right)$$

$$\mathrm{CAR_j}(\mathrm{t}-1,\mathrm{t}+1)=\sum_{\mathrm{t}-1}^{\mathrm{t}+1}\mathrm{average}(\mathrm{ABR_i}) \qquad (5.9)$$

Where $\mathrm{R_{j,\tau}}$ and $\mathrm{R_{m,\tau}}$ are the return on target stock j and the value-weighted index included dividend return, respectively.

Table 5.8 shows that new analysts' forecasts are associated with a +1.65% abnormal return for target stocks around the earnings announcement date that falls between the merger announcement date and the merger effective date or between the merger announcement date and the merger withdrawn date.

Following Gu and Wu [1] to examine the relationship between realized forecast error and short term market price reaction:

$$\mathrm{CAR_{jt}}(\mathrm{t}-1,\mathrm{t}+1)=\beta_0+\beta_1\mathrm{Ferr_{jt}}+\beta_1\mathrm{MNMD_{jt}}+\varepsilon_{\mathrm{jt}} \qquad (5.10)$$

Whereas $\mathrm{FERR_{jt}}=\frac{\text{actual EPS}_{\mathrm{jt}}-\text{analyst median forecast EPS}_{\mathrm{jt}}}{\mathrm{P_{jt}}}\times 100$

$$\mathrm{MNMD_{jt}}=\frac{\text{analysts average forecast EPS}_{\mathrm{jt}}-\text{analyst median forecast EPS}_{\mathrm{jt}}}{\mathrm{P_{jt}}}\times 100$$

$\text{actual EPS}_{\mathrm{jt}}$ is the actual earnings for target stock j at quarter t.

$\text{analyst median forecast EPS}_{\mathrm{jt}}$ is the median value of all analysts earnings forecast for

target stock j at quarter t. analysts average forecast EPS_{jt} is the average value of all analysts' earnings forecasts for target stock j at quarter t. P_{jt} is the target stock price at beginning of current quarter t.

Table 5.9 shows that realized forecast error is negatively related to the 3-day cumulative abnormal return around the merger announcement date.

5.8 Summary and Conclusion

I find that valuation ratios of target firms significantly impact on the analysts' near term forecasts after the merger announcement date and prior to the merger effective (withdrawn) date. In particular, an increase of market to book ratios will lead to a decrease of realized forecast errors post-merger announcement date. In addition, the initial target price ratio has a similar impact on the realized forecast errors within first two trade months after the merger announcement date.

I also find that compared to cash only deals, the magnitude of decrease in realized forecast error associated with increase in market to book ratio is larger for pure stock deals. Realized forecast errors that either result from various means of payment or results from market to book ratio will have a significant impact on the short term cumulative abnormal return for the target stocks within three day window around analysts' new forecast date that falls between the merger announcement date and the merger effective date or between the merger announcement date and the merger withdrawn date. As event study and an OLS tests shows that realized forecast errors help explain a significant cumulative abnormal return o +1.65% for target stocks within a three day window around the earnings announcement date.

My results indicate that M&A deal characteristics, such as merger means of payment and market to book ratio, have a direct impact on analysts' near term forecasts and market reacts quickly to this impact.

Table 5.1
Sample Descriptive Statistics

Table 5.1 presents the data sample descriptive statistics. I obtain individual analyst's earnings forecast quarterly data from I/B/E/S detailed files from the period January 1986 until the December 2013. An analyst enters the sample in a given year if he or she makes at least one forecast and if his or her earnings the forecast date falls between the merger announcement date and the merger effective date or between the merger announcement date and the merger withdrawn date in that year. A M&A deal enters the sample in a given year if there is at one analyst whose forecast date falls between the merger announcement date and the merger effective date or between the merger announcement date and the merger withdrawn date covering this firm in this year. An M&A deal is either announced to be merged with use of cash only payment or with use of pure stock payment.

Year	Number of deals	Number of cash only deals	Number of pure stock deals	Number of target analysts	Number of target analysts for each firm	
					Mean	Median
1986	3	3	0	6	2.00	1.00
1987	4	4	0	17	4.25	4.00
1988	10	10	0	84	8.40	4.00
1989	9	8	1	57	6.33	4.00
1990	4	1	3	14	3.50	2.50
1991	5	3	2	25	5.00	5.00
1992	2	2	0	2	1.00	1.00
1993	2	1	1	35	17.50	17.50
1994	10	9	1	76	7.60	6.00
1995	20	9	11	112	5.60	3.50
1996	15	6	9	159	10.60	3.00
1997	61	18	43	167	2.74	1.00
1998	98	29	69	594	6.06	2.00
1999	100	47	53	502	5.02	2.00
2000	75	32	43	391	5.21	2.00
2001	40	19	21	217	5.43	2.00
2002	17	6	11	113	6.65	2.00
2003	29	16	13	439	15.14	2.00
2004	42	19	13	381	9.07	3.50
2005	33	27	6	284	8.61	4.00
2006	80	66	14	664	8.30	3.00
2007	79	66	13	735	9.30	5.00
2008	36	29	7	300	8.33	4.50
2009	21	10	11	137	6.52	2.00
2010	38	30	8	364	9.58	3.00
2011	50	35	15	747	14.94	7.00
2012	32	30	2	210	6.56	2.00
2013	37	29	8	352	9.51	3.00
All	952	564	378	7184	7.46	3.63

Table 5.1 Sample Descriptive Statistics

Figure 5.1
Frequency of Near Term Analysts Forecast Relative to MAD

Figure 5.1 presents the frequency of new near term analyst forecast at various time points relative to the merger announcement date (MAD) in the period from January 1986 to December 2013. The new near term analyst forecast is selected when the forecast date falls in between the merger announcement date (MAD) and the merger effective date (MED) or between the merger announcement date (MAD) and the merger withdrawn date (MWD). I obtain earnings forecast data from I/B/E/S. I obtain MAD, MED, MWD from SDC platinum.

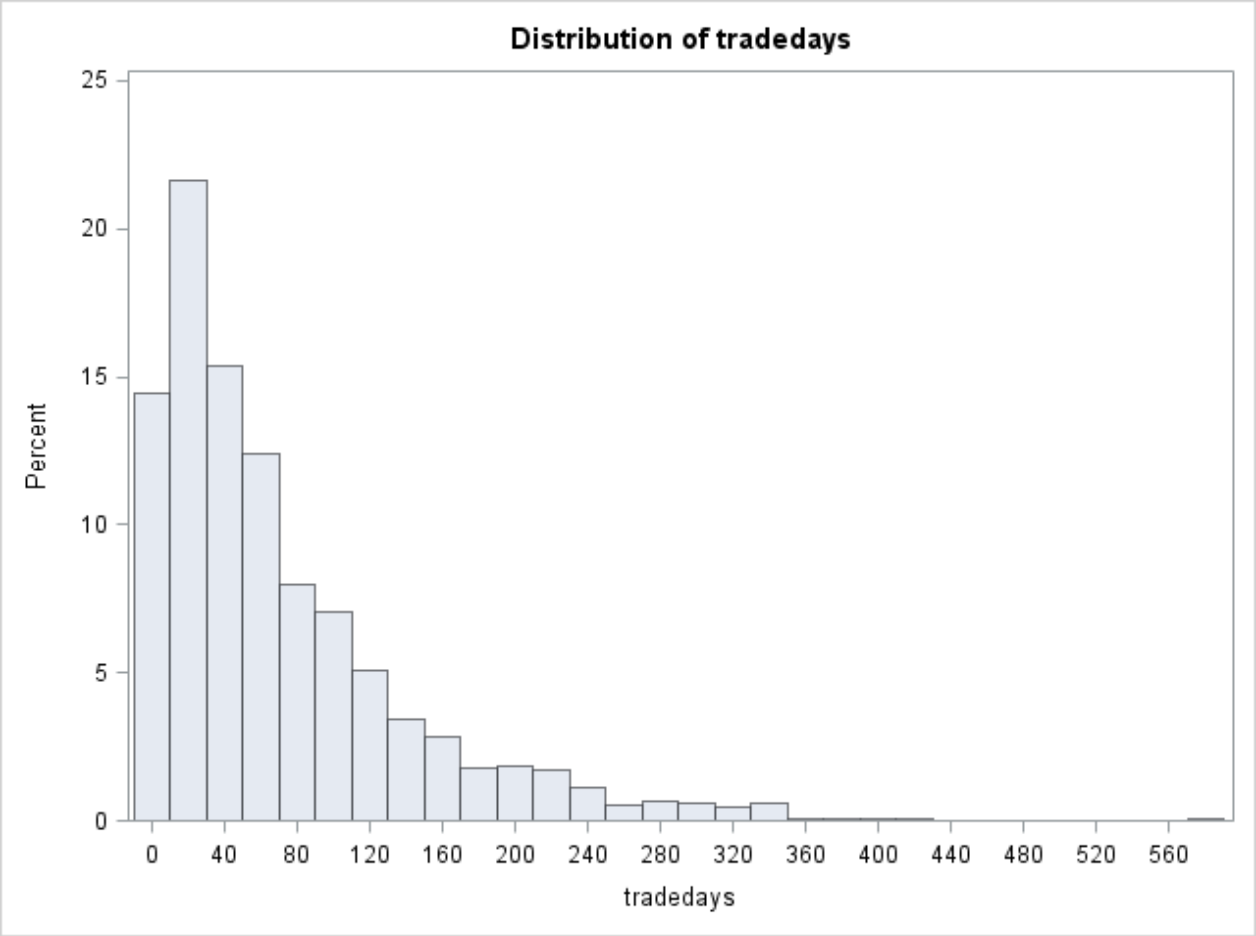


Figure 5.1 Frequency of Near Term Analysts' Forecast Relative to MAD

Figure 5.2
Weekly observations of Analysts Forecast within First 42 Trade Days Post MAD

Figure 5.2 presents the frequency of new near term analyst forecast for each trade week within first 42 trade days relative to the merger announcement date (MAD) in the period from January 1986 to December 2013. The numbers in the bracket on the horizontal axis represents the number of trade days relative to the merger announcement date. The green column presents the frequency of new near term analyst forecast for targets with cash only payment in each trade week. The red column presents the frequency of new near term analyst forecast for targets with pure stock payment in each trade week. The new near term analyst forecast is selected when the forecast date falls in between merger announcement date (MAD) and the merger effective date (MED) or between the merger announcement date (MAD) and the merger withdrawn date (MWD). I obtain earnings forecast data from I/B/E/S. I obtain MAD, MED, MWD from SDC platinum.

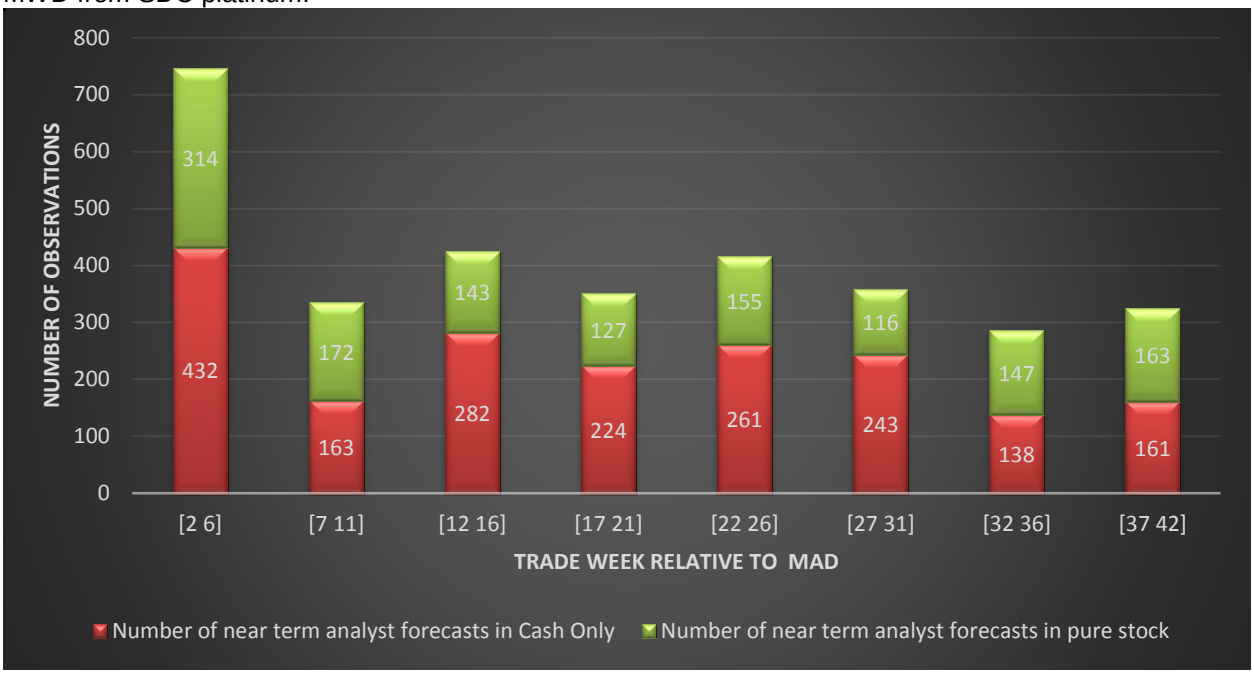


Figure 5.2 Weekly observations of Analysts Forecast within First 42 Trade Days Post MAD

Figure 5.3
Histogram of Near Term Analysts Forecast Relative to MED or MWD

Figure 5.3 presents the frequency of new near term analyst forecast at various time point relative to the merger announcement date (MED or MWD) in the period from January 1986 to December 2013. The new near term analyst forecast is selected when the forecast date falls in between the merger announcement date (MAD) and the merger effective date (MED) or between the merger announcement date (MAD) and the merger withdrawn date (MWD). I obtain earnings forecast data from I/B/E/S. I obtain MAD, MED, MWD from SDC platinum.

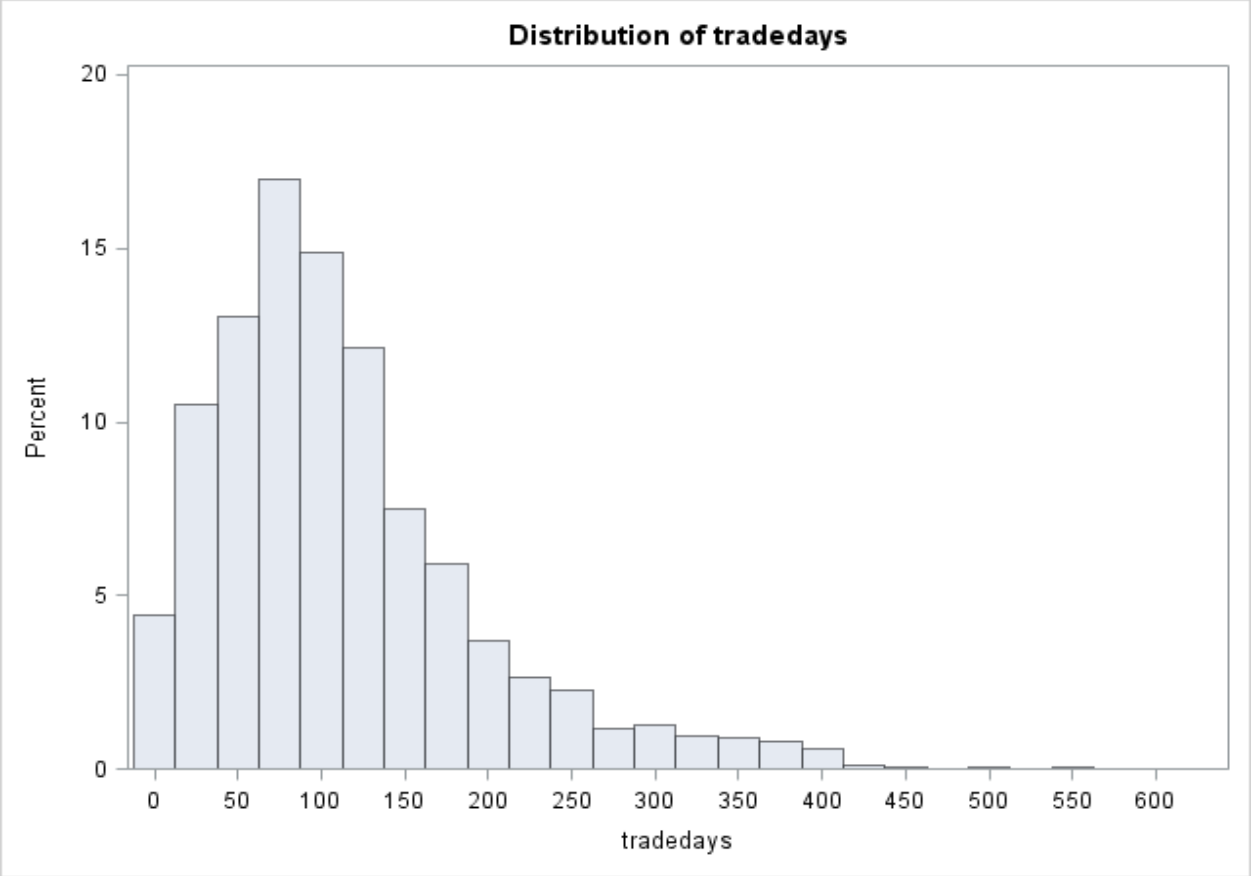


Figure 5.3 Histogram of Near Term Analysts Forecast Relative to MED or MWD

Figure 5.4
Monthly observations of Near Term Analysts Forecast Prior to MED or MWD

Figure 5.4 presents the frequency of new near term analyst forecast for each trade week within last 4 trade months relative to the merger effective date (MED) or the merger withdrawn date (MWD) in the period from January 1986 to December 2013. The numbers in the bracket on the horizontal axis represents the number of trade days relative to the merger announcement date. The green column presents the frequency of new near term analyst forecast for targets with cash only payment in each trade week. The red column presents the frequency of new near term analyst forecast for targets with pure stock payment in each trade week. The new near term analyst forecast is selected when the forecast date falls in between the merger announcement date (MAD) and the merger effective date (MED) or between the merger announcement date (MAD) and the merger withdrawn date (MWD). I obtain earnings forecast data from I/B/E/S. I obtain MAD, MED, MWD from SDC platinum.

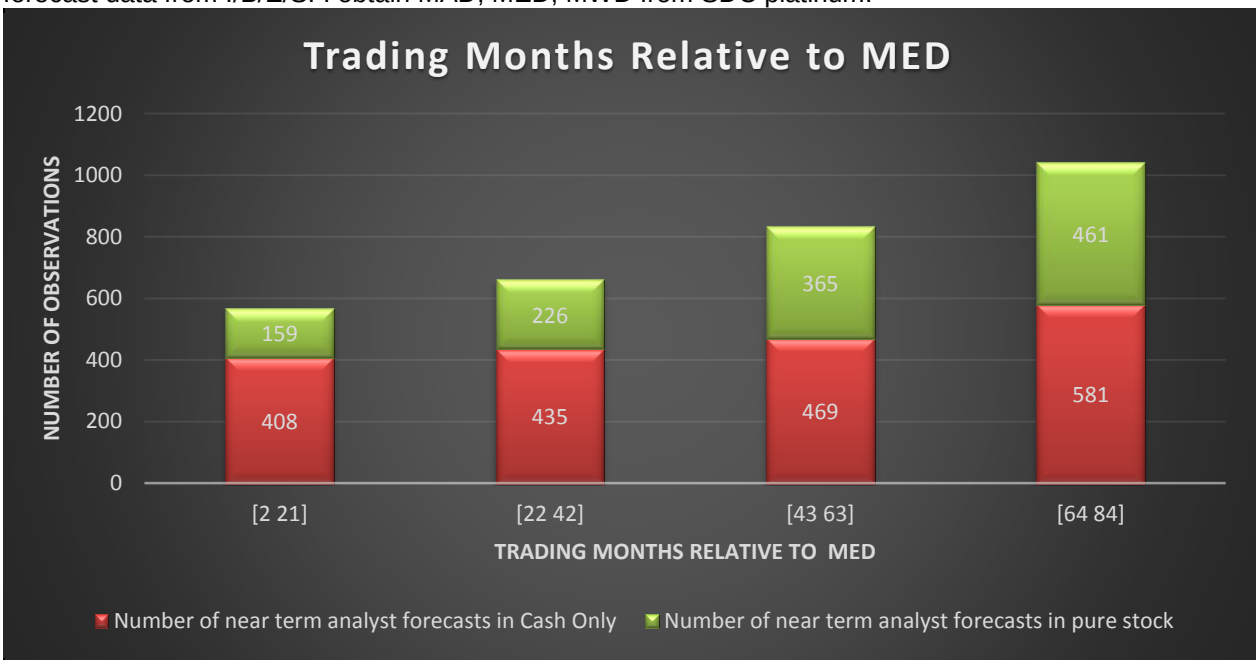


Figure 5.4 Monthly observations of Near Term Analysts Forecast Prior to MED or MWD

Table 5.2
Whole Sample Realized Forecast Error

Table 5.2 presents average realized forecast errors of individual analysts for the entire sample with analysts' near term forecast date fall between one day post MAD and MED or between one day post MAD and MWD. The sample cover the entire target firms whose stocks have been covered at least one analyst in the sample period. The whole sample is divided into two initial target price ratio groups and two market to book ration groups. The realized forecast error is calculated by using next quarter actual earnings minus current near term individual analysts' forecast. Small-Large(MB) indicates the difference between average realized forecast errors of individual analysts who cover target firms with small market to book ratio and average realized forecast errors of individual analysts who cover target firms with large market to book ratio. Small-Large(ITP) indicates the difference between average realized forecast errors of individual analysts who cover target firms with small initial target price ratio and average realized forecast errors of individual analysts who cover target firms with large initial target price ratio.

		Realized Forecast Error		
Trading Days		Panel A: Pure Stock Payment		
		Small MB firms	Large MB firms	Small-Large (MB)
	Small ITP firms	0.00014	-0.00386	0.00399
All Sample		(0.00019)	(0.00124)***	(0.00127)***
	Large ITP firms	0.00022	-0.01021	0.01060
		(0.00023)	(0.00201)***	(0.00187)***
	Small-Large (ITP)	-0.00010	0.00616	
		(0.000294)	(0.00240)**	
Trading Days		Panel B: Cash Only Payment		
		Small MB firms	Large MB firms	Small-Large (MB)
	Small ITP firms	-0.00114	-0.00146	0.00023
All Sample		(0.00022)***	(0.00051)***	(0.00058)
	Large ITP firms	-0.00038	-0.00841	0.00794
		(0.00023)	(0.00141)***	(0.00161)***
	Small-Large (ITP)	-0.00077	0.00758	
		(0.000332)**	(0.00166)***	

Table 5.2 Whole Sample Realized Forecast Error

Notes: *** indicates standard error is significant at 1% significance level
** indicates standard error is significant at 5% significance level
* indicates standard error is significant at 10% significance level

Table 5.3
Realized Forecast Error by Trade Month Relative to MAD

Table 5.3 presents average realized forecast errors of individual analysts for first and second trade months relative to MAD. The whole sample is divided into two initial target price ratio groups and two market to book ration groups. The realized forecast error is calculated by using next quarter actual earnings minus current near term individual analysts' forecast. Small-Large(MB) indicates the difference between average realized forecast errors of individual analysts who cover target firms with small market to book ratio and average realized forecast errors of individual analysts who cover target firms with large market to book ratio. Small-Large(ITP) indicates the difference between average realized forecast errors of individual analysts who cover target firms with small initial target price ratio and average realized forecast errors of individual analysts who cover target firms with large initial target price ratio.

		Realized Forecast Error		
Trading Days		Panel A: Pure Stock Payment		
		Small MB firms	Large MB firms	Small-Large (MB)
	Small ITP firms	0.00186	-0.00903	0.01090
[2 21]		(0.00049)***	(0.00435)**	(0.00355)***
	Large ITP firms	-0.00102	-0.01532	0.01420
		(0.00099)	(0.00508)***	(0.00561)**
	Small-Large (ITP)	0.00293	0.00588	
		(0.00107)***	(0.00717)	
	Small ITP firms	0.00152	-0.00428	0.00578
[2 42]		(0.00031)***	(0.00281)	(0.00221)***
	Large ITP firms	-0.00060	-0.01118	0.01080
		(0.00063)	(0.00331)***	(0.00345)***
	Small-Large (ITP)	0.00218	0.00650	
		(0.00069)***	(0.00478)	
Trading Days		Panel B: Cash Only Payment		
		Small MB firms	Large MB firms	Small-Large (MB)
	Small ITP firms	-0.00057	-0.00223	0.00154
[2 21]		(0.00046)	(0.00109)**	(0.00127)
	Large ITP firms	-0.00151	-0.00599	0.00450
		(0.00038)***	(0.00140)***	(0.00190)**
	Small-Large (ITP)	0.00101	0.00494	
		(0.00062)*	(0.00189)***	
	Small ITP firms	-0.00098	-0.00211	0.00105
[2 42]		(0.00042)**	(0.00070)***	(0.00084)
	Large ITP firms	-0.00241	-0.00775	0.00527
		(0.00044)***	(0.00129)***	(0.00181)***
	Small-Large (ITP)	0.00144	0.00594	
		(0.00065)**	(0.00161)***	

Table 5.3 Realized Forecast Error by Trade Month Relative to MAD

Notes: *** indicates standard error is significant at 1% significance level
** indicates standard error is significant at 5% significance level
* indicates standard error is significant at 10% significance level

Table 5.4
Realized Forecast Error by Trade Month Relative to MED or MWD

Table 5.4 presents average realized forecast errors of individual analysts for last and second last trade months prior to MED or MWD. The whole sample is divided into two initial target price ratio groups and two market to book ration groups. The realized forecast error is calculated by using next quarter actual earnings minus current near term individual analysts' forecast. Small-Large(MB) indicates the difference between average realized forecast errors of individual analysts who cover target firms with small market to book ratio and average realized forecast errors of individual analysts who cover target firms with large market to book ratio. Small-Large(ITP) indicates the difference between average realized forecast errors of individual analysts who cover target firms with small initial target price ratio and average realized forecast errors of individual analysts who cover target firms with large initial target price ratio.

		Realized Forecast Error		
Trading Days		Panel A: Pure Stock Payment		
		Small MB firms	Large MB firms	Small-Large (MB)
	Small ITP firms	0.00078	-0.00677	0.00755
[-21 -2]		(0.00031)**	(0.00234)***	(0.00346)**
	Large ITP firms	-0.00041	-0.00504	0.00462
		(0.01145)	(0.00255)*	(0.00335)
	Small-Large (ITP)	0.00120	-0.00174	
		(0.00145)	(0.00348)	
	Small ITP firms	0.02975	-0.27922	0.01230
[-42 -2]		(0.01050)***	(0.07170)***	(0.00378)***
	Large ITP firms	-0.04684	-0.15277	0.01150
		(0.02293)**	(0.04234)***	(0.00548)**
	Small-Large (ITP)	0.00398	0.00282	
		(0.00216)*	(0.00564)	
Trading Days		Panel B: Cash Only Payment		
		Small MB firms	Large MB firms	Small-Large (MB)
	Small ITP firms	-0.00243	-0.00093	-0.00150
[-21 -2]		(0.00134)*	(0.00251)	(0.00333)
	Large ITP firms	0.00106	-0.01763	0.01870
		(0.00123)	(0.00385)***	(0.00406)***
	Small-Large (ITP)	-0.00354	0.01660	
		(0.00200)*	(0.00490)***	
	Small ITP firms	-0.00162	-0.00234	0.00059
[-42 -2]		(0.00071)**	(0.00224)	(0.00236)
	Large ITP firms	0.00038	-0.00962	0.00999
		(0.00082)	(0.00199)***	(0.00227)***
	Small-Large (ITP)	-0.00204	0.00750	
		(0.00114)*	(0.00311)**	

Table 5.4 Realized Forecast Error by Trade Month Relative to MED or MWD

Notes: *** indicates standard error is significant at 1% significance level
** indicates standard error is significant at 5% significance level
* indicates standard error is significant at 10% significance level

Table 5.5
Variable Definitions

Table 5.5 presents the variable definitions for the panel fixed effect test. j represents the target stock. t represents the quarter between the merger announcement date and the merger effective date or between the merger announcement date and the merger withdrawn date. Those variables include $ferr_{jt}$, D_{jt} $value_{jt}$, $Size_{jt}$, $Following_{jt}$, $dispersion_{jt}$, ITP_{jt}, MB_{jt}. Those variables are all firm level variables. All variables are obtained from the Securities Data Company Platinum (SDC Platinum), Center for Research in Securities (CRSP), Institutional Brokers Estimate System (I/B/E/S) and Standard & Poor's COMPUSTAT databases.

$ferr_{jt}$	Average of individual analyst's realized forecast error for target stock j at quarter t
D_{it}	1 indicates cash only deal and 0 indicates pure stock deal
ITP_{jt}	Initial target price ratio for target firm j on the first day post-merger announcement
MB_{jt}	Market to book ratio for target firm j at quarter t
$Dispersion_{jt}$	Dispersion of analysts' near term forecasts about the target stock j at quarter t
$value_{jt}$	Total nominal consideration paid for target firm j, including all cash, securities, and assumed debt at quarter t
$Size_{jt}$	Nominal market capitalization of the target stock j at quarter t
$Following_{jt}$	Number of analysts covering target stock j at quarter t

Table 5.5 Variable Definitions

Table 5.6
Descriptive Statistics for Full Sample and Two Subsamples

Table 5.6 presents descriptive statistics for full sample and two subsamples. Observations are obtained at firm levels from January 1986 until December 2013. Panel A includes all observations that has analysts' near term forecast dates fall between MAD and MED or between MAD and MWD. Panel B includes all the observations from 2 trading days until 42 trading days post MAD. Panel C includes all the observations from 42 trading days until 2 trading days prior to MED or MWD.

	Panel A: Full Sample Descriptive Statistics					
		Pure Stock Payment			Cash Only Payment	
	N	Avg	Med	N	Avg	Med
$ln(ferr_{jt})$	151	-6.40	-6.52	201	-6.13	-6.16
$ln(ITP_{jt})$	328	-0.09	-0.08	476	-0.06	-0.03
$ln(MB_{jt})$	304	0.97	0.90	447	0.81	0.81
$ln(dispersion_{jt})$	217	-3.22	-3.49	308	-2.74	-2.71
$ln(value_{jt})$	328	6.98	6.80	476	6.86	7.03
$ln(size_{jt})$	308	6.83	6.58	469	6.69	6.75
$ln(following_{jt})$	328	1.32	1.10	476	1.26	1.10
	Panel B: [2 42] relative to MAD Descriptive Statistics					
	Pure Stock Payment			Cash Only Payment		
	N	Avg	Med	N	Avg	Med
$ln(ferr_{jt})$	145	-6.50	-6.75	184	-6.23	-6.26
$ln(ITP_{jt})$	302	-0.09	-0.08	418	-0.06	-0.03
$ln(MB_{jt})$	283	0.98	0.92	394	0.81	0.82
$ln(dispersion_{jt})$	182	-3.40	-3.57	222	-2.94	-3.00
$ln(value_{jt})$	302	7.06	6.93	418	6.94	7.06
$ln(size_{jt})$	287	6.90	6.73	413	6.76	6.84
$ln(following_{jt})$	302	0.99	0.69	418	0.91	0.69
	Panel C: [-42 -2] relative to MED or MWD Descriptive Statistics					
	Pure Stock Payment			Cash Only Payment		
	N	Avg	Med	N	Avg	Med
$ln(ferr_{jt})$	53	-6.69	-6.70	95	-6.22	-6.32
$ln(ITP_{jt})$	109	-0.10	-0.08	225	-0.06	-0.03
$ln(MB_{jt})$	98	1.01	0.96	210	0.80	0.81
$ln(dispersion_{jt})$	57	-3.16	-3.16	193	-2.94	-2.88
$ln(value_{jt})$	109	7.34	7.26	225	7.00	7.18
$ln(size_{jt})$	100	7.14	6.97	222	6.81	6.99
$ln(following_{jt})$	109	0.80	0.69	225	0.81	0.69

Table 5.6 Descriptive Statistics for Full Sample and Two Subsamples

Table 5.7
Realized Forecast Errors and Misvaluation Ratios

Table 5.7 presents panel fixed effect regression of realized forecast errors on the misvaluation ratios in terms of initial target price ratio (ITP) and market to book ratio (MB). Full sample includes all observations that have analysts' near term forecast dates fall between MAD and MED or between MAD and MWD. First subsample includes all the observations that have analysts' near term forecast dates starting from 2 trading days until 42 trading days post MAD. Second subsample includes all the observations that have analysts' near term forecast dates starting from 42 trading days until 2 trading days prior to MED or MWD. The full sample set is a pooled time-series cross-sectional sample of 804 firm quarter forecast observations for period 1986-2013. The first and second subsample set is a pooled time-series cross-sectional sample of 720 and 334 firm quarter forecast observations for period 1986-2013.

	Full Sample	[2 42] relative to MAD	[-42 -2] relative to MED or MWD
Constant	-2.73	-2.78	-3.32
	(0.45)***	(0.46)***	(0.92)***
D_{jt}	-0.27	-0.21	0.60
	(0.15)*	(0.17)	(0.35)*
$ln(ITP_{jt})$	0.69	0.91	0.76
	(0.49)	(0.54)*	(0.82)
$ln(MB_{jt})$	-0.46	-0.32	-0.75
	(0.14)***	(0.13)**	(0.28)***
$ln(dispersion_{jt})$	0.54	0.52	0.52
	(0.06)***	(0.07)***	(0.13)***
$ln(value_{jt})$	0.12	-0.01	0.01
	(-0.31)	(0.30)	(0.36)
$ln(size_{jt})$	-0.31	-0.02	-0.10
	(0.31)	(0.29)	(0.35)
$ln(following_{jt})$	0.02	-0.04	-0.30
	(0.09)	(0.12)	(0.24)

Table 5.7 Realized Forecast Errors and Misvaluation Ratios

Notes: *** indicates standard error is significant at 1% significance level
** indicates standard error is significant at 5% significance level
* indicates standard error is significant at 10% significance level

Table 5.8
Cumulative Abnormal Returns around New Forecast Date

Table 5.8 reports cumulative abnormal returns within a three days window of the earnings announcement date [-1 1] A three days window can disentangle earnings surprise impact on short term abnormal return of target stocks from other impacts.

Period	Full Sample (N=514)
[−1 1]	1.65% (0.91)*

Table 5.8 Cumulative Abnormal Returns around New Forecast Date

Notes: *** indicates standard error is significant at 1% significance level
** indicates standard error is significant at 5% significance level
* indicates standard error is significant at 10% significance level

Table 5.9
Realized Forecast Error impact on Cumulative Abnormal Return

Table 5.9 presents cumulative abnormal returns within a three days window of the earnings announcement date [-1 1]. A three days window can disentangle earnings surprise impact on short term abnormal return of target stocks from other impacts. $\mathrm{MNMD_{jt}}$ captures the difference between analysts' belief of average and analysts' belief of median earnings forecasts in next quarter. $\mathrm{CAR_{jt}}(t-1, t+1)$ captures the 3 day cumulative abnormal return of target stocks around earnings announcement date. $Ferr_{jt}$ captures the earnings surprise of target stocks on the actual earnings announcement date.

	Dependent Variable $CAR_{jt}(t-1, t+1)$ (N=870)
Constant	0.033
	(0.007)***
$Ferr_{jt}$	-0.385
	(0.156)**
$MNMD_{jt}$	-1.754
	(11.346)

Table 5.9 Realized Forecast Error impact on Cumulative Abnormal Return

Notes: *** indicates standard error is significant at 1% significance level
** indicates standard error is significant at 5% significance level
* indicates standard error is significant at 10% significance level

Chapter 6 Merger Means of Payment and Analyst Forecast Inefficiency around the Merger Announcement Date

6.1 Introduction

Are analysts efficient in estimating the near term earnings forecasts of target firms when it comes to reacting to the change of information uncertainty of target firms around merger announcement date? I attempt to answer this question by studying the response of analysts' near term forecast behavior toward the change of information uncertainty of target firms around the merger announcement date. Previous research examines the irrationality of analysts' earnings forecasts in three areas. First, the inefficiency of analysts' earnings forecasts is reflected by the systematic biased long term growth in analyst earnings forecasts. Lin and McNichols [7] demonstrate that analysts affiliated with underwriters are more likely to issue positive biased long term growth forecasts than unaffiliated analysts. Dechow et al. [15] show that analysts tend to issue optimistic long term growth forecasts toward equity issuers. Lim [11] illustrates that analysts report a positive long term earnings forecast bias in order to please the management. Similar findings have been reported by Dugar and Nathan [6], Hughes et al. [42] and So [40]. This chapter contributes to the literature by documenting the impact of merger and acquisition characteristics' (such as merger means of payment method and the change of information uncertainty) on near term analysts' earnings forecasts inefficiency.

Second, researchers examine inefficiency of analysts' earnings forecasts by studying the analysts' weight allocation to private/public information. Beyer and Guttman [43]

find that analysts overweight past positive public information, and this leads analysts to issue optimistic earnings forecasts. Similar evidence can be found in Bernhardt et al. [44] and Chen and Jiang [45]. Those papers emphasize the static impact of analysts' weight allocation to private/public information on the analysts' forecast inefficiency. This chapter adds to the second area of the literature by examining the dynamic, or time series impact of analysts' weight allocation to private/public information on analysts' earnings forecast inefficiency.

Third, researchers examine irrationality of analysts' earnings forecasts by studying the systematic mis-reaction to information. Campbell and Sharpe [46] find that macroeconomic analysts systematically underreact to the value of the prior month's macroeconomic release. Similar findings have been documented by De Bondt and Thaler [47], Abarbanell and Bernard [19], Eastwood and Nutt [48], Bradshaw et al. [49] and Zhang [50]. This chapter adds to the third area by examining analysts' systematic mis-reaction to public information in mergers and acquisitions. I show that analysts systematically mis-react to the target stock mis-valuation ratio around merger announcement dates.

I investigate how the change of information uncertainty contributes to analysts' incentives to generate trading commissions around merger announcement dates. Information uncertainty refers to volatility of analysts' earnings forecast estimates toward target firm, which reflects the degree of ambiguity with respect to the implications of new analyst information for the target firms' earnings estimates. I measure information uncertainty by the standard deviation of analysts' forecasts. The primary hypothesis is that if the analysts are motivated to generate trading commissions

around the merger announcement date, they will issue more optimistic near term earnings forecast toward target stocks for large changes in information uncertainty of target stocks around the merger announcement date. Analysts tend to issue more optimistic near term optimistic forecasts toward target stocks when there is an increase of information uncertainty around the merger announcement date. In turn, this optimistic bias leads to a pattern of increased short term trading volume for target stocks around the merger announcement date. My findings are consistent with the previous finding that analysts overweight the past positive information to generate trading commissions, as in Bernhardt et al. [44], Chen and Jiang [45], and Beyer and Guttman [43].

Prior research also suggests that sell side analysts' forecast inefficiency around merger and acquisition is driven by conflicts of interest (e .g. Erickson and Wang [51], Louis [24], Chan et al. [23], Kolasinski and Kothari [8], Juergens [5], Sibilkov et al.[52]). This chapter extends the literature by indicating that near term sell side analysts' forecast inefficiency around merger and acquisition is driven by the incentive to generate trading commissions around the merger announcement date. Results also support Jackson [53]'s analysts' incentive hypothesis that analysts are motivated to generate trading commissions with a sacrifice of short term forecast accuracy.

One explanation for analyst forecast inefficiency around the merger announcement date derives from behavioral finance. Barberis et al.[54], Daniel et al.[55],Hirshleifer [56], Zhang [57] and Hirshleifer et al. [58] shows that analysts' forecast inefficiency becomes more severe with greater psychological bias that is associated with greater information uncertainty. Erickson et al. [59] and Duchin and Schmidt [60] suggest that acquisition

announcement elevates the level of the information uncertainty of target firms' fundamentals. Similarly, analysts' forecast inefficiency around the merger announcement date may be caused by the psychological bias, and this bias will be larger and hence the analysts will be more likely to issue a more optimistic forecast toward target stocks when there is an increase of information uncertainty for target stocks.

The second explanation for analyst forecast inefficiency around merger announcements relates to the change of analysts' weight allocation to private/public information around the merger announcement date. I use a simple Bayesian model to examine the impact of change of analysts' weight allocation to private/public information on the sensitivity of change of forecast error dispersion relative to the change of analysts' forecast dispersion. I find that when analysts overweight positive public information more in the quarter after merger announcement than in the previous quarter, and information uncertainty increases around the merger announcement, the degree of forecast inefficiency increases in the quarter after the merger announcement date. This chapter extends the analyst forecast inefficiency literature regarding weighing information. Many papers, including Bernhardt et al.[44], Chen and Jiang [45], and Beyer and Guttman [43] focus on the analysts' under/overweight with regard to the first moment variable such as deviation from the analysts' forecast consensus. This chapter adds to this literature by exploring the analysts' over/under weight with regard to the standard deviation of analysts' forecasts, i.e., information uncertainty. Information uncertainty influences on the degree of analysts' psychological biases, which in turn impacts forecast inefficiency.

I use the degree of target analysts' forecast inefficiency around the merger announcement date as my proxy for target analysts' earnings forecast errors. To the extent that initial offer price is the proxy for the fair value of target firm, I also use the initial target price ratio, i.e., the ratio of target stock closing price on the first trading day after merger announcement date to the initial offer price made by the acquirer. This ratio stands for the degree of target firm overvaluation. Jindra and walking [36] and Bessembinder and Zhang [37] use this ratio as a target firm mis-valuation measure. Initial offer price contains short term forward looking price information from the acquirer's perspective. Thiagarajan and Walther [10] as well as Matsumoto [21] show that the manager's guidance on earnings leads analysts to issue frequent pessimistic near term earnings forecast in order to boost the firm's stock price. Richardson, Teoh and Wysocki [13] document that managers guide analysts to issue pessimistic near term forecasts in order to benefit the insider sale of equity through a positive earnings surprise. Similarly, I believe the acquirer's guidance information on M&A transaction in terms of initial offer price has a significant impact on near term analysts' earnings forecasts. In addition, the market to book ratio reflects a degree of momentum for the target price around the merger announcement. According to Ivkovic and Jegadeesh [25], sell side analysts generally recommend positive momentum stocks. Therefore, the market to book ratio of target firm can have significant impact on the near term analysts' forecast errors toward target firm. I expect analysts' forecast inefficiency to initial target price ratio or market to book ratio of target firms to be more severe when target firms have a large degree of mis-valuation.

Prior research has shown that merger means of payment plays a significant impact on the target stock market mis-valuation. Huang and Walking [60] showed that target abnormal returns are significantly higher under cash only payment than stock payment. Similar findings are documented in Gilson et al. [62], Shleifer and Vishny [3] and Alexandridis et al. [63]. Dong et al [38] find that a higher degree of investors' forecast inefficiency is associated with a higher degree of firm mis-valuation. Similarly, I expect a higher degree of analysts' forecast inefficiency is associated with a higher degree of target stock mis-valuation. By combining these concepts, I hypothesize that analysts' forecast inefficiency is more severe under cash only payment than under pure stock payment.

6.2 Hypothesis Development

There is substantial evidence of short term price continuation for target stocks around merger announcement. Andrade and Stafford [64] reported a significant average three day abnormal return of 16% for target firm and this return rise to 24% over a longer period around merger announcement. Similar evidence can be found in sanders and Zdanowicz [65], Shelifer and Vishy [3], Rhodes-Kropf and Viswanathan [39] and Alexandridis et al. [63]. Zhang [50] suggests analysts exaggerate the favorable information of merger announcements and the resulting positive analyst response contributes to target stock price drift around merger announcements.

Many papers indicate analyst forecast inefficiency is positively correlated with the degree of analysts' behavioral bias. Daniel et al. [55], Barberis et al. [54] and Eastwood and Nutt [48] indicate analyst forecast inefficiency is more severe when analysts exhibit

a larger degree of behavioral bias such as conservative bias. Hirsheifer [56] suggests that the increase of uncertainty about firms' fundamentals is associated with the increase of psychological bias. In addition, Erickson et al. [59] illustrate that merger and acquisition increases the level of information uncertainty about target firms' fundamentals. I expect merger announcements increase the level of information uncertainty of target stock fundamentals. Analysts exhibit a larger degree of conservative bias. This leads analysts to give more optimistic near term analysts' forecast and results in a decrease of near term target analysts' forecast errors. When informed investors act on this bias, I should observe target stock prices continuing to drift upward immediately after merger announcement. My first hypothesis is: H1: the larger increase of the information uncertainty around the merger announcement date, the lower near term analysts' forecast errors will be.

Prior research (Jasckson [53], Cowen et al. [66], Beyer and Guttman [43]) documents analysts' conflicts of interest empirical tests by revealing that analysts issue near term optimistic earnings forecasts on stocks they cover in order to generate trading commissions. I believe this conflict of interest is also likely to occur around the merger announcement date because investors are likely to frequently trade target stocks around the merger announcement date. Hence, my second hypothesis is:
H2: Sell side analysts tend to issue optimistic near term earnings forecasts toward target stocks immediately after the merger announcement in order to generate short term trading volume of target stocks.

Bradshaw [67] shows that analysts' forecast inefficiency relates to firms' mis-valuation, and the analysts' earnings forecast errors are correlated with firms' mis-valuation. I

proxy target analysts' earnings forecast errors as the degree of target analysts' forecast inefficiency to target firms' mis-valuation around the merger announcement date. Bessembinder and Zhang [37] suggest that initial target price ratio is a reasonable measure of target stocks mis-valuation. Dong et al. [38] suggests market to book ratio is another measure of target stock mis-valuation. One goal of this chapter is to determine how near term analysts' earnings forecast behavior responds to target mis-valuation ratios around merger announcement dates. Dong et al. [38] show that previous high earnings growth of target firms is associated with large target mis-valuation ratios. If the analysts are irrational in predicting the near term earnings forecasts around merger announcement dates, I would expect analysts to extrapolate the previous high earnings growth of those high target mis-valuation ratio stocks into near future. Analysts are more likely to predict a very optimistic near term earnings forecast for target stocks with large target mis-valuation ratios. Livnat et al. [16] show that analysts' earnings forecasts are negatively related to the realized forecast error. I would expect relatively small realized forecast errors to be generated toward target stocks with large mis-valuation ratios. Thus my third hypothesis is: H3: an increase in the initial target price ratio or an increase in the target market to book ratio will lead to a decrease in the realized target analysts' forecast error.

Huang and Walking [61] show that target abnormal return is significantly higher under cash only payment than stock payment. Gilson et al. [62], Shleifer and Vishny [3] and Alexandridis et al.[63] report similar findings. Dong et al [38] find that a higher degree of investor forecast inefficiency is associated with a higher degree of firm mis-valuation. Similarly, I expect a higher degree of analyst forecast inefficiency associated with a

higher degree of target stock mis-valuation. Thus my fourth hypothesis is: H4: analyst forecast inefficiency is more severe under cash only payment than under pure stock payment.

This chapter also gives two explanations for analyst forecast inefficiency around the merger announcement date. The first is that analyst forecast inefficiency is caused by psychological biases. The second is that analys forecast inefficiency originates from a weight misallocation to public/private information, and this misallocation is caused by analysts' incentives to generate trading commissions.

6.3 Data and Variable Description

6.3.1 M&A Deals

I obtain U.S. domestic M&A transaction data from Securities Data Corporation (SDC) Platinum for years 1980 to 2014. My sample consists of all mergers and acquisitions. I limit my study to U.S. firms. I include cash only, stock only and mixed payment methods under completed status or withdrawn status in my sample. To calculate the initial offer price ratio, I require the accessibility of the initial offer price in SDC and the closing target stock price on the first day following the M&A announcement date in CRSP. In addition, I exclude M&A announcement days that are not a trading day, and I exclude observations with target stock closing price less than five dollars on the merger announcement date. The initial target price ratio is the closing target stock price on the first day following the merger announcement date over the initial offer price. I exclude the observations with missing initial target price ratio. My final sample consists of 4,798 mergers and acquisitions from 3,946 target stock CUSIPs.

6.3.2 Merging Deals with Forecast

I upload those 3,946 unique target stock CUSIPs into the I/B/E/S detail history database and select the quarterly observations starting from January 1980 to December 2014. I get 3,292 unique target stock CUSIPs matched with the original 3,946 codes. I focus on analysts near term EPS forecasts because Ivkovic and Jegadeesh [25] show that one quarter head earnings per share forecast plays an important role in capturing the analyst forecast bias after earning announcement date. I examine the impact of the change on information uncertainty on the analysts' near term earnings forecasts. Therefore, I include the analysts' observations that have a forecast announcement date that falls within a 63 trading day window around the merger announcement date. This yields 2,645 target stock CUSIPs. To avoid extremely volatile analyst dispersion created by the small number of analyst observations, I follow Diether et al. [68] and only include the observations with at least two individual analysts following one target firm. This yields 2,555 unique full target stock CUSIPs.

6.3.3 Merging Deals with Compustat

I upload the 2,555 unique target stock CUSIPs into the Compustat North America database and select the fundamental quarterly observations starting from January 1980 to December 2014. This procedure yields 2,092 unique full target stock CUSIPs.

6.3.4 Merging with CRSP

I upload the 2,092 unique target stock CUSIPs into CRSP database and select the daily observations starting from January 1980 to December 2014. I also choose a 63 trading

day window around the merger announcement date. This yields 1,586 unique full target stock CUSIPs.

6.3.5 Time Window Selection

Following Richardson, Teoh and Wysocki [13]'s analysts forecast sorting method to examine near term analyst forecast bias, I select compustat observations one quarter prior to earnings announcement date over the quarterly horizon, and I calculate a consensus earnings per share (EPS) forecast for each firm using the median of individual analyst forecasts within current quarter. Therefore, this consensus is a near term EPS forecast consensus. Following Livnat et al. [16], I define forecast error as actual EPS minus the consensus divided by the stock price at the end of the quarter. The stock price denominator is to avoid potential spurious relations resulting from cross sectional scale differences in earnings per share. A negative forecast error indicates a near term negative earnings surprise or a near term optimistic analyst's forecast before earning announcement. A positive forecast error indicates a near term positive earning surprise or a near term pessimistic analyst's forecast before earning announcement. The following formula defines my forecast error.

$$\mathrm{FERR_{jt}} = \frac{\text{actual } \mathrm{EPS_{jt}} - \text{analyst forecast } \mathrm{EPS_{jt}}}{\mathrm{P_{jt-1}}} \qquad (1)$$

Where subscript i indicates individual analysts and the j indicates the firm j and t indicates quarter t. The first forecast is available in I/B/E/S detail history for firm j and quarter t. $\text{analyst forecast } \mathrm{EPS_{jt}}$ is the median value of individual analysts' forecast about firm j at quarter t. I obtain the quarterly actual earnings per share $\text{actual } \mathrm{EPS_{jt}}$through I/B/E/S detail history and stock price at the beginning of the quarter $\mathrm{P_{jt-1}}$ through

Compustat after merging the final compustat, final forecast, and SDC database by CUSIP and quarter. Following Erickson et al. [59] I select my forecast date window within a 90 days around the merger announcement date. I set the sample with a forecast date window that falls within a 63 trading day window before the merger announcement date as premerger sample, and I limit my analyst observations to Q6 observation. Finally, I set the sample with a forecast date window that falls within a 63 trading day window after the merger announcement date as my post-merger sample. I then merge the premerger sample with the post-merger sample by target CUSIP and the merger announcement date, yielding 970 target cusip CUSIPs.

6.3.6 Data and Descriptive Statistics

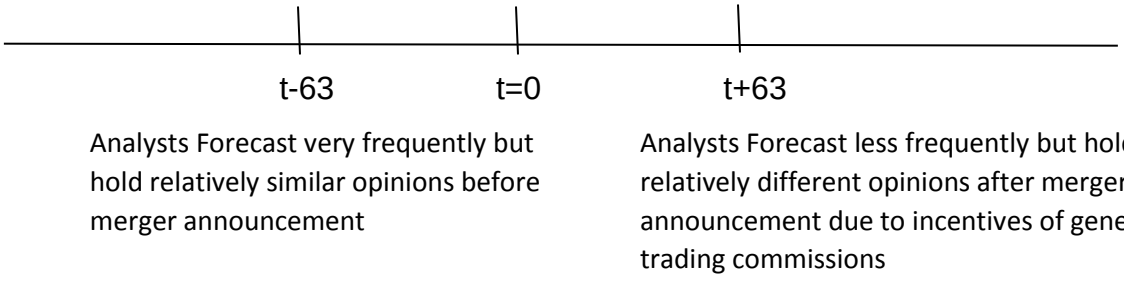
I construct my data sample from three sources. I obtain sell side analysts' earning forecasts for the period from January 1980 to December 2014.The I/B/E/S detail files give the analysts' earnings forecast, forecast date, actual earnings, actual earnings announcement date information. In addition, I focus on the one quarter ahead analysts' earnings forecast (Q6). Moreover, I obtain the merger announcement date, merger effective date as well as merger withdrawal date from SDC platinum database. I include cash only, stock only deals under completed status or withdrawn status in my sample. I retrieve quarterly accounting data such as book equity and earning announcement date from COMPUSTAT. Finally, the daily stock return data and S&P 500 return data come from CRSP. I restrict my sample selection within a time frame that has individual analysts' forecast dates that fall within a 63 trading day window around the merger announcement date.

Table 6.1 presents the sample descriptive statistics. The table presents the number of deals followed by target analysts, the number of deals in cash only payment as well as in pure stock payment for each year, the number of target analysts following the deals for each year and mean, median number of target analysts covering each firm for each year. A target analyst enters the sample in a given year if he or she makes at least one forecast for target firm and if his or her earning forecast date falls within a 63 trading day window around the merger announcement date. A M&A deal enters the sample in a given year if there is at least one target analyst whose forecast date falls within a 63 trading day window around the merger announcement date. An M&A deal is either announced to be merged with use of cash only, pure stock and mixed payment method.

The number of observations that have forecast date fall within a 63 trading day window around the merger announcement date in I/B/E/S database stays flat from year 1987 to 1994. However, it generally increases at a fast paste from year 1995 to 2000. Then it declines from year 2001 to 2003. It subsequently increases from year 2004 to 2008. It shifts to decreases sharply in 2009 and 2010 and reverses its trend from 2011 to 2013 but declines again in 2014. The number of target analysts followed the similar patterns as the number of deals. These figures show the extent of target analysts' coverage for the M&A deal greatly increased during the sample period. This trend is suggestive of increasingly important role played by target analysts in the process of disseminating real value of target firm in a time frame within a 63 trading day window around the merger announcement date. Table 6.2 presents the descriptive statistics for the variables and variable definitions in this paper.

6.3.7 Timeline of analysts' near term forecast

I first examine the timing of analysts' near term forecast relative to the merger announcement date (MAD). For each analyst's one quarter ahead earnings forecast post MAD, I compute the number of trading days between individual analysts forecast date and current MAD. Because I am interested to see whether M&A announcement has a significant impact on analysts' near term forecast within a 63 trading day window around the merger announcement date. I define my timeline relative to the MAD in the following:



t=0 (=MAD), [-63 63]

Suppose AFD is short for the analyst forecast date. I define the number of trading days as follows:

$$t = (\mathrm{AFD} - \mathrm{MAD}) - t_{\mathrm{weekendsAFDMAD}} - t_{\mathrm{holidaysAFDMAD}}$$

Where $t_{\mathrm{weekendsAFDMAD}}$ is the number of weekend days that falls into the time frame between merger announcement date and analyst forecast date. $t_{\mathrm{holidaysAFDMAD}}$ is the number of holidays listed by New York Stock Exchange that falls into the time frame between merger announcement date and analyst forecast date. I choose a 63 trading day window around the merger announcement date because most merger arbitrage activity occurs in this time period. As evidenced by Figure 6.1, the trading volume of

target stock shares has picked up very fast around the merger announcement date. When analysts saw this momentum trend around the merger announcement date, analysts are likely to flow with the trend and give optimistic near term forecasts toward target stocks in order to generate trading commissions in the near term. In addition, I follow Beyer and Guttman [43] to use one quarter time window around the merger announcement date.

6.4 Empirical Analysis of Near Term Analysts Forecast Inefficiency around the Merger Announcement Date

In this section, I examine the relationship between the change of information uncertainty, near term analysts' forecast inefficiency, trading volume of target stocks and target stock mis-valuation. I test the following hypotheses. First, would the increase of the change of information uncertainty lead analysts to give more optimistic near term earnings forecasts toward target stocks around the merger announcement date? Second, compared to undervalued target stocks, would overvalued target stock price lead analysts to issue more optimistic near term earnings forecasts toward target stocks around the merger announcement date? Third, would analysts issue more optimistic near term earnings forecasts toward cash only target stocks than toward pure stock target stocks around the merger announcement date? Fourth, is the near term analysts' earnings forecast inefficiency related to the analysts' incentives of generating short term trading volume around the merger announcement date?

6.4.1 The Change of Information Uncertainty and Near Term Analysts' Forecast Inefficiency around the Merger Announcement Date

First, I test the relationship between the change of information uncertainty and near term analysts' forecast inefficiency. The link between those two variables are important to establish because it provides the empirical evidence that the change of information uncertainty, which is a measure of information asymmetry between target firms and analysts, plays an important role in shaping the near term analysts' earnings forecasts inefficiency.

The change of information uncertainty is measured using the difference between the analysts' near term earnings forecast dispersion within a 63 trading day window after the merger announcement date and the analysts' near term earnings forecast dispersion within a 63 trading day window before the merger announcement date. The near term analysts' forecast inefficiency is measured by the near term analysts' forecast errors. This forecast error is defined in the section 3.5. A non-zero analysts' forecast error indicates near term analysts' forecast is inefficient. The larger the magnitude of the analysts' forecast error, the larger the degree of near term analysts' forecast inefficiency it is. I have conducted the univariate tests to examine the linkage. I sort the change of information uncertainty into five ranks. As table 6.3 shows us when the change of information uncertainty increases around the merger announcement date, the degree of analysts' forecast inefficiency tends to increase because the magnitude of the analyst forecast errors is increasing. In addition, I also see analysts tend to make more optimistic earnings forecast toward target stocks.

To isolate the effects of the change of information uncertainty, I follow Jackson [53],Kolasinki and Koarthi [8], Erickson et al.[59] as well as Bessembinder and Zhang [37] to have target market size, target market to book ratio, number of target analysts

following target stocks, merger means of payment and initial target price ratio as my controlled variables for the dependent variable near term analysts' forecast errors. After controlling the firm-specific factors that impact on the analysts forecast errors, the near term analysts' forecast errors I use here can be serially correlated and also shocks from the same industry can cause analysts' forecast errors to be correlated. To adjust this correlation issue, I cluster standard errors of the regression by four digit target SIC industry and for the same calendar quarter. I use the following model 6.1 and model 6.2 to obtain my regression results:

$$\ln(\text{ferr}_{jt+1}) = \beta_0 + \beta_1 \text{Dummy}_{jt} + \beta_2(\text{dispersion}_{jt+1} - \text{dispersion}_{jt+1}) + \beta_3 \ln(\text{size}_{jt+1}) + \beta_4 \ln(\text{ITP}_{jt}) + \beta_5 \ln(\text{following}_{jt+1}) + \beta_6 \ln(\text{MB}_{jt+1}) + \varepsilon_{jt+1} \quad (6.1)$$

$$\ln(\text{ferr}_{jt+1}) = \beta_0 + \beta_1 \text{Dummy}_{jt} + \beta_2(\text{dispersion}_{jt+1} - \text{dispersion}_{jt+1}) + \beta_3(\text{dispersion}_{jt+1} - \text{dispersion}_{jt+1}).\text{Dummy}_{jt} + \beta_4 \ln(\text{size}_{jt+1}) + \beta_5 \ln(\text{ITP}_{jt}) + \beta_6 \ln(\text{following}_{jt+1}) + \beta_7 \ln(\text{MB}_{jt+1}) + \varepsilon_{jt+1} \quad (6.2)$$

Table 6.4 reveals that the change of information uncertainty has a significant impact on the near term analysts' forecast errors. This result justifies the idea that when the change of information uncertainty increases around the merger announcement date, analysts tend to issue more optimistic near term earnings forecast toward target stocks. Table 6.4 shows that within the same rank of the change of information uncertainty, compared to pure stock payment, the analysts are more willing to issue a more optimistic near term earnings forecast toward target stocks under cash only stock payment or mixed payment.

6.4.2 Target Stock Misvaluation and Near Term Analysts' Forecast Inefficiency around the Merger Announcement Date

Second, I examine whether an overvalued target stock price lead analysts to issue more optimistic near term earnings forecasts toward target stocks when compared to undervalued stocks around the merger announcement date overvalued stocks. As previous papers (Andrade and Stafford [64], Mitchell [69] and Louis [24]) document merger arbitrage activities are usually carried out around the merger announcement date, the target stock price is usually largely mis-valued around the merger announcement date. According to Abarnell [69], analysts mis-react to the previous stock valuation and results in analysts' forecast inefficiency. This inefficiency often leads informed investors to trade the stocks. I am interested in examining whether analysts mis-react to the previous target stock mis-valuation and results in near term analysts' forecast inefficiency around the merger announcement date. This is an important question because it sheds light on how analysts react to target stock valuation and its subsequent impact on the target stock price around the merger announcement date.

I use the degree of near term analysts' forecast errors as the degree of near term analysts' forecast inefficiency around the merger announcement date. To examine the relationship between target stock mis-valuation and near term analysts' forecast inefficiency around the merger announcement date, I first conduct a single sort and double sort univariate test to examine the linkage. Panel A in table 6.5 is sorts the sample only by the target misvaluation. It discloses that analysts are likely to issue a more optimistic near term earnings forecast toward target stocks when the valuation of target stock decreases.. In addition, Panel B in table sorts the sample by both target

misvaluation and the change of information uncertainty. The result in table 6.5 is consistent with my previous finding that the increase of the change of information uncertainty will lead to more optimistic analysts' earnings forecast and a higher degree of analysts' forecast inefficiency. Moreover, I define the ITP>1 or MB>1 as overvalued target stocks and ITP<1 or MB<1 as undervalued target stocks. In panel B, compared to overvalued target stocks, analysts issue more optimistic near term earnings forecasts and analysts' forecast inefficiency is even more severe toward the undervalued target stocks.

6.4.3 Merger Means of Payment and Near Term Analysts' Forecast Inefficiency around the Merger Announcement Date

This section tests whether analysts will give more optimistic earnings forecast toward cash only target stocks than toward pure stock target stocks around the merger announcement date. Merger means of payment has played an important role in impacting the target stock abnormal returns around the merger announcement date. Because the analysts use previous stock valuation as their inputs to produce their earnings forecast, I will be likely to see this factor has a strong impact on the near term analysts' forecast behavior around the merger announcement date.

I first conduct a single sort univariate test to examine the linkage. Table 6.6 reveals that analysts issue more optimistic earnings forecasts toward cash only target stocks than toward pure stock target stocks in the first and the fifth rank of the change of information uncertainty but it reverses its trend in the other three ranks. This indicates that merger means of payment does not significantly impact the near term analyst forecast behavior.

This is consistent with the finding of Koathari and Kolasinski [8]. When the change in information uncertainty increases, the analysts give more optimistic earnings forecast toward target stocks. This pattern is consistent with what I find in Sections 4.1 and 4.2.

6.4.4 What Causes the Near Term Analysts' Forecast Inefficiency

This section answers the question is the near term analysts' earnings forecast inefficiency related to the analysts' incentives of generating short term trading volume around the merger announcement date?. According to Jackson [53], generating trading commissions is a strong motive for analysts to issue biased earnings forecasts because analysts' compensations are tied to the trading commissions. In addition, Irvine [70] finds that the impact of analysts' earnings forecast on the stocks' trading volume is larger when the analysts' earnings forecasts have larger deviation from the consensus. Similarly in a context of merger and acquisition, I will observe the impact of analysts' earnings forecasts on trading volume becomes stronger and analysts are more likely to issue biased earnings forecasts when the change of analysts' forecast dispersion increases or the change of information uncertainty increases around the merger announcement date. To examine the relationship between target stock trading volume and the change of information uncertainty around the merger announcement date, I first conduct a single sort univariate test to examine the linkage. Table 6.7 panel A reveals that analysts issue more optimistic earnings forecasts toward target stocks and the target stock trading volume generally increases when the change of information uncertainty increases around the merger announcement date. Second, I use model 6.3 to estimate whether the change of information uncertainty increases, the biased near term analysts' forecast will have a larger impact on the target stock trading volumes.

$$\mathrm{Vol}_{jt+1} = \beta_0 + \beta_1 \mathrm{Ferr}_{jt+1} + \beta_2 \mathrm{Ferr}_{jt+1} * (\mathrm{dispersion}_{jt+1} - \mathrm{dispersion}_{jt+1}) + \beta_4 \mathrm{ITP}_{jt} + \beta_6 \mathrm{MB}_{jt+1} + \varepsilon_{jt+1} \quad (6.3)$$

Table 6.7 panel B discloses a significant positive coefficient of interaction term between the analysts' forecast error s and the change of information uncertainty. This strongly indicates near term optimistic earnings forecasts has a larger impact on the target stocks trading volume when the change of information uncertainty increases. This is consistent with Irvine [70]'s finding.

In addition, the analysts' incentive hypothesis predicts that analysts are more likely to mis-weight their public/private information when the benefit of doing this is relatively high. According to Cooper et al. [71], analysts overweight more favorable information and more trading volume is generated when stocks are heavily traded. Similarly in a context of merger and acquisition, the benefit of analysts' misweighting their public/private information and they create near term optimistic earnings forecasts toward target stocks that are relatively high around the merger announcement date when target stocks are heavily traded around that date. According to Beyer and Guttman [43], analysts' forecast inefficiency is related to the analysts' weight allocation to their public/private information. If the actual weight is not equal to the efficient weight, then analysts' forecast inefficiency exists. In addition, trading volume impact on the analysts' forecast weighting behavior can be an alternative explanation of what drives the near term analysts' forecast efficiency. To examine the impact of the trading volume on the analysts' weighting behavior around the merger announcement date, I use a simple Bayesian model by following Chen and Jiang [45]. The hypothesis is that analysts tend to overweight positive news more in the quarter after the merger

announcement date than in the quarter before the merger announcement date when trading volume increases around the merger announcement date. I define $Z_{j,t+1}$($Z_{j,t-1}$)as the firm j's actual earnings within one quarter after (before) the merger announcement date. I assume $Z_{j,t+1}$ ($Z_{j,t-1}$) follows a zero mean normal distribution. In addition, I suppose that all public information for firm j $c_{j,t+1}$ ($c_{j,t-1}$) or consensus of analysts' forecasts for firm j within one quarter after (before) the merger announcement date is available for both investors and analysts. $y_{j,t+1}$ ($y_{j,t-1}$) are the consensus of analysts' private information regarding firm j within one quarter after (before) the merger announcement date and this information is available for only analysts who cover the firm j. I have the formulas:

$$c_{j,t+1} = Z_{j,t+1} + \varepsilon_{cj,t+1} \quad (2)$$

$$c_{j,t-1} = Z_{j,t-1} + \varepsilon_{cj,t-1} \quad (3)$$

$$y_{j,t+1} = Z_{j,t+1} + \varepsilon_{yj,t+1} \quad (4)$$

$$y_{j,t-1} = Z_{j,t-1} + \varepsilon_{yj,t-1} \quad (5)$$

Where the $\varepsilon_{cj,t+1} \sim N\left(0, \frac{1}{\rho_{cj,t+1}}\right)$, $\varepsilon_{cj,t-1} \sim N\left(0, \frac{1}{\rho_{cj,t-1}}\right)$, $\varepsilon_{yj,t+1} \sim N\left(0, \frac{1}{\rho_{yj,t+1}}\right)$, $\varepsilon_{yj,t-1} \sim N\left(0, \frac{1}{\rho_{yj,t-1}}\right)$

The analyst's efficient conditional estimates of $Z_{j,t+1}$, $Z_{j,t-1}$ are:

$$E\left[Z_{j,t+1} \middle| y_{j,t+1}, c_{j,t+1}\right] = (1 - h_{j,t+1})y_{j,t+1} + h_{j,t+1}c_{j,t+1} \quad (6)$$

$$E\left[Z_{j,t-1} \middle| y_{j,t-1}, c_{j,t-1}\right] = (1 - h_{j,t-1})y_{j,t-1} + h_{j,t-1}c_{j,t-1} \quad (7)$$

Where $h_{j,t+1} \equiv \frac{\rho_{yj,t+1}}{\rho_{cj,t+1}+\rho_{yj,t+1}} \in [0\ 1]$ $h_{j,t-1} \equiv \frac{\rho_{yj,t-1}}{\rho_{cj,t-1}+\rho_{yj,t-1}} \in [0\ 1]$, are the precision of the analysts' private signals relative to analysts' forecast consensus within one quarter after (before) the merger announcement date. Because (6) and (7) are MSE of the estimates for $Z_{j,t+1}(Z_{j,t-1})$, therefore, I refer$h_{j,t+1}(\ h_{j,t-1})$as the efficient weight of the public information with regard to firm j at one quarter after (before) the merger announcement date. If the efficient weight is allocated to the public information, $FE_{i,j,t+1}, FE_{i,j,t-1}$ has to be zero. In other words, an individual analyst's forecast error is zero with the allocation of efficient weight to the public information $c_{j,t+1}(c_{j,t-1})$

In making forecasts, an individual analyst's actual weight of public information is $K_{j,t+1}, K_{j,t-1}$ within one quarter after (before) the merger announcement date. $K_{j,t+1} \in [0\ 1]$ $K_{j,t-1} \in [0\ 1]$. $f_{i,j,t+1}(\ f_{ij,t-1})$ is the analyst i's actual forecast for firm j within one quarter after(before) the merger announcement date.

$$f_{i,j,t+1} = (1 - K_{j,t+1})y_{j,t+1} + K_{j,t+1}c_{j,t+1} \quad (8)$$

$$f_{i,j,t-1} = (1 - K_{j,t-1})y_{j,t-1} + K_{j,t-1}c_{j,t-1} \quad (9)$$

Using(8)-(6) and plug in (2),(4), then I get

$$E\left[f_{i,j,t+1} - Z_{j,t+1}\middle|y_{j,t+1}, c_{j,t+1}\right] \equiv E\left[FE_{i,j,t+1}\middle|y_{j,t+1}, c_{j,t+1}\right] = \frac{(h_{j,t+1}-K_{j,t+1})}{K_{j,t+1}}(f_{i,j,t+1} - c_{j,t+1}) \quad (10)$$

Using(9)-(7) and plug in (3),(5), then I get

$$E\left[f_{i,j,t-1} - Z_{j,t-1}\middle|y_{j,t-1}, c_{j,t-1}\right] \equiv E\left[FE_{i,j,t-1}\middle|y_{j,t-1}, c_{j,t-1}\right] = \frac{(h_{j,t-1}-K_{j,t-1})}{K_{j,t-1}}(f_{ij,t-1} - c_{j,t-1}) \quad (11)$$

Using (10) divide by (11), then I get

$$\frac{E[FE_{i,j,t+1}|y_{j,t+1},c_{j,t+1}]}{E[FE_{i,j,t-1}|y_{j,t-1},c_{j,t-1}]} = \frac{K_{j,t-1}(K_{j,t+1}-h_{j,t+1})}{K_{j,t+1}(K_{j,t-1}-h_{j,t-1})}\frac{(f_{i,j,t+1}-c_{j,t+1})}{(f_{i,j,t+1}-c_{j,t+1})} \quad (12)$$

Then I square the both sides of the equation

$$\frac{(FE_{ij,t+1})^2}{(FE_{ij,t-1})^2} = [\frac{K_{j,t-1}(K_{j,t+1}-h_{j,t+1})}{K_{j,t+1}(K_{j,t-1}-h_{j,t-1})}]^2\frac{(f_{i,j,t+1}-c_{j,t+1})^2}{(f_{i,j,t+1}-c_{j,t+1})^2} \quad (13)$$

To avoid the serial correlation issue of individual analyst's forecast error, I aggregate individual observations to the firm level observations. Then I sum all the individual analysts' observations and divide by the number of observations n from equation (13) to get,

$$\frac{\sum_{i=1}^{n}(FE_{ij,t+1})^2/n}{\sum_{i=1}^{n}(FE_{ij,t-1})^2/n} = [\frac{K_{j,t-1}(K_{j,t+1}-h_{j,t+1})}{K_{j,t+1}(K_{j,t-1}-h_{j,t-1})}]^2\frac{\sum_{i=1}^{n}(f_{i,j,t+1}-c_{j,t+1})^2/n}{\sum_{i=1}^{n}(f_{i,j,t-1}-c_{j,t-1})^2/n} \quad (14)$$

Then I take the square root on both sides of the equation (14)

$$\sqrt{\frac{\sum_{i=1}^{n}(FE_{ij,t+1})^2/n}{\sum_{i=1}^{n}(FE_{ij,t-1})^2/n}} = \sqrt{[\frac{K_{j,t-1}(K_{j,t+1}-h_{j,t+1})}{K_{j,t+1}(K_{j,t-1}-h_{j,t-1})}]^2}.\sqrt{\frac{\sum_{i=1}^{n}(f_{i,j,t+1}-c_{j,t+1})^2/n}{\sum_{i=1}^{n}(f_{i,j,t-1}-c_{j,t-1})^2/n}} \quad (15)$$

Because $\sqrt{\sum_{i=1}^{n}(f_{i,j,t+1}-c_{j,t+1})^2/n} = Forecastdispersion_{j,t+1}$, $\sqrt{\sum_{i=1}^{n}(f_{i,j,t-1}-c_{j,t-1})^2/n} = Forecastdispersion_{j,t-1}$.

$$\sqrt{\sum_{i=1}^{n}\frac{(FE_{ij,t+1})^2}{n}} = \sqrt{\sum_{i=1}^{n}\frac{(f_{i,j,t+1}-Z_{j,t+1})^2}{n}} = FEdispersion_{j,t+1},$$

$$\sqrt{\sum_{i=1}^{n}(FE_{ij,t-1})^2/n} = \sqrt{\sum_{i=1}^{n}(f_{i,j,t-1}-Z_{j,t-1})^2/n} = FEdispersion_{j,t-1}$$

Then the linear regression is as followings:

$$\frac{\text{FEdispersion}_{j,t+1}}{\text{FEdispersion}_{j,t-1}} = \beta_0 \frac{\text{Forecastdispersion}_{j,t+1}}{\text{Forecastdispersion}_{j,t-1}} \quad (16)$$

Where $\sqrt{\left[\frac{K_{j,t-1}(K_{j,t+1}-h_{j,t+1})}{K_{j,t+1}(K_{j,t-1}-h_{j,t-1})}\right]^2} = \beta_0$

The first method is based on the linear regression. It builds upon the idea that the change of forecast error dispersion should not be predicted by the change of available information. If the efficient weight equals actual weight or ($K_{j,t+1} = h_{j,t+1}$ and $K_{j,t-1} = h_{j,t-1}$), Then intercept should have no predictive power in the change of natural log of forecast error. Therefore, $\widehat{\beta_0} > 1$ suggests analysts overweight public information more in t+1 quarter than t-1 quarter. $\widehat{\beta_0} < 1$ suggests analysts overweight public information less in t+1 quarter than t-1 quarter. Both the linear regression can be adapted to examine the cross sectional variation in the comparison of the magnitude of misweighting between one quarter before the merger announcement date and one quarter after the merger announcement date. For the linear regression method, I estimate the following equation:

$$\frac{\text{FEdispersion}_{j,t+1}}{\text{FEdispersion}_{j,t-1}} = \alpha_{j,t+1} + \sum_{m=1}^{M} \gamma_{mj,t+1} \cdot X_{mj,t+1} \cdot \frac{\text{Forecastdispersion}_{j,t+1}}{\text{Forecastdispersion}_{j,t-1}} + \varepsilon_{j,t+1} \quad (17)$$

The second method is based on the probability regression. This method originates from the idea that the change of forecast error should overshoot (undershoot) the change of deviation in magnitude at firm level. I define the overshoot case by observing $\left|\frac{\text{FEdispersion}_{j,t+1}}{\text{FEdispersion}_{j,t-1}}\right| \geq \left|\frac{\text{Forecastdispersion}_{j,t+1}}{\text{Forecastdispersion}_{j,t-1}}\right|$, I define the undershoot case by $\left|\frac{\text{FEdispersion}_{j,t+1}}{\text{FEdispersion}_{j,t-1}}\right| < \left|\frac{\text{Forecastdispersion}_{j,t+1}}{\text{Forecastdispersion}_{j,t-1}}\right|$. I also define if $\left|\frac{\text{FEdispersion}_{j,t+1}}{\text{FEdispersion}_{j,t-1}}\right| \geq \left|\frac{\text{Forecastdispersion}_{j,t+1}}{\text{Forecastdispersion}_{j,t-1}}\right|$, then

dependent variable probability $\pi = \mathrm{pr}\left(\left|\frac{\mathrm{FEdispersion_{j,t+1}}}{\mathrm{FEdispersion_{j,t-1}}}\right| \geq \left|\frac{\mathrm{Forecastdispersion_{j,t+1}}}{\mathrm{Forecastdispersion_{j,t-1}}}\right|\right) = 1$,

otherwise, $\pi = 0$. The expected value of π is 0.5 when analysts allocate the same weight to public information in one trading quarter before the merger announcement date as in one trading quarter after the merger announcement date. The higher value of π, the more chance of overweighting or underweighting of public information for both one quarter before and one quarter after the merger announcement date.

Where $\mathrm{X_{mj,t+1}}$ is a vector of M factors at one quarter after merger announcement quarter affecting analysts' weighting and $\gamma_{\mathrm{mj,t+1}}$ is a vector of coefficients corresponding to $\mathrm{X_{mj,t+1}}$. $\alpha_{\mathrm{j,t+1}}$ is the intercept at one quarter after merger announcement quarter.

For the probability regression, it can also be used to examine the cross sectional variation in the comparison of the magnitude of mis-weighting between one quarter before the merger announcement date and one quarter after the merger announcement date. I estimate the following equation:

$$\pi = \mathrm{pr}\left(\left|\frac{\mathrm{FEdispersion_{j,t+1}}}{\mathrm{FEdispersion_{j,t-1}}}\right| \geq \left|\frac{\mathrm{Forecastdispersion_{j,t+1}}}{\mathrm{Forecastdispersion_{j,t-1}}}\right|\right) =$$

$$\alpha_{\mathrm{j,t+1}} + \sum_{\mathrm{m=1}}^{\mathrm{M}} \gamma_{\mathrm{mj,t+1}} . \mathrm{X_{mj,t+1}} . \frac{\mathrm{Forecastdispersion_{j,t+1}}}{\mathrm{Forecastdispersion_{j,t-1}}} + \varepsilon_{\mathrm{j,t+1}} \qquad (18)$$

Whereas $\widehat{\gamma_{\mathrm{mj,t+1}}}$ can be estimated in a probit model.

Table 6.8 shows that $\widehat{\beta_0} = 0.37 \text{ or } 0.0129$ is significantly less than 1, demonstrating that analysts on average overweight the public information more to positive news in the one quarter before the merger announcement date than in the one quarter after the merger announcement date.

Table 6.9 examines the impact of trading volume on the analysts' weighting behavior in both one quarter before the merger announcement date and one quarter following the merger announcement date. Both panel A and panel B show that analysts overweight to the positive news more around the merger announcement date when trading volume is increasing because $\gamma_{\widehat{\mathrm{volj,t+1}^+}}$=0.18293>$\gamma_{\widehat{\mathrm{volj,t+1}^-}}$=0.17208 and $\gamma_{\widehat{\mathrm{volj,t-1}^+}}$=0.14180>$\gamma_{\widehat{\mathrm{volj,t-1}^-}}$=0.12780. This finding is consistent with my prediction that when the trading volume of target stocks increases around the merger announcement date, the benefit of analysts' overweighting positive news more and creating near term analysts' forecast inefficiency is relatively high.

6.5 Portfolio Analysis

In the previous section, I find that biased near term analysts' earnings forecasts have a larger impact on the target trading volume when the change of information uncertainty increases around the merger announcement date.

I am interested in examining this relationship further by exploring the interaction of the change in information uncertainty. Following the prior literature, I use the cumulative abnormal return in the portfolio analysis.

I use the double sorting methodology separating the current sample into 2×3 near term forecast errors by the change of information uncertainty portfolios. I predict that the impact of analysts' forecast inefficiency on the cumulative abnormal return of target stocks will increase when the change of information uncertainty increases. That is because the impact of biased analysts' earnings forecast on the trading volume becomes larger when the change of information uncertainty increases. Table 6.10

Panel A reveals two significant findings. First, the cumulative abnormal return of target stocks increases when the information uncertainty change increases. This finding complements Erickson et al.[59]'s finding that the increase of the change of information uncertainty leads to wealth loss for the acquirer stocks around the merger and acquisition. Second, large deviated analysts' earnings forecasts have stronger impact on the cumulative abnormal return of target stocks when the change of information uncertainty increases. This finding is consistent with Section 4 and Irvine [70] that the impact of analysts' earnings forecast on the stocks' trading volume is larger when the analysts' earnings forecasts have larger deviation from the consensus. In addition, panel B examines the relationship between the change of information uncertainty and the daily alphas that are implemented in the Famma French [72]'s three factor model, Carhart [73]'s four factor model and Famma French [74]'s five factor model. The models are carried out as follows:

$$R_{jt} - R_{ft} = \alpha + b_{jM}(R_{Mt} - R_{ft}) + S_j SMB_t + h_j HML_t + \varepsilon_{jt} \quad \text{M(4)}$$

$$R_{jt} - R_{ft} = \alpha + b_{jM}(R_{Mt} - R_{ft}) + S_j SMB_t + h_j HML_t + m_j MOM_t + \varepsilon_{jt} \quad \text{M(5)}$$

$$R_{jt} - R_{ft} = \alpha + b_{jM}(R_{Mt} - R_{ft}) + S_j SMB_t + h_j HML_t + r_j RMW_t + c_j CMA_t + \varepsilon_{jt} \quad \text{M(6)}$$

Whereas the SMB, HML, RMW, CMA are the respectively size, value, profitability and investment factors defined in Famma French [74]. MOM is the momentum factor defined in Carhart [73]. The five factor data are from Kenneth French's website.

Panel B justifies the finding in Panel A, and Panel B shows that with the increase of the change of information uncertainty, the portfolio delivers a relatively higher daily alpha for target stocks. This finding supports the change of information uncertainty as a risk factor explanation. When the change of information uncertainty increases around the

merger announcement date, the risk of holding target stocks increases, therefore target stock shareholders require a higher market adjusted return to compensate for their extra market risk.

6.6 Summary and Conclusion

This chapter explores the relationship between near term analysts' forecast inefficiency and the change of information uncertainty around the merger announcement date. I find that analysts mis-react to the target stock mis-valuation ratio, and this affects the near term analysts' forecast efficiency. I find that analysts issue more optimistic earnings forecasts toward target stocks when the change of information uncertainty increases around the merger announcement date. This empirical finding is linked to the analysts' incentives of creating trading commissions. Furthermore, I find evidence to support the notion that the impact of deviated analysts' earnings forecasts has larger impact on the trading volume of target stocks when there is a change in information uncertainty around the merger announcement date. These findings help extend research regarding analysts' conflicts of interest in a context of merger and acquisition. This chapter also extends Chen and Jiang [45]'s approach to quantify the analysts' weighting behavior in a context of mergers and acquisitions.

Table 6.1
Sample Descriptive Statistics

Table 6.1 presents the data sample descriptive statistics. I obtain individual analyst's earning forecast quarterly data from I/B/E/S detailed files from the period January 1987 until the December 2014. An analyst enters the sample in a given year if he or she makes at least one (Q6) forecast and the forecast date falls within a 63 trading day window around the merger announcement date. A U.S. domestic M&A deal enters the sample in a given year if an ITP ratio exists with target price above five dollars. The sample includes the cash only, pure stock and mixed payment method.

Year	Number of Deals	Number of Cash Only Deals	Number of Analysts Covering Cash Only Deals	Number of Pure stock deals	Number of Analysts Covering Pure stock Deals	Number of Mixed Deals	Number of Analysts Covering Mixed Deals
1987	2	2	8	0	0	0	0
1988	2	1	4	0	0	1	8
1989	5	3	10	2	11	0	0
1990	4	1	7	2	5	1	7
1991	5	2	5	2	18	1	6
1992	1	1	13	0	0	0	0
1993	5	1	7	2	20	2	8
1994	6	6	28	0	0	0	0
1995	15	8	56	6	50	1	2
1996	17	5	31	8	81	4	20
1997	52	33	196	13	99	6	39
1998	110	55	300	37	268	18	164
1999	92	44	224	28	189	20	161
2000	92	61	422	21	183	10	110
2001	38	13	117	13	131	12	121
2002	14	8	45	5	28	1	6
2003	29	16	100	8	90	5	55
2004	42	17	168	16	152	9	120
2005	44	24	251	4	32	16	243
2006	61	40	337	9	75	12	153
2007	62	48	406	8	60	6	88
2008	59	49	449	6	42	4	35
2009	32	16	127	7	56	9	138
2010	26	15	153	6	72	5	36
2011	51	32	384	7	66	12	145
2012	30	26	254	1	2	3	39
2013	41	30	377	5	39	6	38
2014	33	17	148	7	70	9	96
All	970	574	4627	223	1839	173	1838

Table 6.1 Sample Descriptive Statistics

Table 6.2
Variable Definitions and Descriptive Statistics

Table 6.2 provides the descriptive statistics as well as the on the variable definitions

$\pi(.)$	1 if $\left(\left\|\frac{\text{FEdispersion}_{j,t+1}}{\text{FEdispersion}_{j,t-1}}\right\| \geq \left\|\frac{\text{Forecastdispersion}_{j,t+1}}{\text{Forecastdispersion}_{j,t-1}}\right\|\right)$, otherwise it is zero
$Dummy_{jt}$	1 if it is cash only deal, 0 if it is pure stock deal, 2 if it is mixed deal
$dispersion_{jt+1}$	Analysts' dispersion of earnings forecasts about the target stock j within a 63 trading day window after the merger announcement date
$dispersion_{jt-1}$	Analysts' dispersion of earnings forecasts about the target stock j within a 63 trading day window prior to the merger announcement date
$Ferrdispersion_{jt+1}$	Analysts' dispersion of earnings forecasts error about the target stock j within a 63 trading day window after the merger announcement date
$Ferrdispersion_{jt-1}$	Analysts' dispersion of earnings forecasts error about the target stock j within a 63 trading day window before the merger announcement date
$Tradingvol_{jt+1}$	Average trading volume for the target stock j within a 63 trading day window after the merger announcement date
Vol_{jt+1}	Average ratio of trading volume to common shares holding for the target stock j within a 63 trading day window after the merger announcement date
$Following_{jt+1}$	Average number of analysts covering target stock j within a 63 trading day window after the merger announcement date
MB_{jt+1}	Average ratio of market value to book value for target stock j within a 63 trading day window after the merger announcement date
ITP_{jt}	The initial target price ratio or a ratio of target stock closing price on the first trading day after merger announcement date to the initial offer price made by the acquirer
$Size_{jt+1}$	Average market value of target stock j within a 63 trading day window after the merger announcement date
Vol_{jt-1}	Average ratio of trading volume to common shares holding for the target stock j within a 63 trading day window before the merger announcement date

$Following_{jt-1}$	Average number of analysts covering target stock j within a 63 trading day window before the merger announcement date
MB_{jt-1}	Average ratio of market value to book value for target stock j within a 63 trading day window before the merger announcement date
$Size_{jt-1}$	Average market value of target stock j within a 63 trading day window before the merger announcement date

Variables	Mean	Standard Deviation	1th percentile	25th percentile	Median	75th percentile	99th percentile
$\pi(.)$	0.63	0.48	0	0	1	1	1
$Dummy_{jt}$	0.95	0.64	0	1	1	1	2
$dispersion_{jt-1}$	0.079	0.22	0	0.01	0.03	0.07	0.7
$dispersion_{jt+1}$	0.088	0.55	0	0.01	0.03	0.07	0.69
$Ferrdispersion_{jt-1}$	0.087	0.36	0	0.01	0.03	0.06	1.03
$Ferrdispersion_{jt+1}$	0.089	0.54	0	0.01	0.03	0.06	0.79
Vol_{jt-1}	1.05	1.18	0.07	0.04	0.07	1.28	6.86
Vol_{jt+1}	1.37	1.32	0.08	0.5	0.95	1.83	6.29
$Following_{jt-1}$	11.89	10.94	2	4	8	15	49
$Following_{jt+1}$	8.82	8.93	2	3	5	11	44
MB_{jt+1}	2.43	10.25	-16.04	1.31	2.01	3.31	25.01
MB_{jt-1}	6.75	130.68	-15.28	1.25	1.98	3.12	22.52
ITP_j	2.07	34.35	0.61	0.91	0.97	1.02	2.23
$Size_{jt-1}$	5057.87	12153	49.38	409.01	1155.57	3707.62	60885.02
$Size_{jt+1}$	5530.97	13184	38.94	414.04	1293.62	4149.97	70077.72

Table 6.2 Variable Definitions and Descriptive Statistics

Figure 6.1
Average Trading Volume of Target Stock Shares around the Merger Announcement Date

This figure presents the average trading volume of target stock shares by trading day around the merger announcement date (MAD). The observation sample period starts from January 1987 to December 2014 and I select a 90 day window around the merger announcement date.

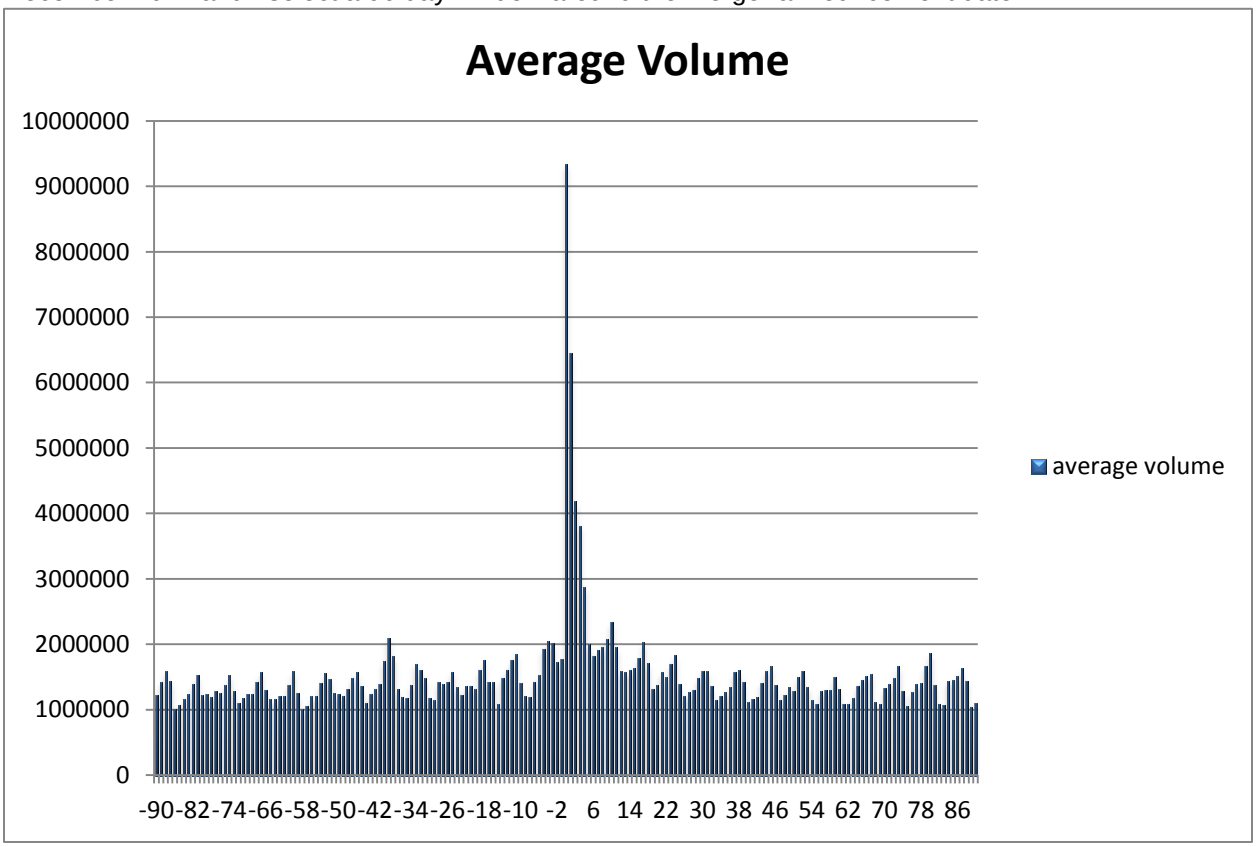


Figure 6.1 Average Trading Volume of Target Stock Shares around the Merger Announcement Date

Table 6.3
Change of Information Uncertainty and Near Term Analysts' Forecast Inefficiency

Table 6.3 presents the univariate test result examining the relationship between the change of information uncertainty and the near term analysts' forecast inefficiency within a 63 trading day window around the merger announcement date. The whole sample includes all analysts-firm observations starting from year 1987 to year 2014. The subsample observations exclude all the observations occurred in the recession years including year 1987, 2000,2001,2002,2008, and 2009. The change of information uncertainty is sorted into five ranks; ΔDisp1 is the lowest rank whereas the ΔDisp5 is the highest rank.

	Whole sample	Subsample without Crisis years Excluding Year 1987, 2000,2001, 2002 ,2008 and 2009
ΔDisp rank	$Ferr_{jt+1}$	$Ferr_{jt+1}$
ΔDisp1	-0.001690	-0.000822
ΔDisp2	-0.002230	-0.000208
ΔDisp3	-0.003900	-0.003515
ΔDisp4	-0.013500	-0.001357
ΔDisp5	-0.019400	-0.008690
ΔDisp5-ΔDisp1	-0.017700	-0.008370
	(0.00712)***	(0.004206)***

Table 6.3 Change of Information Uncertainty and Near Term Analysts' Forecast Inefficiency

Notes: *** indicates standard error is significant at 1% significance level
** indicates standard error is significant at 5% significance level
* indicates standard error is significant at 10% significance level

Table 6.4
Change of Information Uncertainty and Near Term Analysts' Forecast Inefficiency

Table 6.4 presents the regression result examining the relationship between the change of information uncertainty and near term analysts' forecast inefficiency within a 63 trading day window after the merger announcement date. The change of information uncertainty captures the difference of analysts' forecast dispersion within a 63 trading day window after the merger announcement date and that within a 63 trading day window before the merger announcement date. I include all analysts-firm observations starting from year 1987 to year 2014. I cluster standard errors by quarter and four digit target industry.

$Dependent\ variable: Ln(Ferr_{jt+1})$	Model 6.1	Model 6.2
$Constant$	-5.09	-5.11
	(0.26)***	(0.26)***
$Dummy_{jt}$	0.08	0.07
	(0.08)	(0.08)
$\Delta Disp_{jt}$	-1.17	1.17
	(0.44)***	(0.85)
$\Delta Disp_{jt}{*}Dummy_{jt}$		-2.32
		(0.69)***
$Ln(Size_{jt+1})$	-0.16	-0.23
	(0.04)***	(0.05)***
$Ln(ITP_{jt})$	-0.51	-0.4
	(0.28)*	(0.26)
$Ln(Following_{jt+1})$	0.24	0.23
	(0.08)***	(0.08)***
$Ln(MB_{jt+1})$	-0.44	-0.43
	(0.13)***	(0.13)***
Quarter Dummies	Yes	Yes
Industry Dummies	Yes	Yes
R^2	0.19	0.22

Table 6.4 Change of Information Uncertainty and Near Term Analysts' Forecast Inefficiency

Notes: *** indicates standard error is significant at 1% significance level
** indicates standard error is significant at 5% significance level
* indicates standard error is significant at 10% significance level

Table 6.5
Target Stock Misvaluation and Near Term Analysts' Forecast Inefficiency

Table 6.5 presents the univariate test result examining the relationship between target misvaluation and the analysts' forecast inefficiency within a 63 trading day window after the merger announcement date. I include all analysts-firm observations starting from year 1987 to year 2014. Initial target price ratio stands for the ratio of closing target price on the first day after the merger announcement date to initial offer price. The initial target price ratio (ITP) is sorted into five ranks; ITP1 is the lowest rank whereas the ITP5 is the highest rank. Market to book ratio stands for the ratio of target stock market value to target stock book value. The market to book (MB) ratio is sorted into five ranks. MB1 is the lowest rank whereas the MB5 is the highest rank. Panel A sort the data by target misvaluation and Panel B sorts the sample by the change of information uncertainty and target misvaluation.

Panel A: Single sort by target misvaluation

ITP rank	$Ferr_{jt+1}$	MB rank	$Ferr_{jt+1}$
ITP1	-0.01141	MB1	-0.02151
ITP2	-0.00498	MB2	-0.00151
ITP3	-0.00186	MB3	-0.00099
ITP4	-0.00156	MB4	-0.00039
ITP5	-0.00426	MB5	-0.00057
ITP5-ITP1	0.00673	MB5-MB1	0.02090
	(0.00189)***		(0.00718)***

Panel B: Double sort by the change of information uncertainty and target misvaluation

ΔDisp rank	ITP<1	ITP>1	(ITP>1)-(ITP<1)	ΔDisp rank	MB<1	MB>1	(MB>1)-(MB<1)
ΔDisp1	-0.0034	0.00140	0.0048**	ΔDisp1	-0.00163	0.00125	0.00288**
ΔDisp2	-0.00077	0.00010	0.00087**	ΔDisp2	-0.00241	-0.00015	0.00226**
ΔDisp3	-0.00390	-0.00022	0.0017*	ΔDisp3	-0.01381	-0.00021	0.0136*
ΔDisp4	-0.00180	-0.00016	0.00164**	ΔDisp4	-0.01639	-0.00103	0.01536**
ΔDisp5	-0.02050	-0.01480	0.0057***	ΔDisp5	-0.08810	-0.00526	0.08284***
ΔDisp5-ΔDisp1	-0.0175***	-0.0173***		ΔDisp5-ΔDisp1	-0.08647**	-0.00651***	

Table 6.5 Target Stock Misvaluation and Near Term Analysts' Forecast Inefficiency

Notes: *** indicates standard error is significant at 1% significance level
** indicates standard error is significant at 5% significance level
* indicates standard error is significant at 10% significance level

Table 6.6
Merger Means of Payment and Near Term Analysts' Forecast Inefficiency

Table 6.6 presents the univariate test result examining the relationship between merger means of payment and the analysts' forecast inefficiency within a 63 trading day window after the merger announcement date. I include all analysts-firm observations starting from year 1987 to year 2014. The sample is divided into cash only payment method subsample and pure stock payment method subsample

Merger Means of Payment and Analysts' Forecast Inefficiency			
ΔDisp rank	Cash Only	Pure Stock	Cash-Stock
ΔDisp1	-0.00077	0.0005	-0.00127**
ΔDisp2	-0.00091	-0.00146	0.00055*
ΔDisp3	-0.00208	-0.00515	0.00307**
ΔDisp4	-0.00241	-0.00623	0.00382*
ΔDisp5	-0.0258	-0.01413	-0.01167***
ΔDisp5-ΔDisp1	-0.02503***	-0.01463***	

Table 6.6 Merger Means of Payment and Near Term Analysts' Forecast Inefficiency

Notes: *** indicates standard error is significant at 1% significance level
** indicates standard error is significant at 5% significance level
* indicates standard error is significant at 10% significance level

Table 6.7
Target Stock Volumes and Near Term Analysts' Forecast Inefficiency

Table 6.7 presents the univariate test result examining the relationship between target stock volumes and the change of information uncertainty within a 63 trading day window after the merger announcement date. Panel A also discloses the corresponding relationship between the analysts' forecast inefficiency and the change of information uncertainty within a 63 trading day window after the merger announcement date. Panel B discloses the relationship between target stock trading volumes and the interaction between near term earnings forecasts error and the change of information uncertainty. I include all analysts-firm observations starting from year 1987 to year 2014.

Panel A: The Change of Information Uncertainty and Target Stock Volume

ΔDisp rank	$Tradingvol_{jt+1}$	$Ferr_{jt+1}$
ΔDisp1	1887919	-0.00169
ΔDisp2	2054687	-0.00223
ΔDisp3	1354712	-0.00390
ΔDisp4	1583330	-0.01350
ΔDisp5	2796102	-0.01940
ΔDisp5-ΔDisp1	924895	-0.01770
	(462448)**	(0.00712)**

Panel B:	Vol_{jt+1}
$Constant$	1.76
	(0.13)***
$Ferr_{jt+1}$	-85.1
	(24.42)***
$Ferr_{jt+1} * (dispersion_{jt+1} - dispersion_{jt-1})$	28.19
	(13.14)**
MB_{jt+1}	0.0055
	(0.0044)
ITP_{jt}	-0.39
	(0.11)***
Quarter Dummy	Yes
Industry Dummy	Yes
R^2	0.12

Table 6.7 Target Stock Volumes and Near Term Analysts' Forecast Inefficiency

Notes: *** indicates standard error is significant at 1% significance level
** indicates standard error is significant at 5% significance level
* indicates standard error is significant at 10% significance level

Table 6.8
Analysts' Weighting Behavior

Table 6.8 presents the linear regression result examining analysts' weighting behavior within a 63 trading day window around the merger announcement date. I include all analysts-firm observations starting from year 1987 to year 2014. I cluster standard errors by quarter and four digit target industry. The variables definitions are in table 6.2.

	$Ferrdispersion_{jt+1}$ $/Ferrdispersion_{jt-1}$	$\pi(.)$
$Constant$	1.01	0.66
	(0.29)***	(0.02)***
$dispersion_{jt+1}/dispersion_{jt-1}$	0.37	0.0129
	(0.19)**	(0.005)***
Quarter Dummy	Yes	Yes
Industry Dummy	Yes	Yes
R^2	0.26	0.02

Table 6.8 Analysts' Weighting Behavior

Notes: *** indicates standard error is significant at 1% significance level
** indicates standard error is significant at 5% significance level
* indicates standard error is significant at 10% significance level

Table 6.9
Impact of Trading Volume on Analysts' Weighting Behavior

Table 6.9 presents both linear regression and maximum likelihood regression results examining the impact of trading volume on analysts' weighting behavior around the merger announcement date. ΔDisp<0 represents the bad news, ΔDisp>0 represents the good news. Panel A examines the relationship within a 63 trading day window after the merger announcement date. Panel B examines the relationship within a 63 trading day window before the merger announcement date. The variables definitions are in table 6.2.

Table 6.9 Panel A:	$Ferrdispersion_{jt+1}$ $/Ferrdispersion_{jt-1}$		$\pi(.)$	
	ΔDisp<0	ΔDisp>0	ΔDisp<0	ΔDisp>0
$Constant$	0.44104	0.95674	0.51597	0.90193
	(0.08924)***	(0.56617)*	(0.02999)***	(0.02865)***
$Dummy_{jt} * (dispersion_{jt+1}$ $/dispersion_{jt-1})$	-0.08228	0.05042	0.00068	-0.04442
	(0.12312)	(0.16614)	(0.00541)	(0.06337)
$ITP_{jt} * (dispersion_{jt+1}$ $/dispersion_{jt-1})$	0.58343	0.1058	-0.00087	-0.20514
	(0.17618)***	(0.07947)	(0.00489)	(0.10366)**
$MB_{jt+1} * (dispersion_{jt+1}$ $/dispersion_{jt-1})$	0.00511	0.01934	0.00143	0.00292
	(0.01432)	(0.01532)	(0.00045)***	(0.00535)
$Following_{jt+1} * (dispersion_{jt+1}$ $/dispersion_{jt-1})$	0.00092	0.01319	-0.00231	-0.00879
	(0.00630)	(0.011562)	(0.00088)***	(0.00517)*
$Vol_{jt+1} * (dispersion_{jt+1}$ $/dispersion_{jt-1})$	0.17208	0.18293	0.00499	0.01855
	(0.05889)***	(0.08429)**	(0.00407)	(0.00992)*
Quarter Dummy	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes
R^2	0.05	0.03	0.03	0.06

Table6. 9 Panel B:	$Ferrdispersion_{jt+1}$ $/Ferrdispersion_{jt-1}$		$\pi(.)$	
	ΔDisp<0	ΔDisp>0	ΔDisp<0	ΔDisp>0
$Constant$	1.9419	0.45124	0.56212	0.91468
	(0.25397)***	(0.08828)***	(0.03016)***	(0.02710)***
$Dummy_{jt} * (dispersion_{jt+1}$ $/dispersion_{jt-1})$	-0.00857	-0.00033	0.00335	-0.02526
	(0.09692)	(0.11782)	(0.00548)	(0.06132)
$MB_{jt-1} * (dispersion_{jt+1}$ $/dispersion_{jt-1})$	-0.00004	0.01486	-0.00005	0.00553
	(0.00005)	(0.01089)	(0.000007)***	(0.00654)
$Following_{jt+1} * (dispersion_{jt+1}$ $/dispersion_{jt-1})$	-0.00323	-0.00876	-0.00447	-0.00796
	(0.00975)	(0.00444)***	(0.00099)***	(0.00390)**
$Vol_{jt-1} * (dispersion_{jt+1}$ $/dispersion_{jt-1})$	0.12780	0.14180	0.00592	0.03255
	(0.07226)*	(0.06370)**	(0.00475)	(0.01450)**
Quarter Dummy	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes
R^2	0.09	0.05	0.04	0.09

Table 6.9 Impact of Trading Volume on Analysts' Weighting Behavior

Notes: *** indicates standard error is significant at 1% significance level
** indicates standard error is significant at 5% significance level
* indicates standard error is significant at 10% significance level

Table 6.10
Cumulative Abnormal Return for Double Sorting Portfolios

Table 6.10 d panel A double sorts the portfolio by the change of information uncertainty and near term analysts' earnings forecast errors and divide total portfolio into 2×3 portfolios. ΔDisp1 is the lowest rank whereas the ΔDisp3 is the highest rank.
Ferr1 is the lowest rank for the near term analysts' earnings forecast errors whereas
Ferr2is the highest rank for the near term analysts' earnings forecast errors. The table reports the cumulative abnormal return and its t statistics within a 63 trading day window following the merger announcement date for each individual portfolio. The cumulative abnormal return is calculated using a market adjusted return method. Panel B describes three alphas according to the change of information uncertainty.

Table 10 Panel A:	$Ferr1$	$Ferr2$
ΔDisp1	-4.61%	-0.25%
t-stat	-2.69	-0.86
ΔDisp2	1.55%	2.26%
t-stat	2.42	2.34
ΔDisp3	2.22%	2.63%
t-stat	2.18	2.73

Table 10 Panel B:	(ΔDisp1, Ferr1)	(ΔDisp2,Ferr1)	(ΔDisp3,Ferr1)	(ΔDisp1, Ferr2)	(ΔDisp2, Ferr2)	(ΔDisp3, Ferr2)
Three factor alpha	-1.22%	-1.20%	-1.11%	-1.27%	-1.26%	-1.03%
tstat	-12.42	-17.46	-13.06	-20.98	-18.93	-11.33
Four factor alpha	-1.22%	-1.20%	-1.11%	-1.28%	-1.26%	-1.02%
tstat	-12.63	-17.86	-13.06	-21.34	-18.8	-11.79
Five factor alpha	-1.22%	-1.18%	-1.11%	-1.27%	-1.26%	-1.01%
tstat	-12.2	-17.37	-12.84	-20.91	-18.69	-11.25
Rm-Rf	0.0093	0.91%	0.0074	0.0080	0.0086	0.0076
tstat	16.43	10.28	9.39	14.54	8.97	11.7
smb	0.0037	0.0058	0.0049	0.0015	0.0027	0.0008
tstat	3.36	6.04	5.25	1.39	2.41	0.66
hml	0.0031	-0.0013	-0.002	0.0001	-0.0002	-0.0054
tstat	3.21	-0.6	-1.51	0.88	-0.11	-2.09
UMD	-0.34	-0.4659	-0.1537	0.0663	-0.0664	-0.4554
tstat	-3.8	-4.28	-1.62	0.8	-0.66	-2.33
Quarter Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.11	0.16	0.09	0.12	0.15	0.17

Table 6.10 Cumulative Abnormal Return for Double Sorting Portfolios

References

[1] Gu, Z. & Wu, J.S., Earnings skewness and analyst forecast bias, Journal of accounting & economics, 35(1), 5-29, 2003.

[2] Michaely, R. & Womack, K.L., Conflict of Interest and the Credibility of Underwriter Analyst Recommendations, The Review of Financial Studies, 12(4), 653-686, 1999.

[3] Shleifer, A., and Vishny, R. W., Stock market driven acquisitions. Journal of financial Economics, 70(3), 295-311, 2003.

[4] Mitchell, M., Pulvino, T. & Stafford, E., Price pressure around mergers, The Journal of Finance, vol. 59(1), 31-63, 2004.

[5] David A. Becher and Jennifer L. Juergens, M&A Advisory Fees and Analyst Conflicts of Interest, Working paper, University of Texas at Austin,2009.

[6] Dugar, A., and S. Nathan., The Effect of Investment Banking Relationships on Financial Analysts' Earnings Forecasts and Investment Recommendations. Contemporary Accounting Research, 12(1), 131–160, 1995.

[7] Lin, H. & McNichols, M.F., Underwriting relationships, analysts' earnings forecasts and investment recommendations, Journal of accounting & economics, 25(1),101-127, 1998.

[8] Kolasinski, A.C. & Kothari, S.P., Investment Banking and Analyst Objectivity: Evidence from Analysts Affiliated with Mergers and Acquisitions Advisors, Journal of Financial and Quantitative Analysis, 43(4), 817-842, 2008

[9] Francis, J., & Philbrick, D., Analysts' decisions as products of a multi-task environment. Journal of Accounting Research, 31(2), 216, 1993.

[10] Soffer, L., R. Thiagarajan, and B. Walther., Eamings preannouncement strategies. Review of Accounting Studies 5 (1), 5-26, 2000.

[11] Lim.T., Rationality and analyst forecast bias, Journal of Finance 56 (1), 369-85,2001.

[12] Hutton, A., Determinants of managerial earnings guidance prior to regulation fair disclosure and bias in analysts' earnings forecasts. Contemporary Accounting Research, 22(4), 867-914, 2005.

[13] Richardson, S., Teoh, S.H. & Wysocki, P.D., The Walk-down to Beatable Analyst Forecasts: The Role of Equity Issuance and Insider Trading Incentives, Contemporary Accounting Research 21(4), 885-924, 2004.

[14] Abarbanell, J., Do analysts' earnings forecasts incorporate information in prior stock price changes? Journal of Accounting and Economics 14 (2), 147-165,1991.

[15] Dechow, P., Hutton, A., & Sloan, R., An empirical assessment of the residual income valuation model. Journal of Accounting & Economics, 26(1), 1-34, 1999.

[16] Livnat, J., & Mendenhall, R. R., Comparing the post-earnings announcement drift for surprises calculated from analyst and time series forecasts. Journal of Accounting Research, 44(1), 177-205,2006.

[17] Brav, A., & Lehavy, R., An empirical analysis of analysts' target prices: Short-term informativeness and long-term dynamics. The Journal of Finance, 58(5), 1933-1967, 2003.

[18] James, C., & Karceski, J., Strength of analyst coverage following IPOs. Journal of Financial Economics, 82(1), 1-34,2006.

[19] Abarbanell, J., Bernard, V., Tests of analysts' overreaction/underreaction to earnings information as an explanation for anomalous stock price behavior. Journal of Finance 47, 1191–1207,1992.

[20] Raghavan, A., How One Top Analyst Vaults 'Chiniese Wall' to Do Deals for Firm, Wall Street Joiurnial,March 25, page A1,1997.

[21] Matsumoto, D., Management's incentives to avoid negative earnings surprises. The Accounting Review 11 (3),483-514,2002.

[22] Rhodes-Kropf, M., Robinson, D. & Viswanathan, S. 2005, Valuation waves and merger activity: The empirical evidence, Journal of Financial Economics, 77(3), 561-603, 2005.

[23] Chan, L.K.C., Karceski, J. & Lakonishok, J., Analysts' Conflicts of Interest and Biases in Earnings Forecasts, Journal of Financial and Quantitative Analysis, 42(4), 893-913, 2007.

[24] Louis, H., Earnings management and the market performance of acquiring

firms.Journal of Financial Economics,74(1), 121-148,2004.

[25] Ivković, Z., & Jegadeesh, N., The timing and value of forecast and recommendation revisions. Journal of Financial Economics, 73(3), 433-463, 2004.

[26] Betton, S., Eckbo, B. E., & Thorburn, K. S., Merger negotiations and the toehold puzzle. Journal of Financial Economics, 91(2), 158-178, 2009.

[27] Boehmer, E., Broussard, J. P., & Kallunki, J., Using SAS in financial research, P44, 2002.

[28] Loughran, T., & Vijh, A. M., Do long-term shareholders benefit from corporate acquisitions?. The Journal of Finance, 52(5), 1765-1790,1997.

[29] Rau, R., Vermaelen, T., Glammy, value, and the post-acquisition performance of acquiring firms. Journal of Financial Economics 49, 223–254,1998.

[30] Agrawal, A., Jaffe, J., The post-merger performance puzzle. In: Cooper, C., Gregory, A., (Eds.), Advances in Mergers and Acquisitions, Vol. 1. Elsevier, Amsterdam, pp. 7–41, 2000.

[31] Fama, E. F., & French, K. R., The cross-section of expected stock returns. the Journal of Finance, 47(2), 427-465, 1992.

[32] Stickel, S., The anatomy of the performance of buy and sell recommendations, Financial Analysts Journal 51, (5), 25-39, 1995.

[33] Luo, X., Homburg, C., & Wieseke, J., Customer satisfaction, analyst stock

recommendations, and firm value. Journal of Marketing Research, 47(6), 1041-1058, 2010.

[34] Loh, R. K., & Stulz, R. M., When are analyst recommendation changes influential? The Review of Financial Studies, 24(2), 593-627,2011.

[35] Jegadeesh, N., & Kim, W., Do analysts herd? An analysis of recommendations and market reactions. Review of Financial Studies, 23(2), 901-937,2010.

[36] Jindra, Jan, and Ralph A. Walkling, Speculation spreads and the market pricing of proposed acquisitions. Journal of Corporate Finance 10, 495–526, 2004.

[37] Bessmbinder, Hendrik and Zhang, Feng, Overreaction to Merger and Acquisition Announcements, Working Paper, University of Utah, 2015.

[38] Dong, M., Hirshleifer, D., Richardson, S., & Teoh, S. H., Does investor misvaluation drive the takeover market? The Journal of Finance, 61(2), 725-762,2015.

[39] Rhodes-Kropf, M., & Viswanathan, S., Market valuation and merger waves. The Journal of Finance, 59(6), 2685-2718, 2004.

[40] So, E. C., A new approach to predicting analyst forecast errors: Do investors overweight analyst forecasts? Journal of Financial Economics, 108(3), 615-640, 2013.

[41] M Lang, R Lundholm, Cross-sectional determinants of analysts ratings of corporate disclosures, Journal of Accounting Research, 31, 246–271, 1993.

[42] Hughes, J., Liu, J., Su, W., On the relation between predictable market returns and

predictable analyst forecast errors. Review of Accounting Studies 13 (2), 266–291, 2008.

[43] Beyer, A., & Guttman, I., The effect of trading volume on analysts' forecast bias.Accounting Review, 86(2), 451-481, 2011.

[44] Bernhardt, D., M. Campello, and E. Kutsoati, Who herds? Journal of Financial Economics 80 (3), 657–675, 2006.

[45] Chen, Q., & Jiang, W., Analysts' weighting of private and public information. The Review of Financial Studies, 19(1), 319-355, 2006.

[46] Campbell, S. and S. Sharpe, Anchoring bias in consensus forecasts and its effect on market prices, Journal of Financial and Quantitative Analysis 44, 369-390, 2009.

[47] De Bondt, W., and R. Thaler, Do security analysts overreact? The American Economic Review 80 (2), 52-57, 1990.

[48] Easterwood, J., and S. Nutt., Inefficiency in analysts' earnings forecasts: Systematic misreaction or systematic optimism? The Journal of Finance 54 (5), 1777-1797, 1999.

[49] Bradshaw, M., S. Richardson, and R. Sloan., Do analysts and auditors use information in accruals? Journal of Accounting Research 39 (1), 45-74, 2001.

[50] Zhang, Y., Analyst responsiveness and the post-earnings-announcement drift ,*Journal of Accounting and Economics* 46, 201-215, 2008.

[51] Erickson, M., & Wang, S., Earnings management by acquiring firms in stock for stock mergers. Journal of Accounting and Economics, 27(2), 149-176,1999.

[52] Sibilkov, V., Straska, M., & Waller, H. G., Do firms use M&A business to pay for analyst coverage? Financial Review,48(4), 725-751,2013.

[53] Jackson, A. R., Trade generation, reputation, and sell-side analysts. The Journal of Finance, 60(2), 673-717, 2005.

[54] Barberis, N., Shleifer, A., & Vishny, R., A model of investor sentiment. Journal of Financial Economics, 49(3), 307-343, 1998.

[55] Daniel, Kent, David Hirshleifer, and Avanidhar Subrahmanyam, Investor psychology and security market under- and overreactions, Journal of Finance 53, 1839-1885, 1998.

[56] Hirshleifer, David, Investor psychology and asset pricing, Journal of Finance 56, 1533–1596, 2001.

[57] Zhang, X. F., Information uncertainty and stock returns. The Journal of Finance, 61(1), 105-137, 2006.

[58] Hirshleifer, D., Lim, S. S., & Teoh, S. H., Driven to distraction: Extraneous events and underreaction to earnings news.The Journal of Finance, 64(5), 2289-2325, 2009.

[59] Erickson, M., Wang, S., & Zhang, X. F. , The change in information uncertainty and acquirer wealth losses. Review of Accounting Studies, 17(4), 913-943, 2012.

[60] Duchin, R., & Schmidt, B., Riding the merger wave: Uncertainty, reduced monitoring, and bad acquisitions. Journal of Financial Economics, 107(1), 69-88, 2013.

[61] Huang, Y., & Walkling, R. A., Target abnormal returns associated with acquisition announcements: Payment, acquisition form, and managerial resistance. Journal of Financial Economics, 19(2), 329-349, 1987.

[62] Gilson, R. J., Scholes, M. S., & Wolfson, M. A., Taxation and the dynamics of corporate control: The uncertain case for tax-motivated acquisitions. Knights, Raiders, and Targets: The Impact of the Hostile Takeover, 271, 271-299, 1988.

[63] Alexandridis, G., Petmezas, D., & Travlos, N. G., Gains from mergers and acquisitions around the world: New evidence. Financial Management, 39(4), 1671-1695, 2010.

[64] Andrade, G., Mitchell, M., & Stafford, E., New evidence and perspectives on mergers. The Journal of Economic Perspectives, 15(2), 103-120, 2001.

[65] Sanders, R. W., & Zdanowicz, J. S., Target firm abnormal returns and trading volume around the initiation of change in control transactions. Journal of Financial and Quantitative Analysis, 27(1), 109-129, 1992.

[66] Cowen, A., Groysberg, B., & Healy, P., Which types of analyst firms are more optimistic? Journal of Accounting and Economics, 41(1), 119-146, 2006.

[67] Bradshaw, M. T. , Analysts' forecasts: What do we know after decades of work? SSRN. Retrieved June 1, 2012 from http://ssrn.com/abstract=1880339.

[68] Diether, K. B., Malloy, C. J., & Scherbina, A., Differences of opinion and the cross section of stock returns. The Journal of Finance, 57(5), 2113-2141, 2002.

[69] Abarbanell, J. S., Do analysts' earnings forecasts incorporate information in prior stock price changes? Journal of Accounting and Economics, 14(2), 147-165, 1991.

[70] Irvine, P. J., "Analysts' Forecasts and Brokerage-Firm Trading," Accounting Review, 79, 125-149, 2004.

[71] Cooper, R. A., T. E. Day, and C. M. Lewis, "Following the Leader: A Study of Individual Analysts' Earnings Forecasts," Journal of Financial Economics, 61, 383-416, 2001.

[72] Fama, E. F., & French, K. R., Common risk factors in the returns on stocks and bonds.Journal of Financial Economics, 33(1), 3-56, 1993.

[73] Carhart, M. M. , On persistence in mutual fund performance. The Journal of Finance, 52(1), 57-82, 1997.

[74] Fama, E., & French, K., A five-factor asset pricing model. Journal of Financial Economics,116(1), 1-22, 2015.

Biographical Statement

Mr. Yiling Zhang was born in Nanchang, Jiangxi, China in 1986. He received his BBA and MBA degree from Jiangxi University of Science and Technology and University of Nevada Reno in 2007 and 2012 as well as his Ph.D. degree in finance from The University of Texas at Arlington in 2016. From 2012 to 2016, he was with the department of Finance and Real Estate, The University of Texas at Arlington as a Phd. Student. His primary teaching interests are in the areas of investment, personal finance planning, financial derivative, business finance, real estate analysis and international finance. His research includes merger means of payment impact on near term analyst bias, market inefficiency around merger announcement date, asset pricing anomalies and macro impact on gold pricing. Yiling has published articles in the International Journal of Economics and Finance as well as in the Journal of Accounting and Finance. His research paper “Merger Means of Payment and Analyst Recommendation Change” received Best Paper Award at the 4th Global Business and Finance Research Conference 2015 in Melbourne Australia.