Two Essays on Mergers and Acquisitions

Wei-Hsien Li

Dissertation submitted to the faculty of the Virginia Polytechnic Institute and State University in partial fulfillment of the requirements for the degree of

Doctor of Philosophy
In
Business, Finance

John C. Easterwood, Co-Chair
Ozgur S. Ince, Co-Chair
Arthur J. Keown
Sattar A. Mansi

March 28, 2012
Blacksburg, VA

Keywords: M&As, Valuation, Asset reallocation, Overconfidence, Managerial bias, CEO Learning

Two Essays on Mergers and Acquisitions

Wei-Hsien Li

ABSTRACT

This dissertation consists of two chapters. The first chapter examines the valuation effect of the Q-hypothesis of mergers and acquisitions. The Q-hypothesis of mergers and acquisitions proposes that takeovers of low-Q targets by high-Q acquirers should be value creating as acquirers redeploy the targets' assets. I revisit the valuation effects of mergers and acquisitions by considering the potential costs of asset reallocation, impact from misvaluation, and the size of the reallocated assets. By examining the combined announcement returns and changes in operating performance, I find evidence consistent with both the benefits and costs of asset reallocation in the full sample of M&As from 1989 to 2010. Controlling for impact for market misvaluation in the proxy of Q, I find that the relation between value creation and the Q-difference is an inverse U-shape. This is direct evidence in support of the Q-hypothesis of M&As using firm-level data from after 1990. The results are not driven by the acquirer's corporate governance structure and the difference in industry.

The second chapter investigates investigate the effect of CEO overconfidence on learning from the market in completing the announced mergers and acquisitions (M&As). Overconfident CEOs overestimate their ability to create value and believe that the market incorrectly values the firm. Therefore, they will be less likely to revise their M&A announcement according to unfavorable market reaction. I construct a proxy for CEO overconfidence based on the CEO's decisions on exercising options similar to Malmendier and Tate (2005, 2008). Controlling for the corporate governance structure of the firm, I find that an overconfident CEO is more likely to complete a bid despite unfavorable market feedback. I do not find my results are driven by alternative interpretations including managerial quality and private information.

Acknowledgements

I am greatly indebted to the co-chairs of my dissertation committee, John C. Easterwood and Ozgur S. Ince. Words are not enough to express my gratitude to them. It was their guidance and support over the past few years that brought this work to completion. I would also like to thank my other committee members. Sattar A. Mansi shared his valuable experience in academic research. Arthur J. Keown went out his way to help me during the job market. I appreciate all the advice and help from Dilip K. Shome, Raman Kumar, Vijay Singal, Gregory B. Kadlec, and Michael T. Cliff throughout the course of my doctoral study. I would also like to thank my fellow PhD students in Virginia Tech for their companion.

My deepest appreciation goes out to my family. My parents, Long-Yuan and Ying-Lan, have given me so much without expecting anything in return. Their encouragement and comfort helped me through time of frustration. My two older sisters, Chien-Yi and Yi-Ying keep the family tight with laughter. It is the family support system made everything possible for me.

Table of Contents

List of Tables

Chapter 1

Benefits and Costs of Asset Reallocation in Mergers and Acquisitions

1.1 Introduction

Mergers and acquisitions (M&As hereafter) create value when the assets are reallocated from less efficient uses to more efficient uses. The Q-hypothesis of M&As generalize the benefits from asset reallocation and suggests that M&As between high-Q acquirers and low-Q targets are value creating because the target's assets can be redeployed by acquirers with better managerial quality, higher firm productivity, or more valuable investment opportunities. Early empirical studies use pre 1990s data and find evidence supporting the Q-hypothesis of M&As. For instance, Lang, Stulz, and Walkling (1989) document that the acquirers' abnormal returns are higher if the acquirers have higher Q. Servaes (1991) finds that target, acquirer, and the combined returns are higher when targets have lower Q and acquirers have higher Q. However, more recent empirical studies have failed to confirm such findings on valuation effects of M&As. For example, Moeller, Schlingemann, and Stulz (2004) find no relation between acquirer's Q and acquirer's announcement returns. Dong, Hirshilerifer, Richardson, and Teoh (2006) find that higher acquirer's Q is associated with lower acquirer announcement returns. These recent findings pose a serious challenge to the supposed benefits from asset reallocation in M&A decisions.

In this paper, I revisit the valuation effects of asset reallocation in M&As by improving the empirical examination in the following aspects. First, the Q-hypothesis of M&As implicitly assumes that the resources within the merged firm will be costlessly combined and efficiently redeployed. However, when the assets are sufficiently different, the acquirer could bear a substantial cost of integration. Jovanovic and Rousseau (2008) argue that when the difference in Q between the acquirer and the target is sufficiently large, the costs could erode the potential benefits of asset reallocation and even lead to value destruction[1]. Therefore, a refined investigation of the valuation effect from asset reallocation has to control for the costs of asset reallocation.

[1] Among the challenges of integration, the internal capital allocation in the merged firm could be inefficient. Rajan, Servaes, and Zingales (2000) and Scharfstein and Stein (2000) argue that the high diversity in investment opportunities within a firm could cause inefficient capital allocation. Therefore, the

Second, the market-to-book ratio, an often used proxy for Q, captures the net effect of managerial quality, firm productivity, investment opportunities, and misvaluation. Shleifer and Vishny (2003) and Rhodes-Kropf and Viswanathan (2004) argue that misvaluation can be an important force behind M&A initiation decisions and financing choices[2]. Therefore, the market reaction to an M&A bid announced by an acquirer with a high market-to-book ratio could be negative because the market partially corrects the overvaluation following the announcement. The empirical relation between the market-to-book ratio and acquisition value creation cannot be properly interpreted without disentangling potential misvaluation factors from managerial quality, productivity and investment opportunities. Thus, I apply Rhodes-Kropf, Robinson, and Viswanathan (2005) (RRV (2005) hereafter) methodology to decompose the market-to-book ratio of equity (MB) into firm-specific pricing error (FSE), time-series sector error (TSSE), and value-to-book ratio (VB). VB measures the net effect of managerial quality, productivity, and investment opportunities without the interference of misvaluation. Using VB as the measure of Q along with the controls for misvaluation could provide us with a clearer examination of asset reallocation in M&As. Consistent with misvaluation hypothesis, I find that acquirer's firm-specific pricing error is positively related to equity financing in M&As.

In addition, I weight the measures of benefits and costs of asset reallocation by the size of assets involved in M&As in the valuation effect regressions. If there is any benefit or cost associated with asset reallocation, the effect on firm valuations should be in proportion to the amount of the resource being reallocated. Since the measures of value creation (e.g. combined abnormal announcement returns or the changes in operating performance) already take the size of the acquired resources into consideration, using asset reallocation measures based on unweighted proxies of Q might not properly capture the potential valuation effects from asset reallocation. I address this issue by weighting

---

value creation in M&As and benefits from asset reallocation could be hindered by the costs from increasing diversity.

[2] The supporting evidence for these models includes Rhodes-Kropf, Robinson, and Viswanthan (2005), Savor and Lu (2009). On the contrary, Harford (2005) argue that M&As are more likely to be driven by both industry reorganization and the high credit liquidity in the market. In this paper, I focus on the valuation effect of asset reallocation with a framework where both misvaluation hypothesis and asset reallocation incentives could drive M&As.

the proxies for benefits and costs of asset reallocation by the relative size (RS) of the M&As in the valuation effect regressions.

Using the full sample of 2,352 completed and cancelled M&A bids from 1989 to 2010; I find evidence supporting both benefits and costs of asset reallocation. I find that relative size weighted VB-difference (relative size weighted squared VB-difference) is positively (negatively) related to both the combined announcement returns and the changes in operating performance. In other words, I confirm the inverse U-shape relation between the Q-difference and the value creation in M&As suggested by Jovanovic and Rousseau (2008). The evidence suggests that it is necessary to control for the potential costs of integration. Moreover, I find the value creation in M&As is negatively related to the acquirer's misvaluation proxy. This is consistent with the misvaluation hypothesis of M&As where a highly overvalued acquirer is more likely to finance its bid with equity.

Masulis, Wang, and Xie (2007) and Wang and Xie (2010) find that the superior governance structure of the acquirer is positively related to value creation in M&As. Using a subsample where the governance index information is available, I find that my results are not driven by the acquirer's superior governance structure. Moreover, I find my results do not differ between within-industry bids and cross-industry bids. This suggests that my results are not driven by the difficulty in integrating the assets across different industries. I also explore the possibility that compensation structure, governance structure, and other firm characteristics impact the potential benefits from asset reallocation. I find that firms with lower incentive to take risk, better governance (a lower G-index), and higher firm profitability are more likely to engage in M&As with potential benefits from asset reallocation.

This paper contributes to the literature in three ways. First, this paper provides direct evidence supporting the valuation effect of the Q-hypothesis of M&As using firm-level data after 1990. The results complement several recent studies that examine several other acquirer's qualities which could be related to Q. By addressing various issues from the previous empirical studies, this study offers a more comprehensive analysis on the valuation effects of the Q-hypothesis of M&As by controlling for both the costs of asset reallocation and potential misvaluation. Second, the findings on the costs of asset reallocation confirm the insights from recent developments in the asset reallocation

theory in M&As. For example, Jovanovic and Rousseau (2008) propose that asset reallocation is particularly costly when the assets are too dissimilar to integrate. Further explorations of such asset reallocation costs would improve our understanding of the M&A process substantially. Third, I examine the empirical implications of the neo-classical and behavioral theories of M&As simultaneously in a unified framework and find evidence of valuation effect from both theories in M&As.

The rest of the paper proceeds as follows. I review the related literature in Section 1.2. Section 1.3 discusses methodology and data. The empirical analyses are contained in Section 1.4. Section 1.5 is the conclusion.

1.2 Related literature

1.2.1. The benefits from asset reallocation in M&As

M&As are significant corporate events which involve large scale resource reallocation. If the assets are reallocated from less efficient uses to more efficient uses, such a reallocation will be value creating. There is a long literature discussing the benefits from asset reallocation in M&As. The Q-hypothesis of M&As suggests that M&As between higher-Q acquirers and lower-Q targets create more value because the target assets can be redeployed by acquirers with better managerial quality, higher firm productivity, or more valuable investment opportunities. For instance, acquirers with superior managerial quality can purchase assets from poorly-managed targets and put those assets in better use as in the disciplinary view of takeovers. Alternatively, Jovanovic and Rousseau (2002) provide a model in which M&A activities are positively related with acquirer's Q because acquirers with high productivity acquire the assets of targets with low productivity. Similarly, acquirers can put acquired resources from targets with lower value of investment opportunities into acquirers' investment projects which have higher value.

Early empirical studies use pre 1990s data and find evidence supporting the Q-hypothesis of M&As. In other words, they find that the acquirer's Q or the Q difference between the acquirer and the targets is positively related with value creation from the

M&As. Lang, Stulz, and Walkling (1989) document that the acquirers' abnormal returns are higher if the acquirers have high Q in 87 successful tender offers during the period from 1968 to 1986. From 704 mergers and tender offers announced during the period from 1972 to 1987, Servaes (1991) finds that target, acquirer, and the combined returns are higher when targets have low Q and acquirers have high Q. Consistent with the notion that low Q acquirers are more likely to have agency cost of free cash flow, Lang, Stulz, and Walkling (1991) study 101 tender offers from 1968 to 1986 and find that bidder returns are negatively related to free cash flow for low Q acquirer but not for high Q acquirers[3].

However, some recent empirical studies have failed to confirm such findings on valuation effects of M&As. For example, using market-to-book ratio of assets as their proxy for Q, Moeller, Schlingemann, and Stulz (2004) find no relation between acquirer's Q and acquirer's announcement returns from a sample of 12,023 acquisitions by public firms from 1980 to 2001. Bhagat, Dong, Hirshleifer, and Noah (2005) find that the acquirer's Q is negatively related to the acquirer's and the combined announcement returns using the market-to-book ratio of assets as the proxy for Q and a sample of 636 tender offers in both acquirer and target were listed on the NYSE, AMEX, or Nasdaq during 1962-2001. Using price-to-book ratio of equity as their proxy for Q, Dong, Hirshileifer, Richardson, and Teoh (2006) find that a higher Q for the acquirer is associated with lower acquirer announcement returns from a sample of 2,922 successful and 810 unsuccessful acquisition bids from 1978 to 2000. The lack of supportive evidence for the Q-hypothesis poses a serious challenge to the supposed benefits from asset reallocation in M&A decisions.

There is evidence supporting the general idea that high quality acquirers can create value via asset reallocation following M&As. On the one hand, Maksimovic and Philips (2001) and Maksimovic, Philips, and Prabhala (2011) utilize the plant-level data from 1974 to 2000 and document that the gain in the productivity of assets under new ownership is larger when the acquirer's productivity is higher the target's and the acquirers with skills tend to retain more acquired plants. On the other hand, there are

[3] Lang, Stulz, Walking (1989, 1991) and Servaes (1991) construct proxy of Q following Linderberg and Ross (1981) algorithm.

studies which examine the valuation effect from different quality of acquirers which could be related to Q. Masulis, Wang, and Xie (2007) and Wang and Xie (2009) find value creation in M&As is positive when the acquirer's has better corporate governance structure. Heron and Lie (2002) and Leverty and Qian (2010) find that acquisitions made by acquirers with higher operating performance or better efficiency are more likely to be value creating.

In sum, while recent studies show evidence which is conceptually consistent with the Q-hypothesis of M&As, the direct tests on the Q-hypothesis of M&As often find conflicting results. As a result, I plan to implement three improvements on the direct test of the Q-hypothesis of M&As by addressing the following issues: (1) the cost of asset reallocation, (2) the impact of misvaluation on M&A related decisions, and (3) weighting in valuation effect regressions. I will discuss the first two issues in the following paragraphs and the third problem when I introduce the empirical methodology in section 1.3.

1.2.2. The costs of asset reallocation in M&As

There are also potential costs associated with the asset reallocation. The Q-hypothesis of M&As implicitly assumes that the resources within the merged firm will be freely combined and efficiently redeployed. When two firms merge, there are costs of combining dissimilar organizations. The costs of asset redeployment could be modest when the assets are similar. However, if the two organizations are sufficiently different, the acquirer could bear a substantial cost stemming from the incompatibility problem. Jovanovic and Rousseau (2008) argue that the costs of asset redeployment could influence M&A related decisions. In their model, the relation between value of the acquisition and the Q-difference is an inverse U-shape. That is, if the difference in Q between the acquirer and the target is substantially large, the costs could erode the potential benefits of asset reallocation and even lead to value destruction.

Moreover, the allocation of capital within a merged firm could be inefficient. In their model with information asymmetries and agency conflicts between corporate headquarters and divisional managers, Rajan, Servaes, and Zingales (2000) and Scharfstein and Stein (2000) argue that the high diversity in investment opportunities

among the divisions within the firm could cause inefficient capital allocation. They argue that misallocation of capital across divisions can arise from rent-seeking and bargaining between divisional managers and corporate headquarters who might not have sufficient knowledge of divisional investment opportunities. High diversity in opportunities aggravates rent-seeking among divisional managers and increases the probability of inefficient capital allocation. Ahn and Denis (2003) and Burch and Nanda (2003) document an increase of investment efficiency and firm value after a diversity-decreasing event in their studies of spin-offs. Since M&As generally increase diversity within merged firm, the value creation in M&As and benefits from asset reallocation could be hindered by the costs form increasing diversity. The inefficient capital allocation also suggests a concave or an inverse U-shape relation between the value creation from the acquisition and the Q-difference.

In this paper, I use the difference in Q between the acquirer and the target to capture the benefits from asset reallocation along with the squared difference in Q to capture the costs of asset reallocation. This measure is intended to capture extreme differences in the acquirer's Q and the target's Q in either direction. Following Jovanovic and Rousseau (2008), I hypothesize that the relation between value creation and the Q-difference should be concave if there are costs to reallocation as well as benefits. In other words, the Q-difference (squared Q-difference) should be positively (negatively) related to the value creation in M&As.

1.2.3. Misvaluation and M&As

Market-to-book ratio, a commonly used proxy for Q, captures the net effect of managerial quality, firm productivity, investment opportunities, and misvaluation[4]. Shleifer and Vishny (2003) and Rhodes-Kropf and Viswanathan (2004) argue that misvaluation can be the major force behind initiation decisions and financing choices in M&As. That is, an overvalued firm should utilize its cheap equity to purchase less-valued target. Consistent with those theoretical models, RRV (2005) find that overvalued firms are more likely to be an acquirer and are more likely to finance their acquisitions with equity. Therefore, the market reaction to the M&A bid announced by overvalued acquirer

[4] In this paper, I use market-to-book ratio of equity which is highly related to the market-to-book ratio of assets following RRV (2005).

could be negative because the market partially corrects the overvaluation following the announcement and especially if the deals are more likely to be financed by equity. So the empirical relation between the market-to-book ratio and acquisition value creation cannot be properly interpreted without disentangling the misvaluation factors from managerial quality, productivity and investment opportunities.

I apply RRV (2005) methodology to decompose the market-to-book ratio of equity (MB) into firm-specific pricing error (FSE), time-series sector error (TSSE), and value-to-book ratio (VB). I provide a brief description of the methodology in section 1.3 and a detail demonstration in Appendix 1.A.

An alternative interpretation of the misvaluation part of the MB is that FSE and TSSE actually capture the short-term variation in the value of growth opportunities. The need to explore a growth option outside the firm via takeover should be high when the value of internal growth options of the firm is low. Therefore, an acquisition announcement could reveal that the acquirer has exhausted its internal growth opportunities. Similarly, the acquirer's choice of a target with high short-term growth opportunities can also convey the information about its internal growth options. Such revelation of growth opportunities might have a negative impact on the acquirer's announcement return and perhaps the combined announcement return. The growth opportunities revelation effect should be even stronger if the perceived growth opportunities by the market are high[5].

1.3 Data and methodology

1.3.1. Decomposing market-to-book ratio

I apply RRV (2005) methodology to decompose the market-to-book ratio (MB) into misvaluation (MV) and fundamental value-to-book ratio (VB) as follows:

$$MB = MV \times VB$$

Suppose we have an accurate measure for the true value of the firm, V. Market-to-value ratio, MV, would measure the discrepancy between market price and true value, i.e.

[5] A theoretical summary of this argument can be found in Jovanovic and Braguinsky (2004).

misvaluation. The discrepancy could arise from either behavioral bias or information asymmetry between informed investors and the rest of the market. As a result, the value-to-book ratio, VB, would measure the net effect of managerial quality, productivity, and investment opportunities without the interference of misvaluation. If the market correctly forecasts the future growth opportunities, cash flows, and discount rates, then M should equal to V (MV = 1). Otherwise, MV will capture misvaluation part of MB. Further decomposing the misvaluation part of MB into firm-specific price error and time-series sector yields:

$$MB = FSE \times TSSE \times VB$$

where FSE measures the ratio of the market value to fundamental value estimated using firm-specific accounting data and the contemporaneous sector accounting multiples, and captures purely firm-specific deviations from fundamental value. TSSE measures the ratio of estimated fundamental value using contemporaneous sector accounting multiples at time *t* to the estimated fundamental value using long-run sector multiples, and captures the extent to which the industry may be misvalued at time *t*. The final component VB is the ratio of the long-run value implied by long-run sector accounting multiples to the book value and captures long-run growth opportunities of the firm and reflects managerial quality and firm productivity. Using VB as the measure of Q along with the controls of misvaluation part of MB should provide us a clearer examination on the overall valuation effect from the asset reallocation in M&As. The further detail of the decomposition is in Appendix 1.A.

1.3.2. Regression framework

The first measure of the value creation in M&As is the market reaction to the acquisition announcement. $CARC_{(-1,+1)}$ is the value-weighted portfolio of the target and bidder return where toehold adjusted weights are based on the market value of equity 21 days prior to the announcement following Bradley, Desai, Kim (1988). The market model parameters are estimated over the period (-270, -21) with the CRSP equally-weighted return as the market index. I interpret $CARC_{(-1,+1)}$ as the value of M&A synergies which is total value creation from the acquisition regardless how the value is distributed

between acquirer and target[6]. Additionally, $CARA_{(-1,+1)}$ and $CART_{(-1,+1)}$ are the acquirer's and target's risk adjusted three-day cumulative abnormal returns around the announcement of the deal.

The announcement returns reveal information about the market's reassessment of potential synergies, the acquirer's quality, and the probability of real completion. While we can control for various acquirer's characteristics in our empirical examination, the results from the announcement return regression could reflect the market's expected probability of deal completion rather than the expected synergy. For instance, the concave relation between Q-difference and announcement returns could be driven by the market's prediction on a low probability of deal completion rather than the market's expected costs of asset reallocation. To address this issue, I also investigate how the benefits and costs of asset reallocation affect operating performance in M&A events. Since the actual asset reallocation occurs after the deal completion, the valuation effect from asset reallocation should also be observable in operating performance.

I measure the operating performance as return on assets (ROA), which is the Operating income before depreciation (OIBDP) at the fiscal year end scaled by book value of total assets at the beginning of the fiscal year (AT). I used the performance match methodology proposed in Barber and Lyon (1996) to identify changes in the operating performance driven by only the M&A event. At the year before the deal announcement, I find the match firms for the acquirers and the targets based on the industry (2-digit SIC code), size (70%-130% of the book value of the total assets), and operating performance. For every year over the 3 year period after the deal completion, I define the change in the performance adjusted ROA as the difference between the post-event performance adjusted ROA and the pre-event performance adjusted ROA. The post-event performance adjusted ROA is the difference between the merged firm's ROA and the weighted average ROA from the matching firms, and the pre-event performance adjusted ROA is the weighted average performance adjusted ROA of the acquirer and the target. In the regression analyses, I use the average change in performance adjusted ROA over the 3 year period after the deal completion (ΔAdj_ROA) as my second measure of

[6] The results are not sensitive to different windows including (-2, +2), (-5, +2), (-5, +5). Also, the results are similar when using different models including CAPM, Fama-French 3 factor model, and 4 factor model in estimating the abnormal returns.

value creation in M&As. In addition, I provide regression results on average level in industry-size adjusted ROA over the 3 year period after the deal completion (Ind_Adj_ROA) as a supportive measure[7].

If there is any benefit or cost associated with asset reallocation, the effect on firm valuations should also be related to the amount of the resource being reallocated. The measures of value creation used in this paper, $CARC_{(-1,+1)}$ and ΔAdj_ROA, already take the size of the acquired resource into consideration. Thus, using the unweighted Q or the unweighted Q-difference will not properly capture the potential valuation effects from asset reallocation. I address this issue by weighting the measures of benefits and costs of asset reallocation by the relative size (RS) of the M&As in the announcement return regressions. That is, in the valuation effect regressions, the main proxy for the benefit from asset allocation factor is the relative size weighted VB-difference between the acquirer and the target ($(VB_A - VB_T)*RS$). To capture the potential costs of asset reallocation arising from the large differences in VB, I use the relative size weighted VB-difference square ($(VB_A - VB_T)^2*RS$) in the valuation effect regressions.

The valuation effects of asset reallocation will be tested on the following framework:

$$CARC_{(-1,+1)} \text{ or } \Delta Adj\_ROA = \beta_0 + \beta_1[(VB_A - VB_T) * RS] + \beta_2 [(VB_A - VB_T)^2 * RS] + \beta_3 Controls$$

where the controls includes the misvaluation part of MB and other firm characteristics for both the acquirers and the targets and the deal characteristics. The same framework will be also applied on several supportive measures like $CARA_{(-1,+1)}$. I expect a positive (negative) sign on β_1 (β_2) if there are potential benefits (costs) of the asset reallocation in the M&As.

Following prior literature, control variables include different acquirers' characteristics, targets' characteristics, and deal characteristics. Acquirers' characteristics include firm size, cash ratio, leverage, operating cash flow, capital expenditures, and run-ups. Targets' characteristics include cash ratio, leverage, operating cash flow, capital expenditures, and run-ups. Deal characteristics include relative size, industry M&A activities, and dummy variables for deal financed with 100% cash, deal financed with

[7] Please refer to the Appendix 1.B for more detail on the variable construction.

100% equity, deals with multiple bidders, hostile deals, tender offers, cross-industry deals, deals with lockup agreement, deals with termination fee agreement, and deals involving high-tech industries. Please refer to the Appendix 1.B for definitions and motivations for these variables.

The run-ups are defined as the buy-and-hold abnormal returns (BHAR) during the period (-20, -2). The target run-ups capture the potential information leakage and are part of the premium paid by the acquirer. Therefore, target run-ups could also be part of the value creation from M&As. Previous studies document a positive run-up in targets returns prior to M&A announcement. For example, Schwert (1996) find an average run-up of 13.3% using 1,523 takeover bids from 1975 to 1991 and argue that the run-up is an added cost to the bidder. Conversely, there is no evidence supporting acquirer run-ups proxy for either information leakage or part of value creation of M&As. Researchers then face a trade-off between adding noise with the longer widow for estimating combined returns and omitting the target run-ups with the short window. I reconcile the issue by using a short window (-1, +1) for combined returns with controls of run-ups.

Relative size is the transaction value divided by the market capitalization of the acquirer 21 days prior to the announcement where the transaction value is the total value of consideration paid by the acquirer, excluding fees and expenses. Controlling for relative size is crucial in valuation effects regressions given that I weight my proxies for benefits and costs of asset reallocation in regression analyses.

1.3.3. Sample requirement

I examine M&A announcements from Securities Data Corporation (SDC) mergers and acquisitions database from 1989 through 2010[8]. The sample selection is based on the following steps:

1. All domestic acquisitions from January 1, 1989 to December 31, 2010.
2. Both acquirer and target are public and the first digit of the primary SIC code is neither 6 nor 9.
3. The deal value is available.
4. Both completed and cancelled deals are included.

[8] Netter, Stegemoller, and Wintoki (2011) show that the SDC's coverage on M&As is not consistent with other data sources before the third quarter of 1988.

5. The percentage of the target that the acquirer is seeking to purchase in transaction is at least 50%.
6. The percentage of the target that the acquirer held prior to the announcement is less than 50%.
7. Both the acquirer and the target have stock return data is available from CRSP for at least 100 trading days before the announcement.
8. The acquirer is not delisted for at least 30 trading days after the announcement.
9. Both the acquirer and the target have accounting information from the Standard & Poor's COMPUSTAT.

To calculate and decompose the market-to-book ratio, I follow the procedure from RRV (2005) and merge data from SDC, CRSP, and COMPUSTAT. For each fiscal year *t*, I match the COMPUSTAT accounting data with the market value data from CRSP measured three months after the fiscal year-end. Then I match the COMPUSTAT and CRSP observation with an SDC M&A announcement if the announcement date is at least one month after the date of the CRSP market value. If the M&A announcement date falls between the fiscal year-end and one month after the CRSP market value, I match the M&A announcement with the accounting information of the previous year.

To be included in the final sample, both the acquirer and the target need to have sufficient data to calculate the three components of the market-to-book ratio. I exclude bids made by the same acquirer to different targets on the same date. To avoid the influence of outliers, accounting ratios, MBs, VBs are winsorized at 1% level. The final sample contains of 2,352 completed or cancelled M&A bids from 1989 to 2010. Table 1.1 reports the sample distribution of announcement years.

1.3.4. Data description

In Panel A of Table 1.2, I report summary statistics of the major independent variables and the dependent variables in regression analysis later. The mean (median) difference in acquirers' and targets' MB is 0.85 (0.62). The mean (median) difference in VB is -0.15 (-0.03). These results are consistent with RRV (2005). In other words, the average difference in the misvalution is more likely to positive given that the average

difference in MB is positive and the average difference in VB is negative. This suggests that more M&As are driven by overvalued acquirers purchasing less valued targets than are driven by the Q-hypothesis of M&As. The fact that on average the target's VB is lower than the acquirer's VB suggest that the asset reallocation is not the only incentive of M&A initiation. However, asset reallocation could still motivate some M&As and have valuation effect detectable for researchers. The means (medians) of $CARA_{(-1,+1)}$, $CART_{(-1,+1)}$, and $CARC_{(-1,+1)}$ in the sample are -1.57% (-1.03%), 23.17% (18.16%), and 1.48% (1.01%), respectively. The cumulative abnormal returns pattern is consistent with previous literature such as Andrade, Mitchell, and Stafford (2001) and Moeller, Schlingemann, and Stulz (2004). The means (medians) of the changes in industry-size-performance adjusted ROA (ΔAdj_ROA) and the level of the industry-size adjusted ROA (Ind_Adj_ROA) is 0.01 (0.00) and 0.02 (0.01) respectively. This suggest on average the operating performance improves slightly after M&A completion[9].

Panel B Table 1.2 presents the summary statistics of firm characteristics. The numbers suggest that acquirers are substantially larger than targets, and also have higher operating cash flow than targets. The mean (median) target's stock price run-up 5.26% (3.14%) suggests that there could be information leakage for targets of acquisition. The acquirer's stock price run-up is low, suggesting that it does not capture same information as the target run-ups. The acquirers' FSE is larger than the target's FSE, which is consistent with RRV (2005) that the acquirers are relatively more overvalued than the targets. Therefore, the control for misvaluation part of MB (FSE, TSSE, or the sum of them, TE) is crucial for understanding the valuation effects of asset reallocation.

Panel C of Table 1.2 provides the summary statistics of deal characteristics from the sample. The transaction value is the total value of consideration paid by the acquirer, excluding fees and expenses. The mean (median) of transaction value is $2.132 billion ($319.25 million) in 2010 dollars. Relative size's mean (median) is 0.36 (0.16). The statistics of other deal characteristics are similar to what presented in previous literature.

[9] The samples are smaller due to additional data requirements for these operating performance measures. Please refer to the Appendix 1.B for the detail.

Panel D of Table 1.2 provides the correlation matrix for the acquirer's and the target's MB, VB, FSE, TSSE. Both VB and FSE are highly positively correlated to the MB.

1.4 Empirical results

1.4.1. Method of payment and the decompositions of MB

In this paper, I utilize RRV (2005) decomposition of Market-to-book ratio of equity (MB) to obtain the fundamental value-to-book ratio (VB) and use it as an improved proxy for Q. Before I conduct the valuation effect regressions with the VB-related measure and misvaluation measures as controls, I need to confirm whether the components derived from the decomposition behave as predicted by RRV (2005) model. One important implication of the misvaluation hypothesis of M&As is that misvaluation driven M&As are more likely to be financed by equity. Therefore, one should expect the acquirer's misvaluation to be positively related to the proportion or the probability of equity financing. Conversely, M&A bids financed mostly by cash are less likely to be driven by acquirer's misevaluation and should be more likely to create value. If M&As with a positive VB-difference are more likely to be value increasing, one should also expect the VB-difference to be negatively related to the proportion or the probability of equity financing.

Table 1.3 presents the results of regression analysis on the choice of equity financing. In column (1), I use tobit a model with upper limit equal to 1 and a lower limit equal to 0 to regress the percentage of equity financing on VB-difference, squared VB-difference, acquirer's and target's misvaluation, and firm and deal characteristics controls. In column (2), a logit model with the dependent variable equals to 1 if the deal is 100% financed by equity and 0 otherwise are used. Consistent with notion of equity-financed deals are less likely to be value increasing, the coefficients of VB-difference is negative and significant in both columns. Consistent with the misvaluation hypothesis, the coefficients of acquirer's firm-specific pricing error (FSE) is positive and significant

in both columns[10]. I also find that larger acquirer's size, higher acquirer's CAPX, higher target's ROA, and tender offers are related to less equity financing while larger relative size of the deal, target's cash ratio, and existence of lockup and termination fee agreement are related to more equity financing. These results are consistent with previous studies.

1.4.2. The announcement returns and the asset reallocation

Table 1.4 provides the results from the announcement return regressions. The first three columns present the model with $CARC_{(-1,+1)}$ as dependent variable and the fourth and fifth column present the model with $CARA_{(-1,+1)}$ and $CART_{(-1,+1)}$ as dependent variable respectively.

Column (1) presents the model with unweighted difference in MB along with control variables. The coefficient of unweighted difference in MB is insignificant. These results are consistent with those findings in recent studies that acquirer's MB is not associated with acquirer's announcement returns (e.g. Moeller, Schlingemann, and Stulz (2004)). The coefficients of control variables are consistent with literature. For example, I find that firm size, equity-financing, and deals involving high tech industries are negatively related to announcement returns. I also find tender offers and deals financed 100% with cash have higher announcement returns.

Since MB reflects managerial ability, productivity, value of investment opportunities, and misvaluation, these findings could be driven by the misvaluation part of MB and have no implication on the valuation effects from asset reallocation. Thus, I apply RRV (2005) methodology to decompose MB into the misvaluation part and fundamental value-to-book ratio (VB) and use VB as my proxy of Q. Moreover, to further examine valuation effects from the asset reallocation, I consider both the benefits and costs of the asset reallocation. Jovanovic and Rousseau (2008) argue that the costs of asset reallocation could erode or even outweigh the potential benefits from asset reallocation if the difference between the acquirer and the target is sufficiently large. Consistent with their model, I use the VB-difference as the proxy for the benefit of asset

[10] This is also consistent with the notion that FSE captures the firm's short-term variation of investment opportunities. When the market perceive a higher investment opportunities of a firm, equity would be preferred over debt by the managers who want to fully take advantage of the investment opportunities.

reallocation and squared VB-difference as the proxy for the cost of asset reallocation while using acquirer's firm-specific pricing error (FSE), acquirer's time-series sector error (TSSE), and the target's total pricing error (TE) as additional controls.

The results Column (2) suggest that acquirer's FSE is negatively related to $CARC_{(-1,+1)}$ yet the acquirer's time-series sector error (TSSE) and the target's total pricing error (TE) are not significant. These findings are consistent with misvaluation hypothesis of M&As. In other words, highly overvalued acquirers are associated with low combined and acquirer's announcement returns because of partial correction of the market overvaluation or potential equity financing. On the other hand, these results are also consistent with the growth opportunities revelation hypothesis. Namely, acquirers with high perceived short-term growth opportunities reveal the fact that they exhausted internal growth opportunities by announcing M&A bids.

The fact that neither VB-difference nor squared VB-difference is significant in column (2) does not suggest that asset reallocation has no impact on value creation. If there is any benefit or cost associated with asset reallocation, the effect on firm valuations should also be related to the amount of the resource being reallocated. The proxy of value creation in M&As like $CARC_{(-1,+1)}$ already takes the size of the acquired resource into consideration while VB-difference and squared VB-difference do not. Thus, using the unweighted proxies will not properly capture the potential valuation effects from asset reallocation. I then weight the proxies of asset reallocation by relative size (RS) to capture the magnitude of the asset reallocation in M&As.

Column (3) presents the model with $CARC_{(-1,+1)}$ as dependent variable. The benefit from asset reallocation is measured by the difference in Q weighted by relative size, $(VB_A - VB_T)$*RS and the cost of the asset reallocation is measured by squared difference in Q weighted by relative size, $(VB_A - VB_T)^2$*RS which captures the cost of integration of highly dissimilar organizations. If there are benefits from asset reallocation, $(VB_A - VB_T)$*RS should be positively related to either $CARC_{(-1,+1)}$. Similarly, $(VB_A - VB_T)^2$*RS should be negatively related to $CARC_{(-1,+1)}$ if there are costs of asset reallocation. I find that the coefficient of $(VB_A - VB_T)$*RS is positive and significant and the coefficient of $(VB_A - VB_T)^2$*RS is negative and significant. This is consistent with the recent developments in the asset reallocation theory in M&As where the costs of

integration are also considered in the process of asset reallocation. In Jovanovic and Rousseau (2008), a high cost of integration would imply a concave relation between the benefits from asset reallocation and the value creation in M&As.

Evidence in column (3) suggests that there are benefits as well as costs from the asset reallocation process in M&As. I also investigate how the benefits and costs are distributed across the acquirer and the target. According to the Q-hypothesis of acquisitions, the target's assets are being reallocated to better use by the acquirer, the target's shareholders should directly benefit from this improvement in asset utilization assuming the bid is fairly negotiated. The effect of the beneficial asset reallocation on acquirer's shareholders depends on the results of negotiation. If the target has stronger bargaining power, most of the synergy gain will be distributed to the target's shareholders. Further, if there are costs from the asset reallocation, it should be more likely to be bear by the acquirer's shareholders since most of the costs incur after the acquisition is complete. Column (4) presents the model with $CARA_{(-1,+1)}$ as dependent variable. I find that the coefficient of $(VB_A - VB_T)^2$*RS is negative and significant while the coefficient of $(VB_A - VB_T)$*RS is insignificant. Column (5) presents the model with $CART_{(-1,+1)}$ as dependent variable. I find that the coefficient of $(VB_A - VB_T)$*RS is positive and significant and the coefficient of $(VB_A - VB_T)^2$*RS is insignificant. The results are consistent with the notion that the acquirer's shareholders bear the costs of asset reallocation while most of the benefits go to the target's shareholders[11].

1.4.3. The operating performance and the asset reallocation

The announcement returns reveal information about not only the market's assessment of potential synergies but also the probability of deal completion. Thus, the results from the announcement return regression could reflect the market expected probability of deal completion rather than the market expected synergy. For example the negative market reaction to the deal with extremely high Q-difference, could be driven by

[11] The relative size is negative and significant in both CARA and CART regressions and is positive and significant in CARC regression. Assuming that M&A bids are value creating, the synergy should be positively related to the relative size of the deal. However, the larger deal has bigger chance of cancellation. The market therefore will react negatively to the higher probability of cancellation. It seems like the market reaction on acquirer's and target's returns is more likely related to the probability of cancellation. Yet the synergy effect dominates in combined returns regression.

the market's expectation of this value increasing deal being cancelled rather than by the concern about the costs of asset reallocation. To address this issue, I also investigate how the benefits and costs of asset reallocation affect operating performance in M&A events. Since the actual asset reallocation occurs after the deal completion, the valuation effect from asset reallocation should also be observable in operating performance.

I use ROA as my measure the operating performance, which is defined as the Operating income before depreciation (OIBDP) at the fiscal year end scaled by book value of total assets (AT) at the beginning of the fiscal year. I use the performance match methodology proposed in Barber and Lyon (1996) to identify changes in the operating performance driven by only the M&A event. At the year before the deal announcement, I find the match firms for the acquirers and the targets based on the industry (2-digit SIC code), size (70%-130%), and ROA. For every year over the 3 year period after the deal completion, I define the change in the industry-size-performance adjusted ROA as the difference between the post-event performance adjusted ROA and pre-event performance adjusted ROA. The post-event performance adjusted ROA is the difference between the merged firm's ROA and the weighted average ROA from the matching firms, and the pre-event performance adjusted ROA is the weighted average performance adjusted ROA of the acquirer and the target. In the regression analyses, I use the average change in adjusted ROA over the 3 year period after the deal completion (ΔAdj_ROA) as my second measure of value creation in M&As. In addition, I use the average level of the industry-size adjusted ROA (ROA minus the median ROA from the same industry-size group) over the 3 year period after the deal completion (*Ind_Adj_ROA*) as a supportive measure of operating performance after deal completion.

Table 1.5 provides the results from the operating regressions. The first two columns present the model with ΔAdj_ROA as dependent variable and the third column present the model with *Ind_Adj_ROA* as dependent variable. Column (1) presents the regression using a subsample of 1,342 completed deals where the necessary data on the acquirers and targets and their matches are available to calculate ΔAdj_ROA. There are cases where the difference in ROA between the sample firm and its match firm is substantial. For example, the 90th percentile of the difference is around 0.2 which implies a 20% difference. To ensure that my results are not driven by those bad matches, The

regression on ΔAdj_ROA in column (2) is ran in a subsample where the difference in ROA between the sample firm and its match firm is less than 0.05. Column (3) presents the regression using a subsample of 1,175 completed deals where *Ind_Adj_ROA* can be obtained.

The results are qualitatively similar across all three columns in Table 1.5. I find that the coefficient on $(VB_A - VB_T)$*RS is positive and significant and the coefficient on $((VB_A - VB_T)^2$*RS is negative and significant in all three columns. These results suggest that the benefits and costs of asset reallocation are also present in the operating performance of the merged firm and complement Maksimovic and Philips (2001) and Maksimovic, Philips, and Prabhala (2011) findings where the reconstruction that occurs following M&As increases productivity. The coefficient on acquirer's TSSE is negative and significant. This is consistent with the notion that overvaluation driven M&As are value-decreasing[12]. The dummy All Cash is positively related to the operating performance, suggesting deals financed with cash are more likely to be value increasing.

1.4.4. The valuation effects of asset reallocation and corporate governance

Using the corporate governance indexes constructed by anti-takeover provisions[13], Wang and Xie (2010) find that M&As involving acquirers with governance structures that are better than targets are associated with higher synergy. Masulis, Wang, and Xie (2007) find that the acquirer's announcement returns are higher for to those acquirers with superior governance structure. I also find that G-index is negatively related to acquirer's announcement returns in untabulated regressions. Those results suggest that the superior governance structure of the acquirer could be positively related to value creation in M&As. Thus, I investigate whether my findings for the asset reallocation are due to the omission of governance structures.

[12] There is an ongoing debate on whether overvaluation driven M&As are value-decreasing. Consistent with the misvaluation hypothesis, Savor and Lu (2009) find that overvaluation driven M&As are not necessary value-decreasing. Specifically they find that acquirers fare much worse if the overvaluation driven bids are cancelled. Fu, Lin, Officer (2010) on the other hand, find that the overvaluation driven M&As are related to lower operating performance afterward. My results on acquirer's TSSE complement the findings in Fu, Lin, Officer (2010).

[13] The indices they used include GIM index or G-index from Gompers, Ishii, and Metricks (2003), and BCF index or E-index from Bebchuk, Cohen, and Ferrell (2009). My results are similar using both indices. I present the results using G-index.

In column (1) and (2) of Table 1.6, I present regressions on $CARC_{(-1,+1)}$ using a subsample of 1,370 bid announcements from 1989 to 2006 where the governance index information is available from IRRC[14]. In column (3) and (4), I present regressions on ΔAdj_ROA using a subsample of 933 completed M&A bids. In column (1) and (3) a dummy variable for G-index greater than 9 (High G-index) is added as an additional control variable. In column (2) and (4), I add interaction terms between the proxies for benefits and costs of asset reallocation with High G-index to examine whether the valuation effects of asset reallocation are affected by governance structure. I do not find that my results are driven by acquirers' superior governance structure. More importantly, I find the coefficient of $(VB_A - VB_T)$*RS is positive and significant across all four columns in Table 1.6. That is, I find evidence supporting the benefits from asset reallocation with both proxies of the costs of asset reallocation while controlling for corporate governance structure in this subsample. In sum, the findings of valuation effect of asset reallocation are robust with controlling for governance.

1.4.5. Cross-industry vs. within-industry asset reallocation

So far I interpret these findings as evidence supporting the extended model of the Q-hypothesis in Jovanovic and Rousseau (2008) which considers both benefits and costs of asset reallocation. The acquirer substitutes its superior management for the target's poor management and redirects the assets to a better use with potential costs of reallocation. The benefits and costs of asset reallocation are likely to depend on the compatibility of the assets. In M&As between different industry (cross-industry), the assets acquired are less likely to be compatible with the acquirer's existing assets than in M&As within the same industry (within-industry). Therefore, cross-industry M&As could be associated with lower benefits from asset reallocation and higher costs of asset reallocation than within-industry M&As. Thus, my results could simply reflect the compatibility difference of acquired assets between cross-industry and within-industry M&As.

In addition, VB from RRV (2005) decomposition, the proxy of Q in this paper, is defined as the estimated fundamental value using long-run sector accounting multiples

[14] Since 2007, RiskMetrics (who acquired IRRC at 2005) applied a new methodology to collect data which does not collect all the information needed for constructing G-index.

divided by the book value of the asset. That is, the VB is determined by both the contemporaneous firm characteristics and the long-run average sector factor. If VB captures more of the difference across the sectors rather than of the difference across firms, it will not be a proper proxy for Q which should measure the net effect of managerial quality, firm productivity, and investment opportunities and my findings of the VB-difference on valuation effect could be driven by the M&As between different industries.

I test the difference in coefficients in the regressions using cross-industry M&As subsample and within-industry subsample[15]. The results are reported in Table 1.7. In both model specifications, I find that the interaction terms between the benefit (cost) of asset reallocation and cross-industry dummy are insignificant. That is, the impact of the weighted VB-difference on value creation documented in Table 1.4 and Table 1.5 does not appear to arise from differences in cross-industry and within-industry M&As. These results suggest that VB captures more than the difference across the industry and captures the net effect of managerial quality, firm productivity, and investment opportunities. So the benefits and costs implied the measures constructed by VB capture more than asset compatibility, or the problems of asset incompatibility might be too complex to capture using simple dummies for cross-industry M&As.

1.4.6. What helps to create value from asset reallocation?

In section 1.4.2 and 1.4.3, I find empirical evidence for beneficial asset reallocation after controlling for costly reallocation and misvaluation. A natural extension is to investigate the origins of value creation. There is a long literature relating managerial compensation and corporate governance to corporate decisions and firm values. In this section, I ask whether compensation structure, governance structure, and other firm characteristics impact the decision to engage in M&As with potential benefits from asset reallocation (i.e. high VB-difference).

I use CEO pay-performance sensitivity (Delta) to capture the interest alignment between managers and shareholders. Better interest alignment should promote the value-increasing decisions, so I expect a positive relation between the Delta and VB-

[15] I categorize the cross-industry acquisitions as those with the acquirer's primary 2-digit SIC code is different from that of the target. The results are similar if Fama-French 12 industries are used.

difference[16]. Gompers, Ishii, and Metrick (2003) and Bebchuk, Cohen, and Ferrell (2009) find that firm value is related to corporate governance indices constructed from anti-takeover provisions. I expect G-index to be negatively related to VB-difference if better governance promotes beneficial corporate policies. In the free cash flow theory of Jensen (1986), exceptional performance generates the free cash flow for the acquisition. The free cash flow can be used in value-increasing acquisitions (like reallocating assets from poorly managed targets) or in value-decreasing acquisitions driven by empire-building incentives. Therefore, the empirical relation between VB-difference and cash flow proxies will depend on how acquirers utilize their free cash flow. Moeller, Schlingemann, and Stulz (2004) find large firms have lower announcement returns in M&As. I expect the firm size to be negatively related to VB-difference. Lastly, M&As involving high tech industries could be more likely driven by incentives of purchasing growth externally given that growth opportunities are much more important for high tech firms. VB-difference could be lower for high tech deals since acquiring a target with higher VB could be beneficial.

I construct a sample with compensation and governance information available from intersection of the full sample with IRRC and Execucomp. This sample consists of 830 M&A bids announced during 1993-2006. Table 1.8 presents a regression analysis of the relation between the VB-difference and various acquirer characteristics including compensation structure and governance structure. I find that the VB-difference is positively and significantly related to the acquirer's ROA. This finding confirms that the benefits from asset reallocation are partly due to acquirer's superior managerial quality. I also find that the VB-difference is negatively and significantly related to G-index. This result suggests that better governance structure (lower G-index) promotes potential value-increasing decisions. In addition, the coefficients of acquirer's firm size and deals involving high tech industries are significantly negative.

1.4.7. Robustness

My results are robust to the following alternative specification of my empirical tests: (1) use $(VB_A - VB_T)^2 * RS^2$ as the cost measure; (2) Alternative event windows for

[16] I follow Core and Guay's (2002) procedure for the construction of the delta.

measuring abnormal announcement returns, such as (-2, +2) and (-5, +2); (3) alternative estimation windows for estimating abnormal announcement returns, such as (-300, -21) and (-220, -21); (4) alternative models and procedures in RRV (2005) decompositions; (5) alternative measures in several control variables (e.g. leverage, operating cash flows, capital expenditures, run-ups). Moreover, my results are robust to (6) different sample periods like the first half and the second half of the sample period; (7) excluding the "tech bubble" period, i.e. years 1999 and 2000; (8) excluding the cancelled bids.

1.5 Conclusion

There is a long literature discussing the benefits from asset reallocation in M&As. The Q-hypothesis of M&As suggests that M&As between higher-Q acquirers and lower-Q targets create more value because the target assets can be redeployed by acquirers with better managerial quality, higher firm productivity, or more valuable investment opportunities. Despite the supporting evidence found in early studies, the recent studies not only suggest that the asset reallocation incentive is not a predominate factor for M&A initiation but also find no evidence supporting the valuation effects predicted by the Q-hypothesis use data since 1990. Those findings cast a strong doubt on the Q-hypothesis of M&As.

In this paper, I improve the empirical examination of the valuation effects of the asset reallocation by considering the potential costs of asset reallocation, the impact from misvaluation, and the size of the assets being reallocated. Jovanovic and Rousseau (2008) suggest that there are potential costs of asset reallocation when the acquirer and the target are sufficiently different and argue that the relation between the benefit of asset reallocation and the value of acquisition should be an inverse U-shape. Thus I use the Q-difference as a proxy of the benefit from asset reallocation as well as the squared Q-difference as a proxy of the cost in my analyses. Further, many recent studies suggest that the market misvaluation could be an important factor in M&A related decisions, so I apply RRV (2005) decomposition of MB to obtain the fundamental value-to-book ratio (VB) as the proxy of Q without the influence of market misvaluation. Lastly, the value-creation proxies like combined announcement returns and changes in operating performance already take the size of the target's assets into consideration but the Q-

difference and squared Q-difference do not. As a result, using the unweighted proxies will not properly capture the potential valuation effects from asset reallocation. I weight the Q-difference and squared Q-difference by the relative size of the M&A deal in the valuation effect regression.

I provide direct evidence supporting the valuation effects from the benefits and costs from the asset reallocation suggested by the Q-hypothesis of M&As from the regression analyses on announcement returns and operating performances. In other words, the relation between value creation and the VB-difference is an inverse U-shape after controlling the misvaluation and other characteristics of the acquirer and the target. The valuation effect of the benefits and costs of asset reallocation are not driven by the acquirer's corporate governance structure and the difference in industry. Moreover, I find that deals with benefits of asset reallocation are less likely to be financed by equity.

Overall I find that the asset reallocation has substantial valuation impact in M&As as previous studies suggest. Even when asset reallocation is not necessarily the dominate factor of M&A initiation, the valuation effect is strong enough to be observed with my comprehensive empirical framework. My findings suggest that Q-hypothesis of M&As remains important in explaining M&A decisions. A further examination of the motivation behind asset reallocation decisions would be valuable.

References 1:

Ahn, S. and D.J. Denis, 2004, "Internal capital markets and investment policy: evidence from corporate spinoffs," *Journal of Financial Economics,* 71, 489-516

Andrade, G., M. Mitchell, and E. Stafford, 2001, "New evidence and perspectives on mergers," *Journal of Economics Perspectives*, 15, 103-120

Barber, B.M. and J.D. Lyon, 1996 "Detecting long-run operating performance: The empirical power and specification of test statistics," *Journal of Financial Economics,* 41, 359-399

Bates, T.W. and M.L. Lemmon, 2003, "Breaking up is hard to do? An analysis of termination fee provisions and merger outcomes," *Journal of Financial Economics,* 69, 469-504

Bebchuk, L.A., A. Cohen, and A. Ferrell, 2009, "What matters in corporate governance?" *Review of Financial Studies*, 22, 738-827

Bhagat, S., M. Dong, D. Hirshleifer, and R. Noah, 2005, "Do tender offers create value? New methods and evidence," *Journal of Financial Economics,* 76, 3-60

Bradley, M., A, Desai, and E.H. Kim, 1988, "Synergistic gains from corporate acquisitions and their division between the stockholders of target and acquiring firms," *Journal of Financial Economics*, 21, 3-40

Brown, S.J. and J.B. Warner, 1985, "Using daily stock returns: The case of event studies," *Journal of Financial Economics,* 14, 3-31

Burch, T.R., 2001, "Locking out rival bidders: The use of lockup options in corporate mergers," *Journal of Financial Economics,* 60, 103-141

Burch, T.R. and V. Nanda, 2003, "Divisional diversity and the conglomerate discount: evidence from spinoffs," *Journal of Financial Economics*, 70, 69-98

Core, J. and W. Guay, 2002, "Estimating the Value of Employee Stock Option Portfolio and Their Sensitivities to Price and Volatility," *Journal of Accounting Research,* 40, 613-630

Dong, M., D. Hirshileifer, S. Richardson, and S. H. Teoh, 2006, "Does Investor Misvaluation Drive the Takeover Market?" *Journal of Finance*, 61, 725-762

Fu, FJ, LM, Lin, and M. Officer, 2010, "Acquisitions Driven by Stock Overvaluation: Are They Good Deals?" Working paper

Gompers, P.A., J. Ishii, and A. Metrick, 2003, "Corporate governance and equity prices," *Quarterly Journal of Economics*, 118, 107-155

Harford, J., 1999, "Corporate cash reserve and acquisitions," *Journal of Finance*, 54, 1969-1997

Harford, J., 2005, "What drives merger waves?" *Journal of Financial Economics*, 77, 529-560

Heron, R. and E. Lie, 2002, "Operating Performance and the Method of Payment in Takeovers," *Journal of Financial and Quantitative Analysis*, 37, 137-155

Hertzel, M.G. and Z. Li, 2010, "Behavioral and Rational Explanations of Stock Price Performance around SEOs: Evidence from a Decomposition of Market-to-Book Ratios," *Journal of Financial and Quantitative Analysis*, 45, 935-958

Jensen, M.C., 1986, "Agency costs of free cash flow, corporate finance, and takeovers," *American Economics Review*. 76, 323-329

Jovanovic, B. and S. Braguinsky, 2004, "Bidder Discounts and Target Premia in Takeovers," *American Economics Review*, 94, 46-56

Jovanovic, B. and P.L. Rousseau, 2002, "The Q-Theory of Mergers," *American Economics Review*, 92, 198-204

Jovanovic, B. and P.L. Rousseau, 2008, "Mergers as reallocation," *Review of Economics and Statistics*, 90, 765-776

Lang, L.H.P., R.M. Stulz, and R.A. Walkling, 1989, "Managerial performance, Tobin's Q, and the gains from successful tender offers," *Journal of Financial Economics*, 24, 137-154

Lang, L.H.P., R.M. Stulz, and R.A. Walkling, 1991, "A test of the free cash flow hypothesis: The case of bidder returns," *Journal of Financial Economics*, 29, 315-335

Loughran, T. and J.R. Ritter, 2004, "Why has IPO underpricing changed over time?" *Financial Management*, 33, 5-37

Maksimovic, V. and G. Philips, 2001, "The Market for Corporate Assets: Who Engages in Mergers and Asset Sales and Are There Efficiency Gains?" *Journal of Finance*, 56, 2019-2065

Maksimovic, V., G. Philips, and N.R. Prabhala, 2011, "Post-merger restructuring and the boundaries of the firm," *Journal of Financial Economics*, 102, 317-343

Masulis, R.W., C. Wang, and F. Xie, 2007, "Corporate governance and acquirer returns," *Journal of Finance*, 62, 1851-1889

Moeller, S. B., F.P. Schlingemann, and R.M. Stulz, 2004, "Firm size and the gains from acquisitions," *Journal of Financial Economics*, 73, 201-228

Netter, J., M. Stegemoller, and M.B. Wintoki, 2011, "Implications of Data Screens on Merger and Acquisition Analysis: A Large Sample Study for Mergers and Acquisitions from 1992 to 2009." *Review of Financial Studies*, 24, 2316-2357.

Officer, M.S., 2003, "Termination fees in mergers and acquisitions," *Journal of Financial Economics*, 69, 431-467

Rajan, R., H. Servaes, and L. Zingales, 2000, "The cost of diversity: The diversification discount and inefficient investment," *Journal of Finance*, 55, 35-80

Rhodes-Kropf, M. and D.T. Robinson, 2008, "The Market for Mergers and the Boundaries of the Firm," *Journal of Finance*, 63, 1169-1211

Rhodes-Kropf, M., D.T. Robinson, and S. Viswanathan, 2005, "Valuation waves and merger activity: The empirical evidence," *Journal of Financial Economics*, 77, 561-603

Rhodes-Kropf, M. and S. Viswanathan, 2004, "Market valuation and merger waves," *Journal of Finance*, 59, 2685-2718

Savor, P.G. and Q. Lu, 2009, "Do Stock Mergers Create Value for Acquirers?" *Journal of Finance*, 64, 1061-1097

Scharfstein, D. S., and J. C. Stein, 2000, "The dark side of internal capital markets: Divisional rent-seeking and inefficient investment," *Journal of Finance*, 55, 2537-2564

Schwert, G.W., 1996, "Markup pricing in mergers and acquisitions," *Journal of Financial Economics*, 41, 153-192

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

Servaes, H., 1991, "Tobin's q, agency costs, and corporate control: An empirical analysis of firm specific parameters," *Journal of Finance*, 46, 409-419

Wang, C. and F. Xie, 2009, "Corporate Governance Transfer and Synergistic Gains from Mergers and Acquisitions," *Review of Financial Studies*, 22, 829-858

Appendix 1.A

Rhodes-Kropf, Richardson, and Viswanathan (2005) decomposition of the market-to-book ratio.

Market-to-book ratio of equity (MB) is often used to proxy for Tobin's Q in the literature, it reflects managerial quality, productivity, the value of investment opportunities, and misvaluation. That is, high MB can be viewed as a sign of high managerial quality, high productivity, valuable investment opportunities, or a sign of overvaluation. Therefore, the relation between the change in firm value and measures constructed by MB could be driven by the mispricing instead of managerial quality, productivity or investment opportunities. In this paper, I apply Rhodes-Kropf, Robinson, and Viswanathan (2005) methodology to decompose pre-announcement MB into misvaluation and the sum of the other three factors as follows:

$$MB = MV \times VB$$

the above equation in log form:

$$(m - b) = (m - v) + (v - b)$$

I follow RRV (2005) to use lower case letters indicate logarithms of the respective variables. Suppose we have an accurate measure for the true value of the firm, V. Market-to-value ratio, MV, would measure the discrepancy between market price and true value, i.e. misvaluation. The discrepancy could arise from either behavioral bias or information asymmetry between informed investors and the rest of the market. As a result, the value-to-book ratio, VB, would measure net effect of managerial quality, productivity, and investment opportunity without the interference of misvaluation. If the market correctly forecasts the future cash flow, discount rates, and growth opportunities, then $(m - v)$ should be 0. Otherwise, $(m - v)$will capture misvaluation part of MB.

To implement the decomposition of market-to-book ratio, one needs an estimate of firm value, V. For each firm i in industry j at time t, v can be expressed as a linear function of observable firm-specific accounting information, $\theta_{i,t}$, and a vector of conditional accounting multiples, α. Thus, RRV (2005) methodology employs both a vector of contemporaneous time-t accounting variables, α_{jt}, and a vector of long-run

accounting multiples, α_j. The market-to-book ratio for firm i at time t can be further decomposed into 3 components.

$$m_{it} - b_{it} = \underbrace{m_{it} - v(\theta_{it};\alpha_{jt})}_{firm-specific\ error} + \underbrace{v(\theta_{it};\alpha_{jt}) - v(\theta_{it};\alpha_{j})}_{time-series\ sector\ error} + \underbrace{v(\theta_{it};\alpha_{j}) - b_{it}}_{long-run\ value-to-book}$$

where $m_{it} - v(\theta_{it};\alpha_{jt})$ measures the difference between the market value and fundamental value estimated using firm-specific accounting data and the contemporaneous sector accounting multiples. RRV interpret this difference as firm-specific deviations from fundamental value. $v(\theta_{it};\alpha_{jt}) - v(\theta_{it};\alpha_{j})$ measures the difference in estimated fundamental using when contemporaneous sector accounting multiples at time t and the estimated fundamental value using long-run sector multiples. In RRV (2005) this difference is interpreted as the extent to which the industry may be misvalued at time t.

Variable	Definition & notation	Variable	Definition & notation
$M_{i,t}/V(\theta_{it};\alpha_{jt})$	Firm-specific error = FSE	$m_{it} - v(\theta_{it};\alpha_{jt})$	Log of firm-specific error, fse
$V(\theta_{it};\alpha_{jt})/V(\theta_{it};\alpha_{j})$	Time-series sector error = TSSE	$v(\theta_{it};\alpha_{jt}) - v(\theta_{it};\alpha_{j})$	Log of time-series sector error, tsse
$V(\theta_{it};\alpha_{j})/B_{i,t}$	Long-run value-to-book = VB	$v(\theta_{it};\alpha_{j}) - b_{i,t}$	Log of long-run value-to-book, vb
$M_{i,t}/V(\theta_{it};\alpha_{j})$	Total error = TE = FSE×TSSE	$m_{it} - v(\theta_{it};\alpha_{j})$	Log of total error, te = fse+tsse

RRV (2005) use three different models to estimate $v(\theta_{it};\alpha_{jt})$ and $v(\theta_{it};\alpha_{j})$ where those models differ only with respect to what are included in the accounting information vector, $\theta_{i,t}$. In this paper, I use their third model which includes book value of asset (b), net income (NI), and market leverage ratio (LEV) in $\theta_{i,t}$[17]. The market value cam be expressed as a linear model of these variables:

$$m_{it} = \alpha_{0jt} + \alpha_{1jt} b_{it} + \alpha_{2jt} \ln(Abs(NI))_{it} + \alpha_{3jt} I_{(<0)} \times \ln(Abs(NI))_{it} + \alpha_{4jt} LEV_{it} + \varepsilon_{it}$$

[17] The first model includes only book value (b) and the second model includes book value and net income.

where, m_{it} is the natural logarithm of market value of equity, b_{it} is the natural logarithm of book value of equity, $Abs(NI)_{it}$ is the absolute value of net income, $I_{(<0)} \times \ln(Abs(NI))_{it}$ is an indicator function for negative net income observations, and LEV_{it} is the leverage ratio[18].

For each year, I group all CRSP/Compustat firms according to the 12 Fama and French industry classifications and run annual, cross-sectional regressions of the above equation for each industry. After the estimated industry accounting multiples for each year, $\hat{\alpha}_{it}$ is obtained, the estimated value of $v(\theta_{it}; \alpha_{jt})$ can be written as:

$$v(b_{it}, NI_{it}, LEV_{it}; \hat{\alpha}_{0jt}, \hat{\alpha}_{1jt}, \hat{\alpha}_{2jt}, \hat{\alpha}_{3jt}, \hat{\alpha}_{4jt}) = \hat{\alpha}_{0jt} + \hat{\alpha}_{1jt} b_{it} + \hat{\alpha}_{2jt} \ln(Abs(NI))_{it}$$
$$+ \hat{\alpha}_{3jt} I_{(<0)} \times \ln(Abs(NI))_{it} + \hat{\alpha}_{4jt} LEV_{it}$$

Following Hertzel and Li (2010), I average the α_{jt}s from the annual regressions over the available years before the fiscal year end (up to 20 years back) to obtain the long-run sector multiples[19]. So the estimated value of $v(\theta_{it}; \alpha_{j})$ can be written as:

$$v(b_{it}, NI_{it}, LEV_{it}; \overline{\alpha}_{0jt}, \overline{\alpha}_{1jt}, \overline{\alpha}_{2jt}, \overline{\alpha}_{3jt}, \overline{\alpha}_{4jt}) = \overline{\alpha}_{0jt} + \overline{\alpha}_{1jt} b_{it} + \overline{\alpha}_{2jt} \ln(NI)^{+}_{it} + \overline{\alpha}_{3jt} I_{(<0)} \ln(NI)^{+}_{it} + \overline{\alpha}_{4jt} LEV_{it}$$

Table 1.A.1 presents the time-series averages (over fiscal years 1967–2010) of the annual regression coefficients for the 12 Fama and French industries. The results are similar to those reported in Table 4 of RRV (2005), with book value and NI positively correlated with market value, and LEV negatively correlated with market value. The table reports that the average adjusted R^2 for these regressions ranges from 88% to 97%, which shows that within an industry, the 3 accounting variables explain a large majority of the cross-sectional variation in firm's market value of equity in a given year.

[18] Net income (NI, item 172 from Compustat), Leverage ratio is defined as (1 – market value of equity/market value of assets).

[19] This addresses the potential look ahead bias where the RRV (2005) use the average over entire sample period for long-run sector multiples.

Table 1.A.1

Time-Series Average Conditional Regression Coefficients

This table reports the time-series average coefficients from the following regression equation:

$$m_{it} = \alpha_{0jt} + \alpha_{1jt} b_{it} + \alpha_{2jt} \ln\left(Abs\left(NI\right)\right)_{it} + \alpha_{3jt} I_{(<0)} \times \ln\left(Abs\left(NI\right)\right)_{it} + \alpha_{4jt} LEV_{it} + \varepsilon_{it}$$

The dependent variable is the natural log of market value of equity (m). The independent variables are the natural log of book value of equity (b), the natural log of the absolute value of net income *Abs(NI)*, a dummy variable indicating when the NI is negative (I(<0)), and market leverage (LEV). The cross-sectional regression is estimated at the industry-year level for each of the 12 Fama and French industries from fiscal years 1967–2003. The subscripts *I*, *j*, and *t* refer to firm, industry, and year, respectively. Here, $E(\widehat{\alpha_k})$ is the time-series average regression multiple for the *k*th independent variable. I also report the Fama-MacBeth (1973) standard errors below the average estimated coefficients. The reported R^2 is the average adjusted R^2 for each industry.

	Fama-French Industry Classification											
Parameters	1	2	3	4	5	6	7	8	9	10	11	12
$E(\widehat{\alpha_0})$	1.84	1.95	1.73	1.90	2.03	2.19	2.37	2.10	2.11	2.47	1.93	2.24
	0.13	0.18	0.09	0.18	0.20	0.10	0.31	0.15	0.10	0.15	0.12	0.10
$E(\widehat{\alpha_1})$	0.66	0.65	0.69	0.71	0.62	0.65	0.59	0.77	0.66	0.62	0.70	0.62
	0.04	0.06	0.03	0.05	0.06	0.03	0.09	0.05	0.03	0.05	0.04	0.03
$E(\widehat{\alpha_2})$	0.34	0.32	0.29	0.23	0.39	0.31	0.36	0.23	0.30	0.32	0.29	0.31
	0.03	0.05	0.02	0.04	0.06	0.03	0.09	0.05	0.03	0.05	0.03	0.03
$E(\widehat{\alpha_3})$	-0.11	-0.05	-0.03	-0.16	0.03	-0.09	-0.06	0.05	-0.13	-0.13	-0.26	-0.14
	0.11	0.16	0.07	0.14	0.18	0.08	0.24	0.14	0.08	0.12	0.10	0.08
$E(\widehat{\alpha_4})$	-1.76	-1.76	-1.60	-1.43	-1.74	-2.20	-1.46	-2.14	-2.00	-2.27	-1.28	-1.78
	0.17	0.25	0.12	0.24	0.28	0.15	0.39	0.18	0.13	0.22	0.12	0.13
N	44	44	44	44	44	44	44	44	44	44	44	44
R^2	0.92	0.90	0.92	0.92	0.94	0.88	0.90	0.97	0.91	0.89	0.91	0.87

Appendix 1.B

Variable definitions

Variable	Definitions
Panel A: Abnormal Returns and variable of interests	
CAR (-1, +1) CARA: acquirer CART: target CARC: combined	Three-day cumulative abnormal return calculated using the market model. The market model parameters are estimated over the period (-270, -21) with the CRSP equally-weighted return as the market index. Firms with less than 100 days of security returns data available within the estimation period are dropped. The combined return is the value-weighted portfolio of the acquirer and target return where toehold adjusted weights are based on the market value of equity 21 days prior to the announcement following Bradley, Desai, and Kim (1988).
ΔAdj_ROA	The average change in adjusted ROA (CHG_Adj_ROA) over the 3 year period after the deal completion. For each year after the deal completion, $CHG\_Adj\_ROA = Post\_adj\_ROA - Pre\_adj\_ROA$ is obtained. Measured in %. Pre_adj_ROA is defined as the weighted average performance-adjusted ROA of the acquirer and the target where the premerger performance-adjusted ROA is the acquirer's (target's) ROA minus the matching firm's ROA. $Post\_adj\_ROA$ is defined as the difference between the merged firm's ROA and the weighted average ROA from the matching firms. The weights are the premerger book values of the acquirers and the targets. The match firms are identified at the year before the deal announcement which also satisfy the following criteria: (1) Same 2-digit SIC code (2) 70%-130% size match (3) Firms with accounting data available at the corresponding year after deal completion (4) The closest ROA
Ind_Adj_ROA	The average level in acquirer's industry-adjusted ROA over the 3 year period after the deal completion. The industry-adjusted ROA is defined as the acquirer's ROA minus the median ROA of the firm with same 2-digit SIC code and firm size between 70%-130% of acquirer's book value. For getting each median, at least three size-industry matches are required. Measured in %.
$MB_A - MB_T$	Acquirer's MB ratio minus Target's MB ratio.
$VB_A - VB_T$	Acquirer's VB ratio minus Target's VB ratio. The value-to-book ratio (VB) is part of the MB from the decomposition procedure proposed by Rhodes-Kropf, Richardson, Viswanathan (2005). This variable is weighted with relative size in the regression analyses.

Variable definitions

Variable	Definitions
$(VB_A - VB_T)^2$	The square of the difference in VB ratio. This variable is weighted with relative size in the regression analyses.
Panel B: Acquirer / Target Characteristics	
MB, mb	Market-to-book ratio of equity. Number of shares outstanding multiplied by the stock price three months after the fiscal year end and at least 30 days prior to announcement date over book value of equity This definition follows RRV(2005). Mb denotes for log(MB)
VB, vb FSE, fse TSSE, tsse TE, te	In RRV (2005), the log of market-to-book ratio, mb, is decomposed into three compenents: firm-specific error, time-series sector error, and value-to-book ratio. Mb = fse + tsse + vb. I defined te = fse + tsse to capture the total pricing error. The capital letters denotes for exponential transformation.
Firm size	Log of book value of total assets in 2010 dollars. Moeller, Schlingemann, and Stulz (2004) document that the market reaction on mergers with a large acquirer is negative.
Cash Ratio (%)	Cash (CHE) over market value of total assets. Harford (1999) documents that acquisitions by cash-rich firms are value decreasing. Measured in %.
Leverage (%)	Book value of debts (DLC + DLTT) over market value of total assets. According to Jensen (1986), leverage decreases the free cash flow. Measured in %.
ROA (%)	Operating income before depreciation (OIBDP) at the fiscal year end scaled by book value of total assets (AT) at the beginning of the fiscal year. Measured in %.
Capital Expenditure (%)	Capital Expenditure (CAPX) at the fiscal year end scaled by book value of total assets (AT) at the beginning of the year. Measured in %.
Run-ups (%)	Buy-and-hold abnormal returns (BHAR) during the period (-20, -2). The market index is the CRSP value-weighted return. Measured in %.
G-index	GIM index from Gomper, Ishii, and Metrick (2003)
High G-index	Dummy: 1 for G-index greater than 9, 0 otherwise
Ln(delta)	Natural log of the sensitivity of CEO's equity and option holdings to stock price. i.e. Natural log of the $ change of CEO's equity & option holdings to 1% change of stock price (Core and Guay (2002)) (in year 2010 $)
Ln(tenure)	Natural log of CEO's tenure
Duality	Dummy: 1 for CEO is also chairman of the board, 0 otherwise

Variable definitions

Variable	Definitions
Panel C: Deal Characteristics	
Transaction value	Total value of consideration paid by the acquirer, excluding fees and expenses (in millions of 2010 dollars)
Industry M&A activities	For each target, it is the value of all corporate control transactions reported by SDC for the same two-digit SIC code divided by the total book value of assets of all Compustat firms in the same two-digit SIC code in the year before the announcement.
Relative Size, RS	Transaction value divided by the acquirer's market value of the total assets.
All-cash deal	Dummy: 1 for purely cash-financed deals, 0 otherwise
All-equity deal	Dummy: 1 for purely equity-financed deals, 0 otherwise
Equity%	The percentage of equity financing is used in the M&A bid
Multiple bidders	Dummy: 1 for deals with more than one bidder, 0 otherwise
Hostile deal	Dummy: 1 for deals labeled as hostile by SDC, 0 otherwise
Tender offer	Dummy: 1 for deals labeled as tender offer by SDC, 0 otherwise
Cross-industry deal	Dummy: 1 for deals involve targets with a two-digit SIC code other than that of the acquirer, 0 otherwise
Lockup	Dummy: 1 for deals where the target has a lockup agreement, 0 otherwise. Burch (2001) find that lockup agreements are associated with higher target returns and lower acquirer returns.
Termination Fee	Dummy: 1 for deals with termination fee agreement for either acquirer or target. Bates and Lemmon (2003) and Officer (2003) find that the termination fee has a positive effect on deal success and the target returns.
High tech	Dummy: 1 if acquirer and target are both from high tech industries defined by Loughran and Ritter (2004), 0 otherwise

Table 1.1

Sample distribution by announcement year

The sample consists of 2,352 M&A (completed or cancelled) deals with public acquirer and public target where deals from 1989 – 2010 where acquirers sought after at least 50% ownership of the target firm. The combined sample requires data available from Securities Data Corporations (SDC) mergers and acquisitions database, CRSP, and Standard and Poor's COMPUSTAT. The observations with acquirer or target firm's SIC code starting with 6 and 9 are discarded. Variable definitions are in Appendix 1.B

Year	# of deals	portion of sample	Deal Value Mean (millions)	Deal Value Median (millions)	Relative Size Mean	Relative Size Median
1989	71	3.02%	$1,733	$192	47.48%	27.33%
1990	44	1.87%	$547	$88	22.80%	13.09%
1991	47	2.00%	$256	$125	20.99%	14.06%
1992	33	1.40%	$609	$208	32.33%	23.57%
1993	58	2.47%	$2,305	$217	44.59%	18.63%
1994	105	4.46%	$876	$213	38.92%	19.67%
1995	141	5.99%	$961	$177	33.48%	19.24%
1996	162	6.89%	$1,662	$319	40.14%	25.62%
1997	208	8.84%	$1,264	$373	53.42%	26.35%
1998	220	9.35%	$2,937	$313	35.16%	19.00%
1999	228	9.69%	$2,604	$479	36.31%	15.86%
2000	172	7.31%	$4,689	$528	47.38%	12.81%
2001	145	6.16%	$1,486	$221	24.90%	10.32%
2002	74	3.15%	$1,305	$138	18.86%	8.33%
2003	79	3.36%	$817	$206	27.16%	14.66%
2004	85	3.61%	$3,219	$477	46.75%	23.72%
2005	93	3.95%	$3,512	$526	35.68%	14.11%
2006	89	3.78%	$3,186	$870	38.62%	11.62%
2007	96	4.08%	$1,662	$864	36.67%	14.69%
2008	79	3.36%	$2,258	$287	21.09%	11.04%
2009	60	2.55%	$3,763	$401	20.18%	12.51%
2010	63	2.68%	$1,148	$447	22.79%	10.40%
Full sample	2,352	100.00%	$2,132	$319	36.27%	16.08%

Table 1.2

Summary statistics

The sample consists of 2,352 M&A (completed or cancelled) deals with public acquirer and public target where deals from 1989 – 2010 where acquirers sought after at least 50% ownership of the target firm. The combined sample requires data available from Securities Data Corporations (SDC) mergers and acquisitions database, CRSP, and Standard and Poor's COMPUSTAT. The observations with acquirer or target firm's SIC code starting with 6 and 9 are discarded. Accounting ratios, MBs, VBs are winsorized at 1% level. Variable definitions are in Appendix 1.B.

Panel A: Variables of interest

Variables	N	Mean	Median	Q1	Q3	Stddev
(MBA – MBT)	2,352	0.85	0.62	-0.41	2.13	5.72
(VBA – VBT)	2,352	-0.15	-0.03	-0.83	0.71	1.48
(VBA – VBT)2	2,352	2.22	0.59	0.11	2.00	4.78
CARA(-1,+1) %	2,352	-1.57	-1.03	-5.41	2.14	8.58
CART(-1,+1) %	2,352	23.17	18.16	5.98	33.75	28.97
CARC(-1,+1) %	2,352	1.48	1.01	-2.20	4.82	7.98
ΔAdj_ROA %	1,342	1.06	0.44	-4.47	5.76	11.44
Ind_Adj_ROA %	1,175	1.99	0.57	-4.15	7.02	12.24

Panel B: Acquirer's and Target's Characteristics (N = 2,352)

	Acquirer		Target	
Variables	Mean	Median	Mean	Median
Asset (book) mm$	9050.74	1,382.24	1,329.32	178.58
Equity (market) mm$	15702.10	1,906.79	1,395.22	205.85
Cash Ratio (%)	8.38	4.13	12.84	6.54
Leverage (%)	13.03	8.73	14.90	9.37
ROA (%)	16.08	17.30	7.31	12.27
CAPX (%)	9.16	5.68	8.96	5.21
Run-up (%)	1.51	0.26	5.26	3.14
MB	4.32	2.88	3.46	2.10
VB	2.28	2.07	2.43	2.08
FSE	1.54	1.21	1.38	0.95
TSSE	1.27	1.23	1.16	1.16

Panel C: Deal Characteristics (N = 2,352)

Variables	Mean	Median	Variables	Mean	Median
Transaction value mm$	2,132.39	319.25	Cross-industry	0.36	0.00
Relative Size (RS)	0.36	0.16	Lockup	0.10	0.00
Industry M&A	0.12	0.07	Defense	0.13	0.00
All Cash	0.29	0.00	Termination	0.69	1.00
All Equity	0.37	0.00	Litigation	0.06	0.00
Equity%	0.50	0.51	High Tech	0.33	0.00
Hostile	0.04	0.00	$MB_A > MB_T$	0.66	1.00
Tender offer	0.22	0.00	$VB_A > VB_T$	0.49	0.00
Multiple-bidders	0.09	0.00	$TE_A > TE_T$	0.68	1.00

Panel D: Correlation Matrix (N = 2,352)							
	Acq. MB	Acq. VB	Acq. FSE	Acq. TSSE	Tar. MB	Tar. VB	Tar. FSE
Acq. MB							
Acq. VB	0.528						
	(0.000)						
Acq. FSE	0.604	0.044					
	(0.000)	(0.034)					
Acq. TSSE	0.278	-0.078	-0.001				
	(0.000)	(0.000)	(0.942)				
Tar. MB	0.239	0.134	0.097	0.194			
	(0.000)	(0.000)	(0.000)	(0.000)			
Tar. VB	0.259	0.366	0.097	0.010	0.545		
	(0.000)	(0.000)	(0.000)	(0.612)	(0.000)		
Tar. FSE	0.030	-0.018	0.028	0.032	0.355	0.111	
	(0.147)	(0.375)	(0.168)	(0.124)	(0.000)	(0.000)	
Tar. TSSE	0.196	-0.051	0.015	0.627	0.155	-0.114	-0.026
	(0.000)	(0.013)	(0.476)	(0.000)	(0.000)	(0.000)	(0.209)

Table 1.3

Regression analysis of method of payment with the benefit and cost of asset reallocation

For column (1), the dependent variable is the percentage of equity financing is used in the M&A bid, and the tobit model with upper limit equals to 1 and lower limit equals to 0 is used. For column (2), the dependent variable of the logit regression is All Equity which equals to one if the deal is 100% paid by equity and zero otherwise. The sample consists of 2,352 M&A (completed or cancelled) deals with public acquirer and public target where deals from 1989 – 2010 where acquirers sought after at least 50% ownership of the target firm. The combined sample requires data available from Securities Data Corporations (SDC) mergers and acquisitions database, CRSP, Standard and Poor's COMPUSTAT. The observations with acquirer or target firm's SIC code starting with 6 and 9 are discarded. Accounting ratios, MBs, VBs are winsorized at 1% level. Significance is based on White-adjusted standard errors with p-values reported below each coefficient. Variable definitions are in Appendix 1.B.

Depend. Var.	Equity%		All Equity	
Independ Var.	(1)		(2)	
$(VB_A - VB_T)$	-0.053	**	-0.085	**
	(0.046)		(0.046)	
$(VB_A - VB_T)^2$	-0.011		-0.007	
	(0.157)		(0.545)	
Acquirer's FSE	0.128	***	0.148	***
	(<.001)		(0.003)	
Acquirer's TSSE	-0.003		0.247	
	(0.979)		(0.208)	
Target's TE	-0.006		-0.010	
	(0.294)		(0.106)	
Relative Size (RS)	0.221	***	-0.012	
	(<.001)		(0.908)	
Acq. Firm Size	-0.132	***	-0.231	***
	(<.001)		(<.001)	
Acq. Cash Ratio (%)	0.000		-0.001	
	(0.781)		(0.817)	
Acq. Leverage (%)	-0.002		-0.007	
	(0.517)		(0.265)	
Acq. ROA (%)	-0.004		-0.007	
	(0.148)		(0.194)	
Acq. CAPX (%)	-0.008	***	-0.010	***
	(<.001)		(0.001)	
Acq. Run-up (%)	0.006	**	0.004	
	(0.027)		(0.389)	
Tar. Cash Ratio (%)	0.010	***	0.009	**
	(<.001)		(0.028)	
Tar. Leverage (%)	-0.004	*	-0.002	
	(0.088)		(0.626)	
Tar. ROA (%)	-0.012	***	-0.026	***
	(<.001)		(<.001)	

Depend. Var.	Equity%		All Equity	
Independ Var.	(1)		(2)	
Tar. CAPX (%)	0.001		0.000	
	(0.293)		(0.820)	
Tar. Run-up (%)	0.007	***	0.007	
	(0.009)		(0.149)	
Industry M&A	-0.050		-0.122	
	(0.808)		(0.738)	
Hightech	0.021		0.211	*
	(0.780)		(0.093)	
Hostile	-0.219		-0.556	
	(0.322)		(0.144)	
Tender Offer	-2.116	***	-3.367	***
	(<.001)		(<.001)	
Multiple Bidders	-0.132		-0.575	***
	(0.264)		(0.009)	
Cross-Industry	-0.152	**	-0.092	
	(0.027)		(0.429)	
Lockup	0.535	***	0.695	***
	(<.001)		(<.001)	
Termination	0.474	***	0.489	***
	(<.001)		(<.001)	
Year FE	Y		Y	
N	2,352		2,352	
R^2	25.14%		30.23%	

***, **, * Statistical significance at the 1%, 5%, and 10% level, respectively.

Table 1.4

Cross-sectional regression analysis of announcement abnormal returns

The dependent variables are the combined 3-day cumulative abnormal returns for column (1) to (3), the acquirer's 3-day cumulative abnormal returns for column (4), and target's 3-day cumulative abnormal returns for column (5). $(MB_A - MB_T)$ is the unweighted difference in market-to-book ratios between the acquirer and the target. $(VB_A - VB_T)$ is the difference in value-to-book ratios between the acquirer and the target. $(VB_A - VB_T)^2$ is the square of difference in value-to-book ratios between the acquirer and the target. $(VB_A - VB_T)$*RS is the difference in value-to-book ratios between the acquirer and the target weighted by relative size of the deal. $(VB_A - VB_T)^2$*RS is the square of difference in value-to-book ratios between the acquirer and the target weighted by relative size of the deal. The sample consists of 2,352 M&A (completed or cancelled) deals with public acquirer and public target where deals from 1989 – 2010 where acquirers sought after at least 50% ownership of the target firm. The combined sample requires data available from Securities Data Corporations (SDC) mergers and acquisitions database, CRSP, and Standard and Poor's COMPUSTAT. The observations with acquirer or target firm's SIC code starting with 6 and 9 are discarded. Accounting ratios, MBs, VBs are winsorized at 1% level. Significance is based on White-adjusted standard errors with p-values reported below each coefficient. Variable definitions are in Appendix 1.B.

Depend. Var.	$CARC_{(-1,+1)}$					$CARA_{(-1,+1)}$		$CART_{(-1,+1)}$	
Independ Var.	(1)		(2)		(3)		(4)		(5)	
$(MB_A - MB_T)$	-0.015									
	(0.692)									
$(VB_A - VB_T)$			-0.039							
			(0.799)							
$(VB_A - VB_T)^2$			-0.068							
			(0.126)							
$(VB_A - VB_T)$*RS					0.429	**	0.241		0.714	**
					(0.024)		(0.229)		(0.031)	
$(VB_A - VB_T)^2$*RS					-0.138	***	-0.103	**	0.013	
					(<.001)		(0.022)		(0.854)	
Acquirer's FSE			-0.225	*	-0.246	**	-0.206	*	0.039	
			(0.067)		(0.043)		(0.086)		(0.912)	
Acquirer's TSSE			-0.454		-0.404		-0.383		-0.418	
			(0.566)		(0.611)		(0.655)		(0.822)	
Target's TE			0.023		0.022		0.027		-0.081	
			(0.220)		(0.205)		(0.122)		(0.390)	
Relative Size (RS)	0.765	*	0.801	*	1.192	**	-1.267	**	-3.458	***
	(0.057)		(0.050)		(0.013)		(0.020)		(<.001)	
Acq. Firm Size	-0.345	***	-0.327	***	-0.299	***	-0.079		1.172	***
	(0.001)		(0.003)		(0.006)		(0.493)		(0.001)	
Acq. Cash Ratio (%)	0.019		0.013		0.019		-0.005		-0.040	
	(0.395)		(0.554)		(0.410)		(0.806)		(0.602)	
Acq. Leverage (%)	0.020		0.020		0.025		0.006		-0.170	***
	(0.201)		(0.222)		(0.105)		(0.721)		(<.001)	
Acq. ROA (%)	-0.012		-0.012		-0.012		-0.013		0.013	
	(0.373)		(0.358)		(0.349)		(0.381)		(0.690)	

Depend. Var.	$CARC_{(-1,+1)}$			$CARA_{(-1,+1)}$	$CART_{(-1,+1)}$
Independ Var.	(1)	(2)	(3)	(4)	(5)
Acq. CAPX (%)	-0.002	0.001	-0.001	0.023	-0.044
	(0.887)	(0.938)	(0.955)	(0.182)	(0.293)
Acq. Run-up (%)	-0.023	-0.023	-0.019	-0.031	0.007
	(0.162)	(0.150)	(0.230)	(0.197)	(0.872)
Tar. Cash Ratio (%)	-0.009	-0.012	-0.016	-0.025 *	0.195 ***
	(0.464)	(0.306)	(0.177)	(0.061)	(<.001)
Tar. Leverage (%)	0.012	0.008	0.003	0.008	0.101 **
	(0.344)	(0.552)	(0.810)	(0.537)	(0.035)
Tar. ROA (%)	0.004	0.000	-0.001	-0.022 ***	-0.048
	(0.644)	(0.986)	(0.915)	(0.007)	(0.133)
Tar. CAPX (%)	-0.023	-0.026	-0.024	-0.027	-0.098 **
	(0.178)	(0.128)	(0.151)	(0.118)	(0.031)
Tar. Run-up (%)	-0.031 ***	-0.030 ***	-0.030 ***	0.011	-0.172 ***
	(0.002)	(0.003)	(0.003)	(0.284)	(<.001)
Industry M&A	-1.047	-0.934	-1.003	-0.888	0.566
	(0.344)	(0.389)	(0.351)	(0.379)	(0.856)
All Cash	1.040 **	1.062 **	1.098 **	1.983 ***	6.230 ***
	(0.019)	(0.017)	(0.014)	(<.001)	(0.001)
All Equity	-1.706 ***	-1.623 ***	-1.539 ***	-1.191 **	-1.758
	(<.001)	(<.001)	(0.001)	(0.016)	(0.226)
Hightech	-1.205 ***	-1.066 ***	-1.041 ***	-0.777 *	-1.096
	(0.002)	(0.008)	(0.009)	(0.064)	(0.448)
Hostile	2.016 ***	2.036 ***	1.862 **	-1.326 *	6.169 ***
	(0.008)	(0.007)	(0.014)	(0.055)	(0.007)
Tender Offer	1.872 ***	1.860 ***	1.884 ***	1.124 ***	8.298 ***
	(<.001)	(<.001)	(<.001)	(0.008)	(<.001)
Multiple Bidders	-0.843	-0.874	-0.903 *	-1.014 *	-7.906 ***
	(0.114)	(0.101)	(0.088)	(0.077)	(<.001)
Cross-Industry	-0.386	-0.327	-0.307	0.095	-0.666
	(0.266)	(0.351)	(0.379)	(0.801)	(0.578)
Lockup	-1.056 *	-0.978	-1.004	-1.393 **	2.695
	(0.093)	(0.112)	(0.102)	(0.025)	(0.145)
Termination	0.177	0.154	0.133	-0.745 *	2.439 *
	(0.661)	(0.702)	(0.741)	(0.080)	(0.086)
Year FE	Y	Y	Y	Y	Y
N	2,352	2,352	2,352	2,352	2,352
R^2	9.38%	9.77%	10.25%	9.64%	14.23%

***, **, * Statistical significance at the 1%, 5%, and 10% level, respectively.

Table 1.5

Cross-sectional regression analysis of operating performance with the benefit and cost of asset reallocation

The dependent variables are the average change in adjusted ROA over the 3 year period after the deal completion for column (1) and (2), and The average level in acquirer's industry-adjusted ROA over the 3 year period after the deal completion for column (3). $(VB_A - VB_T)$*RS is the difference in value-to-book ratios between the acquirer and the target weighted by relative size of the deal. $(VB_A - VB_T)^2$*RS is the square of difference in value-to-book ratios between the acquirer and the target weighted by relative size of the deal. For column (1), the sample consists of 1,342 completed M&A deals with public acquirer and public target where deals from 1989 – 2007 which satisfying the sample requirement in Table V and the data availability for the dependent variable. For column (2), the sample is a subsample of the sample used in column (1) where the difference between acquirer's (target's) ROA and the matching firm's ROA is less than 0.05. For column (3), the sample consists of 1,175 completed M&A deals which satisfy the sample requirement in Table V and the data availability for the dependent variable. The observations with acquirer or target firm's SIC code starting with 6 and 9 are discarded. Accounting ratios, MBs, VBs are winsorized at 1% level. Significance is based on White-adjusted standard errors with p-values reported below each coefficient. Variable definitions are in Appendix 1.B.

Depend. Var.	ΔAdj_ROA				Ind_Adj_ROA	
Independ Var.	(1)		(2)		(3)	
$(VB_A - VB_T)$*RS	0.975	**	1.011	**	1.478	***
	(0.010)		(0.010)		(<.001)	
$(VB_A - VB_T)^2$*RS	-0.387	***	-0.345	***	-0.254	***
	(0.001)		(0.006)		(0.005)	
Acquirer's FSE	0.215		0.514		0.206	
	(0.476)		(0.261)		(0.136)	
Acquirer's TSSE	-2.265	*	-2.893	**	-2.342	*
	(0.074)		(0.033)		(0.058)	
Target's TE	-0.077		0.199		0.016	
	(0.559)		(0.483)		(0.871)	
Relative Size (RS)	0.419		-0.205		0.136	
	(0.566)		(0.805)		(0.864)	
Acq. Firm Size	-0.524	**	-0.287		-1.095	***
	(0.018)		(0.299)		(<.001)	
Tar. Run-up (%)	-0.003		-0.012		0.007	
	(0.888)		(0.592)		(0.713)	
All Cash	2.996	***	2.663	***	3.486	***
	(<.001)		(0.002)		(<.001)	
All Equity	0.625		0.425		1.931	**
	(0.449)		(0.638)		(0.019)	
Other Controls	Y		Y		Y	
Year FE	Y		Y		Y	
N	1,342		919		1,175	
R^2	7.78%		8.80%		28.13%	

***, **, * Statistical significance at the 1%, 5%, and 10% level, respectively.

Table 1.6

Cross-sectional regression analysis: benefit and cost of asset reallocation interact with High G-index dummy

The dependent variables are the combined 3-day cumulative abnormal returns for column (1), and (2) and the average change in adjusted ROA over the 3 year period after the deal completion for column (3) and (4). $(VB_A - VB_T)$*RS is the difference in value-to-book ratios between the acquirer and the target weighted by relative size of the deal. $(VB_A - VB_T)^2$*RS is the square of difference in value-to-book ratios between the acquirer and the target weighted by relative size of the deal. For column (1) and (2), the sample consists of 1,370 M&A (completed or cancelled) deals with public acquirer and public target where deals from 1989 – 2006 where acquirers sought after at least 50% ownership of the target firm. The combined sample requires data available from Securities Data Corporations (SDC) mergers and acquisitions database, CRSP, Standard and Poor's COMPUSTAT, and IRRC. For column (3) and (4), the sample consists of 933 completed M&A deals where the dependent variable is available. The observations with acquirer or target firm's SIC code starting with 6 and 9 are discarded. Accounting ratios, MBs, VBs are winsorized at 1% level. Significance is based on White-adjusted standard errors with p-values reported below each coefficient. Variable definitions are in Appendix 1.B.

Depend. Var.	CARC (-1,+1)		ΔAdj_ROA	
Independ Var.	(1)	(2)	(3)	(4)
$(VB_A - VB_T)$*RS	0.881 **	0.898 **	1.245 **	1.322 *
	(0.035)	(0.043)	(0.025)	(0.071)
$(VB_A - VB_T)$*RS*High G-index		-0.198		0.828
		(0.852)		(0.444)
$(VB_A - VB_T)^2$*RS	-0.155	-0.166	-0.642 **	-0.822 **
	(0.170)	(0.159)	(0.016)	(0.022)
$(VB_A - VB_T)^2$*RS*High G-index		0.174		0.763
		(0.680)		(0.115)
High G-index	-0.201	-0.254	0.149	-0.074
	(0.568)	(0.477)	(0.808)	(0.908)
Other controls	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
N	1,370	1,370	933	933
R^2	10.68%	10.71%	11.89%	12.07%

***, **, * Statistical significance at the 1%, 5%, and 10% level, respectively.

Table 1.7

Cross-sectional regression analysis: benefit and cost of asset reallocation interact with cross-industry dummy

The dependent variables are the combined 3-day cumulative abnormal returns for column (1), and the average change in adjusted ROA over the 3 year period after the deal completion for column (2). $(VB_A - VB_T)$*RS is the difference in value-to-book ratios between the acquirer and the target weighted by relative size of the deal. $(VB_A - VB_T)^2$*RS is the square of difference in value-to-book ratios between the acquirer and the target weighted by relative size of the deal. For column (1), the sample consists of 2,352 M&A (completed or cancelled) deals with public acquirer and public target where deals from 1989 – 2010 where acquirers sought after at least 50% ownership of the target firm. The combined sample requires data available from Securities Data Corporations (SDC) mergers and acquisitions database, CRSP, Standard and Poor's COMPUSTAT. For column (2), the sample consists of 1,342 completed M&A deals with public acquirer and public target where deals from 1989 – 2007 which satisfy the sample requirement in column (1) and the data availability for the dependent variable. The observations with acquirer or target firm's SIC code starting with 6 and 9 are discarded. Accounting ratios, MBs, VBs are winsorized at 1% level. Significance is based on White-adjusted standard errors with p-values reported below each coefficient. Variable definitions are in Appendix 1.B.

Depend. Var.	$CARC_{(-1, +1)}$	ΔAdj_ROA
Independ Var.	(1)	(2)
$(VB_A - VB_T)$*RS	0.368	1.295 ***
	(0.188)	(0.004)
$(VB_A - VB_T)$*RS*Cross-industry	0.189	-1.044
	(0.606)	(0.146)
$(VB_A - VB_T)^2$*RS	-0.127 **	-0.413 ***
	(0.014)	(0.003)
$(VB_A - VB_T)^2$*RS*Cross-industry	-0.005	0.089
	(0.958)	(0.695)
Cross-industry	-0.312	-1.137 *
	(0.375)	(0.094)
Other controls	Y	Y
Year FE	Y	Y
N	2,352	1,342
R^2	10.27%	7.92%

***, **, * Statistical significance at the 1%, 5%, and 10% level, respectively.

Table 1.8

Who makes M&As with high benefit of asset reallocation

The dependent variable is the difference in value-to-book ratios between the acquirer and the target. The sample consists of 830 M&A (completed or cancelled) deals with public acquirer and public target where deals from 1993 – 2006 where acquirers sought after at least 50% ownership of the target firm. The combined sample requires data available from Securities Data Corporations (SDC) mergers and acquisitions database, CRSP, Standard and Poor's COMPUSTAT, IRRC, and Execucomp. The observations with acquirer or target firm's SIC code starting with 6 and 9 are discarded. Accounting ratios, MBs, VBs are winsorized at 1% level. Significance is based on White-adjusted standard errors with p-values reported below each coefficient. Variable definitions are in Appendix 1.B.

Dependent Var.	$(VB_A - VB_T)$	
Independent Var.	(1)	
Ln(Delta)	0.052	
	(0.288)	
Ln(Tenure)	0.037	
	(0.566)	
Duality	-0.033	
	(0.797)	
G-index	-0.044	**
	(0.028)	
# of segment	0.025	
	(0.422)	
Acq. Firm Size	-0.219	***
	(<.001)	
Acq. Cash Ratio (%)	-0.015	
	(0.112)	
Acq. Leverage (%)	-0.009	*
	(0.091)	
Acq. ROA (%)	0.011	*
	(0.052)	
Acq. CAPX (%)	-0.014	
	(0.128)	
Industry M&A	-0.121	
	(0.603)	
Hightech	-0.319	**
	(0.016)	
Year FE	Y	
N	830	
R^2	9.89%	

***, **, * Statistical significance at the 1%, 5%, and 10% level, respectively.

Chapter 2

Do overconfident CEOs ignore the market?

2.1. Introduction

Mergers and Acquisitions (M&As hereafter) are among the most consequential investment a firm can undertake for both the firm's shareholders and its management. CEOs who make acquisitions despite unfavorable market reaction are more likely to be replaced subsequently (Mitchell and Lehn (1990), Lehn and Zhao (2006)). Given the impact of acquisitions on firm value and the CEO's career, it is logical to ask why some CEOs disregard negative market reaction to acquisition announcements, and still complete the acquisitions.

Luo (2005) and Kau, Linck, and Rubin (2008) find that the announcement returns for the acquirer have an impact on the likelihood of completing deals. That is, *on average,* CEOs are more likely to complete merger bids with positive market reaction and to cancel bids with negative market reaction. If the market feedback provides valuable information about M&A deals which typically have significant impact on a CEO's career, it is even more puzzling that some CEOs choose to ignore the negative market reaction and complete their acquisition bids.

There are three potential explanations of why some CEOs might choose to complete an acquisition despite an unfavorable market reaction. First, CEOs could have private information about the value creation from acquisition. This implies that the post-merger performance for those acquisitions driven by private information should be positive. However, average post-merger performance of M&As is typically negative (Andrade, Mitchell, and Stafford (2001)). Thus the privation information might not be the first-order factor in a CEO's decision to ignore the market reaction. Second, misalignment of manager's and shareholders' interests could also lead a CEO to disregard the market feedback. A self-serving CEO maximizes his utility instead of shareholders' wealth from acquisitions, therefore ignoring valuable market feedback on the impact of acquisitions on shareholders' utility. Kau, Linck, and Rubin (2008) study whether better alignment of the CEO's and shareholders' interests leads to a positive relation between acquirer's announcement return and the probability of completing an

acquisitions and find mixed evidence. Therefore, the misalignment of manager and shareholder interests provides a partial but not complete answer to the question. Third, even if a CEO intends to act in shareholder interests, he could ignore the market's feedback due to his overconfidence. For example, a shareholder-serving manager might ignore the negative market reaction if he perceives that the return from the acquisition is higher than does the market. I complement previous studies by investigating whether overconfidence has an impact on a manager's decision to complete acquisition despite the unfavorable market reaction.

The concept of a behavioral bias affecting a manager's decision making is not new. Roll (1986) suggests that a bidding manager affected by hubris will pay too much for a target because he believes his evaluation of the target is more accurate than the market's. Heaton (2002) proposes a model describing the investment decisions made by an optimistic manager, and he reaches two important conclusions. On the one hand, an optimistic manager will overestimate his ability to create value from corporate projects and might wish to invest in a project which has a negative NPV in the market's opinion even when the manager is loyal to shareholders (ability overestimation effect). On the other hand, because an optimistic manager overvalues the future cash flows from investments, he believes that the capital market undervalues his firm's share (perceived undervaluation effect). As a result, he perceives external financing is more costly than does a manager who is not optimistic[20].

Regarding the M&As related decisions, both ability overestimation effect and perceived undervaluation effect will influence the decision to initiate of a bid. However, given that an acquisition is announced, I expect that the ability overestimation effect will dominate the perceived undervaluation effect in terms of revising the acquisitions bid with the information from the market. Perceived undervaluation effect would increase the perceived cost of external financing, so an overconfident CEO would rely more on internal resource than external funding to finance the bid. Thus, the impact from a negative market reaction to the perceived cost of external financing would be mitigated.

[20] The similar behavior bias can also be detected if a manager weights his private information in evaluating an investment project over than the public information, especially when the information is a value-increasing one. The bias will occur regardless whose information is more accurate. In other words, such a behavior bias only requires a manager perceives that he knows more than the market about an investment project.

Further, a negative market feedback would have little effect on his own valuation on the firm given that he thinks the market is wrong at the beginning. Therefore, an overconfident CEO who overestimates the synergy he can create from the M&A would be more likely to ignore the negative reaction of the announcement and complete the bid.

Although the behavioral bias offers an intriguing explanation of managerial decision making, constructing an empirical proxy for a behavioral bias is difficult[21]. Utilizing CEO compensation data for 477 large publicly-traded U.S. firms from 1980 to 1994, Malmendier and Tate (2005, 2008) (MT hereafter) use a CEO's decisions regarding his option holding to proxy for his beliefs about the company's future performance[22]. MT (2005) find that overconfident CEOs are more likely to rely on internal capital for financing investment. MT (2008) further investigate the relationship between CEO overconfidence and acquisition decisions and find overconfident CEOs are more likely to make an acquisition than non-overconfident CEOs. They also find that overconfident CEOs are more likely to finance the M&As with internal capital. Their evidence is consistent with the ability overestimation effect. Overall, their findings support the view that overconfidence has an impact on CEO decision making.

I utilize CEO option holdings data in Execucomp to construct CEO overconfidence measures similar to MT (2005, 2008)[23]. In this paper, I define two option-based proxies for CEO overconfidence. Following the insight from MT (2005, 2008), I then define a proxy for CEO overconfidence based on the decision regarding option exercise. *Holder67* identifies CEOs who fail to exercise his exercisable option in spite of having his exercisable option portfolio that is more than 67% in-the-money on at least two occasions in the past. I also define another proxy as *Proven* if a CEO's exercisable option portfolio is more than 67% in-the-money at least twice before the observation date. Given that the executive options are typically granted at the money, a deep in-the-money exercisable option portfolio implies that the current market price is

[21] Even though hubris and overconfidence are not identical as psychological characteristics; the empirical proxies for them are likely to be closely related. The empirical proxies used in this paper are referred as proxies for CEO overconfidence for simplicity in presentation.

[22] The data on a CEO's personal wealth are not generally available. However, stock options play an important role in a CEO's compensation. Among CEOs in Execucomp, the reported value of granted options accounts for one-third of CEOs' annual total compensation on average.

[23] The procedure follows Sudarsanam and Huang (2006). The same procedure is been used in other recent papers, e.g. Campbell, Gallmeyer, Johnson, Rutherford, and Stanley (2011).

substantially higher than a weighted average of past market price. The superior price performance could be a proxy for hubris or superior managerial quality. By separating *Proven* CEOs into *Holder67* CEOs and *not-Holder67* CEOs, I can then investigate the whether *Holder67* is capturing overconfidence/hubris or superior managerial quality.

Using a sample 1,345 acquisition bids that were announced from fiscal year 1995 to 2007, I find that both *Proven* and *Holder67* CEOs are more likely to complete a bid despite negative market feedback. Moreover, I find that M&As announced by *Proven* CEOs have higher announcement returns while M&As announced by *Holder67* CEOs do not. Therefore, the relation between *Holder67* and completing a bid despite unfavorable market feedback is unlikely to be driven by either managerial quality or private information. In addition, I find that the positive relation between *Proven* and announcement returns is driven by those *Proven but not Holder67* CEOs. That is, I show that those CEOs who experienced superior price performance but did not reveal their overconfidence are likely to be viewed as better CEOs or CEOs with private information by the market. Overall the evidence support that an overconfident CEO is more likely to ignore the market's negative reaction of his decision.

This paper extends the M&As literature by examining the effects of CEO overconfidence on revisions of M&As decisions. I contribute to the studies about how insider can learn from outsiders by identifying particular group of CEOs who are less likely to learn from the outsiders.

I also contribute to the behavioral corporate finance literature by linking CEO overconfidence to revisions of corporate decision[24]. Additionally, I complement studies on abandoned merger deals which used to focus on target resistance by looking at the acquirer's side of the story.

The rest of the paper proceeds as follows. I develop the empirical design in Section 2.2. Section 2.3 discusses methodology and data. The empirical analyses are contained in Section 2.4. Section 2.5 is the conclusion.

[24] Using similar measures of CEO overconfidence, MT(2005, 2008) study the impact from CEO overconfidence on investment policy and M&A related decisions of firms. Campbell, Gallmeyer, Johnson, Rutherford, and Stanley (2011) use similar measure and more recent data and show that CEO overconfidence is related to forced turnover.

2.2. Empirical Design

The starting research question is: Assuming that a manager believes that he acts in shareholders' interest, what type of manager is more likely to ignore the unfavorable market reaction at acquisition announcement and complete the announced bid? Recent studies on M&As provide evidence of a link between M&As decisions and psychological characteristics of CEOs. Hayward and Hambrick (1997) find that CEO hubris is positively related to bid premium. Chatterjee and Hambrick (2007) show that narcissistic CEOs carry out more and larger acquisitions than those who are less narcissistic. MT (2008) demonstrate that overconfident CEOs are more likely to announce acquisitions. One should also expect that CEO's psychological characteristics would affect their decision to complete an acquisition bid. Moreover, such characteristics should have an impact on how managers process the information they learn from the market about acquisition decisions (Luo (2005), KLR (2008)). In this paper, I investigate the impact of overconfidence on the decision to complete an acquisition bid despite negative market feedback. I use acquisition characteristics, CEO characteristics, and firm characteristics to control for various factors such as resistance from the target, quality of acquisition opportunities, market frictions such as information asymmetry, and managerial frictions such as agency costs.

An overconfident CEO overestimates his ability to create value (ability overestimation effect). Thus, he overestimates the return he can generate both in his own company and by acquiring other firms. An overconfident CEO overestimates the synergy from the acquisition and will attempt an acquisition which a not overconfident CEO would not undertake. On the other hand, an overconfident CEO might also overestimate his ability to create future firm value, so he believes that the market undervalues his firm (perceived undervaluation effect). Therefore, he perceives a higher cost of external finance than do CEOs who are not overconfident. The perceived high cost of external financing will lead an overconfident CEO to forgo value-creating acquisitions which require external financing. That is, the perceived undervaluation effect will have a negative impact on acquisitiveness. In sum, an overconfident CEO faces a trade-off between the ability overestimation effect and the perceived undervaluation effect when

considering acquisition related decisions. Thus, the net effect of overconfidence on acquisitiveness is ambiguous[25].

However, given that an acquisition has been announced, I expect the ability overestimation effect to dominate the perceived undervaluation effect in terms of revising the acquisitions bid with the information from the market. Perceived undervaluation effect would increase the perceived cost of external financing, so an overconfident CEO would rely more on internal resource than external fund to finance the bid. Therefore, the impact from a negative market reaction to the perceived cost of external financing would be mitigated. Moreover, a negative market feedback would have little effect on his own valuation on the firm given that he thinks the market erroneously value his firm. Thus, an overconfident CEO who overestimates the synergy he can create from the acquisition would be more likely to ignore the negative reaction of the announcement and complete the bid.

I examine whether an overconfident CEO is more likely to complete an announced bid despite the negative market reaction at the acquisition announcement using the following empirical setup. To pick up the effect of a significant negative market reaction, I use a variable designed to identify such a reaction (*NCAR*), so that the analysis is based on the model:

$$\Pr\{C = 1|O, NCAR, X\} = \beta_0 + \beta_1 O + \beta_2 NCAR + \beta_3 O * NCAR + \beta_4 X_{CEO} + \beta_5 X_{Firm} + \beta_6 X_{Deal}$$

where O is the overconfidence measure, *NCAR* is a dummy variable equal to 1 if acquirer's abnormal announcement returns (CAR) is less than certain threshold (-2.5%)[26], X_{CEO} is a set of controls for CEO characteristics, X_{Firm} is a set of controls for firm characteristics, X_{Deal} is a set of controls for characteristics of the announced deal, and C is

[25] MT (2008) provide evidence that the ability overestimation effect outweighs the perceived undervaluation effect in their sample of 394 large U.S. firms from 1980 to 1994. Whether their result can be generalized in larger sample across different time period is an empirical issue. In the untabulated results, I find the overconfidence measure does not have significant impact on the M&A initiation or financing. These results suggest that both the ability overestimation effect and the perceived undervaluation effect are in place and are not necessarily evidence against overconfidence.

[26] I also use the variable which takes the value of CAR if CAR < 0 and 0 if CAR > 0, the results are qualitatively similar.

a binary variable that takes the value 1 if the CEO completes the acquisition bid and takes the value 0 if the CEO does not complete the bid. I expect a positive sign on β_3 if the ability overestimation effect dominates perceived undervaluation effects in revision of M&A decision. In other words, a positive sign on β_3 suggests that an overconfident CEO is more likely to ignore the unfavorable market feedback in M&As.

2.3. Data

2.3.1. Sample construction

To obtain the empirical proxy for overconfidence, I start with Standard and Poor's Execucomp data base which contains with sufficient coverage on stock option holding and exercising. The executive compensation data is collected directly from each company's annual proxy (DEF 14A SEC form)[27]. I also require stock price data of firms to be available from CRSP (Center for Securities Prices at the University of Chicago), so that I can estimate the moneyness of a CEO's exercisable option portfolio. I obtain accounting information from Standard & Poor's Compustat database. I obtain the corporate governance data from RiskMetrics IRRC database[28]. There are 27,474 executive-year observations which contain sufficient information to estimate the moneyness of the executives' exercisable option portfolio.

I supplement the data with various items from the Compustat database. I measure firm size as the natural logarithm of assets in millions of dollar of year 2007 cash flow as income before extraordinary items plus depreciation. I normalize cash flow by book value of assets. I measure Q as the ratio of market value of asset to book value of assets following the Lamont and Polk's (2002) methodology. I use fiscal year end closing prices adjusted for stock splits to calculate annual stock returns. I also obtain governance index

[27] Execucomp contains over 2,872 companies, both active and inactive. The universe of firms covers the S&P 1,500 companies, companies that were once part of the S&P 1,500 index, and companies removed from the index that are still trading. Data collection on S&P 1,500 began in 1994. However, there is data back to 1992 mostly for the S&P 500.

[28] Since 2007, RiskMetrics (who acquired IRRC at 2005) applied a new methodology to collect data which does not collect all the information needed for constructing G-index. Because the corporate governance structure is an important control variable in this study, the data ends at 2006 (fiscal 2007).

from IRRC database for a measure of corporate governance. All the firm-specific and CEO-specific independent variables are measured before the M&A announcement.

Of the 18,904 executive-years that contain required information from Compustat and IRRC, 13,287 are CEO-years where a CEO's exercisable option portfolio was in-the-money before observation date at least once. In this paper, I use both the moneyness of the CEO's exercisable option portfolio and the decision to not exercise any options from his deep in-the-money option portfolio to measure overconfidence (I will provide details of measure in the next section). From the 13,287 CEO-years, I identify two subsamples using different criteria related to the moneyness of CEO's exercisable option portfolio. The first subsample is *Proven* CEOs which contains 5,337 CEO-years where the CEO's exercisable option portfolio is at least 67% in-the-money at least twice before the previous fiscal year end. The revealed-belief type of overconfidence measure *Holder67* is a subset in this subsample. In the *Proven* CEOs sample, CEOs who fail to exercise their option at least two or more times before the observation date are categorized as an overconfident CEO (Holder67 =1), the rest of *Proven* CEOs sample are categorized as *Proven but not Holder67*. The detail of CEO-year sample construction is shown in Table 2.1.

I use the Securities Data Corporation (SDC) merger database to obtain announcement dates and deal characteristics for announced acquisition bids made by my sample firms. The bid is either completed or not completed. I also require that the acquiring company seek at least 51% of the target shares and omit bids in which the acquirer already holds at least 50% of the target before the deal. Finally, in order to focus on bids that are relevant for CEO's decision making, I omit acquisitions worth less than 10 % of acquirer's market value of equity. As a result, I have 1,345 acquisition bids from fiscal year 1995 to fiscal year 2007 announced by CEOs from the sample of 13,287 CEO-years. The time distribution of the total value and number of the announced bids is shown in Table 1.2.

2.3.2. Measuring overconfidence

An empirical proxy for a psychological characteristic such as CEO hubris or CEO overconfidence is difficult to construct. MT (2005) propose that researchers could use a CEO's decisions about his personal portfolio to proxy for his beliefs about his company's future performance. A CEO is highly exposed to company risk since a large part of his compensation is equity-based and his human capital is invested in his firm. Also, executive options are non-tradable, and a CEO cannot legally hedge the risk of his holdings by short-selling company stock. As a result, a risk-averse CEO should exercise options early if the stock price is sufficiently high (Lambert, Larcker, and Verrecchia (1991); Hall and Murphy (2002)). If a CEO perceives a higher future cash flow for his firm than does the market, the, he will not exercise his options even when the stock price is sufficiently high to the market's view. Therefore, a CEO who fails to exercise his options on a timely basis also reveals his perception of the firm value.

MT (2005) propose the "*Holder67*" measure which identifies CEOs who (at least twice) fail to exercise options with five years remaining until option expiration despite a 67% increase in stock price (or more) since the grant date. The thresholds (67%) are based on Hall and Murphy (2002)'s optimal option exercise model for a rational CEOs with an undiversified personal portfolio and constant relative risk aversion. For example, in Hall and Murphy (2002)'s model, a CEO who has risk aversion 3 in a constant relative risk aversion (CRRA) utility specification and has 66% of his wealth in company equity, should exercise his exercisable option if the options are more than 67% in-the-money.

Following Sudarsanam and Huang (2006) and Campbell, Gallmeyer, Johnson, Rutherford, and Stanley (2011), I utilize CEO's option holding data in Execucomp to construct similar measures to those in MT (2005, 2008) (the procedure is described in Appendix 2.A). For each year, Execucomp records the estimated value and number of options for exercised options and exercisable but unexercised options in the portfolio. Execucomp does not include the exercise information for individual options. Even though I cannot estimate the moneyness of each granted option like MT did in their hand-collected data, I can still estimate the average moneyness of the aggregate exercisable option portfolio for each CEO-year.

Because of the data limitation, the *Holder67* used in this paper as well as those in other papers using Execucomp is stricter than MT's *Holder67*. A 67% in-the-money aggregate exercisable option portfolio means that the median market price during the fiscal year is 67% higher than the average exercise price. One can easily find one exercisable option is more than 67% in-the-money in an option portfolio which is 67% in-the-money on average. On the other hand, since the coverage of exercise information for individual options is not complete in Execucomp, I can only rely on the aggregate exercise number to identify CEOs who choose not to exercise. That is, I cannot identify CEOs who are exercising expiring options which should not be counted as voluntarily exercise. As a result, there could be CEOs who had exercisable option portfolios more than 67% in-the-money and can be categorized as *Holder67* in MT's definition, but will not be characterized as *Holder67* using my data and method.

Given that the executive options are typically granted at the money, a deep in-the-money exercisable option portfolio implies that the current market price is substantially higher than a weighted average of past market price. The superior price performance was used as a proxy for hubris in the literature (e.g. Hayward and Hambrick (1996)). Also, given the fact there are vesting periods for executive of 3 or 5 years, the increases in firm's market price implied by the aggregate option portfolio are less likely to be driven by short-term market mis-pricing. Therefore, I define a CEO as a *Proven* CEO if his exercisable option portfolio is more than 67% in-the-money at least twice before the observation date. By construction, *Proven* is a proxy of superior long-term price performance. A *Proven* CEO could be either more likely to be affected by hubris or more likely to be with better managerial quality.

The following example demonstrates how a CEO is categorized by different overconfident measure discussed above. Walter J. Sanders III, CEO of Advanced Micro Devices, whose exercisable option portfolio was more than 67% in the money from 1993 to 1997, so he is categorized as a *Proven* CEO since 1994 to whenever the last data period available. He did not exercise any options in 1995 and 1996. As a result, he is categorized as a *Holder67* CEO since 1996. Note that I do not categorize him as a *Proven* (*Holder67*) CEO before 1994 (1996) to avoid a look-ahead bias.

2.3.3. Summary Statistics

Table 2.3 presents summary statistics of acquisition bids announced by CEOs with sufficient compensation data. The sample includes acquisition bids where the value of the deal is at least 10% of acquirer's market value of equity during fiscal year 1995 to 2007. Among the 1,345 acquisition bids, 18% of them are announced by *Holder67* CEOs, 39% of them are announced by *Proven* CEOs, and 9% of them are not completed. The three-day cumulative abnormal return (CAR(-1, +1)) is calculated as net of the market return following Kau, Linck, and Rubin (2008). The average CAR(-1, +1) is 0.03% and is not significantly different from zero. The market reactions to 32% of those announcements are less than -2.5%. The statistics for other CEO characteristics, firm characteristics, and deal characteristics are similar to what presented in previous literature.

The first three columns of Table 2.4 present comparative statistics from announced acquisition bid sample divided by Proven. *Proven* CEOs complete more bids and have relatively positive market reaction on their bid announcements. The firms with *Proven* CEOs also have higher Q and higher stock returns from the past five years. The column four through six of Table 2.4 present comparative statistics divided by *Holder67* within the subsample where *Proven* = 1. Compared to other *Proven* CEOs, *Holder67* CEOs have relatively less positive market reactions to their bids announced (statistically insignificant).

2.4. Empirical results

2.4.1. Do overconfident CEOs ignore the unfavorable market feedback?

To answer "Do overconfident CEOs ignore the market?", I investigative whether an overconfident CEO is more or less likely to complete an announced bid despite the negative market reaction at the acquisition announcement. Given that the deal is announced, the perceived higher cost external financing from perceived undervaluation effect should already be reflected in the announced terms. That is, the learning from market information is less likely to be related to perceived undervaluation effect. As a

result, one should expect the ability overestimation effect will drive overconfident CEOs to ignore the unfavorable market feedback.

Table 2.5 provides the regression results of the above question. The dependent variable is a dummy variable equal to 1 if the deal is completed and 0 if the deal is cancelled. To pick up the effect of a significant negative market reaction, I define a dummy variable *CAR<-2.5%* equals to 1 if the announcement return is less than –2.5%. The first column of Table 2.5 presents the regression results using only control variables. The second column add the *Proven* and the interaction term between *Proven* and *CAR<-2.5%*. The third column add the *Holder67* and the interaction term between *Holder67* and *CAR<-2.5%*. From column (2) and (3), I find that the coefficient of the interaction term is positive and significant. These results suggest that *Proven* CEOs and *Holder67* CEOs are more likely to ignore the unfavorable market feedback and complete their M&A bids. In column (4), I find that those *Proven* CEOs who are not *Holder67* do not exhibit this behavior. Therefore, the propensity to ignore market reactions for *Proven* CEOs is likely to be driven by those who are *Holder67* CEOs. In sum, the evidence is consistent with the notion that a CEO might ignore the negative feedback from the market at the announcement because he overestimates his ability to create value from the acquisition.

2.4.2. Alternative explanations

In this paper, I utilize the option-based overconfidence measure to test whether CEO overconfidence has impact on CEO learning from the market. CEOs could choose not to exercise his deep in-the-money option because of the private information about the firm or the upcoming M&A bids. In other words, *Holder67* could be a signal of favorable private information. To distinguish whether the *Holder67* captures private information or overconfidence, I investigate the relation between announcement returns and *Holder67*. If not exercising deep in-the-money reveals favorable private information, the market reaction to those M&As made by *Holder67* CEOs should be more likely to be positive.

Further, a deep in-the-money exercisable option portfolio implies that the current market price is substantially higher than a weighted average of past market prices. Those who experience such price performance could be managers with superior ability.

Therefore, *Proven* CEOs and *Holder67* CEOs could be better CEOs than the others. M&As announced by CEOs with superior managerial quality should have favorable market reactions[29]. This predicts that *Proven* and *Holder67* to be positively related to the announcement returns.

Table 2.6 provides the regressions where acquirer's risk adjusted three-day cumulative abnormal returns around the announcement are dependent variables. Column (1) presents the results for the control variables only. Column (2) presents the model with *Proven*, column (3) presents the model with *Holder67*, and column (4) presents the model with *Proven but Not Holder67*. I do not find the coefficient of Holder67 to be significant, suggesting that *Holder67* is not likely to proxy for favorable privation information. The coefficient of *Proven* is positive and significant, suggesting that *Proven* could be proxy for superior managerial quality instead of hubris. Moreover, I find that the positive relation between *Proven* and announcement returns is likely to be driven by those *Proven* CEOs who are not *Holder67*. This suggests that *Holder67* is not capturing the effect of superior managerial quality. The results from Table 2.6 suggest the relation between *Holder67* and ignoring the market are unlikely to be driven by either favorable private information or superior managerial quality.

2.4.3. Robustness

In construction of the overconfidence measure, I tried various alternatives. In addition to the median of the daily closing price as the proxy for the average market price at the time of option exercise, I use the mean, 25% percentile, 75% percentile, the minimum, and the maximum of daily closing price. I also use thresholds other than 67% (50% to 150%) to identify which CEO reveals himself as an overconfident CEO. None of these alternatives changes the analysis. The main results are also robust against different criterion of acquisition. For example, omitting bids with deal value less than 5% of acquirer's firm value (MT 2008), or omitting bids with deal value less than 10% of

[29] This is consistent with the general idea of the Q-hypothesis of mergers where acquirers with better managerial quality, firm productivity, and investment opportunity buy inferior target and create value via asset reallocation.

acquirer's firm value and less than $100 million (KLR) does not affect conclusions from the tests.

2.5. Conclusion

In this paper, I use a large sample of firms to investigate the effect of CEO overconfidence on the decision to complete an acquisition bid despite the negative market reaction. An overconfident CEO faces a trade-off when making acquisition decision. On the one hand, he might overestimate his ability of creating the synergy from the acquisition (ability overestimation effect). On the other hand, he believes that his firm is undervalued by the market (perceived undervaluation effect). However, given that the bids are announced, the perceived undervaluation effect could be less important in the revision of M&A announcement. Therefore, one would expect that an overconfident CEO is more likely to ignore the unfavorable market reaction and complete the bid because he overestimates his ability in creating value from the acquisition.

Using a sample of S&P 1500 firms from 1994 to 2006, I find that CEOs who at least twice have a more than 67% in-the-money option portfolio in the past (*Proven* CEOs) and CEOs who at least twice fail to exercise their option when they have a more than 67% in-the money option portfolio in the past (*Holder67* CEOs) are more likely to ignore the negative market feedback as compared to their peers. Moreover, while *Proven* CEOs might capture some effects from superior managerial quality, I find that the results from *Holder67* CEOs are unlikely to be driven by favorable private information and superior managerial quality. In sum, using *Holder67* as the proxy of CEO overconfidence, I find evidence supporting that overconfident CEOs ignore the market in M&As.

References 2:

Aktas, N., E. De Bodt, H. Bollaert, and R. Roll, 2010, "CEO Narcissism and the Takeover Process: From Private Initiation to Deal Completion," Working paper

Andrade, G., M. Mitchell, and E. Strafford, 2001, "New evidence and perspectives on mergers," *Journal of Economics Perspectives*, 15, 103-120

Bates, T. W. and M. L. Lemmon, 2003, "Breaking up is hard to do? An analysis of termination fee provisions and merger outcomes," *Journal of Financial Economics,* 69, 469-504

Campbell, T.C., M. Gallmeyer, S.A. Johnson, J. Rutherford, and B.W. Stanley, 2011, "CEO optimism and forced turnover," *Journal of Financial Economics,* 101, 695-712

Chatterkee, A. and D.C. Hambrick, 2007, "It's All about Me: Narcissistic Chief Executive Officers and Their Effects on Company Strategy and Performance," *Administrative Science Quarterly*, 52, 351-386

Gompers, P.A., J. Ishii, and A. Metrick, 2003, "Corporate governance and equity prices," *Quarterly Journal of Economics*, 118, 107-155

Hall, B. J. and K. J. Murphy, 2002, "Stock options for undiversified executives," *Journal of Accounting and Economics*, 33, 3-42

Harford, J., 1999, "Corporate cash reserve and acquisitions," *Journal of Finance*, 54, 1969-1997

Hayward, M.L.A. and D.C. Hambrick, 1996, "Explaining the Premiums Paid for Large Acquisitions: Evidence of CEO Hubris," *Administrative Science Quarterly*, 42, 103-127

Heaton, J. B., 2002, "Managerial Optimism and Corporate Finance," *Financial Management*, 31, 33-45

Kau, J.B., J.S. Linck, and P.H. Rubin, 2008, "Do managers listen to the market?" *Journal of Corporate Finance*, 14, 347-362

Lamont, O. A. and C. Polk, 2002, "Does diversification destroy value? Evidence from the industry shocks," *Journal of Financial Economics,* 63, 51-77

Lambert, R.A., D.F. Larcker, and R.E. Verrecchia, 1991, "Portfolio Considerations in Valuing Executive Compensation," *Journal of Accounting Research*, 29, 129-149

Lehn, K.M. and MX Zhao, 2006, "CEO Turnover after Acquisitions: Are Bad Bidders Fired?" *Journal of Finance,* 61, 1759-1811

Luo, Y., 2005, "Do Insider Learn from Outsiders? Evidence from Mergers and Acquisitions," *Journal of Finance,* 60, 1951-1982

Malmendier, U. and G. Tate, 2005, "CEO overconfidence and corporate investment," *Journal of Finance,* 60, 2661-2700

Malmendier, U. and G. Tate, 2008, "Who makes acquisitions? CEO overconfidence and the market's reaction," *Journal of Financial Economics,* 89, 20-43

Masulis, R.W., C. Wang, and F. Xie, 2007, "Corporate governance and acquirer returns," *Journal of Finance,* 62, 1851-1889

Mitchell, M.L. and K.M. Lehn, 1990, "Do Bad Bidders Become Good Targets?" *Journal of Political Economy,* 98, 372-398

Officer, M. S., 2003, "Termination fees in mergers and acquisitions," *Journal of Financial Economics,* 69, 431-467

Roll, R. 1986, "The Hubris Hypothesis of Corporate Takeovers," *Journal of Business,* 59, 197-216

Schleifer, A. and R. Vishny, 2003, "Stock market driven acquisitions," *Journal of Financial Economics,* 70, 295-311

Sudarsanam, S. and J. Huang, 2006, "Managerial Incentives, Overconfidence, Risk-taking, and Acquirer Shareholder Value Creation in Mergers and Acquisitions," Working paper

Appendix 2.A

Estimating the moneyness of exercisable option portfolio.

The procedure follows as that in Sudarsanam and Huang (2006) and is similar to that in Campbell, Gallmeyer, Johnson, Rutherford, and Stanley (2011).

For each fiscal year, the moneyness of a CEO's exercisable option portfolio is defined as:

$$\frac{P_{mid} - K_W}{K_W} \tag{2.A1}$$

where P_{mid} is the median daily close price of firm stock during the fiscal year, and K_W is the weighted average exercise price of the aggregate exercisable option portfolio. K_W is calculated as:

$$K_W = \frac{K_e + K_u}{N_e + N_u} = \frac{\left(\sum_{i=1}^{m} K_{ei} * N_{ei} \Big/ \sum_{i=1}^{m} N_{ei}\right) + \left(\sum_{j=1}^{n} K_{uj} * N_{uj} \Big/ \sum_{j=1}^{n} N_{uj}\right)}{\sum_{i=1}^{m} N_{ei} + \sum_{j=1}^{n} N_{uj}} \tag{2.A2}$$

where N_{ei} (K_{ei})is the number (exercise price) of ith exercised option during the fiscal year, and N_{uj} (K_{uj})is the number (average exercise price) of ith unexercised exercisable option during the fiscal year. N_e and N_u are reported in Execucomp. The weighted average exercise price for exercised (unexercised exercisable) options K_e (K_u) can be estimated using the estimated value of exercised (unexercised exercisable) option portfolio, V_e (V_u) and N_e (N_u). The weighted average exercise price for unexercised exercisable options K_u is defined as:

$$K_u = P_{end} - \frac{V_u}{N_u} \tag{2.A3}$$

where P_{end} is the fiscal year end closing price of firm stock. Since V_u is defined as $\sum_{j=1}^{n}(P_{end} - K_{uj}) * N_{uj}$ in Execucomp, equation (2.A3) simply restores the weighted average exercise price from reported data. The weighted average exercise price for exercised options K_e is defined as:

$$K_e = P_{mid} - \frac{V_e}{N_e} \tag{2.A4}$$

Note that the V_e is the actual aggregate value of exercised option in Execucomp. ($V_e = \sum_{i=1}^{m}(P_j - K_{ei}) * N_{ei}$). Therefore, I use the median stock price as a proxy for the weighted average market price at the exercise date and obtain the weighted average exercise price for exercised options from equation (2.A4).

Appendix 2.B

Variable definitions

Variable	Definitions
Panel A: Overconfidence measure and related measure	
Holder67	Dummy variable which takes value 1 if a CEO fails to exercise any option, despite his exercisable option portfolio being more than 67% in-the-money at least twice before the observation date.
Proven	Dummy variable which takes value 1 if a CEO whose exercisable option portfolio is more than 67% in-the-money at least twice before the observation date.
Panel B: CEO/Firm Characteristics	
Age	The CEO's age at the end of fiscal year
Tenure	CEO's tenure at the end of fiscal year (fiscal year – the year become CEO +1), log(tenure) is used in the regression analyses.
Share own	A ratio equals to the number of CEO's shares holding (excluding unexercised options) divided by the number of common share outstanding.
Vested option	A ratio equals to the number of shares from CEO's holding of vested option (unexercised exercisable option in Execucomp) divided by the number of common share outstanding. This variable is rescaled as 100*Vested option in the regressions.
OPTPCT	A ratio equals to the dollar value of option granted divided by the total compensation of CEO during the year.
Firm Size	Book value of total assets expressed in millions of 1994 dollars
Ln(Size)	Log of *Firm size*
MVE	Number of common shares outstanding multiplied by the stock price at fiscal year end.
Tobin' q	Market value of assets divided by book value of assets. The market value of assets is defined as book value of assets minus book value of equity plus market value of assets.
Cash flow	Cash flow during the fiscal year, defined as income before extraordinary items plus depreciation and amortization, divided by book value of assets.
G-index	Corporate governance index from Gompers, Ishii, and Metrick (2003) at the end of the fiscal year.
Return (t-5, t-1)	Accumulated annual stock return for the previous five fiscal years in %, adjusted for stock splits.
Panel C: Deal Characteristics/M&A related variables	
Transaction value	Total value of consideration paid by the acquirer, excluding fees and expenses (in million $)
Relative Size	Transaction value divided by the market capitalization of the acquirer at the last fiscal year end prior to the announcement
Equity financing	Dummy variable which takes value 1 if the at least 50% of the value of consideration will be financed by equity.
Compete	Dummy variable which takes value 1 if there are more than one bidder on the target
Hostile	Dummy variable which takes value 1 if the acquisition bid is labeled as hostile by SDC
Lockup	Dummy variable which takes value 1 if the target has a lockup agreement
Tender offer	Dummy variable which takes value 1 if the acquisition bid is labeled as tender offer by SDC
Termination Fee	Dummy variable which takes value 1 if the acquisition bid where either acquirer or target has termination fee agreement with its advisor
Toehold	Dummy variable which takes value 1 if the acquirer owned part of target before the announcement.
Collar	Dummy variable which takes value 1 if the acquisition bid includes collar agreement.
Completed	Dummy variable which takes value 1 if the acquisition bid was completed later (SDC deal status code as 'C')
Not completed	Dummy variable which takes value 1 if the acquisition bid was not completed (SDC deal status code as 'W')

Variable	Definitions
Diversify	Dummy: variable which takes value 1 if the acquisition bid involves the target with a two-digit SIC code other than that of the acquirer.
CAR (-1, +1)	Three-day cumulative abnormal return (in%) for acquirer calculated as net of the market return. The event date is the announcement date of the acquisition bid.
CAR < -2.5%	Dummy variable which takes value 1 is CAR(-1, +1) is less than – 2.5.
Public Target	Dummy variable which takes value 1 if the target is a public firm
Defenses	Dummy variable which takes value 1 if the target has any defensive mechanism (e.g. poison pills, greenmail, white knights, etc.)
Litigation	Dummy: variable which takes value 1 if either the acquirer or the target launched litigation as a result of the acquisition bid

Table 2.1
Data Screening: Executive and Years

This table shows the construction of the sample used in the regression analysis. The "Requirement" column describes the criteria used to selection observations. The rest of the columns show the numbers resulting from applying the criteria mentioned in the "Requirement" column of that row and all pervious rows.

Panel A: Main Sample

Requirement	Number of Executives	Number of Firms	Observations
Availability of compensation data from Execucomp from fiscal year 1992-2006. The executive is a CEO at some point in the sample period. Drop CEOs in their last year of tenure or CEOs with tenure as 1 year only.	4,843	2,634	29,422
+ Availability of stock price data and accounting data to estimate weighted average exercise price	4,533	2,492	27,474
+ Availability of accounting data and governance index (from RiskMetric IRRC) for regression analyses later	3,521	1,945	18,904
+ Executive serves as CEO in the fiscal year 1994-2006.	3,191	1,911	13,287
Panel B: Subsample			
Proven CEOs: CEOs whose exercisable option portfolio is more than 67% in-the-money at least twice before the fiscal year end.	1,380	1,496	5,337

Table 2.2
Announced acquisitions by fiscal year

The sample includes 1,345 acquisition bids (both completed and not completed) where value of the deal is at least 10% of acquirer's market value of equity of previous fiscal year end. The bids were announced during fiscal year 1995 to 2007. The acquiring company seeks at least 51% of the target shares and holds less than 50% of the target before the deal. The combined sample requires that data be available from Thompson Financial Securities Data Corporations (SDC) mergers and acquisitions database, Standard and Poor's Execucomp, RiskMetric IRRC, CRSP, and Standard and Poor's COMPUSTAT. Variable definitions are in Appendix 2.B.

Year	# of deals	portion of sample	Deal Value Mean (millions)	Deal Value Median (millions)
1995	86	6.39%	$1,506	$471
1996	80	5.95%	$3,085	$373
1997	148	11.00%	$1,626	$1,199
1998	156	11.60%	$3,821	$575
1999	131	9.74%	$3,904	$575
2000	94	6.99%	$2,308	$679
2001	84	6.25%	$2,273	$551
2002	86	6.39%	$1,429	$378
2003	104	7.73%	$759	$298
2004	115	8.55%	$2,044	$212
2005	95	7.06%	$3,376	$370
2006	91	6.77%	$2,830	$469
2007	75	5.58%	$1,283	$488
Full sample	1,345	100.00%	$2,412	$471

Table 2.3
Summary statistics of acquisition bids announced

The sample includes 1,345 acquisition bids (both completed and not completed) where value of the deal is at least 10% of acquirer's market value of equity of previous fiscal year end. The bids were announced during fiscal year 1995 to 2007. The acquiring company seeks at least 51% of the target shares and holds less than 50% of the target before the deal. The combined sample requires that data be available from Thompson Financial's Securities Data Corporations (SDC) mergers and acquisitions database, Standard and Poor's Execucomp, RiskMetric IRRC, CRSP, and Standard and Poor's COMPUSTAT. Variable definitions are in Appendix 2.B.

Variable (N = 1,345)	Mean	Median	Std. dev.
Panel A: Variables of interest			
Holder67	0.18	0.00	0.38
Proven	0.39	0.00	0.49
CAR(-1,+1)	0.03	0.19	8.20
CAR<-2.5%	0.32	0.00	0.47
Completion	0.91	1.00	0.29
Panel B: CEO Characteristics			
Age	54.69	55.00	7.24
Tenure	7.40	5.00	6.47
Share own	0.02	0.00	0.05
Vested option	0.01	0.01	0.01
OPTPCT	0.36	0.34	0.29
Panel C: Firm Characteristics			
Size	5,920.83	1,628.29	16,676.93
G-index	9.46	9.00	2.64
Cash flow	0.09	0.09	0.10
Q	1.93	1.53	1.58
Return (t-5, t-1) (%)	136.38	58.73	578.03
Panel D: Deal Characteristics			
Transaction value mm$	2,411.76	470.51	8,093.62
Relative size	0.27	0.15	0.30
Public target	0.32	0.00	0.47
Equity financing deals	0.45	0.00	0.50
Cross-industry deals	0.35	0.00	0.48
Multiple-bidders	0.06	0.00	0.24
Hostile deals	0.03	0.00	0.16
Lockup	0.05	0.00	0.22
Tender offer	0.09	0.00	0.29
Termination Fee	0.38	0.00	0.49
Toehold	0.02	0.00	0.15
Collar	0.07	0.00	0.26
Litigation	0.02	0.00	0.14
Defense	0.06	0.00	0.24

Table 2.4

Summary statistics of acquisition bids announced: subsamples

The sample includes 1,345 acquisition bids (both completed and not completed) where value of the deal is at least 10% of acquirer's market value of equity of previous fiscal year end. The bids were announced during fiscal year 1995 to 2007. The acquiring company seeks at least 51% of the target shares and holds less than 50% of the target before the deal. The combined sample requires that data be available from Thompson Financial's Securities Data Corporations (SDC) mergers and acquisitions database, Standard and Poor's Execucomp, RiskMetric IRRC, CRSP, and Standard and Poor's COMPUSTAT. Variable definitions are in Appendix 2.B.

				Proven = 1		
	Proven = 0	Proven = 1		Holder67 = 0	Holder67= 1	
Variable	Mean	Mean	Diff.	Mean	Mean	Diff.
N	826	519		276	243	
Panel A: Variables of interest						
CAR(-1,+1)	-0.31	0.57	*	0.70	0.41	
CAR<-2.5%	0.33	0.31		0.30	0.33	
Completion	0.89	0.92	**	0.93	0.91	
Panel B: CEO Characteristics						
Age	54.11	55.60	***	55.49	55.74	
Tenure	6.09	9.48	***	8.87	10.18	**
Share own	0.02	0.02		0.01	0.03	***
Vested option	0.01	0.01	***	0.01	0.01	***
OPTPCT	0.36	0.36		0.38	0.33	*
Panel C: Firm Characteristics						
Size	5,623.54	6,393.98		6,908.63	5,809.43	
G-index	9.52	9.35		9.44	9.26	
Cash flow	0.08	0.10	**	0.10	0.09	
Q	1.84	2.09	***	2.18	1.98	
Return (t-5, t-1) (%)	102.77	186.02	***	214.18	153.60	**
Panel D: Deal Characteristics						
Transaction value mm$	2,306.60	2,579.13		3,224.33	1,846.31	*
Relative size	0.27	0.26		0.24	0.27	
Public target	0.32	0.33		0.32	0.34	
Equity financing deals	0.45	0.45		0.44	0.47	
Cross-industry deals	0.34	0.37		0.37	0.36	
Multiple-bidders	0.07	0.04	**	0.05	0.03	
Hostile deals	0.03	0.03		0.02	0.04	
Lockup	0.04	0.07	**	0.05	0.09	
Tender offer	0.09	0.10		0.10	0.10	
Termination Fee	0.38	0.39		0.38	0.40	
Toehold	0.02	0.02		0.02	0.03	
Collar	0.07	0.07		0.07	0.08	
Litigation	0.02	0.02		0.01	0.02	
Defense	0.05	0.08	*	0.06	0.10	*

*** Denotes statistical significance at the 1% level.

** Denotes statistical significance at the 5% level.

* Denotes statistical significance at the 10% level.

Table 2.5

Who is more likely to complete an announced acquisition bid despite a negative market reaction on the announcement?

The dependent variable is a dummy variable which takes value 1if the firm completed the announced acquisition bid and 0 if that firm withdrew the announced acquisition bid. The firm characteristics and CEO characteristics variables are defined at the beginning of the fiscal year. The logit regression is based on 1,207 acquisition announcements announced by CEOs from the sample of 12,194 CEO-years sample which requires that data be available from Standard and Poor's Execucomp, RiskMetric IRRC, CRSP, and Standard and Poor's COMPUSTAT. See Table 2.1 for criteria used to obtain these CEO-years. Acquisition announcements where deal value is less than 10% of the acquirer's market value of equity are excluded. Variable definitions are in Appendix 2.B. *CAR<-2.5%* is a dummy variable equal to 1 if the three-day cumulative abnormal return around the acquisition announcement is less than –2.5%. Equity financing is a dummy variable equal to 1 if at least 50% of the value of the announced bid planned to be financed by equity. Deal characteristics are obtained from Thomson Financial SDC database. The models are estimated with Fama-French 12 industries fixed-effect and year fixed-effect. The standard errors are clustered by firm. For each independent variable, the first row reports the estimate of coefficient, and the second row reports the p-value.

Dependent Variable	1 if the firm completed announced acquisition bid, 0 if cancelled			
Independent Variable	(1)	(2)	(3)	(4)
Proven		-0.088		
		(0.810)		
Holder67			-0.503	
			(0.179)	
Not Holder67 (but Proven)				0.294
				(0.468)
Proven*CAR<-2.5%		1.418 **		
		(0.019)		
Holder67*CAR<-2.5%			1.517 **	
			(0.046)	
Not Holder67*CAR<-2.5%				0.568
				(0.472)
CAR<-2.5%	0.223	-0.263	-0.076	0.124
	(0.457)	(0.475)	(0.822)	(0.712)
Equity financing	-0.601 *	-0.702 *	-0.684 *	-0.625
	(0.079)	(0.076)	(0.077)	(0.107)
Log(tenure)	-0.258 *	-0.327 **	-0.252	-0.282 *
	(0.077)	(0.041)	(0.118)	(0.050)
Log(size)	0.094	0.055	0.066	0.075
	(0.375)	(0.658)	(0.595)	(0.543)
G-index	-0.042	-0.040	-0.043	-0.053
	(0.475)	(0.485)	(0.464)	(0.372)
Q	0.016	-0.022	-0.038	-0.026
	(0.937)	(0.902)	(0.850)	(0.883)
Return (t-5, t-1) (%)	0.001	0.001	0.001	0.001
	(0.224)	(0.371)	(0.192)	(0.248)
Compete	-2.631 ***	-2.616 ***	-2.619 ***	-2.605 ***
	(<.001)	(<.001)	(<.001)	(<.001)
Hostile	-2.382 ***	-2.613 ***	-2.643 ***	-2.523 ***

Dependent Variable	1 if the firm completed announced acquisition bid, 0 if cancelled							
Independent Variable	(1)		(2)		(3)		(4)	
	(<.001)		(<.001)		(<.001)		(0.001)	
Lockup	-0.027		-0.241		-0.086		-0.091	
	(0.957)		(0.619)		(0.864)		(0.855)	
Tender Offer	1.360	**	1.353	**	1.359	**	1.419	**
	(0.030)		(0.038)		(0.034)		(0.029)	
Termination Fee	2.037	***	2.140	***	2.067	***	2.077	***
	(<.001)		(<.001)		(<.001)		(<.001)	
Toehold	-0.290		-0.241		-0.271		-0.230	
	(0.640)		(0.685)		(0.655)		(0.705)	
Collar	1.624	**	1.625	***	1.630	***	1.708	***
	(0.010)		(0.006)		(0.005)		(0.007)	
Relative size	-0.664	***	-0.597	***	-0.624	***	-0.606	***
	(0.001)		(0.002)		(0.001)		(0.002)	
Litigation	-1.112	***	-1.215		-1.275	*	-1.117	
	(0.140)		(0.102)		(0.078)		(0.128)	
Public target	-2.377	***	-3.090	***	-2.407	***	-2.412	***
	(<.001)		(<.001)		(<.001)		(<.001)	
Year FE	Y		Y		Y		Y	
Industry FE	Y		Y		Y		Y	
N	1,207		1,207		1,207		1,207	
R^2	34.16%		36.72%		36.34%		35.99%	

*** Denotes statistical significance at the 1% level.

** Denotes statistical significance at the 5% level.

* Denotes statistical significance at the 10% level.

Table 2.6
Acquirer's abnormal returns and CEO overconfidence

The firm characteristics and CEO characteristics variables are defined at the end of the previous fiscal year. The dependent variable is acquirer's three days abnormal announcement returns. The regression is based on 1,205 acquisition announcements announced by CEOs from the sample of 12,194 CEO-years sample which requires that data be available from Standard and Poor's Execucomp, RiskMetric IRRC, CRSP, and Standard and Poor's COMPUSTAT. Acquisition announcements where deal value is less than 10% of the acquirer's market value of equity are excluded. Variable definitions are in Appendix 2.B. Deal characteristics are obtained from Thomson Financial SDC database. The models are estimated with Fama-French 12 industries fixed-effect and year fixed-effect. For each independent variable, the first row reports the estimate of coefficient, and the second row reports the p-value.

Dependent Variable	Acquirer's CAR(-1,+1)			
Independent Variable	(1)	(2)	(3)	(4)
Proven		0.971 *		
		(0.053)		
Holder67			0.337	
			(0.574)	
Not Holder67 (but Proven)				0.898 *
				(0.096)
Log(tenure)	0.251	0.063	0.212	0.179
	(0.324)	(0.824)	(0.441)	(0.481)
Log(size)	-0.123	-0.149	-0.128	-0.135
	(0.544)	(0.458)	(0.528)	(0.504)
Cash flow	-0.558	-0.706	-0.515	-0.808
	(0.853)	(0.814)	(0.864)	(0.788)
Cash Ratio	2.977	3.079	3.094	2.760
	(0.273)	(0.253)	(0.256)	(0.311)
Leverage	0.749	1.080	0.797	0.928
	(0.703)	(0.580)	(0.684)	(0.638)
G-index	-0.129	-0.127	-0.128	-0.130
	(0.123)	(0.126)	(0.126)	(0.118)
Q	0.320	0.308	0.322	0.304
	(0.129)	(0.166)	(0.127)	(0.169)
Return (t-5, t-1) (%)	-0.001 ***	-0.001 ***	-0.001 ***	-0.001 ***
	(<.001)	(<.001)	(<.001)	(<.001)
All Cash	0.853 *	0.868 *	0.851 *	0.871 *
	(0.072)	(0.066)	(0.073)	(0.066)
All Equity	-0.765	-0.812	-0.766	-0.807
	(0.322)	(0.296)	(0.322)	(0.299)
Conglomerate	-0.534	-0.563	-0.536	-0.554
	(0.272)	(0.250)	(0.271)	(0.256)
Compete	-1.010	-0.930	-0.974	-1.032
	(0.241)	(0.278)	(0.259)	(0.228)
Hostile	0.441	0.418	0.400	0.528
	(0.698)	(0.712)	(0.725)	(0.641)
Lockup	-2.094 *	-2.201 *	-2.135 *	-2.084 *

Dependent Variable	Acquirer's CAR(-1,+1)			
Independent Variable	(1)	(2)	(3)	(4)
	(0.075)	(0.062)	(0.071)	(0.076)
Tender Offer	1.551 *	1.524	1.554	1.517
	(0.085)	(0.090)	(0.084)	(0.092)
Termination Fee	0.148	0.171	0.150	0.164
	(0.832)	(0.807)	(0.830)	(0.814)
Collar	0.204	0.173	0.193	0.204
	(0.797)	(0.827)	(0.807)	(0.797)
Relative size	-3.304 ***	-3.289 ***	-3.311 ***	-3.272 ***
	(0.005)	(0.005)	(0.005)	(0.006)
Litigation	2.211	2.318	2.235	2.246
	(0.245)	(0.223)	(0.240)	(0.236)
Public target	-3.750 ***	-3.708 ***	-3.750 ***	-3.711 ***
	(<.001)	(<.001)	(<.001)	(<.001)
Year FE	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y
N	1,204	1,204	1,204	1,204
R^2	15.88%	16.17%	15.90%	16.13%

*** Denotes statistical significance at the 1% level.
** Denotes statistical significance at the 5% level.
* Denotes statistical significance at the 10% level.