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Ex Post Valuation Correction and Motives of Merger and Acquisition Decisions

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**EX POST VALUATION CORRECTION
AND MOTIVES OF MERGER AND ACQUISITION DECISIONS**

By
Hien T. Nguyen

A Dissertation Submitted to the Faculty of
Old Dominion University in Partial Fulfillment of the
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ABSTRACT

EX POST VALUATION CORRECTION AND MOTIVES OF MERGER AND ACQUISITION DECISIONS

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This study seeks to decipher the motives of mergers and acquisitions and identify the source of value creation or destruction. The existing literature on corporate mergers and acquisitions generally agrees on four primary motives of merger and acquisition decisions: (1) market timing, (2) response to industry shocks, (3) agency cost and hubris, and (4) synergy. In studying the motives behind acquisition decisions, prior studies have used incomparable methodologies and measures, which often lead to inconclusive debates. In this study, we address the possibility that there could be multiple motives behind a merger. Instead of using a multitude of methodologies to look for the existence of different motives of acquisitions, we use a single methodology that allows us to identify the motives simultaneously. Specifically, we examine components of the market-to-book ratio and correlate them with the motives of merger activity. By observing the changes in the components of the market-to-book ratio over long-run event windows after the merger, we are able to verify ex post the motives behind a merger and identify the source of value creation or destruction. Using a sample of 3,520 domestic merger events over a twenty-year period from 1985 to 2004, we find significant evidence supporting that market timing, response to industry-shocks, and synergy could be simultaneous motives for some mergers. Stock mergers appear to be more related to the market timing motive than cash mergers as the improvements in post-merger operating performance of stock mergers less consistent than those of cash mergers. A decline in sales growth also suggests that many mergers may be driven by agency problems or hubris. It is likely that managers use overvalued common stocks to satisfy their personal interests through corporate mergers. On average, we also find that large acquirers and large acquisitions are more associated with market timing and agency problems and hubris.

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To my mother Loc Tran, my husband Long Trinh and my son Nghia Trinh, who have granted me their relentless emotional and physical supports and sacrifices throughout the completion of this work.

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CHAPTER I

INTRODUCTION

“... We would like to believe that in an efficient economy, mergers would happen for the right reasons, and that their effects would be, on average, as expected by the parties during negotiation. However, the fact that mergers do not seem to benefit acquirers provides reason to worry about [the evidence]. Part of the issue here may be that an acquiring firm can seek a merger for a mix of reasons. Many firms mention mergers as their main strategic tool for growth and success, and point to possible economies of scale, synergies, and greater efficiency in managing assets. Alternatively, there is the somewhat contradictory evidence that mergers can be evidence of empire-building behavior by managers. If mergers could be sorted by true underlying motivations, it may be that those which are undertaken for good reasons do benefit acquirers, but in the average statistics, these are cancelled out by mergers undertaken for less benign reasons.” By Andrade, Mitchell and Stafford (2001, p. 118).

The existing literature on corporate mergers and acquisitions generally agrees on four primary motives of acquisition decisions, including (1) market timing, (2) response to industry-shock, (3) agency cost and hubris and (4) synergy. Some of these motives work for the benefits of shareholders, some against. With the market timing motive, it is argued that mergers occur because corporate managers take advantage of market misvaluation by issuing overvalued stocks to acquire more assets; share value will be destroyed after the event once the misvaluation is recognized. With the response to industry-shock motive, it is argued that mergers occur because firms are prompted to merge to reap the benefits of some common shocks in the industry. This hypothesis predicts that both shareholder value creation and destruction are plausible after the merger, depending on how the market thinks the firm should act on each shock. The agency cost motive suggests that mergers occur because they enhance the acquiring manager's welfare, even if shareholders of the acquirer may suffer. The hubris hypothesis

suggests that acquirers make mistakes in evaluating target firms, and engage in mergers even though there is no synergy or other benefits. Both the agency cost and hubris motives predict firm value destruction after the merger. Finally, the synergy motive argues that mergers occur because there are economic gains from merging the resources of firms and firm value is created as a result.

Conflicting results of the effect of mergers and acquisitions on firm value, based on the post-merger share price performance, have been reported in the literature. Healy et al (1992), Jarrell et al (1988), Andrade et al (2001), and Andrade and Stafford (2004) find the combined share value of the acquirer and target increases after the merger announcement. Mandelker (1974), Lengetieg (1978), Bradley and Jarrell (1988) study the stock returns of acquiring firms and do not find significant abnormal returns after controlling for risk and industry factors. On the other hand, Asquith (1983), Malatesta (1983), Franks, Harris and Titman (1991), and Agrawal, Jaffe and Mandelker (1992) find significant negative returns for acquiring firms after the merger.

It is not uncommon for corporate decisions to have multiple motivations given that firm ownership and control are separated. Since different motives could have conflicting impacts on firm value, it is inevitable to observe the inconsistent empirical findings of post-merger stock returns. The problem is made worse when researchers try to reach a conclusion despite non-comparable methodologies have been used to examine the motives of acquisitions. For example, in arguing for the market timing motive, Shleifer and Vishny (2003), Dong, Hirshleifer, Richardson and Teoh (2006), Rhodes-Kropf and Viswanathan (2004) and Rhodes-Kropf, Robinson and Viswanathan (2005) examine the market-to-book ratio to see how overvaluation drives waves of mergers and decides

means of payment, mode of acquisitions, acquisition premium and post-merger returns. They find that acquirers are more overvalued than targets, and overvalued acquirers prefer to use stock to pay for their acquisitions. In addition, they also find overvalued acquirers are more willing to pay a higher premium for acquisitions and more often experience a negative post-merger return.

In arguing for the response to industry-shock motive, Mitchell and Mulherin (1996), Harford (2005), Andrade and Stafford (2004) and Mulherin and Boone (2000) study aggregate merger and acquisition activity at the industry level and look for clusters of mergers and acquisitions through time and link these clusters with macro shocks of the industry or of the whole economy. They find strong evidence that merger activity clusters through time by industry and that merger activity is driven by macro industry and economic shocks. Finally, in advocating the synergy and agency cost and hubris motives, many studies (for example, see Bradley, Desai and Kim (1988), Maksimovic and Phillips (2001), Malaesta (1983), and Berkovitch and Nayanan (1993)) examine the post-merger share values of the acquirer and target to see whether both parties gain (synergy motive); or the target gains and the acquirer loses (agency cost motive); or if there is ambiguity regarding who gains and who loses (hubris motive).

In view of the multitude of methodologies used in studies of corporate acquisitions, we can approach the conflicting findings of the motives of mergers and acquisitions in two ways. One is to isolate the motives of mergers and acquisitions and examine how investors react to each motive. This solution is however difficult to carry out because the acquirer sometimes does not announce its motive for the acquisition. In addition, even if a motive is announced, there could have been other unannounced

motives hidden behind. This leads us to the second way of handling the problem. The second solution is to use a single methodology that can study the various motives of mergers and acquisitions simultaneously. In this manner, we could more unambiguously identify the motives of acquisitions because the same methodology is used in identifying each motive and conclusions are drawn based on observations of some common parameters. Specifically, in this study, we apply the method of Rhodes-Kropf, Robinson and Viswanathan (2005) (RKRV, henceforth) to decompose the acquirer's market-to-book ratio into three components. We argue that studying the components of the market-to-book ratio not only can verify the market timing motive (as in RKVR) but also can effectively identify other motives that are synergy or agency cost or hubris related. We decompose the M/B ratio into three components: firm-specific mispricing, industry-specific mispricing, and long-run-value-to-book-value. The level and change in each of these three components over long-run event windows after the merger can serve as the ex post evidence of the motivation of the merger. If the firm-specific mispricing reduces after the merger, we argue that market timing was the motive. If the industry-specific mispricing increases after the event, there was an industry shock triggering the decision to merge. If the long-run-value-to-book-value component increases, synergy was the motive for the merger. If long-run-value-to-book-value reduces after the merger, then either agency cost or hubris related motives are accountable for the merger.

We examine a sample of 3,520 domestic merger events in the twenty-year period between 1984 and 2004 obtained from Securities Data Corporation and find very significant evidence that market timing, industry-shock responding, and synergy motives exist simultaneously for some mergers and acquisitions. Among our other important

findings, firstly, our results show that the market learns quickly its mistake of the pre-merger overvaluation of the share value of the acquirer and corrects the mistake quickly after the acquisition announcement. Secondly, our results show that some mergers are related to industry and economy shocks. On average, the market reacts favorably to such mergers and that leads to an increase in the value of the acquirer after the merger. Thirdly, we find the long-run-value to book value decline after mergers. Lastly, post-merger operating performance analysis shows that there are inconsistent improvements on average. A part of the improvement could be due to the relative decline in non-merger firms over the same period. In addition, cash mergers show significant improvements over the one-year window whereas stock mergers have conflicting changes. Finally, we also find evidence that large acquirers and large acquisitions are more associated with market timing and agency/hubris problems.

The contributions of this study to the literature on mergers and acquisitions are in methodology and findings. Regarding methodology, this is the first study that examines components of the market-to-book ratio and uses their changes over time to identify the motives of a merger decision. The long-run study of the M/B components takes into account the time period needed for restructuring and managing merger period turbulences and therefore gives a more precise observation of the motivations and effects of the merger. Regarding findings, this is the first study that considers the possibility that mergers and acquisitions could have different motives simultaneously. In this manner, we address the corporate decision making practice more realistically.

Chapter II of the dissertation includes a review of the literature on motives of mergers and acquisitions and describes the methodology of M/B ratio decomposition.

Chapter III develops the hypotheses. Chapter IV describes the sample and methodology. Results are presented in chapter V and conclusions are in chapter VI.

CHAPTER II

LITERATURE REVIEW

I. Empirical evidence of post-merger performance of acquirer firms

Empirical studies on post-merger performance of acquirers have documented contradictory results of the effect of mergers and acquisitions on firm value.

The group of studies that finds ambiguous evidence of the effect of mergers on firm value starts with the work of Langetieg (1978). In his study, he documents that the post-merger abnormal return of the acquiring firm is not significantly different from that of a control firm in the same industry. Later, Malatesta (1983) studies a sample of 121 mergers from 1969 to 1974 and finds a significant -2.9 percent abnormal return over the twelve month post-merger horizon. There are significant differences between the performance of mergers involving large and small acquiring firms. Acquiring firms with a market value in excess of \$300 million twelve months prior to the merger approval display an insignificant 4.5 percent average abnormal return, while acquirers valued at less than \$300 million display a significant -7.7 percent abnormal return. However, though he does not attribute his finding to market inefficiency, Malatesta does not rule out the possibility that any technique used to determine expected returns perhaps does not adequately capture all relevant risks or changes in risks. In addition, Bradley and Jarrell (1988) do not find significant underperformance in the three years following acquisitions. Using a longer sample period from 1975 to 1984, Franks, Harris and Titman (1991) examine post-merger returns of 399 acquiring firms. Depending on the benchmark used,

they report a range of cumulative abnormal residuals between an insignificant -3.96 percent to a significant +10.44 percent. The calendar-time abnormal return estimates also vary wildly from an insignificant -7.92 percent to a significant +13.22 percent. They also partition the sample based on different firm deal characteristics such as means of payment, relative sizes of the target and bidder, and level of opposition by target managers. Though smaller bidders outperform larger bidders only when inefficient portfolios are used as benchmarks, the difference in abnormal returns of the two groups disappears when efficient control portfolios are used. This finding holds when the sample is partitioned on the basis of relative size rather than raw size. Likewise, the superior performance of cash bidders relative to stock bidders and that of bids opposed by target managers also disappear when efficient benchmarks are used. Therefore, Franks et al fail to find convincing evidence of either negative post-merger returns or differences in post-merger returns between sub-samples formed on the basis of firm or deal characteristics.

Another group of studies finds significant evidence that mergers are value destruction transactions. Asquith (1983) employs a control portfolio approach and finds that for a period of 240 days after the merger, the studied sample of 196 mergers between 1962 and 1976 exhibits a significant -7.2 percent calendar-time abnormal return. Later, Agrawal, Jaffe and Mandelker (1992) study a nearly exhaustive sample of mergers between NYSE acquirers and NYSE/AMEX targets and find that stockholders of acquiring firms suffer a statistically significant loss of 10.26% over the five-year post-merger period, a result robust to various specifications. Their findings suggest that neither firm size effect nor beta estimation problems is the cause of the negative post-merger

returns. Their results also do not seem consistent with the hypothesis that negative post-merger returns are caused by a slow adjustment of the market to the merger.

Evidence of value creation by mergers is also abundant. Extending the review studies of Jensen and Ruback (1983) and Jarrell, Brickley and Netter (1988), Andrade and Stafford (2004) review empirical research on mergers in the three decades from 1973 to 1998 and conclude that mergers create value to shareholders of both target and acquirer firms. However, while the target firm significantly gains in both short- and long-run event windows, the acquirer firm seems to be subsidizing the target's gain and suffers a loss. However, the evidence for value destruction of acquirer firms is not very statistically sound. The average three-day abnormal return for acquirers is -0.7 percent, and over longer event windows, the average acquiring firm abnormal return is -3.8 percent, neither of which is statistically significant at conventional levels. Andrade et al. admit that this insignificant evidence challenges the claim that the acquirer firm's shareholders are losers in mergers. The review work of Andrade, Mitchell and Stafford (2001) is consistent with those presented in earlier reviews by Jensen and Ruback (1983) and Jarrell, Brickley and Netter (1988). In their conclusions, Andrade et al. suggest that one of explanations for the contradictory evidence of acquirer firm's post-merger performance is the existence of various conflicting underlying motivations behind the merger decision. The next part is devoted to review the literature of merger and acquisition motives.

II. Motives of Mergers and Acquisitions

Previous studies on mergers and acquisitions have identified several main motives of mergers and acquisitions including (1) market timing, (2) response to industry shocks, (3) agency cost and hubris, and (4) synergy. The theories behind these motives are based on different sets of assumptions and predict different impacts on post-acquisition performance of the acquirer.

A. Market timing

Shleifer and Vishny (2003) (SV, henceforth) introduced a model of mergers and acquisitions based on stock market misvaluations of both the target and acquiring firms. The basic assumption of the model is that the market is irrational and firms are incorrectly valued. Managers do not act on shareholders value and they take advantage of share value mispricing through merger activity. The SV model explains who acquires whom, the choice of the payment medium, the valuation consequences of mergers and the merger waves.

Dong, Hirshleifer, Richardson and Teoh (2006) test the SV model and gives the model significant empirical support. Dong et al also contrast the Q-hypothesis (Brainard and Tobin 1968) with the SV misvaluation hypothesis and find evidence that the Q-hypothesis is more strongly supported in the pre-1990 period and misvaluation hypothesis is better in the 1990-2000 period. In their study, the two proxies used to measure market misvaluation include the price-to-book value of equity (P/B) ratio and the price to residual income value (P/V) ratio. According to Dong et al., P/V is less controversial because it does not measure misvaluation based on historical cost. PV is a

better measure because residual income value is a forward-looking information given by analysts' forecasts of future earnings. They study a long sample period from 1978 to 2000, covering both the pre-1990 and the 1990-2000 merger waves. Some of their main findings include (1) acquirers are more highly overvalued than targets; (2) more overvalued targets are more often be purchased by equity than by cash; (3) high-valuation acquirers are more likely to use stock rather than cash in acquiring targets and they also tend to pay higher premium especially when stock is the payment method; (4) acquisitions by overvalued acquirers are typically followed by lower post-merger abnormal returns.

Although different from the SV model regarding assumptions, the model of Rhodes-Kropf and Viswanathan (2004) have similar predictions about the effect of market misvaluation on merger waves. In the RKV model, managers of both the target and acquirer firms are rational, however the target lacks information about the value of the equity offered by the acquirer and the value of the merger to the acquirer due to the market's misvaluations of the stocks of the target and acquirer. Market misvaluations in the RKV model have two components – a firm-specific component and a market-wide component. Acquirer firm managers know the stand-alone value of their firms and also the potential value of merging with the target firm. Target firm managers know the stand-alone value of their firms, however, do not know the components of the misvaluation, and therefore find it difficult to assess the offer. Rhodes-Kropf, Robinson and Viswanathan (2005, henceforth RKR) empirically test and find support for the predictions of the RKV and SV models. RKR develop a model that decomposes M/B ratio into two components, market to true value and true value to book value. The first

component measures market misvaluation due to either irrational behavior or information asymmetry that could be firm-specific or industry-wide. The second component measures growth opportunities without being contaminated by the mispricing part. They perform sector-level cross-sectional regressions of firm-level market equities on firm fundamentals each year to derive a time series of the components. RKKV show that the regressions can explain 80% to 94% of the within-sector variation in firm-level market value. They then use the resulting regression coefficients to generate measures of intrinsic values. According to them, “these coefficients have natural interpretations as time-varying valuation multiples and account for variation in the market’s expectations of returns and growth over time and across industries.” Using this breakdown, they come up with main findings. Firstly, they find that acquiring firms are valued significantly higher than targets. Secondly, a large part of the difference in M/B between acquirers and targets is due to differences in firm-specific misvaluation. Roughly 60% of the acquirer’s M/B is attributable to firm-specific misvaluation, while almost none of the target’s M/B is attributable to firm-specific misvaluation. Thirdly, acquirers and targets mostly belong to the sectors with high sector error. Therefore, they seem to share a common misvaluation component. Fourthly, cash targets are undervalued while equity targets are slightly overvalued. Similarly, cash acquirers are less overvalued than equity acquirers. Next, in examining the long-run value-to-book, low M/B firms buy high M/B firms. The long-run value-to-book component of M/B for targets is three to five times higher than that for acquirers. And, misvaluation explains about 15% of acquisition activity at the sector level. Thus, neoclassical factors such as industry productivity shocks also play an important role in explaining merger wave. Finally, they find unambiguous evidence that

misvaluation drives merger waves. During merger waves, highly overvalued bidders account for 65% of the merger activities. RKR, therefore, conclude that “while neoclassical explanations are important for understanding merger activity at the sector level, misvaluation is critical for understanding who buys whom, regardless of whether the merger occurs during a time when productivity shocks could have caused a spike in merger activity.”

B. Response to Industry shocks

Neoclassical theories see mergers as an efficiency-improving response to various industry shocks and predict that mergers increase profitability. An implication of neoclassical theories is that the value of firms will increase if firms positively respond to economic industry shocks by involving in either acquisition or divestiture activities. Mergers have been related to several types of industry shocks in the literature. Coase (1937) identifies technology is a major determinant of firm size, implying that technological change is a motive of mergers and acquisitions. Jarrell, Brickley, and Netter (1988) posit that mergers are motivated by antitrust deregulation, innovations in takeover financing, and improved skills and strategies of implementing merger process. Weston and Chung (1990) observe that takeover activities in 1980s have been high in industries undergoing deregulation, experiencing oil price shocks and otherwise facing structural alterations. Jensen (1993) also specifies that input prices influence merger activity, as shown by the merger activities in the 1980s in response to the energy price volatility in 1970s. Comment and Schwert (1995) argue that relatively broad-based

economic factors, rather than state laws and firm-specific antitakeover amendments, reduced the number of takeovers.

Studying industry-level takeovers and restructuring activities across 51 industries with a sample size of 1064 firms during the 1982-1989 period, Mitchell and Mulherin (1996) find significant differences in both the rate and time-series clustering of these activities. On average, half of the takeovers and restructurings in an industry take place in one-fourth of the sample period. They then link the takeover activity with specific industry economic shocks, including deregulation, energy shocks, foreign competition and financing innovations and find that the link is maintained significantly for all of the shocks, especially those for deregulations and financing innovations. Overall, the study documents evidence that during 1980s most of the takeover activity was driven by broad based fundamental economic factors.

Mulherin and Boone (2000) study the acquisition and divestiture activity of a sample of 1305 firms from 59 industries between 1990 and 1999. They find clustering in both acquisitions and divestitures, which is consistent with the notion that economic change is a source of the activity. Besides, they also study the announcement effects of the two forms of restructuring and find that both acquisitions and divestitures in the 1990s increase the wealth of shareholders. They conclude that the symmetric positive wealth effects for acquisitions and divestitures are consistent with the explanation that synergy is the motive for acquisitions and divestitures and are not consistent with non-synergistic explanations such as entrenchment, empire building, and hubris.

Andrade and Stafford (2004) study merger activities over the period 1970-1994 and find that mergers play a dual economic role. They find firms involved in mergers increase their capital base and respond more to good growth prospects. On the other hand, they also find that firms involved in within-industry mergers are negatively related to the industry capacity utilization during the 1970s and 1980s, which is consistent with the view that mergers are an effective means for industries with excess capacity to rationalize and induce exit.

Harford (2005) examines and compares the two explanations for merger waves, industry shocks and market timing. He studies the industry-level merger waves in 1980s and 1990s and finds support for the neoclassical model with a modification to include a role for capital liquidity. He concludes that economic, regulatory or technological shocks cause industry merger waves. However, shocks propagate a wave only when there is sufficient capital liquidity to accommodate the necessary transactions. This macro-level liquidity component causes industry merger waves to cluster even if industry shocks do not. He also emphasizes that the relation between asset values and merger activity, which suggests that mergers reflects the capital liquidity effect rather than misvaluation effects. Although Harford does not deny evidence that mergers are driven by managers timing the market, he posits that mergers are not the cause of waves. Rather, aggregate merger waves are caused by the clustering of shock-driven industry merger waves, not by attempts to time the market.

C. Agency cost and hubris

Corporate managers are hypothesized to put their personal interests ahead of those of firm owners in the models of agency cost and hubris. Though there are slight differences between the two hypotheses in terms of the behavior of the corporate manager, the two hypotheses are similar in predicting a value destroying effect of mergers. The agency cost hypothesis suggests that corporate managers perform takeovers because they want to enhance their personal welfare by expanding the firm size. Such actions result in agency costs that reduce the total value of the acquiring firm. The hubris hypothesis argues that corporate managers who are motivated by their managerial pride make mistakes in evaluating target firms, and engage in acquisitions even when there is no synergy (Roll 1986). This hypothesis presumes that synergy is zero or even negative, and the merger will result in a redistribution of wealth between the target and acquirer, or a reduction of both parties' values.

Empirical studies on mergers have documented supportive findings for both the agency cost and hubris hypotheses. Dodd (1980) found that the return to the acquirer firm is significantly negative following takeover announcements. Malatesta (1983) finds that mergers are value-creating transactions for target firms but value-destroying transactions for acquiring firms and concludes that takeovers are motivated by agency cost. Moeller, Schlingemann, and Stulz (2004) show that larger firms, which are more likely run by hubris-filled managers, tend to offer higher takeover premium and are more likely to complete a takeover than their smaller counterparts. Hayward and Hambrick (1997) seek for an explanation of the large premium paid for targets in acquisitions. They study a sample of 106 large acquisitions and found that the size of the premium paid is highly

associated with four indicators of CEO hubris including the acquirer's recent performance, recent media praise for the CEO, a measure of the CEO's self-importance, and a composite factor of these 3 variables. On average, the study finds a significant loss in the acquirer's shareholder value following an acquisition, and the greater the CEO hubris and acquisition premium, the greater the shareholders' losses. Berkovitch and Narayanan (1993) use a database of 330 tender offers made during 1963-1988 to distinguish three motives of takeovers, including synergy, agency cost, and hubris motives. It is found that takeovers yield positive total gains in 75 percent of the sample. In a subsample that includes only firms with positive total gains, targets' gains increase with the total gain, indicating that the synergy motive dominates. However, in another subsample that includes only firms with negative total gains, the correlation of targets' gains and the total gain is negative, indicating that the dominating motive is agency cost. There is also evidence that hubris exists in the positive total gain subsample. Berkovitch and Narayanan admit that "while synergy is the reason for the majority of the takeovers, there is strong evidence that many takeovers are motivated by agency and hubris."

D. Synergy

The synergy hypothesis assumes that managers act to increase firm value. This theory posits that firms would engage in acquisitions only if they result in gains to shareholders of the acquirer and target. The theory therefore predicts a positive post-merger performance. In a comprehensive review of the literature on the market for corporate control, Jensen and Ruback (1983) show evidence that corporate takeovers generate positive gains, in which target firm shareholders benefit and bidding firm

shareholders do not lose. Later, Jarrell, Brickley and Netter (1988) confirm the basic conclusions of Jensen and Ruback (1983) and state that “the premiums in takeovers represent real wealth gains and are not simply wealth redistributions (between targets and acquirers).”

Healy, Palepu and Ruback (1992) examine post-acquisition performance of the fifty largest U.S. mergers between 1979 and mid-1984. They find that merged firms experienced significant improvements in asset productivity relative to their industries, leading to higher operating cash flow returns. This performance improvement is particularly strong for firms with highly overlapping businesses. Also, there is a strong positive relation between post-merger increases in operating cash flows and abnormal stock returns at merger announcements, indicating that expectations of economic improvements underlie the equity revaluations of merging firms.

Bradley, Desai and Kim (1988) study a sample of tender offers that occurred in the period from 1963 to 1984 and document a combined value increase for the target and acquiring firms by an average of 7.4 percent. They conclude that “successful tender offers generate synergistic gains and lead to a more efficient allocation of corporate resources” (p.13). Mulherin and Boone (2000) analyze a sample of 281 takeovers from 1990s and find that the positive combined return of the acquirer and target is related directly to the relative size of the takeover. They conclude that the results are consistent with the synergy theory and are inconsistent with models based on management entrenchment, empire building and managerial hubris.

Song and Walkling (2000) find that stock prices of firms in a given industry tend to rise following the announcement of a takeover, presumably in expectation of other takeovers to occur. They posit that mergers become a tool for industries to generate synergies by consolidating and restructuring. Maksimovic and Phillips (2001) show that acquisitions on average result in productive gains for the assets acquired, and that buyers tend to be relatively more productive firms.

E. Research motivations

Existing empirical studies on post-merger performance have documented contradictory findings of the acquirer's performance after the merger. Empirical findings show that the firm value of the acquirer could increase, decrease, or remain the same. There are several questions to be addressed as a result.

Firstly, the market timing theory posits that the acquirer takes advantage of the market's mispricing of its share value by issuing over-valued stocks to acquire the target. Naturally, it leads to a critical question that whether investors will react to the merger by correcting the share value overvaluation after the merger announcement? If they do react negatively, do negative returns after merger announcements documented in the literature represent evidence of a market correction of the overvalued stock and not evidence that mergers are a value-destroying activity?

Secondly, the industry shock-responding theory posits that firms in the same industry would react to common shocks by performing mergers or divestitures to reap benefits of the shocks and increase their firm values. It leads to the question that whether a decision to merge receives support from the market also? If yes, is the increase in share

value persistent over time to reflect the time required to digest a structural change? Vice versa, if the market does not prefer the decision to merge, do we see a reduction in share value even though it is intended to reap some benefits of common industry shocks?

Finally, agency cost and hubris theories posit that managers act against maximizing shareholder wealth either because they want to increase their personal wealth or because they are overconfident. This leads to the question whether investors recognize mergers as a value destruction decision or are confounded by mergers' value-creating potentials in their reactions to merger announcements. Then, can we find evidence for synergy being the motive for mergers?

It is plausible that a decision to merge has more than one motive. The contradictory effects of some of the motives on the acquiring firms' performance offset each other and render it difficult to make conclusive remarks. In addition, the use of incomparable methodologies and different measures add to the problem just mentioned. Hence, it makes sense for us to use a single method that can simultaneously decipher various motives of merger decisions and trace the effect of each motive on the post-event performance of the acquiring firms.

III. Decomposition of M/B ratio

In an effort to explore the misvaluation of share value empirically, RKR (2005) develop a model in which M/B ratio is decomposed into three parts including firm-specific error, time-series sector error and long-run-value-to-book. They argue that if a perfect measure of value exists, that is, if the market can perfectly anticipate future

growth opportunities, discount rates, and cash flows, there would be no pricing error to contaminate M/B ratio, and the long-run-value-to-book should be equal to M/B ratio. According to the RKR method, M/B ratio in logarithmic form can be decomposed into three parts as follows.

$$m - b = (m - v_1) + (v_1 - v_2) + (v_2 - b) \quad (1)$$

where m and b are market and book values of equity in logarithmic forms respectively. The first part, $(m - v_1)$ is the difference between the market value of equity and the firm's fundamental value estimated by industry averages at time t , v_1 . That is, this component measures firm-specific deviations from valuations implied by contemporaneous sector multiples. RKR suggests that this part captures the firm's idiosyncratic misvaluation. The second part, $(v_1 - v_2)$ is the difference between the firm's estimated fundamental value measured by industry averages at time t , v_1 , and the firm's estimated fundamental value measured by long-run industry averages, v_2 . This difference arises when contemporaneous multiples differ from long-run multiples. RKR posits that sectors, or entire market, could be overheated at certain time, and thus that firms in the same sector could share a common misvaluation component. The third part, $(v_2 - b)$, is the difference between firm's estimated fundamental value measured by long-run industry averages, v_2 , and the book value of the firm, b . Industry averages are coefficient parameters of cross-sectional regression of stock value on fundamental factors. RKR suggests that this part captures long-run growth opportunities.

RKR argue that if market is potentially biased in valuing, or if information is asymmetric, then the first two parts capture misvaluation. If the market price deviates

from the true value, then the first two parts will be positive in periods of overvaluation and negative in periods of undervaluation. Of the two parts capturing misvaluation, $(m - v_1)$ captures firm-specific mispricing and $(v_1 - v_2)$ captures mispricing that is shared by all firms in a given sector or market. Using the three break-downs of M/B ratio, RKRV find supportive evidence for the correlated misvaluation theory (RKV 2004) and the irrational stock market theory (SV 2003) which argues that mergers and acquisitions are driven by market misvaluation.

The M/B ratio components of RKRV are empirically capable of tracing the sources of mispricing. Therefore, the method may also help to trace the implicit motives behind mergers and acquisitions.

CHAPTER III

HYPOTHESES DEVELOPMENT

A. Prediction of the market timing hypothesis

In the market timing models of Shleifer and Vishny (2003) and Rhodes-Kropf and Viswanathan (2004), overvaluation of the acquirer's equity leads to incentives to acquire another firm. The incentive to acquire is positively related to the amount of overvaluation. The literature reveals ample evidence that the overvaluation of the acquirer's equity is particularly strong when the acquisition is paid using stock instead of cash. A natural implication of the market timing argument is that the market will correct its overvaluation eventually. We argue that the market will correct its mistake quickly after the merger announcement as investors receive more information about the acquirer. Thus, it is hypothesized that after the merger, investors will recognize that they have overvalued the shares of the acquirer before the event and therefore will correct the mispricing immediately. This leads to the first hypothesis followed

Hypothesis 1: In stock mergers, firm-specific mispricing is corrected after the announcement.

Shleifer and Vishny (2003) suggest that overvalued acquirers prefer to use overvalued stocks to pay for acquisitions. Loughran and Vjih (1997) find that the market does not respond in the same manner to mergers with different methods of payment. They find that acquirers making cash tender offers earn positive long-run abnormal returns, but those making stock acquisitions earn negative long-run abnormal returns. Rau and Vermaelen (1998) find this pattern of returns remains even after controlling for

size and book-to-market ratio. In other words, investors quickly devalue the equity of the acquirer when it is a stock acquisition. These results imply that market timing is more likely related to stock mergers. Therefore, we expect to see a less significant valuation correction after a cash acquisition announcement. The developed hypothesis is

Hypothesis 2: Cash acquirers experience less firm-specific mispricing correction than stock acquirers.

B. Predictions of neoclassical theories

Neoclassical theories argue that industry shocks drive merger activity, which not only leads to waves of mergers (Weston and Chung (1990), Jensen (1993), Mitchell and Mulherin (1996)), but also to waves of divestitures (Coase (1937), Mulherin and Boone (2000)). Typically, a firm responds to shocks such as structural or regulatory changes in the industry by engaging in mergers and acquisitions in order to better reposition itself among the competitors. A general assumption is that the firm's response is value-increasing. Thus, an implication of neoclassical theories is that the shareholder value of the acquiring firm will increase after the acquisition. Therefore, the hypothesis is

Hypothesis 3: Given industry shocks or aggregate shocks proposing merger and acquisition, industry-specific mispricing increases after the merger and acquisition announcement.

C. Predictions of the synergy, agency cost and hubris theories

Synergy theory assumes that managers act to maximize shareholder value and therefore posits that firms would engage in acquisitions only if they result in gains to

shareholders of both sides (Bradley, Desai and Kim 1988, Jensen and Ruback 1983 Jarrell, Brickley and Netter 1988, Song and Walking 2000). Therefore, the developed hypothesis is

Hypothesis 4: Long-run-value of equity for the acquiring firm increases after the acquisition announcement.

Agency cost theories predicts a destruction of share value after the merger event because corporate managers act to increase their own welfare at the expense of shareholders (Malatesta 1983, Walkling and Long 1984, Lewellen, Loderer and Rosenfeld, 1985). Despite incentives can be used to align managers' interests with those of shareholders, Morck, Shleifer, and Vishny (1988) show that agency costs persist when managerial ownership is between 5% and 20% of the total shares outstanding. Thus, agency costs are considerable in the corporate arena. On the other hand, the hubris theory posits that mergers do not create value and that the merger decision results from acquirer managers' mistakes in estimating gains (Roll 1986). Thus, the agency cost and hubris theories and the synergy theory predict contradictory effects on the long-run-value-to-book. Therefore, a rejection of hypothesis 4 is an evidence for supporting the agency cost /hubris theory. If the long-run value of equity of the acquirer decreases after the merger, the agency cost/hubris theory is supported.

CHAPTER IV

SAMPLE AND METHODOLOGY

I. The sample

Completed merger and acquisition deals involving publicly traded US acquirers and targets with deal values larger than \$10 million are collected from the Thomson Financial Mergers and Acquisitions database for the period 1984 to 2004. This yields a sample of 7,199 acquisitions with information on announcement date, effective date, method of payment, deal value, and proportion of acquirer's ex post ownership. Stock price data for all the NYSE/AMEX/Nasdaq US firms are collected from the Center for Research in Securities Prices (CRSP) database. Relevant financial variables are collected from the Compustat data files, including 4-digit SIC codes, fiscal year-end dates and accounting data.

We use the method suggested by RKR (2005) in merging data from the three sources. First, for calculating M/B ratio, we match fiscal year-end data from Compustat with CRSP market values occurring three months afterward. This method takes into account the fact that firms have different fiscal year end dates and ensure that the price data reflects the corresponding year's accounting information. Then, we associate this CRSP/Compustat data with a merger announcement. The annual market-to-book ratios before and after a merger announcement are compared to examine the change of market valuation in the long run and verify ex post the motives of the merger. This approach of merging the three sets of data gives us a final sample of 3,520 completed merger events involving 1,973 acquiring firms.

Table 1 reports the frequency distribution of the sampled mergers by year and payment method over our sample period. Our acquisition sample covers the merger waves between 1985 and 1989 and between 1994 and 2004. Of the 3520 events, 26.7 percent are stock acquisitions, 40.39 percent are cash offers, and 32.90 percent are other payment method acquisitions. Cash is the dominant payment method for acquisitions before 1990, stock is used more often after 1990. Stock acquisitions in 1990s double that in 1980s. Mean deal value in 1990s almost doubles that in 1980s while the median deal values of these two periods are comparable.

<Table 1 is about here>

Applying the methodology of RKR, we group firms into 12 industries based on the 12-industry classifications recommended by Fama and French. Market value of a firm is the CRSP market equity plus Compustat book assets (item 6) minus deferred taxes (item 74) minus book equity (item 60). We also obtain the following size-related measures: Total Plant, Property and Equipment (item 8), Total Cash (item 1), Long-term debt (item 9), Capital Expenditures (item 128), and Net Income (item 172). Return on Assets and Equity are calculated by dividing net income in year t by assets (item 6) or book equity (item 60) in year $t-1$. For leverage measures, we obtain the Current Ratio (items 4/5), Quick Ratio [items (4-3)/5], Market Leverage (1-market equity/market value of firm), and Book Leverage (1-book equity/total book assets).

<Table 2 is about here>

For comparison purpose, Table 2 reports selected firm characteristics of acquirers and those not involved in mergers. Outliers are deleted from the sample. Observations are

required to have positive book value of equity, ROA and ROE greater than -200% and -2000% respectively, M/B ratio below 100 and market equity larger than \$10 million. Statistics for non-mergers are aggregate average for the whole period from 1985 to 2004. For the acquirer sample, statistics reported are for the year before the event. On average, acquiring firms have higher book and market values of assets and equity. Acquirers also have higher investments in plants, property and equipments. They have higher capital expenditures, more long-term debt and higher net incomes. Acquiring firms also report higher ROA, ROE and M/B ratios. Overall, acquiring firms perform better than non-mergers. These firm characteristics resemble those found by RKR.V.

II. Methodology of decomposing the market to book ratio

We follow RKR.V (2005) in decomposing the market-to-book ratio, in which the market-to-book ratio is decomposed into three components, expressed in logarithmic form as follows.

$$m - b = (m - v_1) + (v_1 - v_2) + (v_2 - b) \quad (1)$$

m and b are market and book values of equity in logarithmic forms respectively. The first component, $(m - v_1)$ is the difference between the market value of equity and the firm's fundamental value estimated by industry averages at time t . The second component, $(v_1 - v_2)$ is the difference between the firm's estimated fundamental value measured by industry averages at time t and the firm's estimated fundamental value measured by long-run industry averages. The third component $(v_2 - b)$ is the difference between firm's estimated fundamental value measured by long-run industry averages and the book value

of the firm. Industry averages are coefficient parameters of cross-sectional regression of stock value on fundamental factors.

In RKRIV, three regression models for estimating market value from fundamental factors are used. In this study, we apply the third model which, according to RKRIV, is the most comprehensive and effective in estimating market equity.

$$m_{it} = \alpha_{0jt} + \alpha_{1jt}b_{it} + \alpha_{2jt}ni_{it} + \alpha_{3jt}I_{(<0)}(ni)_{it} + \alpha_{4jt}Lev_{it} + \varepsilon_i \quad (2)$$

where m_{it} is the logarithm of market value of stock i at time t . b_{it} is the logarithm of book value of equity of firm i at time t . ni_{it} is the logarithm of net income of firm i at time t . $I_{(<0)}$ is a dummy variable, taking value of one for negative-net-income firms and of zero for other firms. Lev_{it} is the market leverage ratio of firm i at time t . ε_i is regression residual. The estimated fundamental values are then applied to calculate the three components of market-to-book ratio.

$$m_{it} - b_{it} = [m_{it} - v(\theta_{it}; \alpha_{jt})] + [v(\theta_{it}; \alpha_{jt}) - v(\theta_{it}; \alpha_j)] + [v(\theta_{it}; \alpha_j) - b_{it}] \quad (3)$$

m_{it} and b_{it} are logarithms of market value and book value of equity of firm i at time t , respectively. On the right-hand side of equation (3), the first component is the difference between market value, m_{it} , and the firm's fundamental value which is estimated by industry multiples and the firm's fundamentals (α_{jt} and θ_{it}) at time t . This component measures firm-specific mispricing due to short-run over- or under- valuation when the firm is hot or cold relative to the industry. The second component is the difference between a firm's fundamental value estimated by time- t industry multiples and firm

fundamentals (α_{jt} and θ_{it}) and the fundamental value estimated by long-run industry multiples and firm fundamentals (α_j and θ_{it}) at time t . This component measures industry-specific mispricing due to short-run over- or under- valuation when the industry at time t is hot or cold relative to the industry's long-term fundamentals. The third component, $v(\theta_{it}; \alpha_j) - b_i$, is the difference between a firm's fundamental value estimated by long-run industry multiples and firm fundamentals (α_j and θ_{it}) and the book value of equity, b_i . This component measures the long-run value of the firm. A change in the value of third component implies long-run value creation or destruction of the merger. To decipher motives of mergers, we examine changes in the three components' corrections over one-, two- and three-year windows after the merger. The corrections of the three components are formulated as follows.

$$\text{Firm-specific mispricing correction} = [m_{i(t+a)} - v(\theta_{i(t+a)}; \alpha_{j(t+a)})] - [m_{it} - v(\theta_{it}; \alpha_{jt})]$$

$$\text{Industry-specific mispricing correction} = [v(\theta_{i(t+a)}; \alpha_{j(t+a)}) - v(\theta_{i(t+a)}; \alpha_j)] - [v(\theta_{it}; \alpha_{jt}) - v(\theta_{it}; \alpha_j)]$$

$$\text{Long-run value creation/destruction} = [v(\theta_{i(t+a)}; \alpha_j) - b_{i(t+a)}] - [v(\theta_{it}; \alpha_j) - b_{it}]$$

In the equations, subscript t denotes market value day of equity before merger events, $(t+a)$ denotes market value days of one, two and three years after merger events, with a taking values of 1, 2 and 3, respectively.

If the firm-specific mispricing correction is negative, the market timing hypothesis is supported because the negative change implies that the firm-specific mispricing is corrected when investors understand the acquirer was too hot relative to the

industry before the event. If industry-specific mispricing correction is positive, the industry-shock response hypothesis is supported. That is, the market now believes that the acquirer was too cold relative to the industry and that the merger would reap the benefit of industry shocks such as deregulation or technology advancements. If the long-run value is positive, long-run fundamental value is created by synergy effects of the merger. The synergy hypothesis is thus supported and agency and hubris hypotheses are rejected.

CHAPTER V

RESULTS

Statistics of M/B ratio and its logarithmic form of acquirers one year before and up to three years after the merger are reported in Table 3. Firms that are involved in more than one merger in the sample period are grouped together as active acquirers. On average, M/B ratio of all acquirers decreases gradually from 4.01 before the merger to 3.59 over the one, two, and three years intervals after the merger. In logarithm form, $(\log M - \log B)$, or $(m-b)$, slightly reduces after the merger. All the t-statistics are significant for one-time acquirers and active acquirers. These results generally suggest that mergers destroy shareholder value in the long run.

<Table 3 is about here.>

We run regression (2) for each of the 12-industry classification groups and report results in Table 4. The average R-square is 84% and most of the coefficient parameters are significant at 1% except for the coefficient of negative net income. The signs of the coefficients are in general consistent with market valuation rationales. That is, the regression loadings show that the market value of equity increases with the book value of equity, net income and reduces with negative net income and market leverage. The results show that the regression coefficients are reliable for forecasting the market value of equity.

<Table 4 is about here>

We then use the coefficients from regression (2) to estimate market values of equity of the acquirer based on short-run and long-run industry averages. After that, we

decompose the market-to-book ratio into three components: $m_{it} - v(\theta_{it}; \alpha_{jt})$, firm-specific mispricing; $v(\theta_{it}; \alpha_{jt}) - v(\theta_{it}; \alpha_j)$, time-series industry mispricing; and $v(\theta_{it}; \alpha_j) - b_{it}$, long-run-value to book-value. Corrections of these three components one, two, and three years after mergers are reported in Table 5. Panel A reports the market correction over the three event windows for the whole merger sample. Panel B compares the magnitude of market corrections between acquirers and non-merger firms. For the sample of non-merger firms, firm-specific mispricing, industry-specific mispricing and long-run-value to book are computed for each calendar year. Changes in the three components over the three windows are compared on a yearly basis with the sample of acquiring firms. In Panels C to H of Table 5, changes in the three components of M/B ratio are reported with the sample of acquirers grouped according to the frequency of merger, method of payment, proportion of shares acquired, M/B ratio, market value of acquirers, and industry sectors.

<Table 5 is about here>

I. Evidence of the market timing motive

For the entire sample of acquirers, the firm-specific mispricing significantly and consistently reduces in one, two, and three years after the event. Specifically, in Panel A. of Table 5, the firm-specific mispricing reduces by 0.058 in one year, 0.160 in two years, and 0.172 in three years after the merger. Panel B shows that corrections of the firm-specific mispricing of acquirers are significantly larger than those of non-merged firms over the three-year interval after mergers. On average, the correction of the firm-specific

mispricing is 0.038 larger than that of the non-merged firms in one year, 0.141 in two years, and 0.134 in three years. This result strongly supports Hypothesis 1 that market timing is a motive for acquisitions. The result is consistent with the implication that when the market recognizes it has overvalued the acquirer's share value, it corrects the mistake that has raised the value of the acquirer too much relative to the industry short-run averages. In untabulated results, we tested Hypothesis 1 by excluding finance and utility industries and found similar results with a sample of 2,339 events.

As reported in Panel C of Table 5, we can see that the firm-specific mispricing of one-time acquirers reduces by 0.111 in one year, 0.166 in two years, and 0.224 in three years after the event and all are significant at the 1% level. For the active-acquirer group, firm-specific error reduces by 0.040 in one year, 0.158 in two years, and 0.155 in three years after the event. The difference between these two groups is not statistically significant.

In testing Hypothesis 2 to see if cash and stock payers experience similar reductions of firm-specific error, we split the sample of acquirers into three groups based on the method of payment: cash, stock, and other-method payers. The other-method payers include those using mixed and unknown payment methods. The results are reported in Panel D of Table 5. The results show that stock payers experience significant reductions of the first component in all the three event-windows after mergers, while cash payers experience a reduction of firm-specific mispricing significantly only in the first two years. The magnitude of changes in the firm-specific mispricing for stock payers ranges from -0.070 to -0.473, and is much larger than that for the cash payer sample, which ranges from -0.039 to -0.046. The difference between the stock and cash payers is

significant at the 1% level. This result shows a strong support for Hypothesis 2 that cash payers experience much less error correction than stock payers. The result implies that market timing motive is less dominant in cash acquisitions, and that the market recognizes such implication and does not impose a large value correction because the stock value of the cash payer is not as overvalued as that of the stock payer before the merger.

To further confirm the market timing hypothesis, we divide the sample into five quintiles based on the market-to-book ratio and compare the corrections of firm-specific mispricing between quintile one (value stocks) and quintile 5 (glamour stocks). Results are reported in Panel F of Table 5. The results show that firm-specific mispricing corrections are significantly larger for glamour firms than value firms. Corrections of glamour acquirers' firm-specific mispricing are 0.374, 0.366, and 0.438 more than those of value acquirers over the three-year interval after mergers. The differences are all significant at the 1% level.

We also divide the sample into five quintiles based on the market value of the acquirer and report the results in Panel G of Table 5. We find that large firms experience larger firm-specific mispricing corrections than small firms. However, the difference between the large and small firms quintiles is insignificant in year one. The results imply that the market believes that the pre-event overvaluation is more serious for glamour or large firms and therefore correct more strongly accordingly. Overall, the empirical results on firm-specific mispricing correction strongly suggest that acquirers' stocks are overvalued before mergers and that market timing is a likely motive of merger decision.

II. Evidence of the response to industry-shock motive

In searching for evidence of the industry-shock responding motive, we look at the correction of the industry-specific mispricing. In Panel A of Table 5, for the whole sample, industry-specific mispricing increases after the event and are significant at the 1% level over the two and three years windows, but is insignificant one year after mergers. Specifically, industry-specific mispricing increases by 0.012, 0.050 and 0.080 in one, two and three years after mergers. It indicates that the market likes the merger and believes the acquisition is a good response to the industry shocks in the period between 1985 and 2004. Nevertheless, in Panel B of Table 5, when compared with the non-merged firms' industry-specific mispricing corrections, the corrections of acquirers are not significantly different from those of the non-merged firms. Also, the signs of differences are not consistent. This implies that industry-wide overheating is found across firms in all industries between 1985 and 2004, and not only particularly for the merged firms.

The increase of industry-specific mispricing is consistently found in various sub-category analyses such as those sorted by the frequency of mergers (Panel C), by the method of payments (Panel D), by the proportion of acquired shares (Panel E), by M/B ratio (Panel F), and by the acquirer's market value of equity (Panel G). This indicates that the market likes the mergers and therefore heightens the industry-specific mispricing accordingly.

We then check for corrections of industry-specific mispricing across industries and report the results in Panel H of Table 5. About one third of the industries show that

industry-specific mispricing significantly increases after mergers, especially in the business equipment, finance, chemicals and consumer non-durables industries. This is consistent with the observations of other researchers that mergers take place in industries experiencing input price and deregulation shocks (Mulherin and Boone, 2000). The business equipment, finance, chemicals and consumer non-durables industries had considerable amounts of price and regulatory shocks over the sample period, and mergers in these industries account for 30 to 57 percent of the aggregate merger and acquisition activities. Acquirers in the energy industry, however, experience a decline in industry-specific mispricing. This suggests that the mergers are not expected in the energy industry. This again resembles the documented evidence by Mulherin and Boone (2000) which shows that energy industries, including natural gas, electric utility, and petroleum contribute only from 17 to 27 percent of the aggregate merger activity. Generally, the results suggest that mergers and acquisitions are valued by the market. For other industries, most of the increases in industry-specific mispricing are not statistically significant. The analysis of industry-specific mispricing correction suggests that industry-responding motive might be a motive for merger and acquisition.

III. Synergy, agency cost, or hubris?

A. Long-run value to book value

In Panel A of Table 5, the results show that the long-run value-to-book component insignificantly increases by 0.009 in one year, significantly reduces by -0.019 in two years at the 10% level, and significantly reduces by -0.081 in three years after mergers at the 1% level. However, when compared to non-merger firms, the long-run

value-to-book of acquirers is significantly higher in the one- and two-year windows and insignificantly lower in the three-year window. In the one-year and two-year windows, long-run values of acquirers are 0.027 and 0.028 higher than those of non-merged firms at the 1% and 5% level. In the three-year window, the long-run value-to-book of acquirers is slightly and insignificantly lower than non-merged firms by -0.012. This evidence shows that while the long-run value of the acquirer falls after mergers, it falls relatively less than non-merged firms. This implies that mergers improve long-run value of acquiring firms relative to non-merged companies and this observation supports Hypothesis 4. The result is consistent with the predictions of the SV model that mergers (even if overvalued) made by overvalued acquirers are better than doing nothing. To provide more evidence of relative improvements of acquirers, we compare the annual long-run value-to-book of acquirers and non-merged firms. Results are reported in Appendix A, Panel A.3. Results show that 53 percent of the long-run value-to-book of acquirers is higher than the long-run value-to-book of non-merged firms.

To examine the factors that could negatively affect long-run value of acquirers, we split the sample into two sub-samples, one-time and active acquirers. The results in Panel C of table 5 show that both one-time and active acquirers insignificantly gain long-run value in one year, but lose in two and three years. In comparison, active acquirers lose long-run-value relatively less than one-time acquirers. In general, the results show that mergers and acquisitions are more likely a value-destroying decision than a value-creating activity for one-time acquirers. Panel D of Table 5 shows that stock payers experience significantly larger decreases of long-run value than cash payers. In one, two and three years after the event, stock payers lose 0.026, 0.084, and 0.153 of the long-run

value to book value, while cash payers gain 0.021 in one year and lose only 0.007 and 0.076 of the long-run value in two and three years after mergers. These results show that acquirers choose to pay stock for value-destroying acquisitions and cash for value-creating acquisitions, which implies that acquirers can foresee the effect of their acquisitions on the long-run values of their shares. When acquirers can foresee the negative outcome of stock acquisitions and choose to proceed with them, it is conceivable that stock acquisition is driven by market timing.

To investigate the effect of the size of acquisition on the reduction of long-run value, we split the sample based on the proportion of shares acquired. Of the whole sample of 3520 mergers, 869 mergers, or about 25 percent, involve acquisitions of less than 10% of the target's shares; 675 mergers, or about 20 percent, involve acquisitions of more than 10% and less than 100% of the target's shares; and 1976 mergers, or about 55 percent of the whole sample, involve acquisitions of 100% of the target. Thus, we divide our sample into three groups based on the size of the acquisition, less than 10%, more than 10% but less than 100%, and 100%. Results are reported in Panel G of Table 5. All the three groups experience insignificant changes that are similar in size in the first two event windows. However, the change in the 3-year window is significantly negative for the two later groups, that is, the group acquiring more than 10% but less than 100% of targets and the group acquiring 100% of targets. The 100%-acquisition group has a decline of -0.124 that is twice as large as that of the 10%-to-less-than-100%-acquisition group -0.078. The fact that acquirers taking 100% share-acquisition are more aggressive than those taking partial acquisition implies that these aggressive acquirers involve more in empire building. The result is consistent with implications that mergers that are more

driven by empire building reduce long-term value of the firm more significantly. Also, firm-specific mispricing correction is largest for the 100%-acquisition group, which implies that for this group of acquirers, the manager uses overvalued equity to pursue acquisitions that are driven by managerial self-interest or hubris.

We also look at the effect on long-run value of glamour and value acquirers. Results are reported in Panel F of Table 5. Value acquirers experience a significant reduction of long-run value over the three event windows. The declines are -0.053 in one year, -0.218 in two years, and -0.167 in three years. Glamour acquirers significantly gain in long-run value in one and two years after mergers by 0.056 and 0.081 and lose in the three years window. That is, glamour acquirers outperform value acquirers in raising the long-run value through merger mechanism. Long-run values of glamour acquirers are significantly higher than those of value acquirers by 0.110, 0.299 and 0.118 over the three event windows. Combined with the analysis of firm-specific mispricing correction for glamour acquirers, which shows that market-timing motive is the dominant motive for glamour stocks, we posit that for glamour acquirers the motive of mergers is growth through acquisitions funded with overvalued stocks.

B. Long-run profitability and sales growth

Next, we investigate effects of mergers and acquisitions on operating performance. Table 6 reports accounting performance of the combined firm before and after the event. We apply the method of Healy, Palepu, and Ruback (1992) in computing the accounting performance of the “combined” firm before and after merger events. The before-merger performance is computed as the market value-weighted average of the

target and acquirer. The weight of target is the value of the acquisition deal divided by deal value plus total market value of the acquiring firm. The post-merger performance of the combined firm is the performance of the acquiring firm solely because it is the merged firm. We use five measures of accounting performance: return on total assets, cash-flow returns on assets, returns on cash-adjusted assets, returns on sales, and sales growth. The first four ratios measure profitability, and sales growth measures growth opportunities.

<Table 6 is about here.>

In Panel A of Table 6, performance one-year before and after the merger is reported. There is evidence of significant improvements in profitability after mergers. Regarding the median changes for the whole sample, return on assets is 0.74% higher, cash-flow return on assets is 0.96% higher, return on cash adjusted assets is 0.89% higher, return on sales is 0.60% higher, but sales growth is 1.62% lower. Similar results are found when the acquirers are divided into stock or cash payers. To control for industry contemporaneous trends, beside the raw operating performance we also compute industry-adjusted performance and report in Panel B. The industry-adjusted performances are the differences between values for the merged firms and those of the median non-merged firm in the same 2-digit SIC code. Similar and consistent with the results of Panel A, merged firms experience improvements in return on assets, cash-flow return on assets, return on sales increase, and return on sales of 1.13%, 1.27%, 1.31%, and 0.73% respectively. Sales growth, as in Panel A, declines significantly by 1.98%. The industry-adjusted performance measures are better than the non-industry-adjusted measures, implying that the performances of the non-merged firms in the industry become worse off

over the same period. This result is similar to those reported by Andrade, Mitchell and Stafford (2001) and Healy, Palepu and Ruback (1992) that the cash flows of the non-merged firms in the same industry of the merged companies fall remarkably over the same period. Thus, post-merger operating performance improves relative to the industry, despite the evidence suggests that part of the improvement could be due to the weaker industry performance.

Regarding the effect of payment method on operating performance, we create sub-samples of mergers based on the payment method. In Panel A of Table 6, the results show that stock payers have less positive improvements in non-industry-adjusted accounting performances than cash payers regarding the first four measures in terms of the median value, but stock payers have a smaller decline than cash payers in sales growth. In fact, the mean values of various performance measures of the stock mergers do not show any significant improvement at all. Similar and consistent results are found for industry-adjusted performance.

In sum, the operating performance of the combined firms improves after the merger. However, a part of the improvement could be due to the weaker industry performance, as suggested by Andrade, Mitchell and Stafford (2001) and Healy, Palepu and Ruback (1992). In addition, the weak or lack of performance improvements of stock mergers relative to cash mergers suggest that the motive of stock mergers may not be synergy related.

C. Market Reactions and Motives of mergers and acquisitions

To see if the market is aware of the various motives of mergers and acquisitions, we examine the market reactions to merger announcements. We sort the whole sample into groups based on the type of misvaluation correction over the year (0,1) window. Based on the three M/B ratio correction components, this grouping method creates eight mutually exclusive groups. ***The first group*** includes mergers that have firm-specific mispricing corrections only. ***The second group*** includes mergers that have industry-specific mispricing corrections only. ***The third group*** includes mergers that have long-run value-to-book corrections only. ***The fourth group*** includes mergers that have both firm-specific mispricing and industry-specific mispricing corrections. ***The fifth group*** includes mergers that have firm-specific mispricing and long-run value-to-book corrections. ***The sixth group*** includes mergers that have both industry-specific mispricing and long-run value-to-book corrections. ***The seventh group*** includes mergers that have all three types of mispricing corrections. Finally, ***the eighth group*** includes mergers that do not have any of the three corrections. That is, observations included in the eighth group are those that do not show corrections for motives of market-timing, industry-response, agency cost, and hubris.

The sorting based on the one-year window gives us some interesting results in Panel A of Table 7. Of the 3520 mergers examined, 377 (10.7%) experience only a firm-specific misvaluation correction; 113 (3.2%) experience only an industry-specific mispricing correction; and 278 (7.9%) experience only a long-run value-to-book correction. If we include mergers that have more than one type of mispricing corrections, 2576 (73%) acquirers have motives that are related to firm-specific mispricing; 762

(21.6%) mergers have motives that are related to responses to industrial shocks; 2090 mergers (59.2%) have motives that are related to long-run value-to-book mispricing. In short, market-timing appears to be the most important motive behind mergers and acquisitions. This observation is consistent with RKVR and SV that merger waves occur when common shares of acquirers are overvalued. Agency cost or hubris related motives are the second most important in driving merger activity. That is, the mispricing by the market provides managers of acquirers an opportunity to use shares that are overvalued to help promote personal interests. This is consistent with the evidence reported in Panel D of Table 5 that stock payers suffer firm-specific mispricing and long-run value-to-book corrections that are significantly larger than those of cash payers. In addition, results in all the other panels of Table 5 show that firm-specific mispricing corrections are in general significantly negative over the three event windows whereas long-run value-to-book mispricing corrections are insignificant or significantly negative. In short, the market is aware of the motives behind these mergers and reacts negatively. Mergers with motives that are related to market-timing and agency cost/hubris are value-destroying events on average. On the other hand, the results also show that response to industrial shocks is not a major motive (only 3.2%) for mergers. However, from Panels A through G of Table 5, we can easily see that mergers involving this motive elicit positive responses from the market regardless of the frequency, method of payment, fraction of the target acquired, and M/B ratio of the acquirer. These mergers are value-creating events as the market considers such responses to industry shocks as appropriate. Thus, we have just unambiguously shown that mergers could either create or destroy firm value. We have done so using a single methodology and uses parameters that are comparable.

To get further support regarding the value-creating or value-destroying impacts of mergers, the rest of Panel A of Table 7 reports changes in industry-adjusted operating performance over the one-year window by the type of mispricing correction.

Results in Panel A of Table 7 show that mergers with decrease in firm-specific mispricing, group 1, improve operating performance after the event, all of the four profitability measures improve at the 5% significance level. Mean (median) of return on assets, cash flow return on asset, return on cash adjusted assets, and return on sales increase by 2.35% (1.94%), 2.38% (1.90%), 2.64% (2.04%), and 2.77% (1.35%) respectively. The firms in this group suffer a decline in firm-specific mispricing even though their operating performance improves after the merger. This result implies that the market strongly believes that mergers are driven by overvaluation of stock, so the market corrects for the mispricing despite the merger itself improves the performance of the combined firms. Group 2 mergers also experience increases in all the four profitability measures though return on assets increase insignificantly. The positive industry-specific mispricing correction implies that the market is in favor of the mergers as a response to industry shocks that successfully improve operating performance after merger events. For firms in Group 3, mergers do not lead to improvements in operating performance. Except the median of change in cash flow ROA, all the other measures have insignificant changes. That is, mergers that are driven by motives of agency cost and hubris are likely to suffer in operating performance as well. For mergers that have market-timing and industry response motives, Group 4, the operating performance improvement is less consistent given that all the mean values of the changes are all insignificant. Mergers that are related to agency or hubris problems, Groups 5, 6, and 7, in general report

insignificant changes in all the operating performance measures or significant changes in only a few of the measures. Some changes are negative. In sum, when a merger is associated with motives related to agency problems or hubris, the acquirer suffers a decline in operating performance after the event. Improvements in operating performance are likely to occur only when mergers are related to market-timing or industry shocks.

D. Cumulative returns and market reactions

In Panels B and C of Table 7 we report results of regressing cumulative abnormal returns [CAR(0,1) and CAR(-1,1)] of merger announcements on variables commonly used to represent motives of acquisitions. The market model is used to estimate stock abnormal returns.

$$R_{i,t} = \alpha_i + R_{f,t} + \beta_i(R_{m,t} - R_{f,t})$$

$R_{i,t}$ is stock i return at time t . $R_{f,t}$ and $R_{m,t}$ are risk-free return and market return, respectively, at time t . Cumulative abnormal returns and buy-and-hold abnormal returns are estimated as follows.

$$CAR_{i,t_1,t_2} = \sum_{t_1}^{t_2} (R_{i,t} - \hat{R}_{i,t})$$

The regression model is:

$$CAR[0,1] = \alpha + \beta_1 STOCK + \beta_2 CASH + \beta_3 ROA01 + \beta_4 ROA03 + \beta_5 ADJACASH + \beta_6 ADJACASH * LOWM / B + \beta_7 AVESG + \beta_8 LOGTA + \beta_9 BLEV$$

where STOCK is the method of payment dummy variable, taking a value of 1 if the payment is in stock and 0 otherwise. CASH is cash payment dummy variable, taking value of 1 if payment is in cash and 0 otherwise. Both STOCK and CASH dummies have a value of 0 if the payment is other methods. These two variables are for diagnosing the market timing motive. Negative coefficient on STOCK and positive coefficient on CASH provide evidence that market timing is a motive for mergers and acquisitions. We use one-year and three-year change of return on assets after merger events, ROA01 and ROA03, to diagnose industry-response and synergy motives. Signaling theories posit that stock return should positively correlate with future improvement in profitability if market expects an improvement in profitability. Therefore, positive coefficients on ROA01 and ROA03 provide evidence for industry-shock response and synergy motives. ADJACASH is cash and short-term investments scaled by total assets. LOWM/B is a low-valuation dummy variable taking a value of 1 if the acquirer's M/B ratio is less than 1 and of 0 otherwise. These two variables are for diagnosing the agency cost/hubris motive. Agency cost /hubris hypothesis argues that firms with low growth opportunities (low M/B) are more likely to spend their cash on non value-increasing projects. Therefore, negative coefficients of ADJACASH and ADJACASH* LOWM/B imply that investors dislike mergers that are associated with agency cost/hubris problems. AVESG is the three-year average of sales growth of the acquirer before the merger. A positive coefficient on

AVESG implies that the market supports firms with high growth potential to grow through making mergers and acquisitions. LOGTA is logarithmic total assets of acquirers in the year before the merger. BLEV is book leverage of acquirers in the year before mergers. These two variables enter the regression to control for size and financial leverage. Though not reported, in the regressions we also include industry and year dummy variables to control for industry and calendar year effects. R-square is reported on the last row.

The regression for the whole sample shows evidence for market timing, synergy, and industry-shock responding motive. STOCK has significant negative coefficient and CASH has significant positive coefficient at 1% level, which strongly supports Hypothesis 1 that merger is driven by market timing. ROA01 is positive and significant at 1%, implying that the market expects the operating performance will improve soon after the merger. This supports Hypothesis 3 and 4 that firms merge to respond to industry shocks and to improve operating performance from synergy of the combined target and acquirer. ADJCASH has a positive coefficient and ADJCASH*LOWM/B has a negative coefficient though they are not significant. This evidence suggests that for the whole sample, the market does not consider the mergers are driven by self interest on average. AVESG has an insignificant positive coefficient, which suggests that market is not very much interested in the benefit of achieving growth through merger mechanism.

Comparing the regression results of groups 1, 2 and 3, we see that market timing effect is strongest for group 1 with expected signs for STOCK and CASH coefficients. Group 1 has STOCK with significant negative coefficient at 1% level and CASH with insignificant positive coefficient. This means that market timing is most likely associated

with firms that experience firm-specific mispricing correction. The coefficients of ROA01 and ROA03 of the three groups show that the market expects an improved long-run performance for group-1 mergers and a poor long-run operating performance for group-3 mergers. For group 1, ROA03 is positive at 1% level, which confirms the analysis of operating performance for group 1 that market strongly believes that mergers are driven by overvaluation of stock, so it corrects for mispricing even though it at the same time expects synergy. For group 3, ROA03 is negative at 5% level, which indicates that the market expects poor long-run performance for low-growth firms. The coefficients for ADJCASH and ADJCASH*LOWM/B, however, are internally contradictory. These two variables have unexpected signs and also are insignificant for group 2 and 3. The two variables however are significant at 1% level but have opposite signs. The noisy results indicate that there may be an unobserved endogeneity in the model; it renders our observation of the agency problem as a motive of mergers inconclusive.

CHAPTER VI

CONCLUSIONS

In general, we find supports for all of our hypotheses that market timing, industry-shock responding, and synergy are the motives of acquisitions. Firstly, we find a significant reduction of firm-specific mispricing after merger events, an evidence for the market timing motive. Secondly, we find that industry-specific mispricing increases after the merger, an evidence that the market supports merger activity as an appropriate response to industry shocks. Thirdly, we find that long-run-value-to-book of acquiring firms declines but by a smaller amount than that of non-merged firms. We, therefore, attribute this long-run-value destruction to broad market corrections across all firms and not to agency/hubris problem. Accounting performance analysis shows that mergers and acquisitions lead to improved operating performance, which may be interpreted as an evidence that synergy is involved. Among the three motives, market timing is the most dominant. Market timing motive is so strong that it dilutes away the synergy effect of mergers and acquisitions. We conclude that merger and acquisition decisions are possibly value-creating but at the same time are overwhelmingly driven by market overvaluation. These simultaneous effects of various motives explain for documented evidence that mergers seems to be value-destroying decision. More specifically, we found that large acquiring firms and large share acquisition transactions are more related to the agency cost and hubris problems, and that glamour acquiring firms pursue growth through mergers and acquisitions by issuing their overvalued stocks. The robust check on short-run stock returns confirms the three motives of acquisitions, including market timing, industry-shock response, and synergy.

Table 1. Sample of mergers by year

Merger events come from Securities Data Corporation (SDC) merger database and are required to have acquirer information on the Center for Research in Securities Prices (CRSP) and Compustat data tapes. Only completed deals with value greater than \$10 million are included. All-stock and all-cash acquisitions refer to transactions that are paid wholly in stock or cash, respectively. Other-method acquisitions include combinations of stock, cash, other methods and unknown methods. “Freq” is number of events. “Row %” and “Column %” are the proportions of acquisitions by payment methods and by year, respectively. Mean and median of deal value for all acquisitions are in millions of US dollars as reported by SDC.

Year	<i>All-stock acquisitions</i>		<i>All-cash acquisitions</i>		<i>Other-method acquisitions</i>		<i>All acquisitions</i>			
	Freq	Row %	Freq	Row %	Freq	Row %	Freq	Column%	Mean	Median
1984	5	17.86	15	53.57	8	28.57	28	0.80	397.5	108.7
1985	7	12.00	38	64.00	14	24.00	59	1.67	410.8	122.1
1986	5	6.90	52	75.86	12	17.24	68	1.94	323.7	113.2
1987	13	12.94	54	54.12	33	32.94	100	2.84	346.2	133.1
1988	11	12.16	53	60.81	24	27.03	87	2.47	392.5	97.2
1989	18	14.85	56	47.52	45	37.62	119	3.38	421.5	59.5
1990	13	17.81	40	46.58	31	35.62	88	2.44	110.1	37.3
1991	16	26.42	21	33.96	23	39.62	62	1.77	187.7	72.3
1992	18	24.59	25	36.07	28	39.34	72	2.04	164.0	59.7
1993	21	21.18	30	38.82	44	40.00	100	2.84	262.3	75.4
1994	21	29.85	33	47.76	18	22.39	79	2.24	194.9	47.2
1995	54	28.75	79	41.88	45	29.38	188	5.35	516.3	86.3
1996	62	25.85	99	40.98	80	33.17	240	6.85	521.4	78.5
1997	93	32.64	91	31.82	101	35.54	285	8.09	471.1	131.2
1998	128	37.33	115	33.56	100	29.11	344	9.76	833.0	111.1
1999	131	33.33	145	36.94	117	29.73	392	11.13	1280.5	149.2
2000	117	32.67	142	39.93	98	27.39	357	10.13	1450.1	172.9
2001	85	32.73	85	32.73	89	34.55	259	7.36	897.1	110.4
2002	40	18.68	94	43.96	80	37.36	204	6.08	766.5	86.4
2003	51	20.77	93	38.16	100	41.06	224	6.92	646.7	111.0
2004	31	20.00	62	37.86	68	42.14	165	4.68	1311.7	167.2
Total	940	26.70	1422	40.40	1158	32.90	3520	100.00		

Table 2. Characteristics of non-merged and acquiring firms

Statistics for non-merged and acquiring firms are taken from both Compustat and CRSP for the period between 1985 and 2004 to match the availability of event data from SDC. Statistics are in millions of US dollars. Observations are required to have ROA and ROE greater than -200% and -2000%, respectively, M/B ratio below 100 and market equity larger than \$10 million. Statistics are mean values.

Characteristics	Non-merged firms (13,829 firms)	Acquiring firms (1,973 firms)
Market value of firm	3272.46	10,246.38
Book value of firm	2895.73	7,842.70
Market value of equity	2,126.74	6,023.15
Book value of equity	1360.72	3,028.22
Plant, Property & Equipment	527.42	1,246.96
Capital expenditures	82.24	211.38
Long-term debt	432.24	946.12
Net income	48.23	147.62
Return on assets ratio	1.70%	10.60%
Return on equity ratio	3.20%	17.67%
M/B ratio	3.27	4.01
Market Leverage	35.12%	36.90%
Book Leverage	53.28%	59.03%

Table 3. Statistics of market-to-book ratio

Firms are grouped into all acquirers, one-time acquirers and active acquirers groups. Statistics of M/B ratios and $\log(M) - \log(B)$ are reported for each group for before event, one year, two years and three years after event. First-row and second-row statistics are means and medians, respectively. Significance levels are reported for mean and median. ***, ** and * denote significance at the .01, .05 and .10 levels, respectively.

Panel A. M/B ratio in base form

	<i>All acquirers</i>	<i>One-time acquirers</i>	<i>Active acquirers</i>
Number of events	3520	992	2528
Before event	4.01*** 2.38 ***	3.20 *** 1.92 ***	4.26 *** 2.52 ***
One year after event	3.71*** 2.27 ***	2.79 *** 1.79 **	3.98 *** 2.40 ***
Two years after event	3.52*** 2.31 ***	2.32 *** 1.74 **	3.84 *** 2.48 ***
Three years after event	3.59*** 2.37 ***	2.83 *** 1.85 **	3.77 *** 2.60 ***

Panel B. M/B ratio in logarithmic form, $\log(M) - \log(B)$

	<i>All acquirers</i>	<i>One-time acquirers</i>	<i>Active acquirers</i>
Number of events	3520	992	2528
Before event	1.379*** 0.869 ***	1.172** 0.651 *	1.425** 0.923 ***
One year after event	1.347*** 0.823 ***	1.095** 0.580 **	1.405** 0.876 ***
Two years after event	1.250*** 0.840 ***	1.004** 0.555 **	1.301** 0.908 **
Three years after event	1.206*** 0.867 ***	0.935** 0.617 *	1.225** 0.954 **

Table 4. Estimation model of market equity - Parameter estimates

$$m_{it} = \alpha_{0jt} + \alpha_{1jt}b_{it} + \alpha_{2jt}ni_{it} + \alpha_{3jt}I_{(<0)}(ni)_{it} + \alpha_{4jt}Lev_{it} + \varepsilon_i$$

m_{it} is the logarithm of market value of stock i at time t . b_{it} is the book value of equity of firm i at time t . ni_{it} is the logarithm of net income of firm i at time t . $I_{(<0)}$ is a dummy variable, taking value of one for negative-net-income firms and of zero for other firms. Lev_{it} is the market leverage ratio of firm i at time t . ε_i is regression residual. Regression coefficient parameters are reported for each industry group horizontally. Industries are grouped into 12 groups using Fama and French 12-industry classification. R-squares for time-series regressions for each group are reported in the last column. ***, ** and * denote significance at the .01, .05 and .10 levels, respectively.

Group	$\hat{\alpha}_{0jt}$	$\hat{\alpha}_{1jt}$	$\hat{\alpha}_{2jt}$	$\hat{\alpha}_{3jt}$	$\hat{\alpha}_{4jt}$	R-square
1	1.80 ***	0.71 ***	0.35 ***	-0.12	-1.95 ***	0.87
2	1.84 ***	0.81 ***	0.25 ***	-0.02	-2.28 ***	0.88
3	1.75 ***	0.77 ***	0.26 ***	-0.03	-2.11 ***	0.87
4	2.00 ***	0.76 ***	0.25 ***	-0.03	-2.35 ***	0.84
5	2.49 ***	0.66 ***	0.32 ***	-0.05	-2.51 ***	0.86
6	1.95 ***	0.74 ***	0.28 ***	-0.14 ***	-2.22 ***	0.81
7	2.61 ***	0.77 ***	0.19	0.04	-3.26 ***	0.81
8	2.95 ***	0.86 ***	0.11	0.06	-4.03 ***	0.86
9	2.04 ***	0.77 ***	0.25 ***	-0.10 *	-2.48 ***	0.83
10	2.39 ***	0.65 ***	0.35 ***	-0.13 **	-2.45 ***	0.79
11	2.15 ***	0.60 ***	0.43 ***	-0.18 ***	-1.75 ***	0.80
12	1.99 ***	0.73 ***	0.29 ***	-0.11 **	-2.18 ***	0.82

Table 5. Decomposition of M/B ratio

Equity M/B ratio in logarithmic form is decomposed into firm-specific mispricing, industry-specific mispricing and long-run value to book value components. $m_{it} - v(\theta_{it}; \alpha_{\mu})$ is firm-specific mispricing. $v(\theta_{it}; \alpha_{\mu}) - v(\theta_{it}; \alpha_j)$ is industry-specific mispricing and $v(\theta_{it}; \alpha_j) - b_{it}$ is long-run value to book value of equity. The changes of each component over one-year, two-year and three-year windows are reported. First-row and second-row statistics are mean and median, respectively. ***, ** and * denote significance at the .01, .05 and .10 levels, respectively. “Difference” rows reports mean of two-sample differences.

Panel A. Market correction after events of all acquirers

Event windows [year]	Firm-specific mispricing correction $m_{it} - v(\theta_{it}; \alpha_{\mu})$			Industry-specific mispricing correction $v(\theta_{it}; \alpha_{\mu}) - v(\theta_{it}; \alpha_j)$			Long-run value correction $v(\theta_{it}; \alpha_j) - b_{it}$		
	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]
All events	-.058 ***	-.160 ***	-.172 ***	.012	.050 ***	.080 ***	.009	-.019 *	-.081 ***
N=3,520 events	-.039 ***	-.089 ***	-.090 ***	.016 **	.041 ***	.045 ***	.017 **	.005	-.040 ***

Panel B. Market correction after events – Non-merged firms vs. Acquiring firms

Event windows [year]		Firm-specific mispricing correction $m_{it} - v(\theta_{it}; \alpha_{\mu})$			Industry-specific mispricing correction $v(\theta_{it}; \alpha_{\mu}) - v(\theta_{it}; \alpha_j)$			Long-run value correction $v(\theta_{it}; \alpha_j) - b_{it}$		
		[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]
Acquiring firms (A)	N	1726	1674	1557	1727	1680	1569	1811	1760	1647
		-.058 ***	-.160 ***	-.172 ***	.012	.050 ***	.080 ***	.009	-.019 *	-.081 ***
		-.039 ***	-.089 ***	-.090 ***	.016 **	.041 ***	.045 ***	.017 **	.005	-.040 ***
Non-merged firms (NM)	N	31904	22277	23477	32418	28063	23897	33085	28445	24612
		-.020**	-.019***	-.038***	.016***	.041***	.061***	-.019***	-.047***	-.069***
		-.022 ***	-.012 ***	-.027 **	.001 ***	.036 ***	.051 ***	-.003 **	-.028 **	-.045 ***
Difference (A - NM)		-.038**	-.141***	-.134***	-.004	.009	.019	.027***	.028**	-.012

Panel C. Market correction after events of acquirers by frequency of mergers and acquisitions

Event windows [year]	Firm-specific mispricing correction $m_{it} - v(\theta_{it}; \alpha_{jt})$			Industry-specific mispricing correction $v(\theta_{it}; \alpha_{jt}) - v(\theta_{it}; \alpha_j)$			Long-run value correction $v(\theta_{it}; \alpha_j) - b_{it}$		
	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]
One-time acquirers	-.111 ***	-.166 ***	-.224 ***	.026	.046 ***	.086 ***	.008	-.068 ***	-.140 ***
N=992 events	-.103 ***	-.067 ***	-.173 ***	.029 *	.011	.043 ***	-.002	-.045 ***	-.118 ***
Active acquirers	-.040 *	-.158 ***	-.155 ***	.006	.051 ***	.078 ***	.009	-.003	-.062 ***
N=2528 events	-.018	-.105 ***	-.076 ***	.014	.050 ***	.045 ***	.022 **	.021 **	-.025 ***
Difference (Once – Active)	-.071	-.008	-.069	.020	-.005	.008	-.001	-.065 **	-.077 **

Panel D. Market correction after events of acquirers by method of payment

Event windows [year]	Firm-specific mispricing correction $m_{it} - v(\theta_{it}; \alpha_{jt})$			Industry-specific mispricing correction $v(\theta_{it}; \alpha_{jt}) - v(\theta_{it}; \alpha_j)$			Long-run value correction $v(\theta_{it}; \alpha_j) - b_{it}$		
	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]
Stock payers	-.070 ***	-.378 ***	-.473 ***	.046 *	.165 ***	.222 ***	-.026	-.084 ***	-.153 ***
N=940 events	-.066	-.180 ***	-.279 ***	.053 ***	.109 ***	.141 ***	-.006	-.040 ***	-.069 ***
Cash payers	-.039 ***	-.097 ***	-.046	.001	.010	.038 ***	.021	-.007	-.076 ***
N=1422 events	.003 ***	-.084 ***	-.015	.015 *	.020 *	.016 **	.033 ***	.026 *	-.042 ***
Other method payers	-.048	-.038	-.077 *	.028	.014	.056 ***	-.006	.014	-.012
N=1158 events	-.004	-.041 ***	-.059 ***	.006	.028 **	.037 *	.000	.007	-.016 **
Difference (Stock – Cash)	-.031 ***	-.281 ***	-.426 ***	.045 *	.1544 ***	.184 ***	-.047 *	-.077 **	-.077 **
Difference (Cash – Other)	-.022	-.058	.031	-.027	-.004	-.017	.027	-.021	-.064 *
Difference (Stock – Other)	.0087	-.339 ***	-.395 ***	.018	.150 ***	.167 ***	-.020	-.097 ***	-.141 ***

Panel E. Market correction after events of acquirers by proportion of shares acquired

Event windows [year]	Firm-specific mispricing correction $m_{it} - v(\theta_{it}; \alpha_{jt})$			Industry-specific mispricing correction $v(\theta_{it}; \alpha_{jt}) - v(\theta_{it}; \alpha_j)$			Long-run value correction $v(\theta_{it}; \alpha_j) - b_{it}$		
	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]
Acquired shares less than 10% (Group 1) N=869	-.079 -.066 ***	-.060 * -.046 *	-.063 * -.023	.024 .015	.004 .017	.058 *** .018 *	.014 .032 ***	.018 .033 **	-.002 .007
Acquired shares greater than 10% and less than 100% (Group 2) N=675	-.063 -.013	-.076 -.019	-.050 -.078	.040 .026	.091 *** .084 ***	.093 *** .066 ***	-.015 -.028	-.030 ** -.030 **	-.078 *** -.069 ***
Acquired shares of 100% (Group 3) N=1976	-.046 * -.031 *	-.240 *** -.129 ***	-.272 *** -.137 ***	-.005 .014	.058 *** .044 ***	.087 *** .050 ***	.015 .018 **	-.035 *** -.011	-.124 *** -.082 ***
Difference (Group 2 - Group 1)	.017	-.016	.013	.016	.087 **	.035	-.029	-.048	-.076 *
Difference (Group 3 - Group 1)	.033	-.180 ***	-.209 ***	-.028 *	.055	.029	.002	-.053 **	-.123 ***
Difference (Group 3 - Group 2)	.017	-.164 ***	-.222 ***	-.044	-.033	-.006	.031	-.005	-.046

Panel F. Market correction after events of acquirers by M/B ratio of acquirers

Event windows [year]	Firm-specific mispricing correction $m_{it} - v(\theta_{it}; \alpha_{jt})$			Industry-specific mispricing correction $v(\theta_{it}; \alpha_{jt}) - v(\theta_{it}; \alpha_{jt})$			Long-run value correction $v(\theta_{it}; \alpha_{jt}) - b_{it}$		
	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]
M/B ratio of Acquirers									
Quintile 1	.060 *** .072 ***	-.048 .010	-.002 .007	.023 .006	.121 *** .082 ***	.135 *** .100 ***	-.053 ** -.037 **	-.218 *** -.196 ***	-.167*** -.149***
Quintile 2	-.135 *** -.057 ***	.007 .019	-.053 .006	.000 .014	.055 * .014	.096 *** .052 **	-.009 -.022 **	-.117 *** -.103 ***	-.138*** -.122***
Quintile 3	-.024 -.040	-.070 -.049	-.025 -.023	.011 .007	-.017 .016	-.025 -.032 *	-.014 -.011	-.008 .005	-.068 ** -.044***
Quintile 4	-.020 ** -.028	-.169 *** -.144 ***	-.214 *** -.103 ***	-.027 .016	-.008 .038 *	.025 .017	.036 .033 ***	.082 *** .049 ***	-.021 .001
Quintile 5	-.314 *** -.246 ***	-.414 *** -.172 ***	-.440 *** -.272 ***	.049 ** .050 ***	.106 *** .072 ***	.163 *** .102 ***	.056 *** .047 ***	.081 *** .059 ***	-.048 ** -.011
Difference (Q5 – Q1)	-.374***	-.366***	-.438***	0.027	0.015	.028	.110***	.299***	.118***

Panel G. Market correction after events of acquirers by market value of equity of acquirers

Event windows [year]	Firm-specific mispricing correction $m_{it} - v(\theta_{it}; \alpha_{it})$			Industry-specific mispricing correction $v(\theta_{it}; \alpha_{it}) - v(\theta_{it}; \alpha_{jt})$			Long-run value correction $v(\theta_{it}; \alpha_{jt}) - b_{it}$		
	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]
Market value of Acquirers									
Quintile 1	-.068 ** -.017 ***	-.019 .037	.016 .060	.006 .008	.064 ** .061 ***	.047 .026	.024 .002	-.065 *** -.073 **	-.064 * -.055 *
Quintile 2	-.071 * -.087 ***	-.090 * -.061 *	-.178 *** -.094 ***	.005 .025 *	.018 .020	.079 *** .035 **	-.012 -.006	-.058 * -.033 **	-.095 *** -.072 ***
Quintile 3	.042 .011	-.089 ** -.047 *	-.128 ** -.047 *	-.030 .005	.026 .019	.063 ** .043 **	-.022 -.003	-.022 .002	-.109 *** -.103 ***
Quintile 4	-.103 ** -.037 *	-.262 *** -.144 ***	-.234 *** -.115 ***	.056 ** .024 **	.107 *** .038 ***	.093 *** .032 **	.011 .031	-.027 .021	-.068 *** -.029 ***
Quintile 5	-.094 ** -.101	-.284 *** -.130 ***	-.280 *** -.129 ***	.016 .016	.032 .070 ***	.108 *** .070 ***	.042 ** .034 ***	.055 *** .051 ***	-.070 *** -.019 *
Difference (Q5 – Q1)	-.026	-.266 ***	-.296 ***	0.010	0.033	.061	0.018	0.120	-0.006

Panel H. Market corrections after events of acquirers by industry

Firms are grouped into twelve industry groups based on 12-industry classification suggested by Fama and French.

Event windows [year]	Group	N	Firm-specific mispricing correction $m_{it} - v(\theta_{it}; \alpha_{it})$			Industry-specific mispricing correction $v(\theta_{it}; \alpha_{it}) - v(\theta_{it}; \alpha_{jt})$			Long-run value correction $v(\theta_{it}; \alpha_{jt}) - b_{it}$		
			[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]
Consumer Nondurables											
1	224		-.025	-.085	-.053	.042 *	.053 *	.018	-.004	.011	-.033
			-.017	-.050	-.013	.028 **	.030 *	.019	.009	.026	-.019
Consumer Durables											
2	72		-.061	.092	-.098	-.057	-.061	.033	.049	-.023	-.065
			-.094	-.014	-.272	-.054	-.051	.032	.050	-.044	-.055
Manufacturing											
3	344		-.041	-.062	-.047	-.014	.005	.040 *	.025	-.012	-.077 ***
			-.084 **	-.112 **	-.015 **	-.008	.015	.051 *	.033 **	.011	-.032 *
Energy											
4	116		.231 ***	-.022	.000	-.095	-.182 ***	-.010	-.164 ***	-.077	-.209 ***
			.044	-.160	-.035	-.050	-.155 ***	.112	-.064	-.017	-.237 ***
Chemicals											
5	107		-.023	-.072	-.011	.044	.150 ***	.152 ***	-.018	-.059	-.135 *
			-.066	.033	-.036	.025	.063 ***	.099	.025	.034	-.108 *
Business equipment											
6	584		-.157 ***	-.444 ***	-.356 ***	.044 *	.174 ***	.201 ***	-.008	-.090 ***	-.165 ***
			-.013	-.169 ***	-.186 ***	.075 ***	.119 ***	.066 ***	.000	-.048 ***	-.125 ***

Panel H. Market corrections after events of acquirers by industry (continued)

Group	N	Firm-specific mispricing correction $m_{it} - v(\theta_{it}; \alpha_{jt})$			Industry-specific mispricing correction $v(\theta_{it}; \alpha_{jt}) - v(\theta_{it}; \alpha_{jt})$			Long-run value correction $v(\theta_{it}; \alpha_{jt}) - b_{it}$		
		[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]	[0, 1]	[0, 2]	[0, 3]
Telephone and Television transmission										
7	109	.041	-.220 *	-.503 ***	-.014	.063	-.008	.057	.064	-.163
		-.006	-.281	-.453 ***	.023	.072	.050	.065	.117	-.070
Utilities										
8	158	-.090	.020	-.150 *	.067	-.004	.037	.007	.052	.017
		-.060 *	-.011	-.062 *	.063	.042	.059	-.011	.035	-.052
Wholesale, Retails, Some Services										
9	263	-.052	-.130 **	-.129 *	.003	.018	.055 *	.052 *	-.001	-.127 ***
		-.068 **	-.061 **	-.076	.008	.021	-.013	.028 **	.006	-.077 ***
Healthcare										
10	232	-.066	.009	-.123 *	.013	-.038	.039	.038	.036	.055
		-.019	-.078	-.017 ***	-.043	.042	.029 *	.017	.039	.033
Finance										
11	1023	-.097 ***	-.161 ***	-.232 ***	.015	.051 *	.079 **	.025	-.018	-.035
		-.017	-.064 ***	-.128	.025	.037	.002 **	-.003	-.041	-.012
Other (Mines, Construction, Building Materials, Transportation, Hotels, Business Services, Entertainment)										
12	288	.053	-.061	-.104	-.032	.014	.036	.003	.024	-.055
		-.034	-.105	-.054	-.014	.037	.047	.055	.038	-.029
All groups	3520									

Table 6. Change of operating performance one year after the merger

Performance of the 2combined firms before event is the asset-market-value weighted average of performance of two firms, target and acquirer involving in the transaction. The nominator of weight of targets is deal value. The nominator of weight of acquirers is the market value of assets of acquiring firms. Performance of the combined firms after event is the performance of the acquirer itself.

Panel A. Unadjusted one-year change in operating performance

Raw operating performance and one-year change of operating performance measures are reported for stock, cash and other payment methods. First-row and second-row statistics are means and medians, respectively. ***, ** and * denote significance at the .01, .05 and .10 levels, respectively.

Accounting performance	All mergers (3520 events)	Stock mergers (940 events)	Cash mergers (1422 events)	Others (1158 events)
Return on assets (%) – Before events	16.13*** 15.19 ***	12.80*** 13.72***	16.65*** 16.09***	17.42*** 14.13***
Return on assets (%) – After events	16.26*** 16.00 ***	12.49*** 14.81***	17.66*** 16.90***	16.48*** 15.26***
Change of Return on assets (After – Before)	0.13 0.74 ***	-0.31 0.58***	1.01*** 1.18***	-0.94 0.96***
Cash-flow return on assets (%) – Before events	9.43*** 8.85 ***	5.49*** 7.08***	10.06*** 9.91***	10.97*** 8.17***
Cash-flow return on assets (%) – After events	10.16*** 9.89 ***	6.23*** 7.93***	11.66*** 10.96***	10.38*** 9.26***
Change of Cash flow ROA (After – Before)	0.73 0.96 ***	0.74 0.87***	1.60*** 1.38***	-0.58 0.97***
Return on cash-adjusted assets (%) – Before events	19.57*** 16.64 ***	13.87*** 15.68***	20.02*** 17.81***	22.43*** 15.44***
Return on cash-adjusted assets (%) – After events	19.23*** 17.63 ***	13.24*** 16.67***	21.17*** 18.40***	20.01*** 16.84***
Change of Return on cash adjusted assets (After – Before)	-0.34 0.89 ***	-0.63 0.69***	1.15*** 1.27***	-2.43 1.04***
Return on sales (%) – Before events	14.24*** 15.95 ***	1.77 16.03***	16.29*** 15.60***	18.89*** 16.03***
Return on sales (%) – After events	16.64*** 16.72 ***	7.99 17.58***	18.78*** 16.41***	18.75*** 17.16***
Change of Return on sales (After – Before)	2.39** 0.60 ***	6.22 0.53***	2.50*** 0.87***	-0.14 0.60***
Sales growth (%) – Before events	20.15*** 12.47 ***	27.51*** 17.63***	17.57*** 9.97***	19.55*** 11.95***
Sales growth (%) – After events	18.68*** 11.01 ***	28.34*** 16.34***	15.39*** 9.12***	17.76*** 10.72***
Change of Sales growth (After – Before)	-1.47 -1.62 ***	0.83 -2.45	-2.18* -1.50***	-1.79 -1.17

Panel B. Industry-adjusted one-year change in operating performance

Industry-adjusted operating performance is the difference between the combined firm's performance measures and the corresponding statistics for the median non-merged firms in the same 2-digit SIC industry, computed for each year separately. First-row and second-row statistics are mean and median, respectively. ***, ** and * denote significance at the .01, .05 and .10 levels, respectively.

Industry-adjusted operating performance	All mergers (3520 events)	Stock mergers (940 events)	Cash mergers (1422 events)	Others (1158 events)
Return on assets (%) – Before events	9.66*** 6.95***	7.39*** 6.79***	9.77*** 7.50***	10.92*** 6.08***
Return on assets (%) – After events	10.06*** 7.72***	7.84*** 7.75***	10.96*** 8.10***	10.09*** 6.71***
Change of Return on assets (After – Before)	0.40 1.13***	0.45 1.04***	1.19*** 2.12***	-0.83 0.98***
Cash-flow return on assets (%) – Before events	8.71*** 6.27***	5.82*** 5.33***	8.84*** 6.84***	10.32*** 5.67***
Cash-flow return on assets (%) – After events	9.47*** 7.75***	6.99*** 8.01***	10.46*** 8.05***	9.55*** 6.61***
Change of Cash flow ROA (After – Before)	0.77 1.27***	1.17 1.21***	1.62*** 2.52***	-0.78 0.91***
Return on cash-adjusted assets (%) – Before events	13.61*** 7.85***	8.73*** 7.73***	13.64*** 8.31***	16.61*** 6.95***
Return on cash-adjusted assets (%) – After events	13.65*** 8.87***	9.06*** 8.95***	15.03*** 9.37***	14.40*** 7.50***
Change of Return on cash adjusted assets (After – Before)	0.04 1.31***	0.32 1.04***	1.39*** 2.19***	-2.21 1.21***
Return on sales (%) – Before events	8.80*** 8.45***	8.00 9.58***	10.97*** 7.77***	8.75*** 8.60***
Return on sales (%) – After events	11.43*** 9.33***	9.86 11.57***	13.62*** 8.67***	8.70*** 9.32***
Change of Return on sales (After – Before)	2.62** 0.73***	1.86 0.61***	2.65*** 1.73***	-0.05 0.41**
Sales growth (%) – Before events	8.80*** 1.35***	9.01*** 4.78***	6.69*** 0.15	8.78*** 1.36***
Sales growth (%) – After events	7.07*** 0.55***	9.96*** 3.95***	4.08*** -0.95	6.75*** 0.61***
Change of Sales growth (After – Before)	-1.73** -1.98***	0.95 -2.33*	-2.61*** -2.35***	-2.03 -0.89

Table 7. Market responses to mergers with various motives.

Mergers are grouped into eight mutually exclusive groups based on the market correction of the three components of equity M/B ratio over one-year period, firm-specific mispricing, industry-specific mispricing and long-run value to book value.

Panel A. Industry-adjusted one-year change of operating performance by groups of market valuation corrections

“Change” rows report mean and median of the industry-adjusted one-year change of operating performance before and after merger events. First-row and second-row statistics are mean and median, respectively. ***, ** and * denote significance at the .01, .05 and .10 levels, respectively.

Change of industry-adjusted operating performance (After – Before)	All mergers	Mergers with Firm-specific mispricing correction	Mergers with Industry-specific mispricing correction	Mergers with decrease of Long-run value	Mergers with Both Firm-specific and Industry-specific mispricing correction	Mergers with Both Firm-specific mispricing and Decrease of Long-run value	Mergers with Both Industry-specific mispricing and Decrease of Long-run value	Mergers with all three corrections	Mergers without any of the three correction
Group number		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Number of events	3520	377	113	278	387	1550	308	262	245
Change of Return on assets	0.40 <i>1.13***</i>	2.35*** <i>1.94***</i>	1.68 <i>2.58***</i>	0.38 <i>0.87</i>	0.53 <i>1.39***</i>	-0.02 <i>0.61</i>	0.92** <i>0.45**</i>	-0.84* <i>-0.12</i>	-2.31 <i>-1.82***</i>
Change of Cash flow ROA	0.77 <i>1.27***</i>	2.38*** <i>1.90***</i>	1.86 <i>2.85***</i>	0.78 <i>0.94**</i>	0.97 <i>1.26***</i>	1.04 <i>0.92*</i>	1.30** <i>0.71**</i>	-0.36 <i>0.17</i>	-2.27 <i>-2.46***</i>
Change of Return on cash adjusted assets	0.04 <i>1.31***</i>	2.64*** <i>2.04***</i>	4.18*** <i>3.07***</i>	0.94 <i>0.33</i>	0.22 <i>1.81***</i>	2.51 <i>0.90*</i>	0.39 <i>-0.15</i>	-2.32*** <i>-0.55</i>	-7.47 <i>-2.90***</i>
Change of Return on sales	2.62** <i>0.73***</i>	2.77*** <i>1.35***</i>	2.46*** <i>1.67***</i>	10.78 <i>-0.07</i>	2.64 <i>1.32***</i>	-1.72 <i>0.43*</i>	1.36 <i>-0.21</i>	-1.34 <i>-0.13</i>	3.14*** <i>1.78***</i>
Change of Sales growth	-1.73** <i>-1.98***</i>	2.05 <i>1.32</i>	-0.77 <i>-1.79</i>	-1.88 <i>-2.71</i>	-0.18 <i>-0.12</i>	-4.94* <i>-3.45***</i>	-5.00** <i>-4.75***</i>	-1.64 <i>-2.76**</i>	-3.16 <i>-0.94</i>

Panel B. Regression of Cumulative abnormal return over 1-day event window [0,1] by groups of market valuation corrections

$$CAR[0,1] = \alpha + \beta_1 STOCK + \beta_2 CASH + \beta_3 ROA01 + \beta_4 ROA03 + \beta_5 ADJCASH + \beta_6 ADJCASH * LOWM/B + \beta_7 AVESG + \beta_8 LOGTA + \beta_9 BLEV$$

Cumulative abnormal returns of acquirers over [0,1] window are regressed on various variables. *STOCK* is stock payment dummy variable, taking value of 1 if payment is in stock and 0 otherwise. *CASH* is cash payment dummy variable, taking value of 1 if payment is in cash and 0 otherwise. *ROA01* and *ROA03* are post-event one-year and three-year change of return on assets, respectively. *ADJCASH* is size-adjusted cash and short-term investments in the year before event. *LOWM/B* is a low-valuation stock dummy variable taking value of 1 if acquirers have M/B ratio less than 1, and of 0 otherwise. *AVESG* is pre-event three-year average of sales growth of acquirers. *LOGTA* is logarithmic total assets of acquirers in the year before event. *BLEV* is book leverage of acquirers in the year before event. Though not reported here, the regressions also include industry and year dummy variables to control for fixed effects, industry and year. ***, ** and * denote significance at the .01, .05 and .10 levels, respectively. R-square is reported at the last row.

Change of operating performance	All mergers	Mergers with Firm-specific mispricing correction	Mergers with Industry-specific mispricing correction	Mergers with decrease of Long-run value	Mergers with Both Firm-specific and Industry-specific mispricing correction	Mergers with Both Firm-specific mispricing and Decrease of Long-run value	Mergers with Both Industry-specific mispricing and Decrease of Long-run value	Mergers with all three corrections	Mergers without any of the three correction
Group number	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
Number of events	3520	377	113	278	387	1550	308	262	245
Intercept	0.024**	0.079***	-0.115	0.070	0.007	0.033	0.065*	-0.043	0.101*
STOCK	-0.019***	-0.032*	-0.031	-0.030	-0.010	-0.021***	-0.021	-0.003	-0.016
CASH	0.024***	0.027**	0.012	-0.003	0.040***	0.019**	0.030*	0.026	0.021
ROA01	0.131***	-0.229*	-0.197	0.071	0.050	0.299***	0.124	-0.210	0.398**
ROA03	0.017	0.332***	0.257	-0.152*	-0.110**	0.005	-0.066	0.038	-0.015
ADJCASH	-0.008	-0.243***	-0.007	-0.014	-0.082**	0.030	0.064	-0.025	-0.015
ADJCASH*LowM/B	-0.036	0.194**	0.148	-0.005	-0.031	-0.068	0.284	-0.115	0.819
AVESG	0.000	0.002	0.034	0.019	0.000	-0.001	-0.013	0.012	0.000
LOGTA	-0.004***	-0.009*	0.010	-0.013**	-0.001	-0.004**	-0.008*	0.000	-0.010**
BLEV	0.006	0.002	0.065	0.005	-0.018	-0.009	-0.002	0.070	-0.001
R-Square	.08	.27	.39	.25	.20	.14	.20	.25	.24

Panel C. Regression of Cumulative abnormal return over 2-day event window [-1,1]

$$CAR[-1,1] = \alpha + \beta_1 STOCK + \beta_2 CASH + \beta_3 ROA01 + \beta_4 ROA03 + \beta_5 ADJCASH + \beta_6 ADJCASH * LOWM / B + \beta_7 AVESG + \beta_8 LOGTA + \beta_9 BLEV$$

Cumulative abnormal returns of acquirers over [-1,1] window are regressed on various variables. *STOCK* is stock payment dummy variable, taking value of 1 if payment is in stock and 0 otherwise. *CASH* is cash payment dummy variable, taking value of 1 if payment is in cash and 0 otherwise. *ROA01* and *ROA03* are post-event one-year and three-year change of return on assets, respectively. *ADJCASH* is size-adjusted cash and short-term investments in the year before event. *LOWM/B* is a low-valuation stock dummy variable taking value of 1 if acquirers have M/B ratio less than 1, and of 0 otherwise. *AVESG* is pre-event three-year average of sales growth of acquirers. *LOGTA* is logarithmic total assets of acquirers in the year before event. *BLEV* is book leverage of acquirers in the year before event. Though not reported here, the regressions also include industry and year dummy variables to control for fixed effects, industry and year. ***, ** and * denote significance at the .01, .05 and .10 levels, respectively. R-square is reported at the last row.

Change of operating performance	All mergers	Mergers with Firm-specific mispricing correction	Mergers with Industry-specific mispricing correction	Mergers with decrease of Long-run value	Mergers with Both Firm-specific and Industry-specific mispricing correction	Mergers with Both Firm-specific mispricing and Decrease of Long-run value	Mergers with Both Industry-specific mispricing and Decrease of Long-run value	Mergers with all three corrections	Mergers without any of the three correction
Group number	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
Number of events	3520	377	113	278	387	1550	308	262	245
Intercept	0.024**	0.071**	-0.078	0.077**	0.003	0.034**	0.047	-0.036	0.100**
STOCK	-0.018***	-0.020	-0.055	-0.028	-0.005	-0.025***	-0.012	-0.014	-0.022
CASH	0.021***	0.025**	-0.008	-0.001	0.037***	0.012*	0.027**	0.020	0.025*
ROA01	0.141***	-0.118	-0.255	0.116	0.134	0.285***	0.043	-0.112	0.433***
ROA03	-0.005	0.273***	0.087	-0.105	-0.151***	-0.037	-0.025	0.035	0.039
ADJCASH	-0.013	-0.220***	-0.018	-0.014	-0.094***	0.009	0.039	-0.005	0.017
ADJCASH*LowM/B	-0.005	0.172*	0.159	0.000	-0.032	-0.001	0.258	-0.073	0.829
AVESG	0.000	0.001	-0.008	0.021	0.000	-0.002	-0.007	0.014	0.001
LOGTA	-0.003***	-0.010***	0.010	-0.014***	0.002	-0.003*	-0.003	-0.002	-0.007**
BLEV	-0.002	0.015	0.034	0.008	-0.043	-0.019	-0.043	0.086*	-0.034
R-Square	.09	.26	.37	.33	.23	.15	.19	.26	.28

APPENDIX A – Decomposition of M/B ratio - Non-merged firms vs. Acquiring firms by year

Panel A.1. Firm-specific mispricing correction

Year		[0, 1 year]			[0, 2 years]			[0, 3 years]		
		Non-merged firm (NM)	Acquiring firm (A)	Difference (NM – A)	Non-merged firm (NM)	Acquiring firm (A)	Difference (NM – A)	Non-merged firm (NM)	Acquiring firm (A)	Difference (NM – A)
1988	N	594	13		572	13		563	15	
	Mean	-3.10E-04	.0935	-.094	.0176	-.278	.2959*	.0021	-.215	.2174
1989	N	661	79		637	77		615	74	
	Mean	-.004	-.158	.154*	-.064	-.186	.1218	-.07	.0138	-.084
1990	N	723	58		692	57		674	59	
	Mean	-.058	-.145	.0868	-.058	-.175	.1165	-.064	-.211	.1471
1991	N	778	46		749	45		725	45	
	Mean	-.043	.0277	-.071	-.037	.0154	-.052	-.037	.1019	-.139
1992	N	822	60		789	60		764	56	
	Mean	-.008	-.013	.0052	-.022	-.05	.0285	-.046	-.025	-.02
1993	N	930	63		894	58		864	55	
	Mean	-.022	.0092	-.032	-.074	.025	-.099	-5.20E-04	-.081	.0806
1994	N	1033	54		978	52		929	50	
	Mean	-.086	.0828	-.169**	-.064	.1404	-.204**	-.105	.1994	-.305**
1995	N	1203	148		1136	143		1104	139	
	Mean	.0213	.0601	-.039	-.024	.0371	-.061	.0174	.0145	.0029
1996	N	1384	155		1305	151		1216	153	
	Mean	-.074	.0177	-.092	-.037	.0001	-.037	.0339	.0133	.0205
1997	N	1578	169		1428	165		1327	163	
	Mean	.0038	-.059	.0633	.0497	-.04	.0899	.0808	-.071	.1518*
1998	N	1740	224		1604	222		1473	214	
	Mean	.0185	.0063	.0122	.0861	-.137	.2236**	-.201	-.172	-.029
1999	N	1853	204		1665	194		1531	187	
	Mean	.0841	-.188	.2716**	-.217	-.591	.3746	-.208	-.464	.2556**
2000	N	1883	147		1694	144		1562	143	
	Mean	-.338	.0299	-.368**	-.328	-.285	-.043	-.362	-.426	.0637
2001	N	1964	106		1772	102		1672	103	
	Mean	-.073	-.34	.2669**	-.155	-.534	.3791**	.1463	-.116	.2627*
2002	N	2037	108		1884	103		1608	98	
	Mean	-.099	-.139	.0405	.2215	-.107	.3282**	.1801	.0267	.1533

Panel A.2. Industry-specific mispricing correction

Year		[0, 1 year]			[0, 2 years]			[0, 3 years]		
		Non-merged firm (NM)	Acquiring firm (A)	Difference (NM - A)	Non-merged firm (NM)	Acquiring firm (A)	Difference (NM - A)	Non-merged firm (NM)	Acquiring firm (A)	Difference (NM - A)
1988	N	598	13		583	13		572	15	
	Mean	.033	.0805	-.047**	-.08	.0195	-.099*	.1748	.1823	-.008
1989	N	667	79		642	77		625	74	
	Mean	-.111	-.045	-.066*	.1554	.1164	.039	.2912	.1634	.1278**
1990	N	728	58		705	57		681	59	
	Mean	.2626	.1488	.1138*	.3888	.286	.1028	.4053	.4009	.0045
1991	N	793	46		757	45		729	45	
	Mean	.1386	.1133	.0253	.1493	.2697	-.12	.0295	.1622	-.133
1992	N	829	60		794	60		768	56	
	Mean	.0147	.0584	-.044	-.094	.0245	-.119**	-.069	.0205	-.089*
1993	N	934	63		897	58		870	56	
	Mean	-.112	.0234	-.135**	-.063	-.035	-.028	-.015	-5.30E-04	-.014
1994	N	1038	54		985	52		938	50	
	Mean	.0601	-.027	.0873	.1222	-.009	.1308*	.154	-.062	.2159**
1995	N	1211	148		1145	143		1114	139	
	Mean	.0798	-.054	.1339**	.1161	.0094	.1067*	-.085	.0198	-.105**
1996	N	1397	155		1318	151		1234	153	
	Mean	.043	.0945	-.051	-.156	.1043	-.26**	-.188	-.006	-.183**
1997	N	1589	169		1454	165		1359	164	
	Mean	-.192	.0324	-.225**	-.215	-.12	-.096**	-.059	-.094	.0354
1998	N	1766	225		1643	222		1516	217	
	Mean	-.013	-.108	.0948**	.1543	-.103	.2571**	-.013	.013	-.026
1999	N	1897	204		1710	195		1567	187	
	Mean	.172	.0518	.1202**	-.004	.257	-.261**	.1207	.3018	-.181**
2000	N	1934	147		1735	144		1603	143	
	Mean	-.166	.1337	-.3**	-.037	.1779	-.215**	-.009	.2577	-.266**
2001	N	2010	106		1822	105		1724	104	
	Mean	.1349	-.094	.2291**	.154	.0776	.0764	.3547	.0518	.3029**
2002	N	2079	108		1941	103		1642	102	
	Mean	.0161	.0751	-.059	.2158	.0546	.1612*	.0085	-.006	.014

Panel A.3. Long-run value to book value correction

Year		[0, 1 year]			[0, 2 years]			[0, 3 years]		
		Non-merged firm (NM)	Acquiring firm (A)	Difference (NM - A)	Non-merged firm (NM)	Acquiring firm (A)	Difference (NM - A)	Non-merged firm (NM)	Acquiring firm (A)	Difference (NM - A)
1988	N	598	76		583	75		572	75	
	Mean	-.047	-.018	-.028	-.086	.017	-.103*	-.177	-.147	-.03
1989	N	667	79		642	77		625	74	
	Mean	-.046	.0983	-.144**	-.138	-.004	-.134*	-.15	-.068	-.081
1990	N	728	58		705	57		681	59	
	Mean	-.099	.014	-.113**	-.112	-.047	-.065	-.059	-.081	.0215
1991	N	793	46		757	45		729	45	
	Mean	-.017	-.115	.0974*	.0275	-.221	.2489**	.0805	-.196	.2762**
1992	N	829	60		794	60		768	56	
	Mean	.0367	-.046	.0827*	.0857	-.013	.0989*	.0938	-.062	.1558**
1993	N	934	63		897	58		870	56	
	Mean	.04	-.038	.0784	.0427	-.099	.1415	.0082	.0083	-8.40E-05
1994	N	1038	54		985	52		938	50	
	Mean	-.005	.0115	-.016	-.043	.0819	-.125*	-.034	.1314	-.165*
1995	N	1211	148		1145	143		1114	139	
	Mean	-.058	.0789	-.137**	-.065	.1194	-.184*	-.028	.1158	-.143**
1996	N	1397	155		1318	151		1234	153	
	Mean	-.006	.0384	-.044	.0267	.0917	-.065	-.059	.1342	-.193**
1997	N	1589	169		1454	165		1359	164	
	Mean	.0272	.0229	.0043	-.058	.0468	-.105**	-.113	-.041	-.072
1998	N	1766	225		1643	222		1516	217	
	Mean	-.083	.0204	-.103**	-.164	-.007	-.157**	-.161	-.208	.0465
1999	N	1897	204		1710	195		1567	187	
	Mean	-.102	-.006	-.096**	-.093	-.143	.0497	-.227	-.252	.0249
2000	N	1934	147		1735	144		1603	143	
	Mean	.004	-.117	.1209**	-.149	-.094	-.055	-.15	-.268	.1172**
2001	N	2010	106		1822	105		1724	104	
	Mean	-.142	.0802	-.222**	-.15	-.156	.0065	-.181	-.29	.109
2002	N	2079	108		1941	103		1642	102	
	Mean	-.011	-.03	.0182	-.054	-.066	.0122	.1436	-.011	.1545**

APPENDIX B – Operating performance before and after mergers - Non-merged firms vs. Combined firms by years

Combined firms' and non-merged firms' operating performances are compared. Non-merged firms' mean of performance measures is the average of all non-merged firms in each calendar year. "Difference" columns reports mean of the two-sample differences. ***, ** and * denote significance at the .01, .05 and .10 levels, respectively.

Panel B.1. Return on asset

Year		Average of three-year before event			Average of three-year after event		
		Non-merged firms (NM)	Combined firm (C)	Difference (NM – C)	Non-merged firms (NM)	Combined firm (C)	Difference (NM – C)
1988	N	3952	133		3987	135	
	Mean	13.52	.45	13.07	-82.89	-1.05	-81.84
1989	N	4041	126		3983	125	
	Mean	-1.01	.63	-1.64*	.07	-.78	.84*
1990	N	4036	9		3995	94	
	Mean	-.08	.00	-.08	-3.90	-.11	-3.79
1991	N	3676	91		4043	93	
	Mean	.08	-.67	.74*	-.12	.57	-.70*
1992	N	3983	115		4137	117	
	Mean	.07	-.08	.15	-.38	-.12	-.26
1993	N	3995	139		4432	139	
	Mean	-3.90	.17	-4.06	-.76	.05	-.81*
1994	N	4043	112		4529	124	
	Mean	-.12	.39	-.51	-.48	-.37	-.10
1995	N	4137	247		4845	261	
	Mean	-.38	.24	-.61**	-1.58	-.30	-1.28*
1996	N	4432	288		4723	286	
	Mean	-.76	.17	-.93**	-1.52	-.36	-1.17**
1997	N	45	325		4313	310	
	Mean	-.48	.13	-.61*	-.65	-.41	-.24
1998	N	4845	382		4283	362	
	Mean	-1.58	.33	-1.90**	-.29	-1.11	.82
1999	N	4723	379		4308	353	
	Mean	-1.52	.42	-1.94**	-.32	-.96	.64*
2000	N	4313	256		4178	273	
	Mean	-.65	.06	-.71**	-.27	-.32	.05
2001	N	4283	165		3497	141	
	Mean	-.29	-.24	-.05	2.27	-.02	2.29**

Panel B.2. Cash-flow return on assets

Year		Average of three-year before event			Average of three-year after event		
		Non-merged firms (NM)	Combined firm (C)	Difference (NM - C)	Non-merged firms (NM)	Combined firm (C)	Difference (NM - C)
1988	N	3723	115		3738	121	
	Mean	15.09	.89	14.19	-87.48	-.94	-86.54
1989	N	3790	107		3753	109	
	Mean	-.62	.81	-1.43	.49	-.75	1.23**
1990	N	3777	81		3790	86	
	Mean	.40	.00	.40	-4.07	.08	-4.14
1991	N	3459	72		3821	72	
	Mean	.65	-.44u,	1.09**	-.09	.54	-.63
1992	N	3753	86		3919	89	
	Mean	.49	.08	.41	-.40	-.32	-.08
1993	N	3790	93		4061	91	
	Mean	-4.07	.12	-4.18	-.64	.38	-1.02
1994	N	3821	93		4154	100	
	Mean	-.09	.42	-.51	-.35	-.55	.19
1995	N	3919	207		4495	204	
	Mean	-.40	.32	-.72**	-1.55	-.30	-1.25*
1996	N	4061	215		4407	215	
	Mean	-.64	.43	-1.07**	-1.09	-.24	-.85*
1997	N	4154	245		4014	230	
	Mean	-.35	.11	-.46	-.26	-.32	.06
1998	N	4495	300		3975	282	
	Mean	-1.55	.52	-2.07**	.26	-.86	1.12
1999	N	4407	297		3970	272	
	Mean	-1.09	1.07	-2.16**	.20	-.82	1.01**
2000	N	4014	187		3836	201	
	Mean	-.26	1.04	-1.30**	.34	.31	.03
2001	N	3975	125		3169	112	
	Mean	.26	.10	.17	2.75	.58	2.17*

Panel B.3. Return on cash-adjusted assets

Year		Average of three-year before event			Average of three-year after event		
		Non-merged firms (NM)	Combined firm (C)	Difference (NM - C)	Non-merged firms (NM)	Combined firm (C)	Difference (NM - C)
1988	N	3934	133		3969	135	
	Mean	-.516	.3153	-.831	-108.9	-1.431	-107.4
1989	N	4020	126		3964	125	
	Mean	.2095	.5886	-.379	-1.14	-.902	-.238
1990	N	4012	92		3975	94	
	Mean	1.789	-.113	1.9016	-2.435	.1082	-2.543
1991	N	3660	91		4028	93	
	Mean	-.916	-1.175	.2593	.1214	.5446	-.423
1992	N	3964	115		4130	117	
	Mean	-1.14	-.368	-.772	-1.259	-.45	-.809
1993	N	3975	139		4423	138	
	Mean	-2.435	3.4015	-5.836	-3.413	.0449	-3.458
1994	N	4028	112		4511	124	
	Mean	.1214	.8189	-.698	1.157	-.784	1.941
1995	N	4130	247		4829	261	
	Mean	-1.259	-.259	-1	-1.483	-.454	-1.029
1996	N	4423	286		4715	284	
	Mean	-1.14	-.902	-.238	-1.66	-.598	-1.062
1997	N	4511	325		4305	310	
	Mean	-.916	-1.175	.2593	1.157	.7442	.4128
1998	N	4829	382		4271	362	
	Mean	-1.483	.87	-2.353	1.157	-.784	1.941
1999	N	4715	378		4297	353	
	Mean	-1.66	1.1404	-2.8	.3482	-.552	.8999
2000	N	4305	255		4162	272	
	Mean	-1.14	-.368	-.772	-3.413	.0449	-3.458
2001	N	4271	165		3479	141	
	Mean	1.157	.7442	.4128	-.289	.1579	-.447

Panel B.4. Return on sales

Year		Average of three-year before event			Average of three-year after event		
		Non-merged firms (NM)	Combined firm (C)	Difference (NM - C)	Non-merged firms (NM)	Combined firm (C)	Difference (NM - C)
1988	N	3891	133		3897	135	
	Mean	4.867	1.275	3.5919	-8.39	-.976	-79.42
1989	N	3960	126		3901	125	
	Mean	-13.07	31.627	-44.7	24.677	-1.423	26.099
1990	N	3960	91		3926	93	
	Mean	12.706	.0993	12.606	-7.344	.5175	-7.862
1991	N	3597	91		3958	92	
	Mean	-1.094	-.147	-.948	79.035	1.4847	77.55
1992	N	3901	115		4057	117	
	Mean	24.677	106.08	-81.4	5.0089	-.271	5.2802
1993	N	3926	138		4359	139	
	Mean	-7.344	7.1108	-14.46	-.065	.2422	-.307
1994	N	3958	112		4466	124	
	Mean	79.035	1.2428	77.792	22.771	-.343	23.114
1995	N	4057	247		4797	259	
	Mean	5.0089	-6.852	11.861	-1.581	1.5298	-3.111
1996	N	4359	288		4664	284	
	Mean	-.065	.7769	-.842	32.626	.2731	32.353
1997	N	4466	323		4327	308	
	Mean	22.771	.0692	22.702	-85.57	-.022	-85.54
1998	N	4797	379		4362	363	
	Mean	-1.581	19.595	-21.18	-35.17	-.975	-34.2
1999	N	4664	379		4349	358	
	Mean	32.626	3.1885	29.438	-33.45	2.186	-35.63
2000	N	4327	256		4170	273	
	Mean	-85.57	1.3671	-86.93	38.275	1.6631	36.612
2001	N	4362	168		3563	145	
	Mean	-35.17	2.4494	-37.62	-107.1	-17.29	-89.78

Panel B.5. Sales growth

Year		Average of three-year before event			Average of three-year after event		
		Non-merged firms (NM)	Combined firm (C)	Difference (NM - C)	Non-merged firms (NM)	Combined firm (C)	Difference (NM - C)
1988	N	3539	126		3703	130	
	Mean	-25.07	1.4849	-26.56	-8.942	-6.043	-2.899
1989	N	3677	96		3700	100	
	Mean	-15.41	-9.014	-6.396	-3.37	-2.865	-.505
1990	N	3443	91		3711	93	
	Mean	-29.25	-4.37	-24.88**	54.811	-1.127	55.939
1991	N	3703	114		3713	118	
	Mean	-8.942	.1234	-9.066**	-13.93	88.369	-102.3
1992	N	3700	134		3831	130	
	Mean	-3.37	.3593	-3.729	-15.89	228.43	-244.3**
1993	N	3711	116		4083	129	
	Mean	54.811	1.5831	53.228	-64.53	-.728	-63.8
1994	N	3713	244		4054	262	
	Mean	-13.93	2.1385	-16.07	-16.02	-.918	-15.1
1995	N	3831	259		4345	302	
	Mean	-15.89	.1769	-16.07	-29.27	-4.706	-24.56
1996	N	4083	318		4170	324	
	Mean	-64.53	4.3547	-68.89	-47.42	-8.801	-38.61
1997	N	4054	367		3917	377	
	Mean	-16.02	-.428	-15.59*	7.889	-7.862	78.751
1998	N	4345	375		4009	364	
	Mean	-29.27	-1.34	-18.93	-7.03	-12.75	5.7194
1999	N	4170	249		3977	282	
	Mean	-47.42	-1.74	-45.68	-34.61	-13.06	-21.55
2000	N	3917	165		3461	153	
	Mean	7.889	-5.496	76.385	-79.65	-3.747	-75.91
2001	N	4268	394		4175	357	
	Mean	-31.27	-12.34	-18.93	-5.03	-1.75	5.7194

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