

# **Market Misvaluation and Merger Activity: Evidence from Managerial Insider Trading**

Mehmet E. Akbulut<sup>1</sup>

Marshall School of Business  
University of Southern California

## **ABSTRACT**

This paper tests the empirical predictions of the market misvaluation theory of mergers advanced by Rhodes-Kropf and Vishwanathan (2004) and Shleifer and Vishny (2003) using data on managerial insider trading around merger announcements. To the extent that managerial trading is motivated by misvaluation, I find consistent differences in the merger characteristics and long-run returns of overvalued and undervalued firms. Overvalued firms are more likely to conduct stock mergers, have high pre-merger but negative post-merger excess long-run returns and receive negative market reaction to their acquisition announcements. My results support the theory that market misvaluation affects merger activity.

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<sup>1</sup> Ph.D. candidate in Finance, Marshall School of Business, University of Southern California, 701 Hoffman Hall, Los Angeles, CA 90089, Phone: 213-740-6884, Fax: 213-740-6650, E-mail: akbulut@usc.edu



*... "Sometimes there is confusion between write-offs and the creation and destruction of value. Given that the acquisitions were virtually [all] paid in shares, not cash, this non-cash charge does not represent any value destruction."*

Jean-Marie Messier, chief executive of Vivendi Universal, announcing a €5.7bn write-off, mostly linked to its \$34bn acquisition of Seagram and €2.5bn purchase of Canal Plus.

DO MANAGERS ENGAGE IN COSTLY ACQUISITION SPREES FOR STOCK when they perceive their own company stock as overvalued? While academics and investors alike started entertaining this possibility heavily after witnessing the giant stock-merger deals of late 1990s, Jean-Marie Messier, who as the CEO of the French water utility company Vivendi engaged in a \$100 billion acquisition spree that almost ended in bankruptcy, became -to best of my knowledge- the first to publicly admit it.

Many of the giant stock-merger deals of the late 1990s turned out to be immensely value-destroying for the acquirer shareholders. Moeller, Schlingemann, and Stulz (2003) show that from 1998 through 2001, a small number of acquisition announcements by firms with extremely high valuations are responsible for a \$240 billion loss in acquirer firm value. A particularly famous example is the AOL-Time Warner merger, which with a deal value of \$156 billion, was the biggest merger in corporate history and resulted in a record value destruction of \$31.2 billion for AOL at the announcement of the merger.<sup>2</sup> AOL paid a 70% premium for Time Warner using its stock as the acquisition currency. Despite this large premium and the loss of value at the announcement, many observers believe today that AOL got an excellent deal as its stock was overvalued: "...in early 2002 AOL Time Warner said it would take a \$54 billion charge—the largest in U.S. business history —because the value of the stock it used to buy Time Warner had plunged. That was a tacit admission that the deal had been overvalued... (Washington Post, 7/19/2002)".

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<sup>2</sup> Calculated as the dollar change in AOL's market value in excess of the dollar change in CRSP value weighted market index from days -2 through day +1 relative to the merger announcement day.

The positive relationship between high stock market valuations and merger activity is well-documented: it has been known as early as Nelson (1959) that merger activity peaks in periods of high market valuations. More recently Andrade et al. (2001), confirms Nelson's findings and further shows that the preponderance of stock acquisitions is greater in higher valuation markets. The eagerness of acquirers to use their stock as “acquisition currency” during the times of high market valuation led researchers to argue that they might be overvalued. For example, Loughran and Vijh (1997) and Rau and Vermaelen (1998) present evidence from acquirer long-run returns and argue that overvalued bidders pay with equity to acquire targets at a bargain price whereas undervalued bidders choose cash.

Two recent theories attempt to model the effect of stock market valuations on merger activity. Shleifer and Vishny (2003) propose a model with rational managers and an irrational stock market where mergers are driven purely by investor misvaluation and can occur even in the absence of any synergies. In their model, target managers maximize their own short run private gain instead of long-term shareholder value, making them likely to accept stock bids by the overvalued acquirers. Rhodes-Kropf and Vishwanathan (2004) propose a model where markets are rational but potential market value deviations from fundamental values on both sides of the transaction can rationally lead to a correlation between stock merger activity and market valuation.

Although different in their assumptions about market rationality, both Shleifer and Vishny (2003) and Rhodes-Kropf and Vishwanathan (2004) models yield the same empirical predictions. However any test of these empirical predictions first has to deal with the problem of measuring misvaluation. One way of measuring whether the acquirer was overvalued at the acquisition date is to look at post-event long-run abnormal stock returns.<sup>3</sup> However as Dong et al. (2003) note, there has been much debate about whether evidence of abnormal long-run post-event average returns implies stock market inefficiency with respect to the event (see Fama (1998), Loughran and Ritter (2000), Daniel, Hirshleifer and Teoh (2002), Mitchell and Stafford (2001)). Also in long-run event studies the results are highly sensitive to the choice of “normal” return benchmarks and the method for compounding returns; see e.g. Barber and Lyon (1997).

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<sup>3</sup> See Frank, Harris and Titman (1991), Loughran and Vijn (1997) and Rau and Vermaelen (1998)

Two recent studies attempt to test the misvaluation theories by measuring misvaluation using accounting multiples. Dong et al. (2003) define market misvaluation as the discrepancy between the market price and a contemporaneous measure of the fundamental value. To measure the fundamental value they use the ratio of book value of equity to price (B/P) and the ratio of residual income model value to price (V/P). Rhodes-Kropf et al. (2004) use market-to-book (M/B) as a measure of misvaluation. They decompose M/B into a “misvaluation component” and a “growth component” and calculate measures of fundamental value by running cross sectional regressions of market values on accounting fundamentals each year. While both studies find supporting evidence for the misvaluation theory, their dependence on accounting variables to measure misvaluation raises some concerns. First, accounting variables are easily distorted by non-economic events like management manipulation and changes in reporting requirements. Second, they might be proxying for effects other than misvaluation. For example the ratio of book value of equity to price (B/P) may also capture risk (see Daniel, Hirshleifer, and Subrahmanyam (2001) and Barberis and Huang (2001)), growth opportunities, information asymmetry or managerial discipline. Dong et al. (2003) acknowledge this and use V/P as a supplementary measure. However they note that there is still the possibility that V/P might be proxying for risk. Rhodes-Kropf et al. (2004) criticize Dong et al. (2003) for not separately identifying changes in growth opportunities, expected returns and misvaluation. The variable they use is M/B, which is a well-known proxy for future growth opportunities. They attempt to purify it by subtracting the growth component from M/B. However their fundamental value measures are derived from accounting variables and to the extent they cannot capture the true value, their measures of misvaluation will also reflect time-varying risk premia and growth opportunities.

In this paper, I test the market misvaluation theory of mergers using the information contained in the managerial insider trades prior to the mergers. My analysis consists of two main parts: First, I present evidence on the information content of managerial insider trading and show that managers trade opportunistically prior to merger announcements. Second, I construct a misvaluation measure using the level and direction of managerial insider trading prior to mergers and use it to test the empirical predictions of the market misvaluation theory. Shleifer and Vishny (2003) explicitly mention managerial insider trading as a possible consequence of being

overvalued and to the best of my knowledge this is the first paper which uses managerial insider trading to test the market misvaluation theory of mergers. Unlike the misvaluation measures used by Dong et al. (2003) and Rhodes-Kropf et al. (2004), my measure does not require the calculation of the “*true value*” of the firm. Instead, I measure the “perceived misvaluation” by the managers. I argue that firms where managers are net-sellers in company stock in their private portfolios are perceived to be *overvalued* by their managers whereas firms where managers are net-buyers are perceived to be *undervalued*. Accordingly, higher levels of net-selling relative to the common stock holdings of the managers represent higher levels of overvaluation and higher levels of net-buying represent higher levels of undervaluation.

My misvaluation measure is nevertheless closely related to pricing multiples like B/P and M/B used by Dong et al. (2003) and Rhodes-Kropf et al. (2004), but it provides a more direct way of measuring misvaluation. Recent research shows that managerial trading activity is not randomly distributed among value and growth stocks. Rozeff and Zaman (1998) show that managers in growth firms tend to sell more equity than managers in value firms, i.e. they have “contrarian” views about their firms. They interpret this as evidence that the market overvalues growth stocks and undervalues value stocks. Jenter (2003) finds evidence for the contrarian nature of managerial trading even after controlling for non-information motives for trading by keeping managerial ownership levels and compensation grants constant. In short, Rozeff and Zaman (1998) and Jenter (2003) document the relation between managerial trading and pricing multiples, while Dong et al. (2003) and Rhodes-Kropf et al. (2004) use pricing multiples to measure market misvaluation. My approach measures market misvaluation directly from managerial trades without the intermediate step of using the pricing multiples. This results in a more natural measure which does not suffer from the limitations of price multiples described above.

Central to my measure is the information content in the insider trades of the managers. The information content of insider trading has been well documented (see Jaffee 1974, Finnerty 1976 and Seyhun 1986, 1988). Seyhun (1986) shows that insiders earn an average 3% abnormal return on their transactions. Studies examining insider trading around important corporate announcements indicate significant changes in trading patterns before the public announcement.

Penman (1982) shows that corporate insiders time their trades relative to announcements of earnings forecasts and earn positive abnormal returns. Elliot et al. (1984) find evidence of increased buying prior to extremely favorable earnings announcements and of increased selling prior to extremely unfavorable earnings announcements. Lee et al. (1992) find increased buying and reduced selling prior to repurchase tender offers. Karpoff and Lee (1991) find increased selling prior to seasoned offerings of common stock. Seyhun (1990b) analyzes the insider trades of acquirer firm managers around mergers and tender offers and finds that managers increase their net purchases prior to good acquisitions (as characterized by announcement abnormal return) and prior to bad acquisitions there is an insignificant increase in net selling. He interprets this as evidence that there are *some* top executives who sell stock in their own firms prior to value-decreasing acquisitions. Recently Akbulut (2005a), using a sample of 2,105 mergers from 1983 to 2001 shows that acquirer-firm managers trade opportunistically prior to the merger announcements by abnormally increasing their sales prior to stock mergers and “bad” mergers and their purchases prior to cash mergers and “good” mergers.<sup>4</sup> He interprets these results as evidence that managers trade opportunistically prior to the mergers to take advantage of the insider information they possess about the value of their firm. These findings also confirm Shleifer and Vishny (2003)’s prediction that there would be increased insider selling prior to stock acquisitions, because those deals are more likely to be overvalued.

I classify acquirer and target firms as “overvalued” or “undervalued” based on the level and direction of net trading by the managers in the year prior to the merger announcement. To the extent that managerial trading is motivated by misvaluation, I find persistent differences in acquisition characteristics, methods of payment used, announcement abnormal returns and long run abnormal stock returns of the firms perceived as overvalued and undervalued by their managers. First, consistent with the market misvaluation theory, overvalued acquirers prefer stock as the method of payment whereas undervalued acquirers prefer cash. Moreover, acquirers are more likely to use stock when the target is overvalued.

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<sup>4</sup> “Bad” and “Good” mergers are characterized as having a 4-day announcement cumulative abnormal return of more than less than -10% and more than 10% respectively.

Second, acquirer and target announcement period abnormal returns are negatively correlated with the degree of acquirer and target overvaluation and this correlation is strongest in stock mergers. The most overvalued acquirers and targets in stock mergers have 2.7% and 6.3% lower average announcement cumulative abnormal returns (CAR) respectively than the most undervalued ones. Moreover, target overvaluation greatly affects acquirer announcement abnormal returns; acquirers in stock mergers that buy the most overvalued targets have 4.2% lower average announcement CAR than those that buy the most undervalued targets. These results suggest that market at least partially corrects for preexisting acquirer and target misvaluation at the merger announcement.

Third, overvalued acquirers have higher pre-merger but lower post-merger excess returns than undervalued acquirers and this difference is strongest in stock mergers. The most overvalued acquirers underperform the most undervalued acquirers by 9.4% (0.78% per month) in all mergers and 19% (1.58 % per month) in stock mergers one year after the merger using calendar time portfolio regressions method. Moreover, the underperformance in stock mergers is robust to using value-weighted returns instead of equal-weighted returns, using a different asset pricing model and using Buy-and-Hold abnormal returns method instead of calendar-time portfolio abnormal returns. These findings document an eventual correction of the pre-merger misvaluation in the long run.

Finally, consistent with the predictions of the Shleifer and Vishny (2003) model, overvalued acquirers make more diversifying acquisitions because when they are overvalued, there is a good chance that their industry is also overvalued. Targets require higher bid premiums when they are undervalued and are more likely to resist offers from undervalued acquirers confirming the prediction of Shleifer and Vishny (2003) that target resistance to takeover bids benefits target shareholders. Overall, my results are supportive of the market misvaluation theory of mergers.

The rest of the paper is organized as follows. Section I describes the data and method. Section II tests the empirical predictions of the market misvaluation theory. Section III concludes.



## I. Data and Method

### A. Sample Description

I searched the Securities Data Corporation (SDC) Platinum Mergers & Acquisitions database for completed mergers between public companies from January 1983 to December 2001 where:

- The acquirer owns less than 5% of the target prior to the acquisition and buys the rest with the acquisition
- Data on method of payment, whether the deal was hostile or not and bid premium is available.
- There is price and return data for both acquirer and the target in the University of Chicago's Center for Research in Security Prices (CRSP) database
- There are no other corporate announcements like share repurchases, stock splits etc. concurrent with the merger announcement

These requirements result in an initial sample of 2,564 mergers. Next I search for the insider trades of the acquirer and target firms' managers in the Thomson Financial Insiders Database (IDF). To ensure that each firm has enough insider data coverage prior to the merger I require the first entry in the IDF database for a firm to be at least 13 months prior to the merger announcement. As a result, 459 mergers are eliminated due to insufficient IDF coverage of the acquirer firm. Out of the 2,105 remaining mergers, 135 are eliminated due to insufficient IDF coverage of the target firm. The final sample has 1,970 acquisitions, for which insider trading data for both acquirer and target firms is available.<sup>5</sup>

Table 2 presents the summary statistics for the merger data. Acquirers are substantially bigger than targets and heavily use stock to finance their mergers as opposed to cash, 49.2% versus 24.3% of the time. While acquirers earn a negative announcement abnormal return of -1.3%, acquisitions on average create value, the average 4-day announcement abnormal return for the

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<sup>5</sup> When examining the abnormal acquirer insider trading activity around the mergers, I use the entire 2,136 mergers for which acquirer insider trading data is available. For the remaining of the paper, the final sample of 1,970 mergers is used.

combined firm is 1.2%. Figures 1a and 1b show the annual distribution of merger activity from 1983 through 2001. The stock-merger wave of the late 1990s is clearly visible; from 1995 to 2001, not only the majority of mergers are stock mergers, but these mergers also represent the highest-value deals measured as a percentage of the total market capitalization of all public firms in the CRSP database.<sup>6</sup>

The insider trading data comes from the IDF database, which lists the amount, type and date of each trade as well as the title of the insider from January 1983 to December 2001. To focus on information-related trades, I analyze the direct open market sale and purchase transactions of the managers involving at least 100 shares.<sup>7</sup> Using the managerial position descriptions in IDF database, I categorize the managers in to three disjoint groups ranked in the order of importance: chief executive officers (CEOs), directors of the board and officers. If a person appears in more than one group, I include him only in the one which has the highest ranking. Since I am only interested in the managers' evaluation of their firms, I exclude institutional shareholders and large individual shareholders who are not managers. Finally I exclude the firms in IDF database which could not be matched to CRSP database based on the CUSIP code.

### *B. Measuring Misvaluation*

My main aim in this paper is to understand how market misvaluation influences merger activity. Market misvaluation can drive merger activity if the managers are opportunistic and take advantage of the discrepancy between their valuation and market's valuation of their firms. If the acquirer is overvalued, then the opportunistic managers will try to use company stock as overvalued acquisition currency and buy other firms with it, before the market finds out about the acquirer's true value. This is not the only opportunistic behavior triggered by overvaluation; as long as the managers believe their firm is overvalued, they will try to liquidate their personal holdings of own company stock at the overvalued market prices and refrain from buying it on the open market. This will lead to an increase in managerial sales and a decrease in purchases during

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<sup>6</sup> For each year from 1983 to 2001, the percentage of total market capitalization acquired is calculated by dividing the total market value (measured at 3 days prior to the merger announcement) of the target firms acquired in that year by the total market value at the beginning of that year of all public firms available in the CRSP database.

<sup>7</sup> Nevertheless, I also present results for the value of stocks purchased through option exercises from time to time for information, since most of the stock sold on the open market comes from purchases through option exercises.

the periods when the firm is believed to be overvalued by its managers. As a result, the managers in overvalued firms will be more likely to be net sellers than net buyers in their firms' stock.

However, managers can be trading for a variety of reasons like portfolio rebalancing, diversification or liquidity needs. In order to make sure that the trades I am looking at represent significant changes in holdings rather than marginal portfolio readjustments, I need to control for the wealth of the managers. Since it is impossible to calculate the actual wealth of managers, the best I can do is to come up with a reasonable proxy. I use the value of common share holdings as a proxy for wealth. For each transaction, IDF database reports the number of shares held after that transaction. Using this data, I construct the number of common shares held at one-year prior to the merger announcement date. My measure does not include the value of option holdings, stock grants or salaries and bonuses, since IDF database doesn't have this data. While it is possible to obtain data on the top five paid executives from Execucomp database, doing so would cover only 5% of all the managers in my data. Since I would like to use the information contained in the trades of all managers, not just the highest ranked ones, I decided to use the common shares held as an imperfect proxy for wealth.

I measure the firm-level misvaluation at the merger date by calculating the ratio of total dollar net purchases (purchases minus sales) by the managers during the one-year period prior to the merger to total value of their common stock holdings one year prior to the merger announcement date. I name this variable as NET. Negative values for this variable mean managers as a whole are net-sellers in company stock whereas positive values mean they are net-buyers. By using the ratio of trading to existing stockholdings rather than absolute dollar values, I am able to capture the importance of the trades relative to the managers' existing common share holdings. I then classify firms based on the direction and intensity of managerial trading using the variable NET. Firms for which NET is less than zero are net-seller firms, firms with NET equal to zero are no-trading firms (NO) and firms with positive NET are net-buyer firms. I then sort net-seller firms by the values of NET and label the bottom one-third as high net-sellers (HS), the middle one-third as medium net-sellers (MS) and the top third as low net-sellers (LS). I label the firms with no trading (NET=0) as NO. Similarly, I sort net-buyer firms by the values of NET and label the bottom one-third as low net-buyers (LB), middle one-third as medium net-buyers (MB) and top

one-third as high net-buyers (HB). My final classification from highest net-sellers to highest net-buyers is as follows: HS, MS, LS, NO, LB, MB and HB. If managerial trading activity indeed reflects managers' own beliefs about firm value, then managers in HS firms will have the highest degree of perceived overvaluation whereas managers in HB firms will have the highest degree of perceived undervaluation. Finally I define two summary groups, total net-sellers (TS) and total net-buyers (TB) which include HS, MS, LS and LB, MB, HB groups respectively.

Table 3a shows the summary statistics for NET across different trading activity categories<sup>8</sup>. During the one-year period prior to the merger, managers in HS firms sell on average 143.7% of their beginning common share holdings in acquirer firms and 114.6% in target firms<sup>9</sup>. These highly negative values for NET seem to suggest that at least for some firms, there is a serious attempt by managers to abandon stock prior to acquisitions. Whether or not this represents an abnormal pattern of trading will be addressed later.

Table 3b presents the pairwise correlations of NET variable with firm characteristics for both acquirer and target firms. While most of the correlation coefficients are significant, none of them is higher than 0.15 in absolute value, and the correlations get much smaller if we look at the targets subsample, suggesting that NET is not proxying for firm characteristics. Correlations between NET and other potential misvaluation measures like book-to-price ratio (B/P) and past returns (RET1 and RET2) are relatively high at 0.14, -0.13 and -0.10 respectively for the acquirer firms suggesting that it is crucial to control for these variables when assessing the strength of NET in measuring misvaluation.

There are two main methodological concerns with my method of measuring misvaluation. First, I must establish that managerial trades are on average informed trades. If the managers are trading due to non-informational reasons, then my measure will not capture their beliefs about the true value of the firm. Second, I must show that the managers behave opportunistically in their personal trades and make use of their insider information. Opportunistic managers will decrease

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<sup>8</sup> There were a total of 6 observations where the value of the beginning-of-the-period was very small, resulting in very large positive or negative values for NET. To prevent this, those observations were assigned a NET of 2000% or -2000% depending on the sign.

<sup>9</sup> It is possible to have NET smaller than -100% because managers might purchase stock through options exercises and sell them on the open market, driving NET below -100%.

their purchases and increase their sales if they believe that their firm is overvalued. If the managers are optimistic however, they may expect their firm's value to increase further. Therefore they may increase their purchases and decrease their sales. As a result my misvaluation measure will incorrectly identify these overvalued firms as undervalued.

Akbulut (2005a) calculates cumulative abnormal returns for different event windows following open market sales and purchases of the managers. Table 4 is replicated from Akbulut (2005a). Table 4 shows that purchases are followed by positive cumulative abnormal returns of 0.8% in 5 days to 1.6% in 15 days whereas sales are followed by small positive returns. Akbulut (2005a) shows that there are significant return reversals following the sales events, suggesting that managers successfully time their sales to coincide with peak stock valuations. These results are qualitatively in line with the literature<sup>10</sup> and suggest that managerial trades examined in this paper are on average motivated by managers' inside information about the true value of the firm.

In order to see whether managers on average trade opportunistically, I need to look at the abnormal changes in the managerial trading activity around merger announcements. Opportunistic managers will increase (decrease) their sales and decrease (increase) their purchases prior to the announcement of bad (good) mergers if they are able to anticipate the value consequences of the merger. Similarly, they will increase (decrease) their sales and decrease (increase) their purchases prior to the announcement of stock (cash) mergers since using stock (cash) as the method of payment may signal that the acquirer is overvalued (undervalued).<sup>11</sup> Akbulut (2005a) examines the abnormal managerial insider trading around 2,105 merger announcements from 1983 to 2001. He finds strong evidence for managerial opportunism: managers increase their sales significantly prior to stock mergers and "bad" mergers, whereas no such change is observed prior to cash mergers and "good" mergers, after controlling for non-informational motivations for trading like portfolio rebalancing,

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<sup>10</sup> See Jaffe (1974), Finnerty (1976), Seyhun (1986, 1998), Rozeff and Zaman (1988), Lin and Howe (1990), Jeng, Metrick and Zeckhauser (1999)

<sup>11</sup> If managers have more information about the true value of the firm than the market, they will want to issue new equity when they think that their stock is overvalued (Myers and Majluf, 1984). An extensive empirical literature shows that seasoned equity issues are associated with negative announcement returns of about -3 percent on average (Smith, 1986), and the returns from merger announcements are about 3 percent lower when stock is used instead of cash (Andrade et al., 2001). These findings seem to suggest that overvalued firms prefer stock as a method of payment whereas undervalued firms prefer cash.

diversification and wealth effects.<sup>12</sup> Table 5 is replicated from Akbulut (2005a) and it shows regressions of quarterly managerial net-purchases in dollars and as a percentage of prior holdings on various control variables and dummy variables indicating whether a given firm is an acquirer or a target in a good or a bad acquisition one, two, three and four quarters from the current quarter. The results show that acquirer and target managers abnormally increase their net-sales prior to bad mergers. On the other hand neither acquirer nor target managers exhibit any abnormal increases in net-purchases prior to good mergers. Finally, acquirer managers in bad mergers sell significantly more in both dollar and percentage terms than acquirer managers in good mergers. Next I examine the managerial trading patterns around stock and cash mergers. Table 6-replicated from Akbulut (2005a)-shows that both acquirer and target managers significantly increase their sales prior to stock mergers and increase their purchases prior to cash mergers.

Taken together, the evidence from good versus bad and stock versus cash acquisitions suggest that the managers trade opportunistically in their personal portfolios around the mergers. Moreover, the evidence from stock versus cash acquisitions seems to be consistent with a misvaluation story where the managers take advantage of their private knowledge about the value of the firm in their personal trades. Therefore, examining the managerial trades prior to the mergers gives us a good indication of the degree of misvaluation of the firm.

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<sup>12</sup> Stock (cash) mergers are those where the payment is fully made in stock (cash). “Bad” and “Good” mergers are characterized as having a 4-day announcement cumulative abnormal return of more than less than -10% and more than 10% respectively.

## II. Empirical Testing of the Market Misvaluation Theory of Mergers

In this section I test the empirical predictions of the market misvaluation theory by using managerial insider trades in both acquirer and target firms as a measure of misvaluation.

### *A. Acquirer Misvaluation and Merger Characteristics*

Table 7 examines whether there are significant differences in the merger characteristics of acquirers sorted by acquirer valuation levels as measured by managerial trading activity. Panel A presents the results for all acquisitions, Panel B for stock acquisitions and Panel C for cash acquisitions.

Table 7 points to several important differences in the merger characteristics of net-seller and net-buyer acquirers. First, the likelihood of stock payment increases and the likelihood of cash payment decreases as acquirer becomes a higher net-seller: high net-seller (HS) acquirers use stock as the method of payment 56.9% of the time whereas high net-buyer (HB) acquirers use stock 36.4% of the time.<sup>13</sup> Conversely, high net-buyer acquirers are more likely to use cash than high net-seller acquirers.<sup>14</sup> These results are consistent with the market misvaluation theory of mergers, which predicts that overvalued firms will prefer to use stock and undervalued firms will use cash as the method of payment in acquisitions.

Second, acquirer announcement abnormal returns are inversely related with the degree of insider net-selling. The 4-day announcement cumulative abnormal return (CAR) is -2.5% for high net-seller acquirers compared to a mere -0.2% for high net-buyer acquirers. Moreover, this difference mostly comes from stock acquisitions where acquirer announcement CAR is -4.0% for high net-seller acquirers and -1.4% for high net-buyer acquirers and the difference is highly significant. This suggests that the merger announcement itself causes a partial correction of preexisting acquirer overvaluation.

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<sup>13</sup> The difference is 20.5% and significant at the 1% level

<sup>14</sup> The difference is 9.1% and significant at the 5% level.

Third, in cash acquisitions, target announcement CAR is higher if the acquirer is a net-buyer rather than a net-seller. This reflects the higher bid premia paid by net-buyer acquirers, which is 11.9% higher than what net-seller acquirers pay. This suggests that targets are more reluctant to accept bids from undervalued acquirers and require higher bid premia, even if the method of payment is cash. As a result, target shareholders get higher announcement CARs. This is consistent with Shleifer and Vishny (2003)' prediction that management resistance to some cash tender offers is in the interest of target shareholders.

Fourth, consistent with the prediction of the Shleifer and Vishny (2003) model, net-seller acquirers are more likely to make diversifying acquisitions than net-buyer acquirers. Shleifer and Vishny (2003) argue that a high valuation firm might find acquisition targets in the same industry to be very expensive, especially when the whole industry is overvalued. In this case, making a diversifying acquisition for stock might be cheaper for the overvalued firm. Table 7 shows the percentages of diversifying acquisitions completed for each trading group. Diversification is defined as acquirer and target not having a common 2-digit SIC code in their first 6 SIC codes. 13.4% of the acquisitions of net-seller acquirers are diversifying whereas net-buyer acquirers make diversifying acquisitions 9.7% of the time. The difference is higher in stock mergers; 11% for net-seller acquirers and 4.6% for net-buyer acquirers. On the other hand there are no significant differences in the percentage of diversifying acquisitions across different trading levels for cash mergers.

The evidence presented so far shows how acquirer insider trading levels are correlated with merger characteristics. Next I present evidence about the relationship between target insider trading levels and merger characteristics.

### *B. Target Misvaluation and Merger Characteristics*

Sorting acquisition characteristics by target insider trading levels in Table 8 reveals significant differences across different target trading categories. Perhaps the most important difference is observed in the method of payment used; high net-seller targets are much more likely to be acquired for stock than high net-buyer targets: 55.8% of the high net-seller targets are acquired



for stock, compared to 41.1% for high net-buyer targets.<sup>15</sup> Conversely, high net-buyer targets are more likely to be acquired for cash than high net-seller targets.<sup>16</sup> These results are consistent with the prediction of the misvaluation theory that acquirers prefer to use stock to buy overvalued targets because this way they can make the target shareholders shoulder some of the possible decrease in acquirer stock price resulting from paying too much for the target. Two possible explanations were offered to explain why target managers should agree to be acquired for overvalued stock. Shleifer and Vishny (2003) assume that the target managers have a relatively short horizon than acquirer managers and they want to sell out for reasons of retirement or ownership of illiquid stock options. In this case they will accept the offer, exchange their overvalued target shares for overvalued acquirer shares and sell out. The market is assumed to be irrational and therefore does not react to this exploitation. Rhodes-Kropf and Vishwanathan (2004) suggest that the rational target correctly adjusts bids for overvaluation, but when the market-wide overvaluation is high, the target overestimates the synergies from the merger because it underestimates the market-wide misvaluation and hence accepts the bid.

Acquirer announcement CAR decreases monotonically as the target firm becomes a higher net-seller. Acquirers of high net-seller targets earn an announcement CAR of -2.9% compared to -0.2% for the acquirers of high net-buyer targets. Once again, this difference is more pronounced in stock mergers; -5.0% for acquirers of high net-seller targets compared to -0.7% for acquirers of high net-buyer targets.<sup>17</sup> A possible interpretation is that market realizes the overvaluation of the target at the merger announcement and conjectures that the acquirer is likely to be overvalued. Therefore it partially corrects the overvaluation of the acquirer upon merger announcement.

There is also an indication of greater bid premia for high net-buyer targets. This is consistent with the predictions of the Shleifer and Vishny (2003) model, which argues that undervalued targets will resist the bid until it reflects the true value of the firm, thereby driving the bid premium up. The average bid premium for high net-buyer targets is a significant 17% higher than that for high net-seller targets. This high premium is reflected in target announcement CAR

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<sup>15</sup> The difference is 14.7% and significant at the 1% level

<sup>16</sup> The difference is 9.5% and significant at the 5% level

<sup>17</sup> Both differences are significant at the 1% level

too; high net-buyer targets have a significant 4.7% higher average announcement CAR than high net-seller targets. However I do not find any evidence of increased probability of hostile bids for the undervalued targets.

### *C. Long-Run Raw Stock Returns*

The evidence presented so far seems to be consistent with the market misvaluation story. Sorting the mergers based on prior managerial trading activity in acquirers and targets yields significant differences in merger characteristics among firms in which managers are net-sellers and those in which managers are net-buyers. However central to my interpretation is the correlation between managerial trading patterns and misvaluation. One way of understanding whether managerial trades are motivated by misvaluation is to look at pre-merger and post-merger long-run returns. Market misvaluation theory predicts that overvalued firms will have high pre-merger returns and abnormally high insider sales prior to the merger and negative long-run returns after the merger as the market gradually corrects the overvaluation. On the other hand undervalued firms will have low pre-merger returns but high post-merger returns. To explore this prediction, pre-merger and post-merger total stock returns are calculated for acquirers and targets. Total returns are calculated for two different periods: the one-year period between two years prior to the merger and one year prior to the merger ( $t-2, t-1$ ) and the one-year period prior to the merger ( $t-1, t$ ). Table 9a presents the results.

Table 9a reveals a clear difference in the pre-merger and post-merger returns of net-seller and net-buyer acquirers, consistent with the predictions of market misvaluation theory. Acquirers with the highest pre-merger net-selling also have the highest pre-merger stock returns and this difference is more dramatic for stock mergers; high net-seller acquirers in stock mergers have on average 40.1% higher past stock returns than high net-buyers. This pattern is completely reversed after the merger, with high net-seller firms in stock mergers earning a significant 35% lower average post-merger return than high net-buyer firms in the year following the merger.

There is also evidence suggesting that overvalued targets are acquired mostly by overvalued acquirers: the targets of high net-seller acquirers earn 19.6% higher past stock returns in the year

before the merger than the targets of high net-buyer acquirers. Moreover, the results from Table 9b -which presents acquirer and target raw returns sorted by target insider trading levels- shows that the acquirers of high net-seller targets have 20.1% higher pre-merger one-year returns than the acquirers of high net-buyer targets. Before drawing any further conclusions however, I need to make sure that the observed differences in raw returns of net-seller and net-buyer firms are not just due to risk factors that happen to be correlated with managerial trading activity. In order to control for such risk factors, I calculate excess returns next.

#### *D. Long-Run Excess Stock Returns*

There is a lot of controversy surrounding the calculation of long-run excess returns in the literature. Ritter (1991), Barber and Lyon (1997) and Loughran and Vijh (1997) advocate the use of Buy-and Hold Returns (BHARs) whereas Fama (1998), and Mitchell and Stafford criticize the BHAR approach and advocate Calendar-Time Portfolio Regressions approach (CTPR). Since there is no single perfect measure, I employ both methods when calculating long-run excess returns.

##### *D.1 Buy-and-Hold Abnormal Returns (BHAR)*

First I calculate buy-and-hold abnormal returns for the one-year period prior to the merger and the one-year period after the merger. To calculate excess returns, each firm is matched to its corresponding 10x10 Fama-French size and book-to-market portfolio. The matching portfolios, which are constructed at the end of each June, are the intersections of 10 portfolios formed on size and 10 portfolios formed on the ratio of book equity to market equity. The size breakpoints for year  $t$  are the NYSE market equity deciles at the end of June of  $t$ . BE/ME for June of year  $t$  is the book equity in December  $t-1$  divided by ME for December of  $t-1$ . The BE/ME breakpoints are NYSE deciles. The portfolios for July of year  $t$  to June of  $t+1$  include all NYSE, AMEX, and NASDAQ stocks with market equity data for December of  $t-1$  and June of  $t$ , and positive book equity data for  $t-1$ . The breakpoints and portfolio return data was made available by Kenneth French. Buy-and-hold returns are measured over months  $-12, -1$  for pre-merger returns and months  $+1, +12$  for post-merger returns for both the sample firm and the control portfolios, and the difference is recorded as the abnormal buy-and-hold return to the sample firm. Table 10a shows the results sorted by acquirer's managerial trading activity. Once again, there is a pronounced difference between the pre-merger and post-merger return patterns of net-buyer and net-seller acquirers, and this difference mainly comes from stock mergers. For example, in stock mergers, acquirers with the highest insider net-selling earn a significant 40.3% more pre-merger average BHAR than acquirers with the highest insider net-buying. This result is completely reversed in post-merger returns, this time high net-seller acquirers underperform high net-buyer

acquirers by as much as 27.1%.<sup>18</sup> Sorting BHARs based on target's insider trading levels yields similar results: Table 10b shows that a high level of insider net-selling in the target firm is associated with high pre-merger returns for both the target and the acquirer, but low post-merger returns for the acquirer. In stock mergers, acquirers which buy high net-seller targets outperform those which buy high net-buyer targets by 17.2% prior to the merger, and underperform them by 10.5% after the merger. Managerial insider trading activity prior to the merger seems to be closely related to pre-merger and post-merger excess stock return performance.

## *D.2 Calendar Time Portfolio Regressions Method (CTPR)*

As a next step I calculate the long-run excess returns using the calendar-time portfolio regression (CTPR) method. At every month from January 1984 to December 2000, calendar time portfolios are formed by including all the acquiring firms in a given trading activity category (HS, MS, LS, NO, LB, MB and HB) which announced a merger with another company within the previous 12, 24 and 36 months. The portfolio is rebalanced every month to include all the new event companies and to drop off the old ones whose announcement date falls outside of the holding horizon. Both value-weighted and equally weighted monthly returns are calculated for each portfolio and monthly abnormal returns are calculated as the intercepts estimated using both the Fama-French 3-factor model and the Fama-French-Carhart 4-factor model (Carhart 1997). Heteroskedasticity is an important concern in calendar-time portfolio regressions; since the composition of the calendar-time portfolio changes every month, results from a simple OLS specification will be plagued with heteroskedasticity. In order to correct this problem, Hou et al. (2001) suggest the following GARCH (1, 1) specification:

$$R_{pt} - R_{ft} = \alpha_p + \beta_p (R_{mt} - R_{ft}) + s_p SMB_t + h_p HML_t + \varepsilon_t \quad h_p HML_t + \varepsilon_t$$

$$\sigma_t^2 = \omega + \gamma_1 \sigma_{t-1}^2 + \gamma_2 \varepsilon_{t-1}^2 + \gamma_3 N_t$$

where  $\varepsilon_t$  is an independently and identically distributed Gaussian random error,  $R_{pt}$  is the portfolio return,  $R_{ft}$  is the one-month Treasury bill rate,  $R_{mt}$  is the value-weighted monthly return of CRSP index,  $SMB_t$  is the difference in the returns of a value weighted portfolio of

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<sup>18</sup> These results are robust to using value weighted returns instead of equal weighted returns.

small stocks and big stocks,  $HML_t$  is the difference in the returns of a value-weighted portfolio of high book-to-market stocks and low book-to-market stocks, and the intercept  $\alpha_p$  represents the average monthly abnormal return of the event portfolio. In the second equation,  $N_t$  is the number of stocks included in portfolio at month  $t$  and  $\sigma_t^2$  is the conditional volatility of  $\varepsilon_t$ . By making the conditional volatility depend on the number of stocks in the calendar time portfolio each month heteroskedasticity problem is alleviated. I follow the approach of Hou et al. (2001) and estimate the Fama-French 3-factor model using the above specification. Fama-French-Carhart 4-factor model is estimated by adding in the momentum-factor, UMD, to the Fama-French 3-factor model as follows:

$$R_{pt} - R_{ft} = \alpha_p + \beta_p (R_{mt} - R_{ft}) + s_p SMB_t + h_p HML_t + u_p UMD_t + \varepsilon_t$$

$$\sigma_t^2 = \omega + \gamma_1 \sigma_{t-1}^2 + \gamma_2 \varepsilon_{t-1}^2 + \gamma_3 N_t$$

UMD measures the difference in the returns of a value weighted portfolio of two high prior return portfolios minus and the two low prior return portfolios among the six value-weight portfolios formed on size and prior returns and was made available by Kenneth French.

Tables 11a and 11b present the estimates of the  $\alpha_p$ 's which represent the average monthly abnormal return of the event portfolio using Fama-French 3-factor and Fama-French-Carhart 4-factor models respectively. I present the results for 12-month, 24-month and 36-month horizons using both equally weighted and value-weighted returns sorted by acquirer's trading activity.

Table 11a shows that high net-seller acquirers tend to underperform high-net buyer acquirers after the merger and this effect is stronger in stock mergers. For example for the 12-month holding horizon and using equally weighted returns, high net-seller stock-acquirers underperform high net-buyer stock-acquirers by a significant 1.58% which translates into a 19% ( $1.58 \times 12$ ) underperformance in one year after the merger. Using value-weighted returns, the underperformance drops to 1.23% per month, but is still significant. For longer holding horizons, the underperformance weakens because the impact of the event will gradually decline through time and there will be more firms in the portfolio that had the event long ago. Nevertheless, the underperformance of high net-seller acquirers relative to high-net buyer acquirers is still a

significant 1.15% per month for the 24-month holding horizon using equally-weighted returns. These results are robust to using the Fama-French-Carhart 4-factor model instead of the Fama-French 3-factor model; high net-seller acquirers in stock mergers significantly underperform high-net buyer acquirers by 1.47% per month using equally-weighted returns and 1.45% using value-weighted returns for the 12-month holding horizon (Table 11b).

There is also a negative correlation between acquirer long-run abnormal returns and the degree of net selling in the target. Table 11c shows that in stock mergers, acquirers that buy net-seller targets tend to underperform those that buy net-buyer targets. The underperformance is 0.6% per month (which corresponds to 7.2% per year) using the Fama-French 3-factor model with equal weights and a 12-month holding horizon. Similar results obtain using the Fama-French-Carhart 4-factor model, which are not presented here for brevity.

The main conclusion from examining acquirer's calendar-time portfolio abnormal returns is that there is a negative correlation between acquirer's post-merger long-run abnormal returns and the degree of insider net-selling in the acquirer and the target prior to the merger, and this correlation is stronger in stock mergers. This confirms the earlier findings obtained from raw returns and buy-and-hold abnormal returns.

Overall, the evidence from raw and excess long-run returns presented so far is in line with the predictions of the misvaluation theory. The most overvalued acquirers have the highest pre-merger raw and excess returns whereas the most undervalued ones have the lowest. Consistent with the eventual correction of misvaluation, post-merger raw and excess returns are lower for overvalued acquirers and higher for undervalued acquirers. These differences are more pronounced in stock mergers, where the overvaluation is expected to be more severe. Overvalued targets are more likely to be bought by acquirers with high past excess returns, possibly overvalued acquirers: acquirers buying net-seller targets have a pre-merger BHAR of -10.3% compared to -0.6% for acquirers buying net-buyer targets (Table 10b). These findings all point to the preexisting misvaluation of the acquirers and the eventual correction of it in the long run. Moreover these results are robust to alternative methods of calculating excess returns.

### *E. Method of Payment Regressions*

The most important predictions of market misvaluation theory involve the method of payment decision in mergers. Therefore I devote this section to analyze whether market misvaluation is a determinant of the method of payment decision.

Martin (1996) extensively analyzes the determinants of the method of payment decision in mergers. He finds that the higher the acquirer's growth opportunities, as measured by Tobin's Q, the more likely the acquirer is to use stock to finance an acquisition. He also finds that the likelihood of stock financing increases with higher pre-acquisition market and acquiring firm stock returns and decreases with higher cash availability, higher institutional shareholdings and blockholdings and in tender offers.

In order to see the effect of misvaluation on the method of payment decision, I perform multivariate tests using binary and multinomial logistic regression<sup>19</sup> models using a variable measuring misvaluation and variables that Martin (1996) showed to be important determinants of the method of payment decision. There are four dependent variables. The first dependent variable represents the decision between the stock method of payment and cash method of payment, it is equal to 1 if the merger is financed fully with stock, and equal to 0 if it is financed fully with cash. The second dependent variable is equal to 1 if the method of payment is mixed (a combination of cash and stock) and equal to 0 if the method of payment is cash. The third dependent variable is equal to 1 if the method of payment is stock and 0 if the method of payment is mixed. The fourth dependent variable takes on 3 possible values; 3 if the method of payment is stock, 2 if mixed and 1 if cash.

I measure misvaluation both using the continuous NET variable (which is equal to the value of net purchases during the one-year period prior to the merger divided by the value of the common-share holdings one year prior to the merger) and using a discrete rank variable called

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<sup>19</sup> In the multinomial logistic regression, the intercepts are necessary to determining the probability an acquisition will be stock-, mixed-, or cash-financed. For example, to determine the probability of mixed financing as opposed to stock financing, one would subtract the cumulative distribution probability of stock financing (computed using the first intercept) from that of mixed financing (computed using the second intercept).



NETRANK, which takes on 7 values: 1 if the firm is a high net-seller (HS) firm, 2 if the firm is a medium net-seller (MS) firm, 3 if the firm is a light net-seller (LS) firm, 4 if the firm is a no net insider activity (NO) firm, 5 if the firm is a light net-buyer (LB) firm, 6 if the firm is a medium net-buyer (NB) firm, and 7 if the firm is a high net-buyer (HB) firm. By construction, for both NET and NETRANK variables, lower values represent higher levels of overvaluation. I create this rank variable for both acquirer and the target. Dong et al. (2003) use book to price ratio (B/P) of acquirer and target along with the ratio of residual income model value to price (V/P) as a proxy for measuring overvaluation. Lower values of B/P represent higher levels of overvaluation. They find support for the market misvaluation theory using B/P, namely they find that the probability of stock payment increases as B/P decreases. I include B/P in an alternative specification to see whether the overvaluation rank variables still have explanatory power once an alternative measure of overvaluation is included.

For each dependent variable, there are two model specifications. The first model is the simplest form, it only includes the acquirer and target misvaluation variables, diversification dummy, log of target size and log of relative size and some of the variables that Martin (1996) showed to be important for the method of payment decision, namely acquirer cash holdings, acquirer cash flow and acquirer leverage. In the second model, book to price ratios (B/P) and pre-merger one-year returns and volatilities for the acquirer and the target are added to the model to make sure that the misvaluation variables are not simply proxying for these variables. Since B/P and Tobin's Q are very closely related, I do not estimate a separate model using Tobin's Q instead of B/P as was done by Martin (1996). All regressions include year dummies as well as 2-digit SIC industry dummies for both the acquirer and the target based on the classification used by Grinblatt and Moskowitz (1999). Table 12a presents the results using the continuous NET variable and Table 12b presents the results using the discrete NETRANK variable.

The most important result from Table 12a is that the probability of using stock as a method of payment increases as target increases its net-selling. Furthermore, this result is robust to the inclusion of B/P and pre-merger one year return and volatility of the acquirer, all of which are significant predictors of the stock payment decision. The coefficient for the Target NET variable is always negative and significant in models 1-3 and 7-8. On the other hand the coefficient of

acquirer NET variable has the wrong sign and does not seem to be related with the method of payment choice. Other variables have the expected signs, consistent with Martin (1996), the probability of stock payment increases with acquirer's past returns. Consistent with the findings of Dong et al. (2003) the coefficients of acquirer and target B/P variables have negative signs and significantly predict the likelihood of stock method of payment.

When NETRANK variable is used in the regressions instead of NET, results in Table 12b show that the likelihood of using stock rather than cash as the method of payment increases with both acquirer and target overvaluation. The coefficients of acquirer and target NETRANK variables are negative and significant in model 7. Once other potential measures of misvaluation like B/P and past returns are included, the explanatory power of acquirer and target NETRANK variables diminish, but they nevertheless have the correct signs. Target NETRANK variable does a good job in explaining the decision between stock and mixed financing in models 5 and 6, the coefficients are negative, significant and robust to the inclusion of B/P and past returns.

The evidence in Tables 12a and 12b documents a positive relation between the level of net-selling in acquirer and target firms and the likelihood of using stock as the method of payment. This relation is stronger for target net-selling; target NET variable retains its explanatory power even after the inclusion of alternative measures of misvaluation like B/P and past returns. To the extent that managerial trades reflect the managers' inside knowledge about the true value of the firm, these results can be interpreted as being consistent with the key prediction of market misvaluation theory of mergers that the likelihood of using stock as a method of payment increases in acquirer and target overvaluation.

#### *F. Merger Characteristics Regressions*

Tables 13a and 13b explore the effects of misvaluation on acquirer and target announcement CARs and bid premium using ordinary least squares regressions. Table 13a presents the results using the NET variable and Table 13b presents the results using the NETRANK variable. There are two model specifications. In the first specification, the independent variables are acquirer and target NET or NETRANK variables, dummy variables for hostile offer, tender offer, cash

payment and stock payment, log of relative size and log of target size. In the second specification I add B/P ratios of the acquirer and the target to see whether acquirer and target NET and NETRANK variables contain additional information about misvaluation not captured by the B/P ratios. As before, all regressions control for year and acquirer and target industry fixed-effects.

Table 13a shows that acquirer announcement CAR decreases with increased insider net-selling in both acquirer and target firms. The coefficients of acquirer and target NET variables are positive and significant indicating that acquirer CAR increases (decreases) as the acquirer and the target become higher net-buyers (higher net-sellers). Moreover, this result is robust to the inclusion of B/P in the model. To the extent that managerial trading is motivated by inside information about the value of the firm, these results can be interpreted as evidence that overvalued acquirers and acquirers that buy overvalued targets get lower announcement period CAR. This interpretation is consistent with the misvaluation theory and suggests that the market at least partially corrects acquirer overvaluation with the announcement of the acquisition. Acquirer and target net-selling activity does not explain target announcement CAR when NET variable is used. When NETRANK variable is used instead in Table 13b, the results show that acquirer insider net-selling is negatively related to target announcement CAR.

Finally, there seems to be a negative relation between acquirer and target insider net-selling as measured by NETRANK and bid premium suggesting that highest net-buyer acquirers on average pay 6.93% ( $1.16 \times 6$ ) more bid premium than the highest net-seller acquirers and the highest net-buyer targets receive 6.16% ( $1.03 \times 6$ ) more bid premium than the highest net-seller targets. The fact that net-buyer targets receive higher bid premium is in line with the misvaluation story of Shleifer and Vishny (2003) which suggests that undervalued targets will resist to bids demanding higher prices thus driving up the bid premium.

To summarize, both univariate and multivariate tests repeatedly point out to differences in the merger characteristics and long-run returns between the firms grouped by their pre-merger managerial insider trading patterns. While it is possible that managerial trading does not reflect any inside information, it seems unlikely that complete non-informed trading could produce the observed differences between net-seller and net-buyer firms. Both the magnitude and direction of

the differences are consistent with the view that managerial trading is motivated by inside information about the value of the firm. Using managerial trading activity as a proxy for misvaluation, the results are best interpreted as supporting the predictions of market misvaluation theory as advanced by Rhodes-Kropf and Vishwanathan (2004) and Shleifer and Vishny (2003).

### **III. Conclusion**

This paper examined the effects of market misvaluation on merger activity by measuring firm-level market misvaluation as the discrepancy between the valuations of the managers and the market. Data on the personal trades of the managers in their own company stock are used to infer whether the managers regarded their firms as “overvalued” or “undervalued” prior to the mergers. I first establish that the managers on average trade opportunistically rather than optimistically prior to the mergers. I then group the firms as overvalued and undervalued according to the net trading activity of the managers during the one year period prior to the merger. Using my measure of misvaluation, I find consistent differences in the merger characteristics and long-run returns of overvalued and undervalued firms. Market misvaluation explains the method of payment choice, variations in acquirer and target announcement returns, acquirer pre-merger and post-merger long run returns, and bid premium.

Consistent with the market misvaluation theory of Rhodes-Kropf and Vishwanathan (2004) and Shleifer and Vishny (2003), the acquirer prefers stock as the method of payment when it is overvalued and cash when it is undervalued. Acquirers are more likely to buy overvalued targets for stock. There is an abnormal increase in insider selling by the managers prior to the stock mergers, further suggesting that acquirers in stock mergers are more likely to be overvalued. Overvalued acquirers make more diversifying acquisitions, because when they are overvalued, there is a good chance that their industry is also overvalued. Overvalued acquirers have higher pre-merger returns but lower post-merger excess returns than undervalued acquirers. They also have lower announcement returns, because the market corrects for some of the overvaluation at the announcement of the acquisition. Targets require higher bid premiums when they are undervalued and are more likely to resist offers from undervalued acquirers. Target

overvaluation results in lower announcement returns for the acquirer, since the market punishes the acquirer for paying too much for the target. In addition, my results show that target misvaluation seems to affect the method of payment decision more strongly than acquirer misvaluation. My results support the theory that market misvaluation affects merger activity.

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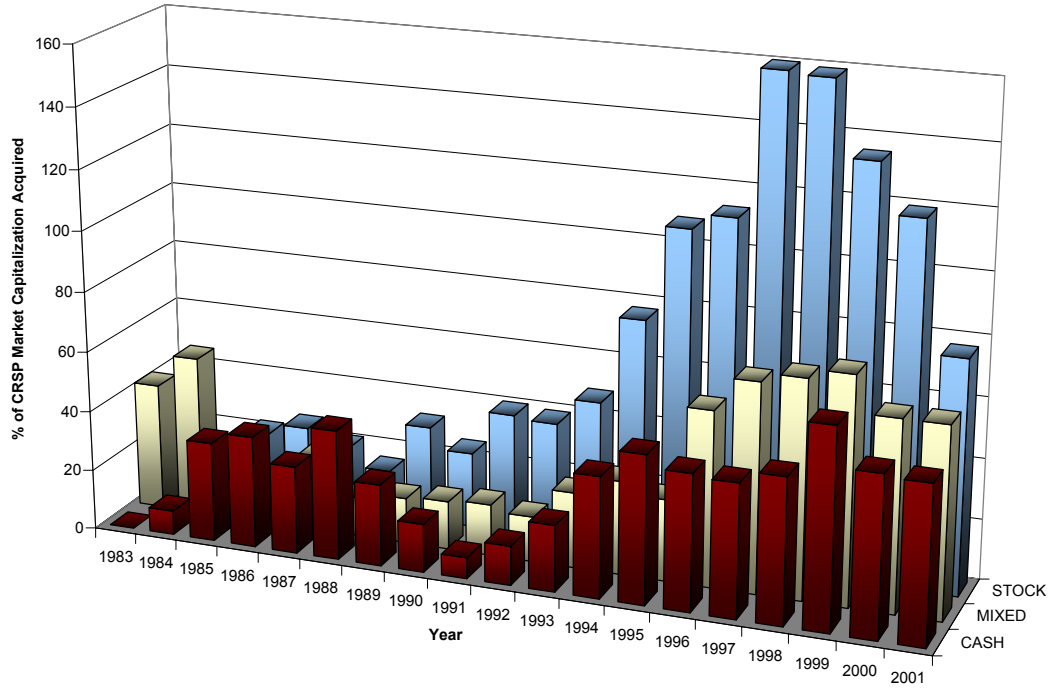
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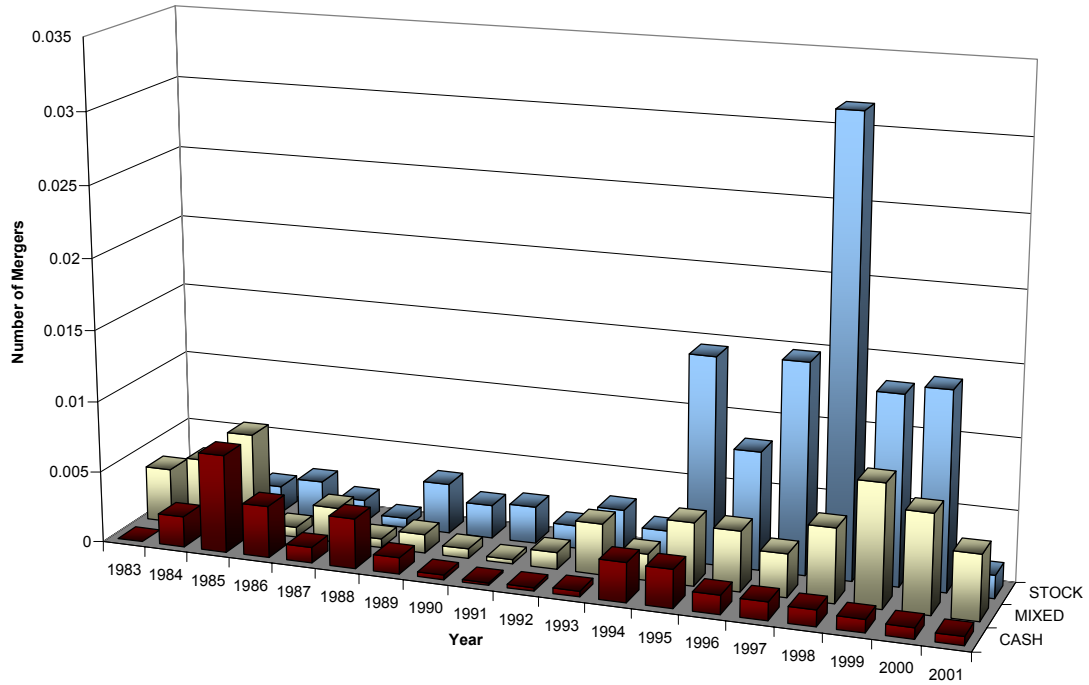
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**Figure 1a**  
Annual Frequency of Mergers by Method of Payment



**Figure 1b**  
Percentage of CRSP Market Capitalization Acquired



**Table 1**  
**Sample Construction**

This table describes the data sources and catalogs the reasons why observations were deleted. Data sources are abbreviated as follows: CRSP is the stock database at the Center for Research in Security Prices at the University of Chicago, SDC is the SDC Platinum Mergers and Acquisitions Database.

	Observations
All public mergers in SDC between 1983-2001 where: -Both acquirer and target have CRSP data -The acquirer owns less than 5% of the target before the merger -There are no other announcements during the 4-day event window	2,564
Acquirer is not in the insiders database	-459
Target is not in the insiders database	-135
<b>Final sample</b>	<b>1,970</b>

**Table 2**  
**Descriptive Statistics - Merger Data**

Sample includes completed merger bids and tender offers where both acquirer and target were listed on the NYSE, AMEX, or NASDAQ during 1983-2001. Acquirer and target market values are measured at day -3 relative to the acquisition announcement date (day 0). Relative size is the ratio of target market value to acquirer market value. Acquirer and target cumulative abnormal returns (CAR) are measured over the four days (-2, 1) around the announcement (day 0) of the acquisition. Combined CAR is calculated as the value weighted average of acquirer and target CARs weighted using day -3 market values of the acquirer and the target. Diversification is defined as acquirer and target not having a common 2-digit SIC code in their first 6 SIC codes.

	Mean	Median
Acquirer Market Value (million \$)	12.7	1.8
Target Market Value (million \$)	0.8	0.1
Relative Size (%)	25.0	10.6
Announcement Abnormal Returns [-2,+1] (%)		
Acquirer	-1.3	-0.9
Target	18.9	16.9
Combined	1.2	0.8
Method of Payment (%)		
Stock Only	49.2	
Mixed	26.5	
Cash Only	24.3	
Diversifying Acquisition (%)	12.3	
Tender Offers (%)	18.7	
Hostile Bids (%)	1.9	
Multiple Bidders (%)	3.8	
N	2,105	

**Table 3a**  
**Summary statistics for the ratio of net purchases to common share holdings across different trading categories**

This table describes the summary statistics for the variable NET (ratio of dollar net purchases to the value of beginning-of-the-period common stock holdings) across different trading activity categories. Negative values for NET represent net-selling, positive values represent net-buying. Net selling firms (those with NET<0) are sorted into 3 groups by NET: Bottom one-third is named HS (high net-sellers), middle one-third is named MS (medium net-sellers) and top one-third is named LS (light net-sellers). Firms with no trading (NET=0) are named as NO. Net buying firms (those with NET>0) are sorted into 3 groups by NET: Bottom one-third is named LB (low net-buyers), middle one-third is named MB (medium net-buyers) and top one-third is named HB (high net-buyers).

Insider Trading Status	ACQUIRERS						TARGETS					
	N	Average (%)	Median (%)	Std. Deviation (%)	Minimum (%)	Maximum (%)	N	Average (%)	Median (%)	Std. Deviation (%)	Minimum (%)	Maximum (%)
HS	408	-143.7	-64.7	249.9	-2000	-27.8	294	-114.6	-53.1	235.2	-2000	-20.0
MS	409	-15.0	-13.9	6.3	-27.7	-6.2	295	-10.9	-10.1	4.1	-19.7	-5.0
LS	409	-2.5	-2.3	1.8	-6.1	0	295	-2.0	-1.9	1.4	-5.0	0
NO	384	0	0	0.0	0	0	584	0	0	0.0	0	0
LB	119	0.5	0.5	0.3	0	1.1	167	0.8	0.8	0.6	0	2.1
MB	120	3.0	2.7	1.4	1.1	5.7	167	6.2	5.7	3.1	2.2	13.1
HB	121	82.8	17.9	270.5	5.7	2000.0	168	132.1	41.5	321.4	13.2	2000
All Firms	1970	-28.1	-2.8	146.1	-2000	2000.0	1970	-7.2	0	142.9	-2000	2000

**Table 3b**  
**Pairwise Correlations Between NET and Firm Characteristics**

This table describes the pairwise correlations between the variable NET (ratio of net purchases to beginning-of-the-period common shareholdings) and firm characteristics for acquirer and target firms. SIZE is the market value 3 days prior to acquisition announcement. B/P is the book to price ratio. ROA (Return on assets) = EBIT/assets. CF (Cash flow) = EBITDA/Sales. CASH (Cash holdings) = (cash+marketable securities)/book value of assets. LEV (leverage) = (book value of debt)/(book value of equity+book value of debt). All accounting variables are measured as of the fiscal year-end ending in the calendar year preceding the acquisition year. RET1 is the raw stock return in the one year period prior to the merger announcement date. RET2 is the raw stock return between two years prior to the announcement date and one year prior to the announcement date. VOL1 is the annualized volatility of the stock return in the one year period prior to the merger announcement date. The sample period is 1984-2000. Correlation coefficients which are significant at 10% level are shown in italics.

		ACQUIRERS								
	NET	SIZE	B/P	ROA	CF	CASH	LEV	RET1	RET2	VOL1
NET	1									
SIZE	<i>-0.06</i>	1								
B/P	<i>0.14</i>	<i>-0.18</i>	1							
ROA	<i>-0.08</i>	<i>0.13</i>	<i>-0.17</i>	1						
CF	<i>-0.01</i>	<i>0.02</i>	<i>0.05</i>	<i>0.01</i>	1					
CASH	<i>-0.15</i>	<i>-0.03</i>	<i>-0.22</i>	<i>0.05</i>	<i>-0.21</i>	1				
LEV	<i>0.13</i>	<i>0.03</i>	<i>0.21</i>	<i>-0.39</i>	<i>0.10</i>	<i>-0.47</i>	1			
RET1	<i>-0.13</i>	<i>0.10</i>	<i>-0.21</i>	<i>-0.01</i>	<i>-0.04</i>	<i>0.16</i>	<i>-0.04</i>	1		
RET2	<i>-0.10</i>	<i>0.09</i>	<i>-0.28</i>	<i>-0.01</i>	<i>0.08</i>	<i>0.19</i>	<i>-0.06</i>	<i>0.06</i>	1	
VOL1	<i>-0.10</i>	<i>-0.03</i>	<i>-0.17</i>	<i>0.16</i>	<i>-0.17</i>	<i>0.49</i>	<i>-0.39</i>	<i>0.11</i>	<i>0.11</i>	1

		TARGETS								
	NET	SIZE	B/P	ROA	CF	CASH	LEV	RET1	RET2	VOL1
NET	1									
SIZE	<i>-0.09</i>	1								
B/P	<i>0.08</i>	<i>-0.09</i>	1							
ROA	<i>-0.03</i>	<i>0.04</i>	<i>-0.05</i>	1						
CF	<i>0.00</i>	<i>0.01</i>	<i>0.03</i>	<i>0.04</i>	1					
CASH	<i>-0.08</i>	<i>-0.04</i>	<i>-0.23</i>	<i>-0.02</i>	<i>-0.09</i>	1				
LEV	<i>0.03</i>	<i>0.06</i>	<i>0.08</i>	<i>-0.09</i>	<i>0.04</i>	<i>-0.50</i>	1			
RET1	<i>-0.08</i>	<i>0.07</i>	<i>-0.08</i>	<i>-0.11</i>	<i>0.02</i>	<i>-0.02</i>	<i>0.03</i>	1		
RET2	<i>-0.08</i>	<i>0.06</i>	<i>-0.20</i>	<i>-0.06</i>	<i>0.00</i>	<i>-0.04</i>	<i>0.05</i>	<i>-0.02</i>	1	
VOL1	<i>-0.01</i>	<i>-0.10</i>	<i>0.02</i>	<i>0.06</i>	<i>-0.04</i>	<i>0.40</i>	<i>-0.25</i>	<i>-0.18</i>	<i>-0.26</i>	1

**Table 4**  
**Abnormal Returns on Insider Transactions by Managerial Position**

This table describes the cumulative abnormal returns for 5, 10 and 15 day event windows around the insider transaction date (day 0). The abnormal returns are calculated by subtracting the return on the CRSP value weighted index from firm returns during the event window. For each transaction day for each insider, the net value of trades by the insider is calculated and the transaction day is labeled as a buy day or a sell day. Taking the transaction day as the event day (day 0), the abnormal returns are calculated for both buy days and sell days. Average abnormal returns are calculated for each management group by averaging the abnormal returns following the buy and sell days of insiders in that group. Standard errors are corrected for serial correlation by using calendar date clustering. Significance levels at 1%, 5% and 10% are denoted by \*\*\*, \*\* and \* respectively.

Management Group	PURCHASES				SALES			
	N	Cumulative Abnormal Returns (%)			N	Cumulative Abnormal Returns (%)		
		Pre-Event (1)	Post-Event (2)	Reversal (2) - (1)		Pre-Event (1)	Post-Event (2)	Reversal (2) - (1)
		[-5,-1]	[1,5]		[-5,-1]	[1,5]		
CEOs	3,568	-2.5 ***	0.2	2.7 ***	6,151	2.2 ***	-0.1	-2.2 ***
Directors	67,028	-1.2 ***	0.7 ***	1.9 ***	115,446	1.9 ***	0.2 ***	-1.8 ***
Officers	28,604	-2.0 ***	1.1 ***	3.0 ***	140,088	2.1 ***	0.1 **	-2.0 ***
All Management Insiders	99,200	-1.5 ***	0.8 ***	2.2 ***	261,685	2.0 ***	0.1 ***	-1.9 ***
		[-10,-1]	[1,10]		[-10,-1]	[1,10]		
CEOs	3,565	-3.9 ***	0.1	4.0 ***	6,138	3.6 ***	-0.1	-3.7 ***
Directors	66,818	-2.2 ***	1.1 ***	3.2 ***	115,153	3.1 ***	0.3 ***	-2.9 ***
Officers	28,538	-3.1 ***	1.7 ***	4.8 ***	139,830	3.3 ***	0.1 **	-3.2 ***
All Management Insiders	98,921	-2.5 ***	1.2 ***	3.7 ***	261,121	3.2 ***	0.2 ***	-3.0 ***
		[-15,-1]	[1,15]		[-15,-1]	[1,15]		
CEOs	3,563	-5.6 ***	0.0	5.6 ***	6,132	5.2 ***	-0.1	-5.3 ***
Directors	66,637	-2.9 ***	1.5 ***	4.3 ***	114,811	4.2 ***	0.2 ***	-3.9 ***
Officers	28,469	-4.1 ***	2.2 ***	6.3 ***	139,579	4.4 ***	0.1 *	-4.3 ***
All Management Insiders	98,669	-3.3 ***	1.6 ***	5.0 ***	260,522	4.3 ***	0.2 **	-4.2 ***

**Table 5**  
**Abnormal Trading Activity Prior to "Good" and "Bad" Mergers - All Managers**

The purpose of this table is to see whether acquirer and target firm managers trade abnormally prior to good and bad mergers. A good merger for an acquirer (target) manager is one in which the acquirer's (target's) 4-day announcement cumulative abnormal return is higher than 10%. A bad merger for an acquirer (target) manager is one in which the acquirer's (target's) 4-day announcement cumulative abnormal return is less than -10%. This procedure yields 154 bad mergers and 80 good mergers for acquirer managers, and 57 bad mergers and 1,261 good mergers for the target managers. In models (1) and (2) the dependent variables are the quarterly dollar value of individual net stock purchases and the quarterly individual net stock purchases as a percentage of prior common stock holdings respectively. Net purchase is defined as the dollar value of purchases minus sales. The dependent variables in models (2) and (4) are constructed by averaging the dependent variables in models (1) and (3) across all the managers in a given firm. Independent variables include book-to-market decile dummies, dummy variables showing whether the firm is a good acquirer, bad acquirer, good target or a bad target in the four quarters following the merger. p-values for F-tests for the equality of the coefficients of these dummy variables are presented at the bottom of the table. Dollar value of equity stake is the number of common shares held at the beginning of the quarter times the beginning-of-the-quarter stock price.  $RET_{q(t-2),q(t)}$  denotes stock return during the last two quarters.  $RET_{q(t-4),q(t-2)}$  denotes the stock return during the two quarters before the last two quarters.  $VOL_{q(t-2),q(t)}$  denotes the annualized stock return volatility during the two quarters before the last two quarter.  $VOL_{q(t-4),q(t-2)}$  is the change in volatility between the last two quarters and the previous two quarters. Each regression includes industry and year-quarter dummies. Industries are defined using the 20 industry definition of Grinblatt and Moskowitz (1999). Coefficient estimates are reported first and robust t-statistics with clustering at the manager (columns one and three) or firm level (columns two and four) second in each column. Significance levels at 1%, 5% and 10% are denoted by \*\*\*, \*\* and \* respectively. All dollar amounts are in thousands of 2004 dollars.

	(1)	(2)	(3)	(4)
	Dollar Value of Individual Net Purchases of Company Stock	Dollar Value of Net Purchases of Company Stock Averaged by Firm-Quarters	Individual Net Purchases of Company Stock as Percentage of Prior Exposure	Net Purchases of Company Stock as Percentage of Prior Exposure Averaged by Firm-Quarters
<b>Independent Variables:</b>				
Intercept	70 (8.44)***	47 (4.81)***	4 (6.55)***	3 (4.08)***
B/M-Decile				
1 (Growth)	-96 (39.23)***	-70 (22.48)***	-4.6 (25.37)***	-4.0 (16.63)***
2	-65 (42.13)***	-54 (23.76)***	-4.0 (28.04)***	-3.8 (17.52)***
3	-40 (34.55)***	-35 (19.69)***	-2.5 (20.74)***	-2.7 (15.12)***
4	-23 (24.92)***	-22 (15.22)***	-1.6 (14.88)***	-1.9 (11.88)***
5	-18 (21.02)***	-14 (10.90)***	-1.5 (13.68)***	-1.5 (10.19)***
6	-9 (12.70)***	-7 (6.18)***	-0.9 (9.52)***	-1.1 (7.52)***
7	-8 (11.42)***	-4 (3.44)***	-0.7 (7.26)***	-0.7 (4.96)***
8	-5 (7.51)***	-1 (0.83)	-0.6 (5.96)***	-0.4 (3.23)***
9	-3 (5.71)***	0 (0.06)	-0.4 (4.68)***	-0.3 (2.08)**
10 (Value)				
Dummy Variable = 1 if :				
BAD Acquirer in Quarter t+1	-63 (4.66)***	-82 (3.10)***	-1.6 (1.61)	-4.3 (2.24)**
BAD Acquirer in Quarter t+2	-69 (5.16)***	-97 (3.67)***	-3.7 (3.26)***	-6.2 (2.97)***
BAD Acquirer in Quarter t+3	-76 (5.48)***	-85 (3.55)***	-3.9 (3.50)***	-4.5 (2.42)**
BAD Acquirer in Quarter t+4	-55 (4.47)***	-65 (2.65)***	-3.5 (3.21)***	-4.9 (2.25)**
GOOD Acquirer in Quarter t+1	-28 (1.72)*	-29 (0.86)	-1.9 (1.35)	-2.6 (0.91)
GOOD Acquirer in Quarter t+2	1 (0.05)	2 (0.07)	-0.5 (0.37)	0.4 (0.17)
GOOD Acquirer in Quarter t+3	-45 (2.59)***	-52 (1.47)	-2.7 (1.97)**	-2.7 (1.05)
GOOD Acquirer in Quarter t+4	-55 (3.17)***	-63 (1.66)*	-2.9 (2.00)**	-2.7 (0.93)
BAD Target in Quarter t+1	-4 (0.23)	7 (0.48)	0.8 (0.47)	2.3 (1.22)
BAD Target in Quarter t+2	-156 (4.20)***	-118 (2.13)**	-4.5 (1.87)*	-6.5 (1.56)
BAD Target in Quarter t+3	-19 (1.26)	-16 (0.81)	-1.4 (0.78)	-0.1 (0.04)
BAD Target in Quarter t+4	-69 (2.85)***	-69 (1.67)*	-6.4 (2.53)**	-10.5 (1.98)**
GOOD Target in Quarter t+1	-4 (1.21)	-9 (1.56)	-0.1 (0.41)	-0.4 (0.83)
GOOD Target in Quarter t+2	-2 (0.77)	-7 (1.24)	-0.9 (2.70)***	-0.8 (1.55)
GOOD Target in Quarter t+3	-3 (0.96)	-8 (1.58)	-0.7 (2.19)**	-0.5 (1.10)
GOOD Target in Quarter t+4	-4 (1.33)	-3 (0.66)	-1.6 (4.59)***	-1.2 (2.37)**
Dollar Value of equity stake	0.0001 (2.04)**	-0.0001 (2.55)**	-	-
Dollar Value of shares purchased through option exercises during the last 12 months	-0.0047 (2.79)***	-0.0146 (4.27)***	-0.0001 (2.39)**	-0.00076 (4.09)***
Dollar Value of "Other" share purchases during the last 12 months	-0.0001 (1.32)	-0.0002 (1.06)	0.00001 (6.37)***	0.00001 (1.35)
Dollar Value of "Gift" share purchases during the last 12 months	-0.0008 (0.89)	-0.0007 (0.34)	0.00003 (1.19)	0.00003 (0.28)
$RET_{q(t-2),q(t)}$	-64 (50.67)***	-45 (24.70)***	-5.1 (45.07)***	-3.6 (22.96)***
$RET_{q(t-4),q(t-2)}$	-40 (34.42)***	-26 (16.21)***	-2.9 (30.99)***	-2.0 (15.30)***
$VOL_{q(t-4),q(t-2)}$	-2 (2.51)**	4 (4.88)***	0.2 (2.66)***	0.4 (4.68)***
$VOL_{q(t-2),q(t)} - VOL_{q(t-4),q(t-2)}$	11 (11.32)***	5 (4.45)***	0.4 (4.49)***	0.2 (1.42)
Log of Total Assets	-7 (26.69)***	-7 (15.57)***	-0.4 (22.57)***	-0.5 (14.95)***
Industry Dummies	Yes	Yes	Yes	Yes
Year-Quarter Dummies	Yes	Yes	Yes	Yes
R <sup>2</sup>	0.064	0.146	0.031	0.075
Number of Observations	1,518,164	233,996	1,421,173	231,502
F-Test for Differences in Coefficients:	p-value	p-value	p-value	p-value
BAD Acquirer in Quarter t+1 = GOOD Acquirer in Quarter t+1	0.091	0.178	0.884	0.625
BAD Acquirer in Quarter t+2 = GOOD Acquirer in Quarter t+2	0.000	0.006	0.061	0.036
BAD Acquirer in Quarter t+3 = GOOD Acquirer in Quarter t+3	0.170	0.439	0.504	0.580
BAD Acquirer in Quarter t+4 = GOOD Acquirer in Quarter t+4	0.999	0.971	0.748	0.560
BAD Target in Quarter t+1 = GOOD Target in Quarter t+1	0.990	0.298	0.592	0.166
BAD Target in Quarter t+2 = GOOD Target in Quarter t+2	0.000	0.047	0.138	0.172
BAD Target in Quarter t+3 = GOOD Target in Quarter t+3	0.299	0.698	0.709	0.788
BAD Target in Quarter t+4 = GOOD Target in Quarter t+4	0.008	0.110	0.061	0.082



**Table 6**  
**Abnormal Trading Activity Prior to Stock and Cash Merger Announcements - All Managers**

The purpose of this table is to see whether acquirer and target firm managers trade abnormally prior to stock and cash mergers. To achieve this goal, dummy variables are created showing whether the firm will be an acquirer or a target in a stock, cash or a mixed acquisition during the next four quarters. The dummies for mixed acquisitions are included in all models but are not reported below for brevity. In models (1) and (3) the dependent variables are the quarterly dollar value of individual net stock purchases and the quarterly individual net stock purchases as a percentage of prior common stock holdings respectively. Net purchase is defined as the dollar value of purchases minus sales. The dependent variables in models (2) and (4) are constructed by averaging the dependent variables in models (1) and (3) across all managers in a given firm. Dollar value of equity stake is the number of common shares held at the beginning of the quarter times the beginning-of-the-quarter stock price.  $RET_{q(t-2),q(t)}$  denotes stock return during the last two quarters.  $RET_{q(t-4),q(t-2)}$  denotes the stock return during the two quarters before the last two quarters.  $VOL_{q(t-4),q(t-2)}$  denotes the annualized stock return volatility during the two quarters before the last two quarter.  $VOL_{q(t-2),q(t)} - VOL_{q(t-4),q(t-2)}$  is the change in volatility between the last two quarters and the previous two quarters. Each regression includes industry and year-quarter dummies. Industries are defined using the 20 industry definition of Grinblatt and Moskowitz (1999). Coefficient estimates are reported first and robust t-statistics with clustering at the manager (columns one and three) or firm level (columns two and four) second in each column. Significance levels at 1%, 5% and 10% are denoted by \*\*\*, \*\* and \* respectively. All dollar amounts are in thousands of 2004 dollars.

	(1)	(2)	(3)	(4)
	Dollar Value of Individual Net Purchases of Company Stock	Dollar Value of Net Purchases of Company Stock Averaged by Firm-Quarters	Individual Net Purchases of Company Stock as Percentage of Prior Exposure	Net Purchases of Company Stock as Percentage of Prior Exposure Averaged by Firm-Quarters
<b>Independent Variables:</b>				
Intercept	70 (8.38)***	47 (4.77)***	4.0 (6.48)***	3.0 (4.05)***
B/M-Decile				
1 (Growth)	-96 (39.16)***	-70 (22.42)***	-4.6 (25.26)***	-4.0 (16.57)***
2	-65 (42.06)***	-54 (23.71)***	-4.0 (27.95)***	-3.7 (17.49)***
3	-39 (34.32)***	-35 (19.56)***	-2.5 (20.56)***	-2.6 (15.04)***
4	-23 (24.83)***	-22 (15.17)***	-1.6 (14.79)***	-1.9 (11.85)***
5	-18 (20.87)***	-14 (10.81)***	-1.4 (13.55)***	-1.5 (10.14)***
6	-9 (12.38)***	-7 (5.98)***	-0.9 (9.30)***	-1.0 (7.41)***
7	-8 (11.20)***	-3 (3.28)***	-0.7 (7.12)***	-0.7 (4.89)***
8	-5 (7.52)***	-1 (0.76)	-0.6 (5.93)***	-0.4 (3.20)***
9	-3 (5.87)***	0 (0.12)	-0.4 (4.73)***	-0.3 (2.11)**
10 (Value)				
Dummy Variable = 1 if :				
Acquirer of STOCK acquisition in Quarter t+1	-11 (2.93)***	-15 (1.83)*	0.0 (0.00)	-0.5 (0.82)
Acquirer of STOCK acquisition in Quarter t+2	-24 (6.58)***	-32 (3.75)***	-1.3 (4.13)***	-2.0 (2.84)***
Acquirer of STOCK acquisition in Quarter t+3	-24 (6.56)***	-34 (4.18)***	-1.2 (3.70)***	-2.2 (3.06)***
Acquirer of STOCK acquisition in Quarter t+4	-13 (4.04)***	-25 (2.88)***	-0.8 (3.02)***	-1.9 (2.54)**
...				
Acquirer of CASH acquisition in Quarter t+1	3 (0.74)	-3 (0.32)	0.0 (0.05)	-0.6 (0.81)
Acquirer of CASH acquisition in Quarter t+2	-11 (2.32)**	-19 (1.90)*	-0.5 (1.30)	-1.1 (1.29)
Acquirer of CASH acquisition in Quarter t+3	3 (0.76)	0 (0.04)	0.6 (1.51)	0.1 (0.15)
Acquirer of CASH acquisition in Quarter t+4	2 (0.53)	-1 (0.12)	-0.2 (0.51)	-0.5 (0.61)
...				
Target of STOCK acquisition in Quarter t+1	-19 (4.63)***	-23 (2.95)***	-1.4 (3.64)***	-1.4 (2.18)**
Target of STOCK acquisition in Quarter t+2	-22 (5.36)***	-28 (3.33)***	-1.9 (4.89)***	-2.1 (3.36)***
Target of STOCK acquisition in Quarter t+3	-9 (2.36)**	-15 (2.49)**	-0.7 (1.91)*	-0.9 (1.74)*
Target of STOCK acquisition in Quarter t+4	-12 (3.48)***	-12 (2.06)**	-3.0 (7.05)***	-2.4 (3.55)***
...				
Target of CASH acquisition in Quarter t+1	9 (2.48)**	8 (1.71)*	0.4 (0.76)	0.2 (0.30)
Target of CASH acquisition in Quarter t+2	2 (0.52)	-4 (0.52)	0.0 (0.02)	-0.2 (0.21)
Target of CASH acquisition in Quarter t+3	-7 (1.26)	1 (0.08)	-1.4 (2.08)**	-0.9 (1.02)
Target of CASH acquisition in Quarter t+4	-0.2 (0.03)	1 (0.11)	0.2 (0.28)	0.0 (0.00)
Dollar Value of equity stake	0.00001 (2.04)**	-0.0001 (2.52)**	-	-
Dollar Value of shares purchased through option exercises during the last 12 months	-0.005 (2.79)***	-0.0147 (4.28)***	-0.00010 (2.39)**	-0.0008 (4.10)***
Dollar Value of "Other" share purchases during the last 12 months	0.000 (1.37)	-0.0002 (1.10)	0.00001 (6.10)***	0.00001 (1.34)
Dollar Value of "Gift" share purchases during the last 12 months	-0.001 (0.89)	-0.0007 (0.33)	0.00003 (1.20)	0.00001 (0.29)
$RET_{q(t-2),q(t)}$	-64 (50.65)***	-45 (24.68)***	-5 (45.07)***	-4 (22.95)***
$RET_{q(t-4),q(t-2)}$	-40 (34.41)***	-26 (16.17)***	-3 (31.02)***	-2 (15.30)***
$VOL_{q(t-4),q(t-2)}$	-2 (2.39)**	4 (4.95)***	0.22 (2.76)***	0.4 (4.71)***
$VOL_{q(t-2),q(t)} - VOL_{q(t-4),q(t-2)}$	12 (11.29)***	5 (4.41)***	0.38 (4.45)***	0.2 (1.40)
Log of Total Assets	-7 (26.57)***	-7 (15.49)***	-0.44 (22.50)***	-1 (14.90)***
Industry Dummies	Yes	Yes	Yes	Yes
Year-Quarter Dummies	Yes	Yes	Yes	Yes
R <sup>2</sup>	0.063	0.145	0.031	0.075
N	1,518,164	233,996	1,421,173	231,502
F-Test for Differences in Coefficients:	p-value	p-value	p-value	p-value
Acquirer-STOCK-q(t+1) = Acquirer-CASH-q(t+1)	0.0118	0.2572	0.9713	0.8901
Acquirer-STOCK-q(t+1) = Acquirer-CASH-q(t+1)	0.0230	0.2780	0.1531	0.4422
Acquirer-STOCK-q(t+1) = Acquirer-CASH-q(t+1)	0.0000	0.0025	0.0005	0.0269
Acquirer-STOCK-q(t+1) = Acquirer-CASH-q(t+1)	0.0043	0.0516	0.2217	0.2422
Target-STOCK-q(t+1) = Target-CASH-q(t+1)	<0.0001	0.0006	0.0044	0.0832
Target-STOCK-q(t+1) = Target-CASH-q(t+1)	0.0001	0.0365	0.0033	0.0405
Target-STOCK-q(t+1) = Target-CASH-q(t+1)	0.7786	0.0773	0.3284	0.9901
Target-STOCK-q(t+1) = Target-CASH-q(t+1)	0.0512	0.1189	<0.0001	0.0144

**Table 7**  
**Acquisition Characteristics Grouped by Acquirer's Managerial Trading Activity**

This table describes mean acquisition characteristics sorted by acquirer's managerial trading activity. Acquirer managerial trading activity is measured by the variable NET, which is the ratio of dollar net purchases of all management insiders to the value of beginning-of-the-period common stock holdings. Acquirer is a net seller if NET<0, a net buyer if NET>0 and a non-trading firm if NET=0. Net seller acquirers are sorted by the variable NET and are categorized into 3 groups. The bottom one-third is called High Net-Sellers (HS), the middle group is called Medium Net-Sellers (MS) and the top one-third is called Light Net-Sellers (LS). Acquirers with no managerial trading are labeled as NO. Net buyer acquirers are also sorted by the variable NET and are categorized into 3 groups. The bottom one-third is called Light Net-Buyers (LB), the middle group is called Medium Net-Buyers (MB) and the top one-third is called High Net-Buyers (HB). As a result we have the following ordering ranging from High Net-Sellers (most overvalued) to High Net-Buyers (most undervalued): HS, MS, LS, NO, LB, MB and HB. Summary categories Total Net-Sellers (TS) and Total Net-Buyers (TB) include the firms which are in HS, MS or LS groups and LB, MB or HB groups respectively. Acquirer and target market values are measured at day -3 relative to the acquisition announcement date (day 0). Relative size is the ratio of target market value to acquirer market value. Bid premium is the ratio of the bid price offered by the acquirer to the target stock price 3 days prior to the announcement of the takeover bid. Acquirer and target cumulative abnormal returns (CAR) are measured over the four days (-2, 1) around the announcement (day 0) of the acquisition. Combined CAR is calculated as the value weighted average of acquirer and target CARs weighted using day -3 market values of the acquirer and the target. Diversification is defined as acquirer and target not having a common 2-digit SIC code in their first 6 SIC codes. Sample includes completed merger bids and tender offers where both acquirer and target were listed on the NYSE, AMEX, or NASDAQ during 1984-2000. HS-HB and TS-TB denote difference in means between ranks HS and HB and TS and TB, and their significance is tested using a two-sample t-test. Panel A reports results for all acquisitions, Panel B for cash acquisitions and Panel C for stock acquisitions. t-statistics are shown in italics.

Acquirer Insider Trading Status	N	Cash %	Stock %	Tender Offer %	Hostile Offer (%)	Multiple Bidders (%)	Bid Premium (%)	Acquirer Market Value (\$ millions)	Target Market Value (\$ millions)	Relative Size (%)	Diversifying Acquisition (2-digit SIC)	Acquirer Ann. CAR (%)	Target Ann. CAR (%)	Combined Ann. CAR (%)
<b>Panel A: All Acquisitions</b>														
HS	408	22.3	56.9	17.4	2.0	2.9	34.7	25,388	1,209	17.2	12.5	-2.5	18.6	-0.2
MS	409	26.2	52.6	19.3	1.7	5.6	37.1	16,478	769	20.6	14.2	-1.4	19.5	0.9
LS	409	23.2	52.8	17.1	1.7	3.2	35.0	8,381	695	21.9	13.4	-1.3	18.7	1.0
NO	384	26.8	42.4	22.7	2.1	6.0	36.1	4,435	788	42.7	13.0	-1.0	16.8	2.2
LB	119	17.6	56.3	14.3	2.5	3.4	34.1	4,766	644	46.9	6.7	-1.0	17.4	1.8
MB	120	19.2	52.5	10.0	0.8	5.0	42.7	3,231	231	24.7	11.7	-0.9	19.4	1.8
HB	121	31.4	36.4	21.5	5.0	5.8	46.1	2,560	430	38.8	10.7	-0.2	21.6	3.8
HS-HB		-9.1 <i>-2.05</i>	20.5	-4.1 <i>-1.02</i>	-3.0 <i>-1.43</i>	-2.8 <i>-1.24</i>	-11.5 <i>-2.2</i>	22,828 <i>6.01</i>	779.0 <i>2.95</i>	-21.6 <i>-4.75</i>	1.8 <i>0.51</i>	-2.3 <i>-2.96</i>	-3.0 <i>-1.45</i>	-4.0 <i>-4.67</i>
TS	1,226	23.9	54.1	17.9	1.8	3.9	35.6	16,742	891	19.9	13.4	-1.7	18.9	0.6
TB	360	22.8	48.3	15.3	2.8	4.7	41.0	3,513	434	36.8	9.7	-0.7	19.5	2.5
TS-TB		1.1 <i>0.44</i>	5.7 <i>1.92</i>	2.7 <i>1.17</i>	-1.0 <i>-1.03</i>	-0.8 <i>-0.64</i>	-5.4 <i>-2.15</i>	13,229 <i>8.17</i>	456.2 <i>3.61</i>	-16.9 <i>-2.47</i>	3.7 <i>1.98</i>	-1.1 <i>-2.56</i>	-0.5 <i>-0.46</i>	-1.9 <i>-4.46</i>

**Table 7 (continued)**  
**Acquisition Characteristics Grouped by Acquirer's Managerial Trading Activity**

Acquirer Insider Trading Status	N	Cash %	Stock %	Tender Offer %	Hostile Offer (%)	Multiple Bidders (%)	Bid Premium (%)	Acquirer	Target	Relative Size (%)	Diversifying Acquisition (2-digit SIC)	Acquirer	Target	Combined Ann. CAR (%)
								Market Value (\$ millions)	Market Value (\$ millions)			Ann. CAR (%)	Ann. CAR (%)	
<b>Panel B: Stock Acquisitions</b>														
HS	232	-	-	0.4	0.4	1.3	34.4	23,793	1,266	18.7	11.2	-4.0	17.8	-1.5
MS	215	-	-	0.5	0.5	2.3	33.2	20,616	1,046	21.4	10.7	-2.1	17.9	0.1
LS	216	-	-	1.4	0.5	0.5	33.9	7,684	745	16.3	11.1	-1.3	16.9	0.5
NO	163	-	-	0.6	0.6	2.5	25.1	3,751	1,319	36.0	11.0	-2.6	11.3	-0.5
LB	67	-	-	-	-	3.0	33.8	4,345	679	57.2	4.5	-1.1	15.2	0.9
MB	63	-	-	-	-	3.2	37.9	2,835	242	25.1	6.3	-0.5	15.6	1.6
HB	44	-	-	-	2.3	2.3	38.6	2,502	404	32.9	2.3	-1.4	12.6	0.8
HS-HB		-	-	0.4	-1.8	-1.0	-4.2	21,291	861.8	-14.2	8.9	-2.7	5.2	-2.3
		-	-	0.99	-0.8	-0.41	-0.47	4.13	2.14	-2.62	2.89	-2.13	2.22	-2.13
TS	663	-	-	0.8	0.5	1.4	33.8	17,514	1,025	18.8	11.0	-2.5	17.6	-0.3
TB	174	-	-	-	0.6	2.9	36.5	3,332	451	39.4	4.6	-1.0	14.7	1.2
TS-TB		-	-	0.8	-0.1	-1.5	-2.7	14,182	573.6	-20.6	6.4	-1.6	2.9	-1.5
		-	-	2.24	-0.18	-1.12	-0.79	6.07	2.73	-1.5	3.2	-2.66	2.28	-2.82
<b>Panel C: Cash Acquisitions</b>														
HS	91	-	-	58.2	3.3	4.4	36.6	30,596	253	9.4	22.0	0.1	24.0	1.7
MS	107	-	-	57.0	3.7	9.3	39.6	18,068	311	11.1	22.4	0.1	24.0	2.0
LS	95	-	-	53.7	4.2	7.4	35.3	10,006	356	22.1	21.1	-0.5	21.3	1.7
NO	103	-	-	58.3	4.9	7.8	42.7	6,313	230	37.2	15.5	1.8	26.6	5.2
LB	21	-	-	52.4	4.8	4.8	32.0	8,865	548	28.6	14.3	-1.1	21.9	3.2
MB	23	-	-	34.8	-	4.3	51.5	952	76	26.1	21.7	-1.0	21.9	2.3
HB	38	-	-	50.0	5.3	10.5	57.3	3,653	529	36.7	23.7	0.8	33.5	6.2
HS-HB		-	-	8.2	-2.0	-6.1	-20.7	26,943	-275.9	-27.3	-1.7	-0.7	-9.5	-4.5
		-	-	0.85	-0.48	-1.12	-2.44	3.18	-1.32	-3.54	-0.21	-0.58	-2.16	-3.15
TS	293	-	-	56.3	3.8	7.2	37.3	19,345	308	14.1	21.8	-0.1	23.1	1.8
TB	82	-	-	46.3	3.7	7.3	49.2	4,230	407	31.6	20.7	-0.2	27.3	4.4
TS-TB		-	-	10.0	0.1	-0.1	-11.9	15,114	-99.2	-17.5	1.1	0.1	-4.2	-2.5
		-	-	1.6	0.04	-0.04	-2.12	4.41	-0.73	-3.69	0.22	0.16	-1.55	-2.81

**Table 8**  
**Acquisition Characteristics Grouped by Target's Managerial Trading Activity**

This table describes mean acquisition characteristics sorted by target's managerial trading activity. Target managerial trading activity is measured by the variable NET, which is the ratio of dollar net purchases of all management insiders to the value of beginning-of-the-period common stock holdings. Target is a net seller if NET<0, a net buyer if NET>0 and a non-trading firm if NET=0. Net seller targets are sorted by the variable NET and are categorized into 3 groups. The bottom one-third is called High Net-Sellers (HS), the middle group is called Medium Net-Sellers (MS) and the top one-third is called Light Net-Sellers (LS). Targets with no managerial trading are labeled as NO. Net buyer targets are also sorted by the variable NET and are categorized into 3 groups. The bottom one-third is called Light Net-Buyers (LB), the middle group is called Medium Net-Buyers (MB) and the top one-third is called High Net-Buyers (HB). As a result we have the following ordering ranging from High Net-Sellers (most overvalued) to High Net-Buyers (most undervalued): HS, MS, LS, NO, LB, MB and HB. Summary categories Total Net-Sellers (TS) and Total Net-Buyers (TB) include the firms which are in HS, MS or LS groups and LB, MB or HB groups respectively. Acquirer and target market values are measured at day -3 relative to the acquisition announcement date (day 0). Relative size is the ratio of target market value to acquirer market value. Bid premium is the ratio of the bid price offered by the acquirer to the target stock price 3 days prior to the announcement of the takeover bid. Acquirer and target cumulative abnormal returns (CAR) are measured over the four days (-2, 1) around the announcement (day 0) of the acquisition. Combined CAR is calculated as the value weighted average of acquirer and target CARs weighted using day -3 market values of the acquirer and the target. Diversification is defined as acquirer and target not having a common 2-digit SIC code in their first 6 SIC codes. Sample includes completed merger bids and tender offers where both acquirer and target were listed on the NYSE, AMEX, or NASDAQ during 1984-2000. HS-HB and TS-TB denote difference in means between ranks HS and HB and TS and TB, and their significance is tested using a two-sample t-test. Panel A reports results for all acquisitions, Panel B for cash acquisitions and Panel C for stock acquisitions. t-statistics are shown in italics.

Target Insider Trading Status	N	Cash %	Stock %	Tender Offer %	Hostile Offer (%)	Multiple Bidders (%)	Bid Premium (%)	Acquirer Market Value (\$ millions)	Target Market Value (\$ millions)	Relative Size (%)	Diversifying Acquisition (2-digit SIC)	Acquirer Ann. CAR (%)	Target Ann. CAR (%)	Combined Ann. CAR (%)
<b>Panel A: All Acquisitions</b>														
HS	294	21.4	55.8	16.3	2.0	5.4	30.9	18,571	1,770	29.2	12.2	-2.9	16.9	0.2
MS	295	22.4	52.5	19.0	3.1	4.7	34.2	10,088	1,253	27.6	12.9	-2.0	18.6	1.0
LS	295	23.4	52.9	20.7	2.7	3.4	34.1	12,104	857	28.5	11.5	-1.2	19.1	1.7
NO	584	26.4	49.0	17.5	1.2	3.8	39.1	11,865	399	21.9	15.2	-1.3	18.4	1.0
LB	167	21.0	50.9	22.2	3.6	4.2	38.6	13,337	372	22.3	11.4	-0.7	21.7	2.3
MB	167	23.4	50.9	12.6	1.2	3.6	34.2	9,761	394	27.1	7.2	-0.4	15.6	1.7
HB	168	31.0	41.1	22.0	1.2	7.7	47.9	4,169	280	46.5	12.5	-0.2	21.5	2.2
HS-HB		-9.5 <i>-2.21</i>	14.7 <i>3.06</i>	-5.7 <i>-1.47</i>	0.9 <i>0.71</i>	-2.3 <i>-0.93</i>	-17.0 <i>-4.07</i>	14,402 <i>4.75</i>	1490.7 <i>3.85</i>	-17.3 <i>0.97</i>	-0.3 <i>-0.08</i>	-2.7 <i>-3.58</i>	-4.7 <i>-2.37</i>	-2.0 <i>-2.72</i>
TS	884	22.4	53.7	18.7	2.6	4.5	33.1	13,582	1,293	28.4	12.2	-2.1	18.2	1.0
TB	502	25.1	47.6	18.9	2.0	5.2	40.2	9,079	348	32.0	10.4	-0.4	19.6	2.0
TS-TB		-2.7 <i>-1.13</i>	6.1 <i>2.19</i>	-0.3 <i>-0.11</i>	0.6 <i>0.74</i>	-0.7 <i>-0.53</i>	-7.1 <i>-3.31</i>	4,503 <i>1.77</i>	944.8 <i>5.41</i>	-3.5 <i>-0.56</i>	1.9 <i>1.06</i>	-1.6 <i>-4.07</i>	-1.4 <i>-1.36</i>	-1.1 <i>-2.66</i>

**Table 8 (continued)**  
**Acquisition Characteristics Grouped by Target's Managerial Trading Activity**

Target Insider Trading Status	N	Cash %	Stock %	Tender Offer %	Hostile Offer (%)	Multiple Bidders (%)	Bid Premium (%)	Acquirer	Target	Relative Size (%)	Diversifying Acquisition (2-digit SIC)	Acquirer	Target	Combined Ann. CAR (%)	
								Market Value (\$ millions)	Market Value (\$ millions)			Ann. CAR (%)	Ann. CAR (%)		
<b>Panel B: Stock Acquisitions</b>															
HS	164	-	-	1.2	1.8	3.0	28.7	21,526	2,454	27.2	10.4	-5.0	14.4	-2.0	
MS	155	-	-	0.6	-	0.6	29.9	10,582	1,615	25.3	11.0	-3.3	16.0	-0.6	
LS	156	-	-	0.6	-	1.3	30.8	14,909	888	26.2	9.0	-1.9	16.3	0.3	
NO	286	-	-	0.7	-	1.7	34.5	12,849	334	20.6	13.6	-1.7	16.0	-0.1	
LB	85	-	-	-	1.2	2.4	32.8	12,298	401	18.4	3.5	-0.4	19.5	1.7	
MB	85	-	-	-	1.2	2.4	30.1	2,541	346	23.2	3.5	-0.8	12.0	0.5	
HB	69	-	-	-	-	1.4	51.0	5,376	326	48.1	8.7	-0.7	20.7	1.4	
HS-HB		-	-	1.2	1.8	1.6	-22.3	16,150	2127.2	-20.9	1.7	-4.2	-6.3	-3.4	
		-	-	1.41	1.73	0.8	-3.03	3.39	3.11	0.61	0.38	-3.48	-2.05	-3.21	
TS	475	-	-	0.8	0.6	1.7	29.8	15,782	1,666	26.3	10.1	-3.4	15.5	-0.8	
TB	239	-	-	-	0.8	2.1	37.1	6,830	360	28.7	5.0	-0.6	17.2	1.2	
TS-TB		-	-	0.8	-0.2	-0.4	-7.3	8,952	1305.8	-2.4	5.1	-2.8	-1.6	-1.9	
		-	-	2.01	-0.29	-0.36	-2.4	2.67	4.25	-0.23	2.57	-4.78	-1.18	-3.7	
<b>Panel C: Cash Acquisitions</b>															
HS	63	-	-	54.0	1.6	7.9	33.1	20,829	479	16.0	20.6	0.5	21.4	2.6	
MS	66	-	-	63.6	12.1	13.6	45.4	12,153	399	22.4	19.7	0.3	29.5	3.5	
LS	69	-	-	62.3	2.9	5.8	38.8	12,829	428	25.3	21.7	0.5	25.5	3.4	
NO	154	-	-	53.2	3.2	4.5	37.9	11,820	188	22.0	20.8	0.0	23.9	2.5	
LB	35	-	-	71.4	5.7	8.6	38.7	29,678	275	28.9	28.6	-0.7	22.5	2.5	
MB	39	-	-	41.0	2.6	5.1	46.8	15,541	349	28.3	15.4	0.9	21.5	3.4	
HB	52	-	-	40.4	-	9.6	49.7	3,854	172	15.8	15.4	0.8	26.7	3.8	
HS-HB		-	-	13.6	1.6	-1.7	-16.6	16,976	306.5	0.2	5.3	-0.2	-5.3	-1.2	
		-	-	1.44	0.99	-0.32	-2.43	2.56	2.23	-0.04	0.71	-0.23	-1.28	-1.02	
TS	198	-	-	60.1	5.6	9.1	39.2	15,149	434	21.4	20.7	0.4	25.5	3.2	
TB	126	-	-	49.2	2.4	7.9	45.8	14,645	256	23.3	19.0	0.4	23.9	3.3	
TS-TB		-	-	10.9	3.2	1.2	-6.6	505	178.6	-1.9	1.7	0.1	1.6	-0.1	
		-	-	1.93	1.49	0.36	-1.48	0.08	1.94	-0.35	0.36	0.09	0.64	-0.16	

**Table 9a**  
**Acquirer and Target Pre-Merger and Post-Merger Stock Returns**

This table shows acquirer and target pre-merger and post-merger one-year stock returns sorted by acquirer's managerial trading activity. Acquirer managerial trading activity is ranked from High Net-Sellers (most overvalued) to High Net-Buyers (most undervalued). Summary categories Total Net-Sellers (TS) and Total Net-Buyers (TB) include the firms which are in HS, MS or LS groups and LB, MB or HB groups respectively. Returns are calculated for the one year period between two years before the announcement date and one-year before the announcement date (t-2,t-1) and one-year before the announcement date and the announcement date (t-1,t). Panel A reports results for all acquisitions, Panel B for cash acquisitions and Panel C for stock acquisitions. t-statistics are shown in italics.

Acquirer Insider Trading Status	N	Acquirer pre-merger 1-year total return (t-2,t-1)	N	Acquirer pre-merger 1-year total return (t-1,t)	Acquirer post-merger 1-year total return (t,t+1)	N	Target pre-merger 1-year total return (t-2,t-1)	N	Target pre-merger 1-year total return (t-1,t)
		(%)		(%)	(%)		(%)		(%)
<b>Panel A: All Acquisitions</b>									
HS	408	34.2	408	41.2	-5.3	370	5.1	408	19.4
MS	409	25.3	409	24.5	2.3	392	7.5	409	16.8
LS	409	20.9	409	18.3	8.9	386	11.6	409	10.6
NO	284	16.1	384	18.2	-10.8	353	3.1	384	13.8
LB	119	17.7	119	9.1	10.6	118	8.2	119	12.8
MB	120	19.7	120	12.4	11.1	119	9.7	120	4.5
HB	121	11.8	121	8.1	13.0	116	4.2	121	-0.2
HS-HB		22.5 <i>5.75</i>		33.1 <i>8.07</i>	-18.2 <i>-3.57</i>		0.9 <i>0.17</i>		19.6 <i>3.87</i>
TS	1,226	26.8	1,226	28.0	2.0	1,148	8.1	1,226	15.6
TB	360	16.4	360	9.9	11.6	353	7.4	360	5.6
TS-TB		10.5 <i>4.62</i>		18.1 <i>7.96</i>	-9.6 <i>-3.77</i>		0.7 <i>0.29</i>		10.0 <i>3.35</i>
<b>Panel B: Stock Acquisitions</b>									
HS	232	40.1	232	53.6	-11.4	204	7.7	232	26.4
MS	215	26.4	215	30.4	-1.0	203	11.2	215	23.3
LS	216	22.5	216	23.0	5.1	202	17.5	216	13.7
NO	110	19.8	163	26.9	-29.4	146	6.4	163	20.7
LB	67	19.5	67	13.1	4.5	66	13.3	67	14.6
MB	63	22.0	63	21.5	10.1	63	15.1	63	8.1
HB	44	15.2	44	13.5	23.6	40	15.1	44	6.4
HS-HB		24.9 <i>3.29</i>		40.1 <i>6.36</i>	-35.0 <i>-5.12</i>		-7.4 <i>-1.04</i>		20.0 <i>2.68</i>
TS	663	29.9	663	36.1	-2.6	609	12.1	663	21.2
TB	174	19.3	174	16.2	11.4	169	14.4	174	10.2
TS-TB		10.6 <i>3.66</i>		19.9 <i>5.85</i>	-14.0 <i>-4.06</i>		-2.3 <i>-0.69</i>		11.0 <i>2.55</i>
<b>Panel C: Cash Acquisitions</b>									
HS	91	28.7	91	18.9	7.0	88	1.3	91	10.7
MS	107	28.3	107	14.0	6.9	103	-1.3	107	5.8
LS	95	20.7	95	12.0	17.0	93	3.5	95	8.3
NO	80	10.6	103	9.5	6.1	96	-4.6	103	15.9
LB	21	10.9	21	1.3	25.3	21	0.7	21	18.1
MB	23	2.6	23	7.9	24.5	22	-9.1	23	-2.8
HB	38	3.6	38	0.9	8.1	38	-13.6	38	-7.2
HS-HB		25.1 <i>3.89</i>		18.0 <i>2.5</i>	-1.1 <i>-0.11</i>		14.9 <i>1.6</i>		17.9 <i>1.69</i>
TS	293	25.9	293	14.9	10.2	284	1.1	293	8.1
TB	82	5.2	82	3.0	17.1	81	-8.6	82	0.5
TS-TB		20.8 <i>4.61</i>		11.9 <i>2.92</i>	-6.9 <i>-1.35</i>		9.7 <i>1.73</i>		7.6 <i>1.25</i>

**Table 9b**  
**Acquirer and Target Pre-Merger and Post-Merger Stock Returns sorted by Target's Trading Activity**

This table shows acquirer and target pre-merger and post-merger one-year stock returns sorted by target's managerial trading activity. Target managerial trading activity is ranked from High Net-Sellers (most overvalued) to High Net-Buyers (most undervalued). Summary categories Total Net-Sellers (TS) and Total Net-Buyers (TB) include the firms which are in HS, MS or LS groups and LB, MB or HB groups respectively. Returns are calculated for the one year period between two years before the announcement date and one-year before the announcement date (t-2,t-1) and one-year before the announcement date and the announcement date(t-1,t). Panel A reports results for all acquisitions, Panel B for cash acquisitions and Panel C for stock acquisitions. t-statistics are shown in italics.

Target Insider Trading Status	N	Acquirer pre-merger 1-year total return (t-2,t-1)	N	Acquirer pre-merger 1-year total return (t-1,t)	Acquirer post-merger 1-year total return (t,t+1)	N	Target pre-merger 1-year total return (t-2,t-1)	N	Target pre-merger 1-year total return (t-1,t)
		(%)		(%)	(%)		(%)		(%)
<b>Panel A: All Acquisitions</b>									
HS	282	29.2	294	38.3	-4.8	291	13.3	294	28.6
MS	284	21.8	295	26.5	4.6	294	12.1	295	11.5
LS	284	26.7	295	16.7	-1.8	295	15.2	295	9.4
NO	526	23.6	584	22.0	-1.3	472	-0.2	584	9.4
LB	164	20.1	167	18.3	6.2	167	7.7	167	8.9
MB	165	17.2	167	11.2	9.2	167	5.2	167	13.2
HB	165	16.9	168	18.2	7.2	168	-5.6	168	16.1
HS-HB		12.2 <i>3.05</i>		20.1 <i>4.84</i>	-12.0 <i>-2.39</i>		18.9 <i>3.92</i>		12.5 <i>2.25</i>
TS	884	25.9	850	27.2	-0.6	880	13.5	884	16.5
TB	502	18.1	494	15.9	7.5	502	2.4	502	12.7
TS-TB		7.8 <i>3.88</i>		11.2 <i>5.07</i>	-8.2 <i>-2.97</i>		11.1 <i>4.37</i>		3.8 <i>1.36</i>
<b>Panel B: Stock Acquisitions</b>									
HS	154	36.4	164	50.3	-13.3	161	23.1	164	35.0
MS	150	24.2	155	34.2	3.7	155	16.4	155	22.2
LS	153	27.8	156	23.8	-5.3	156	17.6	156	16.2
NO	254	29.6	286	31.3	-15.7	213	-1.3	286	11.0
LB	83	22.0	85	20.6	4.2	85	12.0	85	13.4
MB	85	14.3	85	16.9	16.4	85	7.1	85	19.4
HB	68	19.6	69	25.6	9.0	69	5.4	69	22.6
HS-HB		16.8 <i>3.00</i>		24.7 <i>3.69</i>	-22.3 <i>-2.76</i>		17.7 <i>2.52</i>		12.4 <i>1.44</i>
TS	475	29.5	457	36.3	-5.1	472	19.1	475	24.7
TB	239	18.5	236	20.7	9.9	239	8.4	239	18.2
TS-TB		11.0 <i>4.1</i>		15.6 <i>4.77</i>	-15.0 <i>-3.73</i>		10.7 <i>3.03</i>		6.5 <i>1.64</i>
<b>Panel C: Cash Acquisitions</b>									
HS	63	21.4	63	17.5	14.7	63	-5.2	63	19.0
MS	63	20.5	66	16.1	8.8	66	2.1	66	-3.2
LS	66	24.7	69	10.1	11.7	69	6.8	69	6.9
NO	140	20.4	154	10.7	11.1	137	-2.6	154	9.5
LB	34	16.9	35	15.0	7.4	35	6.1	35	5.4
MB	39	14.8	39	0.1	11.0	39	-2.2	39	-1.0
HB	50	12.1	52	10.6	6.0	52	-17.0	52	19.1
HS-HB		9.3 <i>1.45</i>		6.9 <i>1.14</i>	8.7 <i>1.17</i>		11.9 <i>1.33</i>		-0.1 <i>-0.01</i>
TS	198	22.2	192	14.4	11.7	198	1.4	198	7.4
TB	126	14.3	123	8.6	7.9	126	-6.0	126	9.1
TS-TB		8.0 <i>1.87</i>		5.9 <i>1.43</i>	3.7 <i>0.76</i>		7.5 <i>1.43</i>		-1.7 <i>-0.28</i>

**Table 10a**  
**Acquirer and Target Pre-Merger and Post-Merger Long-Run Excess Stock Returns**  
**Buy and Hold Abnormal Returns Method (BHAR)**

This table shows pre-merger and post-merger one-year Buy-and-Hold Abnormal Returns (BHARs) to acquirers and targets grouped by Acquirer's Managerial Trading Activity. Acquirer managerial trading activity is ranked from High Net-Sellers (most overvalued) to High Net-Buyers (most undervalued). Summary categories Total Net-Sellers (TS) and Total Net-Buyers (TB) include the firms which are in HS, MS or LS groups and LB, MB or HB groups respectively. To calculate excess returns, each firm is matched to its corresponding 10x10 Fama-French size and book-to-market portfolio. The matching portfolios, which are constructed at the end of each June, are the intersections of 10 portfolios formed on size and 10 portfolios formed on the ratio of book equity to market equity. The size breakpoints for year t are the NYSE market equity deciles at the end of June of t. BE/ME for June of year t is the book equity in December t-1 divided by ME for December of t-1. The BE/ME breakpoints are NYSE deciles. The portfolios for July of year t to June of t+1 include all NYSE, AMEX, and NASDAQ stocks with market equity data for December of t-1 and June of t, and positive book equity data for t-1. The breakpoints and portfolio return data was made available by Kenneth French. Buy-and-hold returns are measured over months -12,-1 for pre-merger returns and months +1,+12 for post-merger returns for both the sample firm and the control portfolios, and the difference is recorded as the abnormal buy-and-hold return to the sample firm. Panel A reports results for all acquisitions, Panel B for cash acquisitions and Panel C for stock acquisitions. t-statistics are shown in italics.

Acquirer Insider Trading Status	EQUAL WEIGHTED						VALUE WEIGHTED					
	Acquirer pre-merger 1-year excess return (t-1,t)		Acquirer post-merger 1-year excess return (t,t+1)		Target pre-merger 1-year excess return (t,t+1)		Acquirer pre-merger 1-year excess return (t-1,t)		Acquirer post-merger 1-year excess return (t,t+1)		Target pre-merger 1-year excess return (t,t+1)	
	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
Panel A: All Acquisitions												
HS	362	24.3	376	-3.3	309	-0.8	362	23.6	376	-4.1	309	-1.0
MS	366	6.8	373	-6.4	327	-2.8	366	6.0	373	-7.1	327	-2.6
LS	371	2.9	384	-1.2	307	-7.1	371	2.4	384	-1.9	307	-6.8
NO	241	20.2	292	-15.5	285	-7.7	241	20.1	292	-15.4	285	-7.0
LB	108	-6.1	113	-1.1	90	-9.2	108	-5.1	113	-1.0	90	-8.8
MB	106	-2.0	108	0.8	85	-15.7	106	-2.5	108	0.4	85	-15.2
HB	99	-5.2	110	-2.9	96	-18.5	99	-4.5	110	-2.7	96	-16.8
HS-HB		29.5		-0.4		17.7		28.1		-1.4		15.8
		<i>6.70</i>		<i>-0.04</i>		<i>3.15</i>		<i>6.57</i>		<i>-0.13</i>		<i>2.81</i>
TS	1,099	11.2	1,133	-3.6	943	-3.5	1,099	10.6	1,133	-4.4	943	-3.5
TB	313	-4.4	331	-1.1	271	-14.5	313	-4.0	331	-1.1	271	-13.6
TS-TB		15.7		-2.5		11.0		14.7		-3.2		10.2
		<i>7.00</i>		<i>-0.63</i>		<i>3.59</i>		<i>6.55</i>		<i>-0.80</i>		<i>3.32</i>
Panel B: Stock Acquisitions												
HS	203	37.4	215	-17.8	174	4.8	203	36.5	215	-18.7	174	4.7
MS	196	11.1	201	-7.0	171	2.8	196	10.6	201	-7.7	171	2.8
LS	201	6.6	208	-3.1	158	-4.8	201	6.1	208	-3.6	158	-4.8
NO	95	2.7	120	-29.0	118	-4.6	95	3.5	120	-28.8	118	-4.0
LB	63	-2.1	65	-6.4	47	-9.4	63	-1.3	65	-6.3	47	-9.4
MB	55	4.9	56	2.4	41	-12.3	55	4.7	56	1.5	41	-11.2
HB	36	-2.9	37	9.3	31	-14.5	36	-2.0	37	8.5	31	-13.7
HS-HB		40.3		-27.1		19.3		38.5		-27.2		18.4
		<i>6.65</i>		<i>-4.01</i>		<i>1.92</i>		<i>6.54</i>		<i>-4.02</i>		<i>1.82</i>
TS	600	18.5	624	-9.4	503	1.1	600	17.9	624	-10.1	503	1.1
TB	154	0.2	158	0.4	119	-11.7	154	0.7	158	-0.1	119	-11.1
TS-TB		18.3		-9.8		12.9		17.2		-10.1		12.2
		<i>5.73</i>		<i>-3.24</i>		<i>2.70</i>		<i>5.35</i>		<i>-3.28</i>		<i>2.57</i>
Panel C: Cash Acquisitions												
HS	84	-0.3	86	-4.4	70	-10.5	84	-0.2	86	-5.3	70	-10.5
MS	95	-0.5	96	-7.0	91	-11.3	95	-1.7	96	-7.9	91	-10.6
LS	85	-2.8	86	4.4	76	-12.9	85	-3.3	86	4.3	76	-12.5
NO	68	60.3	85	-3.0	81	-4.8	68	61.0	85	-3.2	81	-3.6
LB	20	-13.0	20	7.4	14	-3.0	20	-12.0	20	7.2	14	-2.0
MB	22	-8.3	23	16.5	17	-31.5	22	-9.5	23	15.3	17	-32.1
HB	30	-15.2	35	-8.1	33	-24.1	30	-14.7	35	-7.7	33	-22.1
HS-HB		14.9		3.6		13.6		14.5		2.4		11.6
		<i>1.79</i>		<i>0.43</i>		<i>1.30</i>		<i>1.79</i>		<i>0.28</i>		<i>1.10</i>
TS	264	-1.2	268	-2.5	237	-11.6	264	-1.7	268	-3.1	237	-11.2
TB	72	-12.5	78	3.1	64	-21.5	72	-12.3	78	2.9	64	-20.3
TS-TB		11.3		-5.7		9.9		10.6		-6.0		9.2
		<i>2.70</i>		<i>-1.03</i>		<i>1.62</i>		<i>2.55</i>		<i>-1.10</i>		<i>1.48</i>



**Table 10b**  
**Acquirer and Target Pre-Merger and Post-Merger Long-Run Excess Stock Returns Sorted by Target's Trading Activity**  
**Buy and Hold Abnormal Returns Method (BHAR)**

This table shows pre-merger and post-merger one-year Buy-and-Hold Abnormal Returns (BHARs) to acquirers and targets grouped by Target's Managerial Trading Activity. Target managerial trading activity is ranked from High Net-Sellers (most overvalued) to High Net-Buyers (most undervalued). Summary categories Total Net-Sellers (TS) and Total Net-Buyers (TB) include the firms which are in HS, MS or LS groups and LB, MB or HB groups respectively. To calculate excess returns, each firm is matched to its corresponding 10x10 Fama-French size and book-to-market portfolio. The matching portfolios, which are constructed at the end of each June, are the intersections of 10 portfolios formed on size and 10 portfolios formed on the ratio of book equity to market equity. The size breakpoints for year t are the NYSE market equity deciles at the end of June of t. BE/ME for June of year t is the book equity in December t-1 divided by ME for December of t-1. The BE/ME breakpoints are NYSE deciles. The portfolios for July of year t to June of t+1 include all NYSE, AMEX, and NASDAQ stocks with market equity data for December of t-1 and June of t, and positive book equity data for t-1. The breakpoints and portfolio return data was made available by Kenneth French. Buy-and-hold returns are measured over months -12,-1 for pre-merger returns and months +1,+12 for post-merger returns for both the sample firm and the control portfolios, and the difference is recorded as the abnormal buy-and-hold return to the sample firm. Panel A reports results for all acquisitions, Panel B for cash acquisitions and Panel C for stock acquisitions. t-statistics are shown in italics.

Target Insider Trading Status	EQUAL WEIGHTED						VALUE WEIGHTED					
	Acquirer pre-merger 1-year excess return (t-1,t)		Acquirer post-merger 1-year excess return (t,t+1)		Target pre-merger 1-year excess return (t,t+1)		Acquirer pre-merger 1-year excess return (t-1,t)		Acquirer post-merger 1-year excess return (t,t+1)		Target pre-merger 1-year excess return (t,t+1)	
	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)
Panel A: All Acquisitions												
HS	251	17.1	274	-12.3	252	9.4	251	16.1	274	-13.2	252	9.4
MS	253	10.9	266	12.5	252	-6.9	253	10.5	266	12.1	252	-7.2
LS	254	2.9	267	-9.2	257	-6.6	254	2.6	267	-9.4	257	-6.7
NO	454	17.1	493	-8.9	360	-12.8	454	16.8	493	-9.5	360	-12.0
LB	149	1.8	156	-4.3	134	-11.3	149	1.6	156	-4.6	134	-11.1
MB	145	-4.0	150	-2.2	118	-11.6	145	-3.7	150	-2.4	118	-10.0
HB	147	3.9	150	-7.3	126	-7.2	147	3.8	150	-7.6	126	-6.3
HS-HB		13.2		-4.9		16.6		12.3		-5.5		15.7
		<i>3.20</i>		<i>-1.13</i>		<i>2.97</i>		<i>3.03</i>		<i>-1.26</i>		<i>2.79</i>
TS	758	10.3	807	-3.1	761	-1.4	758	9.7	807	-3.6	761	-1.5
TB	441	0.6	456	-4.6	378	-10.0	441	0.6	456	-4.9	378	-9.1
TS-TB		9.7		1.5		8.7		9.1		1.3		7.6
		<i>4.42</i>		<i>0.29</i>		<i>3.08</i>		<i>4.20</i>		<i>0.25</i>		<i>2.68</i>
Panel B: Stock Acquisitions												
HS	141	25.4	155	-17.1	143	14.5	141	24.5	155	-18.1	143	14.2
MS	134	16.9	140	1.3	129	2.7	134	16.7	140	0.9	129	2.4
LS	141	8.2	143	-12.0	131	-1.5	141	7.9	143	-12.4	131	-1.3
NO	219	17.3	244	-17.3	166	-13.8	219	17.0	244	-18.0	166	-13.1
LB	77	0.7	79	-8.6	67	-10.3	77	0.6	79	-8.9	67	-10.1
MB	75	0.4	79	2.8	57	-6.5	75	0.6	79	2.8	57	-6.0
HB	62	8.2	62	-6.7	47	-5.5	62	8.5	62	-7.0	47	-4.9
HS-HB		17.2		-10.5		20.0		16.0		-11.1		19.1
		<i>2.43</i>		<i>-1.64</i>		<i>2.21</i>		<i>2.33</i>		<i>-1.73</i>		<i>2.12</i>
TS	416	16.8	438	-9.6	403	5.5	416	16.4	438	-10.2	403	5.4
TB	214	2.8	220	-4.0	171	-7.7	214	2.9	220	-4.2	171	-7.3
TS-TB		14.1		-5.6		13.2		13.5		-6.0		12.7
		<i>4.41</i>		<i>-1.65</i>		<i>3.20</i>		<i>4.24</i>		<i>-1.77</i>		<i>3.07</i>
Panel C: Cash Acquisitions												
HS	53	0.2	58	-2.3	56	-2.3	53	-0.7	58	-2.9	56	-1.9
MS	55	1.3	59	-2.3	60	-20.0	55	0.6	59	-2.3	60	-20.5
LS	59	-4.0	64	-2.0	63	-7.2	59	-4.4	64	-2.5	63	-7.4
NO	125	31.9	135	1.1	105	-13.1	125	32.1	135	0.8	105	-12.0
LB	31	0.1	34	1.2	26	-12.3	31	-0.4	34	0.2	26	-12.2
MB	37	-19.8	35	-2.4	27	-27.6	37	-19.2	35	-2.9	27	-24.2
HB	44	-4.6	46	-8.6	45	-6.3	44	-5.1	46	-9.3	45	-4.6
HS-HB		4.7		6.3		4.0		4.3		6.4		2.7
		<i>0.74</i>		<i>0.88</i>		<i>0.35</i>		<i>0.69</i>		<i>0.87</i>		<i>0.23</i>
TS	167	-0.9	181	-2.2	179	-10.0	167	-1.6	181	-2.6	179	-10.1
TB	112	-8.3	115	-3.8	98	-13.8	112	-8.5	115	-4.6	98	-12.0
TS-TB		7.4		1.6		3.8		6.9		2.0		1.9
		<i>1.66</i>		<i>0.35</i>		<i>0.61</i>		<i>1.56</i>		<i>0.42</i>		<i>0.31</i>

**Table 11a**  
**Acquirer Post-Merger Long-Run Excess Stock Returns**  
**Calendar Time Portfolio Regressions Method (CTPR) - Fama-French 3-Factor Model**

This table shows the average monthly abnormal returns for the acquirer firm portfolios obtained from Calendar Time Portfolio Regressions, sorted by acquirer's managerial trading activity. Acquirer managerial trading activity is ranked from High Net-Sellers (most overvalued) to High Net-Buyers (most undervalued). Summary categories Total Net-Sellers (TS) and Total Net-Buyers (TB) include the firms which are in HS, MS or LS groups and LB, MB or HB groups respectively. At every month from January 1984 to December 2000, calendar time portfolios are formed by including all the acquiring firms in a given trading activity category which announced a merger with another company within the previous 12, 24 and 36 months. The portfolio is rebalanced every month to include all the new event companies and to drop off the old ones whose announcement date falls outside of the holding horizon. Both value-weighted and equally weighted monthly returns are calculated for each portfolio and regressed on the three Fama-French risk factors using the following GARCH (1,1) specification:

$$R_{pt} - R_{ft} = \alpha_p + \beta_p (R_{mt} - R_{ft}) + s_p SMB_t + h_p HML_t + \varepsilon_t$$

$$\sigma_t^2 = \omega + \gamma_1 \sigma_{t-1}^2 + \gamma_2 \varepsilon_{t-1}^2 + \gamma_3 N_t$$

where  $\varepsilon_t$  is an independently and identically distributed Gaussian random error,  $R_t$  is the portfolio return,  $R_{ft}$  is the one-month Treasury bill rate,  $R_{mt}$  is the value-weighted monthly return of CRSP index,  $SMB_t$  is the difference in the returns of a value weighted portfolio of small stocks and big stocks,  $HML_t$  is the difference in the returns of a value-weighted portfolio of high book-to-market stocks and low book-to-market stocks, and the intercept  $\alpha_p$  represents the average monthly abnormal return of the event portfolio. In the second equation,  $N_t$  is the number of stocks included in portfolio at month  $t$  and  $\sigma_t^2$  is the conditional volatility of  $\varepsilon_t$ . Panel A reports the results for all acquirers, Panel B for acquirers in stock acquisitions and Panel C for acquirers in cash acquisitions. t-statistics are shown next to  $\alpha_p$  estimates.

Acquirer Insider Trading Status	EQUAL WEIGHTED						VALUE WEIGHTED					
	12-Month Horizon	t	24-Month Horizon	t	36-Month Horizon	t	12-Month Horizon	t	24-Month Horizon	t	36-Month Horizon	t
<b>Panel A: All Acquisitions</b>												
HS	-0.40	-1.70	-0.24	-1.09	-0.21	-1.15	0.09	0.29	-0.12	-0.44	-0.17	-0.78
MS	-0.24	-1.15	-0.21	-1.20	-0.29	-1.66	0.28	1.11	0.06	0.33	0.06	0.31
LS	-0.04	-0.20	-0.16	-1.12	0.00	0.02	0.09	0.38	0.20	1.34	0.04	0.27
NO	0.12	0.49	-0.03	-0.13	-0.05	-0.28	0.02	0.06	-0.05	-0.19	0.04	0.20
LB	-0.07	-0.23	0.07	0.35	0.10	0.51	0.05	0.17	0.40	1.57	0.14	0.58
MB	0.33	1.05	0.12	0.56	0.00	0.01	-0.10	-0.26	-0.01	-0.02	-0.14	-0.56
HB	0.38	1.15	0.22	0.79	-0.02	-0.07	0.42	1.07	0.11	0.37	0.22	0.98
HS-HB	-0.78	-1.92	-0.46	-1.30	-0.19	-0.57	-0.33	-0.65	-0.23	-0.57	-0.39	-1.25
TS	-0.08	-0.55	-0.17	-1.39	-0.07	-0.57	0.12	0.83	0.03	0.22	-0.03	-0.26
TB	0.29	1.46	0.10	0.59	-0.03	-0.19	-0.12	-0.52	0.15	0.90	0.12	0.74
TS-TB	-0.37	-1.51	-0.28	-1.28	-0.04	-0.21	0.25	0.88	-0.12	-0.59	-0.15	-0.75
All Acquirers	0.12	1.16	-0.02	-0.21	0.01	0.09	0.07	0.56	0.03	0.31	-0.03	-0.26
<b>Panel B: Stock Acquisitions</b>												
HS	-0.64	-2.11	-0.33	-1.21	-0.10	-0.38	-0.20	-0.50	-0.06	-0.18	0.01	0.05
MS	-0.48	-1.37	-0.45	-1.87	-0.35	-1.57	-0.05	-0.11	-0.38	-1.60	-0.28	-1.34
LS	0.10	0.40	-0.04	-0.18	0.07	0.37	0.02	0.08	0.16	0.63	0.02	0.08
NO	-0.29	-0.77	0.02	0.07	-0.14	-0.52	-0.01	-0.02	0.06	0.21	0.04	0.12
LB	-0.51	-1.59	-0.16	-0.61	0.23	1.03	-0.18	-0.50	-0.10	-0.33	-0.08	-0.32
MB	0.60	1.53	0.22	0.72	0.09	0.31	-0.24	-0.44	-0.01	-0.01	-0.15	-0.41
HB	0.94	1.89	0.82	1.90	0.32	0.95	1.03	2.06	0.74	1.77	0.51	1.58
HS-HB	-1.58	-2.71	-1.15	-3.11	-0.42	-0.98	-1.23	-1.92	-0.80	-1.48	-0.50	-1.15
TS	-0.26	-1.16	-0.33	-1.52	-0.09	-0.50	0.04	0.20	-0.12	-0.66	-0.15	-0.94
TB	0.19	0.65	0.16	0.72	0.09	0.52	-0.02	-0.07	0.03	0.16	0.07	0.42
TS-TB	-0.45	-1.22	-0.49	-1.58	-0.18	-0.72	0.06	0.17	-0.15	-0.55	-0.23	-0.95
All Acquirers	-0.13	-0.82	-0.13	-0.94	-0.01	-0.07	-0.01	-0.05	-0.10	-0.66	-0.11	-0.84
<b>Panel C: Cash Acquisitions</b>												
HS	-0.11	-0.29	-0.20	-0.78	0.10	0.38	-0.12	-0.29	-0.30	-0.92	-0.17	-0.57
MS	-0.02	-0.05	0.18	0.66	0.11	0.48	0.27	0.73	0.56	1.71	0.34	1.25
LS	0.75	2.10	0.46	2.50	0.37	2.13	0.34	1.10	0.38	1.47	-0.02	-0.08
NO	0.55	1.69	0.33	1.27	0.12	0.46	0.06	0.15	0.34	1.06	0.39	1.48
LB	0.48	0.70	0.16	0.30	0.00	0.00	-0.22	-0.30	0.36	0.75	0.37	0.84
MB	1.11	1.34	0.98	1.56	0.68	1.25	0.55	0.68	0.72	1.39	0.46	0.84
HB	0.94	1.57	0.00	0.00	-0.28	-0.73	1.09	2.05	0.41	0.78	0.35	0.83
HS-HB	-1.04	-1.49	-0.20		0.38	0.82	-1.21	-1.81	-0.72	-1.15	-0.52	-1.01
TS	0.18	0.92	0.12	0.79	0.19	1.26	0.36	1.28	0.36	1.95	0.21	1.28
TB	0.58	1.21	0.31	1.07	0.07	0.29	0.08	0.17	0.14	0.41	0.28	0.93
TS-TB	-0.39	-0.76	-0.19	-0.58	0.12	0.42	0.29	0.54	0.22	0.55	-0.07	-0.20
All Acquirers	0.28	1.55	0.02	0.10	0.08	0.67	0.40	1.82	0.27	1.65	0.19	1.23

**Table 11b**  
**Acquirer Post-Merger Long-Run Excess Stock Returns**  
**Calendar Time Portfolio Regressions Method (CTPR) - Fama-French-Carhart 4-Factor Model**

This table shows the average monthly abnormal returns for the acquirer firm portfolios obtained from Calendar Time Portfolio Regressions, sorted by acquirer's managerial trading activity. Acquirer managerial trading activity is ranked from High Net-Sellers (most overvalued) to High Net-Buyers (most undervalued). Summary categories Total Net-Sellers (TS) and Total Net-Buyers (TB) include the firms which are in HS, MS or LS groups and LB, MB or HB groups respectively. At every month from January 1984 to December 2000, calendar time portfolios are formed by including all the acquiring firms in a given trading activity category which announced a merger with another company within the previous 12, 24 and 36 months. The portfolio is rebalanced every month to include all the new event companies and to drop off the old ones whose announcement date falls outside of the holding horizon. Both value-weighted and equally weighted monthly returns are calculated for each portfolio and regressed on the three Fama-French risk factors using the following GARCH (1,1) specification:

$$R_{pt} - R_{ft} = \alpha_p + \beta_p (R_{mt} - R_{ft}) + s_p SMB_t + h_p HML_t + u_p UMD_t + \varepsilon_t$$

$$\sigma_t^2 = \omega + \gamma_1 \sigma_{t-1}^2 + \gamma_2 \varepsilon_{t-1}^2 + \gamma_3 N_t$$

where  $\varepsilon_t$  is an independently and identically distributed Gaussian random error,  $R_{pt}$  is the portfolio return,  $R_{ft}$  is the one-month Treasury bill rate,  $R_{mt}$  is the value-weighted monthly return of CRSP index,  $SMB_t$  is the difference in the returns of a value weighted portfolio of small stocks and big stocks,  $HML_t$  is the difference in the returns of a value-weighted portfolio of high book-to-market stocks and low book-to-market stocks,  $UMD_t$  measures the difference in the returns of a value weighted portfolio of two high prior return portfolios minus and the two low prior return portfolios among the six value-weight portfolios formed on size and prior returns and the intercept  $\alpha_p$  represents the average monthly abnormal return of the event portfolio. In the second equation,  $N_t$  is the number of stocks included in portfolio at month  $t$  and  $\sigma_t^2$  is the conditional volatility of  $\varepsilon_t$ . Panel A reports the results for all acquirers, Panel B for acquirers in stock acquisitions and Panel C for acquirers in cash acquisitions. t-statistics are shown next to  $\alpha_p$  estimates.

Acquirer Insider Trading Status	EQUAL WEIGHTED						VALUE WEIGHTED					
	12-Month Horizon	t	24-Month Horizon	t	36-Month Horizon	t	12-Month Horizon	t	24-Month Horizon	t	36-Month Horizon	t
Panel A: All Acquisitions												
HS	-0.40	-1.70	-0.24	-1.09	-0.21	-1.15	0.09	0.29	-0.12	-0.44	-0.17	-0.78
MS	-0.24	-1.15	-0.21	-1.20	-0.29	-1.66	0.28	1.11	0.06	0.33	0.06	0.31
LS	-0.04	-0.20	-0.16	-1.12	0.00	0.02	0.09	0.38	0.20	1.34	0.04	0.27
NO	0.12	0.49	-0.03	-0.13	-0.05	-0.28	0.02	0.06	-0.05	-0.19	0.04	0.20
LB	-0.07	-0.23	0.07	0.35	0.10	0.51	0.05	0.17	0.40	1.57	0.14	0.58
MB	0.33	1.05	0.12	0.56	0.00	0.01	-0.10	-0.26	-0.01	-0.02	-0.14	-0.56
HB	0.38	1.15	0.22	0.79	-0.02	-0.07	0.42	1.07	0.11	0.37	0.22	0.98
HS-HB	-0.78	-1.92	-0.46	-1.30	-0.19	-0.57	-0.33	-0.65	-0.23	-0.57	-0.39	-1.25
TS	-0.08	-0.55	-0.17	-1.39	-0.07	-0.57	0.12	0.83	0.03	0.22	-0.03	-0.26
TB	0.29	1.46	0.10	0.59	-0.03	-0.19	-0.12	-0.52	0.15	0.90	0.12	0.74
TS-TB	-0.37	-1.51	-0.28	-1.28	-0.04	-0.21	0.25	0.88	-0.12	-0.59	-0.15	-0.75
All Acquirers	0.12	1.16	-0.02	-0.21	0.01	0.09	0.07	0.56	0.03	0.31	-0.03	-0.26
Panel B: Stock Acquisitions												
HS	-0.45	-1.42	-0.05	-0.16	0.24	0.92	-0.13	-0.26	0.07	0.25	0.06	0.24
MS	-0.26	-0.70	-0.18	-0.72	-0.19	-0.72	0.13	0.32	-0.22	-0.87	-0.19	-0.87
LS	0.20	0.79	0.04	0.20	0.23	1.18	-0.22	-0.75	0.03	0.14	-0.02	-0.10
NO	-0.48	-1.20	-0.06	-0.19	-0.07	-0.27	-0.03	-0.05	0.06	0.21	0.19	0.65
LB	-0.54	-1.59	-0.10	-0.39	0.28	1.37	-0.29	-0.84	-0.07	-0.22	-0.13	-0.51
MB	0.65	1.57	0.27	0.87	0.17	0.57	-0.12	-0.21	0.10	0.24	-0.17	-0.48
HB	1.02	2.01	0.75	1.63	0.27	0.79	1.33	2.86	0.56	1.26	0.20	0.65
HS-HB	-1.47	-2.46	-0.80	-1.79	-0.03	-0.07	-1.45	-2.16	-0.49	-0.92	-0.14	-0.34
TS	-0.05	-0.24	0.00	0.00	0.08	0.45	0.08	0.38	-0.03	-0.17	-0.08	-0.49
TB	0.30	0.91	0.22	0.95	0.17	0.84	-0.09	-0.29	0.01	0.03	-0.04	-0.19
TS-TB	-0.35	-0.88	-0.22	0.00	-0.08	-0.31	0.17	0.46	-0.04	-0.14	-0.04	-0.15
All Acquirers	-0.07	-0.46	0.04	0.26	0.06	0.41	-0.03	-0.14	-0.04	-0.26	-0.04	-0.30
Panel C: Cash Acquisitions												
HS	0.15	0.42	-0.11	-0.42	0.26	1.04	-0.05	-0.13	-0.46	-1.39	-0.24	-0.81
MS	0.19	0.64	0.42	1.60	0.40	1.61	0.18	0.47	0.52	1.71	0.34	1.20
LS	1.05	3.04	0.56	2.80	0.48	2.66	0.45	1.36	0.39	1.47	-0.02	-0.06
NO	0.55	1.64	0.56	2.02	0.26	1.20	-0.06	-0.14	0.22	0.64	0.09	0.35
LB	0.55	0.70	0.18	0.33	0.07	0.16	-0.06	-0.07	0.27	0.60	0.27	0.63
MB	0.95	1.11	0.93	1.41	0.61	1.08	0.43	0.52	0.71	1.31	0.37	0.66
HB	0.88	1.15	0.10	0.25	-0.14	-0.36	1.25	1.37	0.44	0.81	0.45	1.03
HS-HB	-0.73	-0.86	-0.21		0.40	0.86	-1.30	-1.30	-0.90	-1.42	-0.70	-1.31
TS	0.35	1.91	0.30	1.86	0.28	1.98	0.34	1.16	0.27	1.40	0.19	1.07
TB	0.68	1.32	0.37	1.21	0.14	0.59	0.19	0.41	0.11	0.32	0.27	0.84
TS-TB	-0.33	-0.60	-0.07	-0.21	0.14	0.49	0.15	0.28	0.15	0.38	-0.08	-0.21
All Acquirers	0.43	2.36	0.26	1.83	0.27	2.22	0.28	1.20	0.17	0.90	0.16	1.00

**Table 11c**  
**Acquirer Post-Merger Long-Run Excess Stock Returns sorted by Target's Trading Activity**  
**Calendar Time Portfolio Regressions Method (CTPR)**

This table shows the average monthly abnormal returns for the acquirer firm portfolios obtained from Calendar Time Portfolio Regressions, sorted by target's managerial trading activity. Target managerial trading activity is ranked from High Net-Sellers (most overvalued) to High Net-Buyers (most undervalued). Summary categories Total Net-Sellers (TS) and Total Net-Buyers (TB) include the firms which are in HS, MS or LS groups and LB, MB or HB groups respectively. At every month from January 1984 to December 2000, calendar time portfolios are formed by including all the acquiring firms in a given trading activity category which announced a merger with another company within the previous 12, 24 and 36 months. The portfolio is rebalanced every month to include all the new event companies and to drop off the old ones whose announcement date falls outside of the holding horizon. Both value-weighted and equally weighted monthly returns are calculated for each portfolio and regressed on the three Fama-French risk factors

$$R_{pt} - R_{ft} = \alpha_p + \beta_p (R_{mt} - R_{ft}) + s_p SMB_t + h_p HML_t + \varepsilon_t$$

$$\sigma_t^2 = \omega + \gamma_1 \sigma_{t-1}^2 + \gamma_2 \varepsilon_{t-1}^2 + \gamma_3 N_t$$

where  $\varepsilon_t$  is an independently and identically distributed Gaussian random error,  $R_t$  is the portfolio return,  $R_{ft}$  is the one-month Treasury bill rate,  $R_{mt}$  is the value-weighted monthly return of CRSP index,  $SMB_t$  is the difference in the returns of a value weighted portfolio of small stocks and big stocks,  $HML_t$  is the difference in the returns of a value-weighted portfolio of high book-to-market stocks and low book-to-market stocks, and the intercept  $\alpha_p$  represents the average monthly abnormal return of the event portfolio. In the second equation,  $N_t$  is the number of stocks included in portfolio at month  $t$  and  $\sigma_t^2$  is the conditional volatility of  $\varepsilon_t$ . Panel A reports the results for all acquirers, Panel B for acquirers in stock acquisitions and Panel C for acquirers in cash acquisitions. t-statistics are shown next to  $\alpha_p$  estimates.

Target Insider Trading Status	EQUAL WEIGHTED						VALUE WEIGHTED					
	12-Month Horizon	t	24-Month Horizon	t	36-Month Horizon	t	12-Month Horizon	t	24-Month Horizon	t	36-Month Horizon	t
Panel A: All Acquisitions												
HS	-0.23	-1.11	-0.20	-1.17	-0.14	-0.82	0.33	1.45	0.05	0.23	0.17	1.02
MS	-0.09	-0.43	-0.17	-0.84	-0.27	-1.53	0.01	0.05	-0.12	-0.59	-0.24	-1.48
LS	-0.45	-1.69	-0.45	-2.23	-0.08	-0.39	-0.07	-0.30	0.05	0.27	0.06	0.38
NO	-0.01	-0.02	-0.01	-0.04	-0.01	-0.08	0.37	2.00	0.08	0.49	0.00	0.02
LB	-0.28	-0.98	0.02	0.12	-0.03	-0.18	0.01	0.05	0.09	0.44	0.00	0.00
MB	0.06	0.17	0.15	0.51	0.10	0.47	-0.29	-0.99	0.09	0.34	-0.09	-0.38
HB	-0.13	-0.47	-0.04	-0.21	0.07	0.39	-0.25	-0.68	-0.17	-0.81	-0.16	-0.87
HS-HB	-0.10	-0.29	-0.15	-0.58	-0.21	-0.84	0.57	1.34	0.22	0.72	0.33	1.33
TS	-0.23	-1.39	-0.24	-1.73	-0.11	-0.98	0.04	0.21	0.04	0.25	-0.05	-0.38
TB	0.00	-0.02	0.00	-0.01	0.10	0.75	-0.12	-0.59	0.12	0.74	-0.07	-0.47
TS-TB	-0.23	-0.79	-0.24	-0.79	-0.21	-1.21	0.16	0.58	-0.08	-0.37	0.02	0.09
All Acquirers	0.12	1.16	-0.02	-0.21	0.01	0.09	0.07	0.56	0.03	0.31	-0.03	-0.26
Panel B: Stock Acquisitions												
HS	-0.31	-0.95	-0.71	-3.54	-0.46	-2.02	-0.26	-0.58	-0.36	-1.09	-0.28	-1.02
MS	0.03	0.09	-0.15	-0.54	-0.27	-1.05	-0.26	-0.63	-0.36	-1.43	-0.31	-1.17
LS	-0.59	-1.94	-0.54	-2.11	-0.24	-0.99	-0.18	-0.57	0.22	0.83	0.09	0.42
NO	-0.50	-1.95	-0.40	-2.39	-0.39	-1.84	-0.20	-0.48	-0.14	-0.58	-0.28	-1.21
LB	-0.21	-0.63	-0.10	-0.43	-0.01	-0.07	0.15	0.47	-0.24	-0.85	-0.19	-0.78
MB	0.75	1.79	0.23	0.97	0.36	1.31	0.64	1.53	0.12	0.48	0.16	0.65
HB	-0.07	-0.19	-0.16	-0.61	0.02	0.09	-0.47	-0.90	-0.03	-0.10	0.27	1.05
HS-HB	-0.24	-0.49	-0.54	-2.93	-0.48	-1.49	0.21	0.30	-0.33	-0.70	-0.55	-1.46
TS	-0.29	-1.30	-0.27	-1.36	-0.13	-0.67	-0.10	-0.48	-0.22	-1.36	-0.19	-1.31
TB	0.31	1.09	0.05	0.26	0.18	0.83	-0.49	-1.77	0.09	0.41	0.16	0.84
TS-TB	-0.60	-1.66	-0.32	-1.18	-0.31	-1.07	0.39	1.10	-0.32	-1.13	-0.35	-1.46
All Acquirers	-0.13	-0.82	-0.13	-0.94	-0.01	-0.07	-0.01	-0.05	-0.10	-0.66	-0.11	-0.84
Panel C: Cash Acquisitions												
HS	0.67	1.89	0.19	0.77	0.21	0.88	0.62	1.66	0.55	1.69	0.33	1.28
MS	0.65	2.08	0.13	0.40	0.02	0.07	0.54	1.15	0.44	1.03	0.13	0.38
LS	0.09	0.22	0.20	0.74	0.33	1.23	0.76	1.52	0.21	0.58	0.44	1.68
NO	0.32	1.11	0.17	0.77	0.01	0.06	0.66	2.25	0.70	2.86	0.09	0.51
LB	-0.32	-0.61	0.22	0.55	-0.34	-1.04	0.34	0.69	0.47	1.31	-0.01	-0.01
MB	0.41	0.80	0.95	2.59	0.93	4.30	-0.53	-1.14	-0.03	-0.08	-0.37	-1.19
HB	0.10	0.30	-0.10	-0.24	0.12	0.39	-0.33	-0.97	-0.22	-0.43	-0.28	-0.75
HS-HB	0.56	1.14	0.29	0.09	0.23	0.95	1.88	0.76	1.27	0.61	1.35	
TS	0.28	1.05	0.08	0.41	0.12	0.61	0.36	0.96	0.26	1.01	0.32	1.38
TB	0.06	0.20	0.08	0.37	0.00	0.03	-0.03	-0.11	0.22	0.75	-0.10	-0.45
TS-TB	0.22	0.55	0.00	0.00	0.12	0.45	0.39	0.80	0.04	0.10	0.42	1.29
All Acquirers	0.28	1.55	0.02	0.10	0.08	0.67	0.40	1.82	0.27	1.65	0.19	1.23





**Table 13a**  
**Least Squares Regression Results**  
**Continuous Managerial Trading Variable**

This table lists the results for least squares regressions. Dependent variables are acquirer and target cumulative announcement abnormal returns and bid premium. Cumulative abnormal returns are calculated as the cumulative returns in excess of the return on the CRSP value-weighted index over a 4-day event window of [-2,+1] days around the merger announcement date. Bid premium is defined as the ratio of the difference between the bid price and day -3 price of the target to day -3 price of the target. Acquirer Net Managerial Purchase as a % of holdings (NET) = Net Managerial Purchases in the one-year period prior to the merger announcement / total value of common share holdings at the beginning of the one-year period. The dummy variables Hostile, Tender Offer, Cash and Stock take on the value 1 if the acquisition is hostile, mode of acquisition is tender offer, the method of payment is all cash and the method of payment is all stock respectively. B/P is the book to price ratio. B/P for calendar year t is calculated as the book value belonging to the fiscal year ending in calendar year t-1 divided by the stock price at the end of calendar year t-1. Log of Relative Size is the logarithm of TMV3/AMV3, where TMV3 is target's market value at day -3 and AMV3 is the acquirer's market value at day -3 relative to the announcement date. Log of target size is the logarithm of TMV3. The sample period is 1984-2000. All regressions include year and acquirer and target 2-digit SIC major industry dummies. t-statistics are shown in italics.

	Acquirer Announcement Period CAR		Target Announcement Period CAR		Bid Premium	
Acquirer NET	0.17 <i>1.65</i>	0.28 <i>2.55</i>	0.10 <i>0.44</i>	0.03 <i>0.11</i>	-0.01 <i>-0.02</i>	-0.26 <i>-0.63</i>
Target NET	0.48 <i>2.42</i>	0.36 <i>1.78</i>	-0.22 <i>-0.54</i>	-0.24 <i>-0.52</i>	-0.75 <i>-1.07</i>	-0.68 <i>-0.93</i>
Hostile	1.91 <i>1.85</i>	2.11 <i>1.83</i>	3.45 <i>1.17</i>	2.56 <i>0.85</i>	25.77 <i>4.97</i>	22.68 <i>4.07</i>
Tender Offer	0.60 <i>1.15</i>	0.49 <i>0.80</i>	6.26 <i>3.98</i>	6.10 <i>3.60</i>	1.55 <i>0.54</i>	4.25 <i>1.47</i>
Cash	0.84 <i>1.86</i>	1.29 <i>2.36</i>	1.83 <i>1.30</i>	0.01 <i>0.00</i>	-5.98 <i>-1.53</i>	-2.83 <i>-0.92</i>
Stock	-0.70 <i>-1.64</i>	-0.10 <i>-0.20</i>	-1.40 <i>-1.34</i>	-2.16 <i>-1.77</i>	-7.27 <i>-2.16</i>	-0.80 <i>-0.31</i>
Acquirer B/P		0.48 <i>0.84</i>		0.12 <i>0.11</i>		-0.79 <i>-0.33</i>
Target B/P		0.25 <i>0.77</i>		2.02 <i>2.32</i>		4.85 <i>2.05</i>
Log of relative Size	-0.10 <i>-0.92</i>	-0.24 <i>-1.72</i>	-1.71 <i>-5.42</i>	-2.02 <i>-5.53</i>	-2.16 <i>-2.79</i>	-1.45 <i>-2.22</i>
Log of Target Size	-0.44 <i>-3.48</i>	-0.41 <i>-2.62</i>	-0.59 <i>-2.04</i>	-0.17 <i>-0.51</i>	-4.18 <i>-5.38</i>	-3.07 <i>-4.17</i>
Intercept	2.41 <i>1.42</i>	0.30 <i>0.12</i>	16.48 <i>3.00</i>	0.17 <i>2.76</i>	89.62 <i>7.37</i>	72.03 <i>5.84</i>
Sample Size	1970	1497	1970	1497	1970	1497
R2	0.074	0.101	0.113	0.139	0.091	0.119

**Table 13b**  
**Least Squares Regression Results**  
**Discrete Managerial Trading Variable**

This table lists the results for least squares regressions. Dependent variables are acquirer and target cumulative announcement abnormal returns and bid premium. Cumulative abnormal returns are calculated as the cumulative returns in excess of the return on the CRSP value-weighted index over a 4-day event window of [-2,+1] days around the merger announcement date. Bid premium is defined as the ratio of the difference between the bid price and day -3 price of the target to day -3 price of the target. Managerial trading activity in acquirers and targets is measured by a rank variable (NETRANK) which take on 7 values from 1 to 7, with 1 representing the Highest Selling (HS) firms and 7 representing the Highest Buying (HB) firms. Trading Activity rank variable is equal to 1 if HS=1, 2 if MS=1, 3 if LS=1, 4 if NO=1, 5 if LB=1, 6 if MB=1 and 7 if HB=1. The dummy variables Hostile, Tender Offer, Cash and Stock take on the value 1 if the acquisition is hostile, mode of acquisition is tender offer, the method of payment is all cash and the method of payment is all stock respectively. B/P is the book to price ratio. B/P for calendar year t is calculated as the book value belonging to the fiscal year ending in calendar year t-1 divided by the stock price at the end of calendar year t-1. Log of Relative Size is the logarithm of TMV3/AMV3, where TMV3 is target's market value at day -3 and AMV3 is the acquirer's market value at day -3 relative to the announcement date. Log of target size is the logarithm of TMV3. The sample period is 1984-2000. All regressions include year and acquirer and target 2-digit SIC major industry dummies. t-statistics are shown in italics.

	Acquirer Announcement Period CAR		Target Announcement Period CAR		Bid Premium	
Acquirer NETRANK	0.25 <i>2.53</i>	0.32 <i>2.82</i>	0.43 <i>1.67</i>	0.62 <i>2.10</i>	1.16 <i>1.76</i>	1.39 <i>2.11</i>
Target NETRANK	0.25 <i>2.56</i>	0.24 <i>2.06</i>	0.14 <i>0.54</i>	0.27 <i>0.95</i>	1.03 <i>1.98</i>	1.27 <i>2.25</i>
Hostile	1.85 <i>1.80</i>	2.08 <i>1.84</i>	3.41 <i>1.17</i>	2.53 <i>0.85</i>	25.75 <i>5.05</i>	22.67 <i>4.11</i>
Tender Offer	0.55 <i>1.08</i>	0.40 <i>0.66</i>	6.12 <i>3.86</i>	5.89 <i>3.46</i>	0.95 <i>0.33</i>	3.56 <i>1.22</i>
Cash	0.94 <i>2.09</i>	1.38 <i>2.55</i>	1.86 <i>1.32</i>	0.16 <i>0.10</i>	-5.76 <i>-1.48</i>	-2.28 <i>-0.74</i>
Stock	-0.63 <i>-1.49</i>	0.00 <i>0.00</i>	-1.23 <i>-1.17</i>	-1.87 <i>-1.54</i>	-6.57 <i>-1.99</i>	0.07 <i>0.03</i>
Acquirer B/P		0.43 <i>0.74</i>		-0.26 <i>-0.23</i>		-1.87 <i>-0.82</i>
Target B/P		0.19 <i>0.61</i>		1.87 <i>2.18</i>		4.35 <i>2.00</i>
Log of relative Size	-0.19 <i>-1.75</i>	-0.33 <i>-2.30</i>	-1.83 <i>-5.56</i>	-2.16 <i>-5.80</i>	-2.50 <i>-2.97</i>	-1.76 <i>-2.68</i>
Log of Target Size	-0.32 <i>-2.54</i>	-0.32 <i>-1.99</i>	-0.42 <i>-1.41</i>	0.07 <i>0.21</i>	-3.49 <i>-4.50</i>	-2.32 <i>-3.05</i>
Intercept	-1.30 <i>-0.65</i>	-2.88 <i>-1.15</i>	12.43 <i>2.26</i>	11.29 <i>1.85</i>	73.60 <i>5.95</i>	55.20 <i>4.49</i>
Sample Size	1970	1497	1970	1497	1970	1497
R2	0.082	0.101	0.115	0.142	0.093	0.126