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Merger Momentum and Investor Sentiment: The Stock Market Reaction to Merger Announcements

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Merger momentum and investor sentiment: the stock market reaction to merger announcements. [*]

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Abstract

This paper examines the effects of mergers on bidding firms' stock prices. We find evidence of merger momentum: bidder stock prices are more likely to increase when a merger is announced if recent mergers by other firms have been received well (a "hot" merger market) or if the overall stock market is doing better. However, there is long run reversal. Long-run bidder stock returns are lower for mergers announced when the either merger or stock markets were hot at the time of the merger than for those announced at other times.

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I. Introduction

We examine whether the market reaction to a merger announcement depends on the recent merger history of the overall market and of the bidding firm. There has been a great deal of attention paid to when mergers occur. For example, Nelson (1959) documents merger waves dating back to the period 1898-1902 while Holmstrom and Kaplan (2001), among others, describe the merger waves in the 1980s and 1990s.

Less attention has been paid to comparing cycles in the quality of mergers. Variations in merger quality – which we gauge using the return to bidding firms – over a merger cycle can shed light on different theories on why and when acquisitions occur. [1] This study examines whether market factors influence the reaction to a merger announcement. We show that there is a form of momentum in mergers, that is, the market reaction to a merger is positively correlated with the response to other mergers in the recent past.

The literature evaluates a merger based on the initial market reaction to the merger announcement (e.g., Asquith, et. al., 1983) and on the long-run returns to the merger (e.g., Loughran and Vijh, 1997). To understand the sources of merger momentum, we compare the announcement reaction to the long-run return. We use a cross-sectional analysis of 6,259 completed acquisitions by public firms announced between 1982 and 2001 to determine the factors that affect the relationship between the announcement reaction and the long-run return.

We examine three different theories that are each consistent with merger momentum, but have different predictions about long-run returns. The neoclassical theory of mergers assumes that managers act to maximize shareholder value. Under this theory, merger

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[1] The return to a bidding firm reflects both the quality of the merger and price paid by the bidder for the target. We discuss this in the next section.

momentum may result from shocks that increase synergies for a group of mergers. Mergers announced following these shocks should be better than on average than other mergers, leading to correlated announcement returns. A second theory is that there are managerial motivations for mergers. If managerial objectives drive merger decisions, then acquisitions during waves may be worse than other mergers (Gorton, et. al., 2002). Under either theory, rational shareholders are assumed to react immediately to the new information contained in a merger announcement. Thus, there should be no long run drift after the announcement or, at a minimum, there is no reason that the post-acquisition returns to a bidder's stock should depend on when the merger announcement occurs.

The third theory we examine is that momentum results from overly optimistic beliefs on the part of investors and possibly managers. A recent literature suggests that shareholder reaction to a corporate announcement can be affected by investor sentiment, that is, the reaction of investors to factors other than the value created by the merger (e.g., Helwege and Liang, 1996, for initial public offerings). Merger momentum could result from investors as a group becoming optimistic about mergers announced during a particular period of time.

If the market reaction to merger announcement is not based on fundamentals, it might also affect merger decisions. Mergers are more frequent when the bidders appear to be overvalued (Dong, et. al., 2003; Rhodes-Kropf, et. al., 2003; Shleifer and Vishny, 2003). If valuations are driven by beliefs, it is possible that managers may make more acquisitions, especially those financed using stock, during periods of optimism because these offer good opportunities to issue large amounts of stock at an overvalued price.[2] Note that managers also may make additional acquisitions during these times if they are imbued with the same optimistic beliefs as investors.

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[2] There is no reason to believe that, during hot markets, stock issued to purchase capital goods will be less overvalued than stock issued to finance a merger, all else equal. However, it may be difficult to find a worthwhile capital project that involves as much expenditure as a major acquisition. That is, mergers are an efficient way to make large capital purchases with stock.

When swings in merger momentum are caused by changes in optimism, any increase in a bidder's stock price should reverse in the long run as beliefs are replaced by results. If managers make worse acquisitions in hot markets (because they pursue private benefits or because they optimistically overvalue target firms), then the long-run return to bidders might be negative even with a positive announcement return included.

Using our large sample of acquisitions, we find evidence of merger momentum. The market reaction to a merger announcement is positively related to the reaction to other recent merger announcements. However, the effects of merger momentum disappear in the long run. Firms announcing an acquisition during a hot merger market perform no better and possibly worse, all else equal, than those announcing at other times do. This is consistent with over-optimism in hot merger markets. It also suggests that managerial motivations may influence merger decisions in hot markets.

Momentum exists in other forms. We show that there is some evidence of merger momentum at the firm level. There is also momentum in the broader stock market that carries over to merger markets.

The paper is organized as follows. Section II presents hypotheses based on the previous literature. The data and empirical model are discussed in Section III. The short-run market reactions to merger announcements are analyzed in Section IV. Section V examines the long-run market response to merger announcements. The final section offers some conclusions.

II. Merger momentum

We define merger momentum as a correlation between the market reaction to a merger announcement and recent market conditions. Thus, a hot merger market is one where the reaction to recent market conditions has been favorable. Hot markets are related to, but not necessarily the same, as merger waves. Waves are traditionally measured by the number (or value) of mergers rather than by the market's reaction to

merger announcements. The market reaction depends on the new information contained in a merger announcement (e.g., whether a merger is likely to create synergies) as well as how the market reacts to that information. In this section, we describe possible origins of momentum and discuss the hypotheses we test in the following sections.

Merger momentum can reflect common factors that influence the synergies available from different mergers. Studies suggest that mergers are clustered around economic and regulatory shocks (Mitchell and Mulherin, 1996; Andrade, et. al., 2001). Given that most mergers occur following shocks and there is evidence of a positive stock market reaction to mergers (e.g., Andrade, et. al.), it is possible that the shocks create common synergies.

The neoclassical theory of mergers implies that firms – acting in the interests of shareholders – only make acquisitions that increase their value. If mergers are concentrated around common shocks that positively affect the potential synergies from all mergers, then mergers following shocks should be better than other mergers. To put it another way, mergers during waves should, on average, have higher synergies that mergers at other times. Thus, while the number of mergers and the market reaction to merger announcements need not be related, if the neoclassical theory holds and if merger waves are responses to common shocks, then merger waves and merger momentum should be highly correlated.

Managerial motivations, possibly in reaction to shocks, can also lead to increases in merger activity. If making an acquisition reduces the probability that a firm is subsequently acquired, then managers can use mergers to preserve private benefits (Morck, et. al., 1990). Gorton, et. al. (2002) show that merger waves can arise when managers make acquisitions to deter other firms from acquiring their firms ("eat or be eaten"). A manager is willing to acquire defensively even when it is not profitable. Gorton, et. al show that defensive merger waves can result from economic shocks. If mergers during waves are more likely to be defensive in nature, then these mergers

should be less likely to create value. So, bad acquisitions can clump in time and, at least in the long run, mergers during waves should be worse than other mergers.

The market reaction to a merger announcement by the shareholders of the bidding firm depends on more than just the potential synergies from the merger. It also depends on whether the managers of bidding firm are able to capture some of the synergies for their shareholders, whether the market anticipates the acquisition, and whether shareholders react rationally to merger announcements. Throughout the remainder of the paper, we assume that bidding firm managers get at least a portion of any surplus and that mergers are not fully anticipated by the market. If these conditions do not hold, then we should see no relationship between hot merger markets and merger announcement returns.

If shareholders are rational, given the maintained hypotheses, both the neoclassical theory and managerial motivations generate merger momentum, but of a different sort. Under the neoclassical theory, we should see a positive correlation between merger waves and the market reaction to a merger announcement while if managerial motivations dominate, the correlation could be negative. Since the market reaction contains all the information about the future prospects of the soon-to-be-combined firms, there is no reason to expect the price change to reverse after the merger is completed.

Merger momentum can also occur if investors systemically misperceive the synergies available from mergers. There is evidence that investors may be overly optimistic in so-called hot markets. Loughran and Ritter (1995) attribute high returns on seasoned equity offerings to optimistic beliefs on the part of investors. Ljungqvist, et. al. (2002) model and Helwege and Liang (1996) find evidence of over-optimism in hot initial public offering markets. Loughran, et. al. (1994) suggest that IPO issuers time their issues to take advantage of the optimism of investors in hot markets, implying that the issues in hot markets may be worse than average. The same phenomenon could exist in hot merger markets. If over-optimism influences the market reaction to merger announcements, then

we should see autocorrelation in the returns to bidding firms from merger announcements. During hot merger markets, when optimism reigns, the market reaction to all announcements should be more positive than at other times. However, price increases should reverse in the long run as optimism is replaced by results.

Investor sentiment can also affect the type of acquisitions firms make. Managers may be imbued with the same optimism as investors during hot markets. If so, then they might overestimate the synergies from a merger, leading them to make more (ex post) bad acquisitions during hot markets. Alternatively, managers may use hot markets as cover to exploit shareholders. If managers are rewarded for increasing stock prices, then they have an incentive to make bad acquisitions in hot markets, since even a bad acquisition may temporarily boost the acquirer's stock price. When this managerial motivation is important enough, mergers made in hot markets would be worse than those made in cold markets.

There is also evidence that mergers occur when the overall stock market is hot. Nelson (1959) and Jovanovic and Rousseau (2001) find an association between aggregate stock prices and mergers (although the evidence on whether stock price changes cause changes in the number of mergers is mixed, Weston, et. al., 1998). Nelson finds that merger waves starting in the late 1800s are associated with stock market booms. Jovanovic and Rousseau show that this correlation persists through 2000. Both studies suggest that many of the merger waves were caused by changes in the business environment that both increased overall stock prices and led to more profitable merger opportunities. The correlation between aggregate stock prices and mergers could provide support for the neoclassical theory of mergers if a rising stock market reflects an increase in potential merger synergies. In this case (if our other maintained hypotheses hold), mergers during hot stock markets should be better for bidding firm shareholders than mergers at other times. This should be reflected in stock price increases upon a merger announcement with no reversal on average in the long run.

There may also be non-fundamental reasons for an association between hot stock markets and mergers. Firms are more likely to make acquisitions when their stock prices are overvalued (Dong, et. al., 2003, Rhodes-Kropf, et. al., 2003). If hot stock markets mean that more firms have overvalued stock, then this could lead to a correlation between hot markets and mergers. In this case, a rational stock market would react to a merger announcement as evidence that a firm may think its stock is overvalued. This would lead to a negative announcement reaction with no long-run drift.

Of course, the correlation between mergers and stock prices could reflect over-optimism. In this case, we should see a more positive reaction to merger announcements during hot stock markets, but this should reverse in the long run.

The three theories of why firms make acquisitions offer different explanations of merger momentum and how hot markets and mergers might be associated. If mergers come from either synergies or over-optimism, then the market reaction to a merger announcement should be more positive during hot markets. Since both synergies and over-optimism can occur on a market-wide basis, both theories explain hot merger markets. However, the theories differ in their long-run predictions. If mergers are made to exploit synergies, then they should add to firm value in the long run, while if optimistic investor sentiment drives the reaction to mergers, then the long-run performance of a bidding firm should be no better than without the merger. Overlaid on these theories is the fact that merger decisions are made by managers who may have private interests. If managers have greater incentives to make defensive acquisitions in hot markets, then this should contribute to further weak performance for mergers at these times.

III. Model and sample development

This section sets out the data sample and the model to be tested.

A. Data

We look at mergers and acquisitions by U.S. firms announced between 1982 and 2001 as given in the Securities Data Corporation (SDC) database. We define a merger as an acquisition of equity where one firm purchases at least 50% of another and, after the purchase, the bidder owns at least 90% of the target. Thus, we do not include gradual acquisitions, where a bidder establishes a toehold and then slowly increases its ownership until it takes over control of the target.

We use the announcement dates reported in the SDC data.[3] Stock market data is collected from the CRSP data set while balance sheet and income data comes from Compustat. We drop any mergers where we cannot get CRSP and Compustat data for the bidder.

In order to focus as tightly as possible on the effect of general market conditions, we make a number of cuts to the sample. First, tender offers are not included in the basic sample. Acquisitions can be made either via a merger or a tender offer. Mergers are generally friendly agreements between the management of the bidding and target firms while tender offers involve the purchase of shares without the need for approval from target management.[4] We exclude tender offers for two reasons. First, studies generally find that the market response to tender offers is more positive (or less negative) than the reaction to mergers over both short-term and long-term horizons.[5] In part, this may be due to the prevalence of cash payments in tender offers (Martin, 1996). If the proportion of tender offers is related to market conditions, we could attribute some results to market conditions rather than to the mix of tender offers and mergers. The second reason is that there are no tender offers for private firms or for subsidiaries. Thus, to the extent that

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[3] Fuller, et. al. (2002) find that the SDC announcement date is within two days of the announcement date found by a search of other sources for each of the 500 mergers they examined.

[4] Some mergers may start with hostile offers that, after negotiations, end up with a friendly merger agreement. Also, some tender offers may have the approval of the target Board of Directors.

[5] See Jensen and Ruback (1983) for a survey of the short-run response literature and Loughran and Vijh (1997) for a representative long-run response study.

there are the differences in the market response to acquisitions of public targets, private targets, and subsidiaries (Fuller, et. al., 2002), the inclusion of tender offers can bias our results. For these reasons, and since only a small proportion of acquisitions are tender offers, we focus on mergers only. All the results are robust to the inclusion of tender offers (see below).

Many of the mergers in the SDC database involve a target that is much smaller than the bidding firm. It is unlikely that such an acquisition would have a material effect on the future earnings of the bidder, and thus, it should have little effect on the bidder's stock price. To concentrate on the mergers most likely to have a significant effect on the bidding firm's stock price, we require that the target be at least ten percent of the bidder's size. It is important that we have a relative size cutoff, but the exact minimum target size is less crucial. The main results hold for any cutoff between five percent and 25 percent.

To measure the relative size of the target and the bidder, we calculate the ratio of the market value of the target to the market value of the bidder. If we cannot find a market value for the target (most targets are not publicly traded), we use the price paid in the acquisition as a proxy for it. When we cannot find the price paid in the acquisition, we use the book values of equity for both the target and the bidder to estimate relative size. We also eliminate mergers where the target is much larger than the bidder. These mergers are not common and may reflect special circumstances. So, we drop any merger where the target is more than 120% of the size of the bidder.

Finally, we eliminate outliers. Any firm with a negative book value of equity or with a ratio of the book value of equity to the market value of equity of over 10 is dropped. We also exclude firms with return on assets of below - 100% or above 200%. Once we have done this, we also drop mergers in the top 1% and the bottom 1% of the abnormal announcement return.

We are left with a sample of 6,259 mergers. Table 1 provides some descriptive statistics on our sample. We discuss the table when we introduce the variables.

B. Empirical model

The empirical model is set up to test how recent merger activity and changes in stock prices affect the market reaction to a merger announcement in both the short run and the long run. We focus on the bidding firm only. This allows us to include acquisitions of private firms and subsidiaries. To test market reaction, we control for the financial health of the bidder and the specific conditions of the acquisition. The basic model is:

Market reaction = f(merger activity, market momentum, bidder-specific merger

activity, bidder-specific stock momentum, deal-specific and bidder control

variables).   (1)

The dependent variable in the model, the market reaction to a merger, is measured over two horizons. In the next section, we examine the short-run market reaction to a merger announcement using the five-day cumulative abnormal announcement return (CAAR) for the bidding firm surrounding the first public mention that a merger is being discussed or proposed (days -2 through +2).[6] This gives the immediate reaction to the merger. The price reaction incorporates any new information, including synergies created by the merger and the split of synergies between bidder and target, but it also includes the effect of investor sentiments such as over-optimism. Section V examines the long-run reaction to a merger announcement. If the short-run response contains all the information about a merger, the post-announcement abnormal return should be zero on average. Any systematic patterns in the post-announcement abnormal return may be due to investor sentiment. We discuss our proxies for the short- and long-run market reactions in the next two sections, respectively. The remainder of this section describes the key right-hand-side variables in (1).

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[6] The results are similar using a three-day window. We choose the five-day window because Fuller, et. al. (2002) find that a five-day window around the merger announcement date given by SDC is wide enough to capture the first mention of a merger every time for a sample of 500 announcements. Also, note that if merger discussions are broken off but later resumed, we choose the announcement that discussions are being resumed as the announcement date.

The reaction to a merger announcement may depend on recent mergers. We include two measures of recent overall merger activity, one to capture waves and one to capture merger momentum. Shughart and Tollison (1984) find that there is autocorrelation in merger activity, with the number of mergers in a year helping predict the number of mergers in the next year. Since the factors that lead to an autocorrelation in the number of mergers might also affect the market reaction to the merger announcements, we include the number of mergers in the year prior to a particular announcement as one measure of merger conditions.[7] There is an average of 450 mergers in the year prior to the announcements made during the sample period, but the number of mergers is much larger in the latter part of the sample period (see Figure 1).

The second measure of recent merger conditions is our main measure of hot merger markets. We measure merger momentum using the average five-day CAAR on merger announcements made in the twelve months prior to an announcement. We estimate the CAAR using the market model.[8] A hot market is one where recent mergers have generated strong announcement returns.

The two measures of merger activity are positively correlated, but there are differences (see Figure 1). The number of mergers has a local peak in the 1980s, but it is much higher in the 1990s than in the earlier decade. This measure identifies the late 1990s as a hot market relative to the rest of the sample period. It thus misses out the merger wave in the 1980s. The number of mergers in the 1980s was high by historical standards, but not in comparison to the wave in the 1990s. The trailing twelve-month average CAAR, on the other hand, shows no distinct trend. This measure has peaks during the merger wave in the 1980s as well as in the early part of the 1990s merger wave. Thus, the two measures pick up different aspects of merger markets.

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[7] We only include mergers where the ratio of target size to bidder size is at least ten percent and no more than 120 percent. See the discussion in the previous section.

[8] The results are robust to other measures of CAAR such as the ones described in the next section.

Bidder-specific merger activity is controlled for using three variables. We measure the quality of a firm's acquisitions using the five-day announcement return on the last merger by the bidding firm as long as the announcement occurred in the prior three years. To measure how active a firm is, we use the number of acquisitions announced by the bidder in the prior three years. Some firms in the sample make a series of acquisitions while others make only one. Since Schipper and Thompson (1983) and Fuller, et. al. (2002) find that frequent acquirers are different than occasional acquirers, we also include a dummy for whether this is the first merger announcement by the acquirer in the prior three years.

Mergers may also be affected by conditions in the broader stock market. As noted earlier, merger waves generally occur in periods of rising stock prices. We proxy for the general level of stock prices in the market with the CRSP value-weighted index. To examine whether stock prices are rising, we use the change in the index during the period starting one year prior to a merger announcement and ending three days before the announcement.

We measure bidder-specific returns in the period leading up to a merger announcement using the buy-and-hold abnormal return (BHAR) during the period starting one year prior to a merger announcement and ending three days before the announcement. We measure the BHAR relative to the benchmark CRSP value-weighted index.

We divide targets into three groups - public firms, private firms, and subsidiaries - and separate two forms of acquisition financing - stock financing and financing that includes at least some of other type of financing. This allows us to control for differences between stock and other financing (Travlos, 1987; Asquith, et. al., 1987; Servaes, 1991) and between public and other targets (Fuller, et. al., 2002). Our deal-specific control variables include dummy variables for whether the target is a private firm and whether it is a subsidiary (with public targets the omitted group). In our sample, 23% of targets are

publicly traded, 43% are privately owned, and 34% are subsidiaries. We also include dummies that interact the type of target with a dummy for whether a deal is financed using stock since there is evidence that stock-financed acquisitions may differ by target type (Fuller, et. al., 2002). One-quarter of the acquisitions in the sample are financed using common stock.

Morck, et. al. (1990) and Maquieira, et. al. (1997) find that returns to bidding firms are lower when the merger is diversifying. To control for this, we divide firms into 17 industries using the classification given by Kenneth French on his web site.[9] We then define a dummy that takes the value 1 if a merger is diversifying, that is, if it involves firms from two different industries. In the sample, 16% of all mergers are diversifying.

Bidding firms have an average of $2.3 billion in assets and a median of $198 million in assets. The wide range of bidder sizes leads us to include the log of the total assets of the bidding firm as a control variable. Loderer and Martin (1997) find that size is negatively correlated with the short-run CAAR of the bidding firm around a merger announcement.

The ratio of target size to bidder size in our sample has a mean of 33% and a median of 23%. We also include the ratio as a control variable as others have found it to be correlated with the CAAR (e.g., Asquith, et. al., 1983; Travlos, 1987).

We control for the financial strength of the bidding firm using the ratio of book equity to market equity (the book-to-market ratio) and the return on assets (ROA). There is evidence that low Tobin's Q (which is correlated with a high book-to-market ratio) is associated with a higher short-run CAAR (Lang, et. al., 1989; Servaes, 1991). The ratio of book-to-market values also affects long-run returns (Rau and Vermaelen, 1998). The book-to-market ratio is calculated using data available for the year prior to the merger announcement.[10] The average ratio in our sample is 0.61. ROA is included to control for

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[9] The web address is mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html. Using 2-digit SIC codes to define industries gives less explanatory power, but similar results.

[10] We define book equity as total shareholders' equity minus preferred stock plus deferred taxes plus

the financial performance of a firm. Morck, et. al. (1990) suggest that firms with better prior performance make better acquisitions. We use the income in the year prior to the acquisition announcement divided by assets at the end of that year for ROA. Sample firms have an average ROA of 1.30%.

IV. Short-run returns

This section examines the stock market's initial reaction to a merger announcement. To do this, we use a cross-sectional analysis of the five-day CAAR surrounding the announcement of a merger. The key variables are those relating to merger conditions as well as the recent changes in overall stock prices and the price of the bidding firm.

A. CAAR measures

Estimating the CAAR is complicated because the independent variables include measures of the change in overall stock prices and the bidding firm's stock price in the year prior to the announcement. This overlaps with the control period typically used with the market model. We could set the market model based on returns two years prior to an announcement, but many of the firms in our sample are frequent bidders (28 percent of firms had a merger within two years prior to the in-sample merger announcement). For this reason, following Fuller, et. al. (2002), we estimate the CAAR over the 5 days surrounding a merger announcement as the difference between the return for the bidder and the return on a benchmark index:

$$\text{CAAR} \ = \ \sum_{t=-2}^{2} (R_t - R_{index,t}) \hspace{3cm} (2)$$

where R_t is the return on the stock of the firm on date t relative to the announcement date and $R_{index,t}$ is the return on the index for that date. The results are robust to the use of the market model.

postretirement benefit liabilities (as in Fama and French, 1997). When this value is missing, we use total assets minus total liabilities.

To estimate the CAAR, we want to use an index that is highly correlated with what the returns on the bidding firm would be if it had not announced a merger. There are several options. Fuller, et. al., (2002) use the value-weighted market index as the benchmark for measuring the CAAR. However, Mitchell and Mulherin (1996) show that most merger waves are the result of shocks to a specific industry. This suggests that it might be better to use an industry-based index as the benchmark. Alternatively, studies of long-run returns, where the market model is problematic, often create indices by breaking firms into quintiles based on both market equity (ME) and the ratio of book equity to market equity (BE/ME), yielding 25 portfolios (Mitchell and Stafford, 2000). The three indices are highly correlated with bidder returns in the year prior to the merger announcement. They also tend to produce the same results in our empirical tests. To save space, we present the results for the value-weighted index benchmark only, mentioning the other benchmarks when they imply different results (see Rosen, 2003, for the results using the other benchmarks). For our sample of 6,259 mergers, the average CAAR using the value-weighted benchmark is 1.86%, which is significantly different from zero.

B. Regression results

Column (1) of Table 2 presents the CAAR regression results for the full sample of acquisitions. The regressions include controls for the form of financing, the type of target, firm-specific financing characteristics, a dummy for whether a merger is diversifying, and industry dummies.

There is evidence of merger momentum overall and at the firm level. The coefficient on the trailing twelve-month average CAAR, the market-wide merger momentum variable, is positive and statistically significant. A one percentage point increase in the trailing CAAR boosts the CAAR for a bidding firm by 0.384 percentage points. Bidder-specific merger momentum is proxied by the CAAR on the bidder's last merger. The coefficient on that variable is positive and (weakly) significant. A one-percentage point

increase in the CAAR of the bidder's last merger announcement boosts the CAAR on the current announcement by 4.8 basis points.

The coefficient on the overall number of mergers in the prior year is insignificant.[11] As noted earlier, this may be because the sample period contains two merger waves, but the wave in the late 1990s dominates that earlier wave in terms of number of mergers. Thus, the "number of mergers" variable is effectively a late 1990s dummy. See the discussion of robustness below.

The number of mergers in the past three years by the bidder and the first-merger dummy are also not significant. The effect of prior mergers on the short-run reaction to a current merger appears to depend on the market reaction to the earlier mergers, not how many there were.

Stock returns influence the CAAR from a merger announcement. Announcing an acquisition in a rising market yields a better CAAR than announcing one in a falling market. For every percentage point increase in the value-weighted stock market index in the year prior to the announcement, the CAAR is 2.3 basis points larger.

The idiosyncratic return of the bidding firm is (weakly) negatively related to the CAAR. When the return over the year prior to an announcement of the bidding firm's stock return net of the value-weighted index increases by one percentage point, the CAAR from the announcement is 0.4 basis points lower. In other words, when the runup in a bidder's stock is higher, the CAAR is lower, all else equal.

Many of the control variables have significant coefficients in the regressions in Table 2. The signs are consistent with the earlier literature. This suggests that the factors that affect the momentum variables exist in addition to the factors identified in previous papers.

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[11] When we replace the number of mergers with the number of mergers in the industry, the coefficient on the number of mergers in the industry variable is not significant.

C. Discussion

The results strongly support the importance of momentum. Recent history in the merger market affects the CAAR from a merger announcement. A bidding firm's stock price increases more when recent mergers had positive responses from the market. The market also rewards firms whose previous mergers it has liked. Further, a hot stock market leads to better announcement returns.

These results are consistent with both the neoclassical theory and over-optimism. [12] The neoclassical theory implies that if mergers are concentrated in periods following shocks (Mitchell and Mulherin, 1996), then there can be positive autocorrelation in announcement returns. Since the shocks can boost overall stock prices, the CAAR can be positively correlated with recent returns in the stock market. Over-optimism predicts the same relationships but for different reasons. Optimism about mergers overall generates a positive autocorrelation in announcement returns while overall optimism about firms can lead to a positive correlation between CAARs and the returns in the stock market. There is no way, however, of using the announcement results to distinguish these two hypotheses. We turn to the long-run results in Section V for that.

One other result deserves comment. We find a negative coefficient on the runup in the bidding firm's stock. This is different than the finding in Morck, et. al. (1990), possibly because we control for market-wide merger momentum and stock returns. Still, this evidence is consistent with the corporate control motivations that lie at the heart of their paper. One explanation for the negative coefficient on the runup in the bidding firm's stock is hubris (Roll, 1986). The managers of bidding firms that had recent success may be believe that they can create value in situations that the market judges to be negative net present value. The managers thus want to make acquisitions even when they anticipate the announcement will generate a decline in stock prices. They expect

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[12] We cannot directly test the effect of managerial motivations on the CAAR without additional corporate governance variables.

that they will be proved correct in the long run. Because shareholders have imperfect control, they do not prevent managers from making such acquisitions. If, because of hubris, managers make bad acquisitions, then rational shareholders should discount the stock price. Since the acquisitions hurt firm value, there is no reason the initial stock price reaction should reverse in the long run. This implies a nonpositive coefficient on the runup in the bidding firm's stock in the long run regressions. Note that this is similar to the explanation in Rau and Vermaelen (1998). They attribute to hubris their finding that firms with a low book-to-market – often those whose stock price has recently risen – have worse post-merger performance than firms with high book-to-market ratios.

Another possible explanation for the negative coefficient on the bidder runup variable is that firms are more likely to issue stock when their stock is overvalued (Myers and Majluf, 1984). Travlos (1987) and others have attributed the negative CAARs for merger announcement of acquisitions financed using stock to this. A firm might be more likely to use stock to finance an acquisition when its stock price has been increasing and, thus, is more likely to be overvalued. The negative coefficient on the runup variable would then reflect the use of overvalued stock to pay for an acquisition. However, when we drop all stock-financed mergers and run the regression presented in column (1) of Table 2, the results do not change. This makes it less likely that the negative coefficient on the bidder runup variable reflects Myers-Majluf factors.

D. Robustness

The literature suggests that there may be differences in the causes of various merger waves (Nelson, 1959). More specifically, the wave in the mid-1980s may arise for different reasons than the waves in the late-1990s (Shleifer and Vishny, 2003). There is also evidence that the type of target may influence the market reaction (Fuller, et. al., 2002). Finally, the market reaction to a merger announcement may be a reflection of the value-added on not just the merger itself, but the entire merger strategy of the acquirer.

This section examines how robust the results are to splitting the sample by time period, type of merger, type of target, and the presence of a merger program.

The merger wave in the mid-1980s was larger than any prior wave (Jovanovic and Rousseau, 2001). However, it was dwarfed by the wave in the late 1990s. This makes it difficult to determine whether waves affect market reactions to merger announcements since our measure of waves, the number of recent mergers, does not pick up the 1980s as having a major wave. To test for the effects of the two waves, we split the sample into the 1980s (1982-1989) and 1990s (1990-2001). Due to the relative size of the 1990s wave, there are over five times more announcements in the later period.

The second and third columns of Table 2 have regression results for the two time periods. Column (2) has the results for the 1980s. The coefficient on the merger momentum is not statistically significant during that period. This suggests that merger momentum may not have been as important in the 1980s. Also, the coefficient on the number of mergers variable is not significant. This is evidence that the market did not perceive mergers during the first wave as better than other mergers during the 1980s.

The third column of Table 2 gives results for the later period. The interesting difference between these results and the full sample results is that the number of mergers is significantly negatively related to the CAAR in the later period but not in the total sample. This is consistent with defensive managerial motivations being important in the 1990s wave (Gorton, et. al., 2002).

We also examine the effect of the type of merger. We exclude tender offers from our main sample. Augmenting the sample with all tender offers meeting the other sample criteria leaves the qualitative results unchanged. When we look at tender offers alone (not shown), we find that market-wide merger momentum exists and that a negative bidder-specific merger momentum exists. However, there are only 308 tender offers in our augmented sample (and 30 independent variables in the regressions), so we should be cautious in interpreting the results.

Since there is evidence that the market reaction to the announcement stock mergers differs from the announcement to other types of financing, we divide the sample into stock mergers and all others. The results (not shown) for the two subsamples are qualitatively similar. When we split the subsamples into the early and later time periods, the coefficient on the number of mergers is significant in the 1990s for both types of financing.

Many previous studies of mergers focus on publicly-traded targets. Since we focus on the acquiring firm, we want to include all acquisitions, including private targets and subsidiaries. However, to ensure that the results are robust to the type of target, we split the sample into public targets and other targets. The results (not shown) are consistent with the earlier findings, although the number of mergers variable is statistically significant for the publicly-traded target sample and not for the other sample. This is likely due to the effect of mergers after the 1980s, since the coefficient on the number of mergers is insignificant for both subsamples in the 1980s but significantly negative for both in the 1990-2001 period.

If a firm is engaged in a program of mergers, then the reaction to a particular announcement is both an evaluation of the particular target plus an assessment of how the merger fits into the program. Thus, the CAARs for these mergers may reflect more than just the conditions in the market at the time of the announcement. To see whether this is affecting the results, we divide the sample by whether the acquirer had a merger in the prior three years, our proxy for firms with a merger program. The results (not shown) are qualitatively similar for the two groups.

Overall, the results appear robust with the exception of the number of mergers variable. The coefficient on this variable is consistently negative in the later time period. This suggests that there is a difference between a hot market as measured by recent announcement returns and a merger wave as measured by the number of mergers. Announcements during waves – or at least the wave in the late 1990s – are not favorably

viewed by markets, consistent with the managerial motivations for mergers in Gorton, et. al. (2002). At the same time, there is evidence that merger momentum is associated with better market reactions to announcements.

V. Long-run results

Extending our horizon until the results of the mergers are known allows us to test the neoclassical theory against over-optimism and the managerial explanations for mergers. If the neoclassical theory is correct, then the CAAR should be an unbiased estimate of the value of the merger. There should be no trend in returns in the post-announcement period. However, if relationship between the CAAR and the momentum variables occurs because of over-optimism, then we should see a reversal of the CAAR over time as the merged company begins to have a track record. Managerial motivations can exacerbate this if managers make acquisitions with negative synergies during hot markets.

We examine a three-year horizon to include enough time to allow the results of the mergers to become known. This puts us in the controversial area of long-run return measurement. Many advocate the use of buy-and-hold abnormal returns (BHAR) to estimate long-run performance (see, e.g., Rau and Vermaelen, 1998; Lyon, et. al., 1999; Loughran and Ritter, 2000), but others suggest a portfolio approach (see, e.g., Mitchell and Stafford, 2000). The debate, in essence, reflects different tradeoffs of type one versus type two errors. Using BHAR gives hypothesis tests a lot of power, but may reject too many nulls (type one errors). On the other hand, the portfolio approach, by aggregating individual events into calendar time portfolios, throws away valuable information, thereby reducing the power of any hypothesis tests (type two errors). We use the BHAR as the main measure of long-run returns, but also present some analysis using the portfolio approach.

A. Long-run returns using the BHAR measure

The BHAR measure of the long-run results from a merger announcement is similar to our measure of the short-run CAAR. We define the BHAR as the value of holding a long position in the stock of the bidding firm (including periods before and after the merger is completed) and a short position in a benchmark index over the time horizon:

$$\text{BHAR} \;=\; \prod_{t=1}^{T} (1+R_t) \,/\, \prod_{t=1}^{T} (1+R_{index,t}) \quad . \tag{3}$$

As discussed above, we focus on one benchmark, the CRSP value-weighted index, but the results are generally similar when using an industry-based index and an index based on one of twenty-five ME-BE/ME quintiles (see Rosen, 2003). We examine two time horizons, one that includes the announcement period and one that focuses on the post-announcement period only. The first, which we call the total window, runs from two days prior to a merger announcement to three years after the announcement while the second starts three days after to the announcement day and ends three years after the announcement day. The total window captures the total stock market impact of the merger, including the effect of the announcement which the post-announcement period excludes. We only include mergers for which we have at least one year of post-announcement data. As is standard, we assume that when a firm is delisted from CRSP, it earns the benchmark return for the period after it is dropped.

For our sample, the average BHAR in the post-announcement period is –6.66%, which is not significantly different from zero. This estimate of long-run underperformance is in the range of estimates by earlier studies (e.g., Loughran and Vijh, 1997; Rau and Vermaelen, 1998; and Mitchell and Stafford, 2000).

B. Long-run results using the BHAR measure

The BHAR regression results are provided in Table 3. The post-announcement returns are presented in column (1) and the total window is in column (2). We use the

same control variables as we did when examining the short-run CAAR with an additional independent variable, the CAAR, for the post-announcement period.

The coefficient on the trailing twelve-month average CAAR in the market, our measure of market-wide merger momentum, is negative and significant both in the post-announcement period and in the total window. The coefficient has the opposite sign and a larger magnitude than in the short-run regression. Since the coefficient for the total window regressions is negative, not only do firms that announce in a hot merger market have downward drift in their stock price in the post-announcement period, their stock price ends up lower than if they had announced in a cold stock market.

The coefficient on the market momentum variable is also consistent with a reversal of the CAAR. The coefficient on the increase in the value-weighted stock index over the twelve months prior to an announcement is negative and significant. This is true for both the post-announcement period and the total window. This means that an acquisition announced during a hot market does worse, all else equal, than one announced during a cold market. This is true even when we include the positive short-run reaction to the announcements of these mergers.

The CAAR is included as a control variable in the regressions using the post-announcement period. This allows another test of reversal. We find that the entire CAAR is given back in the post-announcement period.[13] That is, the coefficient on the CAAR variable cannot be statistically differentiated from negative one. In addition to being another sign of reversal, this strengthens the results for the merger momentum variables since the results discussed above hold even after the CAAR reversal is controlled for.

The number of mergers, our measure of waves, has an insignificant coefficient for the value-weighted index benchmark. However, for the two other benchmarks, the

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[13] This does not imply that the merger created no synergies, since we have excluded any benefits accruing to the owners of the target.

coefficient is negative and significant (not shown). This is some evidence that mergers announced during waves are worse in the long run than mergers announced at other times.

While it is difficult to draw conclusions, there is no strong evidence of reversal for the firm-specific momentum variables. The measures of merger momentum all have the same sign in both the short- and long-run regressions. The only changes are in statistical significance. Thus, we cannot say that firm-level momentum is reversed in the long run.

One issue when looking at the long-run returns is that many of the firms make additional acquisitions during the post-announcement three-year period. The decision to make an additional acquisition may depend on the stock return of the bidding firm after its initial acquisition announcement, which may in turn, depend on that first announcement. This feedback effect could inflate the long-run effect of a merger announcement. To account for this, we include variables to control for the number of merger announcements in the three-year period over which the long-run return is measured (excluding the initial announcement). Since there is evidence that stock mergers and acquisitions of public targets are different from other acquisitions, we include three variables: the number of mergers, the number of mergers financed with stock, and the number of acquisitions of public targets.

The results including the future merger variables are presented in column (3) of Table 3. We only show the regressions using the post-announcement period, but the results for the total window are similar. The coefficients on the future merger variable and the future public acquisition variables are all significant and the signs are consistent with earlier findings. Firms that make additional acquisition announcements in the three-year post-announcement period have a higher long-run return. This is consistent with firms that are doing better making more acquisitions. That is, high post-announcement returns may cause more acquisitions, not the other way around. The acquisition of a public

target helps the long-run return. Again, this conforms to our results and those of other studies.

When we introduce the future merger variables, the results for the momentum variables are unchanged. Acquisitions in hot merger markets lead to lower long-run returns while acquisitions in hot stock markets lead to long-run returns that are no higher than mergers in other periods.

C. Long-run returns using the portfolio approach

An alternative measure of long-run returns is to create portfolios in calendar time (see, e.g., Mitchell and Stafford, 2000). This generates a single return estimate for each month, which is then compared to a benchmark or analyzed using an asset-pricing model. Since our objective is a cross-sectional analysis, we split our sample into a small number of groups, and then find a single return for each group. The returns are compared to the value-weighted index benchmark, although the results are similar for the other benchmarks and for the Fama-French three-factor model.

We create a return index for the sample as a whole and also for subsamples based on quartiles of our key independent variables: the trailing 12-month average CAAR (merger momentum), the trailing 12-month number of mergers (merger waves), the trailing 12-month return on the CRSP value-weighted index (market momentum), the CAAR on the bidder's last acquisition (bidder-specific merger momentum), the 12-month trailing BHAR on the bidder's stock (bidder-specific stock momentum), and the CAAR of this acquisition. The quartiles are created using monthly averages of the independent variables.

For each month, we take the average return of all firms that have made an acquisition in the prior three years, not including the current month, and net out the benchmark index:

$$\text{PORT}_{j(t),t} \;=\; \sum_{i \in j(t)} R_{i,t} \Big/ N_{j(t)} - R_{index,t} \tag{4}$$

where j(t) consists of acquisitions in group j for the months t-36 through t-1 and where $N_{j(t)}$ is the number of acquisitions in j(t). For each group, all months with fewer than ten firms in a portfolio are dropped (as in Mitchell and Stafford, 2000). We then define the mean return for group j as the average return over the sample period:

$$\text{PORT}_j = \overline{PORT}_{j(t),t} . \tag{5}$$

For the sample as a whole, the portfolio return is –0.08% per month, or –2.79% for the three-year post-announcement period. This is close to the BHAR estimate, and is not statistically significantly different from zero.

Table 4 reports the portfolio average returns and standard deviations. The pattern of returns is generally consistent with the pattern for the BHAR, but statistical significance, not surprisingly, is weaker. Acquisitions in hot merger markets, as measured by the top quartile of 12-month trailing average CAAR, have significantly lower long-run returns than those in cold markets, as measured by the lowest quartile. The results for the other variables are generally statistically insignificant, although the pattern of returns is consistent with the pattern for the BHAR.[14]

D. Discussion

Overall, our results are consistent with the hypothesis that momentum is caused by over-optimism, possibly in addition to other factors. Hot merger markets, as measured by the trailing twelve-month average CAAR, are associated with larger short-run announcement effects but negative long-run returns for acquiring firm shareholders. The reversal of merger momentum occurs for the BHAR and portfolio analysis. The remainder of the results hold for the BHAR analysis, and are not inconsistent with the portfolio analysis.

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[14] One exception is that, when using the industry index as a benchmark, acquisitions made during merger waves have significantly lower returns than those made during troughs. Recall that the coefficient on the merger wave variable in the BHAR regressions is insignificant for the value-weighted index but significantly negative for the industry index.

Hot stock markets, as measured by the trailing twelve-month value-weighted return, are also associated with larger short-run announcement effects that then reverse themselves in the long run. If market participants are optimistic about the prospects for a merger, then they will bid up the stock of the merging firms. However, as the performance of the merged firm is revealed over time, market participants may revise their views of the quality of the merger downward, losing their optimism.

Another possible explanation for the positive short-run momentum in mergers is that mergers reflect a rational reallocation of resources as a result of shocks within an industry or the economy as a whole. But, while mergers may create synergies, this neoclassical hypothesis does not predict the long-run downward drift in prices following mergers in hot markets that we find. Note that our evidence does not suggest that mergers do not happen as a result of shocks, just that something else must be going on as well. It could be that the shocks lead to over-optimism on the part of investors, for example.

E. Robustness

We conduct the same robustness checks using the BHAR as we do for the short-run CAAR. Again, the results are generally robust to dividing the sample by the type of merger, the type of target, and the presence of a merger program. Two findings, however, deserve discussion.

As with the short-run CAAR analysis, there is no strong relationship between the long-run BHAR and either the merger momentum or merger wave variables when the sample is restricted to mergers announced in the 1980s (see column (1) of Table 5). Again, this may be because merger momentum and merger waves did not play a role in merger announcements in the 1980s or it may be because the data are too noisy.

The coefficients on the merger momentum and merger wave variables are both statistically significant and negative for the 1990s subsample under all the different approaches examined in the previous section (column (2) of Table 5 shows the post-announcement return). This is similar to the finding for the short-run CAAR. That is, in

the 1990s, both merger momentum and merger waves seem to affect merger decisions and the market reaction to them.

It also appears that the long-run return from acquisitions completely financed with stock is different from those with at least some non-stock financing. As shown in columns (3) and (4) of Table 5, merger momentum does not have a significantly negative impact the long-run return to a merger financed with stock although it does for other financing.[15] This may mean there is something different about stock financing, or it may indicate that our model does not adequately capture differences between the types of acquisitions made with stock and other acquisitions. For example, a typical firm making a stock-financed acquisition has a lower ROA but a much more rapid recent increase in its stock price then the average firm using other financing for an acquisition. This is consistent with stock financing being preferred when the market overvalues the bidder. If this occurs independently of merger conditions, then this would explain why there is no significant impact of merger momentum or merger waves. Still, this result bears further study.

VI. Conclusions

This paper examines the interaction between broad market conditions and the market response to a merger announcement. We focus on hot merger markets and also examine hot stock markets.

We find evidence of momentum in merger markets. When the market has been reacting favorably to merger announcements, it tends to continue to do so. Similarly, mergers announced during hot stock markets tend to get a better reaction from the market than those announced in a cold market.

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[15] With the industry index, the coefficient merger momentum is significantly positive for stock-financed acquisitions (not shown).

To explain the sources of momentum, we look to the long-run stock returns for bidding firms. We find evidence that the short-run reaction to an announcement is reversed in the long run. Acquisitions announced in hot merger markets lead to long-run declines in the bidder's stock price while there is some evidence that acquisitions announced in hot stock markets are associated with long-run returns that are no higher, and possibly lower, than those announced in cold stock markets. There is even some evidence that, holding all else equal, the short-run reaction to an announcement is fully reversed over the next three years.

Our results are consistent with investor sentiment being an important factor in the market reaction to a merger announcement. If investors expect a broad range of mergers to create synergies, then they react positively to merger announcements. When investor expectations are based more on optimistic expectations than reality, the short-run boost in price caused by a merger announcement are reversed in the long run as the track record of the merger becomes known.

Studies have noted that mergers often cluster within an industry and follow industry-wide or economy-wide shocks. If these shocks increase the synergies available for mergers, then they could lead to merger momentum. But, synergistic shocks alone cannot explain the market reaction to mergers. The long run reversal in the returns to bidding firms' stock requires something additional.

A third explanation for mergers is that they result from managers acting in their private interests. Managerial motivations can spark a defensive merger wave. If so, then mergers during waves should be worse than mergers at other times. We find evidence consistent with this, especially for the merger wave of the 1990s. Overall, there is some evidence that the long-run return to a merger is worse if the merger was made during a wave.

Managerial concerns may operate in addition to investor sentiment. If investors have unrealistic expectations about the synergies from a merger, that still does not explain why

a firm – or more specifically, a manager – should make an acquisition. However, if managers are rewarded for short-term performance, then they might be willing to make bad acquisitions that give their firms a short-term increase in stock performance. This could explain the positive short-run response to merger announcements in hot merger markets as well as the negative long-run performance of the same mergers.

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Table 1. Summary statistics.

Summary statistics for the sample of 6,259 mergers announced during 1982-2001. Trailing 12-month number of mergers is the number of sample mergers in the 12 months prior to an announcement. Trailing 12-month average cumulative abnormal announcement return (CAAR) is the average CAAR for all sample mergers in the 12 months ending 3 days before an announcement. CAAR for the last announcement by the firm is for the most recent merger where the target is at least 10% the size of the bidder as long as the merger was announced in the three years prior to the current announcement. The buy and hold return (BHAR) is measured relative to the CRSP value-weighted index. The ratio of target-to-bidder size is the ratio of target equity to bidder equity. Stock financing is the percent of mergers that are entirely financed by stock. Other financing is the percent of mergers that have some non-stock financing. Target is public, private, and subsidiary refer to the percent of mergers with that type of target. Bidder book-to-market is the book-to-market equity ratio and return on assets (ROA) is the return of assets, both measured at the end of the year prior to the merger announcement (using the net income for the entire year in ROA). Diversifying merger is the percent of mergers where the target and the bidding firm are in different industries. We use the 17-industry classification available at mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

Variable	Mean	Median	Std. dev.
Trailing 12-month average CAAR	1.95%	2.11%	1.04%
Trailing 12-month number of mergers	450	495	209
Trailing 12-month return on the CRSP value-weighted index	17.40%	18.48%	14.61%
CAAR on the last announcement by the firm	2.03%	0.49%	8.24%
Dummy that is one if this is the first announcement by the bidder in the prior 3 years	67.41%	1	46.88%
Number of mergers by the bidder in the 3 years prior to the announcement	0.52	1	0.97
Trailing 12-month BHAR on the bidder's stock	11.17%	-0.69%	70.36%
Stock financing	25.20%	0	43.42%
Other financing	74.80%	1	43.42%
Target is public firm	23.15%	0	42.18%
Target is private firm	43.19%	0	49.54%
Target is subsidiary	33.66%	0	47.26%
Total assets of bidding firm ($ millions)	2327.32	197.71	13572.86
Log(bidder total assets)	8.35	8.30	0.88
Ratio of target-to-bidder size	32.72%	23.47%	24.37%
Bidder book-to-market	0.61	0.50	0.53
Bidder ROA	1.30%	3.09%	13.79%
Diversifying merger	15.50%	0	36.19%

Table 2. Regression results for the CAAR.

The sample consists of mergers announced 1982-2001. The dependent variable is the cumulative abnormal announcement effect (CAAR). The CAAR is defined as $\sum_{t=-2}^{2} (R_t - R_{index,t})$ where R_t is the return on the bidding firm's stock and $R_{t,index}$ is the return on the CRSP value-weighted index. The CAAR is measured over the five-day window surrounding the merger announcement for the bidding firm's stock. Trailing 12-month average cumulative abnormal announcement return (CAAR) is the average CAAR for all sample mergers in the 12 months ending 3 days before an announcement. Trailing 12-month number of mergers is the number of sample mergers in the 12 months prior to an announcement. Trailing 12-month CRSP index return is the return on the value-weighted CRSP index in the year ending three days before a merger announcement. CAAR for the last announcement by the firm is for the most recent merger where the target is at least 10% the size of the bidder as long as the merger was announced in the three years prior to the current announcement. The first merger dummy is one if the firm has made an acquisition in the three years prior to the announcement and zero otherwise. The buy and hold return (BHAR) on bidder's stock is the return in the 12 months ending three days before an announcement. Stock financing is the percent of mergers that are entirely financed by stock. Other financing is the percent of mergers that have some non-stock financing. Target is public, private, and subsidiary refer to the percent of mergers with that type of target. The ratio of target-to-bidder size is the ratio of target equity to bidder equity. Bidder book-to-market is the book-to-market equity ratio and return on assets (ROA) is the return of assets, both measured at the end of the year prior to the merger announcement (using the net income for the entire year in ROA). Diversifying merger is the percent of mergers where the target and the bidding firm are in different industries. We use the 17-industry classification available at mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html. Industry dummies are included in the regressions but not shown in the table. Asymptotic p-values are in parentheses.

	Full sample (1)			Early time period (1982-1989) (2)			Later time period (1990-2001) (3)		
Dependent variable: CAAR.									
	Coef.	p value		Coef.	p value		Coef.	p value	
Merger momentum									
Trailing 12-month average CAAR	0.384	(0.001)	***	-0.247	(0.368)		0.295	(0.028)	**
Trailing 12-month number of mergers / 1000	-0.050	(0.338)		-0.007	(0.915)		-0.024	(0.005)	***
Market momentum									
Trailing 12-month return on CRSP index	0.023	(0.006)	***	-0.010	(0.494)		0.044	(<.001)	***
Bidder-specific merger momentum									
CAAR on bidder's last announcement	0.048	(0.082)	*	-0.067	(0.366)		0.054	(0.061)	*
First merger dummy	0.004	(0.284)		0.012	(0.222)		0.002	(0.571)	
Number of mergers by firm in last 3 years	0.001	(0.558)		-0.001	(0.830)		0.001	(0.628)	
Bidder-specific stock momentum									
Trailing 12-month BHAR on bidder's stock	-0.004	(0.080)	*	0.007	(0.228)		-0.004	(0.042)	**
Control variables									
Private target	0.024	(<.001)	***	0.009	(0.235)		0.029	(<.001)	***
Subsidiary	0.029	(<.001)	***	0.001	(0.935)		0.037	(<.001)	***
Public target with stock financing	-0.021	(<.001)	***	-0.021	(0.036)	**	-0.019	(<.001)	***
Private target with stock financing	0.008	(0.084)	*	-0.005	(0.507)		0.009	(0.063)	*
Subsidiary with stock financing	-0.011	(0.265)		0.002	(0.886)		-0.014	(0.223)	
Log of total assets	-0.011	(<.001)	***	-0.012	(0.001)	***	-0.010	(<.001)	***
Ratio of target-to-bidder size	0.034	(<.001)	***	0.037	(0.003)	***	0.033	(<.001)	***
Bidder book-to-market	0.002	(0.357)		0.005	(0.435)		0.002	(0.562)	
Bidder ROA	0.014	(0.185)		-0.052	(0.180)		0.017	(0.137)	
Diversifying merger	-0.004	(0.175)		-0.003	(0.597)		-0.005	(0.205)	
Adjusted R-sq		0.0746			0.1296			0.0771	
Observations		6,259			935			5,324	

*, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels respectively.

Table 3. Regression results for the BHAR.

The BHAR is defined as $\prod_{t=1}^{T}(1+R_t) / \prod_{t=1}^{T}(1+R_{index,t})$ where R_t is the return on the bidding firm's stock

and $R_{index,t}$ is the return on the CRSP value-weighted index. We include acquisitions with at least one year of observations after the announcement. The post-announcement window runs from three days after an announcement to three years after the announcement. The total window runs from two days before an announcement to three years after the announcement. Trailing 12-month average cumulative abnormal announcement return (CAAR) is the average CAAR for all sample mergers in the 12 months ending 3 days before an announcement. Trailing 12-month number of mergers is the number of sample mergers in the 12 months prior to an announcement. Trailing 12-month CRSP index return is the return on the value-weighted CRSP index in the year ending three days before a merger announcement. CAAR for the last announcement by the firm is for the most recent merger where the target is at least 10% the size of the bidder as long as the merger was announced in the three years prior to the current announcement. The first merger dummy is one if the firm has made an acquisition in the three years prior to the announcement and zero otherwise. The buy and hold return (BHAR) on bidder's stock is the return in the 12 months ending three days before an announcement. Stock financing is the percent of mergers that are entirely financed by stock. Other financing is the percent of mergers that have some non-stock financing. Target is public, private, and subsidiary refer to the percent of mergers with that type of target. The ratio of target-to-bidder size is the ratio of target equity to bidder equity. Bidder book-to-market is the book-to-market equity ratio and return on assets (ROA) is the return of assets, both measured at the end of the year prior to the merger announcement (using the net income for the entire year in ROA). Diversifying merger is the percent of mergers where the target and the bidding firm are in different industries. We use the 17-industry classification available at mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html. Industry dummies are included in the regressions but not shown in the table. The data cover mergers announced between 1982 and 2001. There are 5,749 observations. Asymptotic p-values are in parentheses.

	Dependent variable: BHAR.								
	Post-announcement returns (1)			Total window returns (2)			Post-announcement returns (3)		
	Coef.	p value		Coef.	p value		Coef.	p value	
CAAR	-1.152	(<.001)	***				-1.177	(<.001)	***
Merger momentum									
Trailing 12-month average CAAR	-8.549	(<.001)	***	-8.198	(<.001)	***	-9.617	(<.001)	***
Trailing 12-month number of mergers / 1000	0.530	(0.357)		0.240	(0.684)		1.500	(0.009)	***
Market momentum									
Trailing 12-month return on CRSP index	-0.425	(<.001)	***	-0.393	(<.001)	***	-0.444	(<.001)	***
Bidder-specific merger momentum									
CAAR on bidder's last announcement	0.232	(0.504)		0.205	(0.539)		0.207	(0.552)	
First merger dummy	0.104	(0.003)	***	0.118	(0.001)	***	0.111	(0.001)	***
Number of mergers by firm in last 3 years	0.016	(0.349)		0.023	(0.193)		-0.002	(0.907)	
Number of mergers by firm in the post-acquisition period							0.061	(<.001)	***
Number of mergers by firm in the post-acquisition period financed with stock							-0.034	(0.327)	
Number of mergers by firm in the post-acquisition period with public targets							0.081	(0.038)	**
Bidder-specific stock momentum									
Trailing 12-month BHAR on bidder's stock	-0.089	(<.001)	***	-0.088	(<.001)	***	-0.091	(<.001)	***
Control variables									
Private target	-0.023	(0.581)		0.004	(0.920)		-0.026	(0.537)	
Subsidiary	0.046	(0.247)		0.081	(0.038)	**	0.039	(0.332)	
Public target with stock financing	-0.086	(0.047)	**	-0.107	(0.007)	***	-0.084	(0.054)	*
Private target with stock financing	-0.074	(0.046)	**	-0.086	(0.028)	**	-0.065	(0.090)	*
Subsidiary with stock financing	-0.079	(0.506)		-0.082	(0.556)		-0.053	(0.653)	
Log of total assets	0.068	(<.001)	***	0.064	(<.001)	***	0.062	(<.001)	***
Ratio of target-to-bidder size	0.112	(0.058)	*	0.119	(0.041)	**	0.126	(0.032)	**
Bidder book-to-market	0.085	(0.003)	***	0.086	(0.003)	***	0.088	(0.002)	***
Bidder ROA	0.221	(0.046)	**	0.241	(0.035)	**	0.221	(0.047)	**
Diversifying merger	-0.097	(0.001)	***	-0.103	(0.001)	***	-0.095	(0.002)	***
Adjusted R-sq		0.0695			0.0506			0.0817	

*, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels respectively.

Table 4. Long-run portfolio returns.

The portfolio return for group j is the average over all months with at least 10 observations of $\sum_{i \in j} R_{i,t} / N_{j(t)} - R_{index,t}$, where j(t) consists of acquisitions in group j for months t-36 through t-1, $N_{j(t)}$ is the number of acquisitions in j(t), and $R_{index,t}$ is the return on the CRSP value-weighted index. The quartiles are defined based on monthly averages of the grouping variables. Trailing 12-month average cumulative abnormal announcement return (CAAR) is the average CAAR for all sample mergers in the 12 months ending 3 days before an announcement. Trailing 12-month number of mergers is the number of sample mergers in the 12 months prior to an announcement. Trailing 12-month CRSP index return is the return on the value-weighted CRSP index in the year ending three days before a merger announcement. CAAR for the last announcement by the firm is for the most recent merger where the target is at least 10% the size of the bidder as long as the merger was announced in the three years prior to the current announcement. The buy and hold return (BHAR) on bidder's stock is the return in the 12 months ending three days before an announcement. The sign of coefficient from BHAR regression comes from column (1) of Table 3.

	Top quartile	Second quartile	Third quartile	Bottom quartile	P-value of the difference between the top and bottom quartiles	Sign of coefficient from BHAR regression
Trailing 12-month average CAAR	-13.99%	-5.81%	1.08%	11.63%	0.050	–
Trailing 12-month number of mergers / 1000	-4.34%	7.54%	-2.16%	-10.56%	0.713	0 ♣
Trailing 12-month return on CRSP index	-3.67%	-10.29%	-1.48%	4.77%	0.448	–
CAAR on bidder's last announcement	-0.40%	-18.44%	2.15%	-2.65%	0.821	0
Trailing 12-month BHAR on bidder's stock	-3.74%	-14.18%	-4.79%	0.48%	0.664	–
CAAR	-6.86%	-11.53%	-6.20%	-2.65%	0.671	–

♣ – The coefficient is statistically significantly negative for the industry and quintile benchmarks.

Table 5. Robustness checks on regression results for the BHAR.

The BHAR is defined as $\prod\limits_{t=1}^{T} (1+R_t) \,/\, \prod\limits_{t=1}^{T} (1+R_{index,t})$ where R_t is the return on the bidding firm's stock and $R_{index,t}$ is the return on the CRSP value-weighted index. We include acquisitions with at least one year of observations after the announcement. The post-announcement window runs from three days after an announcement to three years after the announcement. Trailing 12-month average cumulative abnormal announcement return (CAAR) is the average CAAR for all sample mergers in the 12 months ending 3 days before an announcement. Trailing 12-month number of mergers is the number of sample mergers in the 12 months prior to an announcement. Trailing 12-month CRSP index return is the return on the value-weighted CRSP index in the year ending three days before a merger announcement. CAAR for the last announcement by the firm is for the most recent merger where the target is at least 10% the size of the bidder as long as the merger was announced in the three years prior to the current announcement. The first merger dummy is one if the firm has made an acquisition in the three years prior to the announcement and zero otherwise. The buy and hold return (BHAR) on bidder's stock is the return in the 12 months ending three days before an announcement. Stock financing is the percent of mergers that are entirely financed by stock. Other financing is the percent of mergers that have some non-stock financing. Target is public, private, and subsidiary refer to the percent of mergers with that type of target. The ratio of target-to-bidder size is the ratio of target equity to bidder equity. Bidder book-to-market is the book-to-market equity ratio and return on assets (ROA) is the return of assets, both measured at the end of the year prior to the merger announcement (using the net income for the entire year in ROA). Diversifying merger is the percent of mergers where the target and the bidding firm are in different industries. We use the 17-industry classification available at mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html. Industry dummies are included in the regressions but not shown in the table. The data cover mergers announced between 1982 and 2001. Asymptotic p-values are in parentheses.

	Dependent variable: BHAR.											
	Early time period (1982-1989) (1)			Later time period (1990-2001) (2)			Stock-financed acquisitions (3)			Acquisitions with some non-stock financing (4)		
	Coef.	p value		Coef.	p value		Coef.	p value		Coef.	p value	
CAAR	-0.914	(0.010)	***	-1.186	(<.001)	***	-1.398	(<.001)	***	-1.060	(<.001)	***
Merger momentum												
Trailing 12-month average CAAR	-2.345	(0.340)		-11.982	(<.001)	***	-1.261	(0.560)		-10.843	(<.001)	***
Trailing 12-month number of mergers / 1000	-2.550	(0.643)		-2.700	(0.001)	***	0.550	(0.573)		0.440	(0.529)	
Market momentum												
Trailing 12-month return on CRSP index	0.087	(0.471)		-0.448	(<.001)	***	-0.423	(0.003)	***	-0.449	(<.001)	***
Bidder-specific merger momentum												
CAAR on bidder's last announcement	0.588	(0.414)		0.224	(0.536)		0.348	(0.415)		0.194	(0.663)	
First merger dummy	0.097	(0.241)		0.098	(0.010)	***	0.040	(0.578)		0.124	(0.002)	***
Number of mergers by firm in last 3 years	0.007	(0.850)		0.017	(0.320)		-0.015	(0.639)		0.024	(0.211)	
Bidder-specific stock momentum												
Trailing 12-month BHAR on bidder's stock	0.036	(0.428)		-0.108	(<.001)	***	-0.084	(<.001)	***	-0.093	(<.001)	***
Control variables												
Private target	0.082	(0.249)		-0.050	(0.303)		-0.081	(0.523)		-0.028	(0.530)	
Subsidiary	0.047	(0.491)		0.031	(0.506)					0.042	(0.307)	
Public target with stock financing	-0.074	(0.388)		-0.103	(0.041)	**	-0.094	(0.440)				
Private target with stock financing	-0.053	(0.499)		-0.067	(0.105)							
Subsidiary with stock financing	-0.091	(0.508)		-0.112	(0.427)							
Log of total assets	0.139	(<.001)	***	0.067	(<.001)	***	0.097	(0.002)	***	0.056	(0.002)	***
Ratio of target-to-bidder size	0.335	(0.037)	**	0.082	(0.195)		0.127	(0.172)		0.102	(0.166)	
Bidder book-to-market	0.068	(0.139)		0.094	(0.004)	***	0.008	(0.899)		0.097	(0.002)	***
Bidder ROA	0.346	(0.165)		0.226	(0.058)	*	0.137	(0.449)		0.227	(0.109)	
Diversifying merger	-0.044	(0.416)		-0.094	(0.008)	***	-0.057	(0.450)		-0.100	(0.003)	***
Adjusted R-sq	0.1103			0.0869			0.0878			0.0694		
Observations	910			4,849			1,470			4,279		

*, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels respectively.

*Figure 1. The trailing 12-month average CAAR and the trailing 12-month number of mergers
 for mergers announced 1982-2001.*
The data in this figure include all merger announcements meeting the sample criteria. A merger is included as of the
date of its announcement. The average CAAR is the trailing twelve-month average cumulative abnormal announcement return
and the number of mergers is the total merger announcements in the prior twelve months.
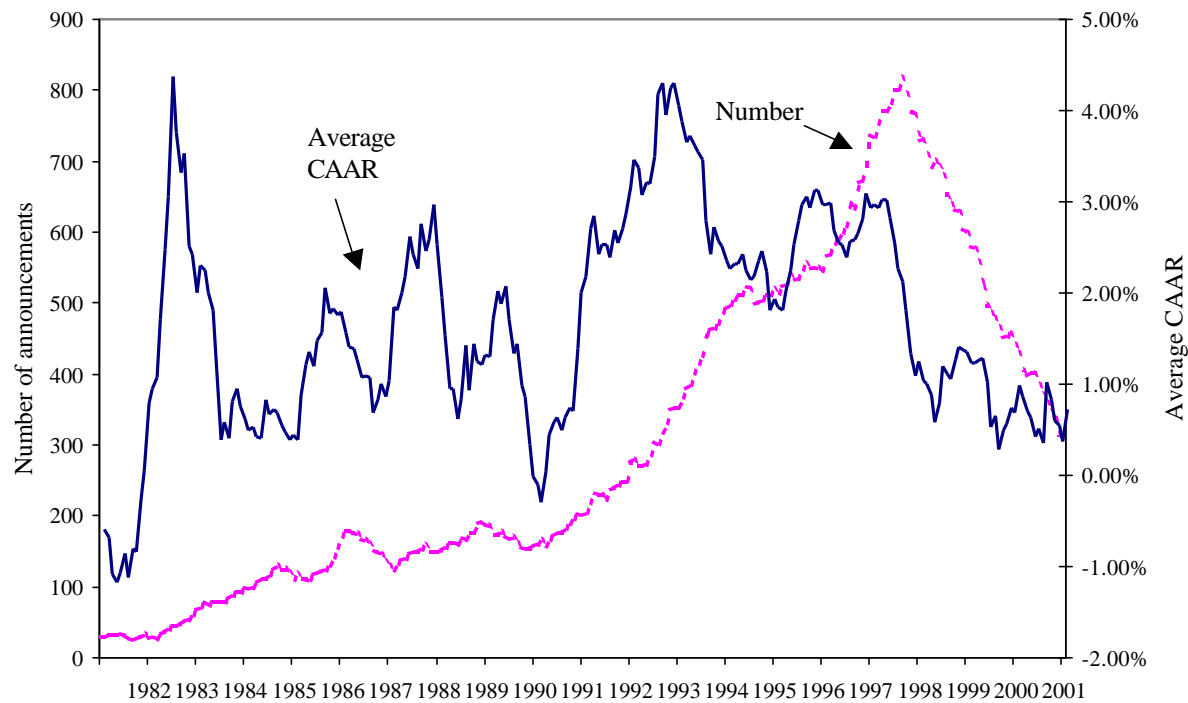
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