The Post-merger Performance Puzzle

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Abstract

While the bulk of the research on the financial performance of mergers and acquisitions has focused on stock returns around the merger announcement, a surprisingly large set of papers has also examined long-run stock returns following acquisitions. We review this literature, concluding that long-run performance is negative following mergers, though performance is non-negative (and perhaps even positive) following tender offers. However, the effects of both methodology (see Lyon, Barber and Tsai (1999)) and chance (see Fama (1998)) may modify this conclusion. Two explanations of under-performance (speed of price-adjustment and EPS myopia) are not supported by the data, while two other explanations (method of payment and performance extrapolation) receive greater support.

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1. Introduction

Most research on the financial performance of mergers and acquisitions has focused on stock returns surrounding announcement dates. Virtually all researchers have reported large positive average abnormal returns to targets, a result that is not surprising given the significant premiums typically involved in takeovers. Conversely, these same researchers have found surprisingly small abnormal returns to bidders over the announcement period. In fact, while some papers have reported significantly positive performance here, quite a few others have found either zero performance or even negative performance to acquirers. In a well-known review article, Roll (1986) concludes that the null hypothesis of zero abnormal performance to acquirers should not be rejected. And, while there have been many subsequent articles, the results appear to be mixed enough that Roll's conclusion appears to hold.

Parallel to the research on announcement period returns, a smaller body of work has investigated long-run post acquisition returns. The earlier research here was typically a small section in a paper primarily devoted to announcement period returns. The profession often paid little attention to the results on long-run returns, perhaps because the strong belief in market efficiency indicated what the results *should* be. However, enough of the earlier papers reported negative long-run returns following mergers that the topic could not be completely ignored. In fact, the results caused Jensen and Ruback (1983, p.20) to comment: "These post-outcome negative abnormal returns are unsettling because they are inconsistent with market efficiency and suggest that changes in stock prices overestimate the future efficiency gains from mergers."

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prices overestimate the future efficiency gains from mergers."

Over the years, the initial trickle of studies has widened to a steady stream. We count 22 different papers examining long-run post-acquisition returns, with 10 having seen print in the 1990s. As the literature has grown, we have witnessed three concomitant developments. A number of the more recent papers have been fully devoted to long-run returns and perhaps an equal number have searched for explanations of the phenomenon, both signs of increased academic interest. In addition, recent papers have adopted the more sophisticated empirical methodologies now available.

Because of the substantial body of work in the area, we believe that a review of the literature is called for. Our paper seeks to answer two questions. First, does the accumulated evidence suggest that post-acquisition performance is, indeed, negative? The evidence on this question is presented in Section 2 of our paper. The answer to this question seems quite important. In addition to the obvious implication for market efficiency, an answer clearly informs the debate on gains from mergers. Studies focussing on announcement period performance conclude that mergers produce wealth gains to stockholders of the target and acquiring firms combined. A finding of negative performance after mergers can overturn this conclusion. Second, what are possible explanations for the literature's findings on long-run performance? Of course, if long-run performance is generally insignificantly different from zero, no explanation is needed. However, if past research suggests under-performance (or out-performance), a convincing explanation enhances the plausibility of that finding. The evidence on this question is

presented in Section 3. Section 4 provides a summary and conclusion.

2.   Long-Run Performance Following Acquisitions

We start by providing a summary of the literature in section 2.1. Section 2.2 provides a detailed review of the individual studies that have examined this issue in various contexts.

2.1   Summary of the Evidence

Section 2.2 reviews 22 articles that have examined the stock price performance of acquiring firms following acquisitions. All of these articles are listed in Table 1. We now attempt to summarize this body of research, a task made easier by separating mergers from tender offers. In addition, since Franks, Harris and Titman (FHT) (1991) altered this literature both by devoting their entire paper to post-acquisition performance and by using more sophisticated measurement techniques, we separate pre-FHT from post-FHT findings.

2.1.1   Pre-FHT Findings on Performance Following Mergers

The first thirteen articles listed in Table 1 all occurred prior to FHT.[1] Of the 13, we exclude Dodd and Ruback (1977), because it deals with tender offers,[2] and Firth

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[1]It is not clear whether Limmack came before FHT, since both were published in 1991. However, we treat the Limmack article as the earlier one, since it does not use the sophisticated techniques of FHT and it devotes little attention to post-acquisition performance.

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(1980), Barnes (1984), Dodds and Quek (1985), Franks, Harris and Mayer (1988) and Franks and Harris (1989), because they do not separate mergers from tender offers.[3] Of the remaining seven, Mandelker (1974) provides the least support for negative post-acquisition performance. The CAARs, though negative, are not economically significant. In addition, while no t-statistics are provided for his entire 40-month post-acquisition period, t-statistics for both a 10-month and a 20-month period are insignificant. On the other extreme, Asquith reports CAARs of –0.072 in the 240 days following merger outcome. This return is both economically and statistically significant, providing perhaps the strongest evidence against the null hypothesis of zero abnormal returns.

All of the other five papers are ambiguous to some extent. Using the same data but different methodologies, Magenheim and Mueller (MM) and Bradley and Jarrell (BJ) reach opposite conclusions. MM find what are most likely significant CAARs over three years, while BJ find insignificant results over the same time period. We are inclined to put more weight on BJ's results, since their approach specifically avoids MM's methodological problem. However, BJ do not separate mergers from tender offers as MM do. Langetieg (1978) reports CAARs between -0.223 and -0.2615 over 70 months using four different statistical methods. While these abnormal returns are both economically and statistically significant, his control firm approach yields insignificant returns. Langetieg places more weight on the control firm approach, though readers may

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[2]Actually, as shown in our Table 1, Dodd and Ruback also examine performance following clean-up mergers, finding one-year CAARs of 0.0844. However, the small sample of 19 and the special nature of this type of merger reduce the informativeness of their result to our discussion.

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not. Malatesta (1983) finds statistically significant abnormal returns for the year after the first public announcement of merger but insignificant results for the year after board/management approval. Limmack (1991) assesses post-acquisition performance over two years, finding significantly negative CAARs for two of his three methodologies. However, Limmack does not separate mergers from tender offers, leaving interpretation somewhat ambiguous. We include this article in the present section of our paper on the (perhaps dubious) premise that abnormal returns would likely have been even more negative if tender offers had been removed from his sample.

Thus, taken together, the literature at this point only suggests the possibility of an anomaly. The lack of corroboration across papers, as well as the use of empirical methodologies now considered inadequate for measuring long-run abnormal stock performance, prevents one from drawing a strong conclusion at this point.

2.1.2 Pre-FHT Findings on Performance Following Tender Offers

Prior to FHT, only two papers examined performance following tender offers. Our calculations, based on Dodd and Ruback's (1977) Table 3, yield a CAAR of -0.0591 for the 60 months following tender offers. By contrast, our calculations, based on Magenheim and Mueller's Table 11.3, yield a CAAR of 0.0632 for the three years following tender offers. Statistical significance can not be assessed for either of these calculations. However, since the CAARs are of opposite signs and of similar magnitudes

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[3]Franks, Harris and Mayer (1988) do separate cash offers from equity offers. While tender offers are predominantly made with cash and mergers are predominantly made with equity, the correlation is not perfect. We leave a discussion of cash vs. equity to a later section of the paper.

(though for different post-event time periods), we conclude that the null hypothesis of zero abnormal returns following acquisition should not be rejected.

2.1.3 Post-FHT Performance Following Mergers

As shown in Table 1, FHT is followed by eight papers. Of these nine, we exclude FHT, Kennedy and Limmack (1996) and Mitchell and Stafford (1988) because they do not separate mergers from tender offers. Of the remaining six articles, Loderer and Martin (LM) (1992) provide the least support for negative post-merger performance. LM find that five-year performance, while negative, is not statistically different from zero. However, this is not to say that the authors provide no support for negative post-merger performance, since three-year abnormal returns are significantly below zero.

By contrast, a number of articles provide stronger evidence of negative post-merger performance. Agrawal, Jaffe and Mandelker (AJM) (1992) find a statistically significant five-year CAAR of -0.1026 under a size and beta adjustment. Anderson and Mandelker (AM) (1993) report five-year CAARs of –0.0956 and –0.0931, under a size and a size & book-to-market (b/m) adjustment, respectively. Both of AM's CAARs are statistically significant. However, one should not view these two studies as independent. The two datasets greatly overlap, since AM use the 1966 to 1987 portion of AJM's data. Loughran and Vijh (1997) find a statistically significant five-year buy-and-hold return

relative to a size and b/m control of –0.159. However, when overlapping cases are eliminated, the buy-and-hold return relative to a control becomes –0.142, which is only marginally significant (t=-1.69). Rau and Vermaelen (1998) find a statistically significant three-year CAAR of –0.0404. However, one is likely to view this CAAR as economically insignificant. Finally, Gregory (1997) finds two-year CAARs between -0.1182 to –0.1801 under six different models, all of which are statistically significant. Gregory uses U.K. data, providing an out-of-sample test of the anomaly. While Gregory does not separate mergers from tender offers, our discussion below suggests that post-acquisition performance would have been even worse if tender offers had been removed from the sample.

Taken together, we believe that the post-FHT articles suggest strong evidence of an anomaly following mergers. One can find some evidence of statistically significant negative abnormal returns in each of the six articles above and strong evidence of both economically important and statistically significant negative performance in a few of the articles. As a group, the studies cover a long time period and two countries (United States and United Kingdom). A wide variety of statistical techniques are used, all of which go beyond the old-style CAPM/market model approaches. While there has been a fair amount of criticism of long-run return studies in general (see e.g., Kothari and Warner (1997), Barber and Lyon (1997) and Lyon, Barber and Tsai (1999)), the differing results on tender offers (see below), as well as the differing methodologies in the six papers, suggest that something more than a statistical bias is at work here. Furthermore, in our

opinion, the results discussed in section 3 below on explanations strengthen one's belief in the anomaly.

2.1.4   Post-FHT Performance Following Tender Offers

Of the nine papers beginning with FHT, four examine tender offers. AJM state that five-year CAARs following tender offers are (p. 1611) "small and insignificantly different from zero. Thus, we find no evidence of unusual performance for tender offers." Loderer and Martin (LM) find that five-year abnormal performance is positive but insignificantly different from zero. Loughran and Vijh (LV) find a five-year buy and hold abnormal return (BHAR) following tender offers of 0.43.   While this number is economically significant, it is only marginally statistically significant (t=1.67).   When overlapping cases are eliminated, the five-year BHAR is even greater at 0.613, though the t-statistic is still marginally significant (t=1.86). Rau and Vermaelen (RV) find a lower, but statistically significant three-year CAAR of 0.0856.

Two related conclusions seem warranted. First, while there is strong evidence, in our opinion, of negative abnormal returns following mergers, there is no similar evidence following tender offers.   Abnormal returns are predominantly positive, not negative. Secondly, one could perhaps even make the case that abnormal returns are significantly positive here, as suggested by the evidence of LV and RV.   However, this might be stretching the case, because LV report only marginal statistical significance and both AJM and LM report insignificance.

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2.1.5 Performance Following Failed Bids

While the profession has always been more interested in long-run returns following successful acquisitions, the literature has occasionally examined bidder returns following unsuccessful bids as well. Our Table 1 notes four such papers. Dodd and Ruback (1977) find a 60-month CAAR of –0.0262 following the announcement of tender offers that later turn out to be unsuccessful. While this appears to be economically insignificant, the absence of t-tests prevents an assessment of statistical significance. Similarly, Firth (1980) reports a CAAR of -0.035 over 36 months following the announcement of acquisition attempts that turn out to be unsuccessful. No t-test is reported over this interval. Asquith (1983) finds a statistically significant CAAR of -0.096 over the 240 days following unsuccessful merger bids. Finally, Limmack (1991) finds 24-month post-bid CAARs of –0.2420, -0.2625, and –0.0738 under three models. The first two are significantly negative, while the third is statistically insignificant.

The results above are merely suggestive at best. The finding of Asquith for unsuccessful merger bids is similar to his finding for successful bids. And, the abnormal returns are generally even more negative for Limmack. However, the results raise more questions than they answer. For example, the methodologies of these papers are not the most current. Will the results change under newer methodologies? Also, Limmack does not separate mergers from tender offers. Are his negative returns driven by mergers? These questions can only be answered by new research.

2.2   Review of the Individual Studies

Mandelker (1974) is generally considered the first modern treatment of the financial consequences of mergers, with merger completion dates being precisely determined and abnormal returns (or residuals, as they were then called) being calculated relative to a benchmark. The paper analyzes 241 mergers that took place during 1941-1962. Both the acquiring and the acquired firms were listed on the New York Stock Exchange (NYSE). The abnormal return for stock j in calendar month t, $_{jt}$, is calculated as:

$$_{jt} = R_{jt} - \hat{}_{ot} - \hat{}_{1t} \,_{jt} \, ,$$

where R_{jt} is the return on stock j in month t,

$\hat{}_{ot}, \; \hat{}_{1t}$ are the *ex-post* coefficients between return and risk for calendar month t, as estimated by Fama and MacBeth (1973),

$_{jt}$ is the beta for security j in month t.

Mandelker's major focus is on returns around the time of the merger, with perhaps his most important finding being (p. 303): "stockholders of acquiring firms seem to earn normal returns from mergers as from other investment-production activities with commensurate risk levels. Stockholders of acquired firms earn abnormal returns of approximately 14%, on the average, in the seven months preceding the merger."

In addition, his rather exhaustive work also presents returns for the combined entity subsequent to the merger. His Table 1 shows cumulative average abnormal returns

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(CAARs) of -0.014 over the 40 months following merger completion, clearly an economically insignificant drop. While no t-statistics over the 40-month period are provided, Mandelker's Table 4 shows statistically insignificant abnormal returns over the first 10 months and the first 20 months following merger completion.

In his Table 1, a firm's beta for month t is measured using data over the previous 60 months. In his Table 8, the beta for month t is measured using data from months (t-30, t-1) and (t+1, t+30). Here, the CAAR over the 40 months following merger completion is -0.026. This CAAR, though somewhat bigger in magnitude than that in Table 1, still seems economically insignificant.

Results on post-merger returns were given little weight in Mandelker's paper, perhaps for two reasons. Research on other market anomalies, which has questioned the efficient market paradigm to some extent, had not yet arisen. In addition, other work showing negative abnormal returns following mergers was to come later as well.

Dodd and Ruback (DR) (1977) examine stock return performance both before and after tender offers. They compile a sample of 124 NYSE firms making successful tender offers and 48 NYSE firms making unsuccessful tender offers over the period from 1958 to 1976. Abnormal returns are calculated from the market model.

The study measures the post-acquisition performance of acquirers over two periods, months (+1, +12) and (+13, +60), relative to the first public announcement of the bid. From their Table 3, we calculate that the CAAR for the successful acquirers over this entire 60-month period is –0.0591. While this performance may be economically

important, the t-statistics reported for the two periods are both insignificant. In addition, we calculate that abnormal returns are –0.0262 for unsuccessful acquirers for the same 60-month period. Again, t-statistics are insignificant for each of the two periods.

The paper also calculates post-acquisition performance following 19 clean-up mergers, i.e. offers where the acquirer owned over one-half of the target firm's shares prior to the merger. DR's Table 4 indicates that the CAAR for acquirers over months (+1, +13) is 0.0844, with a marginally significant t-value of 1.60. No results are reported for months (+13, +60).

Langetieg (1978) examines 149 mergers between NYSE firms over the period from 1929 to 1969. He begins by adjusting returns for both market and industry factors. He abstracts from market returns by using either the Capital Asset Pricing Model (CAPM) or the Black (1972) two-factor model, and employs two industry indices, yielding four measures of abnormal performance. Regardless of the measure, the results in his Table 1 show large negative returns over three intervals (months (+1, +12), (+13, +24), and (+25, +70)) after the merger. Our summations over the three periods yield cumulative abnormal performance over months (+1, +70) between –0.223 and –0.2615.

However, in his Table 2, Langetieg uses a control firm approach as well.   His control firm "represents the firm in the merging firm's two-digit industry having the highest residual (i.e. returns net of market influence) correlation to the merging firm" (p. 371). He calculates abnormal performance as the difference between the acquiring firm's performance using one of the four measures above and the performance of the control firm

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using the same measure. We calculate his cumulative abnormal performance over months (+1, +72) to be –0.055, which is much smaller in magnitude than his first set of results. He summarizes his results as follows (p. 376): "If we were to draw preliminary conclusions based only on the results for merging firms, we would be forced to conclude that the post-merger excess return experience is inconsistent with the efficient markets hypothesis. However, it would be wrong to draw conclusions based only on merging firm results, since the control firm results and the 'paired-difference' results must also be considered. The control firm also shows a generally negative average excess return in most post-merger time intervals. Examination of the 'paired-difference' results shows average excess returns that are still predominantly negative, but *never* significantly different from zero. Hence, we conclude that the post-merger excess return experience is consistent with the efficient markets hypothesis."

This quote indicates that Langetieg puts more weight on the control firm results. However, it is not clear whether this second approach is preferable. After all, the first approach abstracts from industry effects. A control firm may be superfluous in this set-up, since this firm is meant to abstract from industry effects as well.   Subsequent academic studies have not used a control firm this way.

Firth (1980) examines bidders in 434 successful bids and 129 unsuccessful bids in the United Kingdom over the period from 1969 to 1975. Takeover bids where the bidder holds at least 30% of the target stock six months prior to the bid announcement are excluded from the sample. Both bidders and targets are exchange-listed firms. Abnormal

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performance is measured via the market model, with a moving average method used for beta estimation. Specifically, the parameters of the model for a given month t are estimated over months (t-48, t-1), excluding months (-12, +12) around the takeover bid month. His Table III shows CAARs for successful bidders of only 0.001 over the 36 months following the bid announcement. This is clearly an economically insignificant return, and his Table V indicates that this is statistically insignificant as well. Table IV shows CAARs for unsuccessful bidders of 0.035 over the 36 months following bid announcement. Table V indicates statistical significance over the first year but not over the next two years following the bid announcement. However, the table does not allow a statistical inference over the full three-year period.

Asquith (1983) provides a comprehensive study of mergers, with particular attention given to announcement dates. As opposed to the monthly returns in the Mandelker and Langetieg studies, Asquith uses daily data, allowing him to measure returns relative to both the "press day" and "outcome day." The press day is the day that *The Wall Street Journal (WSJ)* reports news of the merger bid and the outcome day is the day that the *WSJ* publishes the outcome.

The study examines 196 NYSE or American Stock Exchange (AMEX) acquirers in successful mergers involving NYSE targets over the 1962-1976 period. Daily abnormal returns are calculated as the difference between the return on the merging firm and the return on a control portfolio with a similar beta. To form this control, all securities on the NYSE and AMEX are ranked once a year according to their betas and placed into one of

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10 decile portfolios.

Asquith's Table 1 shows abnormal returns from 480 days before the announcement date to 240 days after the outcome day. Bidding firms experience positive abnormal returns of 0.134 over days (-480,-40) prior to the press day, perhaps indicating that firms are more likely to make acquisitions after performing well. However, cumulative excess returns are –0.072 over the 240 days following the outcome, with almost all of this decline occurring after day +60. In addition, cumulative excess returns are –0.096 over the 240 day period following the outcome day for a sample of 87 unsuccessful bidders.

While Mandelker makes little mention of the slight post-merger decline in his sample and Langetieg concludes that post-merger performance is not significantly negative, Asquith states (p. 74) "These results are surprising, especially since the post-outcome decline in equity value is delayed by sixty days or more. ...The stock price behavior of merged firms during the post-outcome period thus remains a puzzle. There is no immediate stock price reaction after a merger, but within a year there are large negative excess returns."

Malatesta (1983) examines 256 firms that acquired targets with asset size greater than $10 million over the period 1969-1974. Abnormal returns are calculated from the market model in risk premium form. For months (+1, +12) after the merger announcement, the market model parameters, $_{jt}$ and $_{jt}$, are estimated from the 36 observations closest to a given month t drawn from months (+13, t+60).

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Malatesta's Table 4 presents cumulative average abnormal returns for acquiring firms over the periods (+1, +6) and (+7, +12) relative to the first public announcement date of the merger. Abnormal returns are significantly negative over both periods, with a total CAAR (our calculation) of –0.076 over months (+1, +12). While this cumulative return is similar in magnitude to that in Asquith (1983), Asquith measures returns from the outcome date. Since the first public announcement of a merger is often made after its completion, Malatesta also looks at the subset of roughly one-half of his sample where an announcement of board or management approval of the merger appears in the *WSJ*. For this subset, his Table 5 reports statistically insignificant negative CAARs in both periods (+1, +6) and (+7, +12) relative to this more precise announcement date.

While Malatesta takes the significantly negative returns following the first public announcement quite seriously, he argues (p. 179), "Market inefficiency is an unlikely explanation for negative abnormal post-merger returns to acquiring firms.   Information concerning mergers is widely disseminated. The general characteristics of mergers are well known. It is implausible that investors systematically misinterpret the implications of these common phenomena." Instead, he suggests the possibility that post-merger losses are mere statistical artifacts due to changes in risk parameters around the merger event.

Barnes (1984) examines all mergers between companies listed on the London Stock Exchange over the period from June 1974 to February 1976.   Post-merger performance of the resulting 39 acquiring firms was assessed using the market model with an added industry factor. The author's Figure 1 indicates that the CAAR over the 60

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months following the month of announcement is –0.063. No statistical tests are reported.

Dodds and Quek (1985) examine 70 mergers during 1974-1976 where the acquirer is listed on the Industrial Sector of the London Stock Exchange. Post-merger performance is computed using the market model. The Industrial Group Index of the Financial Times Actuarial Share Index is used as a proxy for the market. Their Table 1 shows a CAAR of –0.068 over the 60 months following the month of merger announcement. No statistical tests are reported for this interval.

Magenheim and Mueller (1988) examine 78 NYSE/AMEX acquiring firms that completed takeovers worth at least $15 million over the period 1976-1981. The authors classify 51 of the acquisitions as mergers and 26 as tender offers. They calculate abnormal returns from the market model, estimating the parameters   and   over one of three periods: months (-60, -4), (-36, -4) or (+13, +36) relative to the initial announcement month. For the first two estimation periods, the authors' Table 11.5 presents CAARs for each of the first three years subsequent to the announcement. Our calculations show that the CAARs over the entire three-year post-announcement period are –0.1436 and –0.3896 using the first and second estimation periods, respectively. Only the CAAR over the first year (-0.0321) is presented using the third estimation period, which runs over the second and third post-announcement years. While the two three-year estimates differ substantially, they both appear to be economically significant. The authors do not report statistical significance over the three-year period.   However, they present z-values (standard normal) of –1.2464 and –4.9307 for performance over months (-3, +36) relative

to the month of initial announcement, using the first and second estimation periods, respectively.

The authors present post-announcement returns for mergers and tender offers separately in Table 11.3, using only the (-60, -4) estimation period. Our calculations show CAARs over the first three years after the announcement to be –0.2437 and + 0.0632, respectively, for the two sub-samples. Once again, z-values are reported for the period (-3, +36). They are –2.60 for mergers and 0.56 for tender offers. Magenheim and Mueller appear to be the first to calculate post-acquisition returns for the two types of acquisitions separately. And, like Magenheim and Mueller, subsequent researchers generally find that returns are higher after tender offers than after mergers.

Bradley and Jarrell (BJ) (1988) criticize Magenheim and Mueller's methodology stating (p. 255), "It is well known that market model parameter estimates based on monthly data are inefficient and nonstationary." And, indeed, financial economists have long pointed out that if the true abnormal performance is non-zero during the estimation period, measurement of abnormal performance in the forecast period will be biased. BJ estimate abnormal returns using a method similar, if not, identical to that of Asquith (1983). Here, a daily abnormal return is the difference between the return on the acquirer's stock and the return on a portfolio of securities of similar beta. The authors find a statistically insignificant CAAR of –0.16 over the first three post-acquisition years.

Franks, Harris and Mayer (1988) examine post-acquisition returns for both the United Kingdom and the United States, as a small part of their detailed study on

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takeovers. The authors use a sample of takeovers over the period 1955-1985, as recorded

in the London Share Price Database (LSPD). The dataset covers all U.K. companies

listed on the London Stock Exchange (LSE) after 1975 and about two-thirds of the

companies (generally larger firms) on the LSE before 1975. The U.S. sample includes all

companies that disappeared by acquisition from the University of Chicago Center for

Research in Security Prices (CRSP) files over the period 1955-1984. The CRSP database

covers all NYSE-listed firms since 1926 and all AMEX-listed firms since 1962. The

authors calculate post-acquisition abnormal returns in four ways:

1. The market model approach, using   and   estimated over the 60-month period

    beginning 71 months before the announcement month.

2. The market model approach, using months (+25, +60) relative to merger completion

    as the estimation period.

3. The return on the acquiring firm minus the return on the market

4. The capital asset pricing model.

    Post-merger returns are computed relative to the month of the final bid for mergers

in the U.S. and the month when the merger was unconditionally accepted in the U.K. The

U.S. sample includes 127 all-cash acquisitions and 392 equity acquisitions. The U.K.

sample includes 221 cash and 207 equity takeovers.

    For the United States, the authors' Table 8.9 shows cumulative average abnormal

returns to acquirers over the first two years following all-equity takeovers to be around

–0.18 under methods (1), (3), and (4). All three estimates are statistically significant.

However, the CAAR is a statistically insignificant –0.018 under the second method. Since Method 2 may lead to a bias if abnormal performance is still negative over months (+25, +60), one might feel less confident with this method than with any of the other three. Taking this view, one would conclude that post-takeover performance in the United States is strongly negative for all-equity acquisitions. Results are quite different for all-cash deals in the U.S., with post-acquisition performance being insignificantly different from zero under each of the four methods.

Only methods (1) and (4) are used for acquisitions in the United Kingdom. Here, abnormal returns following all-equity acquisitions are significantly negative (-0.094) under the first method but insignificant under the fourth. By contrast, abnormal returns following all-cash acquisitions are insignificant under the first method but significantly positive (0.175) under the fourth. One can draw two conclusions from the U.K. results. First, the benchmark is important in studies of long-run returns, as previously shown by Dimson and Marsh (1986) and others. Second, returns following cash acquisitions are higher than those following equity acquisitions, a result that the authors found for the U.S. as well. And, since tender offers are likely financed with cash while mergers are likely financed with equity, the results of Franks, Harris and Mayer are consistent with those of Magenheim and Mueller.

Franks and Harris (1989) examine wealth effects of corporate acquisitions in the United Kingdom. While the bulk of their work concerns the time immediately prior to the takeover event, they consider post-acquisition performance as well. They use a sample

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of 1,058 acquiring firms in acquisitions recorded on the LSPD during 1955-1985. Post-acquisition returns are measured over the 24 months following what they term the "unconditional date," which occurs when a sufficient percentage of shares has been pledged to the acquirer to result in legal control. The authors begin by calculating post-takeover abnormal returns in three ways:

1. Returns relative to the market index

2. Returns relative to the market model, where   and   are estimated over the 60-month period beginning 71 months before the announcement month

3. The capital asset pricing model.

In their Table 10, the CAAR over the 24 months following the unconditional date is approximately 0.05, and statistically significant, under methods 1 and 3. However, the CAAR is a statistically significant –0.126 under the market model. The authors state (p. 245): "The differences in model results are directly attributable in this case to the cumulative effects of subtracting the   values from the realized returns of bidding companies when the market model is used. The average bidder   is 0.0095 per month (average   =0.92), which indicates that bidding firms (premerger) were outperforming the market by almost 1% per month. A failure to repeat this performance after the merger would show abnormal losses of over 20% over a 24-month period."

In their Table 11, the authors measure each return relative to the return on the appropriate size decile portfolio. For each decile, the acquiring firms under-perform their

control portfolio. We calculate an average abnormal return of –0.128 across all acquirers over the two-year period. To our knowledge, this is the first paper in the post-acquisition performance literature that abstracts from a priced factor other than beta. While Franks and Harris do not express a preference between this size adjustment and their other approaches, later research generally gives primary emphasis to methodologies that adjust for size (and other empirically-based factors).

Limmack (1991) examines the post-acquisition performance of acquirers in 448 successful and 81 unsuccessful bids announced during 1977-1986, where both target and bidder were quoted on the International Stock Exchange in London. The author measures abnormal returns in three ways. First, the market model is employed with   and estimated from return data over months (-67, –7) relative to the announcement month. Second, adjusted betas supplied by the London Business School Risk Measurement Service (RMS) are used in the market model. The author states (p. 242): "RMS betas are estimated on the basis of regressing trade-to-trade security returns on the market returns observed over identical periods of time. The betas so calculated are then Bayesian-adjusted following Vasicek (1973)." The alpha for any company is estimated as:

$$_{j} = \overline{R}_j - {}_j ? \overline{R}_M ,$$

where $\overline{R}_j$ and $\overline{R}_M$ are the average returns on firm j and the market, respectively, over the market model estimation period. Third, abnormal performance is measured relative to the market index.

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For the period from the bid month (month 0) to 24 months following the outcome month, Limmack's Table 5 reports CAARs for the acquirers of –0.1496, -0.0467 and –0.0743 for the market model, the adjusted beta model and the market index adjustment, respectively. The first and third abnormal returns are significantly different from zero at the 1% level, while the second CAAR is significant at the 10% level. The author presents value-weighted abnormal returns as well. The numbers here are smaller in magnitude, with only the market model adjustment yielding statistical significance, and only at the 10% level.

Limmack also calculates abnormal returns for unsuccessful acquirers over the same interval. CAARs are –0.2420, -0.2625, and –0.0738 for the market model, the adjusted-beta model and the index adjustment, respectively. Here, the first two CAARs are significant at the 1% level and the third is significant at the 10% level. Value-weighted abnormal performance is similar in magnitude, with two of the three abnormal returns being significant at the 5% level.

Franks, Harris and Titman (FHT) (1991) must be viewed as an important paper in the literature on long-run returns following takeovers for two reasons. First, FHT devote their entire paper to this topic, while previous papers consider long-run returns as a small part of their analyses. Second, the authors use a more sophisticated set of benchmarks than those in prior research.

The paper investigates 399 acquisitions, both mergers and tender offers, over the period 1975-1984. Both the acquirer and the target were on NYSE/AMEX. The authors

measure abnormal returns relative to four benchmarks:

1.   the CRSP equally-weighted index

2.   the CRSP value-weighted index

3.   a ten-factor model provided by Lehmann and Modest (1987)

4.   an eight-portfolio model from Grinblatt and Titman (1988, 1989).

The last benchmark consists of four portfolios based on firm size, three based on dividend yield and one based on past returns. The authors prefer this benchmark, stating (p. 86): "In developing this benchmark, Grinblatt and Titman (1988) formed 72 portfolios using rankings of firms based on market capitalization, dividend yield, past returns, interest rate sensitivity, co-skewness with the equally-weighted index and beta measured with the equally-weighted index. Since these are passive portfolios (i.e., their composition does not change over time), they should not exhibit abnormal performance when performance is measured relative to an efficient benchmark. However, Grinblatt and Titman found that the single-factor, the ten-factor, and another benchmark consisting of portfolios formed solely on the basis of market capitalization all generated significant nonzero performance. This significant performance was eliminated with the eight-portfolio benchmark, which was efficient relative to various subsets of the sample over different sample periods and robust with respect to minor changes in the composition of the benchmark. In addition, a sample of 37 industry portfolios did not exhibit significant abnormal performance when measured against this benchmark."

The authors calculate average abnormal performance in two ways. First, for each

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acquiring company, excess returns (above the one-month Treasury bill rate) are regressed against the relevant set of benchmark portfolios over the 36 months since the final bid date. The intercept in this regression is then averaged across all acquirers. Second, for each calendar month in their sample, the authors form an equally-weighted portfolio of all companies that have acquired a firm in the last 36 months. The excess return on this portfolio is then regressed against the relevant set of benchmark portfolios. The authors motivate the second approach by arguing that the first approach ignores cross-correlation between the abnormal returns of different acquirers.

The basic results of FHT, as presented in their Table 2, show significantly negative post-acquisition abnormal returns using the equally-weighted benchmark, significantly positive abnormal returns using the value-weighted benchmark, and insignificant abnormal returns using either the ten-factor or the eight-portfolio benchmark. Since the authors emphasize the eight-portfolio approach, they argue that post-acquisition abnormal returns are not significantly different from zero. They "conclude that previous findings of poor performance after takeover are likely due to benchmark errors rather than mispricing at the time of the takeover" (p. 81).

The authors separate their sample by (1) size of bidder, (2) medium of exchange, (3) number of bidders, (4) opposition of target management and (5) relative size of target to bidder. While the abnormal returns on a number of sub-samples are significantly different under either an equally-weighted index or a value-weighted index, and the abnormal returns on a few sub-samples are significant under the ten-factor benchmark, no

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abnormal returns are significant under the eight-portfolio benchmark. Because of these results under the last benchmark, the sub-samples do not cause FHT to change their conclusion of zero abnormal performance.

Agrawal, Jaffe and Mandelker (AJM) (1992) completed their paper on the heel of the Franks, Harris and Titman work. While AJM employ similar methodology to that of FHT and even use a sample supplied by Robert Harris, AJM reach different conclusions. AJM's sample of 937 mergers and 227 tender offers (p. 1607) "represents nearly the entire population of acquisitions of NYSE and AMEX firms by NYSE firms over the period 1955 to 1987." An acquisition is classified as a tender offer if the bidder purchased at least 60% of the target's outstanding shares via tender offer.

The authors use two methods to measure long-run abnormal returns with an adjustment for both size and beta. In the first approach, the abnormal performance of stock i in month t, $_{it}$, is calculated as:

$$_{it} = R_{it} - R_{st} - (\,_i - \,_s) (R_{mt} - R_{ft}),$$

where R_{it} is the return on security i in month t; R_{st} is the equally-weighted return across all firms in the same size decile as firm i; $_i$ and $_s$ are the betas of stock i and the size control portfolio, respectively, measured over months (+1, +60) relative to the month of merger completion; R_{mt} is the return on the NYSE value-weighted index in month t; and R_{ft} is the yield in month t on a one-month Treasury bill. With this approach, abnormal returns are cumulated over a five-year period beginning with the month of merger completion.

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The second approach combines the Returns Across Time and Securities (RATS) methodology of Ibbotson (1975) with an adjustment for firm size. The following cross-sectional regression is estimated for each month t relative to the month of merger completion:

$$R_{it} - R_{st} = \gamma_t + \delta_t (R_{mt} - R_{ft}) + \epsilon_{it},$$

where R_{it}, R_{st}, R_{mt} and R_{ft} are defined above.

AJM's Table I shows steadily negative average abnormal returns following merger completion under the first method, with CAARs reaching a statistically significant –0.1026 by month +60. Results for the RATS methodology are quite similar. By contrast, FHT report insignificance with a similar procedure, adjusting for size as well as past performance and dividend yield. AJM also examine long-run abnormal performance following tender offers, finding insignificance under both methods.

In addition, the authors also examine the behavior over different sub-periods in their sample. Five-year cumulative average abnormal returns are significantly negative for mergers that took place in the 1950s, the 1960s and the 1980s. However, CAARs are insignificantly positive over the 1970-79 period. Since this period overlaps with FHT, AJM also examine FHT's sample period. AJM write (p. 1614): "The last two columns of Table II show the post-merger performance over the 1975-1984 time period of the recent paper by Franks, Harris, and Titman (1991). We find no abnormal performance during this time period, a result consistent with that of Franks, Harris, and Titman. A breakdown (not reported) of our 33-year sample period into five-year subperiods (1955

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to 1959, 1960 to 1964, etc.) shows that 1975 to 1979 is the only five-year period when

the post-merger performance is significantly positive. This period constitutes one half of

Franks, Harris, and Titman's sample. Over the remainder of their sample period, 1980 to

1984, the post-merger performance is significantly negative. Thus, the performance over

the combined period, 1975 to 1984, is insignificant. We conclude that Franks, Harris and

Titman's results are specific to their sample period."

Loderer and Martin (LM) (1992) examine a sample of 1,298 acquisitions over the

period from 1965 to 1986. The sample includes mergers, acquisitions of privately-held

corporations, tender offers, and comprehensive acquisitions of the assets of individual

firms. Long-run performance is measured relative to the completion date, as reported in

Mergers and Acquisitions.

The authors use the following regression, which is a variant of the Ibbotson RATS

approach:

$$R_i - R_{si} = \text{}_{oi} D_o + \text{}_{1i} D_1 + \text{}_{2i} D_2 + \text{}_{3i} D_3 + \text{}_{4i} D_4 + \text{}_{5i} (R_m\text{-}R_f) + \text{}_i$$

where R_i is the return on firm i

R_{si} is the return on a size decile portfolio corresponding to firm i

R_m is the return on the value-weighted CRSP index

R_f is the yield on a three-month Treasury bill

D_j is set equal to 1 if the return is measured over year j+1 following the

completion date.

For their entire sample, LM's Exhibit 1 reports significantly negative abnormal

returns over the three-year period following completion. However, the abnormal return is insignificantly different from zero over the full five-year post-acquisition period. In their Exhibit 3, the authors also report returns for three different time periods: 1966-69, 1970-79 and 1980-86. They find that the abnormal return over the entire five-year post-acquisition period is significantly negative during the 1966-69 sub-period but is insignificantly different from zero in later periods.

Loderer and Martin separate acquisitions into four categories in their Exhibit 4: mergers, tender offers, other acquisitions, and acquisitions of assets.   Abnormal performance is significantly negative for the three-year period following both mergers and other acquisitions but is insignificant for both tender offers and acquisitions of assets. Abnormal performance is insignificant for the five-year post-acquisition period for all four types of acquisitions. The authors conclude (p.77): "We find that, on average, acquiring firms do not underperform a control portfolio during the first five years following the acquisition. They simply earn their required rate of return, no more or no less. There is some negative performance for the first three years, especially during the second and the third years after the acquisition, but it is most prominent in the 1960s, it diminishes in the 1970s, and disappears completely in the 1980s. Thus, in the later years, the postacquisition years do not provide strong enough evidence that corporate acquisitions are wasteful nor do they provide evidence contradicting market efficiency."

The Loderer and Martin paper makes an important contribution to the literature, both for its detailed analysis and for its strong conclusion indicated above. However, a

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few points should be made to put the work in proper context. First, going back to Jensen and Ruback (1983), the anomaly has always been framed in terms of abnormal performance following mergers. While LM find strong evidence that, as a group, tender offers, other acquisitions and acquisition of assets do not preceed poor stock performance, their evidence on mergers is more ambiguous. They find marginally significant under-performance in the first two years following mergers and outright significant under-performance in the first three years. Insignificance occurs only over the first four and the first five years following mergers. While AJM (1992) find significance over the full five-year period, earlier researchers generally go out only two or three years. Second, LM cumulate daily returns over a long time period, which can lead to a bias (see Blume and Stambaugh (1983)). Third, AJM's results for mergers in various decades differ from those of LM. AJM find significant five-year under-performance following mergers for the 1950s, the 1960s and the 1980s. Only in the 1970s is post-acquisition performance insignificant. Further research is needed to sort out these temporal differences.

Abnormal returns in both Agrawal, Jaffe and Mandelker (1992) and Loderer and Martin (1992) are adjusted for size, and those in Franks, Harris and Titman (1991) are adjusted for size, dividend yield and past performance. However, Fama and French (1992, 1993), Lakonishok, Shleifer and Vishny (1994) and others document that, in addition to firm size, the book-to-market ratio explains stock returns. Anderson and Mandelker (AM) (1993) use both of these factors to measure post-merger performance,

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saying (p. 1) "One application suggested by Fama and French (1993) is that long run performance studies explicitly control for both size and book-to-market effects. Our study is one such application."

AJM's sample of mergers runs from 1955 to 1987. AM use this sample but start in 1966, since they do not have access to the COMPUSTAT dataset, from which the book-to-market ratio (b/m) can be calculated, in earlier years. Their resulting sample has 670 firms.

Control portfolios are calculated in the manner described by Fama and French (1993). Here, decile portfolios are formed based on size with the smallest decile being further subdivided into three portfolios. Next, 10 b/m portfolios are formed within each of the 12 size portfolios. Abnormal returns are calculated in two ways. First, the return on the appropriate size control portfolio is subtracted from the return on the acquiring firm. Second, the return on the appropriate size and b/m control portfolio is subtracted from the acquirer's return.

AM's Table II shows significantly negative abnormal returns over five years of –0.0956 under the size adjustment. In addition, their table shows virtually identical abnormal returns, -0.0931, under the size and b/m adjustment. Thus, the authors conclude (p. 2) "In sum, the Agrawal, Jaffe and Mandelker finding of long run post-merger under-performance persists even after controlling for the book-to-market effect."

As a small part of their study, Kennedy and Limmack (1996) examine the post-acquisition performance of 247 UK companies making successful takeover bids during the

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period 1980-1989. The study measures abnormal performance relative to two separate benchmarks, the Financial Times All Share Index and size-matched portfolios. Since abnormal returns are similar for both benchmarks, results are reported only for the second. For this second control, all companies on the London Share Price Database are ranked each year by market capitalization and placed into one of ten decile portfolios. Abnormal performance is the difference between the return on the acquiring company and the equal-weighted return on the appropriate size decile.

The CAAR is a statistically insignificant –0.0016 over months (0, +11) relative to the bid month. However, the abnormal return is –0.0492 over months (+12, +23), a result that is significantly below zero at the .01 level.

Next, the authors classify acquisitions as disciplinary when a change in the CEO of the target firm occurs within two years after the bid and non-disciplinary when no change occurs within two years. Abnormal returns to the acquirer over the two years following the bid month are quite similar for disciplinary and non-disciplinary acquisitions.

Gregory (1997) presents a rather exhaustive work on long-run returns for the U.K. The author states (p. 976) "The data set used in this study is a comprehensive list of all successful UK domestic takeovers of listed companies by UK plcs with a bid value greater than 10 million pounds for the period 1984-1992." The author calculates abnormal returns for company i in month t, $_{it}$, according to six models:

1. CAPM: $_{it} = R_{it} - [R_{ft} + {}_i (R_{mt} - R_{ft})]$,

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where R_{it} and R_{mt} are the returns on stock i and the market respectively in month t,

R_{ft} is the risk-free Treasury bill rate in month t, and

β_i is the beta of firm i, measured with data for up to 36 months following the takeover completion month.

2. Dimson and Marsh risk and size adjustment (DM):

$$\varepsilon_{it} = R_{it} - [R_{st} + (\beta_i - \beta_s)(R_{mt} - R_{ft})],$$

where R_{st} is the return on a size control portfolio in month t

3. Simple size control portfolio (SS): $\varepsilon_{it} = R_{it} - R_{st}$

4. Multi-index model (SML):

$$\varepsilon_{it} = R_{it} - [R_{ft} + \beta_i (R_{mt} - R_{ft}) + \gamma_i (R_{610t} - R_{1t})],$$

where R_{610t} is the return in month t on an equally-weighted portfolio of size deciles 6 to 10, where decile 10 is the smallest; and R_{1t} is the month t return on the equally-weighted portfolio of size decile 1.

5. Value-weighted multi-index model:

$$\varepsilon_{it} = R_{it} - [R_{ft} + \beta_i (R_{mt} - R_{ft}) + \gamma_i (R_{ht} - R_{mt})],$$

where R_{ht} is the return in month t on the Hoare-Govett Smaller Companies value-weighted index.

6. Fama and French three-factor model:

$$\varepsilon_{it} = R_{it} - [R_{ft} + \beta_i (R_{mt} - R_{ft}) + \gamma_i (SMB) + \delta_i (HML)],$$

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where SMB is the value-weighted return on small firms less the value-weighted return on large firms; and HML is the value-weighted return on high book-to-market firms minus the value-weighted return on low book-to-market firms.

Results presented in Gregory's Table 2 show abnormal performance over the two years following the month of merger completion. Two-year CAARs vary from –0.1182 to –0.18 over the six models, with all models showing statistical significance. Model 3 (simple size control portfolio) shows the least under-performance, while Model 6 (Fama and French three-factor model) shows the greatest under-performance. The under-performance here seems even greater than that in the United States. For example, Agrawal, Jaffe and Mandelker (AJM) (1992) report a two-year CAAR of only -0.0494, though their 5-year CAAR is –0.1026. Gregory reports a two-year CAAR of –0.1252 under Model 2 (Dimson-Marsh), the same approach as that used by AJM. Of course, the time periods of the two studies vary greatly, so performance differences between the two countries may be sample-specific.

Loughran and Vijh (1997) measure the post-acquisition performance of 947 firms that made acquisitions over the period 1970-1989 where both the target and the acquirer were traded on NYSE, AMEX or NASDAQ. The authors calculate a five-year abnormal return as the difference between the buy-and-hold return of the acquirer and the buy-and-hold return of a control firm based on size and the book-to-market ratio. Abnormal returns are measured from the acquisition date.

Their Table II shows that five-year abnormal returns are insignificantly different

from zero for their entire sample of acquirers. The authors also separate mergers from tender offers, finding that post-acquisition abnormal returns are significantly negative following mergers but marginally significantly positive following tender offers. These results are consistent with much of the previous literature, though Loughran and Vijh's buy-and-hold methodology is new to this area of empirical work. In addition, the five-year buy-and-hold abnormal return of –0.159 is of the same order of magnitude as AJM's five-year CAAR of –0.1026. Of course, the time periods of the two studies do not coincide, and buy-and-hold returns differ from CAARs. Because post-acquisition periods may overlap for acquisitions of the same acquirer, the authors next remove overlapping cases. Table III shows a 5-year buy-and-hold abnormal return of –0.142, with a marginally-significant t-value (t = -1.69).

Rau and Vermaelen (RV) (1998) examine 3,169 mergers and 348 tender offers completed during 1980-1991, where the acquirer is traded on the NYSE, AMEX or NASDAQ and the target is either privately or publicly owned. The authors create a control group by first forming deciles based on market capitalization. Next, securities within each size decile are placed into five quintiles based on the book-to-market ratio. Cumulative abnormal returns on acquirers are computed relative to the appropriate benchmark. In addition, these abnormal returns are further adjusted for bias by subtracting the mean of the empirical distribution generated using the bootstrap approach from the abnormal return of the sample. The authors call these returns "bias adjusted CARs" or BCARs. BCARs are estimated for periods up to 36 months after acquisition

completion.

RV's Table 2 reports significantly negative abnormal returns over 36 months following mergers. However, the BCAR across all mergers of –0.0404 is small in magnitude. The BCAR for acquirers where the targets are publicly-traded is only –0.0258. By contrast, AJM find a three-year CAAR of –0.0738. The BCAR is 0.0885 in the 36 months following all tender offers and is 0.0856 following takeovers of public targets. Both values are statistically significant.

Mitchell and Stafford (MS) (1998) examine performance following three corporate events: takeovers, equity issues and equity repurchases. Their sample of takeovers consists of 2,767 acquisitions (including both mergers and tender offers) of CRSP-listed firms over the period 1961-1993.

MS measure abnormal performance in three ways. First, a three-year buy-and-hold abnormal return (BHAR) is calculated for each acquirer as the difference between the buy-and-hold return of the acquirer and the buy-and-hold return of the appropriate size and b/m portfolio. Both value-weighted and equal-weighted averages of the BHARs are computed across acquirers. Second, equal-weighted and value-weighted portfolios are formed each calendar month using the sample of all acquirers with an acquisition within the last three years. Monthly excess returns on these 'event' portfolios are then regressed on the three Fama and French factors. Third, equal-weighted and value-weighted portfolios of acquiring firms are again formed as in the previous approach. However, an abnormal return each calendar month is calculated as the difference between

the realized return on the event portfolio and an estimate of its expected return. The

latter is estimated from either the Fama-French three-factor model or the appropriate size

and b/m portfolio.

MS's Table 2a shows equal-weighted BHARs for acquirers of –0.02 and value-

weighted BHARs of –0.05 over the first three post-acquisition years. While both returns

are significantly below zero, the authors state (p. 9) "The first notable result to emerge is

the strong statistical significance associated with economically inconsequential numbers

for acquirers".

Table 3a shows intercepts from the Fama-French regressions (the second

approach) of –0.22% and –0.08% per month when portfolios are equal-weighted and

value-weighted, respectively. The three-year cumulations implied by these intercepts are

–0.079 and –0.029 respectively. The first number is statistically significant, while the

second is not.

The third approach yields significantly negative average abnormal monthly returns

with Fama-French benchmarks of –0.15% and –0.13% for equal-weighted and value-

weighted portfolios, respectively.   These numbers are similar in magnitude to those

reported under the previous approach. However, the average abnormal monthly returns

are smaller in magnitude and statistically insignificant with size and b/m benchmarks.

In conclusion, one should note that five of the eight abnormal returns mentioned

above are statistically significant. However, the small magnitude of the buy-and-hold

returns versus the larger returns under the other approaches makes it difficult to draw

inferences on return magnitudes.

3. Explanations

The previous section summarized studies examining long-run post-acquisition returns on acquirers. Because of the unusual findings of the literature, recent studies have searched for explanations. Below, we review this search.

3.1 Speed of Adjustment

Agrawal, Jaffe and Mandelker (AJM) (1992) argue that the negative post-acquisition abnormal returns they observe following mergers are consistent with two hypotheses. First, the market may fully react to the merger at the announcement date, with the subsequent price decline being due to unrelated causes. Alternatively, the market may adjust slowly to news of the merger. Here, the long-run decline reflects that part of the value of the acquisition not captured in the announcement period return.

AJM examine these two hypotheses with the following regression:

$$CAR_{ci} = b_o + b_1 CAR_{ai} + e_i$$

where CAR_{ci} is the post-merger cumulative average abnormal return for firm i. The cumulation period always begins with the month following merger completion and, depending on the regression, ends one to five years after completion. CAR_{ai} is the cumulative average abnormal return for firm i over the announcement period. The study defines the announcement period as either the three-month period ending with the month

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of announcement or the period beginning two months before the announcement and ending with the month of merger completion. Under the hypothesis that the market reacts slowly to merger news, b_1 should be positive. That is, a high (low) return around a merger announcement should be coupled with a high (low) return following its completion. A variant of the hypothesis is that the market overreacts to the merger event, implying a negative value for b_1. By contrast, the coefficient should be zero, if the under-performance following the merger is due to factors unrelated to the merger.

AJM's Table IV shows significantly negative values for b_1 under both definitions of CAR_{ai} when the period used to measure CAR_{ci} ends five years after completion. In addition, b_1 is marginally significant in a number of cases where CAR_{ci} is measured over shorter periods. Thus, the authors state (p. 167), "The evidence seems to indicate a negative relation between the market reaction to the announcement and the subsequent performance of the firm." Nevertheless, the authors temper their conclusion after observing sub-period results. They say (p. 167), "However, when we examine these regressions by subperiods, we find that the coefficient b_1 is negative for the decades of the 1960s, 1970s, and 1980s but is statistically significant only for the 1960s. Thus, we cannot conclude that the negative relationship is pervasive over our entire sample period."

AJM also argue that if post-merger performance reflects slow adjustment, this performance should be related to the size of the acquisition relative to the size of the acquirer. They rank all mergers by relative size in order to form five quintile portfolios. They state (p. 1618): "Portfolios 4 and 5 [the largest relative size] exhibit large under-

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performance, particularly over four to five years after the acquisition. However, the relationship is not monotonic, since large under-performance occurs for portfolio 2 as well. Furthermore, very few of the post-merger time periods in any of the five portfolios exhibit significant returns. Thus, the evidence here does not suggest that the acquirer's post-merger return is a function of the relative size of the acquisition."

In addition, Franks, Harris, and Titman (1991), Loderer and Martin (1992) and Loughran and Vijh (1997) also find no relationship between post-acquisition performance and the relative size of the acquisition.

Given their evidence from the regression above as well as the relative size quintiles, AJM conclude that the hypothesis that negative post-merger abnormal returns are due to slow adjustment to the merger announcement is not supported by the evidence. Since they do not identify the cause of the negative performance, they merely conclude (p. 1620): "The resolution of this anomaly remains a challenge to the profession."

3.2   Method of Payment

3.2.1   Results from Individual Studies

Loughran and Vijh (LV) provide an interesting explanation based on the work of Myers and Majluf (MM) (1984). MM argue that a firm tends to issue stock when its shares are overvalued and to issue debt or to finance out of retained earnings when its shares are undervalued. Consequently, a firm's share price should drop upon the news of an equity issuance. LV suggest that acquirers who issue stock are overvalued, with a

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stock price decline following issuance. Though MM predict an immediate drop in the price of the stock, LV look for long-run post-acquisition under-performance. Negative abnormal returns in the long-run here would be consistent with the finding of under-performance following seasoned equity offerings (SEOs), as reported by Loughran and Ritter (1995) and others. While a long-term price drop following equity issuance is inconsistent with market efficiency, it still must be viewed as a possible explanation, given the results reviewed earlier in this paper.

Though LV present the most detailed discussion of the differences between equity and cash financing of acquisitions, they are by no means the first to look for long-run performance for the two types of acquisitions. We identify seven studies examining performance following cash and stock takeovers, many of them published prior to LV.

Barnes (1984) appears to be the first to split acquirers into those that finance with cash and those that finance with equity. Our interpolation of his Figures 3 and 4 indicates that abnormal performance to the acquirer is approximately –0.056 and -0.054 in the 60 months following the announcement of cash and equity acquisitions, respectively. While these numbers are inconsistent with LV's hypothesis, no t-statistics are reported. In addition, Barnes' total sample contains only 39 firms, making it difficult to draw strong conclusions.

Dodds and Quek (1985) examine a sample of 34 acquisitions financed with equity and 36 acquisitions financed with cash. Their Table 4 indicates a CAAR of -0.072 in the 60 months following equity-financed acquisitions, while their Table 5 indicates a CAAR

of -0.044 following cash-financed acquisitions over the same time period. Unlike Barnes, the difference in performance is in the direction predicted by LV, although the magnitude appears to be rather small. No test statistics over the five-year period are provided.

Because Franks, Harris and Mayer (FHM) (1988) always separate the post-acquisition performance following cash-mergers from that following equity-mergers, we presented their results for both types of mergers in Section 2.2. Rather than repeat this material, we quote FHM (p. 253): "In summary, acquirers that made all-cash bids on average did not suffer postmerger losses and did better than the bidders that made all-equity offers. Whether all-equity bidders have postmerger losses depends on the benchmark employed. Compared with premerger performance, postmerger returns are negative. But using a benchmark based on postmerger parameters, we find all-equity acquirers did not experience abnormal losses in the two years after an acquisition, but they did have negative values three to five years after the acquisitions."

Table 4 of Franks, Harris and Titman (1991) reports average post-merger abnormal performance over 36 months of 0.26% per month under their eight-portfolio benchmark for 156 all-cash bids. The table also shows abnormal performance for acquirers of –0.17% per month for 128 all-equity bids over the same time period. Though the difference is again in the direction predicted by LV, the t-value of 1.37 for the difference between the two returns is insignificantly different from zero. In addition, while the abnormal performance is positive following all-cash bids and negative following all-equity bids, both numbers are insignificantly different from zero.

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Gregory (1997) examines abnormal performance over 24 post-acquisition months using six models. For each of the six models, average abnormal performance is lower for his sample of about 300 equity bids than for his sample of about 80 cash bids, a result consistent with LV's hypothesis. However, acquirers with mixed offers have the highest API under each of the six models. It is difficult to square this result with Myers-Majluf, since equity financing is part of any mixed offer.

Loughran and Vijh (1997) create a two-way classification scheme whereby all takeovers are classified by both mode of acquisition and form of payment. Their Table II shows that the cumulative average abnormal post-acquisition return over five years is –0.25 for a group of 385 equity-financed mergers and 0.617 for a group of 111 cash-financed tender offers. Both returns are significantly different from zero. By contrast, the post-acquisition returns are insignificantly different from zero for both a group of 196 cash-financed mergers and a group of 8 equity-financed tender offers. The authors state (p. 1789): "This evidence is consistent with two hypotheses. First, the post-acquisition wealth gains are greater for tender offers which are usually hostile to incumbent managers as compared to mergers. The wealth gains could occur because of the appointment of more efficient managers as proposed by Martin and McConnell (1991). Second, the acquirer's managers are likely to choose stock payment when their stock is overvalued and cash payment when it is undervalued. Apparently, the market does not react efficiently to the likely wealth gains from the business combination or to the news conveyed by the form of payment."

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In addition, the paper's Table V measures abnormal performance relative to a matching firm of similar size and b/m ratio that did an IPO or an SEO in the previous five years. (By contrast, the matching firms in earlier tables were selected on just their size and b/m ratio.) Now, the post-acquisition abnormal returns on both stock-financed mergers and stock-financed tender offers are insignificantly different from zero. This result provides further evidence that the under-performance of stock-financed acquisitions can be explained by the form of payment.

As discussed in section 2.2 above, Mitchell and Stafford (1998) calculate three-year post-acquisition abnormal performance in three ways: buy-and-hold abnormal returns (BHARs), monthly intercepts from Fama and French regressions, and the difference between the return on the acquirer's portfolio in a calendar month and the return on the event portfolio, where the event portfolio is taken from the Fama and French three-factor model or the appropriate size and b/m portfolio.

The authors' Table 2a shows three-year BHARs of –0.09 and –0.07 for a sample of 1374 stock-financed acquisitions where the portfolio of acquirers is equal-weighted and value-weighted, respectively. Both the returns are significantly negative. By contrast, a sample of 1393 acquisitions without stock financing has BHARs of 0.04 and –0.02 when portfolios are equal-weighted and value-weighted, respectively. The first number here is marginally significant while the second number is insignificant.

Table 3a shows significantly negative intercepts in Fama-French regressions for stock-financed acquisitions whether equal-weighted or value-weighted portfolios are

employed. The intercepts for acquisitions financed without stock are marginally significantly negative and marginally significantly positive for equal-weighted and value-weighted portfolios, respectively. The results in Table 4a are similar.[4]

Taken together, the results in the Mitchell and Stafford paper show that abnormal performance is worse for acquirers using stock-financing than for acquirers avoiding stock.

3.2.2   Summary

As with our summary in section 2.1, we separate results prior to Franks, Harris and Titman (FHT) (1992) from those after it. Three articles before FHT contrast cash with equity offers. Barnes (1984) finds lower abnormal returns following cash-financed acquisitions than those following equity-financed acquisitions, while Dodds and Quek (1985) find the reverse. However, differences in abnormal returns between the two types of acquisitions are small in both studies. In addition, neither article presents test statistics for the entire post-acquisition time period. Franks, Harris and Mayer (1988) generally find significantly positive post-acquisition abnormal performance following all-cash takeovers and significantly negative performance following all-equity takeovers. Taken together, the above studies are not particularly supportive of the method of financing hypothesis.

The evidence beginning with FHT is generally more supportive of this hypothesis. MS report higher performance following acquisitions that are financed with

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[4]Mark Mitchell informs us that the last two row labels in MS's Table 4a were switched. See the discussion on page 22 of their paper.

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cash rather than equity. Loughran and Vijh find significantly positive abnormal returns following cash-financed tender offers and significantly negative returns following stock-financed mergers. LV conclude that both the acquisition form and the mode of payment are important. Gregory (1997) finds worse performance following all-equity takeovers than following all-cash ones for each of six models, although he does not provide statistical tests of the differences. However, FHT find that performance following cash-financed takeovers is not significantly different from that following stock-financed takeovers.

We see the evidence, taken together, as generally supportive of the method of payment hypothesis. In our view Barnes (1984) and Dodds and Quek (1985) should be accorded the least weight, because of both their small sample sizes and their less sophisticated methodologies. Of the remaining five papers, four present evidence consistent with the hypothesis.

3.3   Performance Extrapolation

Rau and Vermaelen (RV) (1998) posit the performance extrapolation hypothesis, which states that both the market and the board of directors or top management of a bidder extrapolate its past performance when assessing the value of a new acquisition. The hypothesis has at least three implications, two of which RV test. First, because of good (bad) past performance, the market assumes that glamour (value) firms make good (bad) acquisitions. Thus, glamour bidders should realize greater abnormal returns at the

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takeover announcement date than should value bidders. Second, the market slowly reassesses the acquirer's quality as information from the acquisition is received. Since glamour (value) firms are initially overvalued (undervalued), long-run post-acquisition abnormal performance should be negative (positive). Third, since both the board and top management are influenced by a bidder's past performance, value bidders will exercise greater prudence toward takeovers than will glamour bidders. Thus, glamour acquirers will pay greater acquisition premiums.

RV do not test the first implication, but, instead, merely state that it is consistent with the empirical observation of Lang, Stulz and Walkling (1989) and Servaes (1991) that a bidder's announcement period return is positively related to the bidder's Q-ratio. Second, RV's Table 4 shows that glamour acquirers in mergers significantly under-perform other glamour firms in the 36 months following acquisition. Glamour acquirers in tender offers outperform other glamour firms following acquisition but the differences are not significant. By contrast, value acquirers significantly outperform other value firms following both mergers and tender offers. Thus, the results of RV's Table 4 support the performance extrapolation hypothesis.

The authors' Table 6 relates long-run returns to three attributes: nature of the acquirer (glamour vs. value), means of payment and type of acquisition. Three-year post-acquisition abnormal returns are higher for value firms than for growth firms for both means of payment (cash and equity) and for both types of acquisitions (mergers and tender offers). By contrast, while three-year abnormal performance for value acquirers is

higher following cash-financed mergers than following stock-financed mergers, the reverse is true for glamour acquirers.[5] Thus, the authors conclude that while these results are consistent with the performance extrapolation hypothesis, they are not always consistent with the method of payment hypothesis.

RV's Table 7 examines the third implication of the performance extrapolation hypothesis. The table shows that glamour acquirers pay significantly higher takeover premiums than do value acquirers in both stock-financed mergers and cash-financed tender offers, results consistent with the performance extrapolation hypothesis. However, premiums are nearly equal for glamour and value acquirers in cash-financed mergers.

3.4 EPS Myopia Hypothesis

RV also posit that managers might be more willing to overpay for an acquisition if it results in an increase in earnings per share (EPS). In addition, the market might initially overvalue these acquirers, leading to poor long-run post-acquisition performance. For each merger, the authors calculate the difference between the actual growth in the bidder's EPS following the merger and the estimated growth had the merger not taken place. Table 8 does not show a significant relationship between the impact of the merger on EPS and the acquirer's subsequent long-run abnormal performance. Thus, the authors conclude that their results do not support the EPS myopia hypothesis.

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[5]Since there were only seven stock-financed tender offers in RV's sample, this type of comparison is not made for tender offers.

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4.   Summary

This article examines the literature on long-run abnormal returns following mergers. We focus on two issues: the magnitude of the abnormal returns and, to the extent that the abnormal returns have deviated from zero, possible explanations.   We place more emphasis on the studies beginning with Franks, Harris and Titman (FHT) (1991), because of both their more sophisticated methodologies and their greater thoroughness.

In our opinion, the work starting with FHT shows strong evidence of abnormal under-performance following mergers. Except for FHT itself, each paper shows at least some evidence of under-performance. Perhaps the greatest counter-evidence comes from research on broader topics, rather than from the studies we have reviewed. A number of recent papers, e.g. Kothari and Warner (KW) (1997), Barber and Lyon (BL) (1997) and Lyon, Barber, and Tsai (LBT) (1999), have criticized the methodologies of long-run return studies in general.   In addition, Fama (1998) surveys the entire long-run performance literature, concluding (p.304), "Consistent with the market efficiency hypothesis that the anomalies are chance results, apparent overreaction of stock prices to information is about as common as underreaction. And post-event continuation of pre-event abnormal returns is about as frequent as post-event reversal." According to this view, the papers summarized here might be nothing more than chance results.

These criticisms are quite important and can not be easily dismissed. None of the papers that we have reviewed were specifically designed to conform to LBT, perhaps the

paper with the most specific prescriptions for avoiding bias. And, it would be surprising if KW, BL, and LBT represent the last word on long-run methodologies anyway. Certainly, future research will suggest other prescriptions as well. In addition, since our survey focuses on acquisitions, we are not in a position to dispute Fama's conclusions on a much broader topic.

Perhaps the strongest rebuttal is the diversity of the research reviewed here. Many papers using different methodologies and different sample periods in both the U.S. and the U.K. report similar results. And, these same researchers find uniformly non-negative long-run performance following tender offers. Viewed in this context, the criticisms of KW, BL, LBT, and Fama might be somewhat mitigated.

Our paper also examines explanations for any findings of under-performance following mergers. We conclude that the evidence does not support the conjecture that under-performance is specifically due to a slow adjustment to merger news. Similarly, Rau and Vermaelen convincingly reject the EPS myopia hypothesis, i.e. the hypothesis that the market initially overvalues acquirers if the acquisition increases EPS, ultimately leading to long-run under-performance.

The evidence in favor of both the method of payment hypothesis and the performance extrapolation hypothesis is stronger. Recent papers generally report greater under-performance following stock-financed acquisitions than cash-financed acquisitions, a result consistent with the work of Myers and Majluf (1984). Similarly, Rau and Vermaelen (1998) present a number of pieces of evidence that glamour bidders under-

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perform value bidders, after abstracting from the effects of method of payment and form

of acquisition.

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Table 1
Summary of the studies on post-acquisition performance

The table summarizes the data, methodology, and results of 22 studies on the stock price performance of acquiring firms after acquisition via merger or tender offer.

Study	Acqui-sition Type[a]	Sample Period	Sample Size	Method[b]	Event Date[c]	# Months[d]	Results	Stat Sig[e]
Mandelker (1974)	M	1941-62	241	Fama–MacBeth 2 factor model	C	40 40	-.014 Constant -.026 Moving	nr nr
Dodd & Ruback (1977)	T	1958-76	124	Market model	A	60 60 13	-.059 Successful -.0262 Failed +.0844 Clean-up mergers	I[f] I[f] I
Langetieg (1978)	M	1929-69	149	4 Methods Control firm	C	70 70	-.223 to -.2615	S I
Firth (1980)	Both	1969-75	434 129	Market model	A	36	+.001 Successful -.035 Failed	I nr
Asquith (1983)	M	1962-76	196 87	-control portfolio	C	11.4	-.072 Successful -.096 Failed	S S
Malatesta (1983)	M	1969-74	256	Market model	A A*	12	-.076 -.029	S I[f]
Barnes (1984)	M	1974-76	39	Market & industry model	A	60	-.063	nr
Dodds & Quek (1985)	M	1974-76	70	Market model	A	60	-.068	nr
Bradley & Jarrell (1988)	Both	1976-81	78	-control portfolio	A	36	-.16	I
Magenheim & Muller (1988)	M T	1976-81	51 26	Market model	A	36	-.2437 +.0632	nr nr
Franks, Harris and Mayer (1988)	Both	1955-84	392 127 207 221	4 methods 4 methods 2 methods 2 methods	C	24	-.018 to -.18 US, Equity -.036 to +.094 US, Cash -.094 to +.042 UK, Equity .0175 to .175 UK, Cash	
Franks and Harris (1989)	Both (UK)	1955-85	1058	3 methods Size decile adj.	C	24	-.126 to .048 -.128	S
Limmack (1991)	Both (UK)	1977-86	448 81	3 methods	A	24	-.1496 to -.0467 Successful -.2625 to -.0738 Failed	
Franks, Harris & Titman (1991)	Both	1975-84	399	8-factor model	A	36	-.0396 Event time +.018 Calendar time	I I
Agrawal, Jaffe & Mandelker (1992)	M T	1955-87	937 227	Size and adj.	C	60	-.1026 +.022	S I

Study	Acqui-sition Type[a]	Sample Period	Sample Size	Method[b]	Event Date[c]	# Months[d]	Results	Stat Sig[e]
Loderer & Martin (1992)	M T O A	1965-86	304 155 746 93	Size and adj.	C	60	-.0075 +.01 +.0075 +.0125	I I I I
Anderson & Mandelker (1993)	M	1966-87	670	Size & b/m adj Size adj	C	60	-.0931 -.0956	S S
Kennedy & Limmack (1996)	Both (UK)	1980-89	247	Size adj	A	23	-.0508	nr
Gregory (1997)	Both (UK)	1984-92	452	6 methods	C	24	-.1182 to -.18	S
Loughran & Vijh (1997)	M T	1970-89	788 135	BHAR (Size & b/m adj.)	C	60	-.159 +.43	S I
Rau & Vermaelen (1998)	M T	1980-91	2,823 316	Size & b/m adj.	C	36	-.0404 +.0856	S S

Mitchell & Stafford (1998)	Both	1961-93	2,767	BHAR (Size & b/m adj.)
				Fama-French regression
				CAARs using:
				  Size & b/m adj.
				  Fama-French regression
					C	36	-.02 EW
							
							-.079 EW
							
							-.018 EW
							
							-.054 EW
								S
								
								S
								
								I
								
								S

[a]M=Merger, T=Tender offer, O=Other acquisitions, A=Acquisition of assets

[b]BHAR = Buy and hold abnormal return, CAAR = Cumulative average abnormal return, b/m = book/market, adj=adjusted

[c]A = Announcement date (first public announcement), A* = Announcement of board or management approval, C = Completion date, O = Outcome date

[d]Number of post-event months

[e]Statistical significance: I = Insignificant, S = Significant, nr = Not reported

[f]Probably