The Causes of Mergers: Tests Based on the Gains to Acquiring Firms' Shareholders and the Size of Premia

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ABSTRACT

Despite the large number of event studies of mergers that have been undertaken, considerable disagreement still exists over whether mergers increase the value of the merging firms, and if so why. Most event studies measure the average returns to the acquired and acquiring companies’ shareholders separately, and based on these averages conclude either that mergers increase wealth, or that they reduce it. From this the authors go on to claim support either for a hypothesis about how mergers increase efficiency, or for one that claims they do not.

This paper develops a methodology that uses the distribution of gains and losses across the two samples of firms, and their relationship to one another to test four hypotheses about why mergers occur: (1) the market-for-corporate-control hypothesis, (2) the synergy hypothesis, (3) the managerial discretion hypothesis, and (4) the hubris hypothesis. The hypotheses are tested with data for 168 mergers between large companies from 1978 through 1990. Considerable support is found for the managerial discretion and hubris hypotheses, and some support is found for the market-for-corporate-control hypothesis. Little or no support is found for the hypothesis that mergers create synergies and that shareholders of both the acquiring and acquired firms share gains from these synergies.

INTRODUCTION
"Many managers were apparently over-exposed in impressionable childhood years to the story in which the imprisoned, handsome prince is released from the toad's body by a kiss from the beautiful princess. Consequently they are certain that the managerial kiss will do wonders for the profitability of the target company. Such optimism is essential. Absent that rosy view, why else should the shareholders of company A want to own an interest in B at a takeover cost that is two times the market price they'd pay if they made direct purchases on their own? In other words investors can always buy toads at the going price for toads. If investors instead bankroll princesses who wish to pay double for the right to kiss the toad, those kisses better pack some real dynamite. We've observed many kisses, but very few miracles. Nevertheless, many managerial princesses remain serenely confident about the future potency of their kisses, even after their corporate backyards are knee-deep in unresponsive toads." (Warren Buffett from the 1981 Berkshire Hathaway Annual Report)

"Sure there are some (synergies) here for sure. I don't know where they are yet. To say that now would be an idiots game (Barry Diller commenting on QVC's proposed "strategic" acquisition of CBS, 7/1/94)

The "decade of the 80's" set all-time records for the number and dollar value of corporate mergers and takeovers in the United States, firmly displacing the famous merger wave of the 1960s. Between 1976 and 1990, $2.6 trillion dollars of resource allocation decisions were made involving over 35,000 corporate acquisitions (Mergerstat, 1991). Moreover, after a slight pause at the beginning of the past decade, mergers again became popular with over $6 trillion dollars of acquisition activity in the 1990's.

Unfortunately, despite the large number of event studies of mergers that have been undertaken, considerable disagreement among researchers still exists as to whether mergers increase the value of the assets of the merging firms, and if so why. The shareholders of target firms receive substantial premia for their shares and uniformly are found to gain from the acquisitions. But, the gains to the acquirers' shareholders are usually close to zero and often are even negative (Berkovitch and Narayanan, 1993; Bradley, Desai and Kim, 1988; Sirower, 1997; Variaya and Ferris, 1987). Given that the acquirers are generally much larger than the firms that they acquire, even small percentage losses to acquiring firm shareholders may suffice to cancel
out the large percentage gains to target firm shareholders. Furthermore, as the window used to measure the returns to acquirers' shareholders is enlarged to allow one to measure postmerger performance, the "gains" to acquiring firm shareholders often become more negative, casting further doubt on both the hypothesis that mergers generate new wealth, and on the generally used assumption of capital market efficiency (Magenheim and Mueller, 1988; Agrawal, Jaffe and Mandelker, 1992; Agrawal and Jaffe, 1999). One's skepticism concerning the causes and consequences of mergers is increased by studies using ex-post accounting evidence that suggest that acquisitions significantly impair the long-term profitability or market shares of the acquired businesses (Mueller, 1985, 1989; Ravenscraft and Scherer, 1988, 1989; Herman and Lowenstein, 1988).

Most event studies of mergers measure the average returns to the acquired and the acquiring companies' shareholders separately, and based on these averages conclude either that the mergers increase wealth, or that they reduce it. From this the authors go on to claim support either for a hypothesis about how mergers increase efficiency, or for one that claims they do not. Very few studies to date have made use of the distribution of gains and losses across the two samples of firms, and their relationship to one another to test the various hypotheses about why mergers occur, and their consequences.¹ This approach will be followed in this paper.

In the next section we discuss four frequently cited hypotheses as to why mergers occur: (1) the market-for-corporate-control hypothesis (MCCH), (2) the synergy hypothesis (SH), (3) the managerial discretion hypothesis (MDH), and the hubris hypothesis (HH). The first two predict that mergers increase efficiency and aggregate shareholder wealth, the second two do not. More importantly for our purpose the first three make quite different predictions as to the relationship between the returns to the acquiring firms' shareholders and the returns to the acquired companies' shareholders, and these predictions form the basis of our tests of the
different hypotheses. Unfortunately, the third and fourth hypotheses make essentially the same predictions with regard to returns patterns, at least in their pure form, and thus are more difficult to distinguish empirically.

The two hypotheses that predict mergers increase efficiency seem more likely to be valid for some types of mergers than for others. Our methodology is, therefore, to divide our sample into subsamples within which the different hypotheses are more likely to find support, and then test the predictions.

The efficient capital market hypothesis predicts that any new information, like the announcement of a merger, leads to a quick adjustment of share prices to reflect unbiasedly the future changes in profits the new information purports. Evidence of a continual fall in the returns on acquiring company shares following mergers seems to imply that the market makes subsequent downward adjustments in its evaluations of the future profit changes to be generated by the merger. Thus, we also test whether support for the different hypotheses varies with the length of the window over which we measure acquiring shareholders' returns.

The hypotheses are tested with data for 168 mergers from 1978 through 1990. The sample is described in Section II. The main tests are presented in Section III. Further discussion and tests are presented in Section IV, with conclusions drawn in Section V. We begin by discussing the four main hypotheses as to why mergers occur.

THEORY AND HYPOTHESES

A. The Market-for Corporate-Control Hypothesis

In his "theory of managerial capitalism," Robin Marris (1963, 1964) claimed that managers sought to maximize the growth of their firm, but were constrained from ignoring
shareholder interests entirely by the threat of takeover and subsequent discharge. Henry Manne (1965) invented the term "market for corporate control," and put forward the hypothesis that this market operated efficiently to eliminate managements that either pursued goals that conflicted with shareholder interests, or were simply incompetent. Under the MCCH any firm can capture the potential gain from a merger by reversing the policies of the target firm, which lower its share price, or by replacing its management with one of average competence, thereby raising its market value from its current level to its (higher) potential value.

The nature of the gains assumed in the MCCH implies that many potential acquirers can achieve them. Thus, once one firm identifies a potential gain in another company and makes a bid for it, one might expect bidding for the target under the MCCH. This bidding raises the target's share price to reflect the full gains from replacing its management. Any residual gains or losses are purely a matter of chance (Barney, 1986). Several authors, who have estimated near zero gains to acquiring firm's shareholders alongside of large percentage gains to acquired firm's shareholders, have interpreted their findings as a result of the MCCH and a bidding process for the target firm (Mandelker, 1974; Asquith, 1983; Jensen and Ruback, 1983; and Bradley, Desai, and Kim, 1988).

It seems reasonable to assume that any gains to the acquiring firm that are not related to the premium paid for the acquired firm vary with the acquired firm's size, i.e., larger absolute gains or losses for acquiring firms are associated with larger target firms. If $G$ is the gain to acquiring firm's shareholders measured in dollars, $V_T$ is the acquired firm's market value, and $P$ is the premium paid to the acquired firm's shareholders, we then hypothesize the following relationship between $G$, $P$ and $V_T$

$$G = aV_T + bP + \mu$$  \hspace{1cm} (1)

The MCCH predicts $a = 0$, and $b = 0$. 

The MCCH is, of course, the hypothesis described somewhat skeptically by Warren Buffett in the quotation at the opening of the article. The prediction that $b = 0$, abstracts from the problem of the winner's curse in a bidding process. This problem is central to the HH, however, and therefore is introduced in subsection D.

**B. The Synergy Hypothesis**

The word synergy entered the merger lexicon during the 1960s merger wave to describe gains from conglomerate mergers that could not be readily identified, but were presumed to be present to explain why the mergers occurred. The article's opening quote from Barry Diller shows that the term is still used in the same way today.

The notion of synergies is so broad that one could think of acquisitions that fit the MCCH as generating synergies. We distinguish these from mergers that generate efficiencies due to some sort of market poser increase or cost reduction that is peculiar to the two firms coming together, i.e., this economy can only be achieved if these two specific companies are joined. Under this assumption, no bidding for the target takes place, and the acquiring firm obtains some of the gains from the acquisition. Since both companies must participate for the gains to be realized, one reasonable assumption is that these gains are shared equally -- in equation (1), $b = 1$. If the gains are equally shared, then $G$ goes to zero as $P$ does, and the SH predicts $a = 0$, and $b = 1$.

An alternative interpretation of the SH would be that the synergies in question could arise with a merger between the bidder (target) and one of several possible targets (bidders). If there are several possible acquirers and a single target, competitive bids can be expected and the target will obtain a greater share of the total gains than the successful bidder. When the synergies are possible if a given firm acquires any one of several targets, the bargaining advantage lies with
the lone acquirer, and we can expect it to obtain the larger share of the gains from the merger. Since each of these possibilities seems equally likely, a reasonable prediction under this more general interpretation of the synergy hypothesis, is again that \( a = 0 \), and that \( b > 0 \).

C. The Managerial Discretion Hypothesis

If the principal-agent relationship between managers and shareholders allows managers to pursue their own goals to some extent, and these goals are related to the growth of the firm, as Marris (1964, Ch. 2) claims, then managers can be expected to pursue this goal by acquiring other firms, because such acquisitions are certainly the fastest way to grow (Mueller, 1969). Under the MDH the premium in the managers' bid does not reflect an expected gain from the merger, but merely represents the price to close the deal. If there are no synergies or other gains associated with the merger, and the market had correctly priced the target company before the merger, then each dollar the acquirer pays the target firm's shareholders above this price is a dollar loss to the acquiring firms' shareholders and \( a = 0, b = -1 \), for the regression in equation (1). Should the mergers involve transaction costs or other inefficiencies which destroy wealth, the losses to the acquiring firms’ shareholders could exceed the gains to the targets and \( b < -1^4 \).

D. The Hubris Hypothesis

The winners' curse arises in a common value auction (the asset has the same value to all bidders), because the highest bidder has the highest positive valuation error and therefore wins the auction but does "not like the prize" (Bazerman and Samuelson, 1983). The conditions necessary for the winners' curse to come into play are present for mergers that fit the MCCH. There is a gain to be made from acquiring company T, but bidders are uncertain about the size
of this gain. The highest bidder bids more than the actual gain, and its shareholders suffer a loss. Of course, rational individuals should not enter into contests in which they lose even when they "win." Thus, the need to posit managerial hubris (Roll, 1986). Managers know about the winners’ curse, and know that other acquirers have on average lost money, but have the hubris to believe that they are better than other managers in spotting attractive merger opportunities.

Once one allows for the possibility of managerial hubris, one must recognize that it could play a role in all types of acquisitions. Synergies of the type assumed under the SH are present in a merger. These amount to 100, but out of hubris the acquirers' managers believe that they can generate synergies of 150. They pay a premium to the target firm's shareholders of 75 (50 percent of expectations), and wind up gaining 25 instead of the 50, that they would have earned in the absence of hubris. In the case of a merger that produces no gains, the hubris hypothesis leads to essentially the same prediction as the MDH, the difference comes in the actually held beliefs, which are unobservable. Every dollar of premium paid produces a dollar loss to the acquirer's shareholders.

Thus, the HH is additive to the other three hypotheses, that is hubris is not a motive for mergers, but rather a potential factor affecting the size of the bid in a merger. Let us define $H$ as the additional amount paid for the target firm due to hubris, and $P'$ the observed premium in the presence of hubris. Intuitively one expects that this excess payment $H$ will be greater, when the observed premium is large, and will vary with the size of the target firm.

$$H = cV_T + dP'$$

(2)

If $c = 0$, and $d > 0$, then hubris leads to overpayments for the targets that are proportional to the observed premia; $c > 0$ and $d = 0$ implies, less plausibly, a constant overpayment for the target independent of the actual premium observed.

Hubris represents a kind of overoptimism or irrationality on the part of the managers of
the acquiring firm. It is possible that this overoptimism is relatively greater for smaller acquisitions than for large ones, or expressed differently, that managers use more sober judgment when undertaking a large acquisition. To allow for this possibility we shall not constrain the sign on the coefficient on the target firm's size in (2). Thus, we assume that \( d \geq 0 \), but that \( e \) can take on any sign.\(^5\)

By definition

\[
P' = P + H \tag{3a}
\]

\[
P' = G - H \tag{3b}
\]

where \( P \) is the premium predicted by one of the other three hypotheses in the absence of hubris.

Using (2) to replace \( H \) in (3a) and (3b) and substituting into (1) yields

\[
G' = eV_T + fP' + \mu
\tag{4}
\]

where \( e = -c - a - bc \), and \( f = b - d - bd \).

---

**E. Discussion**

**Matrix 1**

Hypotheses About Acquirers' Gains (\( G' \))/Premia (\( P' \)) Relationships

\[
G' = eV_T + fP' + \mu
\]

\[
\epsilon = -c + a - bc, \text{ and } f = b - d - bd
\]

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Prediction without HH ((\epsilon = 0, d = 0))</th>
<th>Prediction with HH ((\epsilon \geq 0, d \geq 0))</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCCH ((a = 0, b = 0))</td>
<td>(\epsilon = 0, f = 0)</td>
<td>(\epsilon \geq 0, f &lt; 0)</td>
</tr>
<tr>
<td>SH ((a = 0, b = 1))</td>
<td>(\epsilon = 0, f = 1)</td>
<td>(\epsilon \geq 0, f &lt; 1)</td>
</tr>
<tr>
<td>MDH ((a = 0, b = -1))</td>
<td>(\epsilon = 0, f = -1)</td>
<td>(\epsilon = 0, f = -1)</td>
</tr>
</tbody>
</table>
Matrix 1 summarizes the predictions of the first three hypotheses with and without the addition of managerial hubris. When hubris is absent, \( c = d = 0 \), and \( e = a \), and \( f = b \). Each hypothesis is presented in its strongest form to facilitate differentiation and testing. (As noted above, a more general formulation of the synergy hypothesis would be \( b > 0 \) and thus \( f > 0 \) in the absence of hubris.) Note that the predictions of the MDH are the same, with and without the addition of hubris, \( e = 0 \), and \( f = -1 \). Both hypotheses in their strongest forms imply no efficiencies from the mergers. Without knowledge of what the acquirers' managers were thinking at the time of the acquisition -- did they know that their shareholders would suffer but went ahead anyway -- it is difficult to test the MDH against the HH (Mueller, 1989). We make a couple of efforts in this direction, however, below.

If managers maximize growth as the MDH assumes, this in itself does not rule out the possibility that some mergers generate synergies. If synergistic gains or market power increases are possible when \( A \) acquires \( T \), but not when it acquires \( S \), we would expect the managers of \( A \) to acquire \( T \) rather than \( S \) even if their goal is growth, since this acquisition would increase both \( A \)'s size and its profitability. Increased profitability would reduce the probability that \( A \) itself was taken over by another firm, and give it funds to pursue still more growth. The MDH can explain why some mergers occur even when no net wealth gains are possible, but it does not rule out the possibility that such gains occur in some mergers. We shall, however, test the MDH in its strong form.

**F. Contested versus Uncontested Mergers**

Contested acquisitions involve hostile takeover bids where the target rejects the advances of the bidder, including those with white knight bidders. The most obvious reason why a management would reject a bid for its company that promises an immediate large capital gain...
for its shareholders is that the managers fear that they will be removed from their posts following the takeover. The MCCH seems to be particularly likely to be valid for these types of mergers. We thus put forward the subhypothesis:

**MCCH.1** The coefficients on the target's market value and the premium are both zero for contested mergers ($e = 0, f = 0$).

Uncontested mergers suggest a friendlier relationship between the managers of the two firms, and thus seem less likely to characterize mergers falling under the MCCH. If synergistic gains are expected from the merger, the managers of the target firm may be needed to realize these gains. Thus, we predict such gains to be more likely for uncontested mergers:

**SH.1** The coefficient on the target's market value is zero, and the coefficient on the premium is one for uncontested mergers ($e = 0, f = 1$).

If the only purpose for merging is to achieve growth, one might expect that the bidder's managers would avoid the hassle of acquiring a company whose management contests the takeover. Thus, one can posit that the MDH is more likely to explain uncontested takeovers.

**MDH.1** The coefficient on the target's market value is zero, and the coefficient on the premium is minus one for uncontested mergers ($e = 0, f = -1$).

### G. Multiple Bidders

The MCCH sees the gains from the merger as lying with the target firm, specifically in the replacement of its management. Once one firm has identified these potential gains, other firms choose to join the bidding process (Grossman and Hart, 1980). This conjecture leads to

**MCCH.2** The coefficients on the target's market value and the premium are both zero for multiple bid mergers ($e = 0, f = 0$).

The hubris hypothesis relies on the winner's curse to generate the prediction that bidders
in mergers suffer losses. Although one can argue that the hypothesis holds even for single-bid mergers, because the bidders make offers to preclude other bidders, it seems more likely that the winning firm in the auction overbids when it is not the sole bidder. Since multiple bids are more likely for mergers that fit the MCCH than for those involving firm specific synergies, we have \( MCCH/HH_1 \) For multiple bid mergers in which overbidding occurs randomly on all bids, \( (e < 0, \text{ and } f < 0) \).

The synergy hypothesis implies that the gains from the merger arise due to the particular characteristics of the two merging firms, and thus is consistent with there being only one bidder, yielding

\[ SH_2 \] For single bidder mergers \( (e = 0, f = 1) \).

Adding hubris gives us

\[ SH/HH_1 \] For single bidder mergers \( (e < 0, f < 1) \).

\section*{H. Related versus Unrelated Merging Firms}

Merging partners were categorized as related or unrelated depending on commonality of their production activities.\(^7\) The realization of economies of scale or market power from a higher market share are probably the easiest \textit{synergies} to imagine from a merger, and thus we propose

\[ SH_3 \] For related mergers \( (e = 0, f = 1) \), and

\[ SH/HH_2 \] For related mergers \( (e < 0, f < 1) \).

The hypothesis that managers use their discretion to pursue growth was first linked to growth through mergers to explain the conglomerate mergers of the 1960s, for which more traditional hypotheses about mergers seemed inadequate (Mueller, 1969) and several studies have reported losses to acquirers’ shareholders when diversification mergers are announced (Sicherman and Pettway, 1987; Morck, Shleifer and Vishney, 1990; Kaplan and Weisbach,
1992). Although the managerial discretion hypothesis does not posit that all mergers for growth must be between unrelated companies, because synergies seem less likely for unrelated mergers, one might expect empirebuilding to be more often the motive for unrelated mergers. Positing the strong form of this hypothesis, we obtain

**MDH.2** For unrelated mergers, \( (e = 0, f = -1) \).

### I. Means of Payment

A manager's discretion to pursue growth is likely to be greater when this growth is financed out of internal cash flows than when the financing decisions must be subjected to the scrutiny and potential discipline of external capital markets (Mueller, 1969, 1972; Jensen, 1986; Harford, 1999). Thus, mergers that reflect the exercise of managerial discretion are more likely to be financed entirely out of cash. We test this hypothesis by dividing mergers according to whether they were partially or entirely financed through stock and bond issues (Noncash), or entirely out of cash (Cash).

**MDH.3** For cash mergers, \( (e = 0, f = -1) \).

Given the potential for wealth gains posited under both the MCCH and the SH, one assumes that managers will not have difficulty financing these mergers out of new debt and equity issues. This assumption leads to

**MCCH.3** For noncash mergers, \( (e = 0, f = 0) \).

**SH.4** For noncash mergers, \( (e = 0, f = 1) \).

Adding hubris yields

**MCCH/HH.2** For noncash mergers, \( (e \geq 0, f < 0) \).

**SH/HH.3** For noncash mergers, \( (e \geq 0, f < 1) \).
J. Other Variables and Hypotheses

We conjectured above that in mergers that fit the synergy hypothesis, the gross gains are shared equally by the merging companies (f = 1). Alternatively one might hypothesize that the division of these gains depends on the relative bargaining strengths of the two merging firms, and that these in turn depend on their relative sizes. This can be tested by making the coefficient on the premium a function of the relative sizes of the two merging firms. Most simply we obtain

\[ e = 0, \quad f = f' + g V_T/V_B, \quad f' > 0, \quad g < 0, \text{ and} \]

where \( V_T \) and \( V_B \) are the prebid market values of the target and bidding companies.

MDH.2 conjectures that managerial motives are more likely to be present in unrelated mergers. Diversification is largely a function of past mergers, and thus highly diversified firms are more likely to be led by growth oriented managers. We shall test this hypothesis in the following way:

\[ e = 0, \quad f = f' + g/DIV, \quad f' < 0, \quad g > 0 \]

where \( DIV \) is the number of 4-digit SIC industries in which the bidder operates after the acquisition.

We turn next to a discussion of the data and methodology.

DATA METHODOLOGY

Sample

The data sources used to develop the acquisition sample were the Merger and Acquisition Journal database, the Securities Data Corporation database, the CRSP (Center for Research in Security Prices) tapes and the Wall Street Journal Index. The preliminary sample included all
acquisitions of NYSE or AMEX targets that were made by NYSE or AMEX acquirers during the period 1978-1990.

To increase the power of our statistical tests, target firms were required to be at least 10% the size of the bidder in terms of either assets or market value equity. In addition, bidding firms could not have previously owned more than 5% of the target and the acquisition must have been accomplished in one transaction. Regulated firms (i.e., banks, railroads and utilities) were identified and excluded as were acquisitions involving trusts and limited partnerships. The final sample included 168 acquisitions.

**Acquiring Firm Performance**

To measure the sensitivity of the tests to the length of the event window, gains to the acquiring firm are measured using five windows following the acquisition: 1) announcement effect measured from day -5 through day +5 2) announcement effect measured from day -5 through day T, the day the target firm ceases trading, 3) month zero through month 12, 4) month zero through month 24, and 5) month zero through month 36.

Gains were measured in two different ways: 1) market-adjusted returns (raw shareholder returns adjusted for the overall market returns (S&P 500) for the same period, and 2) market-model returns (raw returns adjusted for the normal returns that would be expected given the security's past performance and sensitivity to market changes). For each return generation method returns for the short-term event windows 1 and 2 were calculated using daily data, while returns for the longer-term event windows 3, 4, and 5 were calculated using monthly data (see the Data Appendix). For all methods, day zero is defined as the first day the market could respond to the news of an acquisition announcement. All gains are measured in absolute dollars calculated relative to the acquirer's market value at $t = -5$. 
**Acquisition Premium**

The CRSP data base is the source of stock price data for measuring acquisition premiums. The *Wall Street Journal Index* was used to identify the announcement date of a proposed takeover. The premium is measured as the dollar change in the value of the target firm from five days prior to the day that the first takeover bid is announced to five days after the announcement of the eventually successful bid. All premia are market adjusted for the S&P 500 return over the measurement period.

**RESULTS AND DISCUSSION**

*A. Summary Statistics*

Table 1 reports descriptive statistics of the variables used in this study. Part A presents the means, standard deviations, minimum and maximum values for the gains to bidding firm shareholders measured relative to the returns predicted by the CAPM regressions, and those adjusted for movements in the S&P index. Both measures show similar patterns. On average bidders experience substantial losses at the time the acquisitions are announced and up through the date that the acquisition is completed (T). The mean returns to bidders rise as further time elapses becoming positive for the market adjusted measure after one year, for the market model returns only after 3 years. The variances in gains to bidding firms are large and grow with time, as does the range of returns. All standard deviations are at least four times greater than their respective means. The third line in Part A gives statistics for the premia in millions of dollars paid for the targets over their price five trading days prior to the announcement of the takeover. The mean premium is positive, but with a standard deviation more than twice its value. The mean premia values exceed even the most negative of the mean gains to bidding firms, so the mergers are on average wealth creating for whichever measure of gains and window one chooses.
This conclusion is illustrated in the last two lines of Part A, where the summary statistics are presented for the sum of the gain for each merger and its respective premium. Although the means of these sums are positive for all five windows and both measures of gains, the standard deviations are so large that none of the net wealth changes is significantly different from zero.

Our interest in this paper is on relationships between gains and premia for different types of takeovers. In Part B of Table 1 market adjusted gains are presented for the different subsamples of mergers, and the two windows \( (t = -5, T) \) and \( (m = 0, m = 24) \), which are the focal points of our subsequent analysis. Once again the standard deviations are much larger than the mean gains, and so differences from zero and from one another are not statistically significant. Nevertheless, the differences are large in absolute values and suggestive. The mean loss to bidding firms shareholders up through the date of the merger is $382 million for contested takeovers, more than three times the sample mean, and six times the mean loss for bidder shareholders in uncontested mergers.

Losses to shareholders are greater in multiple bid takeovers than when there is only one bidder. Moreover, the multiple bidders' average loss increases by more than 150 percent after 24 months, while the single bidders' loss turns into an average gain over this time interval. Unlike for the full sample, and the other subsamples, the mean loss to bidder shareholders in multiple bid takeovers, -$502 million, exceeds the mean premia gains to the targets in these mergers, $394 million.

Mean losses to bidding firms also increase with time for mergers not fully financed with cash (noncash), and between companies in unrelated industries. Mean losses after 24 months to bidders in noncash mergers ($294 million) also exceed mean target premia gains ($230 million) in these mergers.
Part C presents a few additional statistics. The average acquiring firms has a market value of $2.44 billion, the average target has a value of $793 million. The mean premium is 33.8 percent of the value of the target firm with a range from -7 to 107 percent. The average firm operated in roughly nine 4-digit SIC industries.

[Insert Table 1 About Here]

**B. Regression Results**

1. **Full Sample**

   Preliminary estimates of equation (4) revealed heteroscedasticity. We thus work with a deflated version of (4), for which the White-test revealed no heteroscedasticity.

   \[
   G'/V_T = e + fP'/V_T + \mu'
   \]  \hspace{1cm} (5)

   where \( \mu' = \mu/V_T \).

   Table 2 presents the results for eq. (5) with gains to acquiring firm shareholders measured relative to the gains recorded using the market model of the CAPM, and market adjusted gains using changes in the Standard and Poor's portfolio. Gains to acquiring firm shareholders are measured over 5 windows, while gains to target firm shareholders (\( P \)) are measured from \( t = -5 \) to \( t^* = +5 \), where \( t^* \) is the day of the last bid of the successful bidder.

   [Insert Table 2 About Here]

   Perhaps, the first thing that stands out in Table 2 is that there is very little difference between the estimates for (5) that one gets using the market model as a benchmark, and the S&P (market) adjusted estimates. The adjusted \( R^2 \)s are slightly higher for four of the five windows, when the market adjusted returns are used. This modest superiority of the market adjusted returns' estimates persists in the other tests of the hypotheses, and so we present only these estimates in the next two
All coefficients on $P'/V_T$ are negative and significant at a 10 percent or better level. The four estimates for the two shortest windows on gains fall between 0 and -1, but all six estimates for the longer windows are less than -1. Thus, although the mean gains to bidders rose as the length of time from the announcement increased (Table 1), the predicted loss to a bidder per dollar premium bid also increased with time. The relationship between bidder gains and premia is not revealed by the simple averages in Table 1.

The consistent pattern of negative coefficients on $P'/V_T$ offers no support for the synergy hypothesis. Eight of the ten $e$ intercepts are insignificantly different from zero, and in six of these regressions, the $f$s are both significantly less than zero and insignificantly different from minus one, as predicted by both the MDH and the HH.

The two $e$-intercepts that are significantly different from zero are both positive, on the other hand, as are six of the remaining eight insignificant intercepts. Thus, the results in Table 2 can also be interpreted as consistent with the MCCH when it is combined with the hubris hypothesis, and $c < 0$ in equation (2). Positive intercepts and negative coefficients on $P'/V_T$ might also arise under the MDH, if one assumes that some mergers produce gains, but that empirebuilding managers do not limit themselves to only these mergers. Regardless of whether one uses the MDH or the HH to account for the negative slopes on the premium term, the results in Table 2 clearly imply that bidding firm managers overpaid for the firms that they acquired in the majority of mergers in our sample. To see this, consider the market adjusted returns for the window $m = 0, 12$. The intercept is significant at the 10 percent level, and implies that the acquirer would have experienced a mean gain of 28 percent of the target's market value, if it could have purchased the target without paying any
premium over its market price five days before the first bid for the target. The coefficient on $P'/V_T$ implies a predicted gain to acquirers of zero, however, once the premium reaches 22.6 percent of the target's market value, substantially less than the mean and median premia in our sample of 33.8 and 27.9 percent. Thus, even with a positive intercept this equation implies that a majority of bidders suffered losses because they overbid for the targets. Of course, this statement holds for all mergers with $P' > 0$, when the intercept is treated as zero because of its statistical insignificance.\(^\text{12}\)

Although the slope of the line between $G'/V_T$ and $P'/V_T$ becomes more negative as the length of the window of gains expands, the standard errors of the estimates also expand, so that the $t$-statistics on $P'/V_T$'s coefficients actually decline. This pattern repeats with only a couple of exceptions in the further tests. We therefore confine our attention from now on to the estimates from the second and fourth longest windows.

The results reported in Table 2 seem most consistent with some combination of the MCCH, MDH and HH. We have proposed refinements of these hypotheses that should apply to various subsamples of mergers. We discuss first the tests of the different versions of the MCCH.

2. The Market for Corporate Control Hypothesis

We hypothesized that the MCCH is more likely to hold for mergers that are contested, or had multiple bidders, or are not fully financed out of cash (Noncash). Table 3 presents the results for these subsets of mergers.

[Insert Table 3 About Here]

Only the results for contested mergers using the long window ($m = 0, 24$), and for noncash
mergers using the short window \((t = -5, T)\) are consistent with the MCCH in its pure form, i.e., \(e = f = 0\). Both the intercept and the coefficient on \(P'/V_t\) are highly insignificant in the contested merger equation, both are negative but insignificantly different from zero in the noncash subsample's equation. The significantly negative intercept for the window \((t = -5, T)\) in the contested merger subsample is not consistent with the MCCH, however, nor are the negative and significant coefficients on \(P'/V_t\) in both regressions for multiple bidders, and for noncash mergers when the longer window is used. Thus, our results reject the MCCH in its pure form in four of the six regressions. Some additional support for the MCCH is provided in Table 3, when it is combined with the HH (see below).

3. The Synergy Hypothesis

    None of the 16 coefficients on \(P'/V_t\) in Table 3 is positive and significant. Thus, the synergy hypothesis is rejected both for the full sample, and for every subsample of mergers. The sole positive slope coefficient in the table appears in the regression for contested mergers with a short window \((t = -5, T)\), \(f = .38\). We expected synergy to be more likely in uncontested mergers, so that this finding does not seem to offer much support for the SH either. The negative and significant intercept in the equation is also inconsistent with the SH.

    Perhaps, the most plausible of the five proposed synergy hypotheses predicts synergies in mergers between firms having several branches of business in common. To test this hypothesis we defined relatedness at the 2-, 3-, and 4-digit levels. All three gave very similar results, so we present only those based on the 3-digit industry definition, because it divides the sample most evenly. Coefficients on \(P'/V_t\) are higher for the related subsample, but both nonetheless are negative,
although not significantly so. All coefficients in the other 6 subsamples for which the SH might hold (uncontested, single bidder, noncash) are also negative, 5 significantly so at the 10 percent level or better. No subsample contains mergers generating positive aggregate gains to both groups of shareholders that are split in some proportion between them.

4. The Managerial Discretion Hypothesis

The MDH predicts a zero intercept, and a coefficient of -1 on $P'/V_T$ for mergers that were not contested, were unrelated, and were fully financed by cash. All six intercepts are insignificantly different from zero, and all six coefficients on $P'/V_T$ are negative for these subsamples. Five of these six coefficients are insignificantly different from -1. Thus, our results are quite consistent with those predicted by the MDH in its pure form, i.e. when we assume that there are no gains whatsoever from mergers, and all are motivated purely for growth. The only results from these six equations that violate the MDH-prediction that $f = -1$ are for uncontested mergers over the longer window, where the coefficient on $P'/V_T$ is significantly less than minus one. Over the longer window the market projects more than a two dollar loss to acquiring firm shareholders for every dollar of premium bid. Obviously, these mergers are not only consistent with the hypothesis of managerial empirebuilding, but it appears that the mergers do more than merely transfer value from bidder to target. As time elapses the market either begins to expect efficiency declines as a result of the mergers, or downgrades its evaluation of the bidding firm's managements. Large negative coefficients on $P'/V_T$ are observed in several of the other regressions in Table 3. Although none of the other coefficients is significantly less than -1, the general pattern of results in Tables 2 and 3 suggests that the market's evaluation of mergers grows more negative over time, and that some sorts of mergers not only do
not create additional wealth, but actually destroy it.

5. The Hubris Hypothesis

The HH in its pure form assumes that no value is created by a merger and thus makes the same predictions as the MDH. It can also be interpreted as being additive to the other hypotheses. The overbidding predicted by the HH seems most likely in the subsample with multiple bidders. Both of the intercepts for this subsample are insignificantly different from zero, both coefficients on $P'/V_T$ are negative and insignificantly different from -1. Thus, the results for both windows in the multiple bidders' subsample support the pure form of the HH.

The intercept for the longer window in the multiple bidders' subsample, although statistically insignificant, is large in absolute value and implies a mean gain to acquirers, if the premium were zero, of 48 percent. Interpreting this intercept as positive despite its statistical insignificance makes the results for this subsample consistent with a combination of MCCH and HH (MCCH/HH.1), when $c < 0$ in eq. (2).

MCCH/HH.2 applies to noncash mergers. Neither window's results is consistent with this hypothesis assuming $c < 0$, because neither intercept is significantly positive. The results for the longer window in the noncash subsample are consistent, however, with the pure form of the HH, as the intercept is essentially zero and the coefficient on $P'/V_T$ is both significantly less than zero and insignificantly different from -1.

With no positive and significant intercepts and no positive and significant coefficients on $P'/V_T$, it is difficult to find much support in Table 3 for any of the SH hypotheses in combination with the HH, unless one is willing to posit a tremendous amount of hubris. A positive intercept and
a negative coefficient on $P'/V_T$ could arise through a combination of synergy and hubris, if the bidding firm not only did not receive 50 percent of the synergy gains, as we have assumed under the pure SH, but suffered a loss by bidding a premium more than the total synergies generated by the merger.

The HH and MDH make similar predictions and are difficult to separate empirically. In a world in which the MCCH, SH, and MDH are all valid for some mergers, any sample might contain a mixture of each. Although mergers between firms in related industries seem more likely to produce synergies than mergers between firms in diverse industries, some managers who undertake mergers for empirebuilding reasons may acquire firms in related industries to reduce the inefficiencies that mergers often bring. Similarly, managerial hubris might lead to overly high prices in any merger. The general pattern of results in Table 3 -- intercepts that are insignificantly different from zero, coefficients on $P'/V_T$ that are both significantly less than zero and insignificantly different from -1 -- supports both the managerial discretion and hubris hypotheses.

6. Other Tests

Table 4 presents regressions that include interaction terms. SH.5 posits a division of the gain between bidder and target that depends on the relative sizes of the merging firms. The synergy hypothesis is the only one of the four tested for which we have found absolutely no support so far, however. Nevertheless, we estimated the basic model with an interaction term between $P'/V_T$ and $V_T/V_B$ as predicted by SH.5. The first two entries in Table 4 present the results for this test. The coefficients on the interaction terms are positive in both regressions and, as so often has been the case, larger in absolute value but with a lower $t$-statistic with the longer window. The coefficients
on P'/VT are negative in both instances and larger in absolute value than those on the interaction terms. Thus, the two equations both predict losses to the acquiring firm's shareholders that are proportional to the size of the premia paid to the acquired firm's shareholders. Contrary to what the SH predicts, however, the losses to the acquiring firm's shareholders are proportionally larger the smaller the target's size is relative to the size of the bidder. For a target firm of the same size as the bidder, the predicted loss to the bidder's shareholders from the shorter window regression is only 12 percent of the premium received by the target's shareholders. If the target is only one-tenth the size of the bidder, the predicted loss to the bidder is 88 percent of the premium.

Given the lack of support for the SH, this inconsistency is neither surprising nor very troubling. Indeed, as with most of our other findings this result is consistent with both the MDH and HH. It suggests that a management that is prone to bid more than the target firm is worth is more likely to constrain the amount by which it overbids, if the target firm is relatively large. This result is also consistent with the positive intercepts observed in most of the regressions reported in Tables 2 and 3, which in turn imply that \( \xi < 0 \) in eq. (2).

The second pair of regressions in Table 4 includes an interaction term between 1/DIV and P'/VT. Its coefficient is positive in both regressions but significant (10 percent level) for only the shorter window. These results for the short window are consistent with the MDH, and provide the first bit of support for the SH. When the acquiring company operates in a single 4-digit industry after the merger (DIV = 1), the merger must be between undiversified firms (both operated in a single industry), and both must have operated in the same industry. The results for the short window and the interaction term with 1/DIV imply that when DIV = 1, the coefficient on P'/VT is .90, with an intercept of 0.02. The bidder receives close to the $1 predicted by the strong form of the SH for
every $1 in premium paid to the target's shareholders. Our definition of synergy includes both market power increases and cost reductions available only to the two merging firms. Such synergies seem most likely to arise in horizontal mergers, this implication supports the SH. The gains to the bidders relative to those to the target fall to zero, however, if the bidder operates in two industries after the merger. For higher orders of diversification, the predicted relationship between $G'/V_T$ and $P'/V_T$ is negative. In only five mergers in our sample were the two companies both undiversified and operating in the same industry. The result for this regression can be interpreted as implying, therefore, that in a couple of strictly horizontal mergers in the sample, there is evidence of synergies from either a market power increase or cost reduction, but the bulk of the mergers do not appear to have generated such synergies.13

We estimated the same equation for all of our subsamples. In general the results were similar in that the interaction term with $1/DIV$ was positive but either insignificant or weakly significant. The most important exception occurred for noncash acquisitions. As occurred with this subsample for the basic model, both coefficients were insignificant for the shorter window, but became much larger and highly significant for the longer window. The coefficient on the $1/DIV$ interaction is more than double the absolute value of the coefficient on $P'/V_T$. Thus, when $DIV = 1$, bidders are predicted to earn $5.57$ for every $1 premium to the target's shareholders. The proportional gains for bidders again fall to near zero for a $DIV$ of only 2, and become negative and quite large as the degree of diversification after the merger increases. This increasing loss to bidders as their post-merger diversification increases is highly supportive of the MDH, assuming that empirebuilding often takes the form of diversification mergers.14

We also tried dividing the sample according to tender offers versus nontender offers, but this
split did not produce any new insights. Nor did the addition of a time trend prove significant.

C. Discussion

The results for the noncash subsamples found in Tables 3 and 4 differ from most of the other results reported in Tables 2, 3, and 4 in so far as the key coefficients dramatically increase in absolute size and level of statistical significance as the length of the window over which the gains to bidder are measured increases. Even though the absolute size of the coefficients increases as the window lengthens, a fall in significance, as occurs in most of the regressions, is not too surprising. We observed in Table 1 an increase in the variance in returns to bidders with the length of the window used to measure returns. Over time other events add white noise to the measures of abnormal returns from the mergers. Why the reverse pattern with noncash mergers? We close the discussion of our results with a possible explanation.15

Suppose that a firm's management announces its intention to acquire another firm through an exchange of common shares, under the assumption that the price of its shares will not change. If the market reacts negatively, the cost of the acquisition becomes higher than anticipated. Should other bidders for the target appear or the target's management contests the bid, the bidding firm's managers may choose not to go through with the merger. Thus, for completed mergers that are financed at least in part through stock issues, one can expect a bias against observing declines in the bidders' share prices, over short windows around the announcement. If mergers tend to result in wealth losses to bidders' shareholders, then these losses will appear in mergers financed through stock issues only much later, when the market has had time to reevaluate its first, apparently erroneous evaluation of the merger.
This "agency model" interpretation of our results is consistent with the recent findings of Jung, Kim, and Stulz (1996) regarding the stock market's negative reactions to equity issues. In our tests, however, the equity issues are all for a single purpose, to finance a large acquisition. The fact that the acquirer chooses to undertake a merger rather than expand internally suggests that it is lacking in other valuable investment opportunities. The market's eventual reaction to the merger indicates that it too was not a particularly attractive opportunity.

The kind of systematic reevaluation of noncash mergers that we observe is, of course, inconsistent with the assumption of capital market efficiency. But a strong form of capital market efficiency in which the market unbiasedly evaluates the impact of a merger on the acquiring firm in a short window around its announcement does not seem consistent with much that we know about mergers. Mergers come in waves and are positively correlated with stock market upswings. But the majority of mergers occur when the stock market is rising, and investors are most optimistic about the future. Systematic overoptimism with respect to some forms of information reaching the market, like that pertaining to the prospects of a takeover, is a distinct possibility in a rising stock market. Financing mergers through stock issues is likely to be particularly attractive in rising stock markets, if the market's optimism leads to higher (lower) than warranted increases (decreases) in the bidding firms' share prices when the mergers are announced. The dramatic downward reevaluations of mergers financed at least in part through equity reported here indicates a significant overoptimism by the market at the time that these mergers were announced.

The findings of Agrawal, Jaffe, and Mandelker (1992) are consistent with this interpretation. Like many studies before them, they find that the returns to acquiring firm shareholders decline steadily over sustained time intervals for mergers taking place in the 1950s, 1960s, and 1980s.
They do not find such a pattern, however, for mergers during the 1970s. Instead, they estimate an increase in returns following the mergers, suggesting perhaps overpessimism on the part of shareholders during the 1970s, an interpretation that seems consistent with the stock market's performance during that decade.

We thus can recognize two distinct patterns with respect to the market's ability to evaluate the effects of mergers in our results. For several categories of mergers (e.g., uncontested, cash financed) the market's immediate evaluation is that the bidders will lose roughly a dollar for each dollar of premium that they pay. As time elapses, the projected dollar losses to bidder's shareholders per dollar of premium paid increases, but the dispersion of the market's projections also increases, so that the significance level of the estimates falls.

For mergers financed at least in part from equity issues, there is a bias against observing significant negative returns to acquiring firm shareholders at the time of announcement, because managers of the acquiring firm are less likely to proceed with mergers that induce such a negative reaction. As time elapses, the market reevaluates the prospects of the acquiring firm downwards, and after two years projects a $2.48 loss to the bidder for every $1 in premium paid to the target (after 3 years the loss is $3).

CONCLUSIONS

This paper introduces a methodology for testing four hypotheses about the causes of takeovers. The tests link each hypothesis to predictions about the relationship between the dollar gains to the bidders' shareholders, and both the size of and the aggregate premium going to the targets.
The prediction that mergers generate synergistic gains that are shared between the two merging firms was rejected for the full sample of mergers and for every subsample that we identified. The only bit of support found for the SH was for mergers between two firms operating in a single 4-digit industry. The prediction of the market for corporate control hypothesis, that any gains to the bidder's shareholders are independent of the premium paid to the target, was rejected in four of the six cases where it seemed most plausible. Somewhat stronger support for the MCCH could be discerned, when it was assumed to hold in conjunction with the hubris hypothesis.

By far the strongest support was found for the managerial discretion and/or hubris hypotheses. If the intercepts in the various equations are assumed to equal zero on the basis of their consistently low \( t \) values, then our results offer considerable support for the pure forms of the MDH and HH, as the coefficients on \( P'/V_1 \) are consistently negative and insignificantly different from the \(-1\) predicted by the pure form of each hypothesis. If the dominance of positive intercepts in the regression results is assumed to imply that the true intercept is positive, then our results suggest that many types of mergers produce gains of some sort, but that for the average merger the acquiring firms' shareholders lose, because the premium offered for the target is more than the potential gains from acquiring it. Whether the bidders' losses are due to the winner's curse, and the hubris of their managers, or occur because the managers pay more than the target is worth to achieve corporate growth is difficult to discern. Only two tests that we ran differentiated between the two hypotheses.

The idea that diversification is an essential component of a growth strategy has been central to the managerial discretion literature from the start (Marris, 1964; Mueller, 1969, 1972, 1987; Lang and Stulz, 1994). Thus, the stronger negative relationship between bidders' losses and premia to the targets for unrelated mergers than found in the related subsample is in the spirit of the MDH. In
contrast, it is not immediately apparent why managerial hubris should manifest itself more strongly in unrelated mergers than in related mergers. Similarly, the increase in the magnitude of bidders' losses relative to the size of the premia as the post-merger diversification of the bidder increases is clearly compatible with the MDH. For this result to support the HH, one would need to argue that managers of diversified firms are filled with more hubris than managers of undiversified firms.

Our methodology has sought to test the four hypotheses by isolating subsamples in which a particular hypothesis is most likely to be supported. We have confined our tests to binary divisions of the full sample, in part to limit the number of regressions and results we present, in part because the basic conclusions we have reached would not change with finer breakdowns. If we take it for granted that some mergers do have the synergies posited in the SH, then our findings simply indicate that they do not exist in our full sample nor in any of the subsamples in great enough numbers to be revealed by our tests. If we used multiple criteria to define our subsamples, we possibly could isolate a subsample in which the SH was supported, but it would of necessity be smaller than any of the subsamples that were defined by the same criteria. The basic conclusion would still hold, therefore, -- there are not a lot of mergers in the full sample that match the SH. All of the other three hypotheses receive enough support to suggest that they are consistent with some of the mergers in our sample.

Much of the existing literature on mergers has focused on the temporally concentrated and large percentage gains to the targets' shareholders, and has concluded that the mergers generate net increases in wealth and thus must be motivated to obtain some form of broadly defined synergistic gain. In this paper we have emphasized the importance of examining the absolute dollar gains or losses to the bidding companies' shareholders along with the dollar gains to the target, and to extend
the window of observation of the bidder over a longer period. Our tests have provided some support for one form of wealth creating hypothesis -- the market for corporate control hypothesis -- but have also revealed considerable support for two hypotheses that do not presume that wealth is created by mergers -- the managerial discretion and hubris hypotheses.

In fact, several of our findings actually imply that mergers destroy more of the value of the bidding firms than is paid as premium to the target. Six of the eight coefficients on premia for the two-year window reported in Table 3 are less than -1. Thus, after two years the market appears to believe that mergers in these six subsamples destroyed assets on net. Such asset destruction has been documented in many case studies of mergers, and is often vividly revealed at the time previously acquired companies are spun-off.20

Although many of the coefficients on the key variable in our analysis, the premium, were significant, a possible criticism of our results would be that the overall fits to the data as measured by $R^2$ were low. These low $R^2$s were presaged by the large variances in gains reported in Table 1. Anyone wishing to explain the dispersion of gains to acquiring firm shareholders has a lot of explaining to do. We are not surprised, therefore, to find other studies employing several more explanatory variables than we have with $R^2$s no higher than ours are (You, Caves, Smith, and Henry, 1986; Travlos, 1987).

Indeed, we interpret the high overall variability in the gains from mergers, and our and others' difficulty in predicting these gains as further support for the managerial discretion and hubris hypotheses. How many people would play in a game in which their expected winnings were a -$50, the standard deviation around this expectation was nearly $1900, and they might lose as much as $10,000, although they could also win as much as $13,000? One assumes not many. These are the
statistics for the acquiring firms in our sample two years after a merger, however, except that they are measured in millions. Why do the managers of these firms undertake such gambles? One answer is hubris. They believe that they can see value in other firms that no one else can see. Thus, the averages do not apply to them. A second answer is managerial discretion. They are gambling with other people's money.
Endnotes


3. We differ here from Berkovitch and Narayanan (1993) who combine both types of hypotheses in their definition of synergies.

4. A b < -1 might also be observed if the stock market interprets announcements of mergers with poor prospects as signals regarding the talents of the managements who propose such mergers, or the propensity for these managers to pursue value destroying acquisitions.

5. If d were equal to zero, then H > 0 would imply that c ≥ 0.

6. Berkovitch and Narayanan (1993) do differentiate between "the agency motive" for mergers, what we call the MDH, and the hubris hypothesis by arguing that when the agency motive leads to mergers, the mergers actually reduce the efficiency of the merging companies, where this is not the case under the hubris hypothesis. This interpretation does not follow from the original formulations of the managerial discretion-growth hypothesis by Marris (1964) and Mueller (1969), nor from Jensen's (1986) reformulation. An empire building management would not consciously undertake actions that reduce the efficiency of the acquired firms, since this would reduce future cash flows and growth. It might inadvertently undertake such actions, but so too might a management motivated by hubris.

7. The relatedness of the acquisition is measured based on SIC commonality. The data on SIC codes were checked against four sources: Mergers and Acquisitions Journal database, COMPSTAT SIC files, Securities Data Corporation database and Dun and Bradstreet's Million Dollar Directory. A merger was classified as related at the 2-, 3-, or 4-digit levels, if the pair of merging firms had at least one SIC code in common at the respective level of aggregation.

8. For evidence consistent with this hypothesis, see Lang and Stulz (1994).

9. Other work with two additional measures of performance (the raw returns adjusted for the mean of past performance of the security over some time period, and the raw returns) revealed that the conclusions drawn were not sensitive to the choice of measure of gains (Sirower, 1997).

10. This window for calculating premia has been used in several studies, e.g., Bradley, Desai, and Kim (1988); Lang, Stulz, and Walking (1989); Berkovitch and Narayanan (1993); and Smith and Kim (1994). Premia were calculated in the same way as our market adjusted returns to the acquirers were calculated, i.e., as the difference between the returns on the target's shares and the returns on the S&P 500 Index over the same time interval.
11. This heteroscedasticity was confirmed at the one percent level using the White-test (White, 1980).

12. When separate intercepts were estimated for each year, a few were sometimes significant, but their inclusion in the regression did not alter the estimates of the coefficients on $P'/V_T$ materially, nor cause any other modification of our interpretation of the hypotheses. Thus, at the expense of some cosmetic increases in $R^2$s, we do not report the results with the time dummies included.

13. The possibility that some mergers generated market power increases raises the question of whether any of them were challenged by the Department of Justice (DoJ) or Federal Trade Commission (FTC), and what the effects of such challenges were on the subsequent share performance of companies. An examination of the DoJ/FTC annual reports to Congress in compliance with the Hart/Scott/Rodino Act revealed that 15 of the 168 mergers in our sample required some form of divestiture for DoJ/FTC approval. To test for possible effects of these actions, we created a dummy variable with a value of one for the 15 companies, and zero for all others. In none of the models contained in our article did the inclusion of this dummy by itself or as an interaction term with the premium variable result in its having a significant impact on the gains to the acquirers. Given the small number of mergers challenged, this result is perhaps not surprising. If we assume that news of a forced divestiture should have a negative effect on a company’s share price, then these results suggest that the bad news about the mergers created by DoJ/FTC challenges is no worse than other sorts of bad news about the mergers that reaches the market following the mergers’ initial announcements.


15. Jung, Kim, and Stulz, (1996) have linked equity issues to agency problems, and other studies have given explanations for why equity financed mergers are less likely to benefit the acquiring firm's shareholders (Franks, Harris, and Meyer, 1988; Travlos, 1987). Although our findings are broadly consistent with these alternative interpretations, they differ somewhat from the other studies of mergers in that the negative effect on the acquiring firms' shareholders intensifies over time for equity financed mergers.


19. Perhaps, the most favorable subsample for testing the SH contains mergers between firms that were related at the 3-digit level, uncontested, and had a single bidder. Fifty-four mergers satisfied these three constraints. The coefficients on $P'/V_T$ for the five gains windows for this subsample were all negative. Only the coefficient for the gains window $(m=0$ to $m=12)$ was significant, however ($b = -1.29$, $t = 1.76$). Even this subsample supplies no support for the SH, therefore.
20. For recent case studies, see Lys and Vincent (1995) and Kaplan, Mitchell, and Wruck (1997). For evidence of asset destruction based on subsequent spin-offs, see Mueller (1986, pp. 203-06) and Ravenscraft and Scherer (1987, Ch.5).
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Data Appendix: Measures of Acquiring Firm Performance (Gains)

(1) Market-model returns -- An Ordinary Least Squares (OLS) market model is estimated for each security in the sample using 200 daily return observations from day -240 to day -40 and using 46 monthly observations from month -48 to month -2 for the short-term and long-term performance periods, respectively. Using the parameter estimates of the market model, excess returns are estimated for every security for each of the five time periods (the event periods) as follows:

\[ A_{it} = R_{it} - \hat{\alpha}_i - \hat{\beta}_i R_m,t \]

where \( \alpha_i \) and \( \beta_i \) are OLS values from the estimation period, \( R_m,t \) is the return on the CRSP equally weighted market index for day (month) \( t \) and \( R_{i,t} \) is the actual return for security \( i \) on day (month) \( t \). The test statistic for significance of the abnormal return estimates is per Dodd and Warner (1977).

(2) Market-adjusted returns -- returns are calculated for every security for each of the five time periods (the event periods) as follows:

\[ A_{it} = R_{it} - R_m,t \]

The market-adjusted model is essentially the same as the market model where \( \alpha_i = 0 \) and \( \beta_i = 1 \) for all securities. Market-adjusted returns are simply the daily or monthly (as above) post-acquisition return adjusted for the return on the market during the same time period.

Finally, given the daily (monthly) returns that were generated by these two methods, we calculated the dependent variable measure of acquiring firm performance for each of the five time periods as follows:

\[ CAR_{T1,T2} = \sum_{t=T1}^{T2} A_{it} \]

where, \( T1,T2 \) is the interval for each of the five performance periods.
Table 1

Means and Other Statistics of Variables Used in the Analysis (Dollar Values in Millions)

A. Full Sample (n = 168)

<table>
<thead>
<tr>
<th>Window</th>
<th>Gain Measure</th>
<th>t = -5 to t = +5</th>
<th>t = -5 to T</th>
<th>m = 0 to m = 12</th>
<th>m = 0 to m = 24</th>
<th>m = 0 to m = 36</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Min</td>
<td>S.D.</td>
<td>Max</td>
<td>Mean</td>
<td>Min</td>
</tr>
<tr>
<td>Market Model</td>
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<td>-3088</td>
<td>479</td>
<td>2269</td>
<td>-117.6</td>
<td>-8146</td>
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<tr>
<td>Market Adjusted</td>
<td>-111.0</td>
<td>-2790</td>
<td>446</td>
<td>2283</td>
<td>-142.9</td>
<td>-7806</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Window</th>
<th>Premium</th>
<th>t = -5 to t = +5</th>
<th>t = -5 to T</th>
<th>m = 0 to m = 12</th>
<th>m = 0 to m = 24</th>
<th>m = 0 to m = 36</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Min</td>
<td>S.D.</td>
<td>Max</td>
<td>Mean</td>
<td>Min</td>
</tr>
<tr>
<td>Market Model</td>
<td>272.9</td>
<td>-100.7</td>
<td>618.9</td>
<td>5095</td>
<td>157.5</td>
<td>-2497</td>
</tr>
<tr>
<td>Market + Premium</td>
<td>162.0</td>
<td>-2005</td>
<td>628.4</td>
<td>4317</td>
<td>130.1</td>
<td>-7214</td>
</tr>
</tbody>
</table>

B. Subsamples, Market Adjusted Gains

<table>
<thead>
<tr>
<th>Window</th>
<th>Subsample</th>
<th>t = -5 to T</th>
<th>m = 0 to m = 24</th>
<th>t = -5 to T</th>
<th>m = 0 to m = 24</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Min</td>
<td>S.D.</td>
<td>Max</td>
<td>Mean</td>
</tr>
<tr>
<td>Contested</td>
<td>n = 44</td>
<td>-382.1</td>
<td>-7806</td>
<td>1367</td>
<td>1472</td>
</tr>
<tr>
<td>Multiple Bidders</td>
<td>n = 45</td>
<td>-189.2</td>
<td>-4070</td>
<td>722</td>
<td>1472</td>
</tr>
<tr>
<td>Cash only</td>
<td>n = 90</td>
<td>-127.4</td>
<td>-4070</td>
<td>570</td>
<td>544</td>
</tr>
<tr>
<td>Related 3-digit</td>
<td>n = 95</td>
<td>-169.7</td>
<td>-7806</td>
<td>1025</td>
<td>2489</td>
</tr>
</tbody>
</table>

C. Other Variables

<table>
<thead>
<tr>
<th>Market Values ($ millions)</th>
<th>Mean</th>
<th>Min</th>
<th>S.D.</th>
<th>Max</th>
<th>Premium/Target Market Value</th>
<th>Mean</th>
<th>Min</th>
<th>S.D.</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Targets</td>
<td>792.5</td>
<td>17.4</td>
<td>1379</td>
<td>8313</td>
<td>.338</td>
<td>-.070</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bidders</td>
<td>2445</td>
<td>27.4</td>
<td>4656</td>
<td>34169</td>
<td>8.9</td>
<td>1.0</td>
<td>4.2</td>
<td>18.0</td>
<td></td>
</tr>
</tbody>
</table>
Table 2

Results for Basic Model, Full Sample, Differing Gains Windows (n = 168)

\[
\frac{G'}{V_T} = e + f \frac{P'}{V_T} + \mu'
\]

<table>
<thead>
<tr>
<th>Interval for Measuring Gains</th>
<th>Market Model</th>
<th></th>
<th>Market Adjusted</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>e</td>
<td>f</td>
<td>(R^2)</td>
<td>e</td>
</tr>
<tr>
<td>t=-5 to t=+5</td>
<td>-.05</td>
<td>-.27</td>
<td>.016</td>
<td>-.04</td>
</tr>
<tr>
<td></td>
<td>0.93</td>
<td>1.92</td>
<td></td>
<td>0.80</td>
</tr>
<tr>
<td>t=-5 to T</td>
<td>.10</td>
<td>-.69</td>
<td>.033</td>
<td>.03</td>
</tr>
<tr>
<td></td>
<td>1.00</td>
<td>2.59</td>
<td></td>
<td>0.32</td>
</tr>
<tr>
<td>m-1 to m+12</td>
<td>.31</td>
<td>-1.32</td>
<td>.036</td>
<td>.28</td>
</tr>
<tr>
<td></td>
<td>1.75</td>
<td>2.70</td>
<td></td>
<td>1.78</td>
</tr>
<tr>
<td>m-1 to m+24</td>
<td>.12</td>
<td>-1.39</td>
<td>.014</td>
<td>.17</td>
</tr>
<tr>
<td></td>
<td>0.45</td>
<td>1.81</td>
<td></td>
<td>0.72</td>
</tr>
<tr>
<td>m-1 to m+36</td>
<td>.26</td>
<td>-1.68</td>
<td>.011</td>
<td>.31</td>
</tr>
<tr>
<td></td>
<td>0.74</td>
<td>1.70</td>
<td></td>
<td>1.13</td>
</tr>
</tbody>
</table>

Notes: Gains measured relative to market model are net of predicted returns from CAPM equation \(R_{it} = \gamma + \delta \beta_{it}\). Gains measured net of returns on the Standard and Poor’s market portfolio are defined as market adjusted. All premia are measured over the interval \(t = -5\) to \(t* = +5\), where \(t*\) is the day of the final, successful bid. \(T\) equals day on which target disappeared from CRSP tapes.

\(t\)-values under coefficients.
Table 3

Results for Market Adjusted Gains for Basic Model and Different Supsamples

\[
\frac{G'}{VT} = e + f \frac{P'}{VT} + \mu'
\]

<table>
<thead>
<tr>
<th>Interval for Measuring Gains</th>
<th>e</th>
<th>f</th>
<th>(\bar{R}^2)</th>
<th>e</th>
<th>f</th>
<th>(\bar{R}^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contested</td>
<td>n = 44</td>
<td></td>
<td></td>
<td>Uncontested</td>
<td>n = 124</td>
<td></td>
</tr>
<tr>
<td>t = -5 to T</td>
<td>-.36</td>
<td>.38</td>
<td>-.003</td>
<td>.13</td>
<td>-1.04</td>
<td>.075</td>
</tr>
<tr>
<td></td>
<td>2.06</td>
<td>0.94</td>
<td></td>
<td>1.28</td>
<td>3.32</td>
<td></td>
</tr>
<tr>
<td>m = 0 to m = +24</td>
<td>.03</td>
<td>-.21</td>
<td>-.023</td>
<td>.26</td>
<td>-2.23</td>
<td>.053</td>
</tr>
<tr>
<td></td>
<td>0.06</td>
<td>0.19</td>
<td></td>
<td>0.97</td>
<td>2.81</td>
<td></td>
</tr>
<tr>
<td>Multiple Bidders</td>
<td>n = 45</td>
<td></td>
<td></td>
<td>Single Bidder</td>
<td>n = 123</td>
<td></td>
</tr>
<tr>
<td>t = -5 to T</td>
<td>.06</td>
<td>-.76</td>
<td>.078</td>
<td>.02</td>
<td>-.60</td>
<td>.020</td>
</tr>
<tr>
<td></td>
<td>0.44</td>
<td>2.17</td>
<td></td>
<td>0.17</td>
<td>1.87</td>
<td></td>
</tr>
<tr>
<td>m = 0 to m = +24</td>
<td>.48</td>
<td>-1.94</td>
<td>.051</td>
<td>.09</td>
<td>-1.34</td>
<td>.015</td>
</tr>
<tr>
<td></td>
<td>1.13</td>
<td>1.84</td>
<td></td>
<td>0.32</td>
<td>1.68</td>
<td></td>
</tr>
<tr>
<td>Related (3 digit)</td>
<td>n = 95</td>
<td></td>
<td></td>
<td>Unrelated (3 digit)</td>
<td>n = 73</td>
<td></td>
</tr>
<tr>
<td>t = -5 to T</td>
<td>.06</td>
<td>-.38</td>
<td>.007</td>
<td>-.01</td>
<td>-1.04</td>
<td>.070</td>
</tr>
<tr>
<td></td>
<td>0.56</td>
<td>1.28</td>
<td></td>
<td>0.06</td>
<td>2.53</td>
<td></td>
</tr>
<tr>
<td>m = 0 to m = +24</td>
<td>.20</td>
<td>-.68</td>
<td>-.000</td>
<td>.13</td>
<td>-2.54</td>
<td>.052</td>
</tr>
<tr>
<td></td>
<td>0.79</td>
<td>1.00</td>
<td></td>
<td>0.31</td>
<td>2.23</td>
<td></td>
</tr>
<tr>
<td>Cash only</td>
<td>n = 90</td>
<td></td>
<td></td>
<td>Noncash (mixed)</td>
<td>n = 78</td>
<td></td>
</tr>
<tr>
<td>t = -5 to T</td>
<td>.19</td>
<td>-.91</td>
<td>.067</td>
<td>-.10</td>
<td>-.44</td>
<td>.002</td>
</tr>
<tr>
<td></td>
<td>1.41</td>
<td>2.71</td>
<td></td>
<td>0.86</td>
<td>1.09</td>
<td></td>
</tr>
<tr>
<td>m = 0 to m = +24</td>
<td>.49</td>
<td>-1.46</td>
<td>.023</td>
<td>.05</td>
<td>-2.48</td>
<td>.057</td>
</tr>
<tr>
<td></td>
<td>1.42</td>
<td>1.75</td>
<td></td>
<td>0.16</td>
<td>2.38</td>
<td></td>
</tr>
</tbody>
</table>

Notes: See notes to Table 2.

\(t\)-values are under coefficients.
Table 4

Results for Market Adjusted Gains, Basic Model with Interactions, Full and Supsamples

\[
\frac{G'}{V_T} = e + f'P_i^T + g \frac{P_i}{V_T} X + \mu'
\]

<table>
<thead>
<tr>
<th>Interval for Measuring Gains</th>
<th>e</th>
<th>f'</th>
<th>g</th>
<th>R²</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Sample, X = VT/VB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>t = -5 to T</td>
<td>.02</td>
<td>-.96</td>
<td>.77</td>
<td>.056</td>
<td>168</td>
</tr>
<tr>
<td></td>
<td>.25</td>
<td>3.38</td>
<td>2.23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>m = 0 to m = +24</td>
<td>.16</td>
<td>-1.89</td>
<td>1.08</td>
<td>.027</td>
<td>168</td>
</tr>
<tr>
<td></td>
<td>.68</td>
<td>2.56</td>
<td>1.21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full Sample, X = 1/DIV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>t = -5 to T</td>
<td>.02</td>
<td>-.90</td>
<td>1.80</td>
<td>.045</td>
<td>168</td>
</tr>
<tr>
<td></td>
<td>.18</td>
<td>3.13</td>
<td>1.76</td>
<td></td>
<td></td>
</tr>
<tr>
<td>m = 0 to m = +24</td>
<td>.16</td>
<td>-1.53</td>
<td>.62</td>
<td>.018</td>
<td>168</td>
</tr>
<tr>
<td></td>
<td>.70</td>
<td>2.05</td>
<td>0.24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noncash (mixed), X = 1/DIV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>t = -5 to T</td>
<td>-.11</td>
<td>-.60</td>
<td>1.00</td>
<td>-.006</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>.91</td>
<td>1.24</td>
<td>0.60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>m = 0 to m = +24</td>
<td>-.01</td>
<td>-3.92</td>
<td>9.49</td>
<td>.107</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>.02</td>
<td>3.28</td>
<td>2.28</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: DIV is the number of 4-digit SICs the acquiring firm operates in after the merger. See also notes to Table 2.

\(t\)-values are under coefficients.