Merger market dynamics: insights into the behavior of target and bidder firms

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Abstract
This study presents a framework deriving the demand and supply of target firm shares in merger, and tests it using event study methodology and regression analysis. Target and bidder behavior are not mirror images; instead bidders rank and pursue targets which either accept or reject bids. Merger cycles are motivated by bidder demand shifts, target quality is as important as strategic fit for bidders, and transaction type is confirmed as the most reliable predictor of variation in premiums. Target institutional investors raise the cost to the bidder. ©2000 Elsevier Science B.V. All rights reserved.

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1. Introduction

How does the merger market operate over time? What motivates merger waves? How do supply and demand conditions impact target and bidder behavior?

The framework presented here for analyzing these and other questions involving merger dynamics is supply and demand schedules for target firm shares. The advantage of this framework is that it enables us to analyze dynamic aspects of mergers, and to determine more carefully the role of market-wide and transaction-specific factors.

Much of the previous merger research has focused on such topics as related diversification (i.e. Montgomery, 1979; Bettis, 1981; Palepu, 1985; Singh and Montgomery, 1987); what
types of relatedness matter, and how to measure them (i.e. Shelton, 1988; Chatterjee and Wernerfelt, 1991; Markides and Williamson, 1994; Robins and Wiersma, 1995); and the division of overall gains between targets and bidders, but with little exploration of key market forces (i.e. Bradley et al., 1988; Lang et al., 1989; Stulz et al., 1990; Maloney et al., 1993; Smith and Kim, 1994). The literature also includes notable summary studies providing valuable syntheses of diverse empirical studies (i.e. Jensen and Ruback, 1983; Ramanujam and Varadarajan, 1989; Hoskisson et al., 1993), or insights gleaned from multidisciplinary or meta-analytical approaches (i.e. Lubatkin, 1983; Datta et al., 1992), but these works still shed little light on merger market dynamics.

It is surprising that most of this previous work does not consider mergers within the overall context of supply and demand because mergers occur in waves, indicating that supply and demand forces are active over time. Here, supply and demand curves for target firm shares are developed, and the impact of market-wide and transaction-specific effects on these curves is explored and key results of the literature are tested.

The following section examines the demand and supply forces in the merger market and develops testable hypotheses while the construction of the database and key variables are discussed in Section 3. Regression models and statistical results are analyzed in Section 4 and the discussion and implications are presented in Section 5.

2. Supply and demand forces in the merger market

2.1. Supply and demand curves

In this examination of merger demand and supply conditions, target firm shares are claims on target firm assets which may be purchased from shareholders of publicly held firms, or directly from target management in the case of sell-offs or privately held firms. Bradley et al. (1988) and Stulz et al. (1990) present supply curves for target firm shares that are increasing functions of the price offered by the bidder. However, all atomistic shareholders are assumed to be homogeneous, and to tender at one price, and no distinction is made between individual and aggregate supply curves. Here, shareholders have heterogeneous expectations, and Figs. 1, 2 illustrate both individual and aggregate supply curves for a target firm’s shares. Sell-offs 1 and privately held firms can be assumed to be instances in which a single shareholder, target management, holds 100 percent, or a controlling percentage, of the shares. In Fig. 1, each target firm shareholder has a set of expectations regarding the future cash flows of the firm. These expectations form the reservation price, \( P^0 \), at which the

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1 Slovin et al. (1995) define sell-offs as privately negotiated sales of subsidiaries which differ from equity carve-outs and spin-offs, because control of the assets is transferred to a third party. Ravenscraft and Scherer (1987) note that subsidiary sales primarily increase corporate focus, or raise funds. Empirical results are mixed, with authors finding evidence supporting superior fit (i.e. Alexander et al., 1984; Hite et al., 1987; John and Ofek, 1995), and confirming the financing hypothesis (i.e. Shleifer and Vishny, 1992; Ofek, 1993; Lang et al., 1995). Target firm assets are also available because some buyers are willing to overpay (i.e. Jensen, 1986; Lang et al., 1991).
shareholder is willing to sell his/her holdings. Summing the individual holdings of each shareholder with reservation price, $P_0$, provides the total number of target shares that will be supplied to the market at price $P_0$. This summation represents a single point on the aggregate supply curve in Fig. 2. The diversity of expectations among groups of target shareholders determines the pattern of the points which compose the aggregate supply curve. Only two restrictions are imposed on the points which define an aggregate supply curve: (i) only one point corresponds to each offer price, and (ii) the number of shares tendered is monotonically increasing in the price offered to purchase those shares.

The aggregate supply curve of Fig. 2 illustrates the size of the premium over the market price, $P$, that an acquiring firm must pay to purchase a certain number of target firm shares. In order to buy $Q^*$ shares, the bidder must pay a premium of $(P^* - P)$. Note that the required premium, or gain to target shareholders, rises as the fraction of target shares purchased by the acquirer increases, which is consistent with the findings of Bradley et al. (1988). In the case of sell-offs, the individual and aggregate supply curves are identical. The supply curve will generally be upward sloping because of differing expectations or transactions costs, as Bagwell (1991) finds in an empirical analysis of shareholder rankings of bids. In general, shareholder expectations rise if the expected profits of the target firm rise, or if another competing offer surfaces. Fig. 3 illustrates how changes in target shareholder reservation prices change as shareholder expectations change.

2 Grossman and Hart (1980) point out that shareholders may withhold shares if they think that the takeover will succeed and improve the firm, thus creating a ‘free-rider’ problem, and preventing potentially beneficial mergers. Shareholders can avoid this problem by adopting a corporate charter permitting suitors to exclude minority shareholders from participating in post-merger improvements or, alternatively, large shareholders may make the improvements themselves, or facilitate takeovers by sharing the sizable gains on their holdings with the bidder (Shleifer and Vishny, 1986).
Bidder firms are assumed to consider one acquisition during a given planning period. They rank targets by the present value of expected net benefits of acquisition, and then pursue them sequentially. The expected net benefits equal the value created by combining the assets of the two firms, minus the premium required to obtain control. The net benefits offered by alternate targets provide a ceiling on the price a bidder is willing to pay for any one target, and thus, the offer purchase price depends on the required premium, the total value created and the gains available from other targets. Since the bidder pursues only one target within the relevant time horizon, its demand for target shares appears as the single point in the graph of Fig. 4.

Given the demand and supply curves illustrated above, a number of market-wide and transaction-specific forces may affect these curves. Merger waves are an important market-wide effect, and several studies provide evidence of changes in the merger market over time and the course of the merger cycle. Bhidé (1990) claims that the disadvantages of diversification have increased since the importance of information asymmetries has diminished in corporate financing. The results of Morck et al. (1990) and Servaes (1996) suggest that the penalty for diversification changed over time.

Three key transaction-specific forces noted in the literature are bidder rivalry, strategic fit and institutional blockholders. Datta et al. (1992) include bidder rivalry and strategic fit as two of five key factors influencing shareholder wealth in their meta-analysis of 41 empirical merger studies. The role of institutional investors and other large blockholders, such as target and bidder management, has been debated and investigated by a number of researchers (i.e., Shleifer and Vishny, 1986; Pound, 1988; Stulz et al., 1990 and Burkart, 1995). While all
large blockholders can use their voting rights to influence takeover attempts, this study focuses on institutional blockholders because they have no management role in either target or bidder, and therefore are more likely to present a pure shareholder perspective consistent with the derivation of the supply and demand curves.

Two of the remaining factors identified by Datta et al. (1992) — regulatory changes and mode of payment — are included in this study as control variables. The fifth factor, bidder approach, which distinguishes between tender offers and mergers, is not included here because this study is limited to mergers. A final control variable, relative size of target and bidder, is included to control for the division of merger gains because Asquith et al.
Fig. 4. Bidder demand for shares of a target.

(1983) find that relatively larger targets provide greater returns for bidders, but have no impact on target firm gains.

2.2. Hypotheses

Once an offer is made, the bidding firm may face competition from other suitors which should increase the premium via an auction effect, thus reducing the gain to bidders and increasing the gains to targets. The rivalry among bidders raises target shareholder expectations, and shifts the aggregate supply curve to the left, so that a higher price must be offered for any given quantity of shares. The presence of rivals will shift the demand curve upward if the initial offered price is not the maximum price the bidder is willing to pay. Rival bidders can also cause the bidding firm to overpay by exacerbating the hubris effect identified by Roll (1986), in which bidder managements overvalue and overpay for targets. In addition, Burkart shows that bidders with initial stakes of target firm shares, or toeholds, have an incentive to overbid in a bidding contest.

Hypothesis 1: The presence of multiple bidders in a merger contest increases the gain to the target, and decreases the gain to the bidder.

In a single bidder contest, a value-increasing bidder offers enough only so that the marginal shareholder is better off tendering than holding on. Therefore, the winning bid must be epsilon greater than the sum of marginal shareholder’s expectation of the value of a minority share post-bid plus his transaction costs. If the bidder is attempting to acquire all outstanding shares, Bradley (1980) points out that target shares will cease to exist, so the shareholder’s post-bid valuation of a minority share will be zero if he expects the offer to succeed. Note that the shareholder will tender into such a bid whether or not he expects it to succeed.
If this hypothesis is true, then a dummy variable denoting multiple bidders will be positive in a regression equation explaining target firm gains, and negative in a regression equation explaining bidder gains.

Strategic fit impacts merger activity primarily from the demand side via the bidder firm’s calculation of the net benefits offered by various target firms. Depending on the objectives of the bidder firms, targets with greater strategic fit may offer greater net benefits, and thus may be ranked more highly than those with less strategic fit. Thus, the major impact of strategic fit is on target firm rankings, and as result, bidders may have a higher demand for related target firms. Relatedness causes movement along the demand curve instead of a demand curve shift. However, if bidders have other criteria for selecting merger partners, such as industry ranking, financial strength or diversifying into new industries, then relatedness would not improve the ranking of a target firm.

**Hypothesis 2:** Bidders acquiring related target firms will receive higher gains than bidders acquiring unrelated target firms.

This hypothesis will be confirmed if a variable measuring relatedness is positive in a regression equation explaining bidder firm gains.

**Hypothesis 3:** Related target firms will receive higher gains in merger than unrelated target firms.

If this hypothesis is true, then the coefficients on strategic fit variables in a regression equation explaining the gains to merger for targets should be positive indicating the payment of higher premiums for related targets.

The price of a merger is the premium paid to the target. If merger waves result primarily from demand effects, then the increase in demand during a peak would result in an upward demand shift that increases both merger premiums and merger quantities. This could result from higher bidder valuations of target firms due to decreased risk in prosperous economic conditions, low interest rates, or trends toward industry consolidation. Merger waves based on supply effects would result from an increased willingness to tender shares due to a decrease in target shareholder expectations or transaction costs, and would lower the premium paid. The converse reasoning for both demand and supply curve shifts holds true for merger trough periods. If both the supply and demand curves are shifting simultaneously, the price effect, or change in the average premium paid, is indeterminate, and depends on the relative elasticities of the two curves. If merger peaks and troughs are caused by demand shifts, then merger premiums should rise during peaks and fall during troughs, but will move in the opposite pattern if merger cycles result primarily from supply-side changes.

**Hypothesis 4:** The premium to targets increases during merger peaks and decreases during merger troughs.

This hypothesis is confirmed if a variable denoting the number of mergers per year is positive in a regression equation explaining target firm gains. This finding would be consistent with merger waves being caused by changes in bidder firm demand.

**Hypothesis 5:** The gain to bidders decreases during merger peaks and increases during merger troughs.

If this hypothesis is true, then a variable denoting the number of mergers per year will be negative in a regression equation explaining bidder merger gains.

Given the complexity of the merger market, the demand and supply of target firm shares may also be affected by interactions between key forces. Some of the primary interaction
effects include strategic fit and merger cycle, rivalry and merger cycle, and rivalry and strategic fit. The interaction between relatedness and merger cycle will help to determine whether the level of merger activity changes the size of the gain from strategic fit. Morck et al. (1990) found that the discount for conglomerate diversification was higher in 1980–1987 than during 1975–1979, while Servaes (1996) reports that the diversification discount during 1973–1976 decreased significantly from 1961 to 1970.

Hypothesis 6: Strategic fit will dampen the effect of the merger cycle by increasing the gains of bidders during merger peaks and increasing the gains of targets during merger troughs.

If this hypothesis is true, then an interaction term between strategic fit and merger cycle will be positive in both bidder and target firm equations.

Rivalry among bidding firms could either mitigate or enhance the impact of changes in the merger cycle on target and bidder firm gains. Bidder rivalry would raise gains to targets and reduce gains to the bidder in either the merger peak or trough phase, and this effect might be particularly strong during merger peaks. An interaction term between strategic fit and rivalry would measure how rivalry impacts relatedness. The impact of increased bidder competition for the most sought after targets could be isolated from the general gains to related acquisitions.

Hypothesis 7: Increased bidder rivalry will lower the gain to bidders acquiring related targets but will increase the gain to target shareholders.

This hypothesis will be confirmed if an interaction term between relatedness and multiple bidders is negative and positive respectively, in equations explaining bidder and target firm gains.

Hypothesis 8: Increased bidder rivalry will decrease the gain to bidders throughout the merger cycle but increase the gain to targets.

If this hypothesis is true, then an interaction term between the number of mergers and multiple bidders will be negative in a regression equation explaining bidder firm gains, and positive in an equation explaining target firm gains.

Large institutional blockholders of target firm shares also affect supply and demand curves, but empirical evidence of the direction of their impact is mixed. Institutional blockholders can use their stakes to either facilitate or block the merger by attempting to either raise or lower target gains, and subsequently increasing or decreasing the premium required. Thus, large institutional shareholders can significantly increase or decrease aggregate supply curve elasticity.

Previous studies have presented two views of institutional blockholders with regard to their participation in merger. Stulz et al. (1990) argue that since institutional investors are motivated primarily by their low marginal capital gains tax rates, they are more likely to

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4 Increases in heterogeneity of shareholder expectations decrease supply curve elasticity, while decreases in heterogeneity of expectations increase it. As differences in shareholder expectations rise, the vertical distance between points also increases due to a wider dispersion of reservation prices. If the number of shares held by each shareholder remains constant, then the slope of the aggregate supply curve rises, and the curve becomes more inelastic. If all shareholders share identical expectations, then the aggregate supply curve is perfectly elastic, and is identical to the individual supply curve in Fig. 1. The assumption that the number of shares tendered increases monotonically in the purchase price offered prevents a perfectly inelastic aggregate supply curve, in which a certain number of shares will not be sold at any price.
tender their shares for a given premium. Their willingness to tender reduces the premium required by the bidder, and therefore reduces the cost of the bidder to gain control. In a sample of successful tender offers, Stulz et al. (1990) find that institutional ownership has a negative effect on target firm gains, which lends support to this view. However, Pound (1988) points out that institutional investors may have strategic alliances with target management, or conflict-of-interest problems preventing them from actively opposing an outside takeover attempt. These issues may be strong enough to compel investors to simply sell their holdings, or even to vote with target management contrary to their fiduciary interests. His results from a study of proxy contests suggest that institutional owners are aligned with target management, and therefore would act to block the merger by raising bidder firm costs. Since takeover attempts, like proxy contests, involve changes in the control of firm assets, the tax considerations of Stulz et al. (1990), while important in a tender offer, are more likely to be superseded by issues involving strategic alliances with target management.

**Hypothesis 9:** As the percentage of a target firm’s stock held by institutional investors increases, the gain to target shareholders increases.

This hypothesis will be verified if a variable measuring the percentage of institutional ownership is positive in a regression equation explaining target firm gains. This would be consistent with the findings of Pound (1988).

**Hypothesis 10:** As the percentage of a target firm’s stock held by institutional investors increases, the gain received by the bidder firm shareholders decreases.

If this hypothesis is true, then a variable denoting percentage of institutional ownership will be negative in a regression equation explaining bidder firm gains, which would again confirm the findings of Pound (1988).

### 2.3. Control variables

Asquith et al. (1983) find that bidders gain more with larger targets, suggesting that the acquisition of a larger firm may provide greater opportunities to achieve economies of scope; but, larger mergers may also be more difficult to manage. If bidders gain more from acquiring larger targets, then a variable measuring the relative size of the target and the bidder will be positive and significant in the bidder equation. Likewise, if larger targets gain more, then the variable will be positive and significant in the target equations.

Asquith et al. (1983); Schipper and Thompson (1983); Bradley et al. (1988), and Datta et al. (1992) show that regulation is statistically significant in explaining merger gains to the bidding firm. When Congress passed the Williams Act in July 1968, this regulation reduced the freedom that acquiring firms enjoyed in executing merger offers. Schipper and Thompson (1983) found that the Williams Act and other regulations passed from July 1986 until October 1969 reduced the gains to bidding firms. A dummy variable indicating whether the merger occurred before or after October 1969 should be negative in bidder equations and positive in target equations.

According to Travlos (1987), takeover bids financed by stock exchange depress bidder gains because stock exchange conveys that the bidding firm’s stock is overvalued. His results show that bidders making stock exchange offers experience negative abnormal returns regardless of the outcome of the bid. Datta et al. (1992) conclude that stock financing also
depresses target firm gains due to the possible transfer of wealth to bondholders. Therefore, a variable indicating equity financing should be negative in target and bidder equations.

3. Method

3.1. Data

The acquisitions in this study were obtained by randomly selecting bidding firms according to the methodology of Rumelt (1974, 1978). Rumelt collected his sample by randomly selecting 100 Fortune 500 industrial companies in 1949, 1959, and 1969 and 50 of these companies in 1974. An additional random sample was taken of 100 Fortune 500 industrial companies in 1979 to include more mergers that occurred in the late 1970’s and early 1980’s. These randomly selected firms made 199 acquisitions during 1962–1983 that possessed the following characteristics:

1. both target and bidder appear on the CRSP tapes;
2. sufficient line of business data is available for both target and bidder to determine the following information for each business unit: percentage of corporate revenue contributed, the products sold, and customers served;
3. sufficient information on institutional investor holdings is available from the S&P Stock Guide.

The necessary line of business data to classify relatedness were obtained through annual reports, prospectuses and Moody’s Industrial Manual.

As Table 1 shows, the study time period includes 11 years of peak merger activity — 1962–1969, 1981–1983, and 11 years of slow merger activity — 1970–1980. The merger peak and trough years identified by Golbe and White (1993) in their longitudinal study of merger wave activity from the late 1800’s are highlighted in boldface. A total of 46.2 percent or 92 of the mergers occurred during peak periods, and 53.8 percent occurred during trough periods. The fairly equal distribution of the sample across peak and trough years permits effective testing of the differences in the two types of mergers.

3.2. Dependent variables

The dependent variables, the percent change in bidder equity and the percent change in target equity were derived using event study methodology to estimate the change in the bidder and target firm share prices due to merger. First, the expected share price without merger was estimated using the market model employed by Dodd (1980):

\[ R_{jt} + \alpha_j + \beta_j \times R_{mt} + \epsilon_{jt} \]

where \( R_{jt} \) is rate of return on stock \( j \) over period \( t \), \( t = 1 \) day; \( R_{mt} \) is rate of return on value weighted market portfolio over period \( t \); \( \alpha_j = E(R_{jt}) - \beta_j 	imes E(R_{mt}) \); \( \epsilon_{jt} \) is disturbance term of security \( j \) in period \( t \), \( E(\epsilon_{jt}) = 0 \); \( \beta_j = \text{cov}(R_{jt}, R_{mt})/\text{var}(R_{mt}) \).

For each merger, \( \alpha_j \) and \( \beta_j \) were estimated for both the acquiring and acquired firms for a period of 250 trading days ending approximately 3 months before the merger press date.
Table 1
Merger peaks and troughs during 1962–1983 (transactions valued at $1 million or more)

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of mergers</th>
<th>Peak years</th>
<th>Trough years</th>
</tr>
</thead>
<tbody>
<tr>
<td>1962</td>
<td>1047^a</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>1963</td>
<td>1102</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1965</td>
<td>1222</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1966</td>
<td>1286</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1968</td>
<td><strong>1829</strong></td>
<td></td>
<td></td>
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<tr>
<td>1969</td>
<td>1712</td>
<td></td>
<td></td>
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<tr>
<td>1970</td>
<td>1318</td>
<td></td>
<td></td>
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<tr>
<td>1971</td>
<td>1269</td>
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<tr>
<td>1972</td>
<td>1263</td>
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<tr>
<td>1973</td>
<td>1064</td>
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<tr>
<td>1974</td>
<td><strong>926</strong></td>
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<tr>
<td>1975</td>
<td>981</td>
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<td></td>
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<tr>
<td>1976</td>
<td>1145</td>
<td></td>
<td></td>
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<tr>
<td>1977</td>
<td>1209</td>
<td></td>
<td></td>
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<tr>
<td>1978</td>
<td>1452</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1979</td>
<td>1527</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1980</td>
<td>1558</td>
<td>48%</td>
<td></td>
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<tr>
<td>1981</td>
<td>2328</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1982</td>
<td>2298</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1983</td>
<td>2393</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


This established base values for $\alpha_j$ and $\beta_j$ to calculate $R_{jt}$ without merger effects. Over 96 percent of $\hat{\alpha}_{j{exposure}}$ estimated were statistically nonsignificant.

Then, a prediction error for each firm $j$, $PE_{jt}$, was calculated for a period around the date of the first public announcement of the merger using the equation $PE_{jt} = R_{jt} - \beta_j \times R_{mt}$, where the prediction error, $PE$, was the difference between actual stock price and the expected stock price without merger. The period during which base values for $\alpha_j$ and $\beta_j$ are calculated is excluded. The date of first public announcement is identical to the press date of Asquith (1983) and is considered to be the first day that a merger rumor, discussion, tender offer, proposal, agreement or understanding appears in the *Wall Street Journal*.

Estimates of the value created, or the percent change in bidder equity and target equity due to merger, were obtained by summing the $PE_{jt}$ (abnormal change in the rate of return for stock $j$ on day $t$) for the acquiring firm and the target firm for four different intervals around the merger announcement date: (i) the day before and the day of the announcement ($t = -1, 0$), (ii) the day before and the day after the announcement ($t = -1, 1$), (iii) 10 days before and 10 days after announcement ($t = -10, 10$), and (iv) 10 days before and 25 days after announcement ($t = -10, 25$). Multiple time periods were tested in order to capture any pre
and post announcement gains. Bradley (1980) and Keown and Pinkerton (1981) show that a significant amount of the target firm’s gain can occur before the merger announcement date.

### 3.3. Independent variables

Rivalry. This dummy variable equals one if more than one firm was bidding for the target, and is zero otherwise.

Strategic fit. This variable measures the percentage of related strategic fits in the merger, which were determined by pairwise comparisons of line of business data for each business unit of the target and bidder as in Shelton (1988). The relationship between each pair of business units was classified into one of two possible strategic categories: related or unrelated. Businesses units were considered related if they met one of the following criteria:

1. target and bidder business units in the same business;
2. target unit enables bidder to integrate forward or backward, expand product lines or otherwise consolidate the bidder’s market position;
3. target unit enables bidder to enter new but related markets.

The unrelated category is self-explanatory. If any two target and bidder businesses are considered related using the above criteria, then the percentage of sales for each of the two related units together are multiplied together to yield a percentage of the combined sales of the merger (i.e. 20 percent $\times$ 30 percent = 6 percent). The percentages of the combined sales for each related target — bidder business pair are then summed to yield a total percentage of related combined sales for the merger ranging from 0 to 100 percent. This procedure provides a continuous measure of relatedness, as opposed to a simple dummy variable.

Merger cycle. For each merger, this variable denotes the number of mergers which occurred during the announcement year over $1/MM/1000$. High values of this variable indicate that the merger occurred during a peak in the merger cycle, while low values indicate that it occurred during a trough.

Merger cycle*strategic fit. The interaction between merger cycle and strategic fit is measured by multiplying the percentage of related strategic fits by the number of mergers during the announcement year divided by 1000.

Rivalry*strategic fit. The interaction between rivalry and strategic fit is measured by multiplying the rivalry dummy variable by the percentage of related strategic fits.

Merger cycle*rivalry. The interaction between rivalry and merger cycle is measured by multiplying the rivalry dummy variable by the number of mergers during the announcement year divided by 1000.

Institutional holdings. This variable measures institutional holdings divided by total common stock.

Relative size. The relative size of the target was measured by dividing target firm sales by bidder firm sales.

Regulation. This dummy variable equals one if the merger occurred after October 1969 when the Williams Act went into effect, and is zero otherwise.

Equity financing. This dummy variable equals one if the merger was financed by stock exchange, and is zero if the merger was financed by cash.
4. Results

4.1. Correlation matrix and prediction errors

The correlation matrix illustrated in Table 2 shows a high degree of collinearity between the number of mergers per year and the percentage of target firm stock held by institutions. This suggests that institutions may increase their stock holdings during merger waves, possibly to take advantage of generally higher stock prices. These two variables were tested in separate models to avoid introducing multicollinearity. Table 3 shows bidder and target prediction errors plus the abnormal return to value-weighted portfolio of the bidder and the target. In Jensen and Ruback (1983), the average 2 day announcement effects for bidders and targets in three separate studies covering the same time periods as this study ranged from $-1.09$ to $0.07$ percent and from $13.4$ to $6.24$ percent respectively, but value-weighted portfolio return figures are not provided. The 2 day effects for bidders and targets in this sample are $-0.6$ and $11.2$ percent, which are both within the above ranges.

Multivariate regression results are presented in Tables 4–7. Although identical models were tested for both target and bidder firms, the results for targets and bidders are quite different and not mirror images, suggesting that different underlying mechanisms are in operation for the two types of firms. Therefore, target and bidder firm results will be discussed separately.

4.2. Bidder firm results

Tables 4 and 6 show that the impact of multiple bidders is positive and moderately significant (90–95 percent level), thus disproving H1. A closer look at the beneficial effect of rivalry for bidder firms indicates that this variable may be proxying for forms of target quality unrelated to strategic fit such as unique assets or industry leadership. A comparison of the earnings per share achieved by targets with and without multiple bidders supports this assumption. Targets pursued by more than one bidder earned an average of $2.05$ per share. Their less sought after counterparts earned only $1.46$ per share on average.

Strategic fits were positive and moderately significant (at the 85 and 90 percent level) for the bidder firm equations. Although relatedness tends to increase bidder gains, providing some support for H2, target quality as proxied by bidder rivalry tends to play a larger role. These findings are consistent with bidder firms choosing and creating value with both related and unrelated firms in merger, and the equivocal results of over two decades of research on the significance of related diversification, which is summarized in Ramanujam and Varadarajan (1989) and Hoskisson et al. (1993). While bidder firms may achieve marginally more success with related firms, a more important determinant of merger success may be the overall quality of target firms being considered.

Empirical tests of the role of merger waves appear in Table 4. Although both linear and curvilinear specifications of the merger wave variable were tested due to the dynamic nature of these forces, the linear variables, as shown in Table 4, have the greatest explanatory power. The negative merger wave coefficient shows that bidder returns fall during peaks but rise during troughs, and indicates that merger cycles are motivated at least in part by changes in
Table 2
Correlation matrix

<table>
<thead>
<tr>
<th>Percentage of related strategic fits between target and bidder</th>
<th>Dummy = 1 if there are multiple bidders</th>
<th>Dummy = 1 if Williams Act in effect (1)</th>
<th>Number of mergers in merger announcement year/1000</th>
<th>Target sales/bidder sales</th>
<th>Dummy = 1 if acquisition at least partly equity financed</th>
<th>Institutional holdings of target/total target common stock</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of related strategic fits between target and bidder</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dummy = 1 if there are multiple bidders</td>
<td>−0.16</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dummy = 1 if Williams Act in effect</td>
<td>0.06</td>
<td>0.08</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of mergers in merger announcement year/1000</td>
<td>−0.19</td>
<td>0.12</td>
<td>0.09</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Target sales/bidder sales</td>
<td>−0.08</td>
<td>0.04</td>
<td>−0.15</td>
<td>−0.00</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Dummy = 1 if acquisition at least partly equity financed</td>
<td>0.16</td>
<td>−0.20</td>
<td>−0.01</td>
<td>−0.24</td>
<td>0.01</td>
<td>1</td>
</tr>
<tr>
<td>Institutional holdings of target/total target common stock</td>
<td>−0.10</td>
<td>0.14</td>
<td>0.27</td>
<td>0.54</td>
<td>−0.00</td>
<td>0.02</td>
</tr>
</tbody>
</table>

* The Williams Act and other regulations passed from July 1968 to October 1969 reduced the freedom of bidders in executing merger offers.
Table 3
Average target and bidder firm prediction errors in a sample of 199 mergers from 1962 to 1983 ($t = 0$ is day of first public announcement of merger, $t$-statistics in parentheses) change in firm equity measured over the following days

<table>
<thead>
<tr>
<th>Time periods</th>
<th>$t = -1, 0$</th>
<th>$t = -1, 1$</th>
<th>$t = -10, 10$</th>
<th>$t = -10, 25$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average bidder prediction error</td>
<td>-0.006 (-2.37)</td>
<td>-0.009 (-2.90)</td>
<td>0.004 (0.59)</td>
<td>-0.000 (-0.05)</td>
</tr>
<tr>
<td>Average target prediction error</td>
<td>0.112 (10.96)</td>
<td>0.117 (10.79)</td>
<td>0.207 (16.27)</td>
<td>0.219 (15.94)</td>
</tr>
<tr>
<td>Value-weighted portfolio of bidder and target prediction error</td>
<td>0.010 (3.68)</td>
<td>0.011 (2.99)</td>
<td>0.035 (5.92)</td>
<td>0.034 (5.00)</td>
</tr>
</tbody>
</table>

Table 4
Estimated regression coefficients of announcement period returns of bidders on number of mergers/1000 and bidder rivalry in 199 mergers during 1962–1983 ($t = 0$ is the day of first public announcement of merger, $t$-statistics in parentheses), Dependent variable = % change in bidder equity

<table>
<thead>
<tr>
<th>Time periods</th>
<th>$t = (-1, 0)$</th>
<th>$t = (-1, 1)$</th>
<th>$t = (-10, 10)$</th>
<th>$t = (-10, 25)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dummy = 1 if there are multiple bidders</td>
<td>0.029 (1.45)</td>
<td>0.012 (0.54)</td>
<td>0.070 (1.44)</td>
<td>0.090 (1.58)</td>
</tr>
<tr>
<td>Dummy = 1 if Williams Act in effect</td>
<td>0.008 (1.32)</td>
<td>0.012 (1.71)</td>
<td>-0.015 (-0.96)</td>
<td>0.003 (0.15)</td>
</tr>
<tr>
<td>Percentage of related strategic fits between target and bidder</td>
<td>0.007 (9.7)</td>
<td>0.013 (1.50)</td>
<td>-0.007 (-0.39)</td>
<td>-0.009 (-0.39)</td>
</tr>
<tr>
<td>Number of mergers in merger announcement year/1000</td>
<td>-0.018 (-2.56)</td>
<td>-0.017 (-2.12)</td>
<td>-0.038 (-2.19)</td>
<td>-0.052 (-2.45)</td>
</tr>
<tr>
<td>Target sales/bidder sales</td>
<td>0.002 (1.14)</td>
<td>0.000 (0.02)</td>
<td>-0.001 (-0.30)</td>
<td>-0.001 (-0.17)</td>
</tr>
<tr>
<td>Dummy = 1 if Williams Act in effect</td>
<td>-0.020 (-3.68)</td>
<td>-0.015 (-2.44)</td>
<td>-0.015 (-1.16)</td>
<td>-0.024 (-1.46)</td>
</tr>
<tr>
<td>Dummy = 1 if acquisition at least partly equity financed</td>
<td>-0.002 (-0.15)</td>
<td>0.006 (0.33)</td>
<td>0.002 (0.54)</td>
<td>-0.005 (-0.11)</td>
</tr>
<tr>
<td>R²</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.12</td>
<td>0.07</td>
<td>0.04</td>
<td>0.05</td>
</tr>
<tr>
<td>ADJ. R²</td>
<td>0.10</td>
<td>0.05</td>
<td>0.01</td>
<td>0.02</td>
</tr>
</tbody>
</table>

a The Williams Act and other regulations passed from July 1968 to October 1969 reduced the freedom of bidders in executing merger offers.

Table 5
Estimated regression coefficients of announcement period returns for targets on number of mergers/1000 and bidder rivalry in 199 mergers during 1962–1983 ($t = 0$ is the day of first public announcement of merger, $t$-statistics in parentheses), Dependent variable = % change in target equity

<table>
<thead>
<tr>
<th>Time periods</th>
<th>$t = (-1, 0)$</th>
<th>$t = (-1, 1)$</th>
<th>$t = (-10, 10)$</th>
<th>$t = (-10, 25)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dummy = 1 if there are multiple bidders</td>
<td>-0.010 (-0.37)</td>
<td>0.005 (0.18)</td>
<td>0.001 (0.02)</td>
<td>-0.008 (-0.24)</td>
</tr>
<tr>
<td>Dummy = 1 if Williams Act in effect</td>
<td>-0.021 (-0.71)</td>
<td>-0.008 (-0.26)</td>
<td>0.009 (0.23)</td>
<td>-0.005 (-0.13)</td>
</tr>
<tr>
<td>Dummy = 1 if Williams Act in effect</td>
<td>0.014 (0.50)</td>
<td>0.002 (0.15)</td>
<td>0.003 (0.09)</td>
<td>-0.005 (-0.13)</td>
</tr>
<tr>
<td>Target sales/bidder sales</td>
<td>0.001 (0.12)</td>
<td>0.001 (0.07)</td>
<td>-0.003 (-0.33)</td>
<td>-0.004 (-0.42)</td>
</tr>
<tr>
<td>Dummy = 1 if Williams Act in effect</td>
<td>0.061 (2.80)</td>
<td>0.075 (3.24)</td>
<td>0.072 (2.64)</td>
<td>0.090 (2.95)</td>
</tr>
<tr>
<td>Dummy = 1 if acquisition at least partly equity financed</td>
<td>0.050 (0.80)</td>
<td>0.073 (1.11)</td>
<td>0.081 (1.05)</td>
<td>0.078 (0.93)</td>
</tr>
<tr>
<td>R²</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.05</td>
<td>0.06</td>
<td>0.05</td>
<td>0.05</td>
</tr>
<tr>
<td>ADJ. R²</td>
<td>0.02</td>
<td>0.03</td>
<td>0.02</td>
<td>0.02</td>
</tr>
</tbody>
</table>

a The Williams Act and other regulations passed from July 1968 to October 1969 reduced the freedom of bidders in executing merger offers.
bidder demand for target shares. Since bidder gains are the difference between total value created by the two combined firms less the premium paid to the target, the decrease in bidder gains during peaks could be due to higher premiums, greater willingness to acquire riskier takeover candidates, or increased bidder miscalculations of expected total value. In the hubris hypothesis of Roll (1986), managers simply overpay for targets relative to the value created; these findings suggest that more bidders are infected with hubris during the heady times of a merger boom.

Table 7
Estimated regression coefficients of announcement period returns for targets on institutional ownership of target and bidder rivalry in 199 mergers during 1962–1983 (t = 0 is the day of first public announcement of merger, t-statistics in parentheses), Dependent variable = % change in target equity

<table>
<thead>
<tr>
<th>Time periods</th>
<th>t = (−1, 0)</th>
<th>t = (−1, 1)</th>
<th>t = (−10, 10)</th>
<th>t = (−10, 25)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>0.030 (0.62)</td>
<td>0.001 (0.01)</td>
<td>0.080 (1.04)</td>
<td>0.090 (1.08)</td>
</tr>
<tr>
<td>Dummy = 1 if there are multiple bidders</td>
<td>−0.012 (−0.46)</td>
<td>0.003 (0.09)</td>
<td>−0.000 (−0.01)</td>
<td>−0.009 (−0.28)</td>
</tr>
<tr>
<td>Percentage of related strategic fits between target and bidder</td>
<td>−0.020 (−0.69)</td>
<td>−0.006 (−0.20)</td>
<td>0.009 (0.25)</td>
<td>−0.003 (−0.08)</td>
</tr>
<tr>
<td>Institutional holdings of target/total target common stock</td>
<td>0.083 (1.01)</td>
<td>0.072 (0.83)</td>
<td>0.030 (0.30)</td>
<td>0.038 (0.34)</td>
</tr>
<tr>
<td>Dummy = 1 if Williams Act in effect</td>
<td>0.001 (0.09)</td>
<td>0.000 (0.05)</td>
<td>−0.003 (−0.34)</td>
<td>−0.004 (−0.43)</td>
</tr>
<tr>
<td>Dummy = 1 if Acquisition at least partly equity financed</td>
<td>0.060 (2.48)</td>
<td>0.070 (2.92)</td>
<td>0.070 (2.48)</td>
<td>0.080 (2.75)</td>
</tr>
<tr>
<td>Dummy = 1 if Acquisition at least partly equity financed</td>
<td>0.040 (0.65)</td>
<td>0.070 (1.06)</td>
<td>0.080 (1.03)</td>
<td>0.080 (0.953)</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.05</td>
<td>0.06</td>
<td>0.04</td>
<td>0.05</td>
</tr>
<tr>
<td>ADJ. $R^2$</td>
<td>0.02</td>
<td>0.03</td>
<td>0.02</td>
<td>0.02</td>
</tr>
</tbody>
</table>

* The Williams Act and other regulations passed from July 1968 to October 1969 reduced the freedom of bidders in executing merger offers.
The greater explanatory power of the linear specification suggests that changes in bidder demand occur at a fairly even rate throughout the merger cycle. The aggregate demand curve shifts down during merger troughs and up during merger waves, with bidder gains varying over the merger cycle as expected, increasing during troughs and declining during peaks and supporting H5.

The \( t \)-statistics of the merger cycle interaction effect coefficients were all less than unity, and thus hypotheses H6, H7 and H8 are not supported. These results suggest that strategic fit, bidder rivalry and the merger cycle each impact bidder firm gains independently, instead of acting in concert. Unlike Morck et al. (1990) and Servaes (1996), this study finds no significant change in the discount for diversification over the course of the merger cycle. This may be due to two reasons: (i) that a continuous measure was used here instead of time dummies as in the other two studies, and (ii) this study covers a 21 year time period (1962–1983) as opposed to the 12 year study spans of Morck et al. (1990) (1975–1987); Servaes (1996) (1961–1970, 1973–1976).

The role of institutional investors was tested in Table 6, with institutional ownership of target shares being negative and highly significant in both the square root specification of Stulz et al. (1990), and the linear specification, which provided more explanatory power here. Accordingly, these results support H10, and the findings of Pound (1988), while contradicting the results of Stulz et al. (1990). This is consistent with institutional investors allying with target management and increasing the cost to the bidder as opposed to facilitating the merger. It is also consistent with independent institutional investors using their voting rights to maximize the return to their holdings.

4.3. Target firm results

The target firm results in Tables 5 and 7 indicate that merger premiums are constant except for changes in legislation. The dummy variable representing the passage of the Williams act is significant and positive, which is consistent with the findings of Schipper and Thompson (1983), and Datta et al. (1992). These results are not surprising since the majority of the transactions in this sample are equity-financed mergers, and Huang and Walkling (1987); Comment and Schwert (1995); Schwert (1996) all find that the type of transaction is the most important determinant of target firm premiums. The insignificance of the equity financing dummy may primarily be due to lack of variation in the sample; only four of the 199 mergers did not include some form of equity financing. This frequency of stock financing is consistent with Travlos (1987), who finds that mergers tend to be financed by stock exchange, unlike tender offers which tend to be financed by cash. The importance of regulation is also supported by Comment and Schwert (1995), who find that legislation, in the form of control share laws and business combination laws, raises merger premiums in a study of mergers and tender offers from 1977 to 1991.

4.4. Other findings

An additional important result is that the 2 day \( (t = -1, 0) \) and 3 day \( (t = -1, 1) \) time periods consistently had the greatest explanatory power of the four time intervals tested.

\(^5\) Results available from the author upon request.
across all of the models. While these results are at odds with the findings of Bradley (1980), and Keown and Pinkerton (1981), they do support the results of Asquith (1983), and Jensen and Ruback (1983). One possible explanation is differences in determining announcement dates. Here, announcement dates are defined as in Asquith (1983) — the first day any discussion or rumor of a merger appears in the Wall Street Journal, while in Keown and Pinkerton (1981), firms supplied their own announcement dates. In Bradley (1980), a precise definition of the announcement date is not given.

Another key finding which was consistent across all models tested involved the relative size of target and bidder. The target sales/bidder sales variable was positive, but significant only at the 80–85 percent level for bidder equations, and nonsignificant for target firms, indicating that larger targets tend to increase the gains to bidding firms slightly, and may have no impact on the gains to target firms. These results are consistent with Rhoades (1987); Slusky and Caves (1991), and lend some support to the findings of Asquith et al. (1983).

5. Discussion and implications

The approach of studying both the supply and demand sides of mergers over time reveals a dynamic market in which the ebb and flow of bidder demand for target firm shares is key in determining the division of merger gains. During merger peaks, bidder gains fall, suggesting that bidders are more aggressive, displaying greater tendencies to overpay for target firms or to assume more risk in pursuing takeover projects. More reticent, risk-averse bidder behavior during merger troughs results in increases in bidder gains, while target premiums remain relatively fixed, varying primarily with changes in regulation and by transaction type. The surplus received by bidders varies more than the premium received by targets, illustrating that target and bidder behavior are not mirror images.

The passive role of target firm shareholders, who make a simple accept or reject decision when presented with merger bids, is contrasted to the more active role of bidder management, who undertake a more complex process of ranking and pursuing target firms. Confirming the view that different mechanisms are in place for targets and bidders is the finding that despite several identical models being tested for both targets and bidders, the explanatory power of the equations differed markedly for the two different types of firms. In fact, only one variable, regulation, supported the mirror image concept by being consistently significant and of opposite signs in both sets of equations. This analysis suggests that target shareholders are deal focused, requiring certain returns for certain types of deals, and sheds some insight as to why previous research has found that transaction type is the most reliable indicator of changes in premium.

The behavior of institutional investors who own target firm shares leads to a decrease in the gains to bidders, and appears to be the result of several factors. As Pound (1988) suggests, they may align with target management when control of the firm is involved (i.e., proxy contests and mergers) as opposed to allying with potential suitors or focusing on tax considerations. Alternatively, institutional investors may see a merger offer as an opportunity to maximize the gain on their holdings.
Taken together, these findings suggest that bidder firms could benefit from a contrarian strategy, and purchase during merger troughs. Bidding contests do not necessarily result in poor outcomes, especially if the target firm is a strong candidate and in a related industry. Conservative valuation of prospective candidates, with care to avoid any hubris, may be the most critical factor in maximizing bidder firm gains.

A number of avenues for further research have been opened up by this study. One possibility involves examining whether the incidence of transaction types varies with the phase of the merger cycle. The transactions in this sample were overwhelmingly of a single type, stock-financed mergers. If the percentage of all-cash deals rises during merger peaks, then the average premium per transaction will also rise. In addition, target supply curve shifts could be examined by testing variables that would plausibly affect shareholder expectations such as trends in target firm profitability, market share or earnings, and then interacting these variables with number of mergers to determine if target shareholder expectations do vary with the merger cycle.

Target quality seems to more important in creating value for bidder firms that strategic relatedness, and helps explain the very mixed results on the importance of related diversification in the strategy literature. This suggests that multiple factors are entering the bidder ranking process for selecting target firms, and another direction for future research would be determining which factors are most critical. Montgomery (1985) finds that industry effects and market share are significant while Rhoades (1987) finds that firm growth and market growth were significant for bidder firms in his study on banks.

Additional research is also needed to determine if institutional investors are aligning with target management, or negotiating to get the best return on their holdings. If they are aligning with target management, this raises the question as to whether potentially beneficial mergers are blocked, and must be considered in the context of institutional activism. An additional avenue for further research would be examining the role of other large blockholders, such as target and bidder management to determine how the prospect of relinquishing or gaining a management role impacts the shape of the demand and supply curves.

This study represents an initial foray into analyzing the dynamics of the merger market, and analyzing the interaction of supply and demand effects on target and bidder shareholders, and as such, it has unearthed a number of areas ripe for future research, and for additional learning for academicians and practitioners alike.

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References


