THE DETERMINANTS OF MERGER WAVES*

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Abstract

One of the most conspicuous features of mergers is that they come in waves, and that these waves are correlated with increases in share prices and price/earnings ratios. Such a pattern is difficult to explain by the hypotheses that mergers are intended to increase efficiency or market power. In this paper we test four hypotheses that have been put forward to explain merger waves. We find that the two hypotheses based on shareholder wealth maximization - i.e. the industry shocks hypothesis and the *q*-theory of mergers - cannot account for mergers' wave pattern. In contrast, the two hypotheses that do not assume that mergers create wealth -- the overvalued shares and managerial discretion/growth maximization hypotheses – are consistent with this pattern. The number of mergers falling into these two categories increases significantly during stock market booms, thus explaining both why mergers come in waves and why they are correlated with stock price movements. Support for these hypotheses is presented by estimating several models of the determinants of mergers. Additional evidence is presented by examining the means of payment and the returns to acquiring firms for up to three years after the acquisitions. Important differences between tender offers and "friendly mergers" are also identified, which add still more support for the two hypotheses.

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One of the most striking characteristics of mergers is that they tend to come in bunches. This characteristic is readily apparent in Figure 1, where the number of mergers and the Standard and Poor's (S&P) price/earnings ratio (P/E) for each year are plotted beginning with the 1880s. Mergers' wave pattern is readily apparent, as is a relationship to share prices. When the S&P-P/E rises, so too does the number of mergers, a sharp fall in the P/E quickly brings a merger wave to an end.

A by now fairly large literature exists, which formally explores the relationship between merger activity and share prices, and tests whether the claim that mergers come in waves can be established econometrically.[1] Our goal in this article is not to contribute to this literature. Rather we wish to offer an economic explanation for this wave-like pattern in merger activity. We do so by testing four different hypotheses that have been put forward to account for merger waves.

A great many hypotheses seek to explain why mergers occur.[2] Most do not imply the kind of pattern observed in Figure 1, however. Consider, for example, the hypothesis that mergers occur to achieve some efficiency gain that lowers costs. The incentive to cut costs should be strongest during recessions, when most firms have excess capacity and there is considerable downward pressure on prices. Yet, the advent of a recession/depression always brings a precipitous decline in merger activity. Why are increases in efficiency so attractive when stock prices are soaring and so unattractive when they fall?

A similar question can be raised with respect to the hypothesis that mergers are motivated to obtain monopoly power. Market power is presumably always nice to have, why would the desire to obtain market power escalate so dramatically as share prices climb, and disappear so quickly as they crash? Why was market power not just as attractive in the 1930s as in the late 1920s?

The four hypotheses tested in this article do claim to explain why mergers come in waves. We test each using data on mergers in the United States from 1981-99. The four

hypotheses are: (1) The industry shocks hypothesis (Mitchell and Mulherin, 1996; Harford, 2003). Some event occurs, like the invention of a new production process that greatly increases the size necessary to obtain minimum average costs in an industry, and this event precipitates a merger wave *within the industry*. Waves in aggregate merger statistics are due to temporal clustering of industry merger waves. (2) The *q*-theory of mergers. A merger involves one company's purchasing the plant and equipment of another company. Mergers are thus forms of investment, and can be explained like other purchases of plant and equipment using the *q*-theory of investment (Jovanovic and Rousseau, 2002). (3) The overvaluation hypothesis of mergers. From time to time the shares of some companies become overvalued by the stock market. Knowing that their shares are overvalued, the managers of these companies exchange them for real assets through mergers, thereby protecting their shareholders from the wealth loss that will accompany the market's eventual correction of its error in evaluation (Shleifer and Vishny, 2003; Rhodes-Kropf and Viswanathan, 2003; Rhodes-Kropf, Robinson and Viswanathan, 2003). (4) The managerial discretion hypothesis of mergers. Some managers are empire builders. Mergers are the fastest way for a firm to grow, and thus empire-building managers undertake mergers even when they may lower the wealth of their shareholders (Marris, 1964; Mueller, 1969).

The plan of the paper is as follows. In the next section, we discuss the logic underlying each of these four hypotheses, how they are related to merger waves, and how we shall test them. In Section II we describe the pattern of merger activity over the last two decades and the data used to test the hypotheses. The results of these tests are presented in Section III. Although some empirical support for all four hypotheses can be claimed, the strongest support seems to lie with the overvaluation and managerial discretion hypotheses. These hypotheses have additional implications regarding the patterns of returns to shares of acquirers. These implications are discussed and tested in Section IV. Conclusions are drawn in Section V.

I. Hypotheses about Mergers and Merger Waves

A. The Industry Shocks Hypothesis of Mergers

1. *Underlying logic*

Both Mitchell and Mulherin (1996) and Harford (2003) have presented arguments and evidence that merger activity varies significantly across industries. They posit that certain industry shocks occur making mergers profitable. An example of a technological shock was given above. A second example would be deregulation of an industry, which changed the nature of the competitive environment in the industry and the incentives to merge.

To go from waves within individual industries to a wave across the entire economy, several industries must enter a wave at the same time. This might happen if, say, a major technological shock changed the cost structures of several industries at once. An obvious candidate for explaining the great merger wave at the end of the 20th century would be the spread of IT.

2. *Critique*

The two most conspicuous characteristics of mergers are that they come in waves, and that these waves are correlated with stock market booms. The industry-shocks hypothesis ignores this association entirely. There are two ways to bring these two patterns together. (1) A single exogenous event causes both a series of merger waves in several industries and the stock market boom. (2) The stock market boom itself causes a series of industry merger waves. Neither Mitchell and Mulherin (1996) nor Harford (2003) mention the association between aggregate merger waves and share prices, but without an explanation that links this association to industry shocks their account of merger waves is incomplete. The next three hypotheses explicitly relate merger activity to share price increases.

3. *Tests*

We test the industry shocks hypothesis in the following way. It is obvious from Figure 1 that there is considerable time series variation in merger activity. We thus begin by seeing how much of this variation we can explain with a set of two-year time dummies. We use two-year dummies on the grounds that a surge in merger activity must be at least two years in length to be called a "wave".[3] We then construct industry-time dummies and test to see how much additional explanatory power we get out of knowing the industry in which a firm is located when explaining its merger activity.

B. The *q*-Theory of Mergers

1. *Underlying logic*

Under the *q*-theory of investment, the rate of return on a firm's current capital stock exceeds the firm's cost of capital whenever $q > 1$, and the firm expands its capital stock. A straightforward application to the theory of mergers would imply that a firm with $q > 1$ can profitably expand by acquiring assets either in the form of capital investment or mergers.[4]

In the *q*-theory's original formulation to explain investment in plant and equipment, a firm's *existing* assets are earning a return greater than the firm's cost of capital, and thus it is profitable to expand its existing capital stock. Thus it would seem that a direct application of the *q*-theory to mergers would only allow one to explain *horizontal* mergers, for it would be pressing the hypothesis of capital market efficiency unduly hard to claim that a $q > 1$ signifies that the market recognizes that an expansion of a firm's assets into a new market would be profitable, and thus can explain a conglomerate or vertical acquisition. Since less than half of all mergers are horizontal, this implication of the *q*-theory leaves over half of all mergers unaccounted for.[5]

An alternative interpretation of the *q*-theory would be that a $q > 1$ does not necessarily imply that a firm can profitably expand by acquiring more assets in its base industry, but that the firm is well managed and could possibly expand in any direction.[6] Tobin's *q* under this interpretation is not a measure of the quality of a firm's assets, but of its management. We shall interpret the *q*-theory of mergers in this way and test it for all forms of mergers.

2. *Critique*

Jovanovic and Rousseau (2002) (hereafter J&R) are the only ones to have applied the *q*-theory to mergers *and* to claim to be able to explain merger waves with this theory. They liken mergers to the purchase of used plant and equipment, and show for the period 1971-2000 that their *q*-equation for mergers outperforms a similar equation for purchases of used-capital. When a firm chooses to expand, however, it has three options: purchase new plant and equipment, purchase used plant and equipment, or purchase another company. It is not clear why the firm should limit its options to the latter two. As share prices rise during a stock market rally, the cost of acquiring capital by buying other firms should *rise* relative to that for both new and used capital equipment. Table 1 reports by year the mean *q*s (MV_{t-1}/K_{t-1}) for acquirers and targets of both tender offers and friendly mergers. (The distinction between tender offers and friendly mergers is important in some of our later tests, so we present separate figures here to facilitate later comparisons.) The mean *q*s for targets of friendly mergers exceed one in all but two years and rise to as high as 1.5 during the merger wave of 1995-99. Since the *q* for new or used capital equipment equals 1.0 by definition, these forms of asset acquisition must dominate mergers, and mergers should become increasingly *less* attractive as stock market prices and merger activity rise. This point is reinforced when one notes that the average premium paid for a target is around 20 percent in normal times and as much as 50 percent during the peaks of merger waves. Thus, if one calculates Tobin's *q* by placing the value actually paid for a target in the numerator, the implied cost of the assets rises considerably. This can be seen in the columns with the headings D_t/K_{t-1} in Table 1, where the

mean rations of deal values to total assets are presented. In several years acquirers paid on average more than double the value of a target's assets as recorded in its balance sheet. In general, the premia paid for targets in tender offers are smaller than for friendly mergers, but they too rise to 50 percent or more during the late 1990s.[7] The argument that merger waves occur during stock market booms, because buying other companies becomes relatively more attractive than purchasing assets in the new or used capital markets at this time seems difficult to sustain in face of the evidence presented in Table 1.

3. *Test*

In the J&R application of the *q*-theory to mergers, it is the *q* of all potential acquiring firms *relative* to the *q* of all targets at a particular point of time that drives mergers. During a stock market boom this difference widens to create a merger wave. Defining the total amount of assets acquired through mergers of firm *i* in year *t* as M_{it}, q_{it-1} as Tobin's *q* for firm *i* in period *t-1*, and q_{Tt-1} as the mean Tobin's *q* for all target firms in period *t-1*, we obtain:

The *q*-Theory Hypothesis: $\frac{\partial M_{it}}{\partial(q_{i,t-1} - q_{T,t-1})} > 0$.

C. The Overvalued Shares Hypothesis

1. *Underlying logic*

Shleifer and Vishny (2003) (hereafter S&V) present a theoretical explanation of merger waves that rests on the assumption that share prices become *overvalued* during stock market booms. The managers of firms with overvalued shares know that they are overvalued and wish to protect their shareholders from the loss in wealth that will come when the market lowers its estimate of the firm's value to its warranted level. They accomplish this by exchanging their overvalued shares for the real assets of another company, which presumably are correctly priced in the market. The target's managers are assumed to have short time horizons, so they too gain by "cashing in" their stakes in their firms at favorable terms. Although mergers are

not assumed to generate any wealth-creating synergies, when they occur as a result of some firms having overvalued shares, under the S&V theory they appear to be win-win events. In the Rhodes-Kropf and Viswanathan (2003, hereafter RKV) version of the overvaluation theory, the motivation of the acquiring firm's managers is the same as for S&V, but the target's managers are assumed to accept the overvalued shares of bidders, because they overestimate the gains from the merger.

2. *Critique*

The overvaluation hypothesis suffers from a logical difficulty similar to that pointed out with respect to the J&R hypothesis. In this theory, the managers of a company with overvalued shares are assumed to maximize the welfare of their current shareholders at the expense of new ones. Given this objective, it is not obvious why the managers choose to acquire *other firms* as a way of unloading their overvalued shares. Their shareholders will gain if they trade their overvalued shares for *any* fairly valued real assets. Since all firms' share prices tend to rise during a stock market boom, any firm that they buy is likely to be overvalued, although perhaps not to the extent that their own firm is (see again Table 1). When one adds in the premiums paid for targets, purchasing them must provide smaller benefits for the acquirers' shareholders than purchasing other forms of assets. An obvious alternative would be to issue shares and use the proceeds to retire some of the firm's outstanding debt. The debt of other firms is another possibly attractive asset, as are real estate, works of art and any other real assets, whose prices do not rise in proportion to the stock market, and do not require premiums of 20 percent or more to consummate the deal. Thus, the overvaluation hypothesis as an explanation for merger waves is subject to the same criticism as J&R's *q*-theory explanation – overvalued shares can be sold and the funds used to buy other forms of assets, which, during merger waves, are better buys than other companies.

3. *Test*

To test the overvaluation hypothesis, we need to be able to measure the extent of overvaluation of a firm. Here we encounter a logical difficulty. If we can identify firms that are overvalued and measure the extent of overvaluation, so too presumably can the capital market, and firms will cease to be overvalued. This logical conundrum notwithstanding, several different measures of overvaluation have been employed in the literature.

In a recent paper, Dong, Hirshleifer, Richardson and Teoh (2002) (hereafter DHRT) have used two variables to identify overvalued firms and test S&V's theory. One is the ratio of the book value of equity (B) to market price (P). For many firms this ratio will be close to the reciprocal of Tobin's q. Tobin's q equals the ratio of the market value of the firm, V, to the replacement value of its assets, K. For a company with no debt outstanding, $V = P$, and if the book value of its assets equaled their replacement costs, $B/P = K/V$. When using B/P as an index of overvaluation, DHRT come close to saying that firms with high qs, are likely to be overvalued and undertake mergers. Thus, the J&R model may also be interpreted as a test of the overvaluation theory. DHRT's second index of overvaluation is the ratio of residual income model value to price.

Rhodes-Kropf, Robinson and Viswanathan (2003, hereafter RKRV) decompose the market to book value to test the overvaluation theory. We shall use a measure of overvaluation that is similar in spirit to this latter measure, but we think is easier to conceptualize and interpret.

The market value of a firm i can be written as the present value of its profit stream from now to infinity, where p_{it} is i's profits in period t, and k_i is its cost of capital.

$$V_{i0} = \sum_{t=0}^{\infty} \frac{p_{it}}{(1+k_i)^t} \tag{1}$$

Assuming an average rate of growth of g_i from now to infinity, (1) becomes

$$V_{i0} = \sum_{t=0}^{\infty} \frac{p_{io}(1+g_i)^t}{(1+k_i)^t} = \frac{p_{io}}{k_i - g_i} \tag{2}$$

under the assumption that $k_i > g_i$. We shall assume that all firms in an industry have the same costs of capital and expected growth rates. We shall then estimate $1/(k_i - g_i)$ for a typical firm in an industry by regressing the market values of all firms in the industry on their profits for a period of time when, based on the aggregate price/earnings ratio for the S&P index, shares in aggregate do not appear to be overpriced. Call this estimate of $1/(k_i - g_i)$, α. Then using this α we predict in any year t a firm i's market value as

$$\widehat{V_{it}} = \hat{a} p_{it} \tag{3}$$

We then create a measure of a firm's overvaluation in any year, O_{it}, as

$$O_{it} = V_{it} - \widehat{V_{it}} \tag{4}$$

Under the overvaluation hypothesis the assets acquired through mergers should be positively related to O_{it}.

In both the S&V and RKV theories, the managers of the target firms are willing partners in the transactions. Managers of targets in hostile takeovers are virtually never willing partners in the transactions. Although all mergers consummated through tender offers are not hostile takeovers, tender offers seem a less friendly way to acquire another company than through a mutual agreement among the two companies' managers.[3] Defining T_t as the assets acquired through tender offers, and F_t the assets acquired through friendly mergers, we then have $F_t = M_t - T_t$, where M_t is the total amount of assets acquired through all forms of acquisitions. M_t is the variable used to test both the industry-shocks and q-theories of mergers. We estimate the overvaluation model separately for all three variables, with the expectation being that the model explains friendly mergers best.

Overvaluation Hypothesis: $M_{it} = aO_{it} + \mu_{it}$, $F_{it} = bO_{it} + \varepsilon_{it}$, and $T_{it} = cO_{it} + \gamma_{it}$,

with the prediction of $b > a > c \geq 0$.

D. The Managerial-Discretion Hypothesis

1. *Underlying logic*

The managerial-discretion hypothesis assumes that managers get utility from seeing their firms grow rapidly. This utility might arise because managers' incomes are tied to the growth of the firm, or because they get "psychic income" from managing a larger firm. Robin Marris (1964, 1998) was the first to posit growth objectives for managers. He hypothesized further that managers were constrained in their pursuit of growth by the threat of takeover, which he assumed to be inversely related to the ratio of the market value of the firm to its book value of assets, a variable that obviously closely resembles Tobin's q. The managerial discretion hypothesis of mergers can thus be formulated by expressing the managers' utility as a function of the growth of their firms, g and q, $U = u(g, q)$, where $\partial u/\partial g > 0$, $\partial^2 u/\partial g^2 < 0$, $\partial u/\partial q > 0$, and $\partial^2 u/\partial q^2 < 0$. A further justification for including q in the managers' utility function would be that managers own shares in the firm.

If we assume that a firm can always finance growth by issuing equity or debt, even after its internal cash flows are exhausted, then the *only* constraint on a manager's pursuit of growth comes through the fall in q and increased threat of takeover that might accompany growth. Defining *M* as the amount of assets acquired through mergers, and setting $g = g(M)$, we can then maximize $u(g, q)$ with respect to M to determine the utility maximizing level of growth through mergers. This yields the following first order condition:

$$(\partial u / \partial g)(\partial g / \partial M) = -(\partial u / \partial q)(\partial q / \partial M) \qquad (5)$$

Since $\partial u/\partial g > 0$, $\partial g / \partial M > 0$, and $\partial u/\partial q > 0$, (5) cannot be satisfied as an equality when $\partial q / \partial M > 0$. For any merger that increases a firm's *q no tradeoff* between growth and security from takeovers exists. It follows that managers who obtain utility from growth undertake *all* mergers that increase q, as will a manager who maximizes shareholder wealth. Their behavior differs only with respect to mergers that *decrease* q. In Figure 2a we depict the relationship

represented by eq. 5 for mergers that lower q. When no mergers of this type are undertaken, q is at its maximum and the risk of takeover is minimized. When the relationship between q and M is such as to yield $-(\partial u/\partial q)(\partial q/\partial M)_N > 0$, a utility-maximizing manager undertakes M_N of value destroying mergers.

To understand the link between the managerial discretion hypothesis and merger waves, we must consider the psychology of the market during the stock market booms that accompany the waves. As Galbraith (1961, p. 8) observed, an "indispensable element of fact" during stock market bubbles is that men and women proceed "to build a world of speculative make-believe. This is a world inhabited not by people who have to be persuaded to believe but by people who want an excuse to believe." These excuses to believe take the form of various "theories" as to why share prices should rise to unprecedented levels, why the economy has entered a "new era" (Shiller, 2000, Ch. 5). Prominent among these new era theories are typically "theories" about the wealth increases that will follow from mergers. Shiller gives an example of this during the stock market boom and merger wave at the beginning of the 20th century. "The most prominent business news in the papers in recent years had been about the formation of numerous combinations, trusts, and mergers in a wide variety of businesses, stories such as the formation of U.S. Steel out of a number of smaller steel companies. Many stock market forecasters in 1901 saw these developments as momentous, and the term *community of interest* was commonly used to describe the new economy dominated by them" (Shiller, 2000, p. 101, italics in original). Shiller quotes an editorial from the *New York Times* from April 1901, which prophesizes that the U.S. Steel merger will avoid "much economic waste" and effect "various economies coincident to consolidation." The editorial also prophesized similar benefits from mergers in railroads. Such optimism explains why U.S. Steel's share price soon soared to $55 from the $38 it was floated at in 1901. (By 1903 it had plunged to $9, *Economist,* 1991, p. 11.)

Thus, the willingness of investors to accept new news as good news during a stock market boom changes the costs to managers from announcing unprofitable mergers. The announcement of such a merger under normal conditions would result in a sufficiently large fall in the acquiring firm's share price to prevent its managers from undertaking the merger. The announcement of the same merger during a stock market boom leads to only a modest fall in share price, or perhaps even a rise. If the line N in Figure 2b depicts the relationship between q and M when the stock market is at a normal level, then we expect during a stock market boom a shift in this relationship to something like line B. The penalty for announcing a bad merger in terms of a fall in q is smaller during a stock market boom. This change in the relationship between q and M shifts $-(\partial u/\partial q)(\partial q/\partial M)$ to the right, as shown in Figure 2a. The firm acquires more assets through mergers, M_B, since Tobin's q does not drop by as much or perhaps even rises when a merger is announced.

We also posit that the relationship between q and M is sensitive to the level of a firm's cash flows. The larger a firm's cash flow, the more likely it is that it can finance an acquisition of size M out of cash flow without having to lower dividends and thus risk lowering q and increasing the threat of takeover.[4]

The optimism that frees managers to finance unprofitable mergers by issuing shares should also free their hands to use more of their cash flows to finance mergers. The announcement of a potentially unsuccessful acquisition that will be financed out of cash flows is less likely to drive an acquirer's price down in a boom market. This reasoning leads us to include an interaction term between q and cash flow with the predicted sign on this interaction term being positive. The higher q is, the more discretion managers have to undertake unprofitable investments, and the *larger* is the predicted coefficient on cash flows.[5]

Holding M constant, the larger the size of the potential acquirers, the less impact the acquisition has on its q. Thus, the curve relating q to M in Figure 2 should be flatter, the larger

the size S of the acquiring firm relative to the size of the target, M. Assets acquired through mergers should vary positively with firm size.

2. *Critique*

Tobin's q appears in our formulation of the managerial discretion hypothesis, is the key variable in the q-theory of mergers, and might be used as a measure of overvaluation to test this hypothesis. Thus, evidence in support of one of these theories might also be interpreted as supporting one of the others. Although the managerial discretion hypothesis makes some predictions that are not part of the other two theories – as for example regarding cash flow and the cash flow/q interaction term – one must reognize that a clean separation of these three hypotheses is not entirely possible. We describe some additional ways to discriminate among them in the following section.

3. *Test*

To test the managerial discretion hypothesis, we need a variable to capture the degree of speculation in the stock market. We experiment with two variables. The first follows from Shiller's (2000) work and is just the annual value of the S&P P/E ratio (P/E_t). (Although we could subtract the long run average of P/E to obtain a measure of *over* optimism, subtraction of a constant from the variable would not change its statistical properties, and so we simply use the untransformed index.) Our second proxy for over optimism is the annual mean value of the overvaluation variable constructed to test the overvaluation hypothesis, O_t.

These considerations lead to specific predictions as to which firms undertake mergers at a given point in time, and how merger activity varies over time.

Managerial Discretion Hypothesis:

$$\frac{\partial M_t}{\partial CF_{t-1}} > 0, \frac{\partial M_t}{\partial (P/E)_t} > 0, \frac{\partial M_t}{\partial O_t} > 0, \frac{\partial M_t}{\partial q_{t-1}} > 0, \frac{\partial M_t}{\partial (q_{t-1} \cdot CF_{t-1})} > 0, \frac{\partial M_t}{\partial S_{t-1}} > 0$$

As with the overvaluation hypothesis, we expect the managerial discretion hypothesis to find more support for friendly mergers than for tender offers. Tender offers are more likely to meet with resistance from target firm managers and thus produce higher premia. Since acquiring firms' managers are assumed to be only interested in growth under the managerial discretion hypothesis, they should not care which firms they acquire, and will thus favor friendly mergers because of their likely lower premia and transaction costs.[6] Although we estimate the same model for all forms of acquisitions, M_t, tender offers, T_t, and friendly mergers, F_t, we expect a better fit to it for the latter choice of dependent variable.

E. Distinguishing among the several hypotheses

Under the q-theory, the relationship between q and merger activity should be the same at all times. The rise in merger activity during a stock market rally is driven entirely by the general rise in all qs that occurs. Moreover, under the q theory, the observed qs are assumed to be unbiased estimates of the firms' true market values. Thus, under the q-theory the mergers occurring during a merger wave should be wealth creating.

In contrast any mergers arising, because some companies' shares are overvalued, are not assumed to create wealth. As under the q-theory, S&V's overvaluation hypothesis implies the same relationship between overvaluation and merger activity during normal times as during a stock market boom. A company that is overvalued by 30 percent has the same incentive to undertake an acquisition when the stock market is at a normal level or depressed as it has when it is booming. Thus, S&V's overvaluation hypothesis should predict waves correlated with stock prices, solely because the fraction of firms that are overvalued increases during stock market booms. RKV'S version of the overvaluation hypothesis, on the other hand, predicts more mergers during stock market booms both because more firms are overvalued and because potential target managers are more likely to make valuation errors.

There are two reasons to expect a correlation between merger activity and stock prices under the managerial discretion hypothesis. First, because share prices and thus *q*s are on average high, managers have less fear of takeovers and are willing to undertake more acquisitions. This prediction is similar to that of both the *q*- and overvaluation theories, although the rationale behind it is quite different. The second reason to expect a link between merger activity and stock market booms under the managerial discretion hypothesis is that the market's reaction to the announcement of an acquisition is expected to be different during a stock market boom. Thus, the managerial discretion hypothesis predicts a parameter change between a period of normal stock prices and a stock price boom. This difference forms an important part of our attempt to discriminate among the various hypotheses.

II. Methodology and Data Description

Our principal source of data is the *Global Mergers and Acquisitions* database of *Thompson Financial Securities Data*. This company collects merger and spin-off data using a variety of sources such as Reuters Textline, the Wall Street Journal, Dow Jones etc. The database covers all transactions valued at $1 million or more. We define a merger or tender offer as a transaction where more than 50 percent of the target's equity is acquired. A tender offer is a formal offer of determined duration to acquire a company's shares made to its equity holders.

Table 2 presents the fractions of mergers in our sample that take the form of a tender offer by year. The popularity of tender offers during the late 1980s is readily apparent with their fraction of all acquisitions peaking at 28 percent in 1988. In reaction to the wave of hostile takeovers in the late 1980s, managers approached the legislatures in the states in which they were incorporated and demanded legislation that afforded them better protection against takeovers. Most readily complied, which helps explain the sharp relative decline in tender offers in the early 1990s.[7]

The discussion in the previous section leads to various predictions regarding the signs on the relevant variables. In most cases the underlying logic does not allow one to predict the functional form of the relationship, however. We experimented with polynomials up to the third order, but only report the results for the higher order terms, when they are significant.

The regressions might be estimated twice, once as probit regressions to determine the probability that a company undertakes an acquisition, and a second time as Tobit regressions to take into account differences in the sizes of the targets. Both probit and Tobit regressions were estimated, but only the Tobit results are reported, because they differ from the probit results only with respect to the sizes of the coefficients on the different variables. That is to say, when the magnitudes and significance of two coefficients in a probit equation were similar for a particular specification, they were similar for the corresponding Tobit equation. Thus, the same variables that explain *whether or not* a firm undertakes a merger in a particular year explain the *amount* of assets acquired. The close similarity between the results for the probit and Tobit estimations also implies that there was little to be gained from adopting Heckman's (1976) two-stage estimation procedure for censored data.

Summary statistics for our data are presented in Table 3. The variables (*Compustat* data item numbers) are as follows. M_t is the deal value (total consideration paid by the acquirer excluding fees and expenses) divided by the total assets of the acquiring firm in year *t-1*. *Tobin's q* is the market value of the firm divided by its total assets, where market value is the sum of the market value of common stock, and the book values of total debt both short and long term (9+34), and preferred stock, defined as available, as redemption value (56), liquidating value (10), or par value (130). The market value of common stock is the end-of-fiscal year number of shares (54) times the end-of-fiscal year price per share (199). Overvaluation is O_{it} from (4). *Cash flow* is the sum of after tax profits before extraordinary items (18), and accounting depreciation (14). All variables are deflated by the *CPI* (1995=1.00). The average deal value was $343.3 million with targets of tender offers ($592.1

million) being significantly larger than for mergers ($303.7 million). This difference might be explained by the fact that tender offers were often intended to take over large diversified companies and spin off some of their assets. The average target was 19 percent of the acquirer's size in a tender offer, 17 percent in a merger. Mean Tobin's *q* for acquirers in tender offers was not significantly different from that of the full sample. Acquirers in mergers had significantly higher *q*s than other companies, however. Both types of acquirers had significantly higher levels of cash flows than non-acquirers. Both were also dramatically more overvalued on average than were non-acquiring companies. The mean ratios of our overvaluation measure to total assets were 30.8% for acquirers in tender offers and 47.1% for acquirers in friendly mergers, while non-acquirers exhibited almost *no* overvaluation on average (mean 1.1%). The fact that acquirers in friendly mergers were significantly more overvalued than acquirers in tender offers is consistent with our conjecture that the overvaluation hypothesis is more likely to hold for friendly mergers than for tender offers.

The summary statistics for targets, however, contradict the overvaluation hypothesis. Targets of both tender offers and friendly mergers were even more overvalued than their acquirers with the difference being particularly large for friendly mergers. The logic underpinning the overvaluation hypothesis is that managers of acquiring firms trade away their overvalued shares for real assets that will not subsequently fall in value. Such a trade does not make much sense, if the assets acquired are more overvalued than the shares traded for them.

III. The Findings

A. Test of Industry Shocks Hypothesis

Two sets of regressions were run using only time dummies. One defined 1983-84 as the first two-year period and continued with two-year dummies until 1999, which was assigned a dummy variable. The second assigned a dummy variable to 1982-83, 1984-85 and so on by two-year intervals. Table 4 presents the OLS estimates for the second set of time-dummies,

which yielded a slightly better fit to the data. To make it easier to separate *waves* of mergers from *troughs* each observation is defined as a deviation from the sample mean. Those coefficients on the dummy variables that are statistically significant at the 5 percent level are in bold face. The nine time-dummies explain one percent of the variation in merger activity across the sample (see Eq. 1).

In the tests of the other three theories of mergers, we shall concentrate upon the more appropriate Tobit estimates. When we regressed assets acquired onto a set of 243 industry/time dummies (9*27), however, our program for estimating Tobit regressions dropped many industry/time terms. Since we are not interested in the exact coefficients at this juncture, we report only the OLS results for the two regressions. As with the time dummies, the explanatory power of the industry/time interactions was similar for both choices of time dummies, and we report only the results for the set that begins with 1982-83. Eq. 2 in Table 4 presents these results. Considerable variation across industries and time is apparent. Sixty-five of the 243 industry-time interactions are significant. For four industries, six of the dummies are significant. Although there is obviously a lot of clustering of acquisition activity across all industries in the late '90s, every two-year period had at least one significant industry dummy. Thus, merger activity can be said to vary considerably both over time and across industries.

The industry-shocks hypothesis posits that some industry-specific technological, regulatory or other form of change occurs at a point in time and precipitates a merger wave within an industry. To further substantiate the theory, one would need to examine the history of each industry to identify what precipitated a wave of acquisitions in SIC industry 35 in 1994-95, in industry 31 in 1982-83, and so on.[8] While in principle one could do this, it would obviously be a very time consuming task and one fraught with subjectivity. Every industry experiences some changes each year, so that it would always be possible to identify *some* event that preceded and thus possibly caused a wave. But how would one test whether this event did

in fact precipitate the wave, and how would one explain why a similar event did not precipitate a wave in industry Y? More importantly, how could one determine whether "the event" leading to a merger wave within an industry, did not cause its shares to become overvalued and, thus, really supports the overvaluation hypothesis, or did not increase managers' discretion to pursue growth and, thus, supports the managerial discretion hypothesis? We shall not attempt to answer these questions here, because it is clear from Table 4 that regardless of what these answers are, the industry-shocks hypothesis can account for only a small fraction of merger activity. The nine time dummies in eq. 1 of Table 4 explain more than two-thirds as much of the variation in merger activity as the 243 time-industry interaction dummies. Once one accounts for the aggregate variation in merger activity over time, knowing the identity of a firm's industry adds little to our ability to predict its merger activity.

B. Test of the *q*-Theory of Mergers

The key variable in the J&R test of a *q*-theory of mergers is $(q_{it-1} - \overline{q}_{Tt-1})$, where q_{it-1} is the q for potential acquiring firm i in year t-1, and $\overline{q}_{Tt-1}$ is the mean q for all target firms in t-1. The first equation in Table 5 presents the result of a Tobit regression that includes this variable and a set of industry dummies, whose coefficients are not reported to save space. The coefficient on the variable is positive as predicted and highly significant, although the model explains only 1.4 percent of the variation of assets acquired over the time period.

An alternative test of the J&R model is to separate their key variable into its two components, q_{it-1} and $\overline{q}_{Tt-1}$. The coefficient on $\overline{q}_{Tt-1}$ should be negative and equal in absolute value to that on q_{it-1}. The pseudo R^2 more than triples when the variable is separated into its two parts, but the coefficient on $\overline{q}_{Tt-1}$ is *positive*, highly significant, and *16 times* larger than that on q_{it-1}. Instead of merger activity falling as the price of targets rises, it increases dramatically. This is not surprising given the pattern of merger activity depicted in Figure 1,

but we believe it constitutes a serious strike against the q-theory as an explanation for mergers and merger waves.

C. Test of Overvaluation Theory of Mergers

The first equation in Table 6 presents the results from a Tobit regression in which total merger activity is explained by our measure of overvaluation, O_{it} (industry dummies were again included, but their coefficients are not reported). Eqs. 2 and 3 repeat the exercise for friendly mergers and tender offers. The Tobit procedure would not converge when industry dummies were included in the tender-offer equation, so the estimates for it are without controlling for industry differences. The same is true for all other tender-offer equations in Tables 6 and 7. The coefficient on O_{it} is positive and significant as predicted in all three equations and, in the M_t and F_t equations, O_{it} explains a bit more of the variation in assets acquired, than did the q-theory equation. As noted above, q might also be treated as a measure of overvaluation. We conjectured that the overvaluation hypothesis should explain friendly mergers better than tender offers. This conjecture does not seem to be supported in eqs. 2 and 3, where O_{it} picks up a larger coefficient in the tender offers' equation. Further examination reveals more support, however.

O_{it} can be broken into two components, O_t, the mean level of overvaluation across the entire sample, and dO_{it}, the deviation of firm i's overvaluation from this sample mean in t, $dO_{it} = O_{it} - O_t$. If one replaces O_{it} in the equation with dO_{it} and O_t, both variables should have the same coefficient, if all that matters for mergers is the extent of overvaluation of the acquiring firms. Eqs 4 and 5 in Table 6 report the results when this substitution is made. Both coefficients in eq. 4 are highly significant, but the coefficient on O_t is *13 times* larger than that on dO_{it}. This dramatic difference from eq. 2 seems difficult to reconcile with the logic underlying at least the S&V version of the overvaluation theory. From the point of view of the managers of an acquiring company the *source* of its overvaluation should not matter, only its

magnitude. Eq, 4 in Table 6, however, states that overvaluation which is market wide leads to far more assets being acquired through friendly mergers than firm specific overvaluation.

Turning next to eq. 5, we again see that the coefficient on O_t is larger than that on dO_{it}. Indeed, the coefficient on dO_{it} is not significantly different from zero. *All* that matters for tender offers is the overvaluation in the market. A comparison of eqs. 4 and 5 reveals a much stronger fit between the two overvaluation variables and friendly mergers, than for tender offers. This result supports our conjecture that the overvaluation hypothesis should explain friendly mergers better than tender offers. Under the logic of the hypothesis, however, it should be the overvaluation of the acquiring firm that drives acquisitions. The fact that this variable has a much smaller coefficient than the measure of market optimism in the friendly mergers' equation, and is not even significant in the tender offers' equation, seems to contradict the hypothesis somewhat.

D. Test of the Managerial Discretion Theory of Mergers

The first three equations in Table 7 report the results of Tobit regressions for all mergers, friendly mergers and tender offers, when the S&P price/earnings ratio is used as the measure of optimism in the stock market. As discussed above, we expect the managerial discretion theory to provide a better explanation for friendly mergers than for hostile takeovers and tender offers. The objective of hostile takeovers is often to replace the managers of the target firm, and thereby improve the performance of the assets under its control. Although all tender offers are not necessarily hostile takeovers, they are more hostile than a merger to which both firms' managers have agreed. We therefore concentrate on the results for tender offers and friendly mergers.

A cubic relationship for total assets (S_{it}) proved the best fit in all three equations. The coefficients on the three assets terms imply an S-shaped relationship between a company's size

and the amount of assets acquired, with the marginal impact of a change in size varying, but always being positive.

The coefficients on q and the q-cash flow interaction terms are positive and significant in the friendly mergers' equation, but insignificant in the tender-offers' equation. This result supports the prediction that the managerial discretion hypothesis is better at explaining friendly mergers than tender offers. Eq. 2 implies that managers of firms with high qs feel that they have more discretion to pursue growth through mergers, and more freedom to use their cash flows to achieve this growth. In contrast, the decision to make a tender offer does not depend on a firm's having a high q ratio.

One characteristic of bidders in a tender offer, which is very important, is the level of cash flows. Although cash flow has a positive and significant coefficient in both equations, its coefficient is five times larger in the tender-offers' equation. The coefficient on the S&P *P/E* ratio is positive and significant in both equations, but is twice as large in the mergers' equation than for tender offers. These results again support the hypothesis that friendly mergers are different from tender offers and more likely to be driven by managers' pursuit of growth. Managers are more willing to undertake mergers that are not wealth creating when stock prices are high, because they expect more favorable reactions to the announcements of such mergers in times of overall optimism in the market. Tender offers are more likely to be value creating, and thus the managers who undertake them have less to fear in terms of the market's reaction to their announcements.

Equations 4 and 5 in Table 7 replace the S&P *P/E* with the mean level of over-optimism as defined and calculated in the previous subsection. It performs about the same as the *P/E* ratio in both equations with its coefficient in the friendly mergers' equation again being much larger than for tender offers.

Equations 2-5 in Table 7 clearly reveal that friendly mergers are much more sensitive to the degree of optimism in the market than are tender offers. This difference raises the question

of whether the effects of the other variables in the equations are also sensitive to the degree of optimism in the market. Figure 1 reveals a sharp upward movement in the S&P *P/E* starting in 1995. This year can be regarded as the start of the great bull market of the 1990s and constitutes a natural place for dividing our sample on the grounds that the market's optimism regarding future earnings began to increase rapidly at this time. We shall estimate separate coefficients for each of the two time periods, therefore, with the expectation being that the managerial discretion hypothesis receives more support in the period after 1994. The basic model estimated for friendly mergers looks then as follows:

$$F_{it} = \text{a}\ CF_{94,it-1} + \text{b}\ CF_{99,it-1} + \text{c}\ q_{94,it-1} + \text{d}\ q_{99,it-1} + \text{e}\ q_{94,it-1}CF_{94,it-1} + \text{f}\ q_{99,it-1}CF_{99,it-1} + \text{g}\ P/E_t + \text{h}\ S_t + \mu_{it} \quad (6)$$

where the subscript 94 implies observations through 1994, and zero elsewhere, and 99 implies observations from 1995 through the end of 1999, and zero elsewhere. CF_{t-1} is deflated by S_{t-1}. For comparison purposes, (6) is also estimated with T_t as the dependent variable. Since the S&P *P/E* and O_t both appear to be equally good at measuring the degree of optimism in the market, we shall only report the results for the model with the *P/E* variable. As the break in the data has been selected on the basis of the change in optimism occurring in the mid-90s, this split in the data greatly reduces the variation in P/E_t. Therefore, we do not estimate separate coefficients for P/E_t for the two periods. We again experiment with higher order specifications for each variable.

The results appear in eqs. 6 and 7 of Table 7. Size continues to have a cubic relationship with merger activity, and cash flow now exhibits a quadratic relationship, with the coefficients on both terms being positive. An increase in cash flow leads to a disproportionate increase in assets acquired through mergers. The coefficients on the cash flow and *q* terms are substantially larger during the stock market rally at the end of the '90s. It is also the case that the interaction term between *q* and cash flow is significant only during the stock market boom. A positive coefficient for this variable is one of the key predictions of the managerial

discretion theory. The two variables, which measure a management's freedom to undertake unprofitable mergers – *q* and cash flow –, are much more strongly associated with merger activity *only* during the stock market boom. Although the managerial discretion theory is supported in both time periods, its support is much stronger during the stock market boom.

The results for tender offers differ from those for mergers in many respects. The coefficient on the S&P *P/E* is only half as large as in the friendly mergers equation. The degree of optimism in the market is more weakly related to the amount of assets acquired through tender offers than through friendly mergers. Cash flow again has a quadratic relationship with assets acquired in the tender-offers' equation, but now the coefficient on the squared cash flow term is *negative.* Low levels of cash flow appear to be a constraint on companies wishing to make tender offers, but this constraint diminishes rapidly as cash flow increases. In contrast, as cash flows increase managers become *more* prone to use them to make friendly mergers.

Tobin's *q* is insignificant prior to 1995, but becomes positive and significant during the stock market rally implying that firms became more willing to undertake tender offers during the boom, if their own share prices were relatively high. In this respect, firms making tender offers became more like firms making friendly mergers during the stock market boom. Both coefficients on the cash flow/*q* interaction terms are negative, but neither is significant at conventional levels. The behavior of this variable again highlights the significant difference between friendly mergers and tender offers. We expect that tender offers during the first time period to be more likely to be wealth creating, and friendly mergers – particularly during the second time period – to be driven by managerial empire building. A rise in *q* increases the discretion managers have to make bad acquisitions, and thus explains why managers willingness to use their cash flows to undertake friendly mergers increased as their *q*s increased during the stock market boom. At the same time, increases in *q* did not lead to a greater willingness to make tender offers.

E. Discussion

Our tests of the four theories of acquisitions have found support for all. Many of the industry/time dummies are statistically significant, and collectively their substitution for the nine time dummies significantly improves the fit of the equation. On the other hand, the additional explanatory power that one gets from replacing nine time dummies with 243 time-industry dummy variables is less than one half of one percent!

The key variable in J&R's q-theory of mergers picks up a positive and significant coefficient as predicted. The fact that the predictions of the theory break down entirely, once this variable is separated into its two components seems to be a serious objection to it, however.

A positive relationship between company qs and merger activity might also be interpreted as support for the overvaluation hypothesis, on the grounds that qs actually measure the extent of overvaluation. Our measure of overvaluation performed similarly to q in explaining mergers. Further analysis revealed, however, that it was the *average* level of overvaluation in the market – that is the degree of optimism in the stock market – and not a firm's own overvaluation that is the major force behind mergers. Although this result is not strictly inconsistent with at least the KRV version of the overvaluation hypothesis, it does imply that it is not so much the overvaluation of bidders that accounts for mergers during stock market booms, but rather the willingness of the targets' shareholders to accept these overvalued shares. Since the general optimism in the market that explains this willingness also plays an important role in the managerial discretion theory, this finding is consistent with both theories.

S&V's version of the overvaluation hypothesis states that acquiring firms' managers swap their bad stock for good targets' stock and thus prevent more losses in the future for their old shareholders. An obvious prediction of the S&V theory should then be that the use of own equity to pay for acquisitions rises in stock market booms. Table 8 presents a break down of

the sources of finance, cash, debt and equity, for acquisitions by year. A relative increase in the use of cash to finance acquisitions at the peak of the merger boom (1997-1999) is apparent. This increase is fully consistent with the managerial discretion theory, because cash flows increased significantly during the late 1990s and cash flows are the preferred source of finance for managers making bad investments (Mueller, 1969; Jensen, 1986). The relative decline in the use of equity to finance mergers in the boom years 1997-1999 indicates at a minimum that more was behind the merger wave of the late '90s than overvalued shares.[9]

The overall optimism in the market is a key factor in accounting for mergers under the managerial discretion theory. The constraint on managers' pursuit of growth via mergers is the increase in the threat of takeover following the announcement of a wealth-destroying merger. This threat declines during periods of overall market optimism and frees managers to undertake more wealth-destroying mergers. Additional support for the managerial discretion hypothesis was found in the performance of size, cash flow, firm q and the interaction of cash flow and q.

The reader might object that we have "stacked the deck" in favor of the managerial discretion hypothesis by including more variables in its model than for the q- and overvaluation hypotheses. In particular, one might argue that firm size should be regarded as a control variable common to all three theories. We have no major objection to including size in the q- and overvaluation models. When one does, it performs as in the managerial discretion model and, of course, increases the explanatory power of the models somewhat. It is worth pointing out, however, that size cannot easily be rationalized as belonging in either model under their own, underlying logic. A firm with highly overvalued shares can always issue these shares to finance a merger, regardless of the size of the target. Indeed, one might argue that the managers of a firm with overvalued shares should *prefer* acquiring bigger companies, because they can trade away more overvalued paper for real assets. Firms with high qs should also not have trouble acquiring companies larger than themselves by exchanges in stock. Thus,

although large companies may have easier access to capital markets than small ones under normal conditions, when their share prices are above normal, size should not constrain them in issuing shares. In contrast, the justification for size in the managerial discretion model is *not* because it proxies for ease of access to capital markets, but rather for freedom from takeover and enhanced managerial discretion.

IV. The Returns to Acquirers

Under the *q*-theory mergers should create wealth, and the same claim has been made by proponents of the industry shocks hypothesis (Mitchell and Mulherin, 1996; Harford, 2003). Neither the overvaluation nor the managerial discretion hypotheses make such a claim. One way to discriminate among the four hypotheses, therefore, is to examine whether mergers create wealth or not.

Event studies have been the most frequently used methodology for measuring the wealth effects of mergers. Most of these examine the changes in wealth to shareholders of the two merging firms over short "windows" of only a few days around the announcement of the acquisition. This methodology places heavy reliance on the assumption of capital market efficiency. The capital market is assumed to make an unbiased evaluation of the total change in wealth that the merger will produce upon its announcement. This assumption is inconsistent with both the overvaluation and managerial discretion hypotheses as explanations of merger waves. Both assume that the market makes an overly optimistic estimate of the merger's effects upon its announcement, and thus that the wealth changes over a short window are an inaccurate predictor of a merger's ultimate effects. Both hypotheses also imply that the acquiring company's shareholders should suffer a significant loss of wealth over a much longer window. In the case of the overvaluation hypothesis, this loss arises because the market eventually correctly prices the acquirer's assets and the wealth of the shareholders declines by the amount of the initial overvaluation. In the case of the managerial discretion hypothesis, the loss arises because the market eventually learns that the merger will not generate wealth. The

acquirer's share price can then be expected to fall as a result of the premium it paid for the target and to reflect any additional transaction costs and inefficiencies caused by the merger. Both hypotheses also predict that the post-merger losses to acquirers' shareholders are larger for mergers taking place during stock market booms than for mergers during normal times, and larger for friendly mergers than for tender offers.

There is considerable evidence in the literature that is consistent with these predictions. For example, Agrawal, Jaffe and Mandelker (1992) estimated significant negative returns for five-year post-merger windows for mergers taking place in the 1950s, 1960s and 1980s. For the 1970s, however, a period of extremely depressed stock market prices, they estimated insignificantly *positive* abnormal returns. The pessimism that pervaded the stock market during the '70s prevented managers from undertaking wealth-destroying acquisitions out of empire-building motives or because their shares were overvalued.

Loderer and Martin (1992) also estimated returns for different time periods spanning 1966-86. They obtained only *one* significant estimate of a post-announcement abnormal return — a negative return for mergers taking place during the stock market boom between 1966 and 1969. Six additional studies of the 1960s merger wave that estimated negative returns over long post-merger windows are discussed in Mueller (2003).

Evidence also exists of the important difference between friendly mergers and tender offers. Both Magenheim and Mueller (1988) and Rau and Vermaelen (1998) estimate positive post-acquisition returns for tender offers, and negative returns for friendly mergers. These results are consistent with the interpretation of our findings given above – tender offers tend to be wealth creating, while many friendly mergers occur because of overvalued shares or managerial empire building.

As our final test of the different theories we estimate the abnormal returns to acquiring firms' shareholders over windows of one month, and one, two and three years. We present separate estimates for mergers occurring prior to the great merger wave (1980-94), and during

the wave (1995-99). We again present separate estimates for friendly mergers and tender offers. We use the total return index from Datastream, which is adjusted for dividend payments and share splits. If the overvaluation and managerial discretion theories account for much of the increase in merger activity during the stock market boom, then we expect to observe the following patterns:

Prediction 1: The abnormal returns to acquirers over the one-month window are near zero for both time periods.

Prediction 2: The abnormal returns to acquirers for mergers during the wave of 1995-99 become increasingly negative for the longer windows and are more negative than for mergers from 1980-94.

Prediction 3: The abnormal returns to acquirers for friendly mergers are lower than for tender offers in both periods.

Recent studies that estimate abnormal returns have controlled for various characteristics of firms that might be related to differences in returns on shares. The most important of these appear to be firm size and some variant on q, like the ratio of market to book value.[10] We shall not control for the latter ratio, because it is related to the overvaluation of firms. To eliminate this difference would be to discriminate against this hypothesis. We control for the effects of differences in firm size by dividing our sample into size deciles, and calculating the abnormal return for an acquiring firm as the difference between its buy-and-hold return over the respective window and the mean buy-and-hold return for all firms in the same size decile, which did not make an acquisition in the same period.

Our results are presented in Table 9. The first row presents the abnormal returns of acquirers over the month of the merger announcement. As predicted they are near zero for

both friendly mergers and tender offers in each time period, although a bit higher for tender offers. All differences are statistically insignificant.

After one year the shareholders of acquiring firms in friendly mergers have earned significantly lower returns than shareholders of similar sized firms that did not make acquisitions. As predicted, the post-merger abnormal return of –7.37% is larger for friendly mergers taking place during the stock market boom (1995-99) than for the earlier period (–4.56%) with the difference being significant at the 10% level. Also as predicted, the abnormal returns to acquirers in tender offers (+2.95%) are significantly higher than for those of acquirers in friendly mergers – at least during the first period. As we saw in our earlier results, tender offers taking place during the stock market boom years are different from those that took place between 1980 and 1994.[11] Indeed, the relative decline in performance after one year of shares of companies making tender offers between 1995 and 1999 is actually somewhat *larger* than for firms making friendly mergers. These results suggest that tender offers during the stock market boom should be treated similarly to friendly mergers, and the most meaningful comparison as far as friendly mergers is concerned is between friendly mergers over the period 1980-94 (abnormal return of –4.56%), and all acquisitions during 1995-99 (-7.64%, see third set of results in Table 9). A comparison of the means and medians of the various distributions of returns indicates that they are all positively skewed. For both tender offers and friendly mergers, the median abnormal return in the 1995-99 period is significantly lower at the1% level than for the 1980-94 period.

Roughly the same pattern of returns can be observed two years after the acquisitions as for one year. The performance of acquirers has deteriorated relative to non-acquiring firms even more, however. The performance of firms making tender offers during the stock market boom also deteriorates relative to those making friendly mergers, although it is still significantly better during the earliest period. Again combining tender offers in the boom

years with friendly mergers, we have the following pattern of abnormal returns: tender offers (1980-94) 0.51% > friendly mergers (1980-94) -8.34% > all acquisitions (1995-99) -12.15%.

The results after three years are similar: tender offers (1980-94) -0.88% > friendly mergers (1980-94) -7.95% > all acquisitions (1995-99) -10.59%. Thus, the results in Table 9 largely accord with our predictions. At the time of acquisition announcements there is little difference in share performance between acquiring and non-acquiring firms for both types of acquisitions and both time periods. As time elapses, acquiring firms in friendly mergers begin to under perform firms not making acquisitions and the decline is greater for mergers taking place during the stock market boom. Tender offers between 1980 and 1994 exhibit significantly better performance than both friendly mergers and tender offers during the stock market boom. Indeed, the abnormal returns to firms making tender offers during the 1980-94 period remain close to zero for all time periods. Given the significant positive returns to target firms in tender offers, these results allow us to conclude that tender offers between 1980 and 1994 are likely to have been wealth creating. In contrast, the returns to firms making tender offers during the stock market boom suggest that they – like friendly mergers – were wealth destroying. Tender offers during the stock market boom are distinguishable from friendly mergers only in so far as they have a somewhat worse performance.

VI. Conclusions

No single hypothesis can explain all mergers, and each of the hypotheses tested here undoubtedly explains some mergers. Our objective in this article has not been to test general theories of mergers, however, but theories which specifically claim to explain merger waves. Of the four tested, the first two receive the least support. Although significant increases in merger activity can be observed in different industries at different points in time, taking these differences into account increases our ability to explain overall merger activity only marginally relative to simply accounting for the aggregate time-series variation in mergers. Moreover, the shocks that produce waves in some industries may be related to the other theories. For

example, the OPEC-induced increases in oil prices during the 1970s produced huge increases in oil company profits and led to a wave of mergers in this industry. This wave seems to be well-explained by the managerial discretion hypothesis, which emphasizes the importance of cash flows in financing growth.[12] More generally, the "shock" that caused many industries to enter a merger wave in the late 1990s appears to have been the dramatic rise in share prices as predicted by the other three hypotheses.

Under the *q*-theory a firm with a $q > 1$ should wish to acquire assets at any point in time. The *q*-theory's explanation for a wave during a stock market boom must logically be that more firms have high *q*s, when the stock market is high. The *q*-theory also predicts, however, that merger activity should vary inversely with the *q*s of targets. This prediction was resoundingly rejected and thus we must dismiss the *q*-theory as an explanation for merger waves, if not for individual mergers.

The over optimism that accompanies stock market booms figures importantly in both the overvaluation and managerial discretion theories. The market's optimism increases the degree to which companies' shares are overvalued, and the willingness of managers to exchange these overvalued shares for less overvalued assets. High share prices and cash flows increase managerial discretion, and the increased optimism in the market allows managers to announce wealth-destroying mergers without seeing their share price fall and the probability of a takeover rising dramatically. Thus, the association between merger activity and the S&P *P/E* and our measure of overall optimism in the market can be interpreted as support for both theories. Our tests of the overvaluation hypothesis require a somewhat different interpretation of this hypothesis than put forward by its proponents, however. The driving force behind mergers during the merger wave is much more the willingness of targets' shareholders to accept overvalued shares than the extent to which they are overvalued.

The overvaluation and managerial discretion theories both predict a fall in the share price of the acquiring company, once the market realizes that the merger has not created any

synergies, and may even have destroyed wealth. This prediction differentiates these two theories from both the *q*- and industry shock theories, which assume that mergers are wealth creating. This prediction is well supported in our data. Although friendly mergers were followed by losses to acquirers' for both time periods, the losses were particularly large for mergers during the wave of the late '90s.

Several of our results are consistent with both the overvaluation and managerial discretion theories. However, one piece of evidence clearly favors the managerial discretion hypothesis. During the final years of the stock market boom, not only did mergers financed through share swaps *not* increase, they fell relative to those financed by paying out cash.[13]

The most conspicuous feature of the stock market boom of the late 1990s is certainly the heights to which share prices of high tech firms were driven. But merging firms also benefited from the market's euphoria, and the various "theories" about different synergies that would accompany certain mergers. The booming market of the 1990s allowed Dennis Kozlowski to put together the giant conglomerate Tyco. The stock market collapse at the start of the new millennium had the same adverse effect on Dennis Kozlowski and Tyco as did the collapse in the early 1970s on the conglomerate empire builders of the 1960s.[14]

It is common among Wall Street analysts to treat each stock market bubble and merger wave as an unprecedented event, caused by factors unrelated to past bubbles and waves, and thus unlikely to follow the same pattern as these events (Shiller, 2000, Ch. 5, *Economist*, Nov. 6, 1993). In contrast we have emphasized the similarities between these events. Mergers in the United States have always come in waves that correlate with stock market booms, when the market and managers are both likely to be overly optimistic, and the constraints on managers are least binding. The pattern of coefficients for the variables in our equations to explain friendly mergers support the overvaluation and managerial discretion theories, and help explain both the correlation of mergers with aggregate stock market movements, and the identities of the firms making acquisitions.

Although of necessity we have focused on the evidence regarding recent mergers, we believe that an analysis of the earlier merger waves would yield similar findings.[15] Some managers are likely to be empire builders at all points of time, and their proclivities to undertake mergers will be enhanced by rising share prices, shareholder optimism, and lots of cash. Alternatively, rising share prices and shareholder optimism will lead to overvalued shares. The next great merger wave can be expected to occur when the next great surge of optimism drives stock prices upwards, and to subside when share prices begin to fall.

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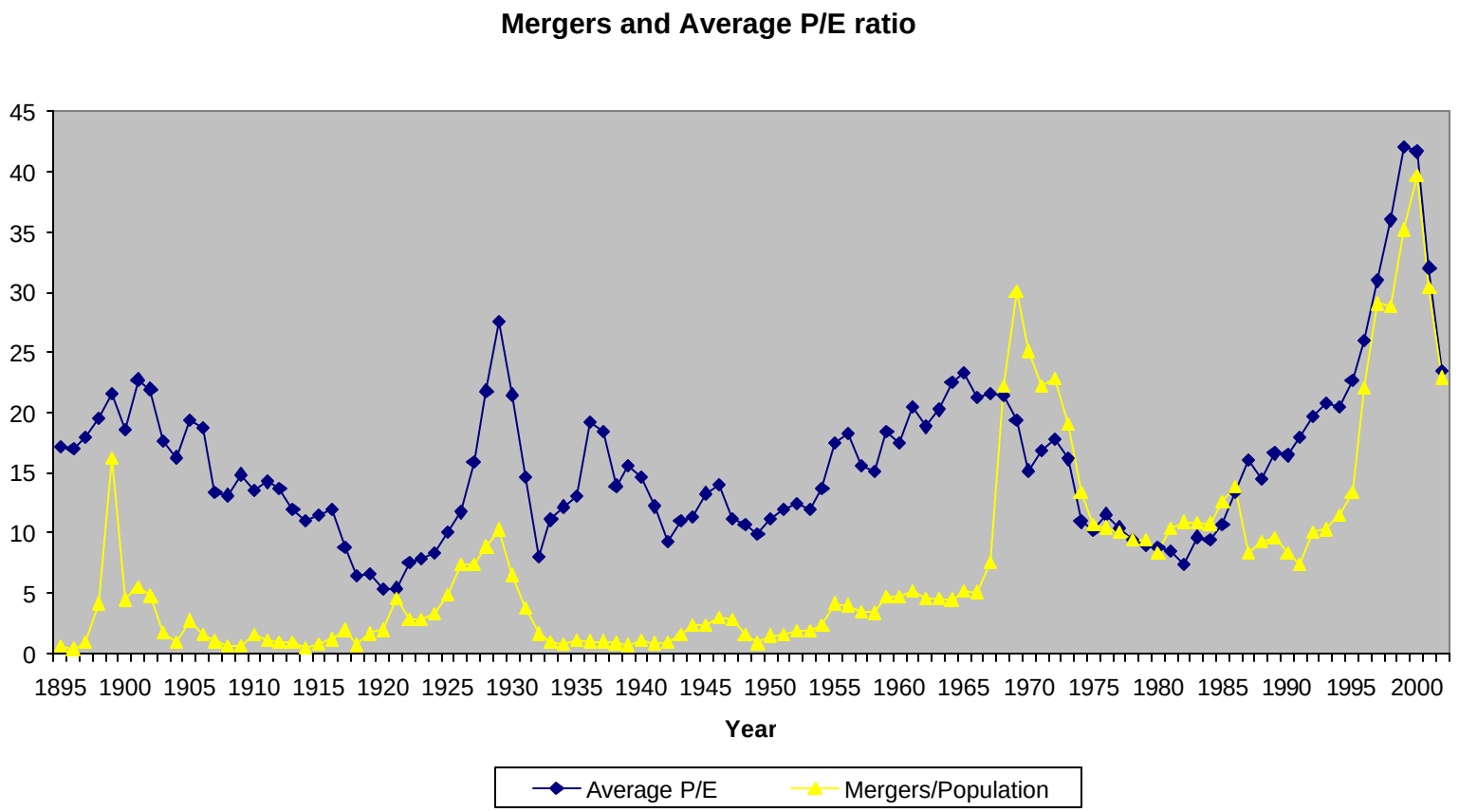
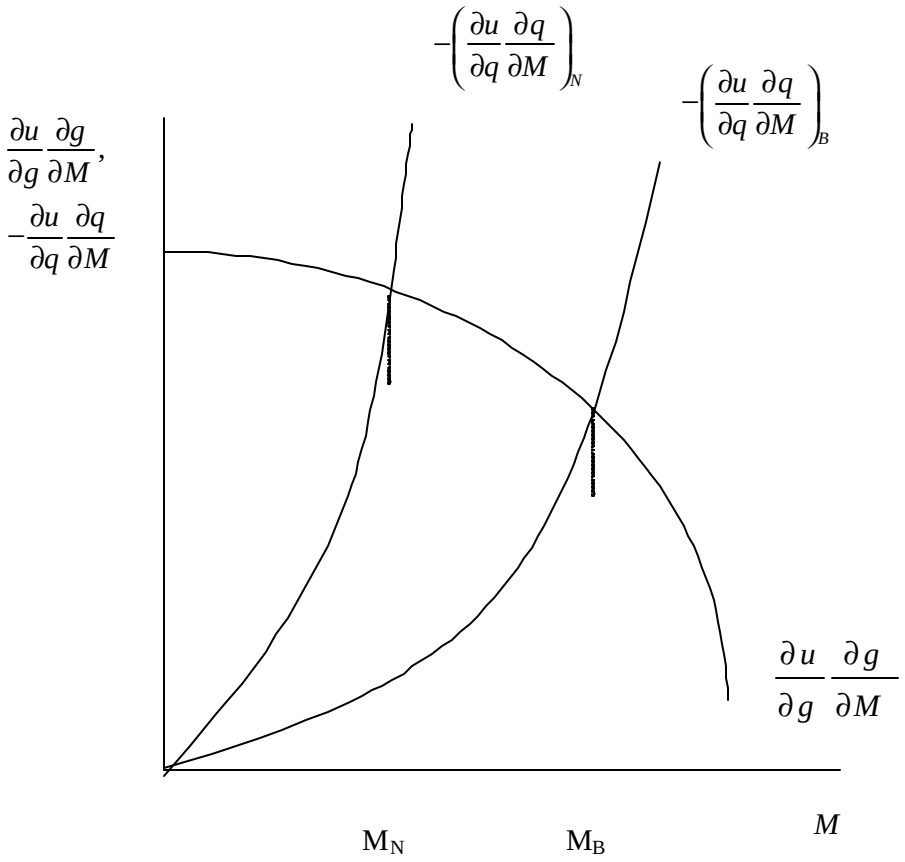
Figure 1:



Sources: Mergers: 1895-1920 from Nelson (1959); 1921-67 from FTC; 1968-2002 from M&A. *P/E* ratios: Homepage of Robert Shiller: http://aida.econ.yale.edu/~shiller/data.htm; for 2002 we use the average *P/E* ratio until July; mergers: number of mergers in the first 8 months multiplied by 1.5 Population: Statistical Abstract of United States (several years).

Figure 2: The Managerial Trade-off

a



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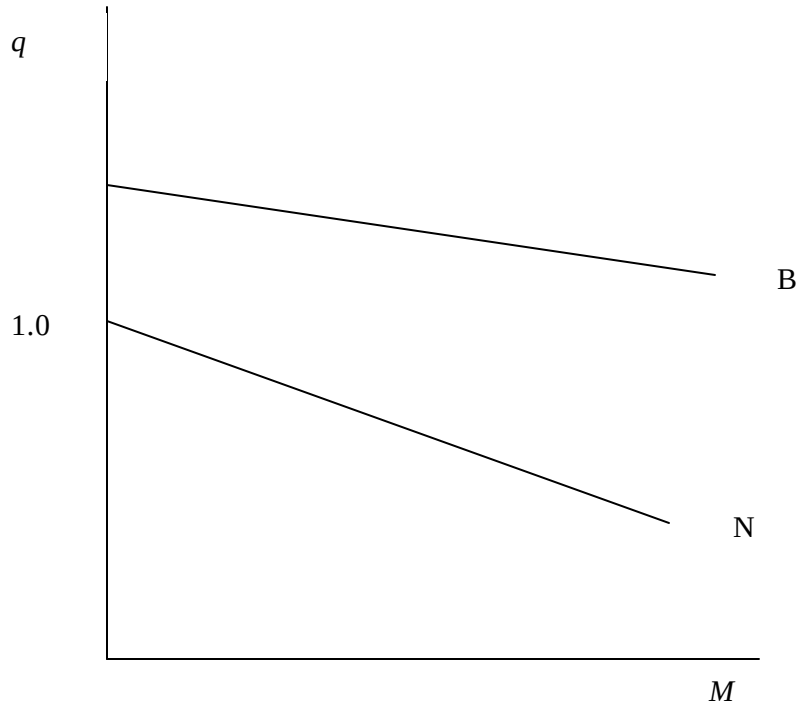

Table 1: Mean Tobin's *q*s of Acquirers and Targets in Mergers and Tender Offers

	Acquirers		Targets			
Year	Friendly Mergers	Tender offers	Friendly Mergers		Tender offers	
	MV_{t-1}/K_{t-1}	MV_{t-1}/K_{t-1}	MV_{t-1}/K_{t-1}	D_t/K_{t-1}	MV_{t-1}/K_{t-1}	D_t/K_{t-1}
1981	1.313	0.697	1.054	1.967	1.074	1.009
1982	1.051	0.876	0.924	1.497	1.036	1.111
1983	1.246	0.782	0.903	1.471	0.750	0.902
1984	1.354	0.908	1.120	1.462	0.955	1.368
1985	1.236	0.862	1.008	2.129	0.960	1.514
1986	1.334	0.952	1.142	1.855	1.047	1.620
1987	1.609	1.224	1.242	1.886	1.150	2.150
1988	1.329	1.214	1.091	1.704	1.065	1.671
1989	1.447	0.942	1.279	2.355	1.067	1.389
1990	1.824	1.428	1.125	2.045	1.289	1.296
1991	1.765	1.056	1.004	1.910	1.003	1.016
1992	2.119	2.057	1.308	2.120	0.935	1.477
1993	1.902	1.679	1.117	2.087	0.946	0.881
1994	1.877	1.796	1.506	1.711	1.210	1.638
1995	1.539	1.500	1.344	1.594	1.058	1.454
1996	1.872	1.629	1.288	1.665	1.561	1.959
1997	2.317	1.436	1.332	2.152	1.141	1.665
1998	2.211	1.768	1.434	1.797	1.209	1.453
1999	2.058	1.732	1.526	2.027	1.177	1.864
81-94	1.529	1.177	1.130	1.871	1.035	1.360
95-99	1.999	1.613	1.385	1.847	1.229	1.679
81-99	1.730	1.320	1.249	1.896	1.121	1.537

Note: MV_{t-1} = market value of the firm in year *t-1*. K_{t-1} = total assets of the firm in year *t-1*. D_t = deal value: amount paid for target in year *t*. In the text the deal value is symbolized by M_t, but we use D_t here to avoid confusion with the market value.

Table 2: Number of Mergers and Tender Offers of US Sample Firms

Year	Total Mergers	Tender offers	%Tender offers
1981	219	14	6.39%
1982	334	22	6.59%
1983	509	23	4.52%
1984	507	29	5.72%
1985	154	35	22.73%
1986	163	44	26.99%
1987	168	44	26.19%
1988	187	53	28.34%
1989	266	45	16.92%
1990	264	19	7.20%
1991	322	12	3.73%
1992	419	11	2.63%
1993	586	19	3.24%
1994	706	24	3.40%
1995	812	40	4.93%
1996	968	46	4.75%
1997	776	59	7.60%
1998	452	54	11.95%
1999	376	45	11.97%
All years	8,188	638	7.79%

Source: Global Vantage/Compustat and Thompson Financial Securities.

Table 3: Summary statistics, mean values

	All Acquisitions	Tender Offers	Friendly Mergers
Acquirer characteristics:			
Tobin's *q*	1.66	1.32	1.73
Overvaluation (% of Total assets)	45.1	30.8	47.1
Cash flow/Total assets	0.058	0.080	0.055
Total assets (Mn 1995 USD)	4472.1	6957.0	4125.0
M_t*	0.183	0.172	0.186
Target characteristics:			
Tobin's *q*	1.22	1.12	1.25
Overvaluation (% of Total assets)	68.3	33.2	73.5
Cash flow/Total assets	0.068	0.084	0.065
Total assets (Mn 1995 USD)	222.9	384.5	195.3
Deal Value (Mn 1995 USD)*	343.3	592.1	303.7
		Non-merging firms:	
Tobin's *q*		1.51	
Overvaluation (% of Total assets)		1.1	
Cash flow/Total assets		0.041	
Total assets (Mn 1995 USD)		1431.2	

* Only firm years with deals are used.

Note: Tobin's q is the market value of the firm divided by book value of assets; Overvaluation is O_{it} from equation (4); M_t = deal value (i.e. the total amount paid for the target) divided by total assets.

Table 4: OLS regressions of assets acquired on time and industry dummies
(Grand mean: 0.010; t-value: 40.51; Nobs: 83,624)

Time-period	82/83	84/85	86/87	88/89	90/91	92/93	94/95	96/97	98/99	adj R^2
Industry:										
Eq. 1:	**-0.0040**	**-0.0039**	**-0.0050**	**-0.0044**	**-0.0028**	0.0010	**0.0055**	**0.0029**	**0.0248**	0.0100
Eq. 2:										
SIC:										
< 10	-0.0100	-0.0100	-0.0100	-0.0063	-0.0055	-0.0025	-0.0049	**0.0418**	-0.0002	0.0146
10 - 14	0.0031	-0.0011	**-0.0077**	**-0.0081**	-0.0001	0.0020	**0.0109**	0.0026	**0.0357**	
15 -19	**-0.0097**	-0.0066	-0.0075	-0.0078	-0.0022	-0.0073	0.0076	0.0016	0.0044	
20 - 21	0.0031	-0.0029	-0.0028	-0.0068	-0.0055	-0.0030	-0.0008	-0.0025	0.0031	
22 - 23	-0.0091	-0.0005	-0.0050	-0.0069	0.0023	-0.0010	-0.0041	-0.0037	0.0091	
24 - 25	-0.0042	0.0004	-0.0014	-0.0066	-0.0080	-0.0031	-0.0060	0.0002	0.0133	
26 - 27	-0.0066	-0.0036	-0.0024	-0.0032	-0.0066	0.0049	-0.0012	-0.0017	**0.0169**	
28 without 283	-0.0059	-0.0036	-0.0033	-0.0036	-0.0041	-0.0053	0.0027	0.0038	**0.0202**	
283	0.0002	-0.0083	-0.0052	-0.0002	0.0035	**0.0091**	**0.0168**	-0.0035	**0.0224**	
29	-0.0073	-0.0038	-0.0100	-0.0037	-0.0051	-0.0059	-0.0068	0.0161	0.0119	
30	-0.0031	-0.0014	-0.0020	0.0020	-0.0074	-0.0099	-0.0018	0.0010	**0.0244**	
31	**0.0287**	-0.0100	-0.0100	-0.0100	-0.0100	-0.0100	-0.0044	-0.0063	-0.0100	
32	-0.0096	-0.0084	-0.0063	0.0004	-0.0058	-0.0075	-0.0089	-0.0100	**0.0207**	
33	-0.0037	-0.0073	-0.0100	-0.0071	-0.0096	0.0041	-0.0013	0.0003	0.0112	
34	-0.0001	-0.0050	-0.0032	-0.0075	-0.0087	-0.0002	-0.0048	-0.0008	0.0072	
35	**-0.0059**	-0.0047	-0.0027	-0.0020	-0.0019	-0.0019	**0.0090**	**0.0078**	**0.0281**	
36	-0.0044	**-0.0068**	**-0.0056**	**-0.0066**	**-0.0070**	-0.0014	**0.0078**	0.0034	**0.0357**	
37	-0.0079	-0.0025	-0.0041	-0.0055	-0.0094	-0.0082	0.0006	-0.0020	**0.0317**	
38	-0.0057	-0.0054	**-0.0082**	-0.0054	-0.0051	-0.0022	**0.0092**	0.0048	**0.0278**	
39	-0.0084	0.0001	-0.0029	-0.0067	-0.0078	-0.0020	-0.0017	0.0065	0.0138	
40 - 47	-0.0078	-0.0040	-0.0038	-0.0070	-0.0072	-0.0052	0.0041	-0.0050	0.0036	
48	0.0003	-0.0029	-0.0053	0.0027	0.0023	0.0013	**0.0235**	**0.0096**	**0.0421**	
49	**-0.0067**	-0.0058	**-0.0083**	**-0.0081**	-0.0055	-0.0012	-0.0025	-0.0035	**0.0121**	
50 - 59	**-0.0061**	**-0.0057**	**-0.0048**	**-0.0045**	**-0.0053**	-0.0018	-0.0007	-0.0024	**0.0153**	
60 - 69	**-0.0093**	-0.0067	**-0.0093**	**-0.0085**	**-0.0073**	0.0007	**-0.0049**	**-0.0043**	0.0041	
70 - 79	**-0.0059**	-0.0030	**-0.0059**	-0.0024	0.0038	**0.0105**	**0.0194**	**0.0118**	**0.0567**	
80 -99	-0.0020	-0.0060	**-0.0070**	-0.0059	0.0040	0.0056	**0.0146**	**0.0081**	**0.0413**	

Notes:
Each entry is the coefficient for a time (column) - industry (row) interactions, and measures the deviation for this industry in this time period from the grand mean (which is 0.01).
Bold coefficients are significant at the 5% level, two-tailed test. There are 65/243 significant industry-time interactions.

Table 5: Tobit regressions to test q-theory

Dependent variable: M_t, t-values are reported under the coefficients.

(n = 87,291)

Eq.	q_{it-1} - $\overline{q}_{Tt-1}$	q_{it-1}	$\overline{q}_{Tt-1}$	pseudo R^2
1	0.033			0.014
	(14.02)			
2		0.034	0.550	0.044
		(14.63)	(26.51)	

Note: q_{it-1} is acquiring firm Tobin's q; $\overline{q}_{Tt-1}$ is average target firm Tobin's q.

Table 6: Tobit regressions to test overvaluation theory

Eq	Type of acquisition	O_{it}	dO_{it}	O_t	n	pseudo R^2
1	All	$4.8*10^{6}$ (10.89)			52,616	0.017
2	Friendly Mergers	$4.6*10^{6}$ (10.07)			52,138	0.019
3	Tender Offers	$7.1*10^{6}$ (6.27)			49,754	0.007
4	Friendly Mergers		0.042 (15.77)	0.55 (22.45)	52,137	0.059
5	Tender Offers		0.011 (1.48)	0.14 (2.55)	49,753	0.024

Note: O_{it} is total overvaluation from (4); $dO_{it} = O_{it} - O_t$ is firm specific overvaluation; O_t is market wide overvaluation in year t. t-values are reported under the coefficients.

Table 7: Tobit regressions to test managerial discretion theory

Eq	1	2	3	4	5	6	7
Type of acquisition	All	Friendly Mergers	Tender Offers	Friendly Mergers	Tender Offers	Friendly Mergers	Tender Offers
q_{it-1}	0.042	0.045	-0.006	0.049	-0.0005		
	(17.05)	(17.92)	(-058)	(19.56)	(-0.05)		
q_{it-1}^{94}						0.019	-0.017
						(5.99)	(-0.96)
q_{it-1}^{99}						0.068	0.041
						(20.33)	(2.74)
CF_{it-1}	0.282	0.234	1.172	0.200	1.102		
	(7.15)	(5.80)	(6.32)	(5.01)	(5.99)		
CF_{it-1}^{94}						0.318	1.550
						(6.07)	(5.00)
CF_{it-1}^{99}						0.329	1.657
						(5.01)	(4.22)
CF_{94}^{2}						0.146	-2.664
						(2.60)	(-2.09)
CF_{99}^{2}						0.273	-3.235
						(4.59)	(-1.95)
$q_{it-1} * CF_{it-1}$	0.019	0.027	-0.081	0.036	-0.064		
	(2.04)	(2.76)	(-1.48)	(3.66)	(-1.15)		
$(q_{it-1} * CF_{it-1})_{94}$						0.020	-0.118
						(1.59)	(-0.92)
$(q_{it-1} * CF_{it-1})_{99}$						0.031	-0.157
						(2.28)	(-1.64)
$(P/E)_t$	0.017	0.019	0.010			0.015	0.007
	(29.27)	(29.34)	(5.94)			(23.54)	(3.90)
O_t				0.600	0.182		
				(25.51)	(2.98)		
S_{it}	$1.4*10^{-5}$	$1.24*10^{-5}$	$2.63*10^{-5}$	$1.32*10^{-5}$	$2.69*10^{-5}$	$1.17*10^{-5}$	$2.55*10^{-5}$
	(19.84)	(16.52)	(12.45)	(17.56)	(12.64)	(15.76)	(12.16)
S_{it}^{2}	$-8.7*10^{-11}$	$-7.6*10^{-11}$	$-2.3*10^{-10}$	$-8.0*10^{-11}$	$-2.4*10^{-10}$	$-7.09*10^{-11}$	$-2.23*10^{-10}$
	(-14.81)	(-12.39)	(-8.47)	(-13.12)	(-7.24)	(-11.18)	(-8.23)
S_{it}^{3}	$1.2*10^{-16}$	$1.0*10^{-16}$	$4.4*10^{-16}$	$1.1*10^{-16}$	$4.5*10^{-16}$	$9.61*10^{-17}$	$4.24*10^{-16}$
	(12.39)	(10.41)	(7.11)	(11.06)	(7.24)	(9.92)	(6.87)
N	82,844	82,305	78,794	82,305	78,794	82,305	78,794
pseudo R^2	0.083	0.087	0.070	0.077	0.065	0.095	0.075

Table 8: Sources of finance for acquisitions (percentages)

Year	Cash	Debt	Equity
1981	6.43	92.86	0.71
1982	0.00	100.00	0.00
1983	0.00	100.00	0.00
1984	1.17	98.71	0.12
1985	45.05	35.91	19.04
1986	69.42	3.36	27.23
1987	62.83	3.85	33.31
1988	67.30	5.54	27.16
1989	61.42	7.11	31.47
1990	54.18	9.22	36.60
1991	40.73	11.00	48.27
1992	44.63	13.11	42.26
1993	37.84	10.16	52.00
1994	39.97	7.61	52.42
1995	40.76	8.00	51.24
1996	38.89	6.49	54.62
1997	43.22	8.60	48.18
1998	42.13	8.12	49.75
1999	61.21	6.88	31.91
All years	40.67	20.48	38.86

Source: *Thompson Financial Securities* database.

Table 9: The Returns to Acquiring Firms

Window	Year of Acquisition	Friendly Mergers			Tender Offers			All Acquisitions		
		N	Mean	Median	N	Mean	Median	N	Mean	Median
Month of Acquisition	1980-94	1344	-0.27	-0.25	178	1.21	0.09	1522	0.44	-0.22
	1995-99	1023	1.20	-0.04	131	2.19	0.97	1154	0.68	0.00
	Difference		-1.47	-0.21		-0.98	-0.88		-0.24	-0.22
One Year after Acquisition	1980-94	1330	-4.56	-9.45	171	2.95	-4.63	1501	-3.69	-8.57
	1995-99	974	-7.37	-12.42	126	-9.71	-13.33	1100	-7.64	-12.53
	Difference		2.82[c]	2.97[a]		12.66[a]	8.71[a]		3.94[a]	3.96[a]
Two Years after Acquisition	1980-94	1241	-8.34	-19.85	159	0.51	-12.62	1400	-7.33	-18.84
	1995-99	865	-10.91	-22.71	112	-21.72	-32.89	977	-12.15	-24.01
	Difference		2.57	2.86[b]		22.22[a]	20.27[a]		4.81[a]	5.17[a]
Three Years after Acquisition	1980-94	1099	-7.95	-26.53	149	-0.88	-19.17	1248	-7.10	-25.18
	1995-99	754	-8.72	-24.74	95	-25.49	-41.66	849	-10.59	-27.90
	Difference		0.77	-1.79		24.61[a]	22.49[a]		3.49	2.72

Note: a, b, and c indicate significant differences at 1%, 5%, and 10% level, respectively. The median test is the Wilcoxon ranksum test.

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Notes:

[1] Evidence that the time series pattern of aggregate merger activity does conform to waves is presented by Golbe and White (1993) and Linn and Zhu (1997) for the United States, and by Resende (1999) for the United Kingdom. Ralph Nelson (1959, 1966) was the first to document the link between merger activity and share prices, and numerous subsequent studies have confirmed his finding. See, for example, Melicher, Ledolter and D'Antonio (1983), Geroski (1984) for the US, and Geroski (1984) and Clarke and Ioannidis (1996) for the UK.

[2] For surveys of these hypotheses see, Steiner (1975), Scherer and Ross (1990, Ch. 5), Mueller (2003, Ch. 8). For the efficiency and market power effects of mergers, see Mueller (1980) and Gugler, Mueller, Yurtoglu, and Zulehner (2003) and for the effects on wages and employment, see Conyon, Girma, Thompson and Wright (2002a, 2002b) and Gugler and Yurtoglu (forthcoming).

[3] This interval is also used by Harford (2003) to identify a wave.

[4] See Andrade and Stafford (2003), and Erard and Schaller (2002).

[5] These conceptual differences in applying the *q*-theory to mergers help explain why Andrade and Stafford (2003) find the cross-sectional patterns of investments in capital equipment and mergers to be quite dissimilar, while Erard and Schaller (2002) claim that they are similar forms of investment.

[6] See, for example, Chappell and Cheng (1984), Andrade and Stafford (1999), and Jovanovic and Rousseau (2002).

[7] We report averages for all MV_{t-1}/K_{t-1} and D_t/K_{t-1} for which we have data. Thus the number of firms in each column for any given year is not identical, although the overlap is substantial. This difference, plus the fact that D_t is measured later than MV_{t-1}, explains why the two 1993 entries for tender offers have the opposite relationship from all other entries.

[3] Schwert (2000) considers unnegotiated tender offers as a measure of the hostility of US deals. He also argues that bidders are more likely to be perceived as hostile when they use tender offers rather than merger proposals.

[4] The hypothesis that managerial discretion and cash flows could explain mergers was first put forward by Mueller (1969). Jensen (1986) coined the expression "free cash flow" to describe this phenomenon. Hay and Liu (1998) present some supportive evidence for the UK.

[5] Gugler, Mueller and Yurtoglu (2004) use this interaction term in investment-cash flow regressions.

[6] Many studies show that targets in tender offers earn higher premia than targets in (friendly) mergers. See for example Jensen and Ruback (1983) and Rau and Vermaelen (1998).

[7] See Roe (1993) and Bebchuk and Ferrell (1999).

[8] Harford (2003) has undertaken such an exercise.

[9] Consistently Gugler, Mueller and Yurtoglu (2003) show that firms use internal cash flows and external equity rather than external debt to finance low marginal *q* investment projects.

[10] See, for example, Barber and Lyon (1997).

[11] An examination of the results by year suggests that the change in tender offers commenced in 1992.

[12] In further support of this hypothesis, many of the petroleum company mergers of the 1970s were unmitigated disasters (Fortune, 1984). For additional evidence from the petroleum industry supporting the managerial discretion theory, see Lamont (1997).

[13] Additional evidence favoring the managerial discretion hypothesis is provided by Mueller and Sirower (2003). They relate the gains to acquiring firms' shareholders to the gains to the targets, and find for friendly (uncontested) mergers that each dollar in premium paid to a target's shareholders is matched after two years by roughly a dollar loss to the bidding firms' shareholders. (Similar results are obtained for several other separations of the sample.) Had the bidders been able to acquire companies without paying any premiums, their shareholders would not have suffered losses. This result does not seem to be what one would expect, if the bidders' shares were overvalued. They should have fallen in price even if the bidders paid no premiums for the targets.

[14] Dennis Kozlowski was removed as head of Tyco in July of 2002.

[15] Leeth and Borg (1994) have estimated large negative post-merger returns for the mergers of the 1920s wave.