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. We explain why none of the hypotheses based on the premise that managers are attempting to maximize profits seem capable of accounting for mergers' wave pattern. We account for this pattern with the hypothesis that *some* mergers are undertaken due to managerial hubris or because managers maximize the growth of their companies, and that the number of mergers falling into this category increases significantly during stock market booms, thus explaining *both* why mergers come in waves and why they are correlated with stock price movements. Support of this hypothesis is presented by estimating a model of the determinants of mergers. Additional evidence consistent with the hypothesis is presented by examining the means of payment used to finance mergers and the characteristics of the targets. Important differences between tender offers and "friendly mergers" are identified, which add still more support for the hypothesis.

Much of the literature on mergers treats them as events driven by the cold logic of maximizing profit. But this logic cannot explain the most conspicuous feature of mergers - that they come in waves, and that these waves are closely associated with movements in stock prices. Figure 1 reports the number of mergers and Standard and Poor's (S&P) price/earnings ratio (*P/E*) for each year beginning in 1895. The merger series has been deflated by the size of the US population to adjust for the growth in scale of the country over the last century. Mergers' wave pattern is readily apparent, as is the relationship to share prices. When the S&P-*P/E* rises, so too does the number of mergers, a fall in the *P/E* quickly brings a merger wave to an end.[1]

Perhaps the most venerable hypothesis of the cause of mergers is that they are a means for obtaining monopoly power. The first great merger wave in the United States occurred at the beginning of the 20th century and produced several companies, which came close to being pure monopolies. Some scholars claim that this wave was precipitated by the passage of the Sherman Antitrust Act in 1890, and early Supreme Court decisions that disallowed cartels.[2] But this would not appear to be the sole cause of the first merger wave, since it did not come to a halt in 1911 following the American Tobacco and Standard Oil of New Jersey Supreme Court decisions that made it clear that the Sherman Act also precluded obtaining monopoly power through mergers. It came to a halt roughly a decade earlier when the economy went into recession.

A loophole in Section VII of the Clayton Act, passed in 1914, made horizontal mergers of considerable size possible, so long as they stopped short of full monopoly. The stock market boom of the 1920s brought with it another large merger wave with many horizontal mergers. Stigler (1950) dubbed this the wave to create oligopolies. Thus, one might still entertain the hypothesis that market power, although on a more modest scale, was the motive behind many mergers in the second wave. One must wonder, however, why the desire to obtain market power escalated so dramatically as share prices climbed, and disappeared so quickly as they crashed. Why was market power not just as attractive in the 1930s as in the late 1920s?

The Celler-Kefauver Act of 1950 closed the loophole in Section VII and its vigorous

enforcement by the Department of Justice and Federal Trade Commission made both horizontal and vertical mergers difficult to consummate. If market power were the driving force behind mergers, then the Celler-Kefauver Act should have brought merger waves to an end. The stock market boom of the 1960s brought with it another major merger wave, however, this time of necessity dominated by diversification or "conglomerate" mergers. Although diversification mergers can lead to increases in market power,[3] most hypotheses put forward to explain the conglomerate mergers of the 1960s emphasized various efficiency gains from diversification.[4]

The desire to increase efficiency also does not seem like a plausible hypothesis to account for the wave pattern of mergers, however. Indeed, the incentive to cut costs is strongest during recessions, when most firms have excess capacity and there is considerable downward pressure on prices. Yet, the advent of a recession/depression has always brought about precipitous declines in merger activity. Why are increases in efficiency so attractive when stock prices are soaring, and so unattractive when they fall?

The 1980s saw the beginning of the fourth great merger wave. Here one might argue that the relaxation of antitrust policy was a precipitating factor. Certainly the shift in policy explains the large fraction of mergers that were horizontal during that period, and the size of some of these horizontal mergers.[5] As can be seen in Figure 1, however, the fourth great merger wave did not come to an end when the Clinton Administration took office and tightened antitrust policy. After a pause in the early 1990s, the wave resumed and soared to unprecedented heights.[6] What brought the last merger wave to an end was the collapse in share prices at the start of the 21st century - the same factor that brought its three predecessors to an end.

Most recent studies treat mergers as simply another form of capital investment, and try to explain them using models from the investment literature.[7] As we explain below, there are also conceptual problems to using investment models based on profits-maximizing behavior to explain merger waves. We estimate the parameters for two such models, and contrast the results with those from models of mergers that do not presume profit maximizing behavior. More specifically, we

claim that the wave pattern of mergers occurs because *some* mergers are undertaken due to managerial hubris or because managers maximize the growth of their companies.[8]   We hypothesize that the number of mergers falling into this category increases significantly during stock market booms, and that this increase explains *both* why mergers come in waves and why these waves are correlated with stock price movements.

Under the efficient capital market hypothesis each company's share price represents an unbiased estimate of the present discounted value of its future earnings.   If the capital market is efficient, a high aggregate *P/E* should signal rapid future growth of the economy.   There is considerable reason to believe, however, that during stock market booms, share prices reflect not simply the capital market's collective wisdom about future earnings growth, but an overly optimistic evaluation of this evidence brought about by various real and psychological factors that accompany stock market rallies.[9]   *P/E*s become in part an index of the market's *over*optimism.

If managers of potential acquiring companies are infected by this overoptimism, and they possess the discretion to pursue their own goals, they will undertake acquisitions that would not be warranted by strict profits maximization. Thus, we hypothesize that overoptimism and overly high share prices at stock market peaks lead to large numbers of mergers, and we present evidence supporting this hypothesis.

In addition to accounting for the wave pattern of mergers, our hypothesis can explain the choice of means for financing mergers, and why so many do not increase the wealth of the acquiring companies' shareholders.   We present and review evidence consistent with our hypothesis with respect to these two additional sets of implications.

We proceed as follows.   We begin by developing the empirical implications of both standard neoclassical theories that treat mergers as forms of capital investment, the hubris hypothesis, and the managerial discretion hypothesis (Section I).   In Section II we describe the pattern of merger activity over the last two decades and the data used to test our hypotheses.   The results of these tests are presented in Section III.   An important component of our tests is to

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separate tender offers from "friendly mergers." Section IV presents results for a model to explain the means of payment used in mergers and tender offers, while Section V examines the characteristics of the targets of mergers. In Section VI we review results from studies of the returns to acquiring company shareholders following mergers, and show how they add further support for our hypothesis. Section VII discusses two alternative hypotheses concerning the causes of merger waves. Conclusions are drawn in Section VIII.

I. Hypotheses about Mergers

A. Modeling Mergers as Profit-Maximizing Investments

1. *The q-Theory of Mergers*

Under the q-theory of investment, whenever the return on a firm's current capital stock exceeds its cost of capital $q > 1$, and it expands its capital stock. A straightforward application to the theory of mergers would imply that firms with qs > 1 can profitably expand by acquiring assets either in the form of capital investment or mergers.[10] Such an application of the q-theory *cannot* explain why merger waves coincide with stock market booms, however. During such a boom share prices rise by far more than do new plant and equipment prices. Thus, buying other companies becomes a relatively more expensive way to acquire physical assets than buying new plant and equipment during periods of overall stock price advances. If anything, one might expect from the q-theory a countercyclical merger pattern. During periods when share prices are generally low and potential targets' qs <1, firms with $q>1$ might find it cheaper to acquire capital goods by buying other firms. Thus, the q-theory as it has been applied in the investment literature, can at best only explain cross-sectional variation in investment.[11]

When the market perceives that a firm's existing assets will generate a larger than average flow of profits, $q > 1$, and the firm can profitably expand its capital stock. 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 is unfortunate.[12]

An alternative interpretation of the q-theory that can account for all forms of mergers is that a $q > 1$ does not necessarily imply that a firm can profitably expand by acquiring more assets in its base industry, but that it is well managed and could profitably expand in any direction.[13] Tobin's q under this interpretation is not a measure of the quality of a firm's assets, but of its management. Defining the total amount of assets acquired through mergers in year t as M_t, we obtain: The q-Theory Hypothesis: $\dfrac{\partial M_t}{\partial q_{t-1}} > 0$

2. A Cash-Flow/Asymmetric-Information Model of Mergers

Numerous studies have observed a positive relationship between capital investment and cash flows. Three explanations have been given for this relationship: (1) There are greater transaction costs in raising funds externally than using internal funds (Duesenberry, 1958). (2) Larger cash flows increase managers' discretion to undertake investments that harm their shareholders (have returns less than their costs of capital) (Grabowski and Mueller, 1972). (3) Some firms suffer from asymmetric-information problems in that their managers are aware that they have attractive investment opportunities, but the equity market is not. Under this assumption, a firm may refrain from undertaking an attractive investment, *unless it has the cash to do so*, because its current shareholders would be harmed by an equity issue at today's share price (Myers and Majluf, 1984, and Fazzari, Hubbard and Petersen, 1988).

The second explanation for a relationship between cash flows and investment is developed in the next section. Because most recent cash-flow/investment studies have been motivated by the asymmetric information hypothesis, we test this version of it.[14]

Under the asymmetric information hypothesis, a firm may pass up an attractive investment rather than finance it by issuing new equity, because the market undervalues its equity at the time that it wishes to invest. Such an undervaluation seems more likely, the lower the firm's market

value is relative to its total assets, that is the lower q is. We thus predict under the asymmetric information hypothesis that the sensitivity of a firm's merger activity to the level of its cash flows *declines* as its q increases.[15] We test this hypothesis by including interaction terms between q_{t-1} and cash flows (CF_{t-1}) in the merger equation. This leads to the

Asymmetric Information Hypothesis: $\dfrac{\partial M_t}{\partial CF_{t-1}} > 0, \dfrac{\partial M_t}{\partial (q_{t-1} \cdot CF_{t-1})} < 0$.

B. Modeling Mergers as Non-Profit-Maximizing Investments

1. The Overvalued Shares and Hubris Hypotheses

Three "stylized facts" about mergers are: (1) that they come in waves which correspond to cyclical movements of share prices, (2) share prices of acquiring firms tend to outperform the stock market for prolonged periods before the mergers, and (3) the share prices of acquiring firms tend to underperform the stock market for prolonged periods after the mergers.[16] One explanation for this pattern could be that the pre-merger abnormal performance of the acquiring firms represents an overvaluation of the companies' shares by the market. Knowing that the shares are overvalued, the managers of these companies undertake mergers.[17] This overvaluation thesis could explain both why more mergers occur at stock market peaks, and why the most active acquirers are outperforming the market even at these peaks. As an index of overvaluation we use the *P/E* for the S&P 500 in the year of the merger (P/E_t) and Tobin's q.

An alternative explanation for why these variables might be related to merger activity is presented by Roll's (1986) hubris hypothesis. Roll explains the relatively poor performance of acquirers' share prices at the time of and following mergers as a result of managerial hubris. They become overconfident about their ability to manage other companies successfully and overbid for the targets. Such overconfidence and hubris rises during stock market booms, and is particularly likely to characterize companies with relatively high share prices (qs). Managers interpret the rising price of their firm's shares as an indication of their managerial abilities.

Under the overvaluation hypothesis, managers know that their own shares are overvalued

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and thus issue them to undertake an acquisition of a, perhaps, correctly-priced target firm. Under the hubris hypothesis it is the *target firm* that is overpriced by overly confident managers of the bidding firm. Although the rise in the bidder's share price is assumed to feed this over confidence, the hubris hypothesis does not explicitly postulate that the managers assume that their own shares are overvalued. Instead, they are assumed to infer from their company's high share price that they possess superior talent. Thus, both the overvaluation and hubris hypotheses rest on assumptions regarding overoptimism – the first with respect to the market's valuation of the bidder's share price, the hubris hypothesis with respect to the bidding management's valuation of the warranted share price for the target. Both of these forms of optimism are likely to be reflected in high qs and *P/E*s, and thus for now, we shall combine them into a single *overvaluation/hubris hypothesis*.

Thus the Overvaluation/Hubris Hypothesis reads: $\dfrac{\partial M_t}{\partial (P/E)_t} > 0, \dfrac{\partial M_t}{\partial q_{t-1}} > 0$

We discuss one possible way to differentiate the two hypotheses below.

For managerial hubris to lead to additional numbers of mergers, managers must also possess the discretion to pursue these sorts of non-profit-maximizing investments. Next we discuss the managerial discretion hypothesis.

2. The Managerial-Discretion Hypothesis

The managerial-discretion hypothesis as it applies to mergers assumes that managers get utility from seeing their firms grow rapidly. This utility from growth might come about because the 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 as an objective of managers, and he put forward the further hypothesis that they would be 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 the value of q,

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$U = U(g,q)$, 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:

$$(\partial u / \partial g)(\partial g / \partial M) = -(\partial u / \partial q)(\partial q / \partial M) \tag{1}$$

Since $\partial u/\partial g > 0$, $\partial g / \partial M > 0$, and $\partial u/\partial q > 0$, (1) 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 will

differ only with respect to mergers that are expected to decrease q. In Figure 2 (A) we depict the

relationship represented by eq. 1 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 $-(\partial u/\partial q)(\partial q/\partial M)_N$, a utility-maximizing manager undertakes

M_N of value destroying mergers.

Merger waves arise, because the frequency of these q-reducing mergers increases during a

stock market boom. This change comes about, because the market's reaction to acquisitions that

destroy wealth varies with respect to both the overall level of optimism in the market, and the level

of optimism with respect to the acquiring firm. In Figure 2 (B) the line N depicts the relationship

between q and M when the stock market is at a normal level. During a stock market boom, the

market is gripped by overoptimism and the relationship between q and M resembles the 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 the $-(\partial u/\partial q)(\partial q/\partial M)$ to the right, as shown in Figure 2 (A), resulting in the firm's undertaking a greater amount of mergers, M_B, since now for every merger the threat of takeover is lower (since Tobin's q does not drop that much).

A shift from N to B in Figure 2 (B) might come about when a firm's own q rises, even when the market is not booming. The announcement of a merger that would have produced a sharp fall in the acquirer's share price, when its q was at a lower level, is greeted more favorably by the market, because the acquirer's own relatively good recent performance, as reflected in its high q, leads the market to make an optimistic evaluation of the merger's likelihood for success. Indeed, this optimism might even lead to curve B having a positive slope. Acquisitions that would produce share price declines when announced in normal times or announced by firms with average qs result in share price increases during market booms, or when announced by firms with high qs.

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 thus increase the threat of takeover).[18]

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. Just as the announcement of a potentially unsuccessful acquisition that will be financed out of a new equity issue is less likely to lead to a large fall in share price for a firm with a high q, the announcement that such a merger will be financed out of cash flows is also less likely to drive an acquirer's price down. This reasoning leads us to include an interaction term between q and cash flow as we did when testing the asymmetric information hypothesis. The predicted sign on this interaction term is, however, the reverse of that postulated under the asymmetric information hypothesis. The higher q is, the more discretion managers have to undertake unprofitable investments, and the *larger* the predicted coefficient on cash flows is.[19]

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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.

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

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

C. Additional Hypotheses

1. *Firm Propensities to Merge*

We shall also test to see whether some firms have higher propensities to merge than others holding all other variables constant. If, for example, some managers are empire-builders and some are not, or some suffer from hubris and some do not, then some firms may simply have a greater propensity to merge, holding all other factors constant. We test for this possibility by including the variable $Prev_t$ in the equation, which is constructed by dividing the assets acquired by a company in each previous year by its assets at the beginning of a year, and averaging over all previous years.

2. *Industry Shocks*

A few recent papers have argued that mergers are responses to "industry shocks".[20] These might include deregulation of an industry, technological change, changes in exchange rates, and so on. To capture the effects of these and all other forms of industry shocks that lead to mergers, we assign each company to a 2-digit SIC industry, and include industry dummies whenever possible.

II. Methodology and Data Description

As stressed above, all of the hypotheses are expected to explain some mergers at every point in time. To test the various hypotheses it would be advantageous to identify which mergers are likely to fit one hypothesis, and which another, and divide the sample accordingly. One obvious criterion for making such a division is movements in stock prices. The overvaluation/hubris and managerial discretion hypotheses should explain a greater fraction of

mergers, when the stock market is booming.

Figure 1 reveals a sharp upward movement in the S&P *P/E* starting in 1994. This point in time 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 point. We shall estimate separate coefficients for the basic model for each of the two time periods, therefore, with the expectation being that the overvaluation/hubris and managerial discretion hypotheses receive more support in the period after 1994.

A conspicuous feature of mergers in the late 1980s was the large number of hostile takeovers taking place at that time. The objective of these was often to replace the managers of the target firm, and thereby improve the performance of the assets under its control. Quite often this was accomplished by selling off some of these assets, assets that had been acquired in earlier mergers (Bhagat, Shleifer and Vishny, 1990). Thus, hostile takeovers seem more likely to be value creating than other mergers, and thus to be explained by one of the hypotheses that assumes this motive. We shall therefore estimate our model separately for tender offers and non-tender (friendly) mergers. Although all mergers consummated through a tender offer 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.[21]

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 1 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.[22]

Since all variables in the managerial discretion model are contained in one or more of the other models, we shall only estimate this model and judge the performance of the various hypotheses by examining the signs and significance of the appropriate variables in the equation. The basic model estimated looks as follows:

$$M_t = a\ CF_{94t\text{-}1} + b\ CF_{99t\text{-}1} + c\ q_{94t\text{-}1} + d\ q_{99t\text{-}1} + e\ q_{94t\text{-}1}CF_{94t\text{-}1} + f\ q_{99t\text{-}1}CF_{99t\text{-}1} +$$

$$g\ P/E_t + h\ Prev_t + m\ K_t + \mu_t \qquad (2)$$

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. M_t and $CF_{t\text{-}1}$ are deflated by $K_{t\text{-}1}$.

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, whenever they are significant.

Equation 2 might be estimated twice, once as a probit regression to determine the probability that a company undertakes an acquisition, and a second time as a Tobit regression 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 2. 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). *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 $371.7 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 qs than other companies, however. Both types of acquirers had significantly higher levels of cash flows than non-acquirers.

III. The Findings

Table 3 presents separate estimates for tender offers and all other mergers. Each sample contains all firms making a tender offer (merger) in a given year, and all firms that undertook neither. When industry dummies were included by themselves in an equation to explain both mergers and tender offers, they produced a pseudo R^2 of only 0.008. Given their lack of importance, we do not report the results for the industry-effect dummies, although they were included in the merger equation. The Tobit estimation procedure failed to converge when industry

dummies were included in the tender offers equation, and thus the reported results for this equation do not allow for industry effects.

A cubic relationship for total assets proved the best fit in both equations. The coefficients on the three assets terms imply an S-shaped relationship between a company's size and the amount of assets it acquires, with the marginal impact of a change in size varying, but always being positive. A company's previous acquisition activity was significantly related to its current level of acquisitions for both tender offers and friendly mergers.

Turning next to the variables of most interest, we see that the coefficient on q is insignificant in the tender-offer equation for the first time period. This result contradicts the q-theory of acquisitions, when they take the form of tender offers for the period of time when they were most frequent, and most likely to have been motivated to replace bad managers of targets by better managers. During the stock market boom years, q does pick up a positive and significant coefficient, however.

The coefficients on the cash flow terms imply a strong positive relationship between cash flow and acquisitions through tender offers in both periods.[23] Both the asymmetric information and managerial discretion hypotheses predict a positive coefficient on cash flow. The key variable for distinguishing between these two hypotheses is the interaction term between q and cash flow. If a firm's acquisition activity is sensitive to its level of cash flows, because its shares are underpriced, this sensitivity should decline as q rises, and a negative coefficient is expected on the interaction variable. Both coefficients on the interaction terms in the tender-offers equation are negative, but neither is statistically significant.

Thus, the results for tender offers provide little support for either a q- or asymmetric information theory of acquisitions. While q does pick up a positive and significant coefficient during the stock market boom years, the fact that it is insignificant during the years when tender offers and hostile takeovers were most prevalent, suggests that it was not the superior talent of the acquiring companies' managers as reflected in their companies' qs that explained tender offers up

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through 1994. The positive and significant coefficient on q after 1994, on the other hand, suggests that tender offers during the merger boom, like friendly mergers (see below), may in part be driven by the degree of optimism in the stock market. This interpretation is strengthened by the positive and significant coefficient on the aggregate *P/E* ratio in the tender offer equation. Logically this variable only belongs in the model testing the hubris or managerial discretion hypothesis. Its significant coefficient in the tender offers equation along with the positive coefficient on q during the merger boom implies that these hypotheses also account for some tender offers.

Consider now the results for the merger equation. The overvaluation/hubris hypothesis predicts positive coefficients on both q and *P/E*. *P/E*'s coefficient is positive and significant, and more than double the size of its coefficient in the tender-offer equation. Friendly mergers are more responsive to the market's optimism than are tender offers.

The coefficient on q is positive and significant for both time periods, but is over three times larger for the 95-99 period. These results for friendly mergers seem quite supportive of the overvaluation/hubris hypothesis. Firms with relatively high qs acquired more assets through mergers than other firms, and the predicted amount of assets acquired by a firm in a given year was greater, the greater the optimism in the stock market as reflected by the S&P-*P/E*.

The managerial discretion hypothesis predicts a positive relationship between cash flow and assets acquired, and a positive coefficient on the q/cash-flow interaction term. The relationship between cash flow and acquisitions for friendly mergers is again quadratic for both periods as in the tender offers equation, but this time *both* coefficients are positive. The marginal effect of an increase in cash flow on assets acquired through mergers was positive and increased as cash flow increased. The coefficients on the q/cash-flow interaction terms are positive for both time periods in the mergers equation, as predicted under the managerial discretion hypothesis, but significant only for the stock market boom years. During these years the coefficient on cash flows is near zero and highly insignificant. Since all firms in the sample have qs greater than zero, the coefficient on the q/cash-flow interaction term in the mergers equation implies a positive

relationship between acquisitions and cash flow that gets stronger as q rises, exactly as the managerial discretion hypothesis predicts. These results for mergers help explain both the time series and cross-sectional patterns of mergers. As stock prices rise, market optimism rises as reflected in the S&P-*P/E* ratio and individual firms' qs increase. This increasing optimism leads to a reduction in the penalty to the acquirer from announcing a value-reducing acquisition - a shift in the relationship between q and M as depicted by line B in Figure 2 (B). Thus, with the market's optimism rising, managers are freer to undertake value-destroying acquisitions. In addition, the increases in cash flows that come at these times allow managers to acquire firms for cash without reducing dividends, and thus are less likely to lead to share price declines, which increase the likelihood of an acquirer becoming a target of a takeover. Thus, at any point in time, it is the companies with the highest qs and cash flows that are acquiring the most assets through mergers.

The results for the merger equation in Table 3 provide much more support for the overvaluation/hubris and managerial discretion hypotheses than for either of the hypotheses that assume profits maximization. In contrast the overvaluation/hubris and managerial discretion hypotheses receive little support in the equation for tender offers. Their main support comes from the positive and significant coefficients on *P/E* and cash flows, and perhaps from the positive coefficient on q after 1994. The insignificant coefficients on both q up to 1994 and the q/CF interaction term are inconsistent with these hypotheses, however. The insignificance of these coefficients also undermines both the q- and asymmetric information hypotheses for tender offers. Indeed, the results for tender-offers provide strong support for *none* of the theories of mergers described above**.** One possible explanation for this result may be that for tender offers it is the characteristics of the *targets* that explain the acquisitions more so than those of the bidders. We examine the characteristics of the targets for both types of acquisitions in section V.

Although the results in table 3 clearly favor the overvaluation/hubris and managerial discretion hypotheses for friendly mergers, they do not immediately reveal the extent to which the variables account for overall merger activity, since the interpretation of the coefficients in Tobit

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equations is not straightforward. Following McDonald and Moffitt (1980), we have computed the total change in assets acquired between 1994 and 1999 that are predicted by changes in our explanatory variables. This calculation effectively decomposes the marginal effect of changes in the independent variables into (1) the change in the probability that a company makes an acquisition in year t, and (2) the change in the amount of assets acquired in t conditional on the firm's making an acquisition. These calculations attribute 33.9% of the increase in assets acquired in friendly mergers between 1994 and 1999 to the rise in the S&P-*P/E*, 5.1% to changes in individual company qs, 1.7% to increases in cash flows, and 3.3% to increases in company size. In contrast, only 10% of the rise in assets acquired through tender offers can be attributed to the rise of the S&P-*P/E*, with an additional 1.5% due to rising firm qs, 3.8% to changes in cash flows, and 2.2% to changes in company size. Although differences in q and cash flows across companies at a particular point in time are significant in determining *which* companies are undertaking acquisitions, the merger wave of the late 1990s is largely explained by the rising stock prices and the optimism that they reflect.

Here it is perhaps worth noting that our results indicate that the rising stock market of the 1990s resulted in substantial increases in the amounts of assets acquired via both mergers and tender offers. The relative decline in tender offers between the 1980s and 1990s apparent in Table 1 occurs in part because of the greater responsiveness of friendly merger activity to share price movements.

IV. Explaining the Means of Finance

If a company undertakes a merger because its shares are overvalued, we might expect it to favor the use of its shares to finance the merger. The overvaluation hypothesis thus leads naturally to the prediction that shares will be favored as the means for financing mergers by companies with high qs. We test this conjecture by creating a variable *Shares* if 95 percent or more of an acquisition was financed by issuing new shares.

Financing Hypothesis I: Shares is positively related to q_{t-1} for mergers.

Managerial discretion increases with the size of a company's cash flows and thus we expect not only that large cash flows are positively related to the probability and size of a merger, but also to the probability that it will be financed out of cash.

Financing Hypothesis II: Shares is negatively related to cash flows for mergers.

These hypotheses were tested jointly by including both variables along with a company's leverage as a further control variable in a probit equation. The results are reported in Table 4. For mergers, the coefficients on q are positive and significant, while those on cash flows are negative and significant in both periods in accordance with the predictions of the two hypotheses. At any point in time, a firm is more likely to issue shares to finance a merger, the higher its share price is relative to the size of its capital stock. Moreover this relation becomes stronger in the stock market boom years of the late 1990s. Consistently, the more cash in the hands of managers, the more of it gets used to finance acquisitions (the less need to issue equity). Again, the relation is somewhat stronger in the boom years but insignificantly so.

The results on tender offers are also consistent with our hypotheses. For tender offers, Tobin's q takes on a positive and significant coefficient and cash flow a negative and significant coefficient during the boom years. In the years until 1994, however, q's coefficient is actually *negative* and cash flow's *positive* but insignificant. This underlines the different nature of tender offers and mergers in "normal" times. It appears, however, that tender offers became similar to ordinary mergers in the "go-go" years at the end of the last century.

Leverage's coefficient is negative in both regressions, but significant only for mergers. The inclusion of firm size and/or industry dummies, as further control variables did not alter our conclusions on the determinants of the method of payment.

V. Predicting the Characteristics of Targets

If tender offers occur because the target firms are poorly managed, one also expects to

observe a relationship between a firm's q and the probability of its becoming the target of a tender offer. We test this hypothesis by running a probit regression for targets of tender offers. In addition to the q of the target firm, we include its cash flow, size and leverage as explanatory variables. The same equation is also estimated for targets of friendly mergers to see whether they differ from targets of tender offers. Separate regressions were run for the two time periods.

Table 5 presents the results. Industry dummies were included, but their coefficients are not reported. The coefficient on q is negative and significant in both of the first two tender-offer equations, while that on cash flows is positive and significant in both. Bidders in tender offers favor buying companies that are underperforming in terms of their share price and have high cash flows. These are exactly the firms whose performance might be improved by a new management team. Consistent with our claim above that tender offers became similar to "normal" mergers in the boom years, the underperformance of targets is a less important determinant of being acquired in a tender offer in the boom years than until 1994. In the first period bidders also tended to shy away from highly levered companies. Not surprisingly, the probability of becoming a target of a tender offer declines significantly as a firm's size grows.

The coefficients on q are also negative and significant in both merger equations, but they are less than half as large for mergers as they are for tender offers. Managers of firms making tender offers appear to select their targets based on their having a low q to a greater extent than managers of companies making friendly mergers. Interestingly, the coefficient on cash flow is negative in both merger equations, although insignificant. In the first time period, leverage picks up a positive and significant coefficient, while size's coefficient is negative and significant as expected. In the second time period, however, neither the size of a company, the level of its cash flows, nor its leverage ratio is significantly related to its being acquired through a friendly merger. Acquirers in friendly mergers favor buying companies with low qs, but beyond that during the merger boom of the late 1990s their choices seem to be nearly random.

As noted, bidders in tender offers seem to be following a more coherent strategy of buying

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underperforming companies. To test this conjecture further we created a dummy variable which takes on a value of one, if a company has both a low q (defined as being less than the sample median), *and* a high cash flow to assets ratio (greater than the sample median). The fifth and sixth equations in Table 5 present the probit estimates for targets of tender offers, when this variable is included. It has a positive and statistically significant coefficient in the first time period, but is insignificant in the second. During the time period when tender offers were most frequent, and many of them took the form of hostile bids, those making the bids did seem to be selecting companies which were underperforming — low qs and high cash flows.

We also reestimated the merger equations adding the low q/high cash flow interaction dummy. In the first period it was insignificant, but during the merger boom in the late 1990s, its coefficient was *negative* and significant. This finding illustrates rather dramatically the important difference between friendly mergers and tender offers. Where companies making tender offers sought out underperforming companies, at least during **"**normal times," companies making friendly mergers during the merger wave actually sought to *avoid* acquiring these same sorts of companies. The goal of managers making friendly mergers does not appear to have been to acquire companies that they could "turn around," but just to acquire companies.

VI. The Returns to Shareholders

There are three reasons to expect that mergers resulting from the overvaluation of company shares, managerial hubris or empire building will be followed by wealth losses for the shareholders of the acquiring firms. (1) If the acquirers' shares are overvalued they will presumably resume their appropriate value at some point after the merger. (2) When managerial hubris lies behind a merger it is likely to lead the acquirers' managers to pay too high of a premium for the target resulting in a wealth loss for the acquirers' shareholders.[24] (3) When mergers are driven by any non-profit-maximizing objective and there are no significant market power or efficiency gains from a merger, the costs of consummating the merger and integrating the two companies can be expected to lower the merged company's profits for some time after the merger. These

considerations lead to the following predictions regarding the returns to acquirers' shareholders: (1) the returns from tender offers should be higher than for friendly mergers, and (2) the returns from all forms of mergers occurring in stock market booms should be lower than for mergers taking place in times of normal or depressed stock values.

Most event studies of acquisitions measure their effects on share prices over very short windows surrounding the mergers' announcements and find that the announcements are accompanied by modest changes in the acquirers' shareholders' wealth. Those studies that have estimated returns over long post-merger windows have often found, on the other hand, that the acquirers suffer substantial losses in wealth.[25] We believe that the use of very short windows around merger announcements places too much trust in the efficiency of the capital market, and is particularly inappropriate for the hypotheses of interest in this paper. When mergers are caused by overvalued shares and managerial hubris, the same factors that lead to the shares being overvalued and the managers over confident may continue to be at work when the mergers are announced. A stock market boom is fed by (over)optimism on the part of shareholders. This optimism is typically underpinned by various "theories" regarding why different companies' shares are going to rise in value (Shiller, 2000, Ch. 5). Among these popular theories are often theories about why certain sorts of mergers are going to generate "synergies." Thus, the announcement of a merger may be greeted by an overly optimistic response by the market. The true impact of the merger on shareholder wealth may not become apparent until the market has had some time to judge its effects.

As our data end in 1999, there are not enough years following all mergers in the sample to calculate shareholder returns over long post-merger windows. We shall content ourselves, therefore, with reporting results from a few relevant studies. Table 6 presents representative findings for eight studies. The first four estimate returns for different time periods. Agrawal, Jaffe and Mandelker (1992) estimate returns over five year, post-announcement periods. Over the 1955-87 period, the cumulative abnormal returns to acquirers is a significant -10 percent. Significant

negative post-merger returns were also estimated for the 1950s, 1960s and 1980s. Insignificantly positive abnormal returns were estimated, however, for the 1970s. This pattern is consistent with the hypothesis that merger waves are fueled by stock market speculation and/or that acquiring companies undertake wealth-destroying acquisitions out of empire-building motives when their share prices and/or cash flows are high, or simply out of hubris fed by high share prices. Acquisitions due to these motives were less likely to have occurred during the 1970s when share prices were depressed, which explains the relatively better post-acquisition performance of acquirers' shares for this period.

Estimates of returns by Loderer and Martin (1992) and Higson and Elliott (1998) are also sensitive to the time period in which the mergers occurred. Loderer and Martin obtained only one significant estimate of a post-announcement abnormal return — a negative return for mergers between 1966 and 1969.[26] This finding is again consistent with the hypothesis that booming stock markets are associated with disproportionate numbers of unsuccessful mergers. Six additional studies of the 1960s merger wave that estimated negative returns over long post-merger windows are discussed in Mueller (forthcoming). We are aware of no study of this period that has obtained *positive* returns over a long post-merger window.

Higson and Elliott find that mergers in the UK between 1975 and 1980, and again between 1985 and 1990 were followed by significant wealth losses to acquirers. Mergers between 1981-84, when the UK stock market was essentially stagnant on the other hand, were followed by significant positive abnormal returns. Gregory estimates a significant -12.5 percent abnormal return for acquirers for M&As between 1984 and 1992, a period over which share prices in the UK were climbing. Putting these two studies together, we see that UK mergers have been followed by negative abnormal returns to acquirers for every time period between 1975 and 1992, except for 1981-84, when share prices remained stagnant.

Magenheim and Mueller (1988) were the first to observe significantly different post-acquisition returns for tender offers and mergers. Tender offers during the late 1970s/early 1980s

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produced insignificantly positive returns for the acquirers, friendly mergers significantly negative returns. This finding was confirmed with a much larger sample by Rau and Vermaelen (1998). They estimate significant post-announcement returns of -4 percent for a sample of 2,823 acquirers in friendly mergers, and significant positive returns for 316 tender offers (time period 1980-1991). They also provide considerable support for the hypothesis that high share prices fueled by overoptimism are associated with wealth destroying mergers. Acquirers with low book to market value ratios earned a -17.3 percent abnormal return over the 3 years following merger announcements. In contrast companies with high book to market values had positive post-announcement returns. Rau and Vermaelen conclude "that these findings are consistent with the hypothesis that the market overextrapolates the past performance of the bidder management when it assesses the benefits of an acquisition decision. As a result, the market, as well as the management, the board of directors and large shareholders overestimate the ability of the glamour bidder to manage other companies" (p. 251).[27]

Loughran and Vijh (1997) and Mitchell and Stafford (2000) report significantly negative post-merger returns for acquisitions financed entirely with shares, and Loughran and Vijh (1997) report insignificantly positive returns for acquisitions financed exclusively with cash. These results are also consistent with the hypothesis that friendly mergers perform worse than tender offers, since as we saw in Section IV tender offers are generally financed with cash, and companies favor using their equity to finance friendly mergers, when it is overvalued. All in all, the results of the studies listed in Table 6 seem quite consistent with the hypotheses and results reported by us for the determinants of mergers.

VII. Alternative Explanations of Merger Waves

Before closing we shall contrast our explanation and evidence regarding the causes of merger waves with two recent alternative explanations.

Jovanovic and Rousseau (2002) (hereafter J&R) use the *q*-theory to account for the merger wave of the 1980s and 1990s. They liken the purchase of other firms to purchasing used capital

equipment, and show for the period 1971-2000 that the q for acquirers is more strongly related to assets acquired through M&As than is the case for assets acquired in used-capital markets.

When a firm chooses to expand 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 noted above, 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 7 reports by year the mean qs (MV_{t-1}/K_{t-1}) for acquirers and targets of both tender offers and mergers. The mean qs for targets of mergers exceed one in all but two years and rise to as high as 1.5 during the merger wave. 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 7. 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.[28] 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.

The key variable in the J&R test of a q-theory of mergers is ($q_{it-1} - \overline{q}_{t-1}$), where q_{it-1} is the q for acquirer firm i in year t-1, and $\overline{q}_{t-1}$ is the mean q for all target firms in t-1. The first term in this variable appears also in our tests of the various hypotheses. We can thus test the J&R model against ours by adding $\overline{q}_{t-1}$ to our equations in Table 3. Their model predicts a coefficient on $\overline{q}_{t-1}$

which is negative and equal in absolute value to that on q_{it-1}. In Table 8 the results are reported

when $\bar{q}_{t-1}$ is added to the equations in Table 3. The coefficient on $\bar{q}_{t-1}$ is *positive* in both

equations, and highly significant in the mergers equation. We thus prefer our interpretation of the

performance of *q* as a determinant of mergers to that of J&R.

Shleifer and Vishny (2001) (hereafter S&V) present a theoretical explanation of merger

waves that rests on the assumption that share prices become *overvalued* during stock market

booms. As noted above, it is difficult if not impossible to test an overvaluation hypothesis against

the hubris hypothesis, and there is also considerable overlap between the two and the managerial

discretion hypothesis. Thus, our results can also be interpreted as support for the S&V theory.

The assumptions underlying the hubris and managerial discretion hypotheses are quite different

from those S&V make, however, as are the implications of the different theories for the effects of

mergers on social welfare. Thus, a comparison of their underlying logics seems warranted.

Unlike for the hubris and managerial discretion hypotheses, under S&V's overvaluation

hypothesis both the acquirers and their targets appear to gain from mergers that occur during stock

market booms. The acquirers' shareholders gain, because overvalued paper assets are traded for

real assets, which will not lose their value when the stock market's overoptimism subsides. The

targets' 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.

As under the asymmetric-information theory of investment, S&V assume that managers of

acquiring firms posses information that the market does not posses. Now, however, the shares are

assumed to be *over*valued and so the managers want to issue them, while under the asymmetric-

information theory of investment managers refrain from issuing shares because they are currently

undervalued. Both theories assume that the managers seek to maximize the welfare of their

current (old) shareholders at the expense of new ones (see, e.g., Myers and Majluf, 1984). These strike us as quite strong assumptions. Nevertheless, assuming that they hold, it is not obvious why the managers choose to acquire other firms as a way of unloading their overvalued shares. Their old 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 7). When one again 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 a possibility, as is real estate, works of art and any other real asset whose price does not rise in proportion to the rise in prices on the stock market, and does not require paying premiums of 20 percent or more to consummate the deal. Thus, the assumption that managers of firms with overvalued shares maximize their shareholders' welfare by undertaking mergers with no synergistic effects is called into question for the same reason that we reject J&R's *q*-theory explanation for merger waves – other forms of assets can be acquired at more attractive prices during merger waves than by buying other companies.

For any merger driven by overvalued shares, some group of shareholders must lose once the market recognizes the true value of the shares and their price falls to reflect this value. While the managers of the targets might gain by cashing in their holdings, their shareholders will certainly lose if they hold on to the shares of the acquirer, which they receive for the target's shares. Thus, while the acquirer's managers may be maximizing their old shareholders' wealth, the target's managers are not. Under the S&V theory, mergers are at best win-win-lose transactions with the losers being those shareholders left holding the acquirers' shares when their price falls back to its warranted value. Under the overvaluation theory of mergers, the *net* wealth changes following a merger must sum to zero. Should the mergers carry with them any real transaction costs to bringing them about, or generate costs of integrating the two companies, the

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net wealth changes from the mergers will be negative, and society will be worse off by the magnitude of these costs.

VIII. Conclusions

Several studies have reported significant discounts for diversification in the 1970s and 1980s.[29] In many cases this diversification was created by acquisitions made during the conglomerate merger wave of the late 1960s. It is somewhat surprising to learn, therefore, that the market values of diversified companies were already significantly discounted in the late 1960s and early 1970s, when the conglomerate mergers were taking place (Servaes, 1996). We say surprising because Matsusaka (1993) reports that announcements of conglomerate acquisitions at that time were coupled with *positive* and significant abnormal returns. Why would the market bid down the shares of companies, which had already diversified, and simultaneously bid up the shares of companies announcing moves in that direction? The obvious answer is that conglomerate mergers were in vogue at the time. The conglomerates' managers were thought to be capable of adding value to any company they acquired. The price-earnings ratios of the conglomerates were bid up accordingly and each newly announced acquisition was greeted with still more enthusiasm.

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. When the managers of AOL and Time/Warner proclaimed that a merger between a high tech Internet firm and a giant traditional media company would create tremendous synergies, the market at first largely accepted the claim. As of the fall of 2002, the proclaimed synergies have yet to appear.[30] The booming market of the late 1990s allowed Dennis Kozlowski to put together the giant conglomerate Tyco. The stock market collapse at the start of the new millennium has had the same adverse effect on Dennis Kozlowski and Tyco as did the collapse in the early 1970s on the empire builders of the 1960s.[31]

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/hubris/managerial discretion model and help explain both the correlation of mergers with aggregate stock market movements, and the identities of the firms making acquisitions.

An additional important finding has been that friendly mergers are quite different from tender offers, at least for the period through 1994. Neither the hubris nor managerial discretion hypotheses nor any of those based on profit maximizing behavior explains well the actions of acquirers in tender offers during the 1980s and early 1990s. These tender offers are better explained by the characteristics of the *targets*. Firms making tender offers up until 1994 sought out companies that were under performing, while firms making friendly mergers during the stock market boom sought to avoid such targets. Friendly mergers at all times, but especially during stock market booms are driven by the above normal share prices and cash flows of the acquirers and the impact these have on their managers' motivation.

Although of necessity we have focused on the evidence regarding recent mergers, we believe that an analysis of the earlier merger waves would also support our hypotheses.[32] Some managers are likely to be empire builders or suffer from hubris at any point of time, and their proclivities to undertake mergers will be enhanced by rising share prices, shareholder optimism, and lots of cash. The next great merger wave can be expected to occur when the next great stock market advance occurs, and to subside when share prices begin to fall.

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Figure 1:

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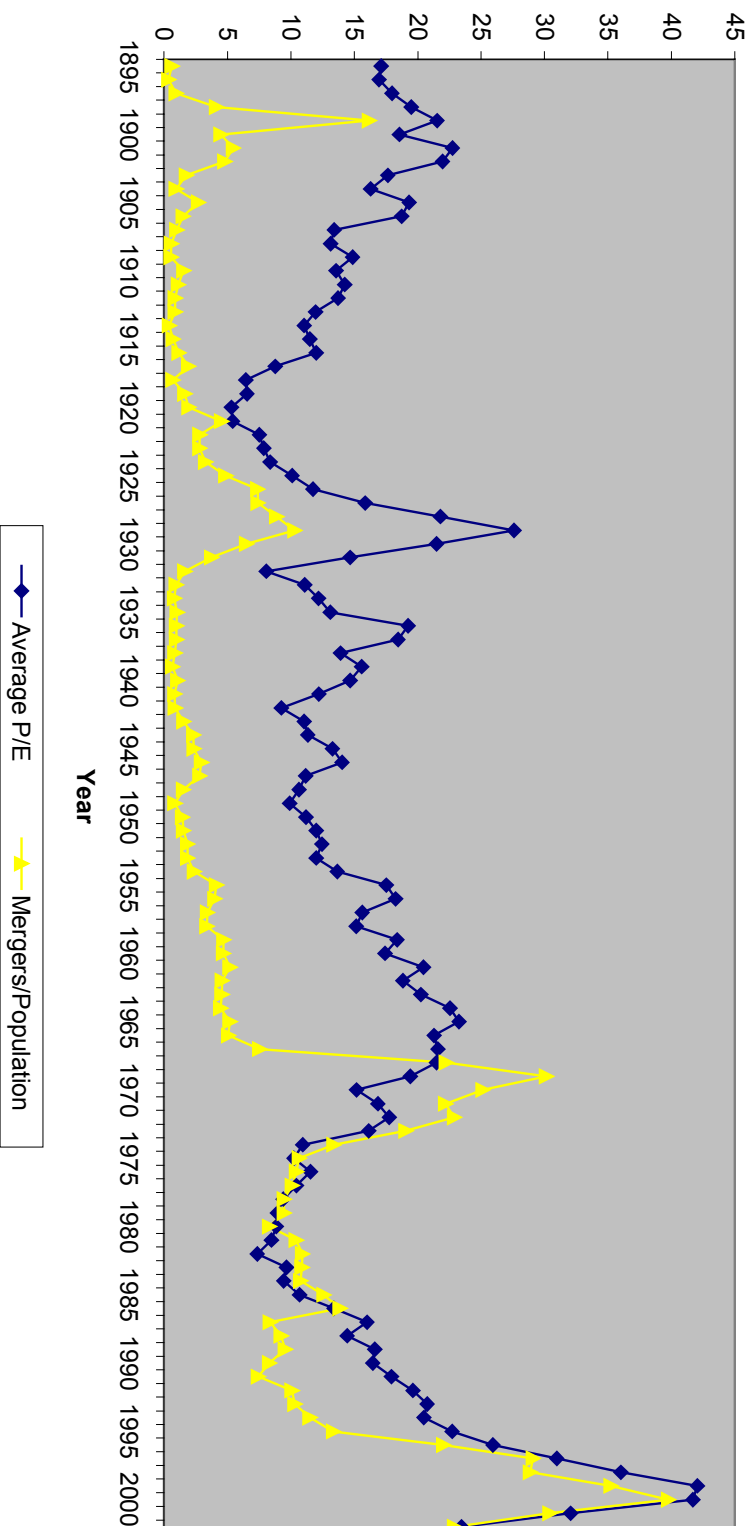
Sources: Mergers: 1895-1920: Nelson (1959); 1921-67: FTC; 1968-2002: M&A. *P/E* ratios: Homepage of Robert Shiller: http://aida.econ.yale.edu/~shiller/data.htm; 2002:
P/E ratio: average until July; mergers: number of mergers in the first 8 months multiplied by 1.5 Population: Statistical Abstract of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

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Figure 2: The Managerial Trade-off
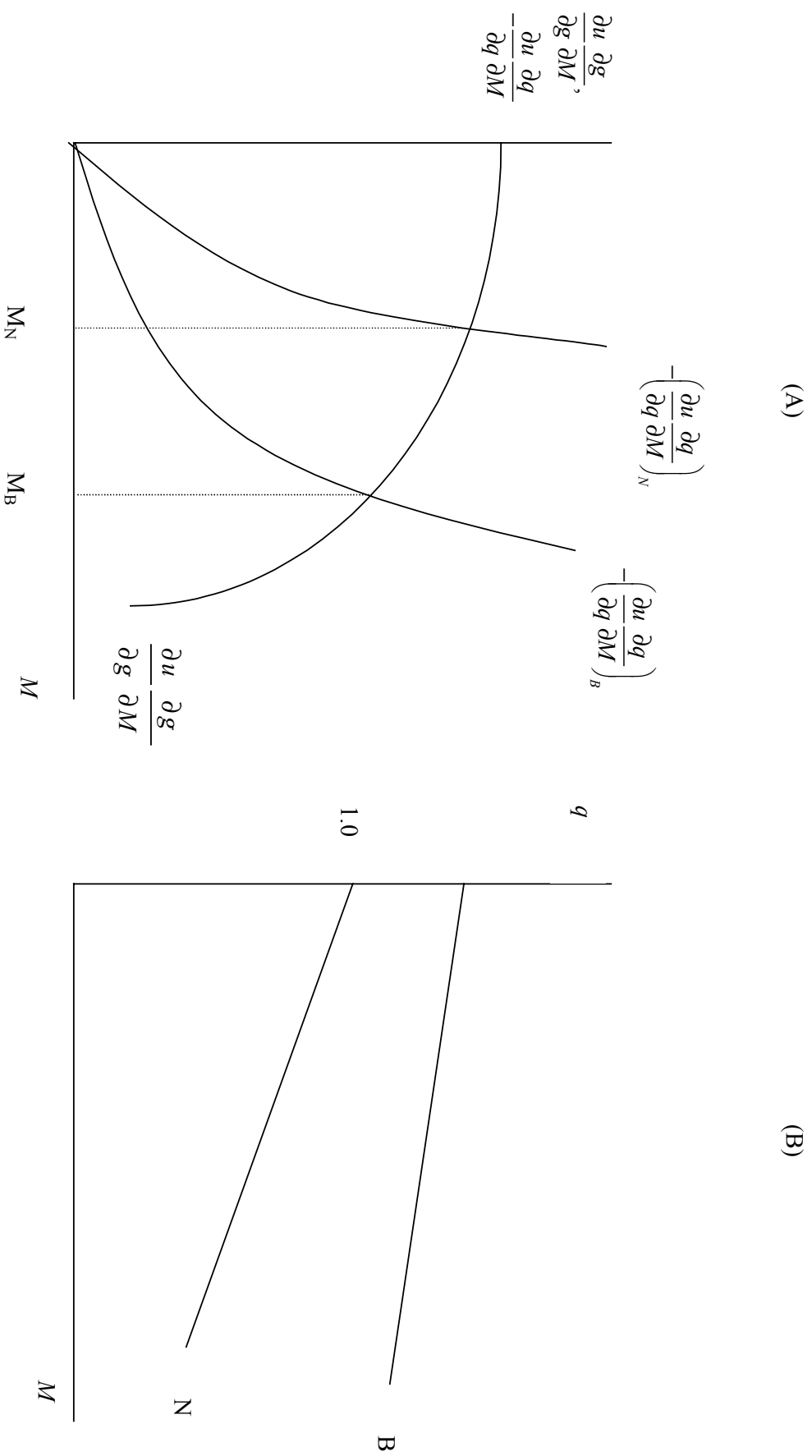
Table 1: Number of Mergers and Tender Offers of US Sample Firms

Year	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 2: Summary statistics, mean values

	Tender Offers	Mergers
Acquirer characteristics:		
Tobin's q	1.320	1.730
Cash flow/Total assets	0.080	0.055
Total assets (Mio 1995 USD)	6957.0	4125.0
M_t*	0.172	0.186
Target characteristics:		
Tobin's q	1.121	1.249
Cash flow/Total assets	0.084	0.065
Deal Value (Mio 1995 USD)*	592.1	303.7

	All observations:
Tobin's q	1.423
Cash flow/Total assets	0.044
Total assets (Mio USD)	1558.9
M_t	0.009

* Only firm years with deals are used.

Note: M_t = deal value (i.e. the total amount paid for the target) divided by total assets.

Table 3: Determinants of Tender Offers and Mergers

Dependent Variable: M_t for Years	Tender offers until 94		Tender offers 95-99		Mergers until 94		Mergers 95-99	
	Coef	t-value	Coef	t-value	Coef	t-value	Coef	t-value
Tobin's q	-0.018	-0.78	0.037	1.96	0.021	6.05	0.069	19.09
Cash flow	1.592	4.52	3.093	3.84	0.345	6.35	0.302	4.15
(Cash flow)²	-2.994	-2.16	-2.860	-1.66	0.129	1.72	0.209	2.44
q*Cash flow	-0.091	-0.59	-0.162	-1.40	0.010	0.78	0.036	2.16
P/E	0.0072 (3.90)				0.015 (23.03)			
Size	0.0000255 (11.46)				0.0000116 (15.07)			
Size²	-2.22E-10 (-7.83)				-7.07e-11 (-11.15)			
Size³	4.25E-16 (6.59)				9.55e-17 (9.45)			
Prev	0.358 (4.96)				0.291 (9.14)			
Const	-2.292 (-12.32)				-0.978 (-2.83)			
No. Observations	78,353				81,818			
No. Deals	496				4,002			
Pseudo R²	0.103				0.097			

Note: Included in the "Tender offers" sample are all non-merger years; included in the "Mergers" sample are all non-tender offer years; Estimation method is maximum-likelihood Tobit.

Table 4: Probit Estimates of the Use of Shares to Finance Tender Offers and Mergers

Dependent Variable: *Shares*$_t$ for	Tender offers				Mergers			
Years	until 94		95-99		until 94		95-99	
	Coef	t-value	Coef	t-value	Coef	t-value	Coef	t-value
Tobin's q	-0.257	-2.07	0.181	2.22	0.041	2.25	0.104	6.73
Cash flow	1.492	1.01	-4.045	-2.98	-0.541	-2.41	-0.656	-3.05
Leverage	-0.340 (-0.97)				-0.226 (-2.31)			
Const	-0.507 (2.76)				0.301 (7.00)			
No. Obs.	548				4,377			
Pseudo R²	0.026				0.013			

Note: Estimation method is maximum-likelihood Probit. *Shares*$_t$ takes on the value one if more than 95% of the deal was financed by own shares, zero elsewise (overall mean: 59.0 %; mean for tender offers: 23.7%; mean for mergers: 63.4%).

Table 5: Probit Equations Explaining Probabilities of Being Acquired

Target / Time period:		Tobin's q	Cash flow	Size	Leverage	Low q* High CF	Const	Nobs	Pseudo R²
Tender offers:									
until 94	Coef	-0.097	0 485	-0.00001	-0.068		-2.623	59,223	0.020
	t-value	-4.93	4.47	-1.95	-0.83		-7.88		
95-99	Coef	-0.103	0 .073	-0.00001	0.010		-5.947	18,015	0.034
	t-value	-3.22	1.01	-1.53	0.06		-17.32		
Mergers:									
until 94	Coef	-0.043	-0.031	-0.00003	0.1089		-2.029	59,844	0.013
	t-value	-3.91	-0.84	-4.74	1.91		-12.05		
95-99	Coef	-0.024	-0.045	-5.27e-06	0.055		-6.026	18,621	0.035
	t-value	-1.74	-0.93	-1.21	0.58		-15.04		
Tender offers:									
until 94	Coef	-0.083	0 .435	-0.00001	-0.052	0 .071	-2.661	59,223	0.021
	t-value	-4.09	3.93	-2.01	-0.64	2.00	-8.00		
95-99	Coef	-0.108	0 .077	-0.00001	0.0016	-0.049	-5.944	18,015	0.034
	t-value	-3.23	1.08	-1.54	0.01	-0.59	-22.97		
Mergers:									
until 94	Coef	-0.041	-0.033	-0.00003	0.114	0.021	-2.039	59,844	0.014
	t-value	-3.67	-0.93	-4.76	1.99	0.74	-12.08		
95-99	Coef	-0.029	-0.039	-5.32e-06	0.042	-0.124	-6.023	18,621	0.036
	t-value	-2.05	-0.77	-1.23	0.45	-2.07	-15.16		

Note: Included in the "Tender offers" sample are all non-merger years; included in the "Mergers" sample are all non-tender offer years; Estimation method is maximum-likelihood Probit.

Table 6: A Summary of Previous Studies

Study	Country Time Period	Type of acquisition	Length of Window	Estimated abnormal returns (in percent)
Magenheim and Mueller, 1988	USA			
	1976-81	51 mergers	3 years	-27.70 *
		26 tender offers	3 years	8.90
Agrawal, Jaffe and Mandelker, 1992	USA			
	1955-87	765 M&As of all types	5 years	-10.30 *
	1955-59	51 M&As	5 years	-23.20 *
	1960-69	299 M&As	5 years	-15.10 *
	1970-79	247 M&As	5 years	4.10
	1980-87	168 M&As	5 years	-19.40
Loderer and Martin,1992	USA			
	1966-86	1,298 M&As	1,250 days	7.50
	1966-69	261 M&As	1,250 days	-61.20 *
	1970-79	598 M&As	1,250 days	30.00
	1980-86	439 M&As	1,250 days	17.50
Gregory, 1997	UK			
	1984-92	408 M&As	2 years	-12.50 *
Higson and Elliott, 1998	UK			
	1975-90	722 M&As	3 years	0.08
	1975-80	305 M&As	2 years	-10.00 *
	1981-84	156 M&As	2 years	26.30
	1985-90	315 M&As	2 years	-6.20 *
Rau and Vermaelen, 1998	USA			
	1980-91	2,823 mergers	3 years	-4.00 *
		316 tender offers	3 years	8.90 *
Loughran and Vijh, 1997	USA			
	1970-89	405 stock financed	5 years	-24.20 *
		228 stock/cash	5 years	-9.60
		314 all cash	5 years	18.50
Mitchell and Stafford, 2000	USA	2,193 mergers	3 years	-1.40
	1961-93	all stock	3 years	-4.30 *

* Statistically significant at 5% level.

Table 7: Mean Tobin's *q*s of Acquirers and Targets in Mergers and Tender Offers

| Year | Acquirers | | Targets | | | |
| | Mergers | Tender offers | 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
81-99	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 8: Determinants of Tender Offers and Mergers

Dependent Variable: M_t for	Tender offers				Mergers			
Years	until 94		95-99		until 94		95-99	
	Coef	t-value	Coef	t-value	Coef	t-value	Coef	t-value
Tobin's q	-0.016	-0.82	0.038	2.21	0.021	6.07	0.066	18.08
Cash flow	1.608	4.92	1.514	3.45	0.394	7.19	0.251	3.45
(Cash flow)²	-3.005	-2.19	-3.665	-1.88	0.164	2.18	0.169	1.96
q*Cash flow	-0.114	-0.82	-0.117	-0.99	0 .006	0.45	0.043	2.48
P/E	0.001 (0.48)				0.010 (11.96)			
Size	0.000026 (11.58)				0.000012 (15.08)			
Size²	-2.23e-10 (-7.88)				-7.09e-11 (-11.17)			
Size³	4.22e-16 (6.58)				9.59e-17 (9.49)			
Prev	0.357 (4.99)				0.289 (9.07)			
$\overline{q}_{t-1}$	0.094 (1.45)				0.219 (7.20)			
Const	-1.769 (-15.56)				-1.098 (-3.17)			
No. Observations	73,331				78,453			
No. Deals	452				3,998			
Pseudo R²	0.071				0.093			

Note: Estimation method is maximum-likelihood Tobit.

Notes

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[1] 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), and Clarke and Ioannidis (1996).

[2] George Stigler (1950) called it the wave to create monopolies. See, for example, Bittlingmayer (1985).

[3] See, Scott (1993).

[4] For surveys of this literature see, Steiner (1975), Cosh, Hughes and Mueller (1980), and Scherer and Ross (1990).

[5] Where horizontal mergers tended to account for about 20 percent of all mergers in the 1950s and 1960s, in the 1980s they increased to well over 40 percent (Mueller, 1980b; Gugler, Mueller, Yurtoglu, and Zulehner, in press).

[6] Measured relative to the size of the US economy and the value of the dollar, the wave at the beginning of the 20th century remained the largest until the end of the 1980s. Measured in current dollars, the merger of 187 companies that created the United States Steel company in 1901 remained the largest merger until the RJ-Nabisco merger in 1988, valued at $25 billion. At the end of the 1990s, mergers exceeding this figure became commonplace.

[7] See, for example, Bittlingmayer (1996), Andrade and Stafford (1999), Blonigen and Taylor (2000), Erard and Schaller (2002), and Jovanovic and Rousseau (2002).

[8] The hubris hypothesis is due to Roll (1986). Baumol (1967) and Marris (1964, 2000) were the first to claim that managers maximized sales or growth. Mueller (1969) was the first to use the growth-maximization hypothesis to explain mergers.

[9] See, for example, Shiller (2000).

[10] See Andrade and Stafford (1999), and Erard and Schaller (2002).

[11] The recent attempt by Jovanovich and Rousseau (2002) to use q-theory to explain merger waves is discussed in section VII.

[12] These conceptual differences in applying the *q*-theory to mergers help explain why Andrade and Stafford (1999) find the cross-sectional patterns of investments in capital equipment and mergers to be quite dissimilar. Erard and Schaller (2002), on the other hand, claim that they are similar forms of investment.

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

[14] Brunner (1988) uses the asymmetric information hypothesis to motivate including cash flows as a determinant of mergers.

[15] For empirical evidence, see Gugler, Mueller and Yurtoglu (2002).

[16] With respect to (3), see Agrawal, Jaffe and Mandelker (1992) and Agrawal and Jaffe (2000). All three facts are discussed in Mueller (forthcoming).

[17] See Rau and Vermaelen (1998) and Shleifer and Vishney (2001). We discuss the Shleifer and Vishny

theory in Section VII.

[18] 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.

[19] See again Gugler, Mueller and Yurtoglu (2002).

[20] See e.g. Andrade and Stafford (forthcoming).

[21] 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.

[22] See Roe (1993).

[23] The coefficients on the two cash flow terms imply that virtually all companies can be found to the left of the peak of the acquisition/cash flow curve.

[24] For evidence supporting this claim see Mueller and Sirower (forthcoming).

[25] For surveys of this literature, see Agrawal and Jaffe (2000), and Mueller (forthcoming).

[26] The Loderer and Martin estimates were made using daily observations, and are infinitesimally small. The figures in Table 6 are the daily estimates multiplied by 1250 to make them comparable to the others in the table. They seem too large in absolute value, however.

[27] This is also the interpretation favored by Agrawal and Jaffe (2000) in their survey of the "post-merger puzzle". Philippatos and Baird (1996) compare *differences* between market and book values before mergers and post-merger performance and also find that relatively high pre-merger market values are associated with poorer post-merger share performance.

[28] 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 a year later than MV_{t-1}, explains why the two 1993 entries for tender offers have the opposite relationship from all other entries.

[29] Indexes of diversification have also been found to be negatively related to returns on shares (Comment and Jarrell, 1995), Tobin's q (Wernerfelt and Montgomery, 1998; Lang and Stulz, 1994; Servaes, 1996) and the market value of a company (Berger and Ofek, 1995).

[30] See, Economist (2002). Interestingly, in the light of the S&V theory, at the time of this writing, shareholders of Time-Warner are suing the managers of AOL for having traded them overvalued shares.

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

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