NBER WORKING PAPER SERIES

STOCK MARKET DRIVEN ACQUISITIONS

Andrei Shleifer
Robert W. Vishny

Stock Market Driven Acquisitions
Andrei Shleifer and Robert W. Vishny
NBER Working Paper No. 8439
August 2001
JEL No. G34

ABSTRACT

We present a model of mergers and acquisitions based on stock market misvaluations of the combining firms. The key ingredients of the model are the relative valuations of the merging firms, the horizons of their respective managers, and the market's perception of the synergies from the combination. The model explains who acquirers whom, whether the medium of payment is cash or stock, what are the valuation consequences of mergers, and why there are merger waves. The model is consistent with available empirical findings about characteristics and returns of merging firms, and yields new predictions as well.

Andrei Shleifer
Department of Economics
Littauer M9
Harvard University
Cambridge, MA 02138
and NBER
ashleifer@harvard.edu

Robert W. Vishny
Graduate School of Business
The University of Chicago
1101 E. 58th Street
Chicago, IL 60637
and NBER
vishny@gsb.uchicago.edu

I. Introduction.

In the late 1990s, the U.S. and world economies had experienced a large wave of mergers

and acquisitions (Figure 1). Most of these deals were for stock, and the acquirers were typically

in the same industry as the targets (Andrade et al. 2001). This wave of acquisitions was very

different from the "hostile" takeover wave of the 1980s in the U.S., when many acquirers were

financiers, and the medium of payment was often cash rather than stock. These acquisitions also

differed from the "conglomerate" wave in the 1960s, when mergers typically involved firms from

different industries.   At the same time, the waves of the 1960s and 1990s were similar in that the

medium of payment was generally stock and both occurred during periods of very high stock

market valuations. In the 1980s, in contrast, the valuations were lower.

Economic explanations of these takeover waves have a special story for each one (e.g.,

Nelson 1959, Shleifer and Vishny 1991, Holmstrom and Kaplan 2001). In the conglomerate

mergers of the 1960s, well-managed bidders built up diversified groups by adding capital and

know-how to the acquired firms (Gort 1962, Rumelt 1974, Meeks 1977, Steiner 1975). In the

bust-up takeovers of the 1980s, raiders financed by bank debt and junk bonds acquired and split

up the very same conglomerates assembled in the 1960s, because the conglomerate organization

was no longer efficient (Jensen 1986, Blair, ed. 1993, Bhagat, Shleifer, and Vishny 1990). The

wave of related acquisitions in the 1990s, which still does not have a name, was evidently

intended to consolidate major industries (Holmstrom and Kaplan 2001, Andrade et al. 2001). In

this respect, the recent wave is similar to the 1920s "mergers for oligopoly" (Stigler 1968).

We propose a more unified theory of acquisitions, which does not rely on a special story

for every decade.   In this theory, transactions are driven by stock market valuations of the

merging firms. We do not assume that markets are efficient, but rather that the stock market may misvalue potential acquirers, potential targets, and their combinations. In contrast, managers of firms are completely rational, understand stock market inefficiencies, and take advantage of them, in part through merger decisions. This theory is in a way the opposite of Roll's (1986) hubris hypothesis of corporate takeovers, in which financial markets are rational, but corporate managers are not. In our theory, managers rationally respond to less than rational markets.[2]

The idea that stock market valuations shape merger activity dates back at least to Nelson's (1959) study of merger waves in the U.S.: "It appears that merger expansion was not only a phenomenon of prosperity, but that it was also closely related to the state of the capital market. Two reference cycle expansions, unaccompanied by a strong upswing in stock prices, were marked by the absence of a merger revival." Recent studies of the long run returns to bidding firms have returned to market efficiency issues. Loughran and Vijh (1997) find that the market does not react correctly to the news of a merger, with acquirers making cash tender offers earning positive long run abnormal returns, and those making stock acquisitions earning negative long run abnormal returns. Rau and Vermaelen (1998) show that this pattern of returns remains even after the correction for size and book-to-market ratio recommended by Fama and French (1993). Martin (1996) and Rau and Vermaelen (1998) also find that glamour bidders pay more frequently with stock than do value bidders. Our model explains these findings.

Despite this evidence, stock market valuations have not been among the leading theories

---

[2]The theory we propose is part of the growing body of research on behavioral corporate finance, including Stein (1988, 1989, 1996), Morck et al (1990a), Shleifer and Vishny (1990), and Baker and Wurgler (2000, 2001), which sees corporate financial policies as a response to market misvaluations.

of mergers. Andrade et al. (2001) classify the theories used to explain mergers between 1973 and 1998 as dealing with efficiency, agency costs, regulation, and diversification. Holmstrom and Kaplan (2001) argue that improvements in corporate governance and regulation fostered more efficient capital markets, in turn leading to greater takeover activity.

Our theory helps answer such questions as who acquires whom?, is the medium of payment cash or stock?, what are the valuation consequences of mergers?, why do mergers come in waves? We show that the key ingredients of the answers are the relative valuations of the combining firms, the horizons of their managers, and the synergies that the market perceives will materialize from the merger. Since at least the first two of these ingredients are measurable, our model generates a number of empirical predictions: 1) acquisitions are disproportionately for stock when aggregate or industry valuations are high, and for cash when they are low; 2) targets in cash acquisitions earn low returns prior to the acquisitions, whereas bidders in stock acquisitions earn high returns; 3) bidders in stock acquisitions are likely to exhibit signs of overvaluation, such as earnings manipulation and insider selling; 4) long run returns to bidders in stock acquisitions are likely to be negative, those to bidders in cash acquisitions are likely to be positive; 5) despite negative long run returns, acquisitions for stock serve the interest of long term shareholders of the bidder; 6) acquiring a firm in another industry may yield higher long run returns than a related acquisition; 7) management resistance to some cash tender offers is in the interest of shareholders; 8) acquisition targets are likely to have managers and shareholders with relatively shorter horizons than do the bidders.

In the next two sections, we present and analyze a simple model of stock market driven mergers. In section IV, we consider the evidence. Section V concludes.

II. A simple model of acquisitions.

We consider two firms, 0 and 1, with capital stocks K and K_1, and stock market valuations per unit of capital of Q and Q_1. We assume that Q and Q_1 do not reflect efficient valuations of these firms, but rather reflect investor sentiment about them. Without loss of generality, we assume that $Q_1 > Q$. The investor sentiment affecting valuations can but need not be idiosyncratic: it may reflect over- or under-valuations of entire industries, sectors, or groups of firms with similar characteristics. For example, all diversified firms (conglomerates) may be in or out of favor, as can all technology stocks, all basic industry stocks, or all European stocks.

We assume that the two firms can merge, and that the short run valuation of the combined equity per unit of capital is given by $sQ_1 + (1-s)Q$, so the market value of the two firms together is $V = (K + K_1)(sQ_1 + (1-s)Q)$. We call s the "perceived synergy" of the merger. In effect, s is the story that the market consensus holds about the benefits of the merger. It could be a story about industrial diversification, or consolidation, or cross-European integration. For example, s could be high when the market favors diversification and the two firms come from different industries, or, alternatively, when a well-performing firm (high Q_1) merges with a poorly-performing firm (low Q), as in the analysis of Rau and Vermaelen (1998). In our model s is just the lubricant that greases the wheels of the M&A process – it might be invented by investment bankers or academics and have little to do with the reality of what drives actual acquisitions.

We define $s^* = K_1/(K + K_1)$ as the "no perceived synergy" point. At this point, the market weighs the combination of the two firms in proportion to their relative sizes, as measured by "book" capital. The case of $s < s^*$ corresponds to negative perceived synergy in that, in valuing the combination, the market attaches relatively more weight to the firm with lower

valuation per unit of capital.   Likewise, the case of s > s* corresponds to positive perceived

synergy in that, the market attaches relatively more weight to the firm with higher valuation per

unit of capital. The case s = 0 corresponds to the market valuing the combination at the same

value per unit of capital as the less valuable firm, and s = 1 to the market valuing the combination

like the more valuable firm. It is possible (and interesting to consider) that s > 1, in which case

the combination of the two firms is perceived by the "euphoric" market to be more valuable

(again, per unit of capital) than even the more valuable firm is on its own. It is also possible that

s < 0, although we are unlikely to see mergers in this case.   In general, we think it more likely

that $0 < s < 1$. Under these assumptions, the total short run gains from two firms merging are

given by $(K + K_1) (sQ_1 + (1\text{-}s)Q) - KQ - K_1Q_1$, which are positive as long as s > s*.

   We make the extreme assumption that, in the long run, all assets are worth q per unit of

capital. Thus, in the long run, firm 0 as a standalone entity is worth qK, firm 1 is worth qK_1, and

the combination, if it materializes, is worth $q(K + K_1)$. This assumption implies that there are no

long run gains from merger (regardless of whether cash or stock is used): no synergies in

combining the two firms, and no managerial improvements. Put differently, s is completely "a

story" that market participants convince themselves of at the time of the merger. This is not to

suggest that, empirically, mergers are always pure financial plays that create no long run value.

We note, however, that there is a great deal of doubt, especially outside the 1980s, that mergers

increase profitability (Meeks 1977, Ravenscraft and Scherer 1987). We make the assumption

that mergers have no long run real consequences to see how far it takes us.

   We distinguish sharply between the short and the long run because, we argue, the

horizons of corporate managers are central to understanding the M&A process. Some corporate

managers or entrepreneurs might wish to retire or exit, or simply have options or equity they are

anxious to sell. These managers have relatively short horizons. Other managers may want to

keep working or are locked into their equity; these managers have relatively long horizons.

Whereas we assume that the stock market is inefficient, the managers are perfectly

rational and informed. They know precisely with respect to both their own firms and the

prospective merger partners how the short run valuation deviates from efficiency, what the

perception of synergies is, and what the long run valuation will be. They then maximize their

personal objective given their horizons and the knowledge of market inefficiencies.

III. The arithmetics of returns.

We consider first the more valuable firm 1 acquiring the less valuable firm 0, and

examine the consequences of this acquisition for both long and short term shareholders of the

target and the acquirer, depending on whether the means of payment is cash or stock. In the

analysis, we need to discuss the determination of the takeover premium. Rather than adopt a

specific model of takeover bids, such as Grossman and Hart (1980), we assume that the acquirer

pays a price $P = Q + p(Q_1 - Q) = pQ_1 + (1-p)Q$ per unit of capital of the target. Like the perceived

synergy, s, here p refers to the weight that the acquirer puts on his own valuation in paying for

the target. Alternatively, p can be interpreted as the relative bargaining strength of the lower

valuation firm. Two special cases stand out. In the first, p=0 and there is no takeover premium.

In the second, $p = s$, and the acquirer pays the price reflecting the merged short run valuation of

the combined entity. It is also possible that $p > s$, as in Roll (1986), and the bidder overpays.

We can analyze such cases, but they are not of central interest.

Throughout this analysis, we make the simplifying assumption that, aside from having a theory of perceived synergies, the market draws no inferences from the announcement of an acquisition. The announcement does not cause prices to converge to long term values, or to move in that direction. Put differently, neither the mergers themselves, nor the choice of cash versus stock, convey any information about the management's valuation of assets in place (Myers and Majluf 1984) or the severity of the agency problems (Morck et al 1990). Market beliefs are specified completely by Q, Q_1 and s, and traders stick to these beliefs in the short run.

Except for simplicity, we do not need to assume no learning by the market. All that is necessary is that learning be incomplete, and the adjustment to rational valuations from the announcement of a merger or a security issue be partial. The conclusion that, in equilibrium, the market puts some weight on the beliefs of rational investors and some on investor sentiment is standard in models of inefficient markets (e.g., De Long et al 1990a, 1990b, Hong and Stein 1999). As long as investor sentiment influences prices, the results we obtain will endure.

Consider first short run gains to acquisitions (in terms of dollar amounts rather than percentages). In the short run, since there is no information entering the market other than the news of the merger, changes in values due to acquisitions are the same as returns. (Since we are assuming that in the long run prices return to efficiency, long run effects of acquisitions on values are different from long run returns.) Moreover, since the market draws the same inferences from the acquisitions for cash and for stock, it is obvious that the bidder, the target, and the total short run changes in value are invariant to whether the means of payment is cash or stock. (This is not true for long run value changes.) We can establish:

Proposition 1. The immediate effect of the acquisition on the combined market value is:

7

(1) $(K + K_1)(s-s^*)(Q_1-Q)$;

the immediate effect on the short run target value is:

(2) $Kp(Q_1-Q)$;

and the immediate effect on the short run bidder value is:

(3) $(Q_1-Q)[K_1(s-1) + K(s-p)]$.

Total returns (changes in value) are increasing in the difference between Q_1 and Q as long as $s > s^*$. In the short run, the combined entity benefits from the perception that the combination of the two firms is synergistic, in that some of the value of the more valuable one spills over on the less valuable one. Equation (2) shows that p governs how much of that gain in the short run accrues to the target firm. When $p = 0$, target shareholders do not gain; when $p = s$, they gain proportionately to their capital.

Finally, equation (3) reveals two elements of the short run gains of bidding shareholders. To the extent that the market is euphoric and $s > 1$, they gain from the upward revaluation of their initial capital stock. But if $s < 1$, the bidding shareholders lose from the devaluation of their own capital. However, to the extent that $p < s$, the bidding shareholders also gain from getting a share of the increased short run valuation of the target's stock.

This analysis suggests that at least some takeover activity may be driven purely by short run stock market perceptions. Obviously, when $s > 1$, there is a money machine available to the bidding firm, which can buy assets and get its own capital revalued upwards. Presumably, such opportunities are limited. But even if the market is not euphoric, but believes that positive synergies are available from a merger, both the target and the acquirer can gain from the merger in the short run as long as $p < s$. The maximum price that the bidder can afford to pay and still

8

benefit in the short run is solved by setting the bidder return to equal zero. It is given by:

(4) $p^* = (s - s^*)/(1 - s^*)$,

which is increasing in s. As long as $p < p^*$, the bidder gains in the short run. Bidders can afford

to pay higher premia when the market is more optimistic about potential synergies.

The results for the long run valuation consequences of mergers are more interesting.

Here we treat acquisitions for cash and stock separately. The results for cash are summarized in:

Proposition 2: The long run effect of the cash acquisition on the combined value of the two firms

is zero, that on the value of the target is K(P-q), and that on the value of the acquirer is K(q-P).

In this model, by construction there are no long term profitability gains from making

acquisitions. What the target gains, the bidder loses. The only long run reason to make

acquisitions for cash is the undervaluation of the target. One might ask why a cash acquirer does

not simply buy a diversified portfolio of undervalued firms. First, the acquirer learns a great deal

about the target through due diligence, and would have more confidence about its undervaluation

than that of a portfolio. Second, the realization of gains from undervaluation might require

taking actions, such as a bust-up and a sale of divisions, for which gaining control is necessary.

In our framework, managers of takeover targets benefit their long term shareholders by

resisting tender offers at a premium if P < q. The interest of long term shareholders is not just an

excuse for resistance, as it has been portrayed in agency models. They actually benefit from it,

even though resistance hurts the short term shareholders because of short term price declines.

In the case of acquisitions for stock, the analysis is more complicated. Define

(5) $r = (pQ_1 + (1-p)Q)/(sQ_1 + (1-s)Q)$

to be the ratio of the price paid per unit of target's capital to the market valuation per unit of

capital of the merged firm. Thus r = 1 corresponds to the case where the price paid for the target reflects combined valuation exactly. Using this terminology, (1-s*)r is the share of the combined capital that ends up belonging to the target shareholders, and 1 - (1-s*)r is the corresponding share that ends up belonging to the bidding shareholders. When r = 1, neither the target nor the bidder shareholders enhance their ownership of capital: shares are exchanged on fair terms.

In the long run, the bidding shareholders have equity worth $q K_1$ if they do not make the acquisition for stock, and $q(K + K_1)[1-(1-s^*)r]$ if they do make this acquisition. Taking the difference, we establish:

Proposition 3: The effect of an acquisition for stock on the long run value of the merged firm is zero; that on the long run value of the target is given by

(6) Kq(r-1);

and that on the long run value of the acquirer by the opposite of (6).

Proposition 3 has an obvious interpretation. In the long run, target shareholders gain from the acquisition as long as r > 1 (or p > s), i.e. the price paid to the target exceeds the valuation of the combined entity. Since in the long run, this is a zero sum game, the opposite holds for the bidder. The only way for the bidder to benefit from the acquisition in the long run is by increasing his shareholders' claim on physical capital. As long as r < 1 (or p < s), bidder shareholders end up owning more capital, and since all capital is worth the same in the long run, they end up better off. When the premium is below the blended valuation of the two companies, bidding shareholders redistribute wealth away from the target shareholders to themselves. When r = 1 (or p = s), this trade does not pay.

In this model, there is an important difference between the effect of an acquisition on the

long run value and long run returns. The acquirer's long run returns without making an acquisition are $K_1(q - Q_1)$, which are negative when the firm is initially overpriced. The acquirer's long run returns after making an acquisition are $q(K + K_1)[1-(1-s^*)r] - Q_1K_1$, which can also be negative even when the acquisition benefits bidder shareholders. In the latter case, bidder returns are negative, but not as negative as they would be without the acquisition.

This distinction between gains from a stock merger and returns raises a number of interesting possibilities. To begin, it may be in the long, but not the short, term interest of shareholders of firm 1 to acquire firm 0. When $p^* < p < s$, the shares of firm 1 drop on the announcement of the deal, but the acquisition still benefits its long run shareholders because in the long run the shares would have fallen even more without it. Indeed, both short and long run observed returns in this range are negative, but the acquisition still serves the interest of long term shareholders of the acquirer. Using overvalued shares as a means of payment enhances the claim on capital of the bidding shareholders, and thereby cushions the collapse of the shares in the long run. This might be the logic of some high flying firms, like America On Line and Cisco, acquiring lower valuation firms for stock during the 1990s.

The analysis illustrates the role of defensive acquisitions by firms with overpriced shares: using these shares to buy assets available for $p < s$ is better than not buying assets. This analysis also cautions against interpreting the finding of negative bidder returns – in either the short or the long run – as indicative of violations of shareholder interest. The simple point is that the alternative of not making an acquisition could result in still lower long run returns.

One instance of defensive acquisitions that our model points to is diversification, which we interpret broadly as buying assets in a lower valuation equivalence class. This might include

acquisitions in a different industry, of private (and lower valued) firms in the same industry, or of smaller (and lower valued) firms. The model suggests a theory of diversification independent of either the implausible theory of conglomerate synergies or the standard agency costs explanations. Specifically, a high valuation firm might find acquisition targets in the same industry to be very expensive, especially when the whole industry is overvalued. A diversifying acquisition might be cheaper, and more attractive in the long run, because it enables the acquirer to use its overvalued shares to increase its claim on capital. In fact, there is a tradeoff between making related acquisitions, which might bring higher short run returns because of higher perceived synergies, and diversifying, which may hurt in the short run but be more attractive in the long run. Diversification that the market saw in the 1960s and the 1990s might simply represent attempts to use overvalued shares to buy relatively less overvalued capital. As we argue in Section IV, this interpretation is consistent with the data on both returns and profitability changes accompanying diversification.

The analysis also suggests some reasons why making acquisitions for stock might be better than issuing stock and holding cash. First, for the case of issuing shares and holding cash, $s = s^*$. As long as the acquirer uses stock and pays $p < s$ for a firm, he might be better off by taking advantage of this synergy in terms of enhancing his shareholders long run claim on capital than by just holding cash. There are no synergies with cash. Second, if the firm issues shares and invests in cash, the market could realize that it has no investment opportunities and reduce its valuation, Q_1. This signalling effect is distinct from Myers and Majluf (1984) in that the signal comes from the investment policy rather than from capital structure. The advantage of acquisitions, aside from positive perceived synergies, is that they contribute to the growth of

12

earnings of the firm, and thereby help justify the high valuations. As the policies of Cisco and

other technology firms illustrate, acquisitions become part of a growth strategy justifying the high

market multiples in a way that cash accumulation cannot. For these two reasons, it might be

better to use overvalued equity to buy other overvalued firms than to invest in cash.

This brings us to a key issue. In this model, combined long run benefits of an acquisition

are always zero, so what the bidder gains the target loses. If the bidder acts in the interest of its

long term shareholders by making the acquisition, the target must be hurting *its* long term

shareholders by agreeing to it. Put differently, who would agree to be a target?

The answer lies in the differences in the horizons of the various managers (see also Stein

1988, 1989). Proposition 1 shows that the target shareholders generally get the majority of *short

run* gains in the acquisition. This implies that firms managed in the interest of *long term*

shareholders are likely to be acquirers, and firms managed in the interest of *short term*

shareholders are likely to be targets.[3] Target shareholders receive a premium, given by p, and get

either cash or stock. If they can sell the stock to investors willing to hold it, they benefit. The

long term shareholders of the acquirer -- who for whatever reason cannot sell -- also benefit as

long as $p < s$. The losers are those accumulating acquirer shares in an overvalued market.

This analysis gives us a taxonomy of when we are likely to see acquisitions, and of what

kind. To begin, we expect to see acquisitions of undervalued firms for cash, and moreover, we

predict that such acquisitions are more likely to be hostile than those for stock. In acquisitions

for stock, both target and acquirer shares are likely to be overvalued (at least at post-

---

[3]When Tobin's q of the acquirer exceeds that of the target, as we have assumed so far.
Below we analyze the case in which the low Tobin's q firm is the acquirer.

13

announcement prices). The target management has an incentive to get rid of its shares at a premium, as well as of the shares of the acquirer it obtains in the exchange.   As long as it can do so, it should welcome the takeover, since it ultimately ends up with cash rather than overpriced securities. In acquisitions for cash, in contrast, target shares are undervalued, and hence the return to holding them is higher than the return on cash. We then expect target management to resist unless the bid reflects the long run valuation of the target.

We are likely to see acquisitions for stock under a combination of three circumstances. First, market valuations must be high, and there must be a supply of highly overvalued firms (bidders) as well as relatively less overvalued ones (targets). This condition is more likely to occur when the dispersion of valuations in the market is also high. Second, the market must perceive a synergy, which both makes the mergers relatively more attractive in the short run, and enables the acquirers to pay a premium yet still enhance their long run claim on capital. Third, assuming that there are enough matches satisfying the first two conditions, there must be some bidders with long horizon managers, and some targets with short horizon managers. When all these three conditions are satisfied, we expect to see acquisitions for stock.

With respect to the first condition, our model makes a sharp prediction that the pace of acquisitions for stock increases in the periods of not only high, but highly dispersed, valuations. This prediction seems to be consistent with some informal evidence. During the 1960s, the valuations of the Nifty Fifty conglomerates were sharply higher than those of the smaller private and public firms they acquired. In the late 1990s, the valuation differences between the large technology firms, which were among the busy acquirers, and many of their targets, were also wide. We do not yet know whether these anecdotes add up to a genuine fact.

The requirement of high perceived synergies is difficult to test. Systematic theories were proposed to rationalize all merger waves during the last century, some of which must be partly true. The disappointing ex post performance is perhaps the most compelling evidence against the view that these synergies, rather than market conditions, were the true reason for the mergers.

The horizon analysis points to some of the key new predictions of the model. It suggests that we expect target firms to be those whose managers want to "get out," for reasons of retirement, ownership of stock options, or attention to short horizon institutional shareholders. In contrast, we expect bidding firms to be controlled by shareholders who cannot as easily get out: entrepreneurs with large equity stakes or managers who are young or locked in. Although we are not aware of any systematic evidence bearing on this issue, the examples of family firms selling out to conglomerates in the 1960s and of entrepreneurial firms selling out to Cisco and Intel in the 1990s seem to fit nicely with this analysis.

A merger can itself shorten an effective horizon of the manager of a target firm. Without a merger, this manager might be unhappily stuck with overvalued shares and options, which he cannot easily sell or exercise. Because a merger provides this manager with the bidder's shares which he can sell immediately, or at least more quickly, it rescues him from the necessity of staying long in an overvalued market. Cisco stock, for example, is much easier to sell than founder stock of a startup. In this way, a merger transforms a reluctant long horizon manager of the target into a happy short horizon manager. Both the target and the acquirer managers benefit: the former by cashing out, the latter by increasing the long run value of his equity. In effect, both are getting rid of overvalued equity: one through a personal sale, the other through issuance. The absence of such gains from trade (at the expense of the new shareholders of the acquirer) is

15

precisely why we see more hostility in cash tender offers than in stock mergers. Since we can measure the horizons of corporate managers at least imperfectly (using data on age, stock options, etc), this analysis yields testable implications.

Finally, we return to the possibility of firm 0, the less valuable one, acquiring firm 1. If we represent the price that firm 0 pays for firm 1 as $P = Q + p(Q_1 - Q) = pQ_1 + (1-p)Q$, we must have $p \geq 1$ for firm 1 shareholders to agree to a takeover. The counterpart of equation (3), namely bidder returns, for the case where firm zero is the acquirer is given by:

(7) $(Q_1 - Q)(sK + (s-p)K_1)$.

For a given level of synergy, the less valued firm generally pays a higher premium and hence suffers greater dilution, but experiences a positive rather than negative revaluation of its shares because of the perceived synergy. Which effect dominates is hard to tell. However, the model provides a possible short run justification for low valuation firms of buying something more glamourous: the glamour might rub off and increase their firm's own short run valuation.

For long run calculations, firm 0 is at a disadvantage in making cash acquisitions since firm 1 is less underpriced. Moreover, since firm 0 must pay a price corresponding to $p > 1$ in a stock acquisition, it loses from making such an acquisition when $s < 1$. In sum, except for the circumstances where firm 0 makes a speculative acquisition to get a jump in its short run valuation from perceived synergy, we do not expect to see acquisitions of the more valuable firms by the less valuable ones. Since such a glamour rub-off appears to us to be somewhat implausible, we do not expect such mergers to be common.

IV. Discussion.

In this section, we discuss the empirical implications of the analysis. Since the results suggest that – generally – there are better reasons for the valuable firm to be the acquirer, we focus on this case. We divide the discussion into two parts. First, we examine the theory in light of the available empirical evidence on short and long run stock returns. Second, we look at the relationship between the aggregate merger activity and the stock market by considering the three U.S. merger waves in the last 40 years.

Implications for the cross-section of returns.

Recent evidence on long and short term stock returns around acquisition announcements is carefully summarized by Agrawal and Jaffe (2000) and Andrade et al. (2001) and we rely on their summaries of evidence rather than on individual studies. Andrade et al. (2001) show that in a sample of 3,688 mergers between 1973 and 1998, target firms gain 23.8% in the window beginning 20 days before the acquisition announcement and ending on the close. Acquirer firms lose 3.8% over the same interval, and the combined value change is a statistically insignificant 1.9%. If we translate the returns in the propositions into percentage returns rather than dollar amounts, our model can easily mimic this pattern of returns. In fact, the simple case of $s = p = s^* = .8$, $Q = 1$, and $Q_1 - Q = .3$ generates a 24% gain for the target firm, a 4.8% loss for the acquirer, and no change for the combined value. More generally, Proposition 1 shows why the returns to the target are of a different order of magnitude than those to the acquirer.

The evidence on long run returns is more interesting. Our model suggests that the more highly valued acquirer would only make a cash bid if the target is undervalued even at the bid

17

price, i.e., P < q. This is most likely to happen with seriously undervalued targets, which must

have experienced low returns prior to being acquired. The evidence on this is limited, although

Andrade et al. (2001) show that in 66% of mergers between 1973 and 1998, the acquirer's Q

exceeded the target's Q. More importantly, our model predicts that long run bidder returns from

cash acquisitions should be positive. Loughran and Vijh (1997) find that, after a size and book-

to-market adjustment, tender offers result in positive abnormal bidder returns of 43% in the 5

years following the merger. Rau and Vermaelen (1998) use a larger sample of 316 tender offers

between 1980 and 1991, and find that acquirers experience long run excess returns of 8.5% in the

3 years following the merger.   This evidence is strongly supportive of the model.

The crucial case in this model is of course acquisitions for stock. The model suggests

that such acquisitions are made by overvalued acquirers of the relatively less overvalued targets.

Moreover, in the model, such acquisitions are likely to result in negative long run returns, but --

as long as p < s -- not as negative as would have obtained without the acquisition. This

prediction is consistent with Rau and Vermaelen (1998), who find that acquirers in mergers earn

a statistically significant negative 4% return relative to a peer portfolio in the 3 years after the

merger. Agrawal and Jaffe (2000) list numerous earlier papers corroborating this finding. Rau

and Vermaelen also show that value bidders outperform glamour bidders in the 3 years after the

completion of the merger, and that glamour bidders pay more frequently with stock than do value

bidders.   Both of these findings are consistent with our view that acquisitions completed with

stock arise from the overvaluation of the bidder relative to the target. Acquisitions for stock by

the glamour bidders indeed appear to be a defensive strategy, as suggested by the model.

Interestingly, the key studies of long run bidder returns, such as Loughran and Vijh

(1997), Rau and Vermaelen (1998), as well as Agrawal and Jaffe (2000), treat the two predictors of negative long run bidder returns – higher bidder valuation (measured in various ways) and use of stock as a means of payment – as evidence for two different hypotheses. They call them the method of payment hypothesis and the performance extrapolation hypothesis.

In our model, these results are part of the same story. The performance extrapolation hypothesis states that the market wrongly extrapolates the past performance of the bidder in determining the combined value of the two firms. This corresponds to $s > s^*$ in our model. According to the means of payment hypothesis, if managers are better informed about the firm's prospects than the market, they will acquire with stock when stock is overpriced, and use cash otherwise. In our model, both the decision to acquire and the means of payment derive from market timing. Stock acquisitions are used specifically by overvalued bidders who expect to see negative long run returns on their shares, but are attempting to make these returns less negative than they would be otherwise. The examples of the acquisition of Time-Warner by AOL and of build-up of high valuation conglomerates with stock illustrate this phenomenon.

In these acquisitions for stock, a high level of perceived synergy can be essential. A higher perceived synergy level, s, helps not only the short run returns, but also the long run returns in the sense that the acquirer can pay a higher p and still stay below s. Even if synergies do not exist, there are strong incentives to "invent" them.

Merger Waves

In his original study, Nelson (1959) pointed out that mergers are highly concentrated in time, that they generally occur during periods of high stock market valuations, and that the means

19

of payment is generally stock. The most recent study, by Andrade et al. (2001), confirms this general picture but also shows that the preponderance of stock acquisitions is greater in high valuation markets, consistent with our model. Thus acquisitions where *any* stock was used as payment represent 45.6% of total in the 1980s, versus 70.9% in the 1990s. The share of acquisitions that were *all* for stock rose from 32.9% in the 1980s to 57.8% in the 1990s.

We can use the model to say a bit more about the American M&A experience of the last 40 years. In our framework, the conglomerate merger wave of the 1960s is the case of prototypical acquisitions by the more overvalued firms of the less overvalued ones for stock. A commonly given reason why these acquisitions took the form of diversification is that the anti-trust policy restricted related acquisitions (e.g., Shleifer and Vishny 1991). Our model suggests an alternative reason. In that period, related acquisitions -- even if they came with higher perceived synergies -- would have been very expensive. From the perspective of long term shareholders of the bidders, which generally fetched extremely high market valuations, it might have been better to use their stock to diversify and to build conglomerates to raise their shareholders' claim to long term capital. Conveniently, a good story was invented to support exactly such acquisitions: the efficiency gains from conglomeration obtained through better management. Thanks to this story, positive short run returns accrued to both the acquirers and the targets (Matsusaka 1990). Moreover, even though conglomerates do not appear to have increased profits (Ravenscraft and Scherer 1987), and the long run stock market returns to the acquirers have been negative (Agrawal and Jaffe 2000), such acquisitions were still preferred to doing nothing. In our model, negative bidder returns are not evidence of a failure to serve shareholder interests – conglomerate values would have fallen even more without them.

The acquisition of smaller family firms by conglomerates such as ITT, and the vertical integration of franchisee-owned restaurants by McDonalds, illustrate this logic. In our model, because the targets were so much smaller than the acquirers, we can think of conglomeration as diversification with $s = 1$. Indeed, discussions of the 1960s acquisitions often argue that the purpose of these combinations was to transfer the high multiple of the acquirer to the earnings of the target. From this angle, the focus on efficiency aspects of conglomerates in most discussions of the 1960s is just window-dressing; the fundamental economics have to do with buying hard capital using overvalued shares. A final point has to do with horizons. The targets in conglomerate mergers were often family-run firms, whose owners wished to sell out and retire. This is exactly what the model predicts: a merger requires a coincidence of short term objectives of the target managers with longer run objectives of the bidders.

In the 1980s, following a decade of miserable stock market performance, the market saw a wave of bust-up takeovers. Just as our model predicts, these were likely to be takeovers of undervalued firms, and they took place for cash rather than stock. Moreover, the incidence of hostility was higher in the 1980s than in any other major merger wave -- exactly as we would predict for takeovers of low valuation firms for cash. The common finding that the bust-up value of the acquired firms was higher than the acquisition price is broadly consistent with our view that market undervaluation of targets was central to the 1980s takeovers (Kaplan 1989, Bhagat et al. 1992). Also consistent with this perspective, the 1980s acquisitions were not followed by negative long run acquirer returns, unlike the acquisitions from the earlier period.

Some other aspects of the 1980s takeover wave also fit in with the theory. The theory holds that, for these acquisitions to earn good short run returns for acquiring shareholders, a story

of perceived synergy, or of benefits to the valuation of combined firms, is needed. It is possible that the free cash flow theory of Jensen (1986), with its emphasis on the elimination of agency problems through takeovers, provided the necessary story for that period. Our model also provides an alternative interpretation of why the takeover wave of the 1980s petered out toward the end of that decade. The traditional explanation is that corporate, state and federal anti-takeover policies, as well as legal action against Drexel and other financiers of hostile takeovers, raised the costs of takeover bids to acquirers to the point that the activity was no longer profitable. In our model, in contrast, the more important culprit is the rising stock market prices, which eliminated undervaluation – the fundamental reason for the takeover wave of the 1980s. Like the conglomerate merger wave of the 1960s, the 1980s wave fits nicely into our framework.

The rising stock market valuations of the 1990s, particularly the second half of the 1990s, stimulated another massive takeover wave. The acquisitions were generally for stock, and the acquirers were often more highly valued firms than the targets, even when both belonged to the same industry. The story of perceived synergies also changed to a combination of technological synergies, industry consolidation, and European integration, although in some instances the spin did not rescue the short run acquirer returns. At the very end of the 1990s, during the peak of the internet bubble, we may in fact have witnessed some euphoric mergers, with $s>1$, where the acquirers and the targets both had internet interests. Such mergers, of course, had large positive short run benefits for both firms.

Perhaps the classic merger of this period is the acquisition of Time-Warner by America On Line for stock (although in this instance, s was not as high as AOL management hoped: the company lost a third of its market value in the few months following the announcement). From

22

our perspective, the central feature of this acquisition is not technological synergies, but/ rather the attempt by the management of overvalued AOL to buy hard assets of Time to avoid even worse returns in the long run. In this acquisition, as in other deals involving high technology acquirers with overvalued stock prices, long run acquirer returns appear to be poor. However, according to our theory, these returns are not as negative as they would have been had the acquisitions not taken place. When future writers condemn the merger spree of the late 1990s as manifesting misguided policies of the acquirers, they should focus on the alternative of not making these acquisitions. Indeed, the fact that many of the high tech acquirers during this period were entrepreneurial firms, with managers owning substantial equity stakes, is *prima facie* evidence that the motive for these acquisitions was not agency, but overvaluation.

V. Conclusion.

This paper has presented a stock market based model for thinking about mergers and acquisitions. This model is not intended to deny a role for more real rather than just valuation factors, emphasized in recent surveys by Holmstrom and Kaplan (2001) and Andrade et al (2001), not to mention our own earlier writings. On the other hand, the model helps interpret a good deal of evidence, and yields new predictions. As such, it may add to the set of frameworks that financial economists use to examine mergers and acquisitions.

References

Agrawal, Anup, and Jeffrey Jaffe, 2000, "The Post-Merger Performance Puzzle," in *Advances in Mergers and Acquisitions*, vol. 1, 7-41, Amsterdam: Elsevier Science.

Andrade, Gregor, Mark Mitchell, and Erik Stafford, 2001, "New Evidence and Perspectives on Mergers?" *Journal of Economic Perspectives*,103-120.

Baker, Malcolm, and Jeffrey Wurgler, 2000, "The Equity Share in New Issues and Aggregate Stock Returns," *Journal of Finance* 55, 2219-2258.

Baker, Malcolm, and Jeffrey Wurgler, 2001, "Market Timing and Capital Structure," Mimeo.

Bhagat, Sanjai, Andrei Shleifer, and Robert W. Vishny, 1990, "Hostile Takeovers in the 1980s: The Return to Corporate Specialization," *Brookings Papers on Economic Activity: Microeconomics*, 1-72.

Blair, Margaret, 1993, *The Deal Decade: What Takeovers and Leveraged Buyouts Mean for Corporate Governance.* Brookings Institution: Washington, DC.

Cowling, Keith, Paul Stoneman, John Cubbin, et al, 1980, *Mergers and Economic Performance.* Cambridge University Press: Cambridge.

DeLong, J. Bradford, Andrei Shleifer, Lawrence Summers, and Robert Waldmann, 1990a, "Noise Trader Risk in Financial Markets," *Journal of Political Economy* 98, 703-738.

DeLong, J. Bradford, Andrei Shleifer, Lawrence Summers, and Robert Waldmann, 1990b, "Positive Feedback Investment Strategies and Destabilizing Rational Speculation," *Journal of Finance* 45, 375-395.

Gort, Michael, 1962, *Diversification and Integration in American Industry.* Princeton University Press: Princeton, NJ.

Grossman, Sanford J., and Oliver Hart, 1980, "Takeover Bids, the Free Rider Problem, and the
    Theory of the Corporation," *Bell Journal of Economics* 11, 42-64.

Holmstrom, Bengt, and Steven Kaplan, 2001, "Corporate Governance and Merger Activity in the
    U.S.: Making Sense of the 80's and the 90's," *Journal of Economic Perspectives*, 121-144.

Hong, Harrison, and Jeremy Stein, 1999, "A Unified Theory of Underreaction, Momentum
    Trading and Overreaction in Asset Markets," *Journal of Finance* 54, 2143-2184.

Jensen, Michael, 1986, "Agency Cost of Free Cash Flow, Corporate Finance and Takeovers,"
    American Economic Review Papers and Proceedings 76, 323-329.

Kaplan, Steven, 1989, "The Effects of Management Buyouts on Operating Performance and
    Value," *Journal of Financial Economics* 24, 217-254.

Martin, Kenneth, 1996, "The Method of Payment in Corporate Acquisitions, Investment
    Opportunities, and Management Ownership," *Journal of Finance* 51, 1227-1246.

Matsusaka, John, 1990, "Takeover Motives During the Conglomerate Merger Wave," University
    of Chicago Mimeo.

Meeks, Geoffrey, 1977, "Disappointing Marriage: A Study of the Gains of the Merger,"
    University of Cambridge Occasional Paper 51, Cambridge University Press: Cambridge.

Morck, Randall, Andrei Shleifer, and Robert Vishny, 1990a, "The Stock Market and
    Investment: is the Market a Sideshow?," *Brookings Papers on Economic Activity*, 157-
    215.

Morck, Randall, Andrei Shleifer, and Robert Vishny, 1990b, "Do Managerial Objectives
    Drive Bad Acquisitions?" *Journal of Finance* 45, 31-48.

Nelson, Ralph, 1959, *Merger Movements in the American Industry*, New York: NBER.

Rau, Raghavendra and Theo Vermaelen, 1998, "Glamour, Value, and the Post-Acquisition

       Performance of Acquiring Firms," *Journal of Financial Economics* 49, 223-254.

Ravenscraft, David and Fredric Scherer, 1987, *Mergers, Selloffs, and Economic Efficiency.*

       Brookings Institution: Washington, DC.

Roll, Richard, 1986, "The Hubris Hypothesis of Corporate Takeovers," *Journal of Business* 59,

       197-216.

Rumelt, Richard, 1974, *Strategy, Structure, and Economic Performance.* Harvard Business

       School Press: Boston, MA.

Shleifer, Andrei and Robert W. Vishny, 1990, "Equilibrium Short Horizons of Investors and

       Firms," *American Economic Review Papers and Proceedings* 80, 148-153.

Shleifer, Andrei and Robert W. Vishny, 1991, "Takeovers in the '60s and '80s: Evidence and

       Implications," *Strategic Management Journal* 12, 51-59.

Stein, Jeremy, 1988, "Takeover Threats and Managerial Myopia," *Journal of Political Economy*

       96, 61-80.

Stein, Jeremy, 1989, "Efficient Capital Markets, Inefficient Firms: a Model of Myopic Corporate

       Behavior," *Quarterly Journal of Economics* 104, 655-669.

Stein, Jeremy, 1996, "Rational Capital Budgeting in an Irrational World," *Journal of Business* 69,

       429-455.

Steiner, Peter, 1975, *Mergers: Motives, Effects, Policies.* University of Michigan Press: Ann

       Arbor, MI.

Stigler, George, 1968, "Monopoly and Oligopoly by Merger," in *The Organization of Industry*,

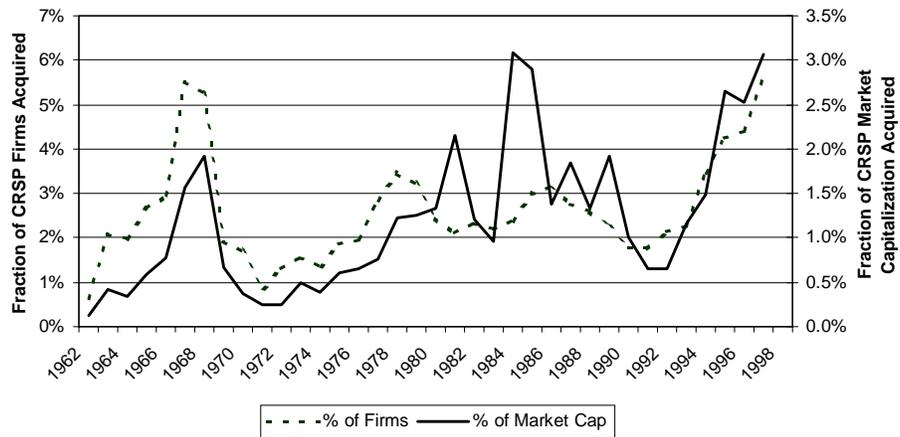   University of Chicago Press: Chicago, IL, 95-107.