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Does Investor Misvaluation Drive the Takeover Market?

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Abstract

This paper documents the relations between firms' pre-offer market valuations and takeover behavior, and evaluates their consistency with the Q theory and the misvaluation theory of takeovers. We employ two valuation measures: price/book ratios and ratios of price to residual income model value. Market valuations of bidders and targets influence the means of payment chosen, the mode of acquisition, the premia paid, target hostility to the offer, the likelihood of offer success, and bidder and target announcement period stock returns. The evidence is broadly consistent with both hypotheses. The evidence for the Q hypothesis is stronger in the pre-1990 period than in the 1990-2000 period, whereas the evidence for the misvaluation hypothesis is stronger in the 1990-2000 period than in the pre-1990 period.

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Does Investor Misvaluation Drive the Takeover Market?

This paper documents the relations between firms' pre-offer market valuations and takeover behavior, and evaluates their consistency with the Q theory and the misvaluation theory of takeovers. We employ two valuation measures: price/book ratios and ratios of price to residual income model value. Market valuations of bidders and targets influence the means of payment chosen, the mode of acquisition, the premia paid, target hostility to the offer, the likelihood of offer success, and bidder and target announcement period stock returns. The evidence is broadly consistent with both hypotheses. The evidence for the Q hypothesis is stronger in the pre-1990 period than in the 1990-2000 period, whereas the evidence for the misvaluation hypothesis is stronger in the 1990-2000 period than in the pre-1990 period.

> Now I'll use my hype-inflated stock to buy companies that have real value.

—Dogbert speaking to Ratbert, *Excuse Me While I Wag*, Scott Adams, Andrews McMeel Publishing, Kansas City, Missouri, 2001.

> The biggest reason AOL Time Warner has been such a dog for investors is that the deal creating the company was done on terms that were insane. And the really painful part is that this was perfectly clear at the time. .... Trouble was, AOL stock was ridiculously overvalued... So don't blame Case for what has happened. He chose the moment, almost to the day, when his stock was most valuable and then used it as currency. He served his shareholders well. It was Time Warner that sold itself for wampum.

—Geoffrey Colvin, "Time Warner, Don't Blame Steve Case," February 3, 2003, *Fortune*.

This paper investigates the motivations for takeovers by documenting the empirical relations between the market valuations of firms and a comprehensive set of takeover characteristics. We test two alternative theories of takeovers, one based upon stock market misvaluation, and the other based upon extensions of the Q theory of investment (Brainard and Tobin (1968)). To do so, we employ market price-to-fundamental ratios as proxies for investor misvaluation, growth opportunities, and agency problems.

Despite a rising interest in psychological approaches to economic decisions in recent years, there has been relatively little study of the degree to which market misvaluation of firms influences investment decisions.[1] An important kind of investment is the purchase of another firm, and a great deal of data are available about the terms and characteristics of takeover transactions. The takeover market is therefore an attractive testing ground for the hypothesis that market misvaluation affects resource allocation and the strategic interaction of firms.

The idea that inefficient market misvaluation is an important driver of the takeover market is not new. For example, Brealey and Myers (2000) (p. 949) discuss a 'bootstrap' game, allegedly important during the diversification boom of the 1960's, based on naive investor interpretations of price/earnings ratios. Nevertheless, as discussed by Shleifer and Vishny (2003), among academics the misvaluation approach to takeovers has traditionally had a low profile relative to efficient markets approaches. Shleifer and Vishny offer a theory in which irrational shifts in investor sentiment affect takeover decisions. We suggest intuitive extensions to their approach to widen the range of implications for takeover characteristics of the misvaluation hypothesis.

The misvaluation hypothesis of takeovers holds that market inefficiency has important effects on takeover activity. These effects stem from the efforts of bidders to profit by

buying undervalued targets for cash at a price below fundamental value; or by paying equity for targets that, even if overvalued, are less overvalued than the bidder. As argued by Shleifer and Vishny (2003), target overvaluation encourages target management to voluntarily accept expropriative offers in order to 'cash out.' Bidder and target misvaluation measures should affect expropriation opportunities and managerial incentives, and therefore transaction characteristics, including the means of payment (stock versus cash), the form of the offer (merger versus tender offer), the bid premium, hostility of the target to the offer, the success of the bid, and event period returns. The misvaluation hypothesis also implies that bidders will tend to be overvalued relative to targets.

An alternative theory, which we call the Q hypothesis of takeovers, focuses on how acquisitions redeploy target assets for better or ill.[2] High market value is an indicator that a firm is well-run or has good business opportunities. Thus, market valuations are proxies for growth opportunities of bidder and target. Takeovers may be designed to eliminate wasteful target behavior, take advantage of better bidder investment opportunities, or alternatively may be used by the managers of inefficient bidders to expand their domains of control.

The Q approach therefore accommodates, though it does not require, agency problems between managers and shareholders. Takeovers of bad targets by good bidders tend to improve efficiency more than takeovers of good targets by bad bidders. Thus, bidder and target valuations are related to announcement date stock returns of bidders and targets, and potentially to how combative is the offer. As with the misvaluation hypothesis, we suggest intuitive extensions of the Q hypothesis to widen its range of implications. Both the misvaluation and Q approaches imply that market valuations are related to the characteristics of takeover transactions; these approaches are discussed more fully in Section IV.

The two valuation ratios applied in this study are price to book value of equity (hereafter P/B), and price to residual-income value as derived from the model of Ohlson (1995) (hereafter P/V). We apply P/B to investigate the Q hypothesis, and both P/B and P/V to investigate the misvaluation hypothesis.

Prior literature also considers P/B (or closely allied variables such as proxies for Tobin's Q) as a proxy for information about the ability of the firm to generate high returns on its investments. Book value reflects historical costs whereas market price reflects forward-looking prospects, so we employ P/B as a proxy for expected growth or managerial effectiveness.

To the extent that B or V are proxies for fundamental value, P/B and P/V are proxies for the degree of firm overvaluation (see also Subsection I.A). P/B or its reciprocal has been viewed as a mispricing proxy in several asset pricing and corporate finance contexts,

though controversy remains. In contrast with book value, our estimate of residual income value (V) contains forward-looking information– analysts' forecasts of future earnings. As a result, P/V filters out the extraneous information about growth and managerial agency problems much better than P/B. Thus, P/V is intended to be a relatively pure measure of misvaluation; it has been used by several authors for this purpose.[3]

Our use of the P/V proxy allows a more focused test of the misvaluation hypothesis. However, analyst forecasts may not *perfectly* filter information about growth from the market price. We further control for growth or agency-related effects by including bidder and target P/B in our multivariate tests of the effects of bidder and target P/V. This is an overly stringent test, because controlling for P/B is likely to remove not only growth, but part of the misvaluation effect we seek to measure.[4] Since P/B and P/V provide complementary information about the misvaluation hypothesis, we perform both univariate and multivariate tests involving both P/B and P/V.

A previous literature has related P/B or allied variables to takeover characteristics.[5] Most past tests condition on what may be, according to either hypothesis, dependent variables.[6] Furthermore, most of this literature examines older or more restricted samples. Our sample period of 1978-2000 includes the decade of the 1990's through 2000, the period of by far the greatest takeover wave in history. The total value of transactions (2001 dollars) from the last 8 years of our sample, 1993-2000, is \$4.35 trillion. This is much greater than the total value of transactions in the preceding 15 years of our dataset, \$1.18 trillion.

To provide a more comprehensive test of the different facets of alternative theories, we investigate how bidder and target valuations are related to a wide set of takeover characteristics. The characteristics relating to the terms of the offer are the payment method (cash versus stock) and the bid premium. The characteristics relating to combativeness are the mood of the offer (friendly versus hostile), the mode of the offer (merger bid versus tender offer), and the probability of offer success. The characteristics relating to stock market reactions are the bidder and target announcement period returns.

In the univariate tests, we divide the observations into quintiles ranked by bidder P/B, bidder P/V, target P/B, or target P/V. Each takeover characteristic is compared across the highest and lowest valuation quintiles. In the multivariate analyses, we consider logistic and least squares regressions of takeover characteristics separately on bidder and target P/B; on bidder and target P/V; and jointly on the four price-to-fundamental variables. We also examine separately 1978-89 and 1990-2000 subperiods. The main qualitative findings are summarized in the Appendix Table. The particular findings in some cases differ across tests, so we summarize here the more robust and salient findings.

Bidders on average have significantly higher P/B and P/V than their targets. This

is as predicted by the misvaluation hypothesis, and is potentially consistent with the Q approach as well. We also provide evidence on bidder/target differentials broken down by transaction type, which provides somewhat more mixed support for the two hypotheses.

We find that higher target valuations are associated with a higher probability that equity rather than cash is the sole means of payment. Targets with higher valuations are less likely to be hostile to the bid; and are more likely to be acquired, to receive merger bids rather than tender offers, to receive lower average bid premia, and to earn lower announcement date abnormal stock returns.

High valuation bidders are much more likely to use stock rather than cash as the sole consideration. Greater bidder valuation is associated with a lower probability of tender offer rather than merger. High P/B bidders tend to pay higher premia, especially in the equity subsample.

Higher bidder valuation (P/B and P/V) is strongly associated with lower bidder announcement-date abnormal stock returns. For example, the bidder return in the highest bidder-P/B quintile quintile is on average 1.5% lower than the bidder returns in the lowest bidder-P/B quintile. Similarly, the bidder return in the highest bidder-P/V quintile quintile is on average 1.8% lower than the bidder returns in the lowest bidder-P/V quintile.

We discuss the interpretation of the specific results in Section IV. However, since the alternative hypotheses make opposite predictions about the relation between bidder valuations and bidder returns, the evidence about this relation deserves special note. Under the misvaluation hypothesis, the market reacts negatively to equity offers because it overvalues the equity being offered more than the target assets being acquired. Alternatively, regardless of the form of the offer, if the offer triggers more careful valuations of the bidder, the prices of overvalued bidders will on average tend to correct downward. Under the Q hypothesis, offers by well-run (high-Q) bidders on average generate greater total gains from takeover, and therefore higher bidder stock returns.

Thus, the P/V and P/B findings are consistent with the misvaluation hypothesis. The Q hypothesis does not have a prediction for P/V, but the evidence is inconsistent with its prediction for P/B. The P/B finding also contrasts with evidence from studies of earlier time periods.[7] Because of differences in sample and variable construction, these findings are not entirely comparable to ours. Nevertheless, the apparent difference raises the possibility that agency or other resource reallocation effects may have been more important during the merger boom of the 1980's than in more recent years.

Overall, a wide range of evidence in this paper generally supports the misvaluation and Q hypotheses, including the distinctive P/V implications of the misvaluation hypothesis. In some cases there are findings that are significant with P/B but not P/V, an outcome more strongly supportive of the Q hypothesis than the misvaluation hypothesis. For

several characteristics, the implications of the Q hypothesis are ambiguous. However, a central prediction suggested in past research on the Q hypothesis (Lang, Stulz, and Walkling (1989), Servaes (1991)) that high valuation bidders earn higher announcement period returns is not confirmed.

There are interesting commonalities and differences across time periods. Valuation effects tend to be stronger in the 1990's/millennial period (1990-2000) than in the 1980's period (1978-1989). Overall, the evidence is supportive of both theories during both early and late time periods. However, the evidence is more consistent with the Q hypothesis in the pre-1990 period than in the subsequent period, and the evidence for the misvaluation hypothesis is stronger in the later period than in the 1980's. This pattern lends some support to the view that the takeovers of the 1980's frequently involved agency problems and real efficiencies, whereas post-1980's takeovers frequently related to market inefficiency.

There is some recent independent work on transaction-level valuations and means of payment in takeovers. Ang and Cheng (2003) use an industry-relative book-to-price ratio and a residual income measure to examine how misvaluation affects means of payment and the long-run abnormal return performance of the combined firm. Rhodes-Kropf, Robinson, and Viswanathan (2004) examine how firm and industry valuations relate to means of payment and merger frequency. In this paper, in order to expose alternative hypotheses to possible disconfirmation on several fronts and develop a set of stylized facts for future theory to explain, we examine a wider range of takeover characteristics.

The remainder of the paper is structured as follows. Section I describes data and empirical methods. Section II describes univariate tests, and Section III describes multivariate tests. Section IV discusses the results in the light of alternative theories. Section V concludes.

I. Data and Methodology

Our sample of takeover bids is obtained from Security Data Corporation (SDC) U.S. mergers and acquisitions database between 1978-2000. We include both successful and unsuccessful offers subject to the following selection criteria:

- Both the acquiring and target firms are traded on NYSE, AMEX, or NASDAQ and their price and return data are available over the eleven-day period around the acquisition announcement from the Center for Research in Security Prices (CRSP).
- The value of the transaction is $10 million or more.
- The offer is announced between January 1, 1978 and December 31, 2000.

- If an acquirer makes multiple attempts to acquire the same target, only the first announcement is included in the sample.

The final sample includes 2,922 successful and 810 unsuccessful acquisition bids.[8] Table I reports the annual breakdown of the sample by outcome, method of payment, mode of acquisition, hostility of the transaction, and whether the bidder and the target are in the same industry.

[Table I about here.]

Accounting data for calculating book value and residual income model value (described below) are from COMPUSTAT. Earnings forecasts needed for calculating the residual income model intrinsic values are obtained from I/B/E/S. To maintain sample size, we do not exclude a transaction from the overall sample just because of missing accounting or I/B/E/S data items.

A. Motivation for and Calculation of Mispricing Proxies

The reliability of the inferences we draw about different hypotheses about takeover markets rests upon the quality of our empirical proxies, P/B and P/V. The validity of our approach, however, does *not* require that either book value or residual income value be a better proxy for rational fundamental value than market price. We merely require that these measures contain substantial incremental information about fundamentals above and beyond market price. We would expect them to do so if a significant portion of variations in market price derives from misvaluation.

A possible alternative means of testing the misvaluation hypothesis is to estimate long-run stock returns. A stock that is inefficiently mispriced should eventually earn abnormal returns when misvaluation is corrected. Thus, long-run abnormal returns provides an indirect measure of misvaluation. Several authors have examined the long-run abnormal returns to successful acquirers, and how these returns relate to means of payment and pre-offer valuation measures.[9] Such studies generally focus on merged firms, and therefore do not measure how mispricing relates to offer success, nor on the distinct effects of bidder versus target misvaluations. Furthermore, there is much controversy about how to interpret long-run post-event returns, which may reflect rational risk premia.[10] A key advantage of tests based on contemporaneous measures of misvaluation is that it does not require drawing inferences from stock returns occurring years after the takeover event.

In support of the P/B proxy, an extensive literature demonstrates that firms' book-to-price ratios are remarkably strong and robust predictors of the cross-section of subsequent one-month returns (see, e.g., the review of Daniel, Hirshleifer, and Teoh (2002)).

Psychology-based theoretical models imply that P/B is a proxy for misvaluation, and thereby will predict subsequent abnormal returns (see, e.g., Barberis and Huang (2001) and Daniel, Hirshleifer, and Subrahmanyam (2001)). Market values reflect both mispricing, risk, and differences in true unconditional expected cash flows (or scale). Book value can help filter out irrelevant scale differences, and so P/B can provide a less noisy measure of mispricing (see Daniel, Hirshleifer, and Subrahmanyam (2001)). On the other hand, P/B is a natural proxy for risk as well. An active debate remains about the extent to which the power of book-to-price to predict returns reflects a rational risk premium or correction of mispricing.[11]

The association of book-to-price with subsequent abnormal returns suggests that some of its variation derives from misvaluation or risk. However, book-to-price has also been used as a proxy for growth opportunities and for the degree of information asymmetry (Martin (1996)). Furthermore, proxies for Tobin's Q that are highly correlated with P/B have been employed to measure the quality of corporate growth opportunities and the degree of managerial discipline. A further source of noise in P/B for our purposes is that book value, the denominator of P/B, is influenced by firm and industry differences in accounting methods.

We calculate P/B as a ratio of equity rather than total asset values, because it is equity rather than total misvaluation that is likely to matter for takeover decisions; a similar point applies for P/V. This would be the case, for example, for a misvalued bidder that contemplates using equity shares to purchase the equity shares of a target firm. Similarly, a potential bidder that is overvalued is presumably more likely to raise equity rather than debt capital to finance a takeover bid.

There is also strong support for P/V (or its reciprocal) as an indicator of mispricing. Lee, Myers, and Swaminathan (1999) find that the aggregate price to residual income value ratio predicts one-month-ahead returns on the Dow 30 stock portfolio better than aggregate price-to-book. Frankel and Lee (1998) find that V is a better predictor than book value of the cross-section of contemporaneous stock prices, and that the price to residual income value ratio (P/V) is a predictor of the one-year-ahead cross-section of returns. Furthermore, Ali, Hwang, and Trombley (2003) report that the abnormal returns associated with P/V are partially concentrated around subsequent earnings announcements. They also report that after controlling for a large set of possible risk factors (including beta, size, book/market, residual risk, and loadings from the Fama and French (1996) three-factor model), P/V continues to predict future returns significantly. These findings make P/V an attractive index of mispricing; D'Mello and Shroff (2000) has used P/V to measure mispricing of equity repurchasers.[12]

There are other possible indices of misvaluation. An alternative measure which we

do not examine is the price/earnings ratio. Price/earnings ratios (or earnings/price ratios) have drawbacks for our purposes. First, earnings/price is not as strong a predictor of month-ahead stock returns as book/market (see, e.g., Fama and French (1996)), suggesting that it is a less accurate measure of mispricing. Second, short-term earnings fluctuations will tend to shift price/earnings even if the degree of misvaluation is unchanged.

The residual income value has at least two important advantages over book value as a fundamental measure. First, it is designed to be invariant to accounting treatments (to the extent that the 'clean surplus' accounting identity obtains; see Ohlson (1995)), making P/V less sensitive to such choices. Second, in addition to the backward-looking information contained in book value, it reflects expectations of future performance as reflected in analyst forecasts of future earnings. The incorporation of analyst forecasts in V filters growth expectations from P.

On the other hand, if analyst forecasts are infected with biases that are correlated with market misperceptions, the residual income value may share some of the misvaluation contained in market price. This could arise if investors are misled by strategic biases in analysts' forecasts, or if analysts and investors are subject to common psychological biases. The cancellation of common biases can weaken P/V as a proxy for misvaluation. This biases the results of tests using P/V toward finding no effect. Furthermore, the additional requirement of data on analyst forecasts reduces the sample size for P/V tests.

These considerations— the high extraneous variation in P/B as an indicator of mispricing, and the possibility of partial cancellation of mispricing in the P/V measure— suggest that either proxy may give an incorrect null result even if misvaluation drives the takeover market. Since neither measure is perfect, it is informative to include both P/B and P/V measures in tests for misvaluation.

In our sample, the correlation of P/B with P/V is not extremely high: 0.530 for bidders and 0.465 for targets. Thus, P/V potentially offers useful independent information beyond P/B regarding misvaluation. This is to be expected, as much of the variation in book/market arises from differences in growth opportunities or in managerial discipline that do not necessarily correspond to misvaluation.

Turning to procedure, we calculate the P/B proxy as the ratio of market value of equity to book value of equity. Each month for each stock, book equity is measured at the end of the prior fiscal year, using the definition as in Baker and Wurgler (2002). Market value of equity is measured at the end of the month.

When a firm has positive book value, the price-to-book ratio P/B is increasing in price, so that P/B is a positive measure of valuation. In contrast, when a firm has negative book value of equity, P/B is negative and is decreasing in price. It therefore becomes an inverse

measure of valuation. Since the intuition behind the measure is that high price relative to book value indicates greater relative valuation, firms with negative book values (and positive price) should be classified as having high valuation. We therefore assign to firms with negative P/B the maximum value of P/B in the takeover sample (after winsorizing P/B at 1% and 99%).[13]

Residual income value V includes both book value of equity, and an adjustment to reflect the value of the firm's forecasted excess income (beyond what would be expected based upon the firm's book value). Excess income is measured using analysts' forecasts of future earnings prospects. Our estimation procedure for P/V is similar to that of Lee, Myers, and Swaminathan (1999). For each stock in month t, we estimate the residual income model (RIM) price, denoted by $V(t)$. With the assumption of "clean surplus" accounting, which states that the change in book value of equity equals earnings minus dividends, the intrinsic value of firm stock can be written as the book value plus the discounted value of an infinite sum of expected residual incomes (see Ohlson (1995)),

$$V(t) = B(t) + \sum_{i=1}^{\infty} \frac{E_t[\{ROE(t+i) - r_e(t)\}\ B(t+i-1)]}{[1+r_e(t)]^i}, \tag{1}$$

where E_t is the expectations operator, $B(t)$ is the book value of equity at time t (negative $B(t)$ observations are deleted), $ROE(t+i)$ is the return on equity for period $t+i$, and $r_e(t)$ is the firm's annualized cost of equity capital.

For practical purposes, the above infinite sum needs to be replaced by a finite series of $T-1$ periods, plus an estimate of the terminal value beyond period T. This terminal value is estimated by viewing the period T residual income as a perpetuity. Lee, Myers, and Swaminathan (1999) report that the quality of their $V(t)$ estimates was not sensitive to the choice of the forecast horizon beyond three years. The residual income valuations are also likely to be less sensitive to errors in terminal value estimates than in a dividend discounting model; pre-terminal values include book value, so that terminal values are based on residual earnings rather than full earnings (or dividends).[14] Of course, the residual income $V(t)$ cannot perfectly capture growth, so our misvaluation proxy P/V does not perfectly filter out growth effects. However, since V reflects forward-looking earnings forecasts, a large portion of the growth effects contained in P/B should be filtered out of P/V.

We use a three-period forecast horizon:

$$\begin{aligned} V(t) &= B(t) + \frac{[f^{ROE}(t+1) - r_e(t)]\, B(t)}{1+r_e(t)} + \frac{[f^{ROE}(t+2) - r_e(t)]\, B(t+1)}{[1+r_e(t)]^2} \\ &\quad + \frac{[f^{ROE}(t+3) - r_e(t)]\, B(t+2)}{[1+r_e(t)]^2\, r_e(t)}, \end{aligned} \tag{2}$$

where $f^{ROE}(t+i)$ is the forecasted return on equity for period $t+i$, the length of a period is one year, and where the last term discounts the period $t+3$ residual income as a perpetuity.[15]

Forecasted ROE's are computed as

$$f^{ROE}(t+i) = \frac{f^{EPS}(t+i)}{\bar{B}(t+i-1)}, \tag{3}$$

where

$$\bar{B}(t+i-1) \equiv \frac{B(t+i-1) + B(t+i-2)}{2}, \tag{4}$$

and where $f^{EPS}(t+i)$ is the forecasted EPS for period $t+i$.[16] We require that each of these f^{ROE}'s be less than 1.

Future book values of equity are computed as

$$B(t+i) = B(t+i-1) + (1-k)\, f^{EPS}(t+i), \tag{5}$$

where k is the dividend payout ratio determined by

$$k = \frac{D(t)}{EPS(t)}, \tag{6}$$

and $D(t)$ and $EPS(t)$ are respectively the dividend and EPS for period t. Following Lee, Myers, and Swaminathan (1999), if $k < 0$ (owing to negative EPS), we divide dividends by (0.06 $\times$ total assets) to derive an estimate of the payout ratio, i.e., we assume that earnings are on average 6% of total assets. Observations in which the computed k is greater than 1 are deleted from the study.

The annualized cost of equity, $r_e(t)$, is determined as a firm-specific rate using the CAPM, where the time-t beta is estimated using the trailing five years (or, if there is not enough data, at least two years) of monthly return data. The market risk premium assumed in the CAPM is the average annual premium over the riskfree rate for the CRSP value-weighted index over the preceding 30 years. Any estimate of the CAPM cost of capital that is outside the range of 3%-30% (less than 1% of our estimates) is winsorized to lie at the border of the range. Previous studies have reported that the predictive ability of P/V was robust to the cost of capital model used (Lee, Myers, and Swaminathan (1999)) and to whether the discount rate was allowed to vary across firms (D'Mello and Shroff (2000)). We checked the robustness of our main findings using the alternative constant discount rate of 12.5% (following D'Mello and Shroff (2000)). The results were similar to those reported here. Finally, P/V is winsorized at the 1% and 99% tails.

To measure the misvaluation of acquirers and targets, we use values of P/B and P/V of the month prior to the acquisition announcement, to ensure that information needed

for calculating the ratios are available before the announcement. The benchmark for fair valuation is not equal to 1 for either ratio, for two reasons. First, book is an historical value that does not reflect growth. Second, residual income model valuations have been found to be too low on average. Thus, our tests consider relative comparisons these misvaluation proxies: higher values of P/B or P/V indicate relative overvaluation, and lower values indicate undervaluation.

B. Announcement Period Returns

Announcement period cumulative abnormal returns (CARs) are computed for the three-day period (-1,1) around the announcement date (day 0). Following Fuller, Netter, and Stegemoller (2002), we employ a modified market model,

$$CAR_i = r_i - r_m, \tag{7}$$

where r_i is the firm-i return and r_m is the CRSP value-weighted market return, over the three-day period around the acquisition announcement.

II. Univariate Tests

This section reports the empirical relations between valuation measures and takeover characteristics in our 1978-2000 sample based on univariate tests; multivariate findings are documented in the next section. Section IV discusses the most robust findings in light of alternative theories of takeover markets.

As observers have often noted, there is clear evidence of aggregate fluctuations in acquisition activity. In Table I, the number of transactions peaks in the middle of the 1980's, and in the latter portion of the 1990's through the turn of the millennium. There are twice as many transactions in the latter period; 67% of the transactions come from 1990-2000, as compared with 33% in 1978-1989. The average transaction value also increases toward the end of the sample period. As a result, as mentioned in the introduction, the total value of transactions (2001 dollars) during 1978-1992 is \$1.18 trillion, and during the last 8 years of the sample, 1993-2000, is \$4.35 trillion. Indeed, the transaction value from 1997-2000 alone is \$3.59 trillion. Acquisitions are more likely to be successful in later years, and more recent acquisitions tend to be mergers. The pre-1990s period has a higher frequencies of hostile offers and tender offers. The acquisition wave of the 1990s through the turn of the millennium is characterized by greater use of stock as a means of payment (see e.g. Andrade, Mitchell, and Stafford (2001) and Holmstrom and Kaplan (2001)). The average bid premium is 34.4% for the entire sample, and the mean abnormal

return is 17.9% for target firms at the announcement of the offer (numbers not reported in table).[17]

Table II reports how valuation measures are related to the acquisition mode and means of payment. Means of P/B and P/V, and their differences between acquirer and target firms are reported in both the overall sample, and across modes of acquisition and methods of payment.[18]

[Table II about here.]

Result 1: *Bidder valuation ratios are on average higher than those of their targets.*

In the overall sample, bidding firms on average have higher P/B and P/V than their targets. The average P/B (P/V) for acquirers is 4.405 (2.189) and for target firms is 3.246 (2.013). For the 2916 (1547) transactions for which we are able to calculate P/B (P/V), the bidder/target P/B (P/V) differential is 1.159 (0.176), differences highly significant.

Result 2: *The bidder/target difference in valuations is on average greater among equity than among cash offers, and among merger bids than among tender offers.*

Since the misvaluation approach emphasizes different motivations for equity and cash offers (Shleifer and Vishny (2003)), it is interesting to examine equity and cash subsamples. Bidder valuations tend to exceed target valuations among each of cash and equity offers. For the 766 (362) cash transactions for which we are able to calculate P/B (P/V), the bidder/target P/B (P/V) differential is 0.566 (-0.081), significant for P/B but not for P/V. Among the 1246 (753) stock offers, the bidder/target P/B (P/V) differential is 1.929 (0.331), highly significant for both measures.

Under both measures, the mean valuation differential between bidder and target is significantly larger among equity than among cash offers ($p < 0.01$; tests not reported in table). Furthermore, the difference in bidder/target valuations is greater among merger bids than among tender offers. For the 2,308 (1,226) merger transactions for which we are able to calculate P/B (P/V), the bidder/target P/B (P/V) differential is 1.310 (0.274), highly significant. Bidders also have higher valuations than their targets among tender offers using the P/B measure, but under the P/V measure bidders have lower valuations. Among the 608 (321) tender offers, the bidder/target P/B (P/V) differential is 0.589 (-0.201), highly significant for P/B, and marginally significant at the 5% level for P/V.

Result 3: *Equity offers are associated with higher bidder and target valuations than cash offers.*

Comparing target valuations, Table II indicates that the targets of cash offers have significantly lower valuations than the targets of stock offers; $P/B = 2.350$ for cash

versus 4.089 for stock ($t = 8.40$). Similarly, $P/V = 1.722$ for cash versus 2.231 for stock ($t = 4.05$).

Turning to bidder valuations, stock bidders on average have higher valuations than do cash bidders, using both P/B and P/V measures; $P/B = 6.018$ for stock versus 2.916 for cash (difference highly significant). Similarly, $P/V = 2.562$ for stock versus 1.641 for cash (difference highly significant). Closely related findings are described in results 4 and 7 below.

Table III analyzes how a wide range of transaction characteristics are related to pre-offer measures of target and bidder valuations. Panels A and B report the effects of target valuation on takeover characteristics; Panels C and D describe the effects of acquirer valuation. In each month, we rank bidders or targets based on their respective valuation ratios and form quintiles. This monthly sorting procedure ensures that any effects we identify are cross-sectional, and therefore are not driven by time-series swings in valuations and takeover characteristics.

[Table III about here.]

Quintile 5, the top valuation quintile, has the highest bidder or target P/B or P/V; quintile 1 has the lowest valuations. We report differences across the top and bottom valuation quintiles to describe how higher market valuation is related to transaction characteristics.[19]

A. Effects of Target Valuations

We first discuss the relation between target valuations and takeover characteristics presented in Table III, Panels A and B.

Result 4: *Higher target valuation is associated with*
i. greater use of equity as a means of payment, and
ii. less use of cash as a means of payment.

Stock is much more likely to be used as method of payment when the target has higher valuation (21.0% quintile difference in probability (P/B); 16.3% (P/V)), both highly significant. Furthermore, higher target valuation is associated with lower probability of a cash offer. The quintile differences in the probability of cash offers are -12.5% (P/B; highly significant) and -6.2% (P/V; significant only at 10% level).

Result 5: *Higher target valuation is associated with a less combative offer:*
i. a lower probability of hostility,

ii. a lower probability of tender offer rather than merger, and
iii. a higher probability of offer success.

Several findings indicate that transactions are more combative when targets have lower valuations. A transaction is less likely to be hostile when the target has higher valuation (quintile difference in probability of -7.5% (P/B) or -5.3% (P/V)). A transaction is less likely to take the form of tender offer (a takeover method sometimes used to bypass the need for approval by target managers) rather than merger bid when the target has higher valuation (quintile difference in probability of -7.5% (P/B) or -7.7% (P/V)). There is also evidence that an offer is less likely to be successful when the target has lower valuation (the quintile difference in probability is 8.7% (P/B) or 5.9% (P/V)).[20]

Result 6: *Higher target P/B is associated with:*
i. a lower bid premium, and
ii. a lower target announcement period return.

Both bid premia and target announcement period returns are on average lower for high valuation targets.[21] The quintile difference for bid premium is -8.4% (-2.6%) for P/B (P/V) and the quintile difference for target announcement period return is -4.7% (-2.5%), P/V insignificant for both.

Result 6.iii: *Higher target valuation is associated with a lower bidder announcement period return.*

Using either measure, bidder announcement returns are substantially lower when targets are more highly valued prior to announcement. The quintile difference for bidder announcement period returns is -1.6% (-1.8%) for P/B (P/V). This effect derives primarily from stock acquisitions, which have quintile differences of -1.9% (-2.4%) (not reported in table).[22]

B. Effects of Bidder Valuations

We turn next to the relation between bidder valuations and takeover characteristics described in Table III, Panels C and D.

Result 7: *Higher bidder valuation is associated with:*
i. greater use of equity, and
ii. less use of cash
as a means of payment.

Bidders with higher valuations are much more likely to use stock as the means of payment. The difference in probability of using stock between the top and bottom valuation

quintiles is a sizable 24.7% (P/B) or 14.7% (P/V). Similarly, high valuation acquirers are less likely to use cash as consideration. The difference in the fraction of cash offers between the top and bottom valuation quintiles is -14.3% (P/B) and -6.4% (P/V).[23]

Result 8: *Higher bidder valuation increases the likelihood of merger bid rather than tender offer.*

High valuation bidders are less likely to use tender offers and more likely to use merger bids. In Panels C and D, the quintile difference in probability of tender offer is -6.8% (significant at 1% level) and -4.9% (significant at the 5% level) for P/B and P/V.

Result 9.i: *Higher bidder P/B is associated with higher bid premia.*

There is some evidence that high valuation acquirers pay higher bid premia, especially when the form of consideration is stock. Using the P/B measure in Panel C the quintile difference in premium is 4.2% for the whole sample and (not reported in the table) 8.0% for stock acquisitions, significant differences. There is no significant effect for P/V in Panel D.

Result 9.ii: *Higher bidder P/B is associated with higher target stock returns.*

There is some evidence that offers by high valuation bidders are associated with higher target announcement period returns. This effect is also much stronger among stock bids than in the entire sample. In Panel C, the P/B quintile difference in target announcement period stock returns is 2.1% for the whole sample (significant at the 10% level), and (not reported in the table) 6.1% among stock acquisitions (highly significant). In contrast, the older samples of Lang, Stulz, and Walkling (1989) and Servaes (1991) indicated that (conditioning on subsequent offer success), there was no significant relation between bidder Q and target return. In Panel D P/V has essentially no effect; among stock offers (not reported in table) there is a quintile difference of 3.7%, significant at the 10% level.

Result 9.iii: *Higher bidder valuation is associated with lower bidder announcement period returns.*

Mean acquirer announcement period returns are significantly more negative when the acquirer has high valuation based on either measure. The mean bidder abnormal return (describing the quintile difference in mean returns from going long in high-valuation and short on low-valuation bidders upon offer announcement) is -1.5% (P/B) or -1.8% (P/V). For P/B the effect derives from the stock and merger subsamples; for P/V the effect is strong with both stock and cash subsamples, and both merger and tender offer sub-samples (not reported in tables).

As mentioned in the introduction, studies on earlier samples on Tobin's Q variables (which tend to be highly correlated with P/B) found very different results, that higher bidder valuation was associated with higher bidder returns. For example, our finding contrasts with the evidence, based on proxies for Tobin's Q in a sample of successful mergers and tender offers from 1972-87 of Servaes (1991). Our finding within the tender offer subsample of no significant relation between acquirer P/B ratios and announcement period acquirer returns (with a point estimate indicating low returns for bidders with low P/B) contrasts with the findings for successful tender offers of Lang, Stulz, and Walkling (1989) (from 1968-86); see also footnote 28. Thus, our overall P/B finding suggests that the 1990's/millennial period may be different from the earlier period.[24]

Our P/B findings also contrast, though not quite as starkly, with the finding of Moeller, Schlingemann, and Stulz (2005) in a 1980-2001 sample of public acquisitions of essentially no relation between Tobin's Q and the bidder's announcement period return. The differing conclusions may derive from their conditioning of returns on success of the offer, our longer sample period, or differences in control variables and in valuation proxies.[25] For our purpose here of distinguishing the misvaluation and Q hypotheses, a cleaner test is provided by examining unconditional mean bidder announcement period returns, since offer success is not known at the time that the announcement returns are realized.

III. Multivariate Tests

Proxies for misvaluation can be correlated with growth prospects for at least two distinct reasons. First, for psychological reasons investor misperceptions may be related to growth—'inherent confounding.' For example, the market may overvalue rapidly growing firms (see Lakonishok, Shleifer, and Vishny (1994)). Second, measurement error in the mispricing proxy may be correlated with growth opportunities—'measurement confounding.' For example, market price in P/B and P/V reflects the market's rational assessment of future growth, not just pricing errors.

A crucial advantage of P/V is that, by taking into account analyst forecasts of future earnings, it addresses mismeasurement confounding. Furthermore, in multivariate testing for the effect of P/V, controlling for P/B (which depends heavily on growth prospects) can also address inherent confounding (and can help sop up any remaining mismeasurement confounding). On the other hand, removing the effects of inherent confounding by definition removes part of the misvaluation effect that we wish to test for. Furthermore, discussed earlier, P/B is itself likely to contain some incremental information about mis-

valuation. It is therefore informative to examine tests that use each variable separately, as well as jointly.

We therefore perform multivariate analysis with additional controls as described in Tables IV and V. All regressions include size variables, leverage, year, and industry as controls. The industry controls are bidder 2-digit SIC major industry dummies as defined by Moskowitz and Grinblatt (1999). To ensure that the effects we identify are not spurious artifacts of low-frequency time-series swings, in the multivariate regressions in Tables IV and V, bidder and target P/B and P/V are ranked each month among all CRSP stocks and assigned a value between 1 and 100 (see Frankel and Lee (1998)).

[Table IV about here.]

[Table V about here.]

Theories of financing and capital structure predict that leverage levels will be related to firms' growth opportunities, so leverage and P/B may be correlated. It is possible that leverage and financing constraints influence bidder behavior, inducing a correlation of B/P with takeover characteristics. We therefore include leverage as one of the control variables in the multivariate tests.[26]

Table IV summarizes logistic regressions relating bidder and target valuation measures to the means of payment and to the mode and mood of the offer. The dependent variables we consider are: (1) cash payment, (2) stock payment, (3) tender offer, (4) hostility, and (5) success. We report three specifications for each dependent variable. First, we regress on bidder and target P/B ranks. Second, we regress on bidder and target P/V. Third, we include both P/B and P/V ranks to examine whether there is incremental explanatory power from P/V as a misvaluation measure given P/B. If so, this provides a fairly stringent confirmation that the identified effect is a result of misvaluation, rather than other economic factors possibly captured by book/market, such as risk premia, growth opportunities, or the degree of managerial discipline. (Stringent, because P/B is likely to extract part of the misvaluation effect from P/V).

The multivariate findings for target valuations in Table IV are generally consistent with those of the univariate analysis. As in the univariate analysis, higher target valuation (higher P/B or P/V) is associated with greater use of stock (Result 4.i), less use of cash (Result 4.ii), a lower probability of a tender offer rather than a merger (Result 5.ii), and a lower probability that the offer is hostile (Result 5.i; the P/V effect on cash and hostility does not withstand inclusion of P/B in the regression). Also, in the multivariate analysis, the effect of valuation on probability of success (Result 5.iii) remains highly significant with the P/B measure, but is not significant with the P/V measure.

The findings for bidder valuations in Table IV are also generally similar to the univariate analysis. As in the univariate analysis, higher bidder valuation (P/B or P/V) is associated with greater use of stock (Result 7.i), less use of cash (Result 7.ii), and a lower probability of a tender offer rather than a merger (Result 8).

There are also some differences between the multivariate and univariate findings. Table V indicates that, as with the univariate findings, higher target valuation as indicated by higher P/B is associated with lower bid premia (Result 6.i) and lower target announcement period returns (Result 6.ii). However, in contrast with the univariate tests, in the multivariate test these relationships apply with the P/V measure as well. As for the effect of target valuation on bidder returns (Result 6.iii), in contrast with the strong negative effect in the univariate tests, in the multivariate tests there is no significant relation.

The positive relation between bidder valuation, as indicated by P/B, with bid premium (Result 9.i) is weaker in the multivariate tests than in the univariate tests. The confidence level is $p < .10$ when only P/B is included in the regression, and is $p = .12$ when both P/B and P/V are included. This relation becomes significant at the 1% level within the stock offer subsample (not reported in tables).

The evidence as to whether bidder valuation is associated with target announcement period returns is mixed. The univariate finding that high bidder P/B is associated with higher target returns (Result 9.ii) does not hold up in the multivariate tests.

Consistent with the univariate findings, for both P/B and P/V, high valuation bidders earn lower bidder announcement period returns (Result 9.iii). These findings contrast with evidence, discussed in Section II, from other studies based on different time periods and empirical measures; see also footnote 28. As with the univariate evidence, these are highly significant effects.

IV. Discussion

We now discuss the more salient empirical findings of the previous two sections from the perspective of two theories of takeovers, the misvaluation hypothesis and the Q hypothesis. In the approach of Shleifer and Vishny (2003), managers value firms rationally, whereas investors do not. Cash takeovers result from the efforts of bidders to acquire undervalued targets at prices below fundamental value. Equity takeovers result from the efforts of highly overvalued bidders to trade their assets for less overvalued target assets, thereby achieving a favorable real exchange ratio. Target managers accept such offers if the target is also overvalued, as takeover gives target management the chance to 'cash out' of illiquid stock or option holdings. More generally, the misvaluation hypothesis reflects the insight that the willingness of target management to cash out should tend to be greater when

the target is less undervalued (or more overvalued).[27]

Under the misvaluation hypothesis, P/B and P/V measures equity misvaluation. Misvaluation affects the ability of a bidder to finance a bid at a favorable price. Furthermore, bidder and target misvaluation create different strategic incentives which affect not only the means of payment (as described above), but also the combativeness of the transaction, the premium paid, and the likelihood of offer success.

The Q hypothesis of takeovers (Lang, Stulz, and Walkling (1989), Servaes (1991), and Jovanovic and Rousseau (2002)) asserts that takeovers reallocate target assets to different uses. These uses can generate higher or lower payoffs depending on the quality of bidder and target management, and on the business opportunities of bidder and target firms.

In this approach, Tobin's Q, proxied by the ratio of firm market value to book value, is an indicator of the degree to which a firm has good opportunities to create shareholder market value from invested resources. On the other hand, poorly run bidders may waste resources on takeovers and make poor use of target assets. For example, bidders may waste their free cash flow (Jensen (1986)), or make empire-building equity offers.

P/B provides a measure of the bidder or target's ability to create value from existing assets.[28] The Q hypothesis predicts that greater total gains are generated in acquisitions involving bad targets and good bidders than in transactions involving good targets and bad bidders. These larger gains are shared between bidder and target. So higher bidder valuation and lower target valuation are predicted to be associated with high bidder and target returns (see Lang, Stulz, and Walkling (1989), and Servaes (1991)), and (we further predict) higher bid premia.

Since P/V is purified of much of the growth effects contained in P/B, our univariate P/V tests are much less subject to an interpretation in terms of growth or leverage-induced financing constraints. Examining the effects of P/V after controlling for P/B provide an even more stringent test for misvaluation.

The misvaluation and Q hypotheses share several implications, which makes it harder to distinguish these alternative theories. Neither has unambiguous predictions about the effects of investor valuations on every takeover characteristic. In our discussion we suggest how each approach can rationalize different findings, and which results present the greatest challenges to each approach. Further theoretical work to extend the range of predictions of each hypothesis is likely to provide additional insights.

A. Relative Bidder/Target Valuations

Result 1, that bidding firms on average have significantly higher valuations than target firms (higher P/B and P/V) in the overall sample is consistent with the misvaluation

hypothesis. The findings for equity offers and merger bids are strong, and for cash offers and tender offers are more mixed. Intuitively, under the misvaluation hypothesis the way a stock bidder can profit from misvaluation is to acquire a less overvalued (though still overvalued) target. Cash bidders should also on average be overvalued relative to their targets, for two reasons. First, the ability to raise capital cheaply loosens a firm's cash constraints, so overvaluation encourages making a cash bid over no bid. Second, cash bidders profit by acquiring undervalued targets.

The bidder versus target findings for P/B are related to findings of Andrade, Mitchell, and Stafford (2001) and Jovanovic and Rousseau (2002), although their studies condition upon offer success. Jovanovic and Rousseau (2002) propose a version of the Q hypothesis in which takeovers are generally value-increasing (thereby ruling out, for example, takeovers involving overinvestment of free cash flow). Our finding and theirs are consistent with this version of the Q approach, as well as with the misvaluation hypothesis. More generally, the Q approach as developed by Lang, Stulz, and Walkling (1989) and Servaes (1991) does not specify whether good or bad transactions predominate, so it is consistent with bidders having either higher or lower market valuation ratios than targets. However, one reason that good bidders may predominate is that if bad bidders create less value, they may have a harder time than good bidders at getting their boards to approve bids.

Neither hypothesis specifically predicts the Result 2 finding that the bidder/target difference in valuations is on average greater among equity than among cash offers, and among merger bids than among tender offers. However, under the misvaluation hypothesis, a profitable equity offer requires the bidder to be overvalued relative to the target. Although the differential is also likely to be positive for a profitable cash offer (since the target must be undervalued), it does not have to be, suggesting a smaller bidder/target valuation difference. A similar point applies to merger versus tender offer, because tender offers tend to be done in cash while mergers predominantly involve equity. This correlation makes sense under the misvaluation hypothesis because overvalued bidders can profit from friendly equity merger bids, rather than hostile cash tender offers.[29]

An interpretation of Result 2 under the Q hypothesis is that friendly offers (associated with merger and use of equity) are made in transactions where there are large total gains to share, and that gains are largest when high Q bidders acquire low Q targets, so that target resources can be allocated to more efficient uses. It follows that merger bidding and equity payment should be associated with a larger bidder-target difference in valuations. On the other hand, if there are agency problems, then friendly merger and equity bids should tend to be made to well-run, high-Q targets; it is bad targets that require discipline. Ceteris paribus, this effect tends to reduce the bidder-target valuation difference in mergers and

equity offers. Thus, a possible explanation for Result 2 is that the first effect is stronger than the second one.

B. Target Valuation and Takeover Characteristics

The Result 3 finding that the targets of cash offers have significantly lower valuations than the targets of stock offers, and the (basically equivalent) findings of Results 4.i-ii that higher target valuation is associated with equity rather than cash offers, are consistent with the misvaluation hypothesis. As discussed earlier, in Shleifer and Vishny (2003) overvalued targets receive equity offers (since overvalued target management is willing to cash out even to relatively overvalued equity bidders). Two further arguments reinforce this point. First, ceteris paribus, the more overvalued (or less undervalued) the target, the stronger the incentive of the bidder to leave part of the target's misvaluation on the shoulders of target shareholders by paying with stock rather than cash. (For a given premium over market, greater target overvaluation increases the cost to the bidder of either a cash or equity offer. But the increase in the cost of an equity offer is smaller to the extent that target shareholders overvalue the merged equity being offered.) Second, if target firms are resistant to selling when they are undervalued, the bidder may seek to circumvent target management and consummate swiftly by means of a cash tender offer. The P/V finding that bidder valuation promotes the use of equity indicates an effect of measured misvaluation even in a test that stringently filters out growth-related effects.

Several findings (Results 5.i-iii) indicate that low target valuation is associated with a more combative transaction: the association of low target valuation with hostility, tender offer rather than merger, and with lower probability of success using both measures in univariate tests. (However, there is no effect of target P/V on hostility after controlling for P/B, and only a univariate P/V effect on success.)

These findings are generally consistent with both the Q hypothesis and the misvaluation hypothesis. Under the Q hypothesis, it is reasonable to expect managers of poorly run and therefore low-valued (low P/B) targets to oppose takeover in order to avoid being fired. This leads to hostility, the use of tender offer, and lower probability of offer success.

Under the misvaluation hypothesis, bidders for undervalued targets have an incentive to profit by bidding below true target value. This should provoke greater opposition by the target to the offer (consistent with the evidence discussed above), reducing the probability of success. The manager of an undervalued target has an incentive to fight hard either to block the offer or to drive up the price. This in turn increases the incentive of the bidder to bypass management through a tender offer. Cash offers exploit unwilling, undervalued targets, whereas less undervalued or more overvalued targets are more willing to 'cash out'

to relatively overvalued equity offers. Furthermore, since target overvaluation encourages target management acceptance, it should also improve the probability of offer success.

The evidence (Result 6.i) that bid premia are on average higher for more undervalued targets under the P/B measure is consistent with both hypotheses. However, the P/V finding, which is insignificant (though of the right sign) in the univariate test but strong in the multivariate analysis, provides only partial support for the misvaluation hypothesis.

Under the Q hypothesis, there is greater room to improve a poorly run target. The bidder can therefore afford to pay a higher premium for the target. Furthermore, the managers of a poorly run target may fight harder to prevent takeover, in order to avoid being fired. Thus, low valuation targets under the P/B measure should receive higher premia.

Under the misvaluation hypothesis, greater undervaluation increases a target's incentive to fight to maintain a premium (or avoid a discount) relative to fundamental value. In addition, a bidder has a stronger incentive to increase its bid relative to market in order to ensure success. Thus, more undervalued targets (P/B or P/V) should earn higher premia relative to the market price.

The evidence (Result 6.ii) that target announcement period returns are on average higher for low valuation targets is consistent with undervalued targets fighting for a higher premium (relative to an unduly low market price), and with takeover bids on average acting to correct preexisting target mispricing.

The Q hypothesis provides an alternative explanation for the significant P/B findings. The largest value improvements are possible for bad targets with low valuations. This larger gain can be shared with target shareholders, increasing the announcement period return (see, e.g., Lang, Stulz, and Walkling (1989) and Servaes (1991)).

C. Bidder Valuation and Takeover Characteristics

The finding that stock bidders are on average more highly valued than cash bidders (Result 3), and the (basically equivalent) finding that bidders with higher valuations are more likely to use stock rather than cash as consideration (Results 7.i-ii), are consistent with the hypothesis that overvalued bidders prefer to acquire target resources using their overpriced stock as a currency. Intuitively, given a bid, greater bidder overvaluation increases the incentive to pay with equity rather than cash by reducing the fundamental cost per dollar of market value offered as consideration.[30]

Theories of financing and capital structure offer an alternative explanation of this finding. Bidders with strong growth opportunities may prefer to keep their leverage low to avoid being capital constrained in the future. They can do so by financing their offers

with equity (as argued by Jung, Kim, and Stulz (1996) and Martin (1996)).

Neither hypothesis specifically predicts Result 8, that greater bidder valuation is associated with a lower probability of tender offer rather than merger. A possible interpretation under the misvaluation hypothesis is that overvalued bidders tend to use equity, which is rarely used in tender offers. A possible interpretation under the Q hypothesis is that bidders with good growth opportunities should reduce leverage by issuing equity, which again is associated with merger rather than tender offer.

A possible explanation for Result 9.i that bidders with high valuation, measured by P/B, pay higher bid premia (especially when the form of consideration is stock) is that overvalued bidders either find it easier to raise enough capital to make a high bid, or are more willing to make a high bid using an overvalued currency, their stock. Furthermore, an overvalued equity offer is less attractive to target management than a corresponding cash premium, so overvaluation increases the pressure on an equity bidder to boost the premium.

The Q hypothesis provides an alternative explanation: good (high-valuation) bidders are able to create greater value from acquisition, and share some of this larger gain with target shareholders in the form of a higher premium. Since there is no significant finding for P/V, this evidence supports the Q hypothesis more strongly than the misvaluation hypothesis. On the other hand, the Q hypothesis does not address the greater strength of the effect among equity than among cash bids.

Despite the evidence that among stock offers, bidders with higher valuation pay higher premia, there is no evidence that targets are more likely to view offers from high valuation bidders as friendly, nor that such offers have a greater probability of success. This is reasonable if target management understands that the bidder is overvalued (as in the approach of Shleifer and Vishny (2003)). If so, then a higher premium relative to market in a stock offer merely compensates for the fact that the market value of the offered shares is inflated relative to fundamental value. Alternatively, under the Q approach, it could be that well-run (high-valuation) bidders are more likely to remove target management. If so, target management will fight harder in opposition to the bid, forcing a higher premium.

The finding that bidders with higher valuations (using both measures) on average earn substantially lower announcement period returns (Result 9.iii) contrasts with findings of studies that used earlier samples. The evidence is also in sharp conflict with the Q hypothesis, which predicts that a well-run bidder can generate greater gains from takeover (Lang, Stulz, and Walkling (1989), Servaes (1991)). Furthermore, the fact that this effect is present within each of the cash and stock subsamples indicates that this finding does not derive from correlation of P/B with the use of equity as a means of payment (as in the adverse selection effect of Myers and Majluf (1984)).

From a misvaluation perspective, as discussed above, overvalued bidders are predicted to offer high bid premia to targets. In the case of equity offers, the market tends to believe mistakenly that the bidder is paying too much (since the market overvalues the equity being offered more than it overvalues the target assets). Thus, investors tend to view an offer by an undervalued bidders as a masterful stroke, and an offer by an overvalued bidder as a clumsy blunder.

More generally, this empirical finding is consistent with the announcement of a takeover bid alerting investors to preexisting mispricing, thereby causing a partial correction. An alternative argument is that takeover bids may on average incite greater bidder mispricing. Some existing behavioral theory predicts that discretionary corporate events are associated on average with a corrective effect on prior mispricing (see Daniel, Hirshleifer, and Subrahmanyam (1998)). Intuitively, takeover bids are salient events that call attention to the firms involved. To the extent that more careful analysis helps investors correct misvaluation, the stock price reaction tends to oppose the prior misvaluation.[31] However, we do not exclude the opposite possibility.

Overall, as indicated in the Appendix Table, evidence from the full time period, there are a variety of robust regularities about valuations and takeover behavior that offer substantial support for both the misvaluation and the Q hypotheses. Neither theory explains all aspects of the data, and for some takeover characteristics the hypotheses do not offer unambiguous predictions. The distinctive P/V findings of the misvaluation hypothesis receive substantial support. However, in some cases there are findings that are significant with P/B but not P/V, an outcome that tends to be more strongly supportive of the Q hypothesis. On the other hand, the Q hypothesis is directly contradicted in one of the predictions offered by some of its originators, that high valuation bidders will earn higher announcement period returns. This disagreement is strongest in the 1990's/millennial subsample.

D. Differences in Valuation Effects Over Time

Observers have often portrayed the takeovers of the 1980s as relating to agency problems and real efficiencies, and the takeovers of the 1990's and turn of the millennium as relating to market inefficiency. Subsample analysis indicates that the empirical findings in the overall sample are to a large extent present in both the '1980's subsample,' which runs from 1978-1989, and the '1990's/millennial subsample,' which runs from 1990-2000. Most findings identified in the overall sample remain strong in the later period; the findings for the 1980's tend to be weaker. Statistical significance in the 1980's is also reduced by the smaller sample size (1222) in the earlier period than in the later period (2510); there

are only 324 P/V observations of bidder-target pairs in the earlier period, compared with 1223 P/V observations in the later period. The Appendix Table summarizes findings for the two subperiods.

The evidence on the whole tends to be supportive of both theories during both early and late time periods. However, some differences in findings across the two periods tend to be more consistent with the misvaluation hypothesis in the 1990's/millennial period than in the 1980's, and to be more consistent with the Q hypothesis in the 1980s than in later period. The full-sample finding that bidders have higher valuations than targets applies only within the 1990's/millennial period.[32] Indeed, during the 1980s targets had higher valuations than bidders using the P/V measure, which opposes the misvaluation hypothesis.[33] Tender offer targets have higher P/V than their bidders in the full time period; this effect is inconsistent with the misvaluation hypothesis, and derives entirely from the 1980's. The evidence regarding P/V does not provide compelling support for the Q hypothesis either, since P/V is not a proxy for managerial quality. However, in the 1980's bidders do tend to have marginally higher P/B than targets.

In the univariate tests, the full-period findings regarding effects of bidder P/B and P/V are all strong in the 1990's/millennial subsample, as are the effects of target P/B; the effects of target P/V are also strong in the 1990's except for the effects on hostility and success.

Most of the findings for target P/B are quantitatively similar in the 1980's to the full sample, though the significance tends to be weaker because of smaller sample size. However, the effect of target P/B on means of payment (a prediction of the misvaluation hypothesis) is not present in the 1980's sample.

Owing partly to differences in sample size, the full-sample findings for target P/V become much less significant during the 1980's (though in some cases the point estimates for the 1980's appear to be substantial). Some but not all of the full-sample results for bidder P/B remain in the 1980's. The full sample effects of bidder P/V vanish entirely in the 1980's.

In the multivariate tests, almost all of the full-sample findings for target P/B, bidder P/B, and bidder P/V continue to hold in the 1990's/millennial subsample, as do most of the target P/V findings.

Most of the full-period findings for target P/B hold up in the 1980's, but the full-period findings for target P/V vanish, which fails to support the misvaluation hypothesis during the 1980's. For bidder P/B, some of the full-period findings survive but some vanish in the 1980's, indicating weaker support for both theories. For bidder P/V, most of the full-sample findings vanish, though an indication of an effect on bidder announcement period returns remains.

The greatest challenge to the Q hypothesis is the finding that high bidder valuation as measured by P/B is associated with lower bidder announcement period returns. This effect is very strong in the 1990's/millennial subsample, but is not present during the 1980's. Thus, this challenge is milder during the 1980's than in the full period sample.

In summary, neither theory explains all aspects of the data, and in some cases the hypotheses do not offer unambiguous predictions. Nevertheless, the main weight of the evidence tends to be supportive of both theories, with greatest consistency with the Q hypothesis in the 1980's and greatest consistency with the misvaluation hypothesis in the 1990's.

With regard to the misvaluation hypothesis, it could be argued that it is not actual misvaluation that influences takeovers, but merely an incorrect perception by managers that there is overvaluation. If managers believe that the price/book ratio is an indicator of misvaluation, they may make takeover decisions based on it. However, most managers are probably unfamiliar with P/V, so this argument does not explain the P/V effects that obtain after controlling for P/B.

V. Summary and Conclusion

We examine the misvaluation hypothesis— that inefficient stock market misvaluation is an important driver of the takeover market— and the Q hypothesis— that high quality bidders improve bad targets more than bad bidders improve good targets— using contemporaneous measures of the valuations of bidders and targets: price/book (P/B), and the ratio of price to residual income valuation (P/V). The P/V variable helps us evaluate whether a relation between market valuations and takeover characteristics is due to mispricing or to other effects deriving from growth opportunities or from the quality of bidder and target managements.

Several empirical patterns emerge. With one or both measures, bidders are more highly valued relative to their targets in the full sample, especially among equity offers and merger bids. More highly valued bidders are more likely to use stock and less likely to use cash as consideration, are willing to pay more relative to target market price, are less inclined to use tender offer rather than merger bid, and earn lower announcement period returns. Low valuation targets receive higher premia relative to market price, are more likely to be hostile to the offer, are more likely to receive tender offers rather than merger bids, have a lower probability of being successfully acquired, and earn higher announcement period returns.

Most of the effects we identify are stronger in the 1990's/millennial subsample than in

the 1980's. In addition, the evidence is broadly supportive of both the Q and misvaluation hypotheses in both periods, but tends to be more supportive of the Q hypothesis in the 1980's, and the misvaluation hypothesis in the 1990's/millennial period.

The cross-sectional tests we offer here filter away any effects of aggregate valuations, and disentangle the effects of bidder versus target misvaluation. Our findings raise the question of whether market valuations drive aggregate patterns of takeover activity. Some recent papers examine aggregate valuation and the takeover market (Bouwman, Fuller, and Nain (2004), Verter (2003)). These papers confirm that there are long-term swings in market valuations and in aggregate takeover activity, and have offered some independent support for the view that valuations affect takeover activity. A challenge for this literature is that the effective sample size is reduced by the low frequency of merger waves, and the fact that aggregate measures mix the effects of bidder and target valuations. Our tests are therefore complementary with those of these papers.

A challenge for distinguishing alternatives is that the misvaluation and Q hypotheses share several implications. Furthermore, each hypothesis is ambiguous with respect to some takeover characteristics. We suggest how each approach can rationalize different findings, and which results present the greatest challenges to each approach. Further theoretical work will be valuable in developing further predictions that distinguish alternative hypotheses more sharply.

There is no reason to believe that the influence of market valuations (rational or otherwise) on managerial decisions is limited to the takeover market. As discussed earlier, recent research provides evidence that financing, repurchase, reporting, and investment decisions are related to valuation measures. Our evidence contributes to an emerging theme in recent literature that valuations (and, some have argued, misvaluations) may be important for many of the decisions that firms make.

The recently emerging misvaluation perspective offers an alternative to the traditional approaches to corporate finance, including the Q theory, which are premised upon the efficient markets hypothesis. There have been some initial steps toward incorporating misvaluation into the theory of takeover transactions (see Shleifer and Vishny (2003)), financing, and investment decisions (see Stein (1996) and Daniel, Hirshleifer, and Subrahmanyam (1998)). The emerging indications of possible misvaluation effects suggest that further theoretical analysis of how firms can exploit misvaluation may be fruitful.

[Appendix Table about here.]

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Notes

[1]On the financing side, several authors have provided evidence that firms time new equity issues to exploit market misvaluation, and manage earnings to induce such misvaluation—see, e.g., Ritter (1991), Loughran and Ritter (1995), Rajan and Servaes (1997), Teoh, Welch, and Wong (1998b, 1998a), Teoh, Wong, and Rao (1998), Rangan (1998), and Baker and Wurgler (2000)). Recent evidence suggests that inefficient market valuations influence levels of investment (Polk and Sapienza (2004)) and the sensitivity of investment to cash flow (Baker, Stein, and Wurgler (2003)).

[2]Our development of the Q hypothesis is based upon the work on Tobin's Q and takeovers of Lang, Stulz, and Walkling (1989), Servaes (1991), Martin (1996), and Jovanovic and Rousseau (2002), and on agency, growth and takeovers of Morck, Shleifer, and Vishny (1990).

[3]For example, see Frankel and Lee (1998), Lee, Myers, and Swaminathan (1999), and Ali, Hwang, and Trombley (2003); a corporate finance application is provided by D'Mello and Shroff (2000).

[4]The evidence from past literature (see Section I) suggests that P/B is informative about misvaluation, both on its own and incrementally to P/V.

[5]See Walkling and Edmister (1985), Lang, Stulz, and Walkling (1989) Servaes (1991), Martin (1996), Rau and Vermaelen (1998), Jovanovic and Rousseau (2002), and Moeller, Schlingemann, and Stulz (2004, 2005).

[6]For example, most studies examine samples of successful offers. If misvaluation or growth affects offer success, and so does a transaction characteristic (such as friendly versus hostile, merger versus tender, or cash versus equity), then examining successful offers can potentially induce a conditional correlation between the misvaluation or growth measure and the characteristic even if misvaluation or growth has no effect on the characteristic.

[7]In Lang, Stulz, and Walkling (1989) and Servaes (1991), announcement-period bidder returns among offers that subsequently succeeded were *higher* when bidders had high Tobin's Q measures; P/B is highly correlated with Q measures (see also footnote 28). Moeller, Schlingemann, and Stulz (2005) find essentially no relation between bidder Q and bidder returns in a more recent sample of successful offers; see also the discussion near footnote 25.

[8]The bid premium is defined as the bid price of the offer divided by the market price of the target 5 days before the announcement. If the bid premium is less than -50% or greater than 200%, then we treat it as missing. We require that target stock price at the time of the announcement exceed $3. To ensure data accuracy, for successful acquisitions, we compare the CRSP delisting date of the target and the SDC effective date. If the difference between the two dates is greater than 40 trading days, then the acquisition is deleted from the sample.

[9]See, for example, Franks, Harris, and Titman (1991), Loughran and Vijh (1997), Rau and Vermaelen (1998), and Moeller, Schlingemann, and Stulz (2004, 2005).

[10]Some recent overviews include Fama (1998), Loughran and Ritter (2000), and Daniel, Hirshleifer, and Teoh (2002)). The outcomes of long-run return studies are often sensitive to the empirical method, including the choice of the return benchmark, the method for compounding returns, and the treatment of cross-event return correlations (Barber and Lyon (1997), Mitchell and Stafford (2000), Fama (1998), and Loughran and Ritter (2000)).

[11]See, e.g., Fama and French (1996), Daniel and Titman (1997), and the review of Daniel, Hirshleifer, and Teoh (2002). Some more recent empirical papers addressing factor risk versus mispricing as explanations for the book-to-price premium include Griffin and Lemmon (2002), Cohen, Polk, and Vuolteenaho (2003) and Vassalou and Xing (2004).

[12]To test the hypothesis that private information influences the takeover bidders' choice of means of payment, Chemmanur and Paeglis (2003) use ex post realized earnings as inputs in valuation models to construct proxies for private signals. In contrast, our focus is on measuring market pricing errors relative to publicly available information. We therefore calculate our misvaluation proxies solely using contemporaneous information (current price, book value, and analyst forecasts).

[13]Only 1.32% of bidding firms and 1.75% of target firms in our sample have negative book values of equity. When we exclude negative book value firms from our analysis involving P/B, our main results remain unchanged, with slightly lower significance levels in some instances. In addition, our results are generally very robust to the use of the reciprocal, B/P, instead of P/B, and the use of V/P instead of P/V.

[14]For example, D'Mello and Shroff (2000) found that in their sample of repurchasing firms, firms' terminal value was on average 11% of their total residual income value, whereas using a dividend discount model the terminal value was 58% of total value.

[15]Following Lee, Myers, and Swaminathan (1999) and D'Mello and Shroff (2000), in calculating the terminal value component of V we assume that expected residual earnings remain constant after year 3, so that the discount rate for the perpetuity is the firm's cost of equity capital.

[16]If the EPS forecast for any horizon is not available, it is substituted by the EPS forecast for the previous horizon and compounded at the long-term growth rate (as provided by I/B/E/S). If the long-term growth rate is not available from I/B/E/S, the EPS forecast for the first preceding available horizon is used as a surrogate for $f^{EPS}(t+i)$.

[17]These findings are similar to those of Andrade, Mitchell, and Stafford (2001), who report a median bid premium of 37.9% and mean target announcement abnormal returns of 16% in their takeover sample during 1973-98.

[18]Median values suggest similar inferences and are not reported. In addition, Table II restricts the sample to observations where the given valuation ratio (P/B or P/V) is available for both bidder and target firms.

[19]We occasionally discuss subsample findings not contained in the tables when there are differences in effects within subsamples such as cash versus equity. Such subsample findings must of course be interpreted with caution when categorizing based upon a dependent variable, except to the extent that theory explicitly offers predictions based on such categories.

[20]Schwert (2000) provides related findings in a 1975-96 sample period.

[21]In an early sample, Walkling and Edmister (1985) report that target book-to-price is related to the bid premium; Lang, Stulz, and Walkling (1989) and Servaes (1991) find that, conditional on subsequent offer success, target announcement returns are decreasing in target Q measures. Although he does not focus on this issue, Table 7 of Pinkowitz (2000) indicates little relation between target book-assets/market-assets and premia in a 1985-94 sample of hostile offers.

[22]Servaes (1991) and Morck, Shleifer, and Vishny (1990) report evidence that, conditional on subsequent

offer success, bidder returns are lower when the target has a high Q or is rapidly-growing.

[23]Applying data primarily from the 1980's, Martin (1996) and Rau and Vermaelen (1998) established that high bidder valuation was, conditional upon subsequent offer success, associated with the use of equity as a means of payment. In addition to providing a forward-looking P/B test, our finding that undervaluation as measured by P/V predicts the use of cash rather than equity provides evidence that misvaluation matters above and beyond any possible growth-related effects.

[24]Our results and those of earlier studies are not entirely comparable due to differences in sample and variable definitions. Lang, Stulz, and Walkling (1989) used successful tender offers in the University of Rochester Merc Database and Austin Tenderbase, and Servaes (1991) used successful mergers and tender offers from CRSP. When we restrict our sample to the years of partial overlap with the time periods of these two papers (with or without the success restriction), we do not find a significant relation between bidder abnormal returns and bidder P/B. However, our sample has very few observations prior to 1981.

[25]Since bidders with high P/B (documented here) and high Q (Martin (1996)) tend to pay with equity, and since equity bidders for public firms tend to earn lower abnormal returns than do cash bidders (Travlos (1987), Brown and Ryngaert (1991), Fuller, Netter, and Stegemoller (2002), Bhagat et al (2005)), our finding is compatible with some other available evidence.

[26]To make the regressions comparable, we impose the condition that data for both P/B and P/V be available. The results are generally similar if we expand the sample to include all firms for which data for P/B are available in the regressions that do not involve P/V.

[27]It is not necessary for the hypothesis that voluntary acceptance occur if and only if a target is overvalued. In practice the manager of an undervalued target may be pressured to sell by shareholders enthusiastic about the offered premium, or induced to sell by bidders offering indirect side payments. Such effects smooth the relationship between target valuation and the probability that the target is willing to sell the firm to an expropriative bidder.

[28]Empirical studies on Tobin's Q and takeovers use Q proxies relating to the ratio of total asset rather than equity values. However, equity P/B is highly correlated with asset P/B; furthermore, our multivariate tests include leverage controls.

[29]The use of cash can expedite a hostile transaction by avoiding the SEC filing requirements associated with equity issuance, and, perhaps, by making it easier for investors to evaluate the offer.

[30]See Rau and Vermaelen (1998) and Shleifer and Vishny (2003). Overvaluation encourages making either a stock or a cash offer relative to no offer. The incentive of an overvalued firm to make an equity offer is direct: the ability to pay with overvalued equity. Cash bids are encouraged indirectly; the ability of an overvalued firm to raise equity capital cheaply relaxes capital constraints. Since performing a separate equity issue in addition to a takeover bid is costly (investment banking fees, management time, and possible offer delay), overvaluation should encourage stock over cash offers.

[31]Some past evidence suggests that when new public information about a firm arrives, the market price tends to move to correct prior mispricing. For example, Skinner and Sloan (2002) and Ali, Hwang, and Trombley (2003) report that firms that are overvalued by P/V measures tend to earn low returns at subsequent earnings announcement dates. Some authors have explored whether the markets overreact to sales growth trends (Lakonishok, Shleifer, and Vishny (1994), Dechow and Sloan (1997)). Overreaction to public news could potentially exacerbate preexisting mispricing instead of correcting it. However, more recent studies suggest that the market tends to underreact to public or 'tangible' news arrival (Daniel and Titman (2003), Chan (2003)).

Furthermore, a body of evidence about various types of discretionary corporate actions suggests that there is a tendency toward partial correction of prior mispricing; post-event long-run abnormal returns tend to be of the same sign as initial event-date reactions (this empirical literature is reviewed in Hirshleifer (2001)).

[32]On the other hand, in a sample of 50 successful mergers in the 1950s, Gort (1969) found that acquirers on average had higher price-earnings ratios than their targets (significant in a sign test, though not at the 5% level in a parametric test).

[33]A speculative explanation for the observed pattern relates to the lower analyst coverage of firms prior to the 1990s. Since bidders are bigger than targets, bidder forecasts are available more often than target forecasts. So in the 1980s subsample there was a stronger sample selection in P/V tests for targets with high market valuations.

Table I
Descriptive Statistics for Takeover Bids

Number of takeover bids, mean value of transaction, and percentage of transactions that are successful, hostile, tender offers, merger bids, all cash payment, all stock payment, and mixed payment, by calendar year. Sample includes merger bids and tender offers where both acquirer and target were listed on the NYSE, AMEX, or NASDAQ during 1978-2000. All dollar figures are in millions of 2001 dollars.

Year	*N*	Mean value per transaction	% successful	% hostile	% tender offers	% merger bids	% cash	% stock	% mixed
1978	17	1046.7	76.5	23.5	29.4	70.6	52.9	47.1	0.0
1979	11	981.1	63.6	10.0	27.3	72.7	90.9	9.1	0.0
1980	29	872.5	75.9	11.5	24.1	75.9	20.7	3.4	75.9
1981	99	1509.1	60.6	13.1	23.2	76.8	6.1	0.0	93.9
1982	89	624.3	68.5	18.0	28.1	71.9	0.0	0.0	100.0
1983	105	644.0	70.5	11.7	20.0	80.0	4.8	0.0	95.2
1984	120	840.2	61.7	11.0	31.7	68.3	17.5	5.8	76.7
1985	157	1031.5	67.5	15.3	33.1	66.9	45.9	31.2	22.9
1986	139	813.5	67.6	15.4	31.7	68.3	52.5	26.6	20.9
1987	167	695.5	66.5	13.4	21.0	79.0	40.1	28.1	31.7
1988	161	630.2	55.3	15.2	35.4	64.6	61.5	21.7	16.8
1989	128	972.0	64.1	13.4	30.5	69.5	39.8	38.3	21.9
1990	74	710.5	73.0	7.6	16.2	83.8	35.1	37.8	27.0
1991	85	491.4	78.8	3.7	10.6	89.4	10.6	61.2	28.2
1992	97	423.3	81.4	3.1	5.2	94.8	16.5	62.9	20.6
1993	120	1101.6	85.8	2.6	10.8	89.2	26.7	47.5	25.8
1994	206	585.2	80.6	7.3	14.6	85.4	29.6	54.9	15.5
1995	248	827.4	84.3	7.3	14.1	85.9	25.0	58.9	16.1
1996	264	1126.1	84.8	7.2	14.4	85.6	23.9	50.4	25.8
1997	366	1197.6	87.7	4.2	16.4	83.6	16.4	54.9	28.7
1998	342	2982.8	89.5	2.4	12.9	87.1	16.1	57.3	26.6
1999	394	3064.5	84.0	3.9	17.0	83.0	24.1	46.2	29.7
2000	314	2951.1	85.7	2.3	20.1	79.9	25.5	48.1	26.4
Total	3732	1481.1	78.3	7.6	19.4	80.6	26.2	41.6	32.2

Table II
Mean Acquirer and Target Valuation Ratios by Mode of the Offer and Payment Method

The valuation ratios are the price-to-book ratio *P/B* and the price-to-value ratio *P/V*. The intrinsic value is estimated using the residual income model when the discount rate is based on firm-specific CAPM. *T*-statistic of differences between acquirer and target, and between stock and cash offers is reported in parentheses. For each valuation ratio, we require that both the acquirer and the target have non-missing values. Sample includes both successful and unsuccessful merger bids and tender offers where both acquirer and target were listed on the NYSE, AMEX, or NASDAQ during 1978-2000.

		Tender Offers				Merger Bids				All			
	Ratio	Acquirer	Target	Acquirer – Target (*t*-stat)	N	Acquirer	Target	Acquirer – Target (*t*-stat)	N	Acquirer	Target	Acquirer – Target (*t*-stat)	N
Cash	*P/B*	3.550	2.690	0.860 (2.83)	379	2.295	2.016	0.279 (1.48)	387	2.916	2.350	0.566 (3.18)	766
	P/V	1.654	1.843	-0.189 (-1.36)	214	1.623	1.548	0.075 (0.66)	148	1.641	1.722	-0.081 (-0.86)	362
Stock	*P/B*	4.000	2.975	1.026 (1.16)	19	6.049	4.107	1.943 (8.89)	1227	6.018	4.089	1.929 (8.95)	1246
	P/V	1.633	1.840	-0.207 (-1.03)	17	2.583	2.240	0.343 (4.31)	736	2.562	2.231	0.331 (4.24)	753
Mixed	*P/B*	2.449	2.387	0.062 (0.15)	210	3.746	2.981	0.765 (2.94)	694	3.445	2.843	0.602 (2.72)	904
	P/V	1.560	1.787	-0.228 (-1.51)	90	2.113	1.902	0.212 (1.51)	342	1.998	1.878	0.120 (1.04)	432
All	*P/B*	3.184	2.594	0.589 (2.47)	608	4.727	3.418	1.310 (9.08)	2308	4.405	3.246	1.159 (9.30)	2916
	P/V	1.626	1.827	-0.201 (-1.96)	321	2.336	2.062	0.274 (4.34)	1226	2.189	2.013	0.176 (3.22)	1547
		Acquirer	Target			Acquirer	Target			Acquirer	Target		
Stock - Cash	*P/B*	0.451	0.285			3.754	2.090			3.102	1.740		
(*t*-stat)		(0.38)	(0.30)			(14.35)	(9.21)			(11.36)	(8.40)		
Stock - Cash	*P/V*	-0.021	-0.003			0.960	0.692			0.920	0.508		
(*t*-stat)		(-0.14)	(-0.01)			(6.65)	(5.66)			(7.93)	(4.05)		

Table III
Mean Acquisition Characteristics by Acquirer or Target Valuation Ratio Quintiles

Each month, acquirer and target firms are separately ranked on valuation ratios (*P/B* and *P/V*) into quintiles and are assigned a rank between 1 and 5, with 1 being the lowest ratio quintile (most undervalued). *P/B* is the price-to-book ratio. *P/V* is the price-to-value ratio, where the intrinsic value is estimated using the residual income model when the discount rate is based on firm-specific CAPM. This table reports mean acquisition characteristics for each of the quintiles and difference in means between ranks 1 and 5. Bid premium is the ratio of the bid price offered by the acquirer to the target stock price 5 days prior to the announcement of the takeover bid. Acquirer and target cumulative abnormal returns (CAR) are measured over the three days (-1, 1) around the announcement (day 0) of the acquisition. *N* is the total number of acquisitions in each quintile. Sample includes merger bids and tender offers where both acquirer and target were listed on the NYSE, AMEX, or NASDAQ during 1978-2000. ***, **, * denote difference in means between ranks 1 and 5 is significant at the 1%, 5%, 10% level, respectively, based on the two-sample *t*-test.

			Probability of cash payment (%)	Probability of stock payment (%)	Probability of tender offer (%)	Probability of hostile acquisition (%)	Probability of successful acquisition (%)	Bid premium (%)	Target announce-ment CAR (%)	Acquirer announce-ment CAR (%)
Panel A. Acquisitions sorted monthly by target *P/B* ratio										
Target *P/B* Rank	*N*	Target *P/B*								
1 (Undervalued)	518	0.847	31.3	31.9	22.8	11.2	73.9	38.4	20.1	-0.2
2	677	1.250	26.6	37.1	21.6	10.6	77.3	34.9	18.9	-1.2
3	692	1.784	28.9	40.6	23.1	7.1	80.9	33.2	18.2	-1.1
4	680	2.966	25.3	47.5	22.4	7.8	79.7	32.5	17.9	-1.8
5 (Overvalued)	570	9.651	18.8	52.8	15.3	3.7	82.6	30.0	15.4	-1.8
Difference 5-1		8.804***	-12.5***	21.0***	-7.5***	-7.5***	8.7***	-8.4***	-4.7***	-1.6***
Panel B. Acquisitions sorted monthly by target *P/V* ratio										
Target *P/V* Rank	*N*	Target *P/V*								
1 (Undervalued)	282	0.768	27.3	41.1	24.5	9.8	80.1	35.2	19.6	-0.8
2	436	1.112	25.5	40.6	23.6	11.4	77.3	35.9	20.0	-1.3
3	432	1.558	26.6	42.8	25.0	10.8	78.2	34.1	18.9	-1.8
4	433	2.316	22.4	49.2	21.0	8.8	79.2	33.2	17.8	-2.2
5 (Overvalued)	322	4.980	21.1	57.5	16.8	4.5	86.0	32.6	17.2	-2.6
Difference 5-1		4.212***	-6.2*	16.3***	-7.7**	-5.3***	5.9*	-2.6	-2.5	-1.8***

Table III (contd.)
Mean Acquisition Characteristics by Acquirer or Target Valuation Ratio Quintiles

			Probability of cash payment (%)	Probability of stock payment (%)	Probability of tender offer (%)	Probability of hostile acquisition (%)	Probability of successful acquisition (%)	Bid premium (%)	Target announce-ment CAR (%)	Acquirer announce-ment CAR (%)
Panel C. Acquisitions sorted monthly by acquirer *P/B* ratio										
Acquirer *P/B* Rank	*N*	Acquirer *P/B*								
1 (Undervalued)	574	1.022	33.6	28.9	22.3	8.5	78.7	32.1	16.8	-0.3
2	737	1.571	28.2	38.7	21.0	9.2	77.7	32.2	17.1	-0.9
3	730	2.270	25.9	44.8	19.0	7.2	78.2	34.3	17.3	-1.6
4	729	3.846	23.6	45.0	19.9	6.1	81.5	36.2	20.2	-1.5
5 (Overvalued)	632	12.337	19.3	53.6	15.5	6.5	81.0	36.3	18.9	-1.9
Difference 5-1		11.315***	-14.3***	24.7***	-6.8***	-2.1	2.3	4.2**	2.1*	-1.5***
Panel D. Acquisitions sorted monthly by acquirer *P/V* ratio										
Acquirer *P/V* Rank	*N*	Acquirer *P/V*								
1 (Undervalued)	429	0.833	26.6	40.6	18.6	7.1	79.5	35.4	18.5	-0.7
2	592	1.149	26.2	42.6	18.8	6.1	84.1	33.7	18.0	-1.3
3	583	1.509	26.6	43.7	21.6	8.1	80.4	35.2	19.9	-1.2
4	590	2.202	29.5	41.5	22.4	6.9	81.4	35.1	21.0	-1.3
5 (Overvalued)	481	4.843	20.2	55.3	13.7	5.1	80.5	35.5	18.3	-2.6
Difference 5-1		4.011***	-6.4**	14.7***	-4.9**	-2.0	1.0	0.1	-0.2	-1.8***

Table IV
Logistic Regressions

Sample includes merger bids and tender offers where both acquirer and target were listed on the NYSE, AMEX, or NASDAQ during 1978-2000 and the data needed to calculate both *P/B* and *P/V* are available. *P/B* is the price-to-book ratio. *P/V* is the price-to-value ratio, where the intrinsic value is estimated using the residual income model when the discount rate is based on firm-specific CAPM. *P/B* and *P/V* are ranked monthly among all CRSP stocks and assigned a value between 1 and 100. Diversifying = 1 if acquirer and target share the same 3-digit COMPUSTAT SIC codes; 0 otherwise. Relative Size =acquirer market value / target market value. Target size = target market value of equity. Leverage = acquirer total debt/total assets. For each coefficient, the second row reports the *p*-value. All regressions include year and acquirer 2-digit SIC major industry dummies.

	Dependent Variable (=1 if yes, 0 otherwise)														
	Cash			Stock			Tender Offer			Hostile			Success		
Target *P/B*	-0.009		-0.007	0.020		0.018	-0.014		-0.012	-0.021		-0.021	0.017		0.017
	0.011		*0.041*	*0.000*		*0.000*	*0.000*		*0.002*	*0.000*		*0.000*	*0.000*		*0.000*
Acquirer *P/B*	-0.025		-0.021	0.028		0.024	-0.021		-0.016	0.000		-0.001	-0.006		-0.006
	0.000		*0.000*	*0.000*		*0.000*	*0.000*		*0.000*	*0.975*		*0.934*	*0.124*		*0.178*
Target *P/V*		-0.005	-0.003		0.007	0.005		-0.007	-0.005		-0.008	-0.006		0.002	0.000
		0.094	*0.239*		*0.003*	*0.047*		*0.026*	*0.077*		*0.094*	*0.223*		*0.550*	*0.967*
Acquirer *P/V*		-0.017	-0.009		0.019	0.008		-0.019	-0.013		-0.001	0.003		0.001	-0.001
		0.000	*0.008*		*0.000*	*0.008*		*0.000*	*0.000*		*0.825*	*0.583*		*0.844*	*0.731*
Diversifying	0.361	0.386	0.372	-0.461	-0.470	-0.478	0.526	0.538	0.549	0.739	0.771	0.756	-0.262	-0.249	-0.260
	0.030	*0.020*	*0.026*	*0.002*	*0.001*	*0.001*	*0.003*	*0.003*	*0.003*	*0.005*	*0.003*	*0.004*	*0.140*	*0.159*	*0.144*
Log of	0.417	0.339	0.443	-0.220	-0.119	-0.240	0.216	0.154	0.247	-0.523	-0.552	-0.512	0.448	0.447	0.449
Relative Size	*0.000*	*0.000*	*0.000*	*0.000*	*0.011*	*0.000*	*0.000*	*0.005*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*
Log of Target	0.062	0.000	0.083	-0.173	-0.062	-0.197	0.192	0.126	0.223	0.368	0.304	0.386	-0.148	-0.101	-0.148
Size	*0.302*	*0.998*	*0.177*	*0.001*	*0.197*	*0.000*	*0.002*	*0.032*	*0.000*	*0.000*	*0.000*	*0.000*	*0.013*	*0.085*	*0.014*
Leverage	-0.691	-0.407	-0.785	-0.894	-1.346	-0.880	-0.868	-0.630	-1.076	0.208	0.694	0.202	0.634	0.373	0.631
	0.222	*0.459*	*0.172*	*0.058*	*0.003*	*0.064*	*0.129*	*0.264*	*0.068*	*0.798*	*0.379*	*0.805*	*0.261*	*0.499*	*0.263*
Intercept	-0.631	-0.868	-0.366	-1.097	-0.626	-1.377	-0.526	-0.511	-0.113	-4.325	-4.724	-4.386	1.775	1.835	1.807
	0.271	*0.127*	*0.530*	*0.028*	*0.198*	*0.007*	*0.356*	*0.371*	*0.846*	*0.000*	*0.000*	*0.000*	*0.004*	*0.003*	*0.004*
N	1513	1513	1513	1513	1513	1513	1513	1513	1513	1479	1479	1479	1513	1513	1513
Pseudo-R^2	.1790	.1634	.1850	.2232	.1860	.2302	.1915	.1851	.2044	.2238	.2084	.2256	.1359	.1227	.1359

Table V
Least Squares Regressions

Acquirer and target announcement period cumulative abnormal returns (CAR) are measured over the three days (-1, 1) around the announcement (day 0) of the acquisition. Bid premium is the ratio of the bid price offered by the acquirer to the target stock price 5 days prior to the announcement of the takeover bid. Sample includes merger bids and tender offers where both acquirer and target were listed on the NYSE, AMEX, or NASDAQ during 1978-2000 and the data needed to calculate both *P/B* and *P/V* are available. *P/B* is the price-to-book ratio. *P/V* is the price-to-value ratio, where the intrinsic value is estimated using the residual income model when the discount rate is based on firm-specific CAPM. *P/B* and *P/V* are ranked monthly among all CRSP stocks and assigned a value between 1 and 100. Relative Size =acquirer market value / target market value. Target size = target market value of equity. Leverage = acquirer total debt/total assets. For each coefficient, the second row reports the *t*-statistic. All regressions include year and acquirer 2-digit SIC major industry dummies.

	Dependent Variable								
	Bid Premium			Target Announcement Period CAR			Acquirer Announcement Period CAR		
Target *P/B*	-0.222		-0.207	-0.136		-0.114	-0.007		-0.001
	-6.45		-5.92	-5.18		-4.28	-0.79		-0.08
Acquirer *P/B*	0.066		0.065	0.019		0.044	-0.056		-0.042
	1.68		1.57	0.64		1.42	-5.26		-3.72
Target *P/V*		-0.108	-0.086		-0.080	-0.068		-0.008	-0.006
		-3.94	-3.15		-3.85	-3.26		-1.07	-0.87
Acquirer *P/V*		0.004	0.028		-0.048	-0.037		-0.044	-0.031
		0.12	0.84		-2.05	-1.47		-5.23	-3.36
Log of Relative Size	1.977	2.020	2.093	3.263	3.408	3.422	0.778	0.668	0.824
	3.73	3.91	3.94	8.06	8.71	8.46	5.36	4.76	5.67
Log of Target Size	-0.584	-0.964	-0.335	0.300	0.206	0.535	0.130	0.067	0.168
	-1.07	-1.80	-0.61	0.72	0.51	1.28	0.87	0.46	1.12
Leverage	-13.074	-10.927	-13.372	-7.836	-6.783	-8.025	1.941	2.418	1.892
	-2.57	-2.14	-2.63	-2.03	-1.77	-2.09	1.40	1.76	1.37
Intercept	48.525	48.196	48.558	17.755	19.289	19.249	-2.561	-2.712	-1.732
	9.17	9.07	9.09	4.40	4.80	4.74	-1.77	-1.88	-1.19
N	1479	1479	1479	1513	1513	1513	1513	1513	1513
Adjusted-R^2	.0869	.0710	.0920	.0978	.0965	.1064	.0576	.0569	.0654

Appendix Table
Summary of Main Findings

This table summarizes the main results of the paper. Panel A reports the acquirer minus target mean differences in price-to-book (*P/B*) ratios and in price-to-value (*P/V*) ratios for given means of payment and form of transaction, and also reports stock minus cash mean differences in valuation ratios among acquirers, and among targets. The relation between takeover characteristics and target and acquirer misvaluation measures in univariate tests is reported in Panel B and in multivariate tests is reported in Panel C. In each panel, the columns "all", "80s", and "90s" report results based on the whole sample period 1978-2000, sub-period 1978-1989, and sub-period 1990-2000, respectively. The intrinsic value V is calculated from the Residual Income Model. Cash = 1 if the acquisition is all cash; 0 otherwise. Stock = 1 if the acquisition is all stock; 0 otherwise. Tender Offer = 1 if the acquisition is a tender offer; 0 otherwise. Hostile = 1 if the acquisition is viewed as hostile by target management; 0 otherwise. Success = 1 if the offer is successful; 0 otherwise. Acquirer and target announcement period cumulative abnormal returns (CAR) are measured over the three days (-1, 1) around the announcement (day 0) of the acquisition. Bid premium is the ratio of the bid price offered by the acquirer to the target stock price 5 days prior to the announcement of the takeover bid.

Panel A: Valuation Difference

	Acquirer – Target															Stock – Cash					
	All			Cash			Stock			Tender Offer			Merger			Target			Acquirer		
	all	80s	90s	all	80s	90s	all	80s	90s	all	80s	90s	all	80s	90s	all	80s	90s	all	80s	90s
P/B	+ ***	+ *	+ ***	+ ***		+ ***	+ ***		+ ***	+ **		+ **	+ ***	+ *	+ ***	+ ***	+ **	+ ***	+ ***	+ **	+ ***
P/V	+ ***	– ***	+ ***		– **		+ ***		+ ***	– **	– **		+ ***	– **	+ ***	+ ***		+ ***	+ ***	+ *	+ ***

Panel B: Univariate Tests

	Cash			Stock			Tender Offer			Hostile			Success			Bid Premium			Target CAR			Acquirer CAR		
	all	80s	90s	all	80s	90s	all	80s	90s	all	80s	90s	all	80s	90s	all	80s	90s	all	80s	90s	all	80s	90s
Target *P/B*	– ***		– ***	+ ***		+ ***	– ***	– **	– ***	– ***	– ***	– **	+ ***		+ ***	– ***	– ***	– ***	– ***	– ***	– ***	– ***	– **	– ***
Acquirer *P/B*	– ***	– ***	– ***	+ ***	+ ***	+ ***	– ***	– ***			– *				+ *	+ **		+ ***	+ *		+ **	– ***		– ***
Target *P/V*	– *			+ ***		+ ***	– **		– **	– ***	– ***		+ *	+ **				– *			– **	– ***		– ***
Acquirer *P/V*	– **		– ***	+ ***		+ ***	– **		– **													– ***		– ***

Panel C: Multivariate Tests

	Cash			Stock			Tender Offer			Hostile			Success			Bid Premium			Target CAR			Acquirer CAR		
	all	80s	90s	all	80s	90s	all	80s	90s	all	80s	90s	all	80s	90s	all	80s	90s	all	80s	90s	all	80s	90s
Target *P/B*	– **		– (a)	+ ***	+ *	+ ***	– ***	– ***		– ***	– *	– **	+ ***		+ ***	– ***	– ***	– ***	– ***	– ***	– ***			
Acquirer *P/B*	– ***	– (a)	– ***	+ ***		+ ***	– ***	– ***	– ***		– (a)				– (a)	+ (a)		+ (a)				– ***		– ***
Target *P/V*	– *(b)			+ **	– *	+ ***	– *			– *(b)				– *		– ***		– ***	– ***		– ***			
Acquirer *P/V*	– ***		– ***	+ ***		+ **	– ***		– ***		+ *								– **(b)		– *(b)	– ***	– *(b)	– ***

NOTES

1. **+ (–)** indicates a positive (negative) relation between the P/B and P/V measures with the takeover characteristics.
2. ***, **, * indicate significance at the 1%, 5% and 10% levels, two-tailed tests respectively.
3. The significance levels for Panel C (the multivariate tests) are based on the regressions using all four misvaluation measures.
4. (a) indicates significance at 13% level, two-tailed test.
5. (b) reports significance for the regression when acquirer and target P/V measures are included but acquirer and target P/B measures are excluded. For these cells, the variable was insignificant when all four misvaluation ratios are included in the regression.