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Does Investor Misvaluation Drive the Takeover Market?

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This paper provides evidence that irrational market misvaluation, at both the transaction and aggregate levels, affects the volume and character of takeover activity. As proxies for market misvaluation, we examine pre-takeover book/price ratios and pre-takeover ratios of residual income model valuation to price for bidders, targets, and the aggregate stock market. Misvaluation of bidders, targets, and the aggregate stock market influences the aggregate volume of takeovers, the means of payment chosen, the premia paid, target hostility to the offer, the likelihood of offer success, bidder and target announcement period stock returns, post-takeover long-run returns, and the returns from diversifying transactions.

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> 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*, p.35.

1 Introduction

Despite the 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 arena for testing 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 in the diversification boom of the 1960's, based on naive investor interpretations of price/earnings ratios. Nevertheless, as discussed by Shleifer and Vishny (2003), the misvaluation approach to takeovers has had a low profile among academics relative to efficient markets approaches. Shleifer and Vishny offer a theory in which irrational shifts in investor sentiment affect takeover decisions. In their setting there are no synergies, managers behave rationally, and takeovers are driven purely by stock market misvaluation.

In this paper, we examine empirically the misvaluation hypothesis of takeovers: that market inefficiency has an important effect on the character and volume of takeover

[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 (1998a, 1998b), Teoh, Wong, and Rao (1998) and Baker and Wurgler (2000)). Recent evidence indicates that market valuations influence the sensitivity of investment to cash flow (Baker, Stein, and Wurgler (2002)), and that proxies for market misvaluation are related to levels of corporate investment (Polk and Sapienza (2002)).

activity. We test several of the predictions of Shleifer and Vishny (2003), as well as several further predictions of the misvaluation hypothesis developed intuitively here.

At the aggregate level, we test whether stock index misvaluation, and the dispersion in misvaluations across firms, influence the volume of takeover transactions, the method 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 both event period and post-acquisition returns. At the firm level, we examine whether bidder and target misvaluation affects these characteristics, as well as the returns from same-industry versus diversified acquisitions.

We define misvaluation as the discrepancy between the current market price and a contemporaneous non-market measure of fundamental value. A key advantage of the use of contemporaneous measures of misvaluation is that they do not require drawing inferences from returns occuring years after the takeover event. We consider both a crude fundamental measure, book value, and a more sophisticated one, residual income value as derived from the model of Ohlson (1995). Our misvaluation proxies are therefore the ratio of book value of equity to price (hereafter B/P), and the ratio of residual-income value to price (hereafter V/P).

Previous papers have related B/P or allied variables to takeover characteristics. One contribution of this paper is that it examines systematically the relation of B/P to a wider range of takeover characteristics, using uniform methodologies and a uniform sample that is much larger than those in some previous studies. A second and key contribution is that it applies a purer measure, contemporaneous V/P, to address the misvaluation hypothesis.

B/P has been used as an empirical mispricing proxy in a variety of asset pricing and corporate finance contexts.[2] Unfortunately, since book value reflects historical costs rather than forward-looking prospects, B/P (or closely allied variables such as the reciprocal of proxies for Tobin's Q) is a proxy not just for misvaluation, but for the ability of the firm to generate high returns on its investments. B/P or allied variables have therefore been applied in numerous papers as proxies for various other firm characteristics, such as growth opportunities and the degree of managerial discipline.

The residual income model has been widely used to measure firm fundamental values in the accounting literature.[3] The numerator of V/P reflects expected future perfor-

[2]In corporate finance contexts, see, e.g., Walkling and Edmister (1985), Rau and Vermaelen (1998) and Ikenberry, Lakonishok, and Vermaelen (1995).

[3]Support for the use of V/P as a mispricing proxy is provided by Frankel and Lee (1998), Lee, Myers,

mance by incorporating not just book value, but the information in analysts' forecasts of future earnings. Since the numerator of V captures future earnings prospects, V/P filters out the extraneous effects of growth and agency problems much better than B/P.

Since B/P is subject to multiple interpretations, the greater purity of V/P can provide valuable information about the effects of inefficient misvaluation in the takeover market. On the other hand, despite its drawbacks, we will argue that B/P is likely to contain information about misvaluation not captured by V/P. Subsection 2.1 discusses in more detail the motivation for and differences between B/P and V/P as misvaluation proxies.

A possible alternative measure of a firm's misvaluation at the time of takeover is its long-run abnormal stock return. Loughran and Vijh (1997) and Rau and Vermaelen (1998)) provide evidence based upon long-run abnormal returns suggesting that overvalued firms tend to pay with stock, whereas undervalued firms pay with cash. Papers on long-run returns have focused on successful bidders, whereas we apply our contemporaneous misvaluation measures to both targets and bidders, and to both unsuccessful and successful transactions. Furthermore, there remains much debate about whether evidence of excess long-run post-event average returns implies stock market inefficiency with respect to the event.[4] So in testing the misvaluation hypothesis of takeovers, it is useful to examine the information contained in contemporaneous misvaluation proxies.

To address the misvaluation hypothesis systematically, we consider statistical evidence during the period 1978-2000 about the relation of misvaluation measures to takeover-related decisions and market reactions. Although results for aggregate market misvaluation and the takeover market are important, aggregate misvaluation mixes the effects of bidder and target mispricing. To disentangle these effects, we therefore examine transaction level evidence as well.

Other approaches to takeovers, such as agency or efficient resource allocation, also imply relations relation between B/P and takeover characteristics. However, it is not obvious what implications such approaches have for V/P, if any. Thus, we focus here on describing and testing a fairly wide range of implications of the misvaluation hypothesis. We summarize the main qualitative findings in the appendix table, and describe some key findings here.

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and Swaminathan (1999), and Ali, Hwang, and Trombley (2003); a corporate finance application is provided by D'Mello and Shrof (2000).

[4]For recent overviews, see Fama (1998), Loughran and Ritter (2000), and Daniel, Hirshleifer, and Teoh (2002)). For example, the outcomes of long-run return studies are often sensitive to the choice of the return benchmark and the method for compounding returns (Barber and Lyon (1997)).

The misvaluation hypothesis implies that overvalued firms are more likely to make takeover bids (especially stock offers), either because such firms can take advantage of their overvalued acquisition currency (Loughran and Vijh (1997), Rau and Vermaelen (1998), and Shleifer and Vishny (2003)), or can finance offers more easily. In Shleifer and Vishny (2003), managers of overvalued targets are willing to accept even expropriative stock offers in order to "cash out" of their firms.

Consistent with these arguments, we find that when the aggregate stock market is overvalued, total takeover transaction value as a fraction of market capitalization is greater using the aggregate V/P measure (not B/P); and that stock is more likely to be used as consideration, whereas cash is (with marginal significance) less likely. The above intuition also implies that bidders will tend to be overvalued relative to targets, especially in stock offers, in which takeover by a relatively overvalued bidder expropriates target shareholders. The evidence supports both of these implications;[5] acquirers on average have significantly lower B/P and V/P ratios than their targets, especially in stock offers.

Furthermore, an intuitively reasonable argument is that, given an offer takes place, greater target overvaluation encourages bidders to offer stock of the merged firm rather than cash in order to induce target shareholders to shoulder part of their firm's overvaluation.[6] Thus, greater bidder and target overvaluation are both predicted to increase the probability that the form of payment is equity, and to reduce the probability of a cash offer. The firm-level analyses generally confirm these predictions.[7]

Shleifer and Vishny (2003) further predict that firms will in the aggregate make more stock offers when there is high dispersion in misvaluations across firms, as this increases the set of possible pairings of overvalued targets with even more overvalued bidders. We find that the aggregate proportion of stock (cash) offers relative to the total value of offer activity is significantly higher (lower) during months in which the dispersion of V/P (not B/P) across traded firms is higher.

The frequency with which bids are hostile, and with which offers fail, is lower when

[5] Jovanovic and Rousseau (2002) report that a firm's acquisition activity is on average increasing in its Tobin's Q. They interpret this evidence as consistent with the hypothesis that a firm with good growth opportunities should invest more. Our findings are not inconsistent with this possibility. However, our findings that acquirers also tend to have low V/P ratios relative to targets suggests that misvaluation plays an important role.

[6] For a given premium, greater target overvaluation increases the cost to the bidder of either a cash or equity offer. However, the increase in the cost of an equity offer is smaller to the extent that target shareholders overvalue the equity of the merged firm.

[7] The firm level association between bidder B/P and means of payment is known (Martin (1996)); our finding that this relation applies for V/P as well provides evidence that this reflects a misvaluation effect rather than solely growth or managerial discipline.

the aggregate market is overvalued, consistent with targets being willing to accept offers in order to "cash out" of overvalued firms. Also consistent with this reasoning, at the firm level target and not bidder undervaluation is associated with greater offer hostility; and (based on B/P) lower probability of offer success.

When the aggregate market is more overvalued (B/P, not V/P), transactions are more likely to be merger bids rather than tender offers. This is consistent with the preceding results, since both hostility and the use of cash tend to be associated with tender offers rather than merger bids. Bidder and target firm level overvaluation are also generally associated with merger bids rather than tender offers.

Higher dispersion in valuations across traded firms is associated with lower probability of hostility, higher probability of offer success (V/P), and lower probability of tender offer rather than merger. This evidence is consistent with the spirit of Shleifer and Vishny's approach; high dispersion of misvaluation creates more opportunities for highly overvalued bidders to locate somewhat overvalued targets whose managers are willing to sell (friendly transactions often being mergers).

There is some indication (strong with B/P, not with V/P) that targets receive higher bid premia when the market is relatively undervalued. This is consistent with targets bargaining to maintain the premium relative to fundamental value when they perceive their assets to be underpriced. Consistent with this interpretation, at the firm level target undervaluation increases premia.[8] There is less consistent evidence that bidder undervaluation decreases bid premia.

Greater target undervaluation, and greater bidder and aggregate market overvaluation (B/P) are associated with more positive target announcement period returns.[9] Thus, there is a tendency for offers to correct target misvaluation, possibly owing the tendency of undervalued targets to receive higher premia.

The bidder's stock price reaction to the offer announcement becomes more negative when the bidder, target, or aggregate market is overvalued. This is consistent with offers awakening investors at least partly to prior bidder misvaluation; and with the adverse market update about overvalued targets discussed above making investors more skeptical about the value of the planned acquisition to the bidder. These findings differ from the literature on takeovers and agency problems based on earlier samples; see footnote 25.

[8]This finding is consistent with that of Walkling and Edmister (1985) for B/P in an earlier sample.

[9]In Lang, Stulz, and Walkling (1989) and Servaes (1991), announcement-period target returns are higher when targets have low Tobin's Q measures, suggesting that the offer corrects target mismanagement. The fact that our finding holds using V/P as well as B/P supports the hypothesis of a misvaluation effect above and beyond any agency effect on target returns.

Greater dispersion in misvaluations across traded firms is associated with more negative abnormal stock price reaction of bidders, and more positive abnormal stock price reactions of targets to bid announcement. These intriguing relationships remain to be explained.

Across all acquisitions in the sample, average post-acquisition abnormal returns in the five years after successful completion are close to zero, and are distinguishable neither by mode of acquisition (tender offer or merger) nor by means of payment (cash, mixed, or stock).[10] This finding seems inconsistent with the misvaluation hypothesis, but the appropriate benchmark for long-run abnormal returns is hard to measure accurately.

More consistent with the misvaluation hypothesis is the cross-sectional finding that contemporaneous measures of misvaluation contain incremental power to predict long-run abnormal returns. There is an indication (V/P) that acquirer post-acquisition long run excess returns (adjusting for size and book/market) are poorer when the acquisitions are made in a relatively overvalued market.

At the firm level, poorer bidder long-run abnormal returns are associated with bidder, not target, overvaluation. For example, in the five years subsequent to offer completion, the difference in excess long-run returns across extreme acquirer V/P quintiles (overvalued minus undervalued) is -93.8%, and is stronger among merger bids (-109.3%) and stock acquisitions (-112.7%). We also find that the effect of V/P on long-run bidder returns is much greater in diversifying than in related acquisitions (the effect with B/P is slight); and that misvaluation effects (B/P and V/P) on target announcement period returns and on bid premia are also generally much stronger in diversifying acquisitions.

In summary, the evidence we provide is on the whole consistent with the proposition that irrational market misvaluation of firms affects both aggregate merger activity and the behavior of both bidders and targets in takeover contests.

The remainder of the paper is structured as follows. Section 2 describes the data and method of the study. Section 3 describes the time patterns in takeover frequency and characteristics. Section 4 describes the effects of aggregate patterns of misvaluation on takeover activity and transaction characteristics. Section 5 describes univariate tests of the relation between bidder or target misvaluation on different transaction characteristics. Section 6 describes multivariate tests. Section 7 concludes.

[10]This contrasts with the significant findings reported by Loughran and Vijh (1997) and Rau and Vermaelen (1998) for samples that precede the merger boom of the 1990's. Our results are more similar to previous findings when we restrict the sample to the 1978-89 subperiod that overlaps more with these studies.

2 Data and Methodology

Our sample of takeover bids is obtained from Security Data Corporation (SDC) U.S. mergers and acquisitions database between 1978-2000. Our sample contains 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 transaction is 10 million dollars 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.[11] Table 1 reports the annual breakdown of the acquisitions by acquisition outcome, method of payment, mode of acquisition, hostility of the transaction, and whether the bidder and the target are in the same industry.

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 preserve sample size, we do not exclude a transaction from the overall sample just because of missing accounting or I/B/E/S data items.

2.1 Motivation for and Calculation of Mispricing Proxies

The reliability of the inferences we draw about the misvaluation hypothesis of takeover markets rests upon the quality of our misvaluation proxies, B/P and V/P. 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

[11] 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.

above and beyond market price. We would expect them to do so if a significant portion of variations in market price derives from misvaluation.

In support of the B/P proxy, an extensive literature demonstrates that firms' B/P 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)). There is evidence that B/P predicts returns at the aggregate as well as the cross-sectional level; see Pontiff and Schall (1998). Psychology-based theoretical models imply that B/P 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 B/P can provide a less noisy measure of mispricing (see Daniel, Hirshleifer, and Subrahmanyam (2001)). On the other hand, B/P is a natural proxy for risk as well. An active debate remains about the extent to which B/P-based return predictability reflects a rational risk premium or correction of mispricing.[12] One of the challenges for the risk explanation is the concentration of the return differential for stocks with different levels of B/P at the dates of subsequent earnings or pre-earnings announcements (La Porta, Lakonishok, Shleifer, and Vishny (1997), Piotroski (2001), and Skinner and Sloan (2002)).

The association of B/P with subsequent abnormal returns suggests that there is a misvaluation or risk component to the variation of B/P. However, B/P has been used as a proxy not just for misvaluation or for risk, but also for growth opportunities and for the degree of information asymmetry (Martin (1996)). Furthermore, proxies for Tobin's Q that are highly correlated with B/P have been employed to measure the quality of corporate growth opportunities and the degree of managerial discipline. A further source of noise in B/P for our purposes is that book value, the numerator of B/P, is influenced by firm and industry differences in accounting methods.

We calculate B/P as a ratio of equity rather than total asset values (which would be closer to the reciprocal of Tobin's Q), because purposes it is equity rather than total misvaluation that is likely to matter for takeover decisions. 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

[12]See, e.g., Fama and French (1996) and 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 B/P premium include Griffin and Lemmon (2002), Cohen, Polk, and Vuolteenaho (2002) and Vassalou and Xing (2002).

bid.

There is also strong support for V/P as an indicator of mispricing. Lee, Myers, and Swaminathan (1999) find that residual income values predict one-month-ahead returns on the Dow 30 stocks better than aggregate B/P. Frankel and Lee (1998) find that the residual income value is a better predictor than book value of the cross-section of contemporaneous stock prices, and that V/P 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 high V/P are partially concentrated around subsequent earnings announcements. They also report that after controlling for a large set of possible risk factors, V/P continues to predict future returns significantly. These findings make V/P an attractive index of mispricing.[13,14]

The residual income model of valuation is in principle more fine-tuned than book value, for at least two reasons. First, it is designed to be invariant to accounting treatments (to the extent that the 'clean surplus' accounting identity obtains; see Ohlson (1995)), making V/P less sensitive to such choices. Second, in addition to the backward-looking information contained in book value, it also reflects analyst forecasts of future earnings.

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 errors. To the extent that biases are correlated, the V/P measure becomes a weaker proxy for

[13]For example, D'Mello and Shrof (2000) apply V/P to measure mispricing of equity repurchasers. To test the hypothesis that private information influences the takeover bidders' choice of means of payment, Chemmanur and Paeglis (2002) 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).

[14]There are other possible indices of misvaluation. An alternative measure which we do not examine is the earnings/price ratio. Earnings price ratios have several 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 earnings/price even if the degree of misvaluation is unchanged. Third, and relatedly, negative earnings are more common than negative book values, leading more frequently to negative values of earnings/price. In recent independent work, Bouwman, Fuller, and Nain (2002) examine the relation of earnings/price ratios and of bidder past returns to takeover activity using a 1979-1997 sample. However, their focus is on the general effects of market valuations, rather than specifically testing for the effects of market inefficiency. Although past returns reflect changes in market valuations, they are not sharp proxies for *mis*valuation as they do not normalize for a measure of fundamental information available to the market.

misvaluation. This biases the results of tests using this method toward finding no effect.

These considerations— the high extraneous variation in B/P as an indicator of mispricing, and the possibility of partial cancellation of mispricing in the V/P measure— suggest that either proxy may give an incorrect null result even if misvaluation drives the takeover market. Unfortunately, the fact that B/P can proxy not just for misvaluation, but also for firm growth opportunities or managerial discipline suggests that tests involving B/P may also give positive results even if there is no misvaluation. Since neither measure is perfect, it is informative to include both B/P and V/P measures of misvaluation in our tests.

In our sample, the correlation of B/P with V/P is quite low— only .33 for bidders and .21 for targets. Thus, V/P potentially offers useful independent information beyond B/P 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.

To illustrate the benefit of including V/P, consider the effect of misvaluation on means of payment. Martin (1996) and Rau and Vermaelen (1998) document that bidders with lower B/P are more prone to make equity rather than cash or mixed offers. Rau and Vermaelen (1998) interpret this finding as indicating that bidders that are irrationally overvalued by the market seek to trade overvalued equity for target resources. However, Martin interprets this finding as indicating that bidders with excellent growth opportunities pay with equity in order to retain discretion over future funds that the firm may generate. By examining mispricing with V/P, we can resolve more clearly whether mispricing affects the choice of means-of-payment above and beyond any effect of growth opportunities on this decision.

Turning to procedure, we calculate the B/P proxy as the ratio of book value of equity to market 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.

Our estimation procedure for V/P 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)),

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

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 periods, plus an estimate of the terminal value beyond period T. This terminal value is estimated by taking 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).[15] Of course, the residual income $V(t)$ cannot perfectly capture growth, so our misvaluation proxy V/P does not perfectly filter out growth effects. However, since V reflects forward-looking earnings forecasts, a large portion of the growth effects contained in B/P should be filtered out of V/P.

We use a three-period forecast horizon:

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

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.[16]

Forecasted ROE's are computed as

$$f^{ROE}(t+i) = \frac{f^{EPS}(t+i)}{\bar{B}(t+i-1)}, \quad \text{where} \quad \bar{B}(t+i-1) \equiv \frac{B(t+i-1) + B(t+i-2)}{2},$$

[15] For example, D'Mello and Shrof (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.

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

and where $f^{EPS}(t+i)$ is the forecasted EPS for period $t+i$.[17] We require that each of these f^{ROE}'s be less than 1.

Future book values of equity are computed as

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

where k is the dividend payout ratio determined by

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

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 risk premium 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% is winsorized to lie at the border of the range. Previous studies found that estimates of V were insensitive to the cost of capital model used (Lee, Myers, and Swaminathan (1999)) and to whether the rate is allowed to vary across firms (D'Mello and Shrof (2000)). We checked the robustness of our main findings using the alternative constant discount rate of 12.5% (following D'Mello and Shrof (2000)). The results were similar to those reported here. Finally, V/P is winsorized at the 1% and 99% tails.

To measure the mivaluation of acquirers and targets, we use values of B/P and V/P of the month prior to the acquisition announcement, to ensure that information needed for calculating the ratios are available before the announcement. For both ratios, the benchmark for fair valuation is not 1. 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, it is important to compare these misvaluation proxies on

[17] 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 $f^{EPS}(t+i)$.

a relative basis: higher (lower) values of B/P or V/P mean relative undervaluation (overvaluation).

2.2 Announcement Period and Long-Run Abnormal 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,

$$CAR_i = r_i - r_m,$$

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.

Long-run abnormal returns of acquiring firms are calculated as the difference between the five-year buy-and-hold returns of acquirers and those of the matching firms. For each acquirer, a matching firm is selected out of the universe of NYSE, AMEX, and NASDAQ firms on the basis of firm size (market value of equity) and B/P. First, each month, all NYSE/AMEX/NASDAQ firms are ranked into size deciles based on market value of equity. Second, within the size decile that the acquirer is in, a matching firm is selected as the one with the closest book-market ratio to the acquirer in the month prior to the acquisition announcement. If the acquirer has a missing book-market value (7.5% of the cases), the matching firm is selected as the firm with the closest market value of equity to the acquirer.

As in Loughran and Vijh (1997), the five-year buy-and-hold returns of bidders and matching firms are calculated over an identical time interval starting on the day after the effective date; if an acquirer is delisted from CRSP before the five-year anniversary of the acquisition completion date, acquirer and matching firm long-run returns stop on that date. If a matching firm is delisted before the acquirer within the five-year period starting the effective date (20% of the cases), the value-weighed market return is spliced until the end of the buy-and-hold period.

In common with most past studies of long-run returns after takeovers, our test statistics assume independence of returns across events. However, long-window returns overlap in time, especially as takeovers are clustered. This is likely to induce a degree of cross-event dependence in returns. Thus, the significance of the long-run return results is likely to be overstated.[18]

[18] An alternative approach is to form a portfolio of successful bidders in the preceding few years, and

The use of B/P as a matching firm criterion (or loadings on the Fama/French HML factor as part of the expected return benchmark) is common practice in many studies that require a benchmark for normal returns. However, if B/P is a misvaluation proxy, this has the effect of throwing away part of the abnormal performance of takeover firms that we seek to identify (see Loughran and Ritter (2000)). In this respect our long-run abnormal return tests are conservative, especially in those tests involving B/P rather than V/P as a proxy for the misvaluation of takeover firms.

3 Time Patterns in Takeover Activity and Estimated Misvaluation

Table 1 reports descriptive information for our sample of acquisitions from 1978 to 2000. As observers have often noted, there is clear evidence of cyclical patterns in acquisition activity. The number of transactions peaks in the middle of the 1980s and the latter portion of the 1990s. The average transaction value has increased toward the end of the sample period. Acquisitions were more likely to be successful in later years, and more recent acquisitions tend to be mergers. Prior to the 1990s there were more hostile offers and tender offers. The acquisition wave of the 1990s was characterized by an increased frequency of stock as a means of payment (see e.g. Andrade, Mitchell, and Stafford (2001) and Holmstrom and Kaplan (2001)).

Table 2 reports mean valuation ratios and long run returns for our sample of acquirer and target firms. The first two columns of Table 2 report the market capitalization of acquirer and target firms respectively, in 2001 dollars. The mean market capitalization of acquiring firms increased in the latter part of the sample owing to the bull market of the 1990s.

The next four columns of Table 2 report our measures of misvaluation, B/P and V/P. In the mid-to-late 1980's, bidder valuations are quite low, especially as measured by V/P. During this period, as seen in Table 1, cash offers were common. Across both measures, Table 2 indicates that acquirers became more overvalued in the mid-to-late 1990's (as evidenced by lower values of B/P and V/P). During this period, as seen in Table 1, the frequency of stock acquisitions increased. This suggests, as discussed by

test whether this portfolio earns abnormal returns. Moeller, Schlingemann, and Stulz (2003) report that such an approach leads to insignificant abnormal returns for acquirers as a whole in their 1980-2001 sample, as compared with significant negative abnormal returns using an event-based approach. The calendar approach accords the same weight to returns from months associated with many versus few transactions, biasing significance downward if returns are not perfectly correlated across transactions.

Shleifer and Vishny (2003), that the rise in overvaluation contributed to the greater use of stock during the acquisition wave of the 1990s. We explore this hypothesis in more detail in Table 6 below.

The bid premium is defined as the SDC bid price of the offer divided by the CRSP market price of the target 5 days before the announcement. The average bid premium is 34.4% for the entire sample, and abnormal returns are about 18% for target firms at the announcement of the acquisition.[19] The last two columns of Table 2 report the long run returns to acquiring firms. While there is considerable variation in acquiring firm performance across years, there is no evidence of negative average abnormal returns for acquiring firms as a group. Finer breakdowns of long run returns are contained in later tables.

4 Aggregate Misvaluation Patterns and Takeovers

Table 3 provides evidence on aggregate measure of stock index misvaluation and how they are related to the method of payment, the mode of acquisition, bid premium, target and acquirer announcement period returns, acquirer long-run abnormal returns, and transaction value. Our measures of aggregate misvaluation are B/P and V/P for the value-weighted market portfolio. For each of the 267 months in our sample period (1978-2000) we calculate aggregate B/P and V/P using all available firms with data available to calculate the respective measures. The analysis in Table 3 is a set of OLS regressions in which we regress a dependent variable on the two measures of aggregate misvaluation, and on measures of cross-sectional dispersion in misvaluations— standard deviations $\sigma(B/P)$ and $\sigma(V/P)$. The transaction-specific dependent variables are averaged across acquisition bids. The last dependent variable, monthly volume as fraction of total market capitalization, measures aggregate takeover activity. It is the monthly sum of transaction value across all offers during that month, divided by total market capitalization.

There are several findings. First, consistent with the prediction of Shleifer and Vishny (2003), stock (rather than cash or a mixture of cash and securities) is more likely to be used as consideration in acquisitions when the aggregate stock market is overvalued (significant negative coefficients for B/P and V/P). Furthermore, cash is, with marginal significance, less likely to be used when the aggregate stock market is undervalued.

[19] 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.

The means-of-payment findings are consistent with bidders wishing to trade overvalued equity for target assets and target management wishing to cash out (Shleifer and Vishny (2003)), and/or with bidders for overvalued targets wishing to force target shareholders to shoulder part of their firm's overvaluation.

Second, consistent with the prediction of Shleifer and Vishny (2003), using the V/P measure we find that bidders make relatively more stock offers when there is large dispersion in valuations across traded firms.[20] This is indicated by the positive and highly significant coefficient on σ(V/P). However, no such effect is detectible using the B/P measure. Similarly, high dispersion of V/P is associated with significantly less use of cash as a fraction of the total value of takeover activity; this effect is not significant for B/P.

Third, transactions are less likely to be hostile when the market is overvalued, also consistent with the approach of Shleifer and Vishny (2003). There is an indication using the B/P measure that overvaluation encourages merger bids over tender offers, but this effect is not present with the V/P measure.

Fourth, transactions are less likely to be hostile when there is larger dispersion in valuations across traded firms. Consistent with this, dispersion in valuations is negatively related to the relative frequency of tender offers rather than merger bids, although the effect is not significant for B/P.

Fifth, transactions are more likely to be successful when the market is overvalued (B/P and V/P). This is reasonable since, as discussed above, in an overvalued market transactions tend to be less hostile.

Sixth, transactions are more likely to succeed when there is greater dispersion in valuations across traded firms (V/P but not B/P). Again, this is consistent with the evidence above that higher dispersion is associated with less hostility.

Seventh, the stock price reactions of acquirers to the announcement of the takeover bid are on average higher when the aggregate market is undervalued (positive coefficients for acquirer announcement period returns on B/P and V/P), suggesting a corrective effect of the bids. There is also an indication that the stock price reactions of targets to the announcement of takeover bids are lower when the aggregate market is undervalued (only significant for B/P).

Eight, the abnormal stock price reaction of bidders to the announcement of the bid is more negative, and the abnormal reaction of targets is more positive, when there is

[20] In their approach, high dispersion creates more opportunities for pairings in which the bidder is very overvalued relative to an overvalued target.

greater dispersion in valuations across traded firms. This, along with the fourth item on hostility and the frequency of tender offers, provide empirical regularities to be explained.

Ninth, there is some indication that targets receive higher bid premia relative to their market prices when the stock market is more undervalued (significant only for B/P). This is consistent with target management being aware that their firms are undervalued, and insisting upon compensating increases in bid premia relative to market price.

The relation between the dispersion in valuations and the average bid premium is negative with the V/P measure but strongly positive with the B/P measure. This ambiguity may derive from the opposing effects of bidder versus target undervaluation on bid premium (see the discussion of Table 6 in Section 5). We do not draw any conclusion from these findings.

Tenth, there is some weak indication that acquirer post-acquisition long run returns are worse when the acquisitions are made in a more overvalued market. The relationship betweeen dispersion of valuations and long-run returns is again inconsistent between B/P and V/P (with insignificance for V/P), so the data does not provide a firm conclusion about this relationship.

Finally, total offer value as a fraction of market capitalization is higher when the market is more overvalued as measured by V/P, consistent with Shleifer and Vishny (2003).[21] This, together with the first finding on use of equity, suggests that in overvalued markets firms exploit their overvalued stock and the receptiveness of overvalued potential targets to engage in a greater volume of stock acquisitions.

On the whole these findings support the hypothesis that misvaluation affects both the aggregate volume of takeover activity and the character of takeover transactions. However, the misvaluation hypothesis is not confirmed in every detail, and in some cases the strength of the findings depends on which misvaluation measure is used.

To provide sharper tests, it is important to disentangle mispricing effects by examining separately the misvaluations of bidders and targets, which can have opposing

[21]Since takeovers often are associated with the issuance of securities, one reason that market valuations may influence takeover activity is that they influence the ease of raising capital. Rhodes-Kropf and Viswanathan (2002) analyze how rational market valuations influence takeover behavior. Since their model is based upon rational interpretation of private information signals, their focus is not on predictions about contemporaneous, publicly observable measures of misvaluation such as those applied here. Stein (1996) and Daniel, Hirshleifer, and Subrahmanyam (1998) provide models in which irrational mispricing affects corporate decisions. Ikenberry, Lakonishok, and Vermaelen (1995) and D'Mello and Shrof (2000) provide evidence that repurchasers of equity tend to be undervalued by investors; Loughran and Ritter (1995) and Jindra (2000) provide evidence of overvaluation of equity issuers. Baker and Wurgler (2000) find that the equity share in aggregate new issues is a predictor of subsequent market index returns.

implications for transaction characteristics. A further handicap of aggregate mispricing tests is that mispricing of the aggregate market is likely to be imperfectly correlated with mispricing of particular bidder or target firms. We therefore turn to the effects of firm-level misvaluation in the next two sections.

5 Firm Level Misvaluation: Univariate Tests

Table 4 reports our analysis of how under- or over- valuation influences the acquisition mode and method of payment. Mean values of B/P and V/P, and their differences between acquirer and target firms are reported across modes of acquisition and methods of payment.[22]

In Table 4, bidding firms on average tend to have lower values for B/P and V/P than target firms, indicating that bidders are overvalued relative to targets. Average B/P (V/P) ratio for acquirers is 0.580 (0.710) and for target firms is 0.678 (0.788). The pairwise differences are statistically significant.

Furthermore, this difference in valuation is concentrated in stock merger offers. For the 1227 (719) acquiring firms for which we are able to calculate B/P (V/P) we find that target firms have B/P (V/P) ratios that are on average greater than those of acquiring firms by 0.14 (0.12). This evidence indicates that stock bidders are overvalued relative to their targets. This is consistent with the prediction of Shleifer and Vishny (2003).

Table 4 also indicates that the targets of cash offers are significantly more undervalued than the targets of stock offers; $V/P = 0.831$ for cash versus 0.759 for stock. (This finding seems to derive primarily from merger bids.) This finding is consistent with the hypothesis that bidders can sometimes detect target misvaluation, and are more prone to paying stock for overvalued targets in order to rest part of this overvaluation upoon the shoulders of target shareholders. This finding is also consistent with the approach of Shleifer and Vishny (2003), in which cash targets are undervalued and stock targets are overvalued.

Furthermore, this evidence indirectly tends to support the prediction of Shleifer and Vishny (2003) that cash targets will be undervalued in absolute terms. However, this evidence does not rule out the possibility that targets of cash offers are absolutely overvalued, but not as overvalued as the targets of stock offers.

Finally, Table 4 indicates that stock bidders are on average significantly more over-

[22]Median values suggest similar inferences and are not reported. In addition, Table 4 restricts the sample to observations where B/P and V/P are available for both bidder and target firms.

valued than cash bidders, using both B/P and V/P measures; $V/P = 0.786$ for cash versus 0.642 for stock. This is consistent with the hypothesis that overvalued bidders prefer to acquire target resources using their overpriced stock as a currency, and the prediction of Shleifer and Vishny (2003).

Several papers examine long-run abnormal returns to evaluate whether the market efficiently values firms engaged in takeovers (see, e.g., Franks, Harris, and Titman (1991)). We examine the long-run returns for successful acquiring firms conditional on means of payment (cash, equity or mixed) and on the mode of acquisition (merger or tender offer) in Table 5. Consistent with Table 2, for the whole sample mean long-run returns are virtually zero for for the whole sample of acquiring firms (-3.41%, insignificantly different from zero). Nor is there significant evidence of excess long-run performance among either stock acquisitions or cash acquisitions separately—for stock acquisitions, the long-run cumulative return of -2.55% is not significantly different from zero. Finally, there is little evidence of a differential in the long-run performance of merger bids versus tender offers (insignificant -6.32% for mergers versus +6.60% for tender offers).

In contrast, in samples that do not include the takeover boom of the 1990's, Loughran and Vijh (1997) and Rau and Vermaelen (1998) found that in the long run, cash tender offers achieve superior abnormal stock performance and that stock mergers experience inferior performance.[23] When we restrict our sample to a time period ending in 1989 (to be more comparable to Loughran and Vijh's 1970-89 sample) we also find that mergers underperform tender offers.

In general, misvalued firms should on average experience abnormal subsequent returns over time as prices are corrected. Thus, the evidence of no differential in long-run returns during the full sample period between stock offers versus cash offers opposes the misvaluation hypothesis and the prediction of Shleifer and Vishny (2003). However, as discussed in the introduction, the appropriate benchmark for long-run abnormal returns is hard to gauge. This reduces the power of, and potentially biases, such tests. To provide sharper tests of the hypothesis, we therefore exploit contemporaneous measures of misvaluation. In the discussion of Table 4, we found that contemporaneous measures indicate that bidders in stock acquisitions are overvalued. In Section 6, we describe multivariate analysis of this issue. In addition, we will later examine whether the strength of the relation between misvaluation proxies and long-run returns differs between stock

[23]Our sample also has more transactions during the overlap period 1981-9 than the sample of Loughran and Vijh, suggesting that part of the difference may also be due to the greater coverage of our SDC sample.

and cash acquisitions.

Table 6 analyzes how the characteristics of takeover bids are related to contemporaneous measures of bidder and target misvaluation (B/P, V/P). Panels A and B describe the effects of acquirer misvaluation; Panels C and D report the effects of target misvaluation. In each month, we rank firms based on their respective misvaluation ratios and form quintiles.

We refer to quintile 1, in which overvaluation is highest and V/P and B/P are lowest relative to other firms in the same category (other bidders, or other targets), as the top overvaluation quintile; quintile 5, which contains high values of B/P or V/P, indicate the strongest undervaluation. We report differences across the top and bottom overvaluation quintiles (OMU, overvalued minus undervalued) to describe how differences in misvaluation are related to transaction characteristics. The characteristics we consider are the use of cash versus stock, tender offer versus merger bid, offer success, hostility of the acquisition, the level of the bid premium, and both announcement period and long-run stock returns. We report these statistics for all acquisitions and then break the sample down by method of payment and mode of acquisition.

These cross-sectional tests are not designed to capture the effects of common market-wide misvaluation of most bidders, or of most targets. Differencing between quintiles will tend to eliminate such effects. Thus, the tests here are complementary with the aggregate mispricing results in Section 4.

Some consistent patterns emerge for bidding firms from Panels A and B. The probability of stock payment is strongly related to our misvaluation measures. Bidders that are more overvalued are more likely to use stock as consideration, consistent with the prediction of Shleifer and Vishny (2003). The difference in probability of using stock between the top and bottom overvaluation quintiles is 14.7% (V/P) or 25.9% (B/P). An associated finding is that undervalued acquirers are more likely to use cash as consideration. The difference in the fraction of cash offers between the top and bottom misvaluation quintiles is between -5.5% (V/P) and -14.1% (B/P).[24]

There is some evidence that overvalued acquirers pay higher bid premia, especially when the form of consideration is stock. Using the B/P measure in Panel A the quintile difference in premium is 4.6% for the whole sample and 8.7% for stock acquisitions, significant differences. The direction of effects is similar for V/P, but does not attain

[24] An exception to this pattern is that in the tender offer subsample, overvaluation is associated with greater use of cash, though only at the 10% level of significance. The reason for this is unclear, and the greater use of cash is not accompanied by a decrease in the use of stock.

significance with this measure. The significant findings for B/P suggest that overvalued bidders either find it easier to raise enough capital to make a high bid, and/or are more willing to make a high bid using an overvalue currency, their stock.

Despite the indication that among stock offers, more overvalued bidders pay higher premia, there is no evidence that targets are more likely to view offers from overvalued 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. If so, then a higher premium in a stock offer is necessary merely to compensate for the fact that the market value of the offered shares is inflated relative to fundamental value.

Consistent with high bidding by overvalued acquirers, the acquirer announcement period returns are significantly more negative when the acquirer is more overvalued based on both misvaluation measures. We call the strategy that is long on the top overvaluation quintile and short on the bottom overvaluation quintile the overvaluation-minus-undervaluation or OMU portfolio. The OMU portfolio abnormal return (describing the quintile difference in acquirer CARs) is -1.6% (B/P) or -1.8% (V/P). These substantial and highly significant return differentials suggest that the announcement of a takeover bid tends to alert investors to preexisting mispricing, thereby causing a partial correction.

In a 1980-2001 sample of successful offers for public firms, Moeller, Schlingemann, and Stulz (2003) find essentially no relation between Tobin's Q and the bidder's announcement period return. Furthermore, among large bidders there is a significantly positive relationship, which is potentially consistent with a more positive market reaction to offers when the market perceives the agency costs of managerial discretion to be low. The differing conclusions may arise from our longer sample period; from differences between Tobin's Q (a total-assets-based measure) and the inverse of B/P (an equity-based measure); or from their restriction to successful offers.[25]

A further datum compatible with high bidding by overvalued acquirers in stock offers is that, in such offers, greater acquirer overvaluation increases the target announcement period returns (the quintile difference in target CARs for stock acquisitions is 5.9% sorting by bidder B/P and 3.3% sorting by bidder V/P). However, the effect in the

[25]Our finding of significantly lower announcement period returns to bidders with low B/P ratios in merger bids provides an interesting contrast with the evidence, based on proxies for Tobin's Q in a sample of mergers from 1972-87, of Servaes (1991). Similarly, our finding of no significant relation between acquirer B/P ratios and announcement period acquirer returns in tender offers (with a point estimate indicating low returns for bidders with low B/P) provides an interesting contrast with the earlier findings for tender offers of Lang, Stulz, and Walkling (1989) (from 1968-86) and Servaes (1991).

overall sample is relatively weak.

Turning next to the relation of misvaluation to the long-run stock performance of the acquirers, recall that Tables 2 and 4 indicated no significant mean long-run abnormal returns to acquirers as a whole. When we sort acquirers according to their misvaluation in Panels A and B of Table 6, a strong pattern emerges: more overvalued acquirers significantly underperform more undervalued acquirers.[26] The long-run returns associated with the OMU portfolio are -32.8% (B/P) to -53.1% (V/P).[27]

This differential is even stronger when we focus solely on stock offers. For stock offers, the OMU portfolio achieves long-run returns of -32.1% (B/P), and -56.3% (V/P); for abnormal returns the B/P figure shrinks to an insignificant -14.8%, whereas the V/P figure becomes -112.7%. The stronger abnormal returns of the OMU portfolio formed among stock transactions suggests that more misvalued bidders may tend to choose stock.

It is interesting that the strongest results even for raw returns are obtained for the V/P measure. By including forecasts of abnormal earnings, V/P can remove the component of B/P attributable to rational growth expectations, potentially resulting in a purer measure of misvaluation.

Rau and Vermaelen (1998) report that underperformance of merger bidders is concentrated in glamour bidders (those with low book/market ratios). This indicates a performance differential among merger bidders according to B/P. Although in our sample there is little mean long-run underperformance in stock mergers as a whole, our findings that V/P is a strong predictor of long-run return performance, and that this relation is strongest for merger and stock acquisitions, complement their findings. Since B/P proxies for growth and managerial agency problems, the degree to which B/P proxies for these characteristics may differ between firms involved with takeover and a general sample of firms, and since growth and agency problems may be correlated with risk, it is hard to determine the appropriate risk benchmark in B/P tests. Our V/P

[26] As in several previous studies, the fact that long-run returns cover overlapping time periods induces cross-observation dependence, so that our test statistics overstate the significance of the long-run return findings. Thus, even though the economic magnitudes of some of the long-run return effects we describe are substantial, the findings are open to different interpretations.

[27] The results are weaker using abnormal instead of raw returns under the B/P sorting. As mentioned near the start of Subsection 2.2, the use of B/P as a matching firm criterion biases our measures of long-run abnormal returns toward zero more strongly when we apply a B/P measure for misvaluation of takeover firms than with our V/P measure. The matched sample is selected based upon B/P, potentially removing much of the misvaluation effect that the B/P measure is intended to capture. In contrast, the V/P measure has a stronger effect with abnormal returns of -93.8%.

findings therefore lend additional support to the misvaluation hypothesis.

Panels C and D of Table 6 report similar statistics for target firms. There is evidence that bid premia and announcement period returns are on average greater for more undervalued targets.[28] This suggests that takeover bids on average tend to correct target mispricing. The quintile difference for bid premium is -8.5% (-3.4)% for B/P (V/P) and the quintile difference for target CAR is -4.3% (-3.1%).

Panels C and D provide several further findings. 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 (see also Shleifer and Vishny (2003)). Consistent with this prediction, stock is much less likely to be used as method of payment when the target is undervalued (22.6% quintile difference in probability (B/P); 14.5% (V/P)), both highly signficant.

Partially consistent with this reasoning, target overvaluation reduces the probability of a cash offer, but only with the B/P measure. The quintile differences in the probability of cash offers are -12.4% (B/P) and an insignificant -4.0% (V/P). These quintile results suggest that cash targets are less overvalued than equity targets. But this does not rule out the possibility that cash targets are overvalued in absolute terms.

Furthermore, a transaction is more likely to be hostile when the target is more undervalued (quintile difference in probability of -7.9% (B/P) or -6.0% (V/P). There is also some evidence an acquisition is less likely to be successful when the target is undervalued (the quintile difference in probability using the B/P measure is 9.3%). Together, these findings suggest that more undervalued targets are more resistant to takeovers (consistent with the prediction of Shleifer and Vishny (2003)), and fight hard either for a higher price or to block the transaction.

Overall the evidence in the four panels also indicates that the relation between misvaluation and takeover characteristics tends to be stronger in merger bids than in tender offers. Several of the overvaluation quintile 1-5 differences by columns are larger in absolute value and more significant for mergers than for tender offers.

For example, in Panel A the quintiles are formed by acquirer overvaluation (low minus high B/P ratios). Acquirer overvaluation seems to have a larger effect in the predicted direction for merger bids than for tender offers on the probability of stock payment (much larger effect, 27.2% and significant at the 1% level instead of 3.6% and

[28]In an earlier sample, Walkling and Edmister (1985) find a significant relation between B/P and premia. 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.

insignificant), for the bid premium (5.3% and significant at the 1% level instead of 4.3% and insignificant [the sample size is smaller for tender offers]), target CAR (3.3% and significant instead of 0.9% and insignificant), acquirer long-run return (-36.0% and significant instead of -32.6% and insignificant).

Similarly, in Panel B acquirer overvaluation seems to have a larger effect in the predicted direction for merger bids than for tender offers on the probability of stock payment (14.7% and highly significant instead of 0.6% and insignificant), slightly so on the bid premium (1.1% and insignificant instead of 0.1% and insignificant), and on target CAR (2.1% and insignificant instead of -7.4% at 10% significance[29], and acquirer long-run return (-63.0% and significant at the 1% level instead of -7.4% and insignificant). Also, the acquirer excess long-run return becomes highly significant (-109.3%) for merger bids instead of -22.8% and insignificant for tender offers.

In Panels C and D, target overvaluation also seems to have a larger effect in the predicted direction for merger bids than for tender offers. There are larger effects for B/P and V/P on the probability of stock payment (22.6% [B/P] or 13.7% [V/P], both significant at the 1% level instead of 2.2% [B/P] or -1.9% [V/P], both insignificant). The effect of misvaluation is large on bid premium for merger bids, but is even stronger for tender offers.

Taken together, the evidence provided by the univariate tests is on the whole consistent with the proposition that market misvaluation influences the behavior of both targets and bidders in takeover contests.

In an exploratory fashion, we also consider whether misvaluation effects differ between diversifying versus related acquisitions. Table 7 provides some indication that the long-run return differential between the most overvalued and undervalued bidder quintiles is greater for diversifying acquisitions than for related acquisitions. For reasons discussed earlier, we focus on raw rather than excess returns. For B/P (Panel A), we see that for 3-digit SIC industries the cross-industry and same-industry inter-quintile differences in long-run raw returns is essentially the same, -26.0% versus -26.3%; based on 4-digit SIC codes, the inter-quintile difference is slightly more negative in cross-industry acquisitions than in same-industry acquisition, -29.9% (significant at the 10% level) versus -21.7% (not significant).

For V/P, in contrast, the difference is strong. For 3-digit SIC industries the cross-industry and same-industry inter-quintile differences in long-run raw returns are -76.2%

[29]The tender offer difference is 10% significant in opposition to the misvaluation hypothesis. But the tender offer quintiles are not even close to being monotonic.

($p < .01$) and -19.3% respectively. For 4-digit SIC industries the cross-industry and same-industry inter-quintile differences in long-run raw returns are -54.7% ($p < .01$) and -25.1% respectively.

The stronger misvaluation effects occuring in diversifying acquisitions do not seem to arise from higher dispersion in misvaluation measures in the cross-industry subsample; the interquintile differences for B/P and V/P are only very slightly larger for cross-industry than for same-industry acquisitions. This presents an interesting regularity to be explained.

6 Firm Level Misvaluation: Multivariate Tests

To assess the robustness of our univariate findings, we perform multivariate analysis with additional controls. Table 8 summarizes logistic regressions relating acquirer and target misvaluation to the method of payment and to the mode and mood of the offer. The dependent variables we consider are: (i) cash payment, (ii) stock payment, (iii) tender offer, (iv) hostility, and (v) success. We report two regression specifications for each dependent variable. First, we regress on B/P ratios for the acquirer and target along with size variables and year and industry controls. The industry controls are acquirer 2-digit SIC major industry dummies as defined by Moskowitz and Grinblatt (1999). Second, we add the V/P ratios for the acquirer and target to examine whether there is incremental explanatory power from a residual income misvaluation measure. If so, this provides further 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.

Table 8 indicates that overvalued acquirers are more likely to pay with stock, and less likely to pay cash, consistent with the misvaluation hypothesis and the prediction of Shleifer and Vishny (2003). The coefficients on acquirer B/P in the cash (stock) regressions are significantly different from zero. Furthermore, the acquirer V/P variables also have significant coefficients. This suggests that V/P contains incremental information about misvaluation above and beyond B/P.[30]

Tender offers are significantly more likely when either acquirers or targets are more

[30]In Table 8, to maximize the comparability of the regressions, we have imposed the condition that the data for both B/P and V/P be available. In the regressions that do not involve V/P, if we expand the sample to include all firms for which data for B/P are available, the results are generally similar. The main differences are that for cash offers, acquirer B/P has a smaller (but still significant) coefficient; and that in this regression target B/P becomes significant at the 5% instead of just the 10% level.

undervalued. This finding is consistent with the misvaluation hypothesis. A target manager who understands that his firm is undervalued 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.

Indeed, undervalued targets, as measured by B/P, do have a significantly higher probability of opposing the offer (i.e. the frequency of hostile offers is higher). This B/P effect remains when V/P is included in the regression. The B/P finding is consistent with the approach of Shleifer and Vishny (2003). However, the incremental V/P effect itself is close to zero, indicating that V/P does not capture any misvaluation effect on hostility above and beyond that captured by B/P.

The use of stock as a means of payment is also associated with target overvaluation, and the use of cash with target undervaluation. This is consistent with the approach of Shleifer and Vishny (2003), and with the misvaluation hypothesis.

Table 8 further indicates that target undervaluation as measured by B/P (but not V/P) reduces the probability that the bidder is successful. Intuitively, bidders for undervalued targets have an incentive to try to get by with bids that are relatively unattractive relative to 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 above result is derived in a regression that does not control for the premium. Under the misvaluation hypothesis, mispricing will influence the premium, so such a control may remove some of the misvaluation effects we seek to measure. However, Walkling (1985) established that the level of the premium is an important determinant of offer success, suggesting its possible inclusion as a regressor. We obtain similar results when the premium is included (not reported in the table). Intuitively, a target that is more undervalued, for a given premium relative to market (not true) value, has more incentive to oppose the bid.

Table 9 investigates the explanatory power of our misvaluation measures for acquirer and target announcement period returns, bid premium and long-run acquire returns, controlling for relative sizes of bidder and target, as well as year and industry controls as in Table 8. In Panel A, acquirer announcement period returns are greater for more undervalued acquirers (for both B/P and V/P measures). As with the univariate evidence, these are highly significant effects. This evidence suggests that the act of takeover bidding tends to have a corrective effect on the misvaluation of the acquirer. Apparently, for undervalued bidders, making a takeover bid tends to be viewed by investors as a masterful stroke, whereas for overvalued bidders, a bid is viewed as a clumsy blun-

der. These findings make an interesting contrast with evidence based on different time periods and somewhat different empirical measures; see footnote 25.

There is also some indication that bidder announcement period returns tend to be lower when the target is more overvalued (B/P, not V/P). This is consistent with the hypothesis that the bid acts as a corrective to target overvaluation, thereby increasing investor skepticism as to the desirability of the acquisition for the bidder. This confirms in a more recent sample the findings of Morck, Shleifer, and Vishny (1990); they interpret this effect as indicating that the market is skeptical of acquisitions of high growth targets.

We find that bid premia relative to market (not fundamental) value tend to be higher for targets that are more undervalued. Again, this effect is consistent with bidders understanding that undervalued targets are prepared to fight harder for a high premium relative to market value.

Thus, a clear pattern emerges from the univariate and multivariate results. Overvalued acquirers are more likely to use stock and less likely to use cash as consideration, are willing to pay more relative to target market price, and are less inclined to use tender offer rather than merger bid. Undervalued targets receive higher premia relative to market price, are more likely to be hostile to the bid, and have a lower probability of being successfully acquired in the offer.

The final test in Table 9 Panel A relates contemporaneous misvaluation measures to long-run post-acquisition returns. Although the point estimates for the effects are large, the significance of the relation is weaker than in the univariate analysis. Only acquirer V/P gains significance at the 5% level, suggesting that overvalued acquirers have poor long-run stock performance.

There are some revealing differences in these findings when the sample is divided into same-industry versus cross-industry acquisitions in Panels B and C respectively. Several of the misvaluation effects documented in Table 9 are stronger (or even completely drive by) cross-industry acquisitions, and the adjusted R^2's of several of the regressions are stronger in the cross-industry acquisitions. This suggests that synergies may be dominant in same-industry acquisitions, whereas misvaluation effects may play a larger role in cross-industry acquisitions.

7 Summary and Conclusion

We have examined whether market misvaluation is an important driver of the takeover market using contemporaneous measures of misvaluation of bidders, targets, and the

aggregate market: book/price (B/P), and the ratio of residual income valuation to price (V/P). Including V/P allows us to determine whether the effects we identify are due to mispricing rather than to effects relating to firm growth opportunities or to the quality of bidder or target managements.

Although there are potential explanations for some of our findings from an efficient markets perspective, taken as a whole, the evidence is consistent with the misvaluation hypothesis of takeovers— that irrational mispricing of stocks influences the volume and character of takeover activity. The evidence suggests that irrational misvaluation of the stock of targets, bidders, and the aggregate stock market influences the decisions of both targets and bidders. Misvaluation measures are related to the aggregate volume of takeovers, the means of payment chosen, the premia paid, the likelihood of offer success, the decision of targets to oppose the bid, announcement period and long run abnormal stock returns, and the returns from diversifying acquisitions. A variety of specific findings are on the whole consistent with the approach of Shleifer and Vishny (2003), and of other intuitive implications of the misvaluation hypothesis.

There is no reason to believe that the influence of market misvaluation on managerial decisions is limited to the takeover market. As discussed earlier, previous research has provided evidence that financing, repurchase, and investment decisions are related to misvaluation. Thus, our evidence contributes to an emerging theme in recent literature indicating that misvaluation is likely to be important for many of the investment, reporting and financing decisions that firms make.

This body of evidence presents a challenge to the traditional theory of corporate finance, which is 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 that misvaluation has important effects suggest that further theoretical developments along these lines are likely to be fruitful.

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Table 1
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, cash payment, stock payment, mixed payment, and occurring in the same industry (based on bidder and target 3-digit COMPUSTAT SIC codes), by calendar year. Sample includes merger bids and tender offers where both bidder 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	% same-industry
1978	17	1046.7	76.5	23.5	29.4	70.6	52.9	47.1	0.0	6.7
1979	11	981.1	63.6	10.0	27.3	72.7	90.9	9.1	0.0	30.0
1980	29	872.5	75.9	11.5	24.1	75.9	20.7	3.4	75.9	20.8
1981	99	1509.1	60.6	13.1	23.2	76.8	6.1	0.0	93.9	29.0
1982	89	624.3	68.5	18.0	28.1	71.9	0.0	0.0	100.0	38.1
1983	105	644.0	70.5	11.7	20.0	80.0	4.8	0.0	95.2	39.4
1984	120	840.2	61.7	11.0	31.7	68.3	17.5	5.8	76.7	36.1
1985	157	1031.5	67.5	15.3	33.1	66.9	45.9	31.2	22.9	40.4
1986	139	813.5	67.6	15.4	31.7	68.3	52.5	26.6	20.9	43.0
1987	167	695.5	66.5	13.4	21.0	79.0	40.1	28.1	31.7	37.0
1988	161	630.2	55.3	15.2	35.4	64.6	61.5	21.7	16.8	35.9
1989	128	972.0	64.1	13.4	30.5	69.5	39.8	38.3	21.9	48.4
1990	74	710.5	73.0	7.6	16.2	83.8	35.1	37.8	27.0	55.1
1991	85	491.4	78.8	3.7	10.6	89.4	10.6	61.2	28.2	55.0
1992	97	423.3	81.4	3.1	5.2	94.8	16.5	62.9	20.6	64.4
1993	120	1101.6	85.8	2.6	10.8	89.2	26.7	47.5	25.8	55.7
1994	206	585.2	80.6	7.3	14.6	85.4	29.6	54.9	15.5	57.5
1995	248	827.4	84.3	7.3	14.1	85.9	25.0	58.9	16.1	55.9
1996	264	1126.1	84.8	7.2	14.4	85.6	23.9	50.4	25.8	59.0
1997	366	1197.6	87.7	4.2	16.4	83.6	16.4	54.9	28.7	57.0
1998	342	2982.8	89.5	2.4	12.9	87.1	16.1	57.3	26.6	58.0
1999	394	3064.5	84.0	3.9	17.0	83.0	24.1	46.2	29.7	52.6
2000	314	2951.1	85.7	2.3	20.1	79.9	25.5	48.1	26.4	57.5
Total	3732	1481.1	78.3	7.6	19.4	80.6	26.2	41.6	32.2	51.4

Table 2

Mean Valuation Ratios, Abnormal Returns and Acquirer Long-Run Returns in Takeover Bids by Calendar Year

Time analysis of takeover bids (long-run return columns for completed transactions only). B/P is the book-price ratio. V/P is the intrinsic value-price ratio, where the intrinsic value is estimated using the residual income model (RIM) when the discount rate is based on firm-specific CAPM. Bid premium is the ratio of the SDC bid price offered by the bidder 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. Acquirer and matching firm (selected on size and B/P) long-run returns are buy-and-hold returns starting on the day after the completion date up to five years after. Acquirer excess long-run return is the difference between acquirer long-run return and the matching return. Sample includes merger bids and tender offers where both bidder and target were listed on the NYSE, AMEX, or NASDAQ during 1978-2000. All dollar figures are in millions of 2001 dollars.

Year	Acquirer market value	Target market value	Acquirer B/P	Acquirer V/P	Target B/P	Target V/P	Bid premium (%)	Target announce-ment CAR (%)	Acquirer announce-ment CAR (%)	Acquirer long-run return (%)	Acquirer excess long-run return (%)
1978	5716.8	563.2	0.96	0.65	0.78	0.57	40.7	14.9	-0.7	108.7	31.1
1979	6839.6	518.3	1.07	0.69	0.71	0.46	47.0	16.9	-0.3	171.0	-43.5
1980	9528.3	821.7	0.97	0.85	0.84	0.55	45.3	14.2	-2.0	137.9	43.5
1981	3753.6	1098.9	1.08	0.57	1.05	0.48	43.7	17.2	-1.2	142.8	-25.5
1982	1580.6	489.4	1.10	0.94	1.00	0.79	46.8	18.3	0.5	224.7	72.3
1983	1326.9	423.6	0.92	0.78	0.91	0.69	33.5	12.6	-0.7	59.3	-35.4
1984	3100.4	585.7	0.85	0.81	0.78	0.61	36.1	15.4	-0.1	84.1	-30.1
1985	3064.5	773.0	0.78	1.00	0.75	0.86	28.8	13.8	-0.2	60.1	-27.9
1986	2192.5	603.9	0.65	0.86	0.82	0.77	30.4	15.1	-0.4	36.6	-14.8
1987	2952.9	460.3	0.60	0.75	0.62	0.73	37.5	23.3	0.3	33.6	-48.9
1988	2752.5	383.1	0.82	1.01	0.84	0.89	42.0	20.7	-0.9	88.1	3.9
1989	2395.1	644.1	0.69	0.74	0.73	0.61	31.5	16.2	-0.3	80.9	13.9
1990	4653.8	477.7	0.68	0.81	0.72	0.78	42.9	21.6	-2.2	152.6	37.6
1991	2386.7	362.9	0.64	0.80	0.86	0.69	37.9	18.9	-0.5	136.6	19.4
1992	2512.4	303.5	0.59	1.04	0.77	0.95	37.6	18.7	-1.2	159.4	31.2
1993	3814.2	670.0	0.64	1.05	0.68	1.04	32.4	18.4	-1.0	137.3	48.8
1994	3375.4	456.4	0.55	1.07	0.63	1.12	32.0	17.9	-1.1	140.2	-11.3
1995	4007.0	675.7	0.52	0.81	0.68	0.83	31.4	17.7	-1.0	86.0	-18.1
1996	4888.2	780.8	0.47	0.76	0.62	0.90	29.8	17.1	-0.6	50.8	-10.9
1997	6958.7	749.4	0.42	0.65	0.51	0.75	28.9	15.9	-0.6	—	—
1998	10303.6	2201.0	0.40	0.61	0.56	0.72	31.3	16.0	-2.2	—	—
1999	20815.3	1977.0	0.56	0.63	0.65	0.75	37.3	20.1	-1.7	—	—
2000	23963.4	1762.7	0.62	0.53	0.70	0.63	37.5	21.8	-4.1	—	—
Total	7911.5	1001.0	0.61	0.77	0.68	0.78	34.4	17.9	-1.2	98.8	-3.4

Table 3

Least Squares Regressions of Aggregate Acquisition Characteristics on Aggregate Market Misvaluation Measures

Each month during 1978-2000, average values of acquisition characteristics are regressed on the value-weighted market-wide B/P or V/P ratios of the previous month, or on the standard deviation across firms of B/P or V/P in the previous month. All dependent variables are averaged across acquisitions except for the last one, which is the monthly sum of transaction value divided by total market capitalization.

	Independent Variable (calculated over both takeover and non-takeover firms)										
Dependent Variable	**B/P**	**t-stat**	**V/P**	**t-stat**	**σ(B/P)**	**t-stat**	**σ(V/P)**	**t-stat**	**Intercept**	**Sample Size**	**Adjusted R^2**
Cash	0.10	(1.49)			-0.19	(-1.57)			0.37	267	.0107
			0.16	(1.93)			-0.37	(-2.46)	0.31	262	.0273
Stock	-0.74	(-13.11)			0.05	(0.44)			0.78	267	.3912
			-0.28	(-3.53)			1.25	(8.83)	0.04	262	.2466
Tender Offer	0.15	(3.29)			-0.14	(-1.61)			0.21	267	.0428
			0.05	(0.89)			-0.39	(-3.82)	0.33	262	.0476
Hostile	0.14	(4.48)			-0.12	(-2.15)			0.10	266	.0815
			0.10	(2.52)			-0.25	(-3.64)	0.12	261	.0604
Success	-0.33	(-6.44)			0.08	(0.87)			0.89	267	.1328
			-0.21	(-3.20)			0.69	(5.93)	0.61	262	.1372
Acquirer Ann. Period CAR	1.63	(2.60)			-4.53	(-3.91)			1.36	267	.0728
			2.34	(2.93)			-4.17	(-2.94)	-1.07	262	.0523
Target Ann. Period CAR	-5.21	(-2.71)			11.53	(3.25)			11.97	267	.0587
			-1.07	(-0.44)			13.74	(3.17)	12.26	262	.0301
Bid Premium	17.20	(5.28)			41.34	(6.97)			-5.24	262	.2132
			4.63	(1.02)			-19.03	(-2.32)	40.82	257	.0161
Acquirer Excess Long-Run Return	10.12	(0.28)			225.87	(3.78)			-165.13	211	.0624
			132.94	(2.21)			-124.44	(-1.47)	-55.02	211	.0138
Monthly Volume as Percent of Total Market Capitalization (%)	0.07	(-0.56)			0.18	(-0.79)			0.55	267	-.0041
			-0.60	(-4.02)			0.29	(-1.10)	0.98	262	.0575

B/P is the aggregate market book-price ratio, and V/P is the aggregate market intrinsic value-price ratio, where the intrinsic value is estimated using the residual income model (RIM) when the discount rate is based on firm-specific CAPM. Each is value-weighted across all exchange-traded firms for which data is available. σ(B/P) and σ(V/P) are the standard deviations of these variables across exchange-traded firms. 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 SDC bid price offered by the bidder to the target stock price 5 days prior to the announcement of the takeover bid. Acquirer excess long-run return is the difference between acquirer and matching firm (selected on size and B/P) buy-and-hold returns starting on the day after the completion date and ending up to five years after. 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.

Table 4
Mean Bidder and Target Valuation Ratios by Mode of the Offer and Payment Method

The valuation ratios are the book-price ratio B/P and the intrinsic value-price ratio V/P. The intrinsic value is estimated using the residual income model (RIM) when the discount rate is based on firm-specific CAPM. t-statistic of difference indicates whether the acquirer and the target have significantly different valuation ratios. For each valuation ratio, we require that both the bidder and the target have non-missing values. Sample includes both successful and unsuccessful merger bids and tender offers where both bidder and target were listed on the NYSE, AMEX, or NASDAQ during 1978-2000.

		Tender Offers				**Merger Bids**				**All**			
	Ratio	Acquirer	Target	Difference (t-stat)	N	Acquirer	Target	Difference (t-stat)	N	Acquirer	Target	Difference (t-stat)	N
Cash	B/P	0.589	0.742	-0.153 (-3.68)	379	0.727 [g]	0.799 [e]	-0.072 (-1.97)	387	0.659 [c]	0.771 [a]	-0.112 (-4.05)	766
	V/P	0.772	0.816	-0.043 (-1.30)	210	0.806 [h]	0.853 [f]	-0.047 (-1.10)	142	0.786 [d]	0.831 [b]	-0.045 (-1.71)	352
Stock	B/P	0.591	0.755	-0.164 (-1.26)	19	0.409 [g]	0.549 [e]	-0.140 (-12.09)	1227	0.412 [c]	0.552 [a]	-0.140 (-12.14)	1246
	V/P	0.702	0.687	0.014 (0.16)	16	0.640 [h]	0.761 [f]	-0.121 (-7.19)	719	0.642 [d]	0.759 [b]	-0.118 (-7.11)	735
Mixed	B/P	0.821	0.862	-0.040 (-0.74)	210	0.722	0.747	-0.025 (-0.29)	694	0.745	0.774	-0.028 (-0.42)	904
	V/P	0.787	0.768	0.019 (0.36)	91	0.759	0.814	-0.054 (-1.92)	335	0.765	0.804	-0.039 (-1.56)	426
All	B/P	0.669	0.784	-0.114 (-3.55)	608	0.556	0.650	-0.094 (-3.46)	2308	0.580	0.678	-0.098 (-4.35)	2916
	V/P	0.773	0.796	-0.023 (-0.84)	317	0.693	0.787	-0.093 (-6.76)	1196	0.710	0.788	-0.079 (-6.37)	1513

Note: Among all tender offers and merger bids, the difference in means between B/P of targets in cash and stock bids (a-a), between V/P of targets in cash and stock bids (b-b), between B/P of acquirers in cash and stock bids (c-c), and between V/P of acquirers in cash and stock bids (d-d), are significant at the 1%, 5%, 1%, and 1% levels, respectively. Similarly, the corresponding differences for the merger bid subsample, (e-e), (f-f), (g-g) and (h-h), are significant at the 1%, 5%, 1%, and 1% levels, respectively, all based on the two-sample t-test.

Table 5
Mean Acquirer Long-Run Returns by Acquisition Mode and Payment Method

Acquirer and matching firm (selected on size and B/P) long-run returns are buy-and-hold returns starting on the day after the completion date up to five years after. Acquirer excess long-run return is the difference between acquirer long-run return and the matching return. Sample includes completed mergers and tender offers in which both bidder and target were listed on the NYSE, AMEX, or NASDAQ during 1978-1996.

	Tender Offers			Mergers			All		
	Acquirer Long-Run Return (%)	Acquirer Long-Run Excess Return (%) (t-stat)	N	Acquirer Long-Run Return (%)	Acquirer Long-Run Excess Return (%) (t-stat)	N	Acquirer Long-Run Return (%)	Acquirer Long-Run Excess Return (%) (t-stat)	N
Sub-Period 1978-1989									
Cash	74.80	-7.66 (-0.46)	141	61.64	-24.82 (-1.69)	110	69.03	-15.21 (-1.35)	251
Stock	45.72	7.29 (0.17)	7	62.00	-22.18 (-1.48)	145	61.25	-20.82 (-1.44)	152
Mixed	123.27	12.88 (0.41)	97	94.37	-12.54 (-1.04)	278	101.85	-5.93 (-0.49)	375
All	93.16	0.94 (0.06)	245	78.81	-17.72 (-2.20)	533	83.33	-11.84 (-1.59)	778
Sub-Period 1990-1996									
Cash	125.43	17.85 (0.65)	80	107.27	-23.00 (-0.78)	108	115.00	-5.74 (-0.28)	188
Stock	57.69	-99.45 (-1.57)	4	113.49	4.72 (0.41)	437	112.98	3.77 (0.33)	441
Mixed	106.74	40.54 (0.60)	27	116.01	14.79 (0.74)	145	114.55	18.86 (0.95)	172
All	118.44	19.15 (0.74)	111	113.04	2.47 (0.26)	690	113.79	4.77 (0.53)	801
Whole Period 1978-1996									
Cash	93.13	1.54 (0.11)	221	84.25	-23.92 (-1.46)	218	88.72	-11.16 (-1.02)	439
Stock	50.07	-31.52 (-0.84)	11	100.66	-2.00 (-0.21)	582	99.72	-2.55 (-0.27)	593
Mixed	119.67	18.90 (0.66)	124	101.79	-3.17 (-0.30)	423	105.84	1.86 (0.18)	547
All	101.04	6.60 (0.49)	356	98.12	-6.32 (-0.98)	1223	98.78	-3.41 (-0.58)	1579

Table 6
Mean Acquisition Characteristics by Acquirer or Target Valuation Ratio Quintiles

Each month, acquirer and target firms are separately ranked on valuation ratios (B/P and V/P) into quintiles and are assigned a rank between 1 and 5, with 1 being the lowest ratio quintile. B/P is the book-price ratio. V/P is the intrinsic value-price ratio, where the intrinsic value is estimated using the residual income model (RIM) 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. In each Panel, results for the overall sample are shown first, followed by results of subsamples broken down by method of payment (cash or stock) and mode of acquisition (tender offers or merger bids). Bid premium is the ratio of the SDC bid price offered by the bidder 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. Acquirer and matching firm (selected on size and B/P) long-run returns are buy-and-hold returns starting on the day after the completion date and ending up to five years after. Acquirer excess long-run return is the difference between acquirer long-run return and the matching return. The number of observation N in each quintile represents the largest count of non-missing data items in that quintile (this means that most of the data items in that quintile have fewer than N non-missing observations). Sample includes merger bids and tender offers where both bidder and target were listed on the NYSE, AMEX, or NASDAQ during 1978-2000.

One asterisk (*) denotes difference in means between ranks 1 and 5 is significant at the 10% level, ** at the 5% level, and *** at the 1% level based on the two-sample t-test.

Panel A. Acquisitions sorted by acquirer's B/P ratio

Acquirer B/P Rank	N	Acquirer B/P	Probability of cash payment (%)	Probability of stock payment (%)	Probability of successful acquisition (%)	Probability of tender offer (%)	Probability of hostile acquisition (%)	Bid premium (%)	Target announce-ment CAR (%)	Acquirer announce-ment CAR (%)	Acquirer long-run return (%)	Acquirer excess long-run return (%)
All Takeover bids												
1	575	0.140	19.3	54.1	81.4	15.1	6.6	36.4	19.0	-2.0	69.1	-16.4
2	734	0.348	23.8	46.2	81.1	19.5	5.9	35.5	19.7	-1.4	104.2	-13.7
3	729	0.524	25.4	44.4	78.6	19.5	7.4	35.0	17.9	-1.6	109.7	20.0
4	736	0.725	27.6	39.9	78.3	21.1	8.8	32.8	17.0	-0.9	121.3	13.2
5	628	1.302	33.4	28.2	78.0	22.0	8.8	31.8	16.8	-0.4	101.9	-7.6
Difference 1-5		-1.162***	-14.1***	25.9***	3.4	-6.8***	-2.2	4.6***	2.3*	-1.6***	-32.8**	-8.8
Cash Takeover Bids												
1	111	0.185	—	—	72.1	55.9	16.0	36.9	23.0	0.3	65.9	-38.5
2	175	0.364	—	—	76.0	56.0	12.5	41.4	26.6	0.1	98.0	-44.4
3	185	0.564	—	—	64.9	45.4	16.0	36.8	23.5	-0.1	111.9	25.4
4	203	0.767	—	—	69.0	44.3	19.7	31.6	19.3	0.9	88.7	-27.1
5	210	1.257	—	—	75.7	36.7	14.7	34.6	22.3	0.8	91.8	15.7
Difference 1-5		-1.072***	—	—	-3.6	19.2***	1.3	2.3	0.7	-0.5	-25.9	-54.2
Stock Takeover Bids												
1	311	0.117	—	—	85.2	1.6	3.2	37.3	17.9	-3.7	76.9	-19.3
2	339	0.282	—	—	87.3	1.2	2.1	31.7	17.8	-2.1	96.8	-20.0
3	324	0.440	—	—	86.4	0.9	0.9	31.1	14.5	-2.6	115.1	27.2
4	294	0.604	—	—	83.3	1.4	1.4	31.4	14.8	-1.9	116.5	27.8
5	177	1.060	—	—	85.3	1.7	1.7	28.6	12.0	-0.6	109.0	-4.5
Difference 1-5		-0.943***	—	—	-0.1	-0.1	1.5	8.7***	5.9***	-3.2***	-32.1	-14.8
Tender Offers												
1	87	0.161	71.3	5.7	82.8	—	23.5	42.4	25.1	-0.7	46.7	-0.6
2	143	0.371	68.5	2.8	89.5	—	17.5	43.4	30.1	0.6	133.6	29.3
3	142	0.602	59.2	2.1	73.2	—	24.5	41.4	28.2	-0.7	92.1	21.4
4	155	0.755	58.1	2.6	76.1	—	27.3	37.5	25.4	0.4	130.0	-2.7
5	138	1.383	55.8	2.2	76.8	—	22.8	38.1	24.2	0.8	79.2	-13.3
Difference 1-5		-1.222***	15.5**	3.6	5.9	—	0.7	4.3	0.9	-1.5	-32.6	12.8
Merger Bids												
1	488	0.136	10.0	62.7	81.1	—	3.5	35.3	18.0	-2.2	73.6	-19.6
2	591	0.343	13.0	56.7	79.0	—	3.0	33.6	17.2	-1.9	94.4	-27.8
3	587	0.505	17.2	54.7	79.9	—	3.2	33.4	15.4	-1.8	114.9	19.6
4	581	0.717	19.4	49.9	78.8	—	3.7	31.5	14.8	-1.3	118.9	17.5
5	490	1.280	27.1	35.5	78.4	—	4.7	29.9	14.7	-0.7	109.6	-5.8
Difference 1-5		-1.143***	-17.1***	27.2***	2.8	—	-1.2	5.3***	3.3**	-1.5***	-36.0**	-13.9

Panel B. Acquisitions sorted by acquirer's V/P ratio

Acquirer V/P Rank	N	Acquirer V/P	Probability of cash payment (%)	Probability of stock payment (%)	Probability of successful acquisition (%)	Probability of tender offer (%)	Probability of hostile acquisition (%)	Bid premium (%)	Target announce-ment CAR (%)	Acquirer announce-ment CAR (%)	Acquirer long-run return (%)	Acquirer excess long-run return (%)
All Takeover bids												
1	414	0.337	19.8	56.8	79.7	13.5	5.7	35.8	18.2	-2.6	61.5	-78.0
2	568	0.538	27.6	43.5	81.3	20.1	6.3	34.1	19.8	-1.3	91.5	10.5
3	567	0.726	26.3	42.5	78.8	23.6	9.4	35.1	20.6	-1.2	113.9	11.9
4	566	0.929	28.1	41.2	85.3	19.6	5.5	34.2	18.1	-1.2	110.0	2.0
5	466	1.307	25.3	42.1	79.4	17.4	7.5	34.9	17.9	-0.8	114.6	15.9
Difference 1-5		-0.970***	-5.5**	14.7***	0.3	-3.9	-1.8	0.8	0.3	-1.8***	-53.1***	-93.8***
Cash Takeover Bids												
1	82	0.439	—	—	72.0	54.9	17.7	37.5	22.6	-0.8	89.0	-67.5
2	157	0.611	—	—	75.8	50.3	12.8	37.0	25.0	-0.4	93.1	-3.4
3	149	0.766	—	—	69.8	53.0	20.4	40.4	27.9	0.4	88.5	-12.5
4	159	0.972	—	—	81.1	44.0	8.7	34.2	21.8	0.2	81.7	-9.2
5	118	1.292	—	—	72.9	43.2	12.5	34.5	22.8	2.1	101.2	12.5
Difference 1-5		-0.853***	—	—	-0.9	11.7	5.2	3.0	-0.2	-2.8***	-12.1	-80.0*
Stock Takeover Bids												
1	235	0.301	—	—	87.2	0.4	1.3	35.0	18.1	-3.5	48.6	-101.7
2	247	0.508	—	—	82.2	2.0	2.9	32.3	18.0	-1.3	94.0	17.5
3	241	0.707	—	—	88.0	2.9	2.9	29.1	15.7	-2.1	126.9	34.7
4	233	0.911	—	—	88.8	0.9	1.7	31.3	15.4	-1.8	128.1	30.2
5	196	1.287	—	—	85.7	0.5	1.6	33.0	14.8	-2.1	104.9	11.0
Difference 1-5		-0.985***	—	—	1.5	-0.1	-0.3	2.0	3.3*	-1.5**	-56.3***	-112.7***
Tender Offers												
1	56	0.446	80.4	1.8	78.6	—	25.0	37.9	21.1	-1.4	99.8	-6.6
2	114	0.593	69.3	4.4	89.5	—	19.5	42.7	29.5	0.2	108.0	17.9
3	134	0.705	59.0	5.2	74.6	—	25.6	43.3	30.3	-0.7	82.2	0.4
4	111	0.897	63.1	1.8	87.4	—	14.8	35.6	26.0	-0.8	96.2	-11.5
5	81	1.284	63.0	1.2	77.8	—	21.3	37.8	28.6	2.7	107.2	16.3
Difference 1-5		-0.838***	17.4**	0.6	0.8	—	3.8	0.1	-7.4*	-4.1***	-7.4	-22.8
Merger Bids												
1	358	0.320	10.3	65.4	79.9	—	2.6	35.4	17.8	-2.8	53.2	-93.6
2	454	0.524	17.2	53.3	79.3	—	2.9	31.9	17.3	-1.6	86.1	8.1
3	433	0.733	16.2	54.0	80.1	—	4.3	32.4	17.5	-1.3	125.2	16.0
4	455	0.937	19.6	50.8	84.8	—	3.2	33.8	16.2	-1.4	113.6	5.4
5	385	1.312	17.4	50.6	79.7	—	4.5	34.3	15.7	-1.5	116.2	15.8
Difference 1-5		-0.992***	-7.1***	14.7***	0.1	—	-2.0	1.1	2.1	-1.3***	-63.0***	-109.3***

Panel C. Acquisitions sorted by target's B/P ratio

Target B/P Rank	N	Target B/P	Probability of cash payment (%)	Probability of stock payment (%)	Probability of successful acquisition (%)	Probability of tender offer (%)	Probability of hostile acquisition (%)	Bid premium (%)	Target announce-ment CAR (%)	Acquirer announce-ment CAR (%)	Acquirer long-run return (%)	Acquirer excess long-run return (%)
All Takeover bids												
1	518	0.148	18.3	53.9	83.0	14.7	4.1	29.9	15.9	-1.6	85.6	-38.4
2	680	0.400	24.4	48.5	79.9	22.1	6.4	32.4	17.3	-2.0	84.6	-9.5
3	691	0.608	28.7	40.8	81.2	23.2	7.0	32.7	17.8	-1.2	91.7	-12.4
4	678	0.862	27.6	37.2	77.4	21.5	10.6	35.0	19.0	-1.2	105.5	4.9
5	570	1.388	30.7	31.2	73.7	23.0	12.0	38.4	20.1	-0.3	101.7	3.8
Difference 1-5		-1.240***	-12.4***	22.6***	9.3***	-8.3***	-7.9***	-8.5***	-4.3***	-1.4***	-16.0	-42.2
Cash Takeover Bids												
1	95	0.161	—	—	78.9	57.9	11.0	32.6	22.0	0.3	92.0	-56.0
2	166	0.448	—	—	71.7	59.6	17.6	33.4	21.7	-0.4	94.4	-12.5
3	198	0.621	—	—	76.3	51.5	15.3	34.6	23.7	0.6	81.5	-42.3
4	187	0.873	—	—	68.4	39.6	19.0	36.3	23.3	0.6	79.7	-5.5
5	175	1.446	—	—	64.6	44.6	17.9	40.4	25.2	0.7	101.2	21.5
Difference 1-5		-1.284***	—	—	14.4***	13.3**	-7.0	-7.9**	-3.2	-0.4	-9.2	-77.5
Stock Takeover Bids												
1	279	0.147	—	—	86.0	1.4	1.4	29.0	13.5	-2.9	96.4	-41.9
2	330	0.350	—	—	84.8	0.6	1.8	31.4	15.5	-3.0	82.9	-3.0
3	282	0.566	—	—	86.5	2.1	1.1	31.5	15.4	-2.1	83.2	-20.3
4	252	0.767	—	—	87.3	1.6	0.8	34.1	17.1	-2.3	112.9	5.5
5	178	1.295	—	—	79.8	2.2	5.7	33.9	15.3	-1.2	96.9	9.1
Difference 1-5		-1.148***	—	—	6.2*	-0.8	-4.3**	-4.9*	-1.7	-1.7**	-0.5	-51.1
Tender Offers												
1	76	0.173	72.4	5.3	90.8	—	14.9	33.8	24.4	-0.3	118.8	24.5
2	150	0.451	66.0	1.3	80.7	—	19.5	37.5	24.0	-0.3	78.2	-16.3
3	160	0.628	63.8	3.8	85.0	—	19.6	37.7	26.4	0.8	91.0	-14.7
4	146	0.975	50.7	2.7	72.6	—	29.7	44.3	29.5	-0.4	114.2	36.8
5	131	1.507	59.5	3.1	73.3	—	31.5	45.2	28.0	1.2	94.4	-8.5
Difference 1-5		-1.334***	12.8*	2.2	17.5***	—	-16.7***	-11.4***	-3.6	-1.5	24.4	32.9
Merger Bids												
1	442	0.144	9.0	62.2	81.7	—	2.3	29.2	14.4	-1.9	76.8	-55.1
2	530	0.385	12.6	61.9	79.6	—	2.7	30.9	15.5	-2.4	87.3	-6.7
3	531	0.602	18.1	52.0	80.0	—	3.1	31.1	15.3	-1.8	91.9	-11.5
4	532	0.831	21.2	46.6	78.8	—	5.2	32.4	16.1	-1.4	102.5	-6.2
5	439	1.353	22.1	39.6	73.8	—	5.9	36.3	17.8	-0.7	104.0	7.8
Difference 1-5		-1.209***	-13.0***	22.6***	7.9***	—	-3.6***	-7.0***	-3.4**	-1.2**	-27.2	-62.9*

Panel D. Acquisitions sorted by target's V/P ratio

Target V/P Rank	N	Target V/P	Probability of cash payment (%)	Probability of stock payment (%)	Probability of successful acquisition (%)	Probability of tender offer (%)	Probability of hostile acquisition (%)	Bid premium (%)	Target announce-ment CAR (%)	Acquirer announce-ment CAR (%)	Acquirer long-run return (%)	Acquirer excess long-run return (%)
All Takeover bids												
1	274	0.319	21.5	55.8	84.7	16.8	4.9	33.0	17.1	-2.7	73.3	-14.7
2	422	0.511	21.8	50.0	80.1	21.8	8.7	33.9	18.5	-2.1	90.5	-6.2
3	420	0.712	28.1	42.4	76.9	26.0	11.7	33.0	17.7	-1.8	82.3	-23.5
4	423	0.958	25.5	40.9	78.0	22.9	10.4	35.1	19.9	-1.1	100.4	-13.5
5	310	1.432	25.5	41.3	79.7	23.9	10.9	36.4	20.1	-0.9	91.8	-8.7
Difference 1-5		-1.113***	-4.0	14.5***	5.0	-7.1**	-6.0***	-3.4	-3.1*	-1.8**	-18.5	-6.1
Cash Takeover bids												
1	59	0.401	—	—	78.0	55.9	16.7	37.3	25.4	0.7	75.5	-0.1
2	92	0.525	—	—	77.2	60.9	18.0	38.8	24.6	-0.5	79.2	-22.4
3	118	0.764	—	—	68.6	59.3	21.1	35.5	23.8	0.0	52.4	-54.7
4	108	1.011	—	—	63.0	57.4	29.4	39.8	25.5	0.6	99.1	-36.4
5	79	1.403	—	—	73.4	57.0	18.7	40.8	28.3	1.3	87.8	-43.3
Difference 1-5		-1.002***	—	—	4.5	-1.0	-2.0	-3.5	-2.9	-0.6	-12.3	43.2
Stock Takeover bids												
1	153	0.286	—	—	91.5	0.7	1.3	33.5	16.1	-4.6	52.5	-64.9
2	211	0.515	—	—	83.9	1.4	2.4	30.1	16.7	-3.0	96.2	5.5
3	178	0.710	—	—	83.7	3.4	4.0	31.6	14.3	-2.6	93.6	-10.7
4	173	0.963	—	—	83.2	1.7	0.0	29.7	15.9	-1.7	104.3	-9.7
5	128	1.509	—	—	82.8	2.3	4.0	30.7	12.9	-2.4	100.5	14.2
Difference 1-5		-1.224***	—	—	8.7**	-1.7	-2.7	2.9	3.2	-2.2**	-48.0*	-79.1
Tender Offers												
1	46	0.395	71.7	2.2	84.8	—	19.6	36.2	24.9	1.1	85.8	-2.0
2	92	0.520	60.9	3.3	81.5	—	27.2	44.6	26.4	-0.8	78.0	15.7
3	109	0.689	64.2	5.5	77.1	—	27.5	34.7	26.1	-0.9	36.9	-71.1
4	97	0.979	63.9	3.1	73.2	—	29.2	44.1	28.8	0.9	87.6	-30.4
5	74	1.313	60.8	4.1	83.8	—	27.0	47.3	31.7	1.1	100.2	-39.0
Difference 1-5		-0.918***	10.9	-1.9	1.0	—	-7.5	-11.0**	-6.8	0.0	-14.3	37.0
Merger Bids												
1	228	0.303	11.4	66.7	84.6	—	1.8	32.4	15.5	-3.5	68.1	-19.8
2	330	0.508	10.9	63.0	79.7	—	3.4	30.8	16.3	-2.5	95.4	-14.7
3	311	0.720	15.4	55.3	76.8	—	5.8	32.3	14.8	-2.1	106.6	1.6
4	326	0.952	14.1	52.1	79.4	—	4.7	32.4	17.2	-1.7	104.9	-7.6
5	236	1.469	14.4	53.0	78.4	—	5.7	32.9	16.5	-1.5	88.3	4.5
Difference 1-5		-1.165***	-3.0	13.7***	6.3*	—	-3.9**	-0.5	-1.0	-1.9***	-20.2	-24.4

Table 7

Industry Effect on the Impact of Misvaluation on Acquirer Long-Run Returns

Each month, acquirer firms are separately ranked on valuation ratios (B/P and V/P) into quintiles and are assigned a rank between 1 and 5, with 1 being the lowest ratio quintile. B/P is the book-price ratio. V/P is the intrinsic value-price ratio, where the intrinsic value is estimated using the residual income model (RIM) when the discount rate is based on firm-specific CAPM. This table reports mean acquirer long-run raw and excess returns for each of the quintiles and difference in means between ranks 1 and 5, for acquirers of same-industry and cross-industry takeovers, where industry classifications are based on 3-digit or 4-digit COMPUSTAT SIC codes. Acquirer and matching firm (selected on size and B/P) long-run returns are buy-and-hold returns starting on the day after the completion date and ending up to five years after. Acquirer excess long-run return is the difference between acquirer long-run return and the matching return. Sample includes completed merger and tender offers where both bidder and target were listed on the NYSE, AMEX, or NASDAQ during 1978-1996.

	3-digit-SIC-based Industry Classification								**4-digit-SIC-based Industry Classification**							
	Same-Industry				Cross-Industry				Same-Industry				Cross-Industry			
Acquirer B/P Rank	N	B/P	Acquirer long-run return (%)	Acquirer excess long-run return (%)	N	B/P	Acquirer long-run return (%)	Acquirer excess long-run return (%)	N	B/P	Acquirer long-run return (%)	Acquirer excess long-run return (%)	N	B/P	Acquirer long-run return (%)	Acquirer excess long-run return (%)
A. Acquirers ranked by B/P																
1	116	0.158	61.4	-17.9	98	0.214	72.8	-23.3	94	0.141	56.0	-17.3	120	0.217	74.9	-22.8
2	129	0.412	130.1	2.0	159	0.424	86.9	-28.1	88	0.406	122.5	36.7	200	0.424	99.1	-37.4
3	124	0.567	104.3	18.9	125	0.629	109.6	21.3	87	0.571	76.2	-15.8	162	0.613	123.5	39.4
4	118	0.782	109.7	2.7	134	0.841	123.8	16.9	91	0.772	116.9	10.3	161	0.837	117.3	10.2
5	106	1.158	87.7	3.4	98	1.333	98.8	-14.5	89	1.193	77.7	2.6	115	1.280	104.9	-11.3
Difference 1-5		-1.000***	-26.3	-21.3		-1.119***	-26.0	-8.8		-1.052***	-21.7	-19.9		-1.063***	-29.9*	-11.5
B. Acquirers ranked by V/P																
	Same-Industry				Cross-Industry				Same-Industry				Cross-Industry			
Acquirer V/P Rank	N	V/P	Acquirer long-run return (%)	Acquirer excess long-run return (%)	N	V/P	Acquirer long-run return (%)	Acquirer excess long-run return (%)	N	V/P	Acquirer long-run return (%)	Acquirer excess long-run return (%)	N	V/P	Acquirer long-run return (%)	Acquirer excess long-run return (%)
1	87	0.432	74.1	-59.5	70	0.423	44.7	-108.3	70	0.435	50.5	-59.9	87	0.422	69.5	-98.5
2	104	0.614	79.7	7.6	139	0.598	99.7	15.8	74	0.620	69.2	1.2	169	0.598	100.8	17.2
3	105	0.839	98.5	-15.2	111	0.788	123.8	31.5	71	0.840	86.7	-14.5	145	0.800	123.7	20.2
4	98	1.151	111.4	13.0	112	0.949	100.7	-18.0	75	1.164	108.7	17.0	135	0.976	104.0	-14.9
5	79	1.396	93.4	4.1	74	1.467	120.9	31.3	55	1.421	75.6	-15.4	98	1.435	124.1	35.6
Difference 1-5		-0.964***	-19.3	-63.6*		-1.044***	-76.2***	-139.6***		-0.985***	-25.1	-44.5		-1.014***	-54.7***	-134.1***

One asterisk (*) denotes difference in means between ranks 1 and 5 is significant at the 10% level, ** at the 5% level, and *** at the 1% level based on the two-sample t-test.

Table 8
Logistic Regressions

Sample includes merger bids and tender offers where both bidder and target were listed on the NYSE, AMEX, or NASDAQ during 1978-2000 and the data needed to calculate both B/P and V/P are available. p-values of coefficients are in brackets. All regressions include year and acquirer 2-digit SIC major industry dummies as defined by Moskowitz and Grinblatt (1999).

	Dependent Variable (=1 if yes, 0 otherwise)									
	Cash		**Stock**		**Tender Offer**		**Hostile**		**Success**	
Acquirer B/P	0.992	0.871	-1.347	-1.050	0.778	0.678	0.038	0.042	0.309	0.280
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.001]	[0.877]	[0.867]	[0.133]	[0.180]
Target B/P	0.432	0.369	-1.150	-1.045	0.580	0.511	0.758	0.729	-0.550	-0.565
	[0.003]	[0.013]	[0.000]	[0.000]	[0.000]	[0.001]	[0.000]	[0.001]	[0.000]	[0.000]
Acquirer V/P		0.625		-0.705		0.565		-0.021		0.156
		[0.004]		[0.001]		[0.008]		[0.944]		[0.488]
Target V/P		0.133		-0.257		0.217		0.321		-0.018
		[0.416]		[0.079]		[0.225]		[0.241]		[0.922]
Log of Relative Size	0.386	0.421	-0.182	-0.212	0.197	0.228	-0.519	-0.502	0.451	0.455
	[0.000]	[0.000]	[0.000]	[0.000]	0.000	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Log of Target Size	0.039	0.076	-0.129	-0.169	0.144	0.184	0.295	0.317	-0.105	-0.101
	[0.506]	[0.214]	[0.009]	[0.001]	0.016	[0.003]	[0.000]	[0.000]	[0.075]	[0.092]
Intercept	-3.343	-3.957	2.160	2.767	-2.734	-3.370	-4.659	-5.033	2.172	2.103
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.001]	[0.002]
Sample Size	1488	1488	1488	1488	1488	1488	1453	1453	1488	1488
p-value of Likelihood Ratio	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000

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 acquisition is successful; 0 otherwise.
B/P is the book-price ratio.
V/P is the intrinsic value-price ratio, where the intrinsic value is estimated using the residual income model (RIM) when the discount rate is based on firm-specific CAPM.
Bid premium = SDC bid price offered by the bidder / target stock price 5 days prior to the announcement of the takeover bid.
Relative Size = acquirer market value / target market value.

Table 9
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 SDC bid price offered by the bidder to the target stock price 5 days prior to the announcement of the takeover bid. Acquirer excess long-run return is the difference between acquirer and matching firm (selected on size and B/P) buy-and-hold returns starting on the day after the completion date and ending up to five years after. Sample includes merger bids and tender offers where both bidder and target were listed on the NYSE, AMEX, or NASDAQ during 1978-2000 and the data needed to calculate both B/P and V/P are available. t-statistics of coefficients are in parentheses. All regressions include year and acquirer 2-digit SIC major industry dummies as defined by Moskowitz and Grinblatt (1999).

Panel A. All acquisitions

	Dependent Variable							
	Acquirer Announcement Period CAR		**Target Announcement Period CAR**		**Bid Premium**		**Acquirer Excess Long-Run Return**	
Acquirer B/P	2.20	1.86	-1.00	-1.17	-1.13	-0.56	36.08	18.22
	(3.99)	(3.32)	(-0.65)	(-0.74)	(-0.54)	(-0.27)	(1.30)	(0.64)
Target B/P	0.99	0.80	2.66	2.36	4.78	4.77	-25.69	-35.07
	(2.25)	(1.80)	(2.15)	(1.89)	(2.90)	(2.87)	(-1.04)	(-1.41)
Acquirer V/P		1.83		0.39		-3.73		60.18
		(3.25)		(0.25)		(-1.75)		(2.01)
Target V/P		-0.08		2.42		4.13		21.34
		(-0.19)		(1.95)		(2.50)		(0.96)
Hostile	-1.22	-1.16	5.09	5.01	10.17	9.85	-24.78	-18.06
	(-1.71)	(-1.64)	(2.55)	(2.52)	(3.78)	(3.67)	(-0.50)	(-0.37)
Tender Offer	0.99	0.93	7.08	7.04	4.47	4.57	16.19	11.52
	(1.76)	(1.67)	(4.49)	(4.47)	(2.10)	(2.15)	(0.54)	(0.38)
Cash	1.15	1.14	2.36	2.42	-1.57	-1.45	-62.57	-65.22
	(1.95)	(1.94)	(1.43)	(1.47)	(-0.71)	(-0.65)	(-2.02)	(-2.11)
Stock	-0.54	-0.40	-1.60	-1.36	-1.77	-1.69	-14.85	-14.06
	(-1.13)	(-0.84)	(-1.20)	(-1.02)	(-0.98)	(-0.93)	(-0.56)	(-0.53)
Log of Relative Size	0.52	0.58	3.20	3.31	2.60	2.63	1.12	2.59
	(3.53)	(3.92)	(7.80)	(7.98)	(4.75)	(4.74)	(0.14)	(0.31)
Log of Target Size	0.16	0.21	-0.26	-0.05	-1.17	-0.97	-12.38	-10.44
	(1.06)	(1.40)	(-0.62)	(-0.12)	(-2.10)	(-1.69)	(-1.38)	(-1.15)
Intercept	-7.90	-8.91	9.46	6.20	35.72	32.83	46.01	-12.49
	(-4.80)	(-5.13)	(2.05)	(1.27)	(5.77)	(5.01)	(0.60)	(-0.15)
Sample Size	1453	1453	1453	1453	1419	1419	550	550
Adjusted R^2	.0648	.0708	.1382	.1397	.0855	.0892	-.0170	-.0085

B/P is the book-price ratio.
V/P is the intrinsic value-price ratio, where the intrinsic value is estimated using the residual income model (RIM) when the discount rate is based on firm-specific CAPM.
Hostile = 1 if the acquisition is viewed as hostile by target management; 0 otherwise.
Tender Offer = 1 if the acquisition is a tender offer; 0 otherwise.
Cash = 1 if the acquisition is all cash; 0 otherwise.
Stock = 1 if the acquisition is all stock; 0 otherwise.
Relative Size =acquirer market value / target market value.

Panel B. Same-industry acquisitions (where industry is based on 3-digit COMPUSTAT SIC codes)

	Dependent Variable							
	Acquirer Announcement Period CAR		**Target Announcement Period CAR**		**Bid Premium**		**Acquirer Excess Long-Run Return**	
Acquirer B/P	2.09	1.33	0.06	-0.31	-1.71	-0.85	22.92	14.60
	(1.98)	(1.21)	(0.02)	(-0.11)	(-0.45)	(-0.22)	(0.41)	(0.24)
Target B/P	0.76	0.67	0.67	0.61	3.47	3.51	-33.45	-30.05
	(1.12)	(0.99)	(0.38)	(0.34)	(1.44)	(1.46)	(-0.94)	(-0.84)
Acquirer V/P		2.36		0.27		-4.18		-10.51
		(2.75)		(0.12)		(-1.37)		(-0.22)
Target V/P		-1.05		1.62		5.56		51.41
		(-1.62)		(0.95)		(2.41)		(1.65)
Hostile	-1.62	-1.65	6.93	6.86	10.24	10.09	-63.97	-71.18
	(-1.45)	(-1.48)	(2.38)	(2.35)	(2.57)	(2.54)	(-0.77)	(-0.86)
Tender Offer	1.98	1.91	7.86	7.84	3.67	3.80	59.39	62.57
	(2.20)	(2.12)	(3.34)	(3.33)	(1.15)	(1.19)	(1.26)	(1.33)
Cash	1.82	1.78	5.03	5.13	1.94	2.19	-89.41	-93.05
	(2.00)	(1.96)	(2.12)	(2.16)	(0.60)	(0.68)	(-1.95)	(-2.03)
Stock	-0.58	-0.53	-0.87	-0.71	-1.88	-1.67	-3.36	-4.36
	(-0.84)	(-0.77)	(-0.48)	(-0.39)	(-0.75)	(-0.66)	(-0.09)	(-0.12)
Log of Relative Size	0.64	0.67	3.44	3.51	2.10	2.16	9.17	10.78
	(2.73)	(2.87)	(5.66)	(5.71)	(2.53)	(2.59)	(0.74)	(0.87)
Log of Target Size	0.30	0.29	-0.13	0.01	-1.23	-0.91	-15.13	-11.10
	(1.37)	(1.30)	(-0.23)	(0.02)	(-1.62)	(-1.16)	(-1.17)	(-0.85)
Intercept	-8.91	-9.12	13.19	10.58	41.88	36.74	102.07	30.07
	(-3.69)	(-3.51)	(2.10)	(1.55)	(4.87)	(3.96)	(0.92)	(0.25)
Sample Size	786	786	786	786	771	771	289	289
Adjusted R^2	.0397	.0478	.1242	.1231	.0691	.0745	.0021	.0053

B/P is the book-price ratio.
V/P is the intrinsic value-price ratio, where the intrinsic value is estimated using the residual income model (RIM) when the discount rate is based on firm-specific CAPM.
Hostile = 1 if the acquisition is viewed as hostile by target management; 0 otherwise.
Tender Offer = 1 if the acquisition is a tender offer; 0 otherwise.
Cash = 1 if the acquisition is all cash; 0 otherwise.
Stock = 1 if the acquisition is all stock; 0 otherwise.
Relative Size =acquirer market value / target market value.

Panel C. Cross-industry acquisitions (where industry is based on 3-digit COMPUSTAT SIC codes)

	Dependent Variable							
	Acquirer Announcement Period CAR		**Target Announcement Period CAR**		**Bid Premium**		**Acquirer Excess Long-Run Return**	
Acquirer B/P	1.32	1.09	-4.62	-4.58	-4.85	-4.18	38.07	22.20
	(2.29)	(1.89)	(-2.45)	(-2.41)	(-1.97)	(-1.68)	(1.13)	(0.66)
Target B/P	1.78	1.27	7.51	6.97	10.95	11.20	9.82	-17.20
	(2.99)	(2.08)	(3.86)	(3.48)	(4.33)	(4.31)	(0.22)	(-0.39)
Acquirer V/P		1.23		-1.67		-6.59		124.23
		(1.65)		(-0.68)		(-2.04)		(2.77)
Target V/P		1.61		3.40		2.66		12.53
		(2.78)		(1.78)		(1.07)		(0.37)
Hostile	-0.61	-0.67	3.53	3.21	9.29	8.74	-25.74	-4.43
	(-0.70)	(-0.76)	(1.22)	(1.11)	(2.44)	(2.30)	(-0.37)	(-0.06)
Tender Offer	0.37	0.26	7.00	6.93	5.82	6.00	-18.58	-34.54
	(0.54)	(0.38)	(3.13)	(3.10)	(1.96)	(2.02)	(-0.43)	(-0.81)
Cash	0.07	0.11	0.88	0.92	-2.80	-2.74	-36.17	-43.02
	(0.10)	(0.15)	(0.37)	(0.38)	(-0.89)	(-0.88)	(-0.77)	(-0.92)
Stock	-0.80	-0.59	-1.66	-1.50	-0.18	-0.31	-29.29	-30.55
	(-1.23)	(-0.91)	(-0.78)	(-0.70)	(-0.06)	(-0.11)	(-0.67)	(-0.70)
Log of Relative Size	0.78	0.87	2.78	2.85	2.72	2.64	10.41	8.90
	(4.11)	(4.54)	(4.45)	(4.53)	(3.37)	(3.25)	(0.83)	(0.71)
Log of Target Size	0.25	0.40	0.06	0.27	-1.00	-0.98	-6.08	-3.62
	(1.16)	(1.86)	(0.09)	(0.38)	(-1.10)	(-1.06)	(-0.44)	(-0.26)
Intercept	-9.53	-11.77	2.53	0.14	23.61	24.59	-27.71	-98.22
	(-4.91)	(-5.81)	(0.40)	(0.02)	(2.85)	(2.82)	(-0.27)	(-0.89)
Sample Size	663	663	663	663	644	644	259	259
Adjusted R^2	.1849	.1988	.1420	.1438	.1031	.1070	-.0568	-.0267

B/P is the book-price ratio.
V/P is the intrinsic value-price ratio, where the intrinsic value is estimated using the residual income model (RIM) when the discount rate is based on firm-specific CAPM.
Hostile = 1 if the acquisition is viewed as hostile by target management; 0 otherwise.
Tender Offer = 1 if the acquisition is a tender offer; 0 otherwise.
Cash = 1 if the acquisition is all cash; 0 otherwise.
Stock = 1 if the acquisition is all stock; 0 otherwise.
Relative Size =acquirer market value / target market value.

Appendix:
Summary of Main Findings

This table summarizes our main results on the relation between takeover characteristics and misvaluation measures at the aggregate market portfolio level in Panel A and at the firm level in Panels B and C. Additional results comparing the misvaluation measures for takeovers are in Panel D. For the aggregate tests, B/P and V/P are the lagged monthly value-weighted market-wide average book-to-price or intrinsic value-to-price ratios, and σ(B/P) and σ(V/P) are the standard deviation of B/P and V/P ratios of the market. The intrinsic value V is calculated from the Residual Income Model. Volume is the monthly sum of transaction value divided by total market capitalization. All other takeover characteristics are averaged across all takeover bids each month. 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 SDC bid price offered by the bidder to the target stock price 5 days prior to the announcement of the takeover bid. Acquirer excess long-run return is the difference between acquirer and matching firm (selected on size and B/P) buy-and-hold returns starting on the day after the completion date and ending up to five years after. 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.

	Volume	Cash	Stock	Tender Offer	Hostile	Success	Bid Premium	Acquirer CAR	Target CAR	Acquirer Long-run Return	Acquirer Excess Long-run Return
A. Aggregate Tests											
B/P			–***	+***	+***	–***	+***	+***	–***	n.a.	
V/P	–***	+*	–***		+**	–***		+***		n.a.	+**
σ(B/P)					–**		+***	–***	+***	n.a.	+***
σ(V/P)		–**	+***	–***	–***	+***	–**	–***	+***	n.a.	
B. Firm-Level Univariate Tests											
Acquirer B/P	n.a.	+***	–***	+***			–***	+***	–*	+**	
Acquirer V/P	n.a.	+**	–***					+***		+***	+***
Target B/P	n.a.	+***	–***	+***	+***	–***	+***	+***	+***		
Target V/P	n.a.		–***	+**	+***			+**	+*		
C. Firm-Level Multivariate Tests											
Acquirer B/P	n.a.	+***	–***	+***				+***		n.a.	
Acquirer V/P	n.a.	+**	–***	+***				+***		n.a.	+**
Target B/P	n.a.	+***	–***	+***	+***	–***	+***	+*	+*	n.a.	
Target V/P	n.a.		–*				+**		+*	n.a.	

Appendix:
Summary of Main Findings, Contd.

D. Further Results

From Table 4:

1. Acquirers are more overvalued than targets, based on B/P and V/P, for the overall sample. This finding is also significant (<1% level) for cash and stock offer subsamples based on B/P; and for the stock offer subsample based on V/P.
2. Targets in cash offers are more undervalued than targets in stock offers. Acquirers in stock offers are more overvalued than acquirers in cash offers. These findings are significant at the 5% level based on either B/P or V/P.

From Table 6:

1. Overvalued bidders earn lower announcement period CAR V/P is more effective than B/P in distinguishing acquirer CAR in cash offers and tender offers.
2. The relation between misvaluation and long-run return is strongest among stock offers.

From Table 7:

The positive relation of acquirer long-run returns to quintile differences in V/P is much stronger in cross-industry takeovers than in same-industry takeovers.

From Table 9:

B/P and V/P are generally more significant in OLS regressions for cross-industry takeovers (Panel C of Table 9) than for same-industry bids (Panel B), and the R^2 is also generally higher in cross-industry OLS regressions.

NOTES

1. + (–) indicates a positive (negative) relation between the misvaluation measure and the takeover characteristic.
2. ***, **, * indicate significance at the 1%, 5% and 10% levels, respectively.
3. n.a.: Not Applicable (for Volume at firm-level), or not done (Acquirer raw long-run return in OLS regressions).