

## DO INSTITUTIONS PREFER HIGH-VALUE ACQUIRERS? AN ANALYSIS OF TRADING IN STOCK-FINANCED ACQUISITIONS

Timothy R. Burch

*University of Miami*

Vikram Nanda

*Georgia Institute of Technology*

Sabatino Silveri

*State University of New York–Binghamton*

### Abstract

If owners of target shares in a stock-for-stock merger perceive the acquirer as overvalued, they should sell their holdings more aggressively to profit before such overvaluation dissipates. We study institutional owners of targets and find that slightly more than half liquidate their shares in stock mergers, consistent with high institutional-share turnover rates found in the prior literature. However, share retention is higher when valuation measures suggest greater acquirer overvaluation, regardless of whether institutional owners generally prefer growth or value stock. Institutions that prefer large-cap, growth stock are most enthusiastic about bids from large, high-valuation acquirers, and substantially increase their stakes in such deals.

*JEL Classification:* G34

### I. Introduction

How do a target's institutional shareholders respond to a stock-for-stock bid, particularly one from an acquirer with a high valuation? In this article we examine the trading activity of institutional owners of target shares (but not acquirer shares) in completed stock-for-stock mergers. We find that 56% of the institutions we track either sell their target shares before deal completion or their converted acquirer shares soon thereafter. Liquidations are less likely, however, when acquirers have higher valuations. Moreover, nonliquidating institutions increase their stakes on average, and do so more strongly, in deals with higher acquirer valuations. Consistent with the recent literature highlighting the role of style preferences, we find that affinity for high-valuation acquirers is stronger for institutions

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that prefer growth stocks. These results may help explain why target firms might accept stock-financed deals despite findings in the literature that such deals do not typically create value.

Our research stems from the observation that merger waves are correlated with the stock market. Periods of heightened merger activity, especially for stock-financed transactions, tend to occur when the stock market is booming (e.g., Maksimovic and Philips 2001; Jovanovic and Rousseau 2008). In addition, it often takes a contracting stock market to bring a merger wave to a halt. These facts lead to the view that misvaluation in the stock market or information asymmetries between managers and outsiders can influence the level of stock-financed acquisitions (e.g., Shleifer and Vishny 2003; Dong et al. 2006). According to this view, managers of overvalued firms use their highly valued stock to finance the purchase of fairly priced or less overvalued targets. Buttressing this view is the finding that in terms of long-term wealth effects, stock-financed acquisitions do not appear to create value on average.<sup>1</sup>

Given this finding and the hypothesized role of large investors in the market for corporate control (Shleifer and Vishny 1986), a natural question is how institutional owners of target firms evaluate stock-financed mergers. We find institutional owners are net sellers on average, which in itself is not surprising given the normal trading behavior, profit taking, and rebalancing needs of institutions (e.g., Baker, Coval, and Stein 2007). The more interesting question we pursue is cross-sectional: does share retention vary across acquirer valuation metrics? We believe the answer has implications for the potential efficacy of institutional monitoring in corporate control events. If institutions do not appear to make appropriate trading decisions in mergers, it suggests that poor deals are less likely to be opposed either through activism or indirectly through trading.<sup>2</sup>

As is common in much of the literature, we measure price-to-book of equity and market-to-book of assets as our valuation metrics of the acquirer's stock. If institutional owners perceive that the acquirer's stock is overvalued according to such metrics, arguments in Shleifer and Vishny (2003) imply that aggressive selling may follow at some point. Institutions with relatively short horizons may temporarily support the merger if they believe they can liquidate their holdings before the overvaluation is corrected in the market.<sup>3</sup> Such institutions will view the market's reaction to an overvalued stock-financed bid as being upward biased and will trade accordingly. The resulting prediction is that institutions will eventually sell more heavily after offers from acquirers they perceive to be more overvalued.

Another possibility is that institutional shareholders do not regard highly valued acquirers as being overvalued and react to their bids as they would to bids from other acquirers. They may trade or retain their target shares according to their usual trading

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<sup>1</sup>Loughran and Vijh (1997) find that stock-financed acquisitions do not perform well in the postacquisition period and that target shareholder returns from the preannouncement period through deal completion are nonpositive (negative for larger targets). For additional relevant evidence, see Rau and Vermaelen (1998), Agrawal and Jaffe (2000), and Mitchell and Stafford (2000).

<sup>2</sup>For an example of the potential monitoring role of institutional trading, see Parrino, Sias, and Starks (2003).

<sup>3</sup>Target managers may react similarly to short-term motives and may be further lured by lucrative severance payouts or offers of employment with the acquirer (see Shleifer and Vishny 2003; Hartzell, Ofek, and Yermack 2004).

strategies, regardless of the acquirer's valuation. In this regard, the fact that the median shareholder does not retain shares during our measurement period is not particularly surprising. Baker, Coval, and Stein (2007) find that during the 12 quarters before a merger's announcement, 43% of institutions liquidate their shares of target firms over a given 4-quarter period. Hence, once a merger is announced it is not surprising to observe an even higher degree of institutional selling because of profit taking and rebalancing needs. Indeed, Baker, Coval, and Stein find that only about 30% of institutional investors retain their positions through the merger's completion. Such trading patterns may be unrelated to measures of acquirer valuation.

A third possibility is that institutions actually prefer acquirers with high market values. They may, for example, view acquirers with high market valuations as being well run or having superior growth opportunities (e.g., Lakonishok, Shleifer, and Vishny 1994; Dong et al. 2006). The resulting prediction is that institutions will retain more shares, or even buy additional shares, in deals involving high-valued acquirers.

To conduct our study, we examine ownership of acquirer shares at the second quarter-end after the deal's completion for deals announced during 1980–2006. As noted, our sample is limited to target-share owners that do not own acquirer shares before the deal announcement. This approach has two advantages. First, it narrows the focus to institutions that are less likely to have pre-existing motives for owning or retaining the acquirer's stock.<sup>4</sup> Second, these institutions are particularly interesting to study because of their strong incentives to carefully evaluate the merger deal. After all, if they are passive and do not trade, their target shares will be converted into a new investment. In comparison, institutions that already hold both the acquirer and target shares could well have different motives to retain or sell their holdings given their revealed preference for holding acquirer shares.<sup>5</sup> Although the approach we adopt is appropriate given the question we are seeking to address—whether the retention decision of target shareholders is influenced by acquirer valuation—a limitation is that we do not assess how the broader set of institutions may evaluate the acquisition.

Our empirical findings are more consistent with the third possibility we consider. Although the median institution liquidates its holdings, controlling for other factors that may affect institutional trading, we find that institutions own 20% more than predicted (in absolute terms) when the acquirer's price-to-book ratio is in the top sample quartile (we find similar results in univariate analysis). These findings are robust to a variety of regression specifications and the use of market-to-book value of assets as an alternative valuation measure. Additionally, we use the decomposition approach in Rhodes-Kropf, Robinson, and Vishwanathan (2005) to provide another market overvaluation measure and again our findings hold.

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<sup>4</sup>For example, a mutual fund that has a relatively negative assessment of the future stock returns of an acquirer may nonetheless retain acquirer shares if it has capital gains liabilities in the shares that it would be forced to pass along to its retail investors. Of course, regardless of whether a target shareholder already owns acquirer shares, capital gains on the target shares it owns may influence its decision of whether to liquidate the holdings or to have them convert into acquirer shares and thereby defer the tax liability. We address this potential tax issue by showing that our results are unaffected by the target's prior returns.

<sup>5</sup>Cross-holdings by institutions could potentially influence the merger process itself, although Harford, Jenter, and Li (2011) find that such holdings are too small to matter in most acquisitions.

We also find that institutional style preferences seem to affect the trading behavior of institutions in our sample. Mutual funds are known to follow style preferences (Chan, Chen, and Lakonishok 2002), and Abarbanell, Bushee, and Raedy (2003) find that institutional style preferences affect investment decisions in spinoffs. Because stock-financed bids from overvalued acquirers are more likely to come from firms whose stocks are classified as growth stocks (Rhodes-Kropf, Robinson, and Vishwanathan 2005; Dong et al. 2006), institutions with preferences for such stocks may trade very differently from those preferring value stocks. Preferences for large- versus small-cap stocks may also come into play, given that stock bids tend to come from relatively large firms. To investigate, we categorize institutions into two orientations based on their holding preferences as in Abarbanell, Bushee, and Raedy. Consistent with the preference for growth stocks documented in Chan, Chen, and Lakonishok (2002), we find that share retention is increasing in the acquirer's price-to-book ratio regardless of whether the institution tends to prefer growth or value stocks but that this result is strongest for growth-oriented institutions. Perhaps it is due, in part, to such a preference that institutions do not appear on average to trade in a manner that would indicate concern about potential acquirer overvaluation. Coupled with target management's incentives often being skewed by the acceleration of stock option exercise, severance pay, or employment deals (Hartzell, Ofek, and Yermack 2004; Shleifer and Vishny 2003), these results may help explain why target firms accept stock-financed deals that, on average, appear to have poorer long-term performance than cash deals.

## **II. Related Literature**

The findings in our study relate to several strands of literature concerned with mergers and acquisitions, specifically stock-financed acquisitions, as well as the role of institutional investors. Our article follows those such as Shleifer and Vishny (2003), Rhodes-Kropf, Robinson, and Vishwanathan (2005), and Dong et al. (2006) that explore the use of overvalued stock to finance acquisitions. Dong et al. find that such misvaluation helps explain takeover activity during 1990–2000 (a period of strong stock market performance), and Rhodes-Kropf, Robinson, and Vishwanathan use a market-to-book decomposition to find similar support over 1978–2001.

In studying postoffer stock returns, Loughran and Vijh (1997) find that stock-based acquisitions are associated with significantly negative acquirer excess returns, and cash-based offers are associated with significantly positive excess returns. Similar findings are reported in Rau and Vermaelen (1998) (using size and book-to-market benchmarks) and Agrawal and Jaffe (2000). Mitchell and Stafford (2000) argue that although many studies of long-term returns following corporate events are flawed on methodological grounds, there is nonetheless evidence of long-run acquirer underperformance in stock mergers.

Our work is also related to studies that discuss the incentives of large shareholders to engage in monitoring or control activities (e.g., Shleifer and Vishny 1986; Admati, Pfleiderer, and Zechner 1994; Maug 1998; Bethel, Liebeskind, and Opler 1998; Bertrand and Mullainathan 2001; Parrino, Sias, and Starks 2003). Two recent studies that examine

the monitoring role of institutions in the merger process in particular are Gaspar, Massa, and Matos (2005) and Chen, Harford, and Li (2007). Gaspar, Massa, and Matos find that bid premiums are lower when the target firm's institutional owners have demonstrated shorter term investment strategies in the past. They argue that shorter term institutional investors provide weaker monitoring and hence allow target managers to accept poorer deals. Chen, Harford, and Li report complementary findings in which the presence of long-term institutions with large shareholdings in the acquirer firm is associated with higher postmerger returns and a greater likelihood that deals with poor announcement returns are withdrawn.

In contrast to studies that focus on the direct governance role institutions play in the merger process, however, our focus is on trading decisions and in this respect is closer to Ashraf and Jayaraman (2007). They find that active institutions (investment companies and independent investment advisors) increase their holdings of acquirer stock when the acquirer's announcement return is more positive. Institutions also respond more favorably, in terms of their trading strategies around the announcement, to stock acquisitions than to cash acquisitions despite the former creating less wealth as measured by announcement returns. Our work differs from Ashraf and Jayaraman in that our main focus is on how preannouncement acquirer valuation metrics affect institutional trading for stock deals, and only for institutions that own target stock but not acquirer stock (as of the deal's announcement). By examining such a sample, we build on a substantial prior literature regarding how the market valuation of the acquirer may affect the merger process. This sample also puts the focus on the investment decisions of institutions that, if completely passive, will have a new investment thrust upon them when the target stock they own is converted into acquirer shares.

In many contexts, institutions are often regarded as being more sophisticated and informed than individual investors. Bowen, Davis, and Matsumoto (2002) and Ke and Petroni (2004) suggest that, at least before Regulation Fair Disclosure, one source of the advantage institutions have may have been private communications with management. Bartov, Radhakrishnan, and Krinsky (2000) and Ke and Ramalingegowda (2005) provide evidence that institutions trade to exploit the well-known postearnings announcement drift.

However, there are also studies that suggest many institutions do not appear particularly sophisticated in their investment strategies. Griffin, Harris, and Topaloglu (2003) show that many institutional investors chase momentum returns but do not earn significant future abnormal returns from doing so. It is also well documented that investment strategies are sometimes distorted because of window dressing concerns (e.g., Musto 1999). Furthermore, some authors find that institutions tend to herd in their investment decisions (Lakonishok, Shleifer, and Vishny 1992; Grinblatt, Titman, and Wermers 1995).

Finally, our study contributes to an emerging body of work on institutional style preferences. Abarbanell, Bushee, and Raedy (2003) find that institutional demand for stocks after spinoffs is affected by their general investment strategies. Bushee and Goodman (2007) study informed trading by institutions and argue that because of a specialization effect, institutions are more likely to possess private information on stocks that conform to their style preferences. Preferences for growth versus value among

mutual funds (Chan, Chen, and Lakonishok 2002) may be due to such specializations. Jiang (2010) finds a general preference for high market-to-book stocks among institutions (see Kumar 2009 for similar preferences by retail investors).

### III. Data and Descriptive Statistics

#### *Data*

We obtain our sample of completed takeovers between 1980 and 2006 from Thomson Financial's Securities Data Corporation (SDC) Platinum database.<sup>6</sup> Using data available in SDC, we restrict the sample to stock-for-stock merger deals involving publicly traded acquirer and target firms. We further require that the acquirer not own more than 30% of the target before the merger and that the acquirer owns 100% afterward. Deals in which the acquirer or target is in the financial services industry are excluded. These screens result in 3,170 candidate merger deals.

We next limit the sample to mergers for which we can match the acquirer and target to the Center for Research in Security Prices (CRSP) and Standard & Poor's Compustat databases, which results in a sample of 1,447 mergers. An additional 155 deals are excluded because we do not find the necessary institutional ownership data for both acquirer and target firms in the CDA/Spectrum 13F database. Hence, we begin with 1,292 candidate deals before screening out cases that do not have at least one target institutional owner meeting our institutional ownership requirements, as detailed next.

To ensure that the institutions we examine hold a nontrivial stake in the target, we require they own 1% or more of target shares at the end of the latest quarter before deal announcement.<sup>7</sup> Next, to sharpen the focus on institutions that are less likely to have a motive to own the acquirer's stock, we eliminate institutions that already own the acquirer's stock before the deal's announcement. Note that this screen also leaves us with cases in which an institution is more likely to carefully consider the consequences of retaining target shares through the merger's effective date, because retaining shares will result in the institution owning stock of a firm in which it has no prior ownership. Of the 1,292 candidate merger deals, we eliminate 147 because there is not at least one institutional owner in the target that both meets the 1% preannouncement target ownership threshold and the requirement that it owns no shares in the acquirer before the merger's announcement. As with prior studies, we impose a size filter and hence additionally eliminate 140 deals in which the target stock has an equity capitalization less than \$30 million before the announcement. Our final sample consists of 4,802 institution-merger

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<sup>6</sup>We focus on completed deals so we can measure the shares an institution owns at the second quarter-end available following the merger and hence reduce the impact of potential short-term trading frictions. As we discuss later, evidence from shorter term changes in holdings from before the merger announcement to the latest quarter-end before the deal completion date suggests short-term trading frictions may inhibit the ability of institutions to rebalance their positions quickly.

<sup>7</sup>As we discuss later, the main results in this study are robust to measuring preannouncement institutional ownership as of the latest quarter-end that occurs at least one full quarter before the merger announcement, or imposing an additional restriction that the institution's target-share ownership is at least 1% of its portfolio.

observations, which encompass a total of 1,005 mergers and 1,039 distinct institutions. The median merger in our sample has two institutional owners.

### *Descriptive Statistics*

In Panel A of Table 1 we report descriptive statistics for the merger deals in our sample. It is not surprising that acquirers are larger than targets. *Relative Acquirer Size*, which is the acquirer's market value of equity divided by that of the target measured 20 trading days before the merger announcement, has a mean and median of 29 and 5, respectively. The mergers in our sample take a mean and median of 134 and 112 calendar days, respectively, to complete. Fifty-six percent of the mergers are nondiversifying, which we define as having the acquirer and target in the same primary three-digit Standard Industrial Classification (SIC) code. Definitions for this and other variables in the study are provided in the Appendix.

Panel B describes the acquirers and targets. Our primary valuation measure is the firm's *P/B*, which is the market value of equity divided by the book value of equity. As noted in Dong et al. (2006), this measure has an advantage over using long-run returns to infer overvaluation, given the controversies about how to interpret and measure the statistical significance of long-run returns. Dong et al. note that for *P/B* to be useful, it need only contain information about misvaluation above and beyond that contained in the market value alone. In constructing *P/B*, we measure book values at the latest fiscal year-end before the merger announcement date, and we measure market values 20 trading days before the announcement. *P/B* (as well as the market-to-book of assets ratio, which we use as an alternative) is winsorized at the top and bottom 1%. When a firm has negative book value, we assign the maximum value of *P/B* in the sample (after winsorizing). There are 24 such cases, and our results are robust to removing them from the sample.

The mean and median *P/B* of acquirer firms in our sample are 8.9 and 3.9, respectively. This compares to an average of 6.0 for acquirers in stock merger deals and 3.7 in mixed merger deals (cash and stock) in Dong et al. (2006). Note that the mean and median *P/B* for target firms are 5.8 and 2.8, respectively, and that the mean and median of *Acquirer P/B – Target P/B* are 3.1 and 0.9, respectively. We find similar relative results using the ratio of the market value of assets to book value of assets (*MA/BA*). Shleifer and Vishny (2003) predict that in acquisitions driven by overvaluation, acquirers will have higher valuations than targets. Hence, the relative valuations of acquirers and targets (as measured by *P/B* and *MA/BA*) in our sample seem consistent with Shleifer and Vishny's description of overvaluation-driven takeovers.

We also report *ACAR*(-1,+1) and *TCAR*(-1,+1), which are the cumulative abnormal returns (CARs) for the acquirer and target firms, respectively, over the three trading days around the merger announcement. Consistent with the literature, average announcement effects are negative for acquirers and positive for targets. For completeness, we also report statistics on firm size (using market value of equity) and leverage. The sizes of acquirers and targets are consistent with Panel A in that acquirers have a larger mean and median. Leverage ratios of acquirers and targets are similar.

Panel C provides detail on the sample distribution through time and across 48 Fama–French industries. There is a noticeable spike in the number of deals during the

1995–2001 period, coinciding with a strong bull market period. In addition, over 50% of the sample is concentrated in six industry groups: 13 (pharmaceutical products), 30 (petroleum and natural gas), 32 (communication), 34 (business services), 35 (computers), and 36 (electronic equipment). These findings lead us to control for year and industry effects in the analysis.

**TABLE 1. Descriptive Statistics for Firms and Mergers.**

Variable		Mean	Median	Std. Dev.	N
<b>Panel A. Merger Characteristics</b>					
	<i>Relative Acquirer Size</i>	29	5	167	1,005
	<i>Days to Completion</i>	134	112	88	1,005
	<i>Nondiversifying</i>	56%			1,005
<b>Panel B. Firm Characteristics</b>					
Acquirer	<i>Acquirer P/B</i>	8.9	3.9	16.1	1,005
	<i>Acquirer MA/BA</i>	4.4	2.3	7.1	1,005
	<i>ACAR(-1,+1)</i>	-4%	-3%	10%	1,005
	<i>Acquirer Size (\$billion)</i>	9.7	1.5	32.2	1,005
	<i>Acquirer Leverage</i>	22%	19%	20%	1,005
Target	<i>Target P/B</i>	5.8	2.8	9.7	1,005
	<i>Target MA/BA</i>	2.9	1.8	3.8	1,005
	<i>TCAR(-1,+1)</i>	17%	14%	21%	1,005
	<i>Target Size (\$billion)</i>	1.2	0.3	4.3	1,005
	<i>Target Leverage</i>	21%	15%	22%	1,005
Difference	<i>Acquirer P/B - Target P/B</i>	3.1	0.9	16.1	1,005
	<i>Acquirer MA/BA - Target MA/BA</i>	1.5	0.4	6.1	1,005
<b>Panel C. Yearly Breakdown of Mergers and Acquirer Fama-French (FF) Industry Groups</b>					
Year	Percentage (N = 1,005)	FF Group	Percentage (N = 1,005)	FF Group	Percentage (N = 1,005)
1980	0.00%	1	0.20%	28	0.30%
1981	0.10%	2	0.90%	29	0.00%
1982	0.00%	3	0.00%	30	6.10%
1983	0.00%	4	0.00%	31	3.10%
1984	0.40%	5	0.20%	32	7.20%
1985	1.10%	6	0.90%	33	0.80%
1986	0.60%	7	1.30%	34	21.10%
1987	1.70%	8	0.40%	35	7.50%
1988	0.90%	9	1.60%	36	9.30%
1989	1.10%	10	0.40%	37	2.00%
1990	0.80%	11	4.00%	38	1.20%
1991	1.10%	12	4.70%	39	0.20%
1992	1.70%	13	5.40%	40	1.10%
1993	2.80%	14	1.40%	41	3.20%
1994	4.10%	15	0.30%	42	3.20%
1995	6.10%	16	0.20%	43	0.90%
1996	7.60%	17	1.20%	44	0.00%
1997	11.10%	18	0.40%	45	0.00%
1998	12.70%	19	1.30%	46	0.00%
1999	11.70%	20	0.10%	47	0.10%
2000	11.00%	21	3.80%	48	1.30%

(Continued)



TABLE 1. Continued.

Panel C. Yearly Breakdown of Mergers and Acquirer Fama–French (FF) Industry Groups

Year	Percentage ( <i>N</i> = 1,005)	FF Group	Percentage ( <i>N</i> = 1,005)	FF Group	Percentage ( <i>N</i> = 1,005)
2001	7.50%	22	0.60%		
2002	3.30%	23	0.70%		
2003	3.70%	24	0.20%		
2004	3.70%	25	0.20%		
2005	3.50%	26	0.30%		
2006	1.80%	27	1.10%		

Note: The merger sample includes completed stock-for-stock mergers in which both the acquirer and target are listed on the NYSE, AMEX, or NASDAQ during 1980–2006. Institutions we study comprise those that own at least 1% of the target and no shares of the acquirer at the latest quarter-end preceding the merger announcement. Panel A reports the following merger characteristics: *Relative Acquirer Size* is the size of the acquirer divided by the size of the target, where size is the market value of equity 20 trading days before deal announcement. *Days to Completion* is the number of calendar days between the announcement date and the effective date of the merger. *Nondiversifying* is an indicator variable set to 1 if the acquirer and target share the same three-digit Standard Industrial Classification (SIC) code. Panel B reports the following firm characteristics: *P/B*, the price-to-book ratio of equity, is the ratio of the market value of equity to the book value of equity. Book equity is measured at the end of the fiscal year immediately preceding the announcement date, and the market value of equity is measured 20 trading days before the merger announcement. *P/B* is winsorized at the 1% and 99% levels. *MA/BA* is the ratio of the market value of equity (measured 20 trading days before the announcement date) plus the book value of liabilities (Compustat data item 181, measured at the end of the fiscal year immediately preceding the acquisition announcement date), to the book value of assets (data item 6, measured at the same time as the book value of liabilities). *MA/BA* is winsorized at the 1% and 99% levels. *ACAR*(−1,+1) is the three-day period cumulative abnormal return for the acquirer's stock around the announcement date (day 0) using the market model with the CRSP value-weighted market return. *TCAR*(−1,+1) is similarly defined for the target stock. *Acquirer Size* and *Target Size* are measured as the market value of equity 20 trading days before the merger announcement date. *Leverage* is computed as at the end of the fiscal year immediately preceding the announcement date as total debt (data item 9 + data item 34) divided by total assets (data item 6). Panel C reports the yearly breakdown of the mergers and the Fama–French 48 industry group classification for the acquirers.

#### IV. Valuation Measures and Institutional Trading

##### *Univariate Results*

In Table 2 we report univariate statistics for the institutions we track in the sample. We first report statistics for the full sample of 4,802 institution-merger observations, and then by quartiles based on *Acquirer P/B*.

Panel A reports results for the full sample for completeness, but we focus our discussion on the quartile groups. The median *Institution Size*, based on market value of holdings across all stocks reported in the 13F data at the quarter-end before the merger's announcement, ranges from \$3.6 billion in the third *P/B* quartile group to \$4.9 billion in the top *P/B* quartile. *Preannouncement Holdings* are the percent of target shares owned by the institutions in our sample at the latest quarter-end before the merger announcement. The mean and median are 3% and 2%, respectively, across all quartile groups.

We now turn to our main variable of interest, which is *Postmerger Retention Rate*. This variable is the number of acquirer shares the institution owns after the merger's effective date (measured at the second quarter-end after the effective date) divided by

**TABLE 2. Descriptive Statistics for Institutional Holdings.**

Variable	Mean	Median	Std. Dev.	N
<b>Panel A. Full Sample</b>				
<i>Institution Size</i> (\$billion)	22.3	4.2	59.1	4,802
<i>Preannouncement Holdings</i>	3%	2%	3%	4,802
<i>Postmerger Retention Rate</i>	55%	0%	119%	3,786
<i>Premember Retention Rate</i>	53%	52%	51%	4,384
<b>Panel B. Acquirer P/B in Bottom Quartile</b>				
<i>Acquirer P/B</i>	1.4	1.5	0.5	251
<i>Institution Size</i> (\$billion)	29.3	4.7	72.2	1,331
<i>Preannouncement Holdings</i>	3%	2%	4%	1,331
<i>Postmerger Retention Rate</i>	52%	0%	114%	978
<i>Premember Retention Rate</i>	51%	40%	53%	1,246
<b>Panel C. Acquirer P/B in Second Quartile</b>				
<i>Acquirer P/B</i>	3.0	3.0	0.5	252
<i>Institution Size</i> (\$billion)	19.5	3.7	59.1	1,216
<i>Preannouncement Holdings</i>	3%	2%	4%	1,216
<i>Postmerger Retention Rate</i>	48%	0%	110%	984
<i>Premember Retention Rate</i>	53%	52%	50%	1,099
<b>Panel D. Acquirer P/B in Third Quartile</b>				
<i>Acquirer P/B</i>	5.3	5.0	1.0	251
<i>Institution Size</i> (\$billion)	17.0	3.6	46.0	1,157
<i>Preannouncement Holdings</i>	3%	2%	3%	1,157
<i>Postmerger Retention Rate</i>	52%	0%	109%	967
<i>Premember Retention Rate</i>	53%	53%	51%	1,072
<b>Panel E. Acquirer P/B in Top Quartile</b>				
<i>Acquirer P/B</i>	25.9	13.3	25.4	251
<i>Institution Size</i> (\$billion)	22.5	4.9	52.7	1,098
<i>Preannouncement Holdings</i>	3%	2%	3%	1,098
<i>Postmerger Retention Rate</i>	67%	0%	144%	857
<i>Premember Retention Rate</i>	58%	66%	51%	967

Note: The merger sample includes completed stock-for-stock mergers in which both the acquirer and target are listed on the NYSE, AMEX, or NASDAQ during 1980–2006. Institutions we study comprise those that own at least 1% of the target and no shares of the acquirer at the latest quarter-end preceding the merger announcement. *Acquirer P/B*, the price-to-book ratio of equity of the acquirer, is the ratio of the market value of equity to the book value of equity. Book equity is measured at the end of the fiscal year immediately preceding the announcement date, and the market value of equity is measured 20 trading days before the merger announcement. *P/B* is winsorized at the 1% and 99% levels. *Institution Size* is total market capitalization of all stocks the institution owns at the latest quarter-end before the merger announcement. *Preannouncement Holdings* is the percent of the target the institution owns at the latest quarter-end before the merger announcement. *Postmerger Retention Rate* is the number of postmerger acquirer shares owned (measured at the second quarter-end after the effective date) divided by the number of expected shares owned assuming all target shares owned prior the announcement were held and converted into acquirer shares at the exchange ratio. *Premember Retention Rate* is the number of target shares owned at the latest quarter-end before the merger's effective date divided by the number of shares owned at the latest quarter-end before the merger announcement. Both *Premember Retention Rate* and *Postmerger Retention Rate* are winsorized at the top 1% level. Panel A provides the descriptive statistics for the full sample; Panels B through E divide the sample into quartiles based on *Acquirer P/B*.

the expected number of shares, where the latter is based on the institution's ownership of target shares before the announcement (measured at the latest quarter-end prior).

To illustrate, suppose an institution's preannouncement ownership of target shares would, via the exchange ratio provided in the merger, be expected to convert into 30,000 acquirer shares of the postmerger acquirer firm. If we observe the institution actually owns 15,000 acquirer shares at the second quarter-end following the effective date, *Postmerger Retention Rate* would be calculated as  $(15,000/30,000) = 50\%$ . This metric will capture both changes in holdings due to trading in the target shares (before the effective date) and changes in holdings due to trades in acquirer shares that take place before we measure postmerger holdings in the quarterly data. We winsorize this variable at the top 1% level.

The median *Postmerger Retention Rate* is 0% across all quartile groups; thus, at least half of the institutions own no shares in the acquirer firm at the second quarter-end after the merger.<sup>8</sup> The mean, however, is 55% and is a result of nonliquidating institutions, on average, increasing their holdings (the mean retention rate for nonliquidating institutions is 123%). Panels B through D show that institutions retain substantially fewer shares when the acquirer is in the bottom *P/B* quartile group compared to the top quartile group. This could be due to selling premerger target shares or postmerger (exchanged) acquirer shares.

In the bottom quartile group, the mean *Postmerger Retention Rate* is 52%, compared to a mean of 67% in the top quartile group. We do not test for statistical significance for this or other results in Table 2, because we are more interested in drawing inferences after controlling for other factors through regression analysis. The univariate statistics do, however, suggest that institutional trading varies in the acquirer's valuation, at least as measured by *P/B*.

For completeness we also examine *Premember Retention Rate*. This variable is the number of target shares owned at the latest quarter-end before the merger's effective date divided by the number of target shares owned at the latest quarter-end before the deal's announcement. Constructing *Premember Retention Rate* allows us to examine selling activity already under way before the merger is completed. As an example of how this metric is calculated, if an institution holds 30,000 shares of the target before the announcement and 15,000 before the effective date, *Premember Retention Rate* is 50%. As for *Postmerger Retention Rate*, we winsorize this variable at the top 1% level. Note that if a calendar quarter-end does not occur between the merger's announcement and effective dates, *Premember Retention Rate* cannot be calculated and hence the observation is not included in analysis using this variable. The results in Panels B through D show that more shares are retained in mergers with high acquirer *P/B* than in mergers with low acquirer *P/B*. For example, the mean and median *Premember Retention Rate* in the bottom acquirer *P/B* quartile group are 51% and 40%, respectively, versus 58% and 66%, respectively, in the top quartile group.

In untabulated results we repeat the univariate analysis for *MA/BA* and find similar results—institutions retain more shares in deals with higher acquirer *MA/BA* ratios. We

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<sup>8</sup>We do confirm that these institutions are still carried in the 13F data with nonzero holdings in other stocks. The high average liquidation rate is consistent with the results in Baker, Coval, and Stein (2007), who find that liquidations of target shares are common even well before a merger is announced.

now turn to regression analysis so we can control for other factors that potentially affect institutional trading in target firms.

### *Regressions Explaining Postmerger Retention Rate*

Table 3 reports ordinary least squares (OLS) regressions that explain *Postmerger Retention Rate* (later we discuss similar results using regression approaches that account for truncation in retention rates). The key variable in models (1)–(3) is  $\text{Log}(\text{Acquirer } P/B)$ , the natural log of the acquirer's  $P/B$ , and the key variable in models (4)–(6) is *Acquirer  $P/B$  TopQ*, an indicator variable set to 1 if the acquirer's  $P/B$  is in the top sample quartile. All models include an indicator variable for each year as well as an indicator variable for each of the 48 Fama–French industries (we do not report the coefficients in the table). We also adjust  $p$ -values for clustering by merger (we discuss other types of adjustments in a subsequent section).

Model (1) shows that the acquirer's  $P/B$  ratio is positively and significantly related to *Postmerger Retention Rate*, as the coefficient and  $p$ -value for  $\text{Log}(\text{Acquirer } P/B)$  are 0.085 and .001, respectively. This confirms the univariate result that institutions retain more shares in deals with higher acquirer valuations. In terms of economic significance, model (1) implies that holding other factors in the regression model constant, a one-standard-deviation increase in  $\text{Log}(\text{Acquirer } P/B)$  results in *Postmerger Retention Rate* increasing by 9% (in absolute terms). Given that the mean *Postmerger Retention Rate* is 55% (see Table 2), this is an economically material effect.

By including the log of target's  $P/B$  in the regression, we control for the possibility that an institution's view of the acquirer's  $P/B$  may be affected by whether the target is a high- or low- $P/B$  firm. That is, if the institution already owns stock in a high- or low- $P/B$  firm, this may indicate its preferences for high- or low- $P/B$  stocks more generally. We do not find that  $\text{Log}(\text{Target } P/B)$  is significant. Later, however, we examine style preferences more directly and find that preferences do affect retention rates.

The regression includes other variables as well: the institution's scaled size (the market value of preannouncement holdings in all of the stocks it owns divided by the total market capitalization of NYSE, AMEX, and NASDAQ securities on CRSP to normalize across years), *Percent of Portfolio* (the percent of the institution's preannouncement portfolio devoted to the target's stock), the acquirer's absolute size, the acquirer's size relative to the target, the acquirer's leverage ratio, and *Nondiversifying* (an indicator variable set to 1 if the acquirer and target share the same three-digit SIC code). We observe that larger institutions retain more shares, potentially because it is more difficult for them to find replacement holdings or unwind their larger (on average) holdings. Institutions with a larger portion of their preannouncement portfolio devoted to the target also retain more shares (the coefficient on *Percent of Portfolio* is positive and significant).

By including  $\text{Log}(\text{Acquirer Size})$ , we control for potential institutional preferences based on market capitalization. We find that institutions retain fewer shares in deals with larger acquirers. However, the size of the acquirer relative to that of the target does not significantly affect institutional trading, nor does the acquirer's leverage or whether the target and acquirer are in the same industry. For our purposes, the important point is that the  $P/B$  result holds after controlling for these various factors.

TABLE 3. Regressions Explaining Postmerger Retention Rate.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log( <i>Acquirer P/B</i> )	0.0851*** (.001)	0.0969*** ( $< .001$ )	0.1213*** ( $< .001$ )				0.1215*** ( $< .001$ )	0.1172*** ( $< .001$ )
<i>Acquirer P/B TopQ</i>				0.2052*** (.001)	0.2223*** (.001)	0.1992*** (.004)		
Log( <i>Target P/B</i> )	0.0219 (.432)	0.0184 (.523)	0.0296 (.369)	0.0216 (.451)	0.0187 (.530)	0.0310 (.358)	0.0300 (.355)	0.0349 (.284)
Log( <i>Scaled Inst Size</i> )	0.1375*** ( $< .001$ )	0.1392*** ( $< .001$ )	0.1242*** ( $< .001$ )	0.1372*** ( $< .001$ )	0.1387*** ( $< .001$ )	0.1232*** ( $< .001$ )	0.1242*** ( $< .001$ )	0.1274*** ( $< .001$ )
<i>Percent of Portfolio</i>	1.2941*** ( $< .001$ )	1.2472*** ( $< .001$ )	1.0460*** ( $< .001$ )	1.2730*** ( $< .001$ )	1.2236*** ( $< .001$ )	1.0288*** ( $< .001$ )	1.0461*** ( $< .001$ )	1.0580*** ( $< .001$ )
Log( <i>Acquirer Size</i> )	-0.0460** (.025)	-0.0465** (.023)	-0.0447* (.055)	-0.0446** (.028)	-0.0444** (.029)	-0.0380* (.093)	-0.0446* (.057)	-0.0411* (.081)
Log( <i>Relative Acq Size</i> )	0.0411 (.132)	0.0402 (.135)	0.0204 (.470)	0.0497* (.058)	0.0503* (.058)	0.0309 (.277)	0.0204 (.471)	0.0240 (.404)
<i>Acquirer Leverage</i>	0.0354 (.777)	0.0074 (.952)	0.0579 (.706)	0.0832 (.496)	0.0670 (.577)	0.0862 (.574)	0.0569 (.711)	0.0806 (.599)
<i>Nondiversifying</i>	0.0199 (.661)	0.0169 (.704)	-0.0032 (.947)	0.0177 (.696)	0.0150 (.738)	-0.0044 (.927)	-0.0031 (.949)	0.0022 (.963)
<i>ACAR(-1,+1)</i>		0.6365** (.012)	0.6049** (.038)		0.5989** (.018)	0.5628* (.057)	0.6063** (.038)	0.5962** (.045)
<i>TCAR(-1,+1)</i>		-0.1725 (.210)	-0.0701 (.644)		-0.1712 (.216)	-0.0789 (.610)	-0.0691 (.651)	-0.0657 (.670)
<i>Change in Acquirer P/B</i>			-0.0033 (.133)			-0.0010 (.643)	-0.0033 (.134)	-0.0036* (.091)
<i>Days to Completion</i>			-0.0001 (.741)			-0.0002 (.621)	-0.0001 (.740)	-0.0002 (.695)
<i>Average Inst Trading</i>			-0.1886 (.282)			-0.2254 (.206)	-0.1884 (.286)	-0.2021 (.257)
<i>Target Return Prior Year</i>							-0.0010 (.938)	
Constant	0.1675 (.654)	0.2813 (.434)	0.4673* (.054)	0.1849 (.612)	0.2966 (.398)	0.5452** (.032)	0.4666* (.055)	0.4262 (.119)
<i>Lambda</i>								0.6632 (.592)
Observations	3,740	3,731	3,276	3,740	3,731	3,276	3,276	3,276
Adjusted $R^2$	4.6%	4.9%	4.3%	4.6%	4.8%	4.0%	4.3%	4.4%

Note: The merger sample includes completed stock-for-stock mergers in which both the acquirer and target are listed on the NYSE, AMEX, or NASDAQ during 1980–2006. Institutions we study comprise those that own at least 1% of the target and no shares of the acquirer at the latest quarter-end preceding the merger announcement. The dependent variable is *Postmerger Retention Rate*, the number of postmerger acquirer shares owned by an institution (measured at the second quarter-end after the effective date) divided by the number of expected shares owned assuming all target shares before the announcement were held and converted into acquirer shares at the prevailing exchange ratio, winsorized at the top 1%. *Acquirer P/B*, the price-to-book ratio of equity of the acquirer, is the ratio of the market value of equity to the book value of equity. Book equity is measured at the end of the fiscal year immediately preceding the announcement date, and the market value of equity is measured 20 trading days before the merger announcement. *P/B* is winsorized at the 1% and 99% levels. *Acquirer P/B TopQ* is an indicator variable set to 1 if the acquirer's *P/B* is in the sample top quartile. *Target P/B* is the price-to-book ratio of the target, defined similar to that of the acquirer. *Scaled Inst Size* is the total market value of stock ownership by the institution divided by the total market capitalization of stocks covered on CRSP, measured 20 trading days before deal announcement. *Percent of Portfolio* is the percent of the institution's preannouncement portfolio allocated to target shares. *Relative Acq Size* is the size of the acquirer divided by the size of the target, where size is the market value of equity 20 trading days before deal announcement. *Acquirer Leverage* is computed as at the end of the fiscal year immediately preceding the announcement date as total debt (data item 9 + data item 34) divided by total assets (data item 6). *Nondiversifying* is an indicator variable set to 1 if the acquirer and target share the same three-digit Standard Industrial Classification (SIC) code. *ACAR(-1,+1)* is the three-day period cumulative abnormal return for the

(Continued)

TABLE 3. Continued.

acquirer's stock around the announcement date (day 0) using the market model with the CRSP value-weighted market return.  $TCAR(-1,+1)$  is similarly defined for the target stock. *Change in Acquirer P/B* is *Acquirer P/B* minus the *P/B* of the acquirer measure one year before. *Days to Completion* is the number of calendar days between the announcement date and the effective date of the merger. *Avg Inst Trading* is a measure of institutional trading (across many institutions) before the announcement, where positive (negative) values indicate buying (selling) on average. *Target Return Prior Year* is the target's return for the year preceding the announcement date. For model (8), a Heckman two-stage regression is estimated in which the first stage is a probit regression on the payment method (stock vs. cash) and the second stage is an ordinary least squares regression corrected for sample selection (i.e., payment method choice). The dependent variable in the first-stage probit specification equals 1 if the deal consideration comprises more than 50% stock. The specification of the probit is the same as model (7) in this table with the additional variable *Aggregate Crossownership*, which reflects the aggregate ownership in the target by institutions owning both the target and the acquirer. The statistical significance of *Lambda* tests for sample selectivity. For each coefficient, the second row reports the two-tailed *p*-value in parentheses adjusted for clustering by merger. All regressions include year dummies and 48 Fama–French industry dummies.

\*\*\* Significant at the 1% level.

\*\* Significant at the 5% level.

\* Significant at the 10% level.

Model (2) adds  $ACAR(-1,+1)$  and  $TCAR(-1,+1)$  because an institution's trading decisions may be affected by the return it receives in the target shares around the announcement as well as any reactions in the acquirer's stock price.  $ACAR(-1,+1)$  is positive and significant ( $p$ -value = .012). Hence, if the market responds more favorably (or less unfavorably) to the deal from the acquirer's perspective, institutions retain more shares.  $TCAR(-1,+1)$  is not significant.

In model (3) we include additional control variables. *Change in Acquirer P/B* is defined as *Acquirer P/B* (recall this is measured just before announcement) minus the acquirer's *P/B* measured one year before. We include this variable to control for the potential that institutional trading is affected by how the acquirer's valuation measure has changed during the year leading up to the merger announcement, but it is not significant. We include *Days to Completion* as an ex post control (albeit a noisy one) for how long the merger may have been expected to take or the likelihood of completion because of regulatory hurdles, logistical and personnel complications, and so on. This variable is insignificant.

Finally, we include *Average Inst Trading* to control for background trends in institutional trading in the target firm. This metric uses eight quarters of institutional ownership data before the deal announcement and tracks how institutions that own at least 1% of the target in one quarter change their holdings to the next (see the Appendix for more detail). The metric is then scaled by how long the merger takes to complete, to roughly estimate how the average institutional owner with a significant stake in the target would be expected to change its holdings in the target firm based on prior institutional trading trends. The more positive (negative) the metric, the more institutions with significant stakes have been buying (selling) the target firm over a two-year period before the deal announcement. This variable is also insignificant. Our key variable of interest,  $\text{Log}(\text{Acquirer } P/B)$ , remains significant and the magnitude of its coefficient implies that a one-standard-deviation increase in  $\text{Log}(\text{Acquirer } P/B)$  results in *Postmerger Retention Rate* increasing by 13% (in absolute terms).

In models (4)–(6) we continue to find qualitatively similar results using a dichotomous *P/B* variable. We set *Acquirer P/B TopQ* to 1 if *Acquirer P/B* is in the top quartile of the sample, and to 0 otherwise. We observe that the coefficients on *Acquirer P/B TopQ* are positive and significant with values ranging from 0.199 to 0.222 and *p*-values ranging from .001 to .004. This implies that, on average, when the acquirer's price-to-book is in the top quartile, institutions retain around an additional 20%.

Models (7) and (8) repeat model (3) except they address the possibility that retention rates are affected by the potential endogeneity of the method of payment decision. In model (7) we include the target's stock return over the calendar year before the merger's announcement. Presumably, when target returns are higher the preference for stock is greater by any owners of target shares who have capital gains tax concerns (e.g., mutual funds that have to pass net gains to their retail clients). We find that the target's prior-year return is insignificant. Model (8) takes a two-stage least squares approach in which the first stage estimates the likelihood of payment in stock (see the table description for more detail). *Heckman's Lambda* is insignificant, which suggests that there is not a significant selection bias. It is worth noting that the coefficients and *p*-values for the acquirer's price-to-book ratio are not materially affected compared to those observed in model (3).

In untabulated results we include additional control variables, one at a time. It is possible that some institutions choose to retain shares of the target stock to pursue merger arbitrage opportunities. These opportunities may arise when the target's postannouncement stock price does not initially rise to the expected terminal value because of the possibility the deal will not be completed.<sup>9,10</sup> Pursuing such opportunities may cause institutions to retain more target shares and may, all else equal, result in greater retainment of acquirer shares. Therefore, we add the return of the target from after the announcement through the delisting date. We can view this variable as an *ex post* estimate of the holding-period return in the target stock an institution may have expected to earn after the deal was announced. The target return variable is not significant and the acquirer *P/B* variable's magnitude and significance are unaffected. We also try a number of return calculations that all yield similar results: CARs, excess holding-period returns, raw holding-period returns, and all of these adjusted so that they are on a per day basis.

We also try other control variables. First, we include an indicator variable set to 1 if the deal is hostile according to SDC (1% are thus classified), and this variable is not significant. Next, we include an indicator variable set to 1 if the acquirer has granted the target a lockup option. This variable provides an opportunity to investigate whether institutional trading is affected by the likelihood the deal will be completed (Burch 2001 finds deals with lockup options have significantly higher completion rates). Along

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<sup>9</sup>For example, in a cash tender offer a typical pattern (particularly if bidder competition is not expected) is for the postannouncement target stock to trade at a discount to the tender price because of uncertainty over whether the tender offer will be completed. Hence, the simple (risky) arbitrage strategy is to long the target stock in anticipation that this discount will dissipate if the offer is successfully completed. In stock-for-stock deals, a common strategy is to long the target's stock and short the acquirer's stock. Mitchell and Pulvino (2001), Baker and Savasoglu (2002), and Jindra and Walkling (2004) discuss and examine merger arbitrage strategies.

<sup>10</sup>It is possible that some institutions have the ability to hedge via trading derivatives or shorting acquirer shares. Although we do not have data to examine this issue, there is no reason to expect this to introduce a bias in the direction of higher retention rates in deals with higher acquirer valuation ratios.

similar lines, we also investigate whether institutional trading is affected by the size of the acquirer's toehold in the target (observations with no acquirer toehold are coded with a 0% toehold). Neither the lockup option variable nor the toehold variable is statistically significant. We also try a number of specifications, including having both together or one at a time, adding a square term, using multiple indicator variables for various size ranges, and adding interaction terms between the *Acquirer P/B* variable and the lockup or toehold variables. None of these specifications results in statistically significant coefficients on any of these variables or affects the main result.

### *Regressions Explaining Premerger Retention Rate*

Do institutions that do not plan to retain the acquirer shares they will receive actually sell their target shares before the effective date? On the one hand, some institutions may believe their returns will be higher if they sell target shares soon after the merger's announcement is made, for example, because they believe the acquirer's stock performance will be poor once the deal is completed. On the other hand, there may be reasons to wait and sell acquirer shares after the merger is completed. For example, we have already discussed merger arbitrage strategies in which a trader attempts to profit from the movement in the target firm's stock between the merger's announcement and completion.

In Table 4 we estimate OLS regressions to explain *Premerger Retention Rate*. We report the same eight specifications estimated in Table 3, and the results for our key variable of interest are similar, although somewhat weaker in terms of economic magnitude. As we discuss later, this is perhaps not surprising.

In models (1)–(3) we find that  $\text{Log}(\text{Acquirer } P/B)$  has a coefficient of between 0.031 and 0.041, with  $p$ -values ranging from .002 to .003. The coefficients imply that for a one-standard-deviation increase in  $\text{Log}(\text{Acquirer } P/B)$ , *Premerger Retention Rate* increases anywhere from 4% to 5%. This is economically significant given that the overall mean *Premerger Retention Rate* is 53%, although the magnitude of the effect is not as large as we find for *Postmerger Retention Rate* in Table 3. In models (4)–(6) the coefficient on *Acquirer P/B TopQ* ranges from 0.054 to 0.058, with  $p$ -values ranging from .026 to .053. The magnitudes suggest that share retention is 5% to 6% greater when the acquirer's *P/B* is in the top quartile.

As in Table 3 that examines *Postmerger Retention Rate*, in Table 4 we observe that institutions retain more shares when their size (in terms of market capitalization across all stocks they own) is larger. The coefficients on *Percent of Portfolio* and  $\text{Log}(\text{Acquirer Size})$  are also significant, with the same signs as in Table 3. We find that  $ACAR(-1,+1)$  is no longer significant. There is also weak evidence that selling before the effective date is affected by the target's announcement return, with less selling (more retention) when target returns are lower. It may be that lower target announcement returns partially reflect lower perceived probabilities of deal completion and that institutions are less likely to trade in such deals.

Note that *Days to Completion* is negative and significant. One way to interpret this variable is as an ex post measure that, on average, should be positively related to the ex ante probability of deal completion. Under this interpretation, the negative coefficient would suggest that institutional selling is weaker when a deal is perceived as less likely to



TABLE 4. Regressions Explaining Premerger Retention Rate.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log( <i>Acquirer P/B</i> )	0.0316*** (.002)	0.0310*** (.003)	0.0405*** (.002)				0.0406*** (.002)	0.0376*** (.004)
<i>Acquirer P/B TopQ</i>				0.0578** (.026)	0.0566** (.029)	0.0536* (.053)		
Log( <i>Target P/B</i> )	-0.0144 (.268)	-0.0154 (.240)	-0.0196 (.162)	-0.0131 (.315)	-0.0145 (.270)	-0.0206 (.136)	-0.0185 (.206)	-0.0197 (.179)
Log( <i>Scaled Inst Size</i> )	0.0202*** (<.001)	0.0205*** (<.001)	0.0205*** (<.001)	0.0200*** (<.001)	0.0203*** (<.001)	0.0201*** (<.001)	0.0204*** (<.001)	0.0210*** (<.001)
<i>Percent of Portfolio</i>	0.6866*** (<.001)	0.6948*** (<.001)	0.7124*** (<.001)	0.6686*** (<.001)	0.6815*** (<.001)	0.7133*** (<.001)	0.7116*** (<.001)	0.6998*** (<.001)
Log( <i>Acquirer Size</i> )	-0.0373*** (<.001)	-0.0372*** (<.001)	-0.0430*** (<.001)	-0.0356*** (<.001)	-0.0355*** (<.001)	-0.0398*** (<.001)	-0.0428*** (<.001)	-0.0426*** (<.001)
Log( <i>Relative Acq Size</i> )	-0.0115 (.319)	-0.0081 (.486)	-0.0049 (.680)	-0.0049 (.670)	-0.0013 (.913)	0.0029 (.806)	-0.0050 (.673)	-0.0025 (.831)
<i>Acquirer Leverage</i>	0.0270 (.701)	0.0315 (.652)	0.1432** (.041)	0.0477 (.494)	0.0531 (.444)	0.1556** (.027)	0.1415** (.043)	0.1525** (.028)
<i>Nondiversifying</i>	0.0039 (.860)	0.0048 (.824)	0.0149 (.509)	0.0068 (.758)	0.0079 (.719)	0.0183 (.426)	0.0154 (.497)	0.0150 (.507)
<i>ACAR(-1,+1)</i>		-0.0228 (.822)	-0.1162 (.300)		-0.0440 (.664)	-0.1296 (.255)	-0.1129 (.317)	-0.1312 (.249)
<i>TCAR(-1,+1)</i>		-0.0942* (.066)	-0.1017* (.052)		-0.1002* (.053)	-0.1130** (.035)	-0.0985* (.060)	-0.1004* (.055)
<i>Change in Acquirer P/B</i>			-0.0008 (.416)			0.0001 (.939)	-0.0008 (.435)	-0.0008 (.422)
<i>Days to Completion</i>			-0.0005*** (.009)			-0.0005*** (.006)	-0.0005*** (.009)	-0.0005*** (.011)
<i>Average Inst Trading</i>			0.1473** (.034)			0.1383* (.050)	0.1481** (.033)	0.1627** (.022)
<i>Target Return Prior Year</i>							-0.0027 (.658)	
Constant	0.2757 (.127)	0.4182*** (<.001)	1.0524*** (<.001)	0.2751 (.144)	0.3989*** (<.001)	1.0061*** (<.001)	1.0565*** (<.001)	1.0621*** (<.001)
<i>Lambda</i>								0.4861 (.728)
Observations	4,332	4,324	3,844	4,332	4,324	3,844	3,844	3,819
Adjusted R <sup>2</sup>	7.8%	7.8%	8.9%	7.6%	7.7%	8.6%	8.9%	8.8%

Note: The merger sample includes completed stock-for-stock mergers in which both the acquirer and target are listed on the NYSE, AMEX, or NASDAQ during 1980–2006. Institutions we study comprise those that own at least 1% of the target and no shares of the acquirer at the latest quarter-end preceding the merger announcement. The dependent variable is *Premerger Retention Rate*, the number of target shares owned by an institution at the latest quarter-end before the merger's effective date divided by the number of shares owned at the latest quarter-end before the merger announcement date, winsorized at the top 1%. *Acquirer P/B*, the price-to-book ratio of equity of the acquirer, is the ratio of the market value of equity to the book value of equity. Book equity is measured at the end of the fiscal year immediately preceding the announcement date, and the market value of equity is measured 20 trading days before the merger announcement. *P/B* is winsorized at the 1% and 99% levels. *Acquirer P/B TopQ* is an indicator variable set to 1 if the acquirer's *P/B* is in the sample top quartile. *Target P/B* is the price-to-book ratio of the target, defined similar to that of the acquirer. *Scaled Inst Size* is the total market value of stock ownership by the institution divided by the total market capitalization of stocks covered on CRSP, measured 20 trading days before deal announcement. *Percent of Portfolio* is the percent of the institution's preannouncement portfolio allocated to target shares. *Relative Acq Size* is the size of the acquirer divided by the size of the target, where size is the market value of equity 20 trading days before deal announcement. *Acquirer Leverage* is computed as at the end of the fiscal year immediately preceding the announcement date as total debt (data item 9 + data item 34) divided by total assets (data item 6). *Nondiversifying* is an indicator variable set to 1 if the acquirer and target share the same three-digit SIC code. *ACAR(-1,+1)* is the three-day period cumulative abnormal return for the acquirer's stock around the announcement date (day 0) using the market model with the CRSP value-weighted market return. *TCAR(-1,+1)* is similarly defined for the target stock. *Change in Acquirer P/B* is *Acquirer P/B* minus the *P/B* of the acquirer measure one year before. *Days to Completion* is the number of calendar days between the announcement date and

(Continued)

TABLE 4. Continued.

the effective date of the merger. *Avg Inst Trading* is a measure of institutional trading (across many institutions) before the announcement, where positive (negative) values indicate buying (selling) on average. *Target Return Prior Year* is the target's return for the year preceding the announcement date. For model (8), a Heckman two-stage regression is estimated in which the first stage is a probit regression on the payment method (stock vs. cash) and the second stage is an ordinary least squares regression corrected for sample selection (i.e., payment method choice). The dependent variable in the first-stage probit specification equals 1 if the deal consideration comprises more than 50% stock. The specification of the probit is the same as model (7) in this table with the additional variable *Aggregate Crossownership*, which reflects the aggregate ownership in the target by institutions owning both the target and the acquirer. The statistical significance of *Lambda* tests for sample selectivity. For each coefficient, the second row reports the two-tailed *p*-value in parentheses adjusted for clustering by merger. All regressions include year dummies and 48 Fama–French industry dummies.

\*\*\*Significant at the 1% level.

\*\*Significant at the 5% level.

\*Significant at the 10% level.

be completed. However, in untabulated results we include a lockup option that the prior literature suggests is informative in terms of deal completion expectations. When we do so, the coefficients and significance levels on *Days to Completion* in models (3) and (6) are unaffected (they do not become weaker). This result suggests that the significance of *Days to Completion* more likely indicates that it is difficult (or costly) for selling institutions to unload a large position quickly when there is less time to do so.<sup>11</sup>

More broadly, this finding suggests a likely explanation for why the relation between institutional trading and the acquirer's *P/B* is weaker in Table 4 (where the institutional trading metric is *Premerger Retention Rate*) than in Table 3 (where *Postmerger Retention Rate* is used). Compared to *Premerger Retention Rate*, the alternative metric *Postmerger Retention Rate* allows for substantially more time for institutions to trade shares if they wish to do so. The fact that *Days to Completion* is significant in Table 4 but not in Table 3 suggests that *Premerger Retention Rate* is affected by a binding time constraint, whereas *Postmerger Retention Rate* is not (relatively speaking).

Models (7) and (8) repeat those in Table 3 that address the potential endogeneity of the method of payment. Once again the key results continue to hold, and neither the target's prior-year return nor Heckman's *Lambda* is statistically significant.

In untabulated results we also try all of the additional control variables considered and discussed in the earlier regression analysis of *Postmerger Retention Rate* (acquirer toehold, target returns between the announcement and effective date, etc.). The results are qualitatively unaffected.

### Robustness

In Table 5 we address additional robustness concerns. First, the dependent variables in Tables 3 and 4 are truncated at 0%, because as recorded in the 13F data, institutions can

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<sup>11</sup>Recall that *Premerger Retention Rate* is measured at the latest quarter-end before the deal's effective date, which implies that *Days to Completion* is not a very precise measure of the time institutions have to sell shares before when we measure their holdings. In untabulated results we substitute the number of trading days between the announcement date and when the quarterly holdings before the effective date are measured. This variable has similar size and significance as *Days to Completion*.

at most sell all of their shares (the data do not contain potential short positions). To make sure the OLS results are not materially affected by this truncation, in Panel A of Table 5 we report probit regressions in which the dependent variable is an indicator set to 1 if the retention rate is above the sample median. Models (1) and (2) use an indicator for whether *Postmerger Retention Rate* is above its sample median of 0% (i.e., the indicator is set to 1 if the institution owns any shares of the postmerger acquirer), and models (3) and (4) take a similar approach for *Premerger Retention Rate* (for this variable, the sample median of 52% is used). All models include the additional variables in models (3) and (6) of Table 3 (including industry and year dummies), but we do not report them here for brevity.

**TABLE 5. Additional Regressions Explaining Postmerger and Premerger Retention Rate.**

Panel A. Probit Regressions of Retention Rates on Acquirer P/B				
Model:	(1)	(2)	(3)	(4)
Regression Approach:	Probit	Probit	Probit	Probit
Retention Rate (Dependent Variable):	Postmerger	Postmerger	Premerger	Premerger
Log( <i>Acquirer P/B</i> )	0.0595*** ( <.001)		0.0421*** (.002)	
<i>Acquirer P/B/TopQ</i>		0.0800** (.013)		0.0511* (.084)
Control variables	Yes	Yes	Yes	Yes
Observations	3,276	3,276	3,844	3,844
Pseudo R <sup>2</sup>	7.1%	6.8%	8.1%	7.9%
Panel B. Median and Interquartile Regressions of Retention Rates on Acquirer P/B				
Model:	(1)	(2)	(3)	(4)
Regression Approach:	Median	Median	Interquartile	Interquartile
Retention Rate (Dependent Variable):	Postmerger	Postmerger	Postmerger	Postmerger
Log( <i>Acquirer P/B</i> )	0.0026*** (.001)		0.1935*** ( <.001)	
<i>Acquirer P/B/TopQ</i>		0.0033*** (.002)		0.3013*** (.007)
Control variables	Yes	Yes	Yes	Yes
Observations	3,276	3,276	3,276	3,276
Pseudo R <sup>2</sup>	0.5%	0.5%	0.061	0.056
Panel C. Regressions of Retention Rates on Acquirer P/B				
Model:	(1)	(2)	(3)	(4)
Regression Approach:	OLS	OLS	OLS	OLS
Retention Rate (Dependent Variable):	Postmerger	Postmerger	Postmerger	Postmerger
Sample Restrictions:	Ret. Rate > 0	Ret. Rate > 0	Prior Port. Weight in Target ≥ 1%	
Log( <i>Acquirer P/B</i> )	0.1454** (.016)		0.1451*** ( <.001)	
<i>Acquirer P/B/TopQ</i>		0.2390** (.042)		0.1656** (.011)
Control variables	Yes	Yes	Yes	Yes
Observations	1,445	1,445	776	776
Pseudo R <sup>2</sup>	7.2%	7.0%	5.2%	3.9%

(Continued)

TABLE 5. Continued.

Panel D. Regressions of Retention Rates on Relative (Acquirer to Target) P/B				
Model:	(1)	(2)	(3)	(4)
Regression Approach:	OLS	OLS	OLS	OLS
Retention Rate (Dependent Variable):	Postmerger	Postmerger	Postmerger	Postmerger
Log( <i>Relative P/B</i> )	0.0498* (.058)	0.0087 (.862)		
Log( <i>Rel P/B</i> )* <i>TgtP/B TopM</i>		0.1085* (.073)		
<i>Relative P/B TopM</i>			0.0982* (.053)	0.0375 (.598)
<i>Rel. P/B TopM</i> * <i>Tgt.P/B TopM</i>				0.2384** (.020)
<i>Tgt.P/B TopM</i>		0.1495** (.016)		0.0609 (.382)
Control variables	Yes	Yes	Yes	Yes
Observations	3,276	3,276	3,276	3,276
Adjusted R <sup>2</sup>	6.0%	6.5%	5.9%	6.5%

Note: The merger sample includes completed stock-for-stock mergers in which both the acquirer and target are listed on the NYSE, AMEX, or NASDAQ during 1980–2006. Institutions we study comprise those that own at least 1% of the target and no shares of the acquirer at the latest quarter-end preceding the merger announcement. In Panel A, which reports probit regressions, the dependent variable in models (1) and (2) is an indicator variable set to 1 if *Postmerger Retention Rate* is greater than the sample median of 0%. The dependent variable in models (3) and (4) of Panel A is an indicator variable set to 1 if *Premerger Retention Rate* is greater than the sample median of 52%. In Panel B the dependent variable is the *Postmerger Retention Rate*. Models (1) and (2) are median regressions while models (3) and (4) are interquartile range regressions. In Panel C the dependent variable is the *Postmerger Retention Rate*. Models (1) and (2) restrict the *Postmerger Retention Rate* to being positive (nonzero) while models (3) and (4) restrict the sample to institutions whose premerger announcement holdings in the target represent at least 1% of the institution's total holdings. In Panel D the dependent variable is the *Postmerger Retention Rate*. *Acquirer P/B*, the price-to-book ratio of equity of the acquirer, is the ratio of the market value of equity to the book value of equity. *Relative P/B* is the ratio of the *Acquirer P/B* to the *Target P/B* (*Target P/B* is defined analogously to *Acquirer P/B*). *Acquirer P/B TopQ* is an indicator variable set to 1 if the acquirer's *P/B* is in the sample top quartile. *Tgt.P/B TopM* is an indicator variable set to 1 if the target's *P/B* is above the sample median. *Relative P/B TopM* is an indicator variable set to 1 if the *Relative P/B* is above the sample median. All regressions (Panels A through D) include the control variables from model (3) in Table 3 but are not shown for brevity. In all panels, coefficients are reported in the first row (marginal effects for probit regressions) and the second row reports the two-tailed *p*-value in parentheses adjusted for clustering by merger. All regressions include year dummies and 48 Fama–French industry dummies.

\*\*\*Significant at the 1% level.

\*\*Significant at the 5% level.

\*Significant at the 10% level.

The panel reports the marginal effects (the change in the probability of being above the median per unit of change in the independent variable) above the bracketed *p*-values. As in Table 3, *p*-values are adjusted for clustering by merger. The coefficient on Log(*Acquirer P/B*) in model (1) is positive and significant (*p*-value < .001), consistent with the Table 3 results. The coefficient on *Acquirer P/B TopQ* in model (2) is also positive and statistically significant, which indicates that if the acquirer's *P/B* is in the top quartile, institutions are around 8% more likely to own acquirer shares after the merger (controlling for other factors). Models (3) and (4), in which the dependent variable is an indicator set to 1 if *Premerger Retention Rate* is above the sample median of 52%, confirm the results from Table 4. The acquirer's price-to-book ratio is positively associated with

retention of target shares before the merger's effective date. As before, we also find the association is not as strong as when using *Postmerger Retention Rate*. In Panel B we report median regressions (models (1) and (2)) and interquartile regressions (models (3) and (4)) and continue to find that retention rates are higher in deals with higher acquirer price-to-book ratios. Overall, Panels A and B increase our confidence that the results in our study are not due to outliers.

In Panel C we include further restrictions on the sample. First, we wish to know whether our main result is driven only by lower liquidation rates when acquirers have higher price-to-book ratios. In models (1) and (2), therefore, we restrict the sample to institutions with nonzero postmerger liquidation rates. We find that even for nonliquidating institutions, retention rates are higher when acquirer price-to-book ratios are higher. In models (3) and (4) we impose an additional restriction that an institution's premerger-announcement holding in the target is at least 1% of its portfolio. This dramatically reduces the sample size, but nonetheless we continue to observe that the main result holds.

In our main analysis we have measured the acquirer's price-to-book ratio in absolute terms rather than relative to the target's price-to-book ratio. Our choice has the advantage of assuming an institution will evaluate the acquirer's stock on its own merits and not view the acquirer as having a low or high valuation based on how it compares to only one small part of the institution's portfolio (the target's stock). It is interesting, however, to investigate whether retention rates vary in the acquirer's price-to-book ratio relative to the target's. Panel D reports the results of four regressions that take various approaches.

In model (1) we replace the log of the acquirer's price-to-book ratio with  $\text{Log}(\text{Relative } P/B)$ , which is the log of the ratio of the acquirer's price-to-book ratio to that of the target's. We find that the relative price-to-book has a positive and significant coefficient ( $p$ -value = .058). From model (2) we see that the effect is stronger when the target's price-to-book is above the sample median. One way to interpret this is that the target's price-to-book ratio can be used as a proxy for an institution's revealed preference for firms with high price-to-book ratios.

Models (3) and (4) repeat the analysis using a dichotomous variable for relative price-to-book and the results continue to hold. The greater the acquirer's price-to-book, whether measured in absolute terms (as in Tables 3 and 4) or measured in relative terms (as in Panel D of Table 5), the greater the retention of shares by institutional holders.

There are also other robustness checks that we do not report in the table. First, although we believe that price-to-book value of equity is a more appropriate valuation measure than the market-to-book value of assets ( $MA/BA$ ) for a study of stock-market-driven mergers, we repeat our analysis with the latter and find qualitatively similar results. Second, because institutions may anticipate a merger announcement and adjust their holdings beforehand, we recalculate the two institutional trading metrics (*Postmerger Retention Rate* and *Premmerger Retention Rate*) by measuring preannouncement ownership one quarter earlier. Again, we obtain similar results. Third, we remove observations from the 1999–2000 period (during the tech bubble), and again results are robust.

Aside from the probit specification, there are also a number of other econometric tweaks we try. Although the  $p$ -values we report in the tables are adjusted for clustering by merger, we also find similar results if we cluster by institution instead, or if we use White's correction for heteroskedasticity. Finally, as we have noted before, our continuous institutional trading measures (*Postmerger Retention Rate* and *Premerger Retention Rate*) are truncated from below. As an alternative to the probit approaches taken in Table 5, we also try Tobit regressions and find similar results.

## V. Further Analysis

### *Long-Run Performance*

The work in Rhodes-Kropf, Robinson, and Vishwanathan (2005), among others, emphasizes that valuation measures such as the market-to-book ratio (and, by implication, the price-to-book ratio) may potentially reflect both misvaluation and growth opportunities. In Panel A of Table 6 we use the market-to-book decomposition in Rhodes-Kropf, Robinson, and Vishwanathan to investigate how institutional trading varies in a measure of overvaluation we label *RKRV Overvaluation*. We define this metric as the sum of the firm-specific error and time-series sector error as defined in their article. We also include the acquirer's *RKRV Long-Run Value-to-Book*, which is the measure of growth opportunities from their article. Models (1) and (2) report OLS regressions that explain *Postmerger Retention Rate* and *Premerger Retention Rate*, respectively, and models (3) and (4) report probit regressions using an indicator variable approach for whether the retention rates are above their respective sample medians.

The regressions in Panel A show that retention rates are increasing in both the acquirer's *RKRV Overvaluation* and its *RKRV Long-Run Value-to-Book*. The key implication of this result, from our perspective, is that the earlier finding in which institutional retention rates are greater for deals with greater acquirer valuation ratios does not appear to simply be driven by growth opportunities.

In Panel B we examine whether postmerger acquirer returns are lower for stocks with higher acquirer price-to-book ratios. The first row reports median excess returns, measured as the acquirer's one-year postmerger return minus the CRSP value-weighted return. The second row reports median four-factor alphas from a regression of monthly returns on the three Fama–French factors and the Carhart momentum factor. Median excess returns decrease monotonically across the four acquirer price-to-book quartiles, and the medians in the highest and lowest quartiles are statistically different ( $p$ -value < .001). There is more variability across the quartile groups for the alphas, but using this measure as well the highest acquirer price-to-book quartile has significantly worse performance.

Thus far the evidence suggests that institutions retain more shares in deals with the highest acquirer price-to-book ratios and that such deals have poorer postmerger performance. An institution's wealth experience in a deal will depend on both its retention of shares and the acquirer's postmerger performance; therefore, in Panel C we examine metrics that combine both. The first is the acquirer's postmerger excess return times

**TABLE 6. Measures of Overvaluation and Long-Run Performance.**

Panel A. Regressions of Retention Rates on Rhodes-Kropf, Robinson, and Viswanathan (2005) Market-to Book Decomposition				
Model:	(1)	(2)	(3)	(4)
Regression Approach:	OLS	OLS	Probit	Probit
Retention Rate:	Postmerger	Premerger	Postmerger	Premerger
<i>RKR</i> Overvaluation	0.0909** (.019)	0.0514*** (<.001)	0.0601*** (<.001)	0.0576*** (<.001)
<i>RKR</i> Long Run Value-to-Book	0.0735* (.080)	0.0304** (.014)	0.0426*** (.001)	0.0286** (.019)
Control variables	Yes	Yes	Yes	Yes
Observations	3,215	3,759	3,215	3,759
Adjusted $R^2$	4.1%	8.9%		
Pseudo $R^2$			7.3%	8.1%

  

Panel B. Postmerger Acquirer Stock Performance by Acquirer P/B Quartiles				
Acquirer P/B Quartile:	1 (Lowest)	2	3	4 (Highest)
Median excess return	-21%	-29%	-33%	-46%
$p$ -value: lowest = highest				(<.001)
Mean excess return	-1%	-24%	-31%	-40%
$p$ -value: lowest = highest				(<.001)
Median alpha	-0.01%	-0.08%	-0.07%	-0.22%
$p$ -value: lowest = highest				(.042)
Mean alpha	-0.05%	-0.24%	-0.15%	-0.50%
$p$ -value: lowest = highest				(.013)

  

Panel C. Postmerger Acquirer Stock Performance*Retention Rate by Acquirer P/B Quartiles				
Acquirer P/B Quartile:	1 (Lowest)	2	3	4 (Highest)
Mean (Excess Return*Retention Rate)	-0.86%	-9.51%	-13.57%	-24.95%
$p$ -value: lowest = highest				(<.001)
Mean (Alpha*Retention Rate)	-0.07%	-0.27%	-0.21%	-0.48%
$p$ -value: lowest = highest				(.011)

Note: The merger sample includes completed stock-for-stock mergers in which both the acquirer and target are listed on the NYSE, AMEX, or NASDAQ during 1980–2006. Institutions we study comprise those that own at least 1% of the target and no shares of the acquirer at the latest quarter-end preceding the merger announcement. In Panel A, models (1) and (2) report ordinary least squares (OLS) regressions explaining *Postmerger Retention Rate* and *Premerger Retention Rate*, respectively. Models (3) and (4) report probit regressions explaining whether *Postmerger* or *Premerger Retention Rate*, respectively, is greater than the sample median. The specifications in Panel A replace the acquirer's price-to-book measure with the market-to-book decomposition factors in Rhodes-Kropf, Robinson, and Viswanathan (2005). Specifically, the regressions include *RKR* Overvaluation (which we define as the sum of the firm-specific error and the time-series sector error from Rhodes-Kropf, Robinson, and Viswanathan 2005) and *RKR* Long Run Value-to-Book from Rhodes-Kropf, Robinson, and Viswanathan, as well as the control variables from model (3) in Table 3 (which are not shown for brevity). The coefficients reported in the first row are marginal effects and the second row reports the two-tailed  $p$ -value in parentheses adjusted for clustering by merger. All regressions include year dummies and 48 Fama–French industry dummies. Panel B reports means and medians of postmerger acquirer stock performance for each acquirer P/B quartile for the 36-month period beginning the month after merger completion. *Acquirer P/B*, the price-to-book ratio of equity of the acquirer, is the ratio of the market value of equity to the book value of equity. *Excess Return* is defined as acquirer return minus market return. *Alpha* is the intercept from a Fama–French four-factor regression model. The CRSP value-weighted return is used for the market return for both *Excess Return* and *Alpha*. The  $p$ -values in Panel B test the null hypotheses that the means or medians are equal for the lowest and highest acquirer P/B quartile. Panel C reports the mean of the product (winsorized at the 1% and 99% levels) of *Excess Return* or *Alpha* with the *Postmerger Retention Rate* for each acquirer P/B quartile. The  $p$ -values in Panels C are for tests of the null hypotheses that the mean of the product is equal for the lowest and highest acquirer P/B quartile.

\*\*\*Significant at the 1% level.

\*\*Significant at the 5% level.

\*Significant at the 10% level.

the institution's postmerger retention rate,  $Excess\ Return \times Retention\ Rate$ . Similarly, we also construct a metric using the acquirer's alpha,  $Alpha \times Retention\ Rate$ .<sup>12</sup> Both metrics are significantly more negative in the highest acquirer price-to-book quartile, which implies that institutions are made worse off, on average, by how their trading differs across acquirers' price-to-book ratios.<sup>13</sup>

### *The Effect of Investment Style Preferences*

In practice, valuation metrics such as the price-to-book and market-to-book ratios are often used to indicate whether the acquirer is a growth (high- $P/B$ ) or value (low- $P/B$ ) stock. Hence, it is possible that our main results are due to institutions following their style preferences with respect to value or growth stocks. Additionally, it may also be the case that size preferences (small or large market capitalizations) affect retention rates.

Given the earlier results showing that rebalancing is more pronounced when measured after the merger, we focus our analysis on how the relation between *Postmerger Retention Rate* and *Acquirer P/B* is affected by institutional style preferences. As in Abarbanell, Bushee, and Raedy (2003), we group institutions into four mutually exclusive categories based on their style preferences: large-cap growth, large-cap value, small-cap growth, and small-cap value. We exclude 19 institutions (corresponding to 31 institution-merger observations) that cannot be classified, and the sample begins in 1981 (the first year for which we have style preference data). In Table 7 we first report univariate statistics for *Postmerger Retention Rate* for two broader categories: growth (which combines small- and large-cap growth institutions) and value (which combines small- and large-cap value institutions). The medians imply liquidations by at least half of institutions in both of the growth and value categories. When we categorize institutions into the four size-value/growth preference groups, we observe greater share retention for the large-growth and large-value groups. This is perhaps not surprising, as acquirers in the sample tend to be relatively large.

In Table 8 we estimate regressions to explain *Postmerger Retention Rate* for each of the six subsamples reported in Table 7. In model (1) we report a regression on the sample of growth-oriented institutions. The coefficient on  $\text{Log}(\text{Acquirer } P/B)$  is 0.128 and the  $p$ -value is .002, implying that the share retention by these firms is increasing in the acquirer's price-to-book. In model (2) we also find a preference by value-oriented firms for higher acquirer price-to-book (coefficient of 0.113 and  $p$ -value of .024). The magnitude of the effect for the value-oriented firms is similar to that for the growth-oriented firms. Thus, there appears to be a general preference for higher price-to-book acquirers regardless of preferences for growth versus value.

<sup>12</sup>We winsorize each metric at the top and bottom 1% level. Note we do not report medians in the table because of median postmerger retention rates being zero (see Table 2), medians of each metric are also zero in each *Acquirer P/B* quartile.

<sup>13</sup>In untabulated results, we repeat the analysis by limiting the sample to institutions that do not liquidate their holdings, which allows us to investigate whether the results in Panel C are merely driven by liquidation decisions. Although the medians for  $Alpha \times Retention\ Rate$  do not statistically differ across *Acquirer P/B* quartiles, the medians for  $Excess\ Return \times Retention\ Rate$  and the means for both  $Excess\ Return \times Retention\ Rate$  and  $Alpha\ Return \times Retention\ Rate$  are significantly more negative in the highest *Acquirer P/B* quartile ( $p$ -values range from < .001 to .013).



**TABLE 7. Postmerger Retention Rate by Institutional Style Preference.**

	Growth	Value	Large Growth	Large Value	Small Growth	Small Value
Mean	54%	57%	76%	74%	48%	48%
Top quartile	66%	79%	100%	100%	54%	59%
Median	0%	0%	5%	8%	0%	0%
Bottom quartile	0%	0%	0%	0%	0%	0%
Observations	2,175	1,408	444	470	1,731	938

Note: The merger sample includes completed stock-for-stock mergers in which both the acquirer and target are listed on the NYSE, AMEX, or NASDAQ during 1981–2006. Institutions we study comprise those that own at least 1% of the target and no shares of the acquirer at the latest quarter-end preceding the merger announcement. *Postmerger Retention Rate* is the number of postmerger acquirer shares owned (measured at the second quarter-end after the effective date) divided by the number of expected shares owned assuming all target shares owned before the announcement were held and converted into acquirer shares at the exchange ratio, winsorized at the top 1%. Institutional style preference is based on the institution's preference for large versus small market capitalization firms and value versus growth firms as in Abarbanell, Bushee, and Raedy (2003).

In model (3) we narrow the focus to large-cap, growth-oriented institutions. The key variable of interest is  $Acq\ P/B\ TopQ \times Acq\ Size\ TopQ$ , which is an indicator variable set to 1 for deals in which the acquirer is in the top sample quartile of both *P/B* and size. This variable identifies deals that may be particularly appealing to institutions that prefer large-cap, growth stocks, and its coefficient and *p*-value are 1.381 and .029, respectively. The coefficient, which exceeds 1, and the significance level confirm a strong style effect in which these institutions are net buyers in deals that are more likely to conform to their style preference.

In model (4) we report a regression estimated with the large-cap, value-oriented institutions. The indicator variable on  $Acq\ P/B\ BotQ \times Acq\ Size\ TopQ$ , which is set to 1 for deals these institutions are more likely to prefer (those with lower acquirer *P/B* and larger size) is not significant. It may be that there are few acquirers in the sample that these institutions view as truly being “value stocks” because acquirers in stock-driven acquisitions tend to have higher price-to-book values than targets (see Table 1).

Turning the focus to small-cap, growth-oriented institutions, in untabulated results we include the variable  $Acq\ P/B\ TopQ \times Acq\ Size\ BotQ$  and find it is not significant. It is unlikely, however, to find acquirers in our sample that will sufficiently appeal to small-cap-oriented institutions on the basis of size. As Panel A of Table 1 shows, the acquirers in the sample tend to be considerably larger than the targets. Hence, in model (5) we include  $Acq\ P/B\ BotQ \times Acq\ Size\ TopQ$ , which identifies deals these institutions should particularly dislike on the basis of both size and price-to-book. Indeed, the coefficient of this variable is negative and statistically significant. The coefficient's value of  $-0.555$  suggests that controlling for other factors, these institutions retain 55.5% fewer shares when the acquirer is in the bottom quartile of *P/B* and the top quartile of size.

Finally, when we only include small-cap, value-oriented institutions in the regression, in untabulated results we find that an indicator variable defined to identify deals these institutions are more likely to prefer ( $Acq\ P/B\ BotQ \times Acq\ Bot\ TopQ$ ) is not significant. As before, we conjecture this is because there are few sample deals that actually have small-cap acquirers. Therefore, in model (6) we once again focus on identifying deals

these institutions should particularly dislike, in this case by including  $Acq\ P/B\ TopQ \times Acq\ Size\ TopQ$ . This variable is insignificant. However, we do observe a negative and significant coefficient on  $Acq\ Size\ TopQ$ , an indicator variable set to 1 if the acquirer's size is in the top quartile. The negative, significant coefficient is consistent with a dislike of larger acquirers.

**TABLE 8. OLS Regressions Explaining Postmerger Retention Rate by Institutional Style Preference.**

	(1) Growth	(2) Value	(3) Large Growth	(4) Large Value	(5) Small Growth	(6) Small Value
$\text{Log}(Acquirer\ P/B)$	0.1284*** (.002)	0.1132** (.024)				
$\text{Log}(Acquirer\ Size)$	-0.0674** (.029)	-0.0302 (.347)				
$Acq\ P/B\ TopQ$			0.2649 (.400)			0.0971 (.570)
$Acq\ P/B\ BotQ$				0.0594 (.780)	0.0301 (.744)	
$Acq\ Size\ TopQ$			-0.2050 (.467)	-0.3112 (.245)	0.0559 (.583)	-0.3362** (.012)
$Acq\ P/B\ TopQ \times Acq\ Size\ TopQ$			1.3806** (.029)			-0.0072 (.972)
$Acq\ P/B\ BotQ \times Acq\ Size\ TopQ$				0.1456 (.812)	-0.5550*** ( $<.001$ )	
$\text{Log}(Target\ P/B)$	0.0675 (.133)	0.0067 (.882)	0.1264 (.336)	0.0539 (.595)	0.0416 (.310)	0.0068 (.897)
$\text{Log}(Scaled\ Inst\ Size)$	0.1147*** ( $<.001$ )	0.1276*** ( $<.001$ )	0.1203** (.019)	0.1147* (.075)	0.0945*** ( $<.001$ )	0.1485*** ( $<.001$ )
$Percent\ of\ Portfolio$	1.2486 (.104)	1.3348 (.157)	-15.2549* (.083)	27.6928* (.068)	0.7374 (.349)	1.9604* (.072)
$\text{Log}(Relative\ Acq\ Size)$	0.0297 (.393)	0.0324 (.535)	0.1154* (.098)	0.1655* (.080)	-0.0425 (.171)	0.0399 (.386)
$Acquirer\ Leverage$	-0.0318 (.869)	0.2565 (.241)	-0.1692 (.734)	-0.0186 (.969)	-0.0391 (.848)	0.3520 (.131)
$Nondiversifying$	-0.0141 (.816)	0.0136 (.856)	0.1111 (.451)	0.3276* (.068)	-0.0295 (.673)	-0.1230 (.145)
$ACAR(-1,+1)$	0.4999 (.130)	0.8062* (.065)	0.1944 (.766)	0.5774 (.494)	0.5247 (.193)	0.8974 (.102)
$TCAR(-1,+1)$	-0.1642 (.224)	0.0516 (.872)	-0.2756 (.468)	0.2393 (.796)	-0.2717* (.070)	0.0197 (.936)
$Change\ in\ Acquirer\ P/B$	-0.0013 (.647)	-0.0079** (.035)	0.0066 (.301)	0.0076 (.321)	0.0021 (.455)	-0.0097** (.047)
$Days\ to\ Completion$	-0.0001 (.846)	-0.0001 (.704)	0.0006 (.799)	-0.0004 (.596)	-0.0012* (.079)	-0.0000 (.974)
$Average\ Inst\ Trading$	-0.2194 (.411)	-0.1552 (.440)	-1.1966 (.272)	-0.5679 (.197)	-0.1636 (.441)	-0.1193 (.615)
Constant	1.2841** (.041)	-0.1495 (.663)	-1.8009* (.053)	0.6737 (.400)	1.8717*** ( $<.001$ )	0.1843 (.630)
Observations	1,872	1,261	384	404	1,488	857
Adjusted $R^2$	3.7%	2.9%	13.1%	-2.8%	3.0%	3.0%

(Continued)

TABLE 8. Continued.

Note: The merger sample includes completed stock-for-stock mergers in which both the acquirer and target are listed on the NYSE, AMEX, or NASDAQ during 1981–2006. Institutions we study comprise those that own at least 1% of the target and no shares of the acquirer at the latest quarter-end preceding the merger announcement. Those included in the analysis are the institutions we can be classified into ownership style preferences according to Abarbanell, Bushee, and Raedy (2003). The dependent variable is *Postmerger Retention Rate*, the number of postmerger acquirer shares owned (measured at the second quarter-end after the effective date) divided by the number of expected shares owned assuming all target shares owned before the announcement were held and converted into acquirer shares at the exchange ratio, winsorized at the top 1%. *Acq P/B TopQ* (or *Acq P/B BotQ*) is an indicator variable set to 1 if the acquirer's *P/B* is in the sample top (or bottom) quartile. *P/B* is the ratio of the market value of equity to the book value of equity where market value is measured 20 days before the merger announcement and book value is measured at the end of the fiscal year immediately preceding the announcement date. *Acq Size TopQ* is an indicator variable set to 1 if the acquirer's market capitalization 20 days before the merger announcement is in the top sample quartile. *Target P/B* is the price-to-book ratio of the target, defined similarly to that of the acquirer. *Scaled Inst Size* is the total market value of stock ownership by the institution divided by the total market capitalization of stocks covered on CRSP, measured 20 trading days before deal announcement. *Percent of Portfolio* is the percent of the institution's portfolio invested in the target. *Relative Acq Size* is the size of the acquirer divided by the size of the target, where size is the market value of equity 20 trading days before deal announcement. *Acquirer Leverage* is computed as at the end of the fiscal year immediately preceding the announcement date as total debt (data item 9 + data item 34) divided by total assets (data item 6). *Nondiversifying* is an indicator variable set to 1 if the acquirer and target share the same three-digit Standard Industrial Classification (SIC) code. *ACAR(-1,+1)* is the three-day period cumulative abnormal return for the acquirer's stock around the announcement date (day 0) using the market model with the CRSP value-weighted market return. *TCAR(-1,+1)* is similarly defined for the target stock. *Change in Acquirer P/B* is *Acquirer P/B* minus the *P/B* of the acquirer measured one year prior. *Days to Completion* is the number of calendar days between the announcement date and the effective date of the merger. *Avg Inst Trading* is a measure of institutional trading (across many institutions) before the announcement, where positive (negative) values indicate buying (selling) on average. For each coefficient, the second row reports the two-tailed *p*-value in parentheses adjusted for clustering by merger. All regressions include year dummies and 48 Fama–French industry dummies.

\*\*\*Significant at the 1% level.

\*\*Significant at the 5% level.

\*Significant at the 10% level.

To summarize, the strongest style preferences are observed for institutions that favor growth stocks. The regressions show that large-cap, growth-oriented institutions are net buyers in deals whose acquirers fit their preferences. Furthermore, small-cap, growth-oriented institutions retain fewer shares in deals whose acquirers do not fit their preferences.

## VI. Conclusion

In this article we study the trading behavior of institutions that own meaningful stakes in target firms but not in the acquirers in completed stock-for-stock acquisitions. Theoretical and empirical evidence in the literature commonly associates such deals with overvalued acquirer stock. We investigate whether trading by institutional owners of the target is affected by the degree to which the acquirer stock is potentially overvalued on the basis of widely used valuation ratios such as price-to-book of equity and market-to-book of assets.

One possibility is that institutions recognize overvaluation and sell more aggressively in deals in which the acquirer is more likely overvalued (Shleifer and Vishny 2003).

Examining more than 1,000 completed stock-financed deals during 1980–2006, we find the opposite. Although 56% of institutions in our sample liquidate their shares, consistent with high rates of institutional share turnover documented in the prior literature, such liquidations are significantly less likely when the acquirer has a higher price-to-book value of equity or market-to-book of asset values. Further investigation reveals this is particularly true for institutions that favor large, growth stocks in their holdings—on average, these institutions are net buyers in deals with large acquirers that have high valuation ratios. Institutions with other style preferences are net sellers on average, but their trading is nonetheless affected by their style preferences. We also find that postmerger returns appear to be worse for acquirers with higher valuation ratios and that share retention rates are higher in deals with higher degrees of overvaluation as measured by Rhodes-Kropf, Robinson, and Vishwanathan's (2005) market-to-book decomposition method.

Overall, the evidence suggests that, perhaps in part due to style preferences, institutions do not appear on average to trade in a manner that is consistent with recognizing and responding to acquirer overvaluation in stock-financed acquisitions as measured by widely used valuation measures as well as the market-to-book decomposition in Rhodes-Kropf, Robinson, and Vishwanathan (2005). In light of target management's incentives often being skewed by the acceleration of stock option exercise, severance pay, or employment deals (Shleifer and Vishny 2003), our results may help reconcile why target firms accept stock-financed deals that, on average, appear to have poorer long-term performance than cash deals (e.g., Loughran and Vijh 1997; Mitchell and Stafford 2000).

Our results also highlight the importance of shareholder composition along a dimension that is only recently beginning to be explored, namely, institutional investor style preferences (e.g., see Abarbanell, Bushee, and Raedy 2003). Examining the effects of such style preferences on other corporate events should provide fertile ground for future research.

## Appendix: Variable Definitions

### *Institution Variables*

*Institution Size*: The aggregate market value of stock ownership across all holdings by the institution at the latest quarter-end before the deal announcement.

*Percent of Portfolio*: The dollar value of holdings in the target stock divided by *Institution Size*, measured at the latest quarter-end before the deal announcement, expressed as a percent.

*Postmerger Retention Rate*: The number of postmerger acquirer shares owned (measured at the second quarter-end after the effective date) divided by the number of expected shares owned assuming all target shares owned before the announcement were held and converted into acquirer shares at the exchange ratio, winsorized at the top 1%.

*Preannouncement Holdings*: The percent of target stock owned by the institution at the latest quarter-end before the deal announcement.

*Premerger Retention Rate*: The number of target shares owned at the latest quarter-end before the merger's effective date divided by the number of shares owned at the latest quarter-end before the merger announcement, winsorized at the top 1%.

*Scaled Inst Size: Institution Size* divided by the total market capitalization of stocks covered on the Center for Research in Security Prices (CRSP), measured 20 trading days before the deal announcement.

### *Institutional Style Variables*

The investment style classifications are based on each institution's preference for large versus small market capitalization firms and value versus growth firms as described in Abarbanell, Bushee, and Raedy (2003).

### *Merger Variables*

*ACAR*(-1, +1): The acquirer's announcement-period cumulative abnormal return (CAR), computed for the three-day period around the acquisition announcement date (day 0) using the market model (trading days -250 to -20 before deal announcement) using the CRSP value-weighted market return.

*Acquirer Leverage*: Total debt divided by total asset, computed at the latest fiscal year-end before the deal announcement date.

*Acquirer MA/BA*: The market-to-book value of assets of the acquirer, which is the ratio of the market value of equity plus the book value of liabilities to the book value of assets. Book value of assets is defined as total assets and book value of liabilities is defined as total liabilities, measured at the latest fiscal year-end before the deal announcement. Market value of equity is from CRSP and is measured 20 trading days before the acquisition announcement date. *MA/BA* is winsorized at the 1% and 99% levels.

*Acquirer P/B*: The acquirer's price-to-book value of equity, which is the ratio of the market value of equity to the book value of equity. Market value of equity is measured 20 trading days before deal announcement, and book equity is measured at the end of the latest fiscal year the deal announcement. When a firm has negative book value, following Dong et al. (2006), we assign the maximum value of *P/B* in the sample (after winsorizing *P/B* at 1% and 99%).

*Acquirer P/B TopQ*: An indicator variable set to 1 if *Acquirer P/B* is in the top sample quartile.

*Acquirer Size*: Market value of common equity of the acquirer from CRSP, measured 20 trading days before deal announcement.

*Alpha*: The acquirer's alpha from a Fama-French four-factor regression model (returns over the risk-free rate regressed on the CRSP market return, HML, SMB, and Carhart's momentum factor) using 36 monthly returns beginning the month after the merger's completion.

*Average Inst Trading*: The weighted average cumulative abnormal return of the target and acquirer firms measured over trading days -63 to +126 relative to the merger announcement date using a market model (estimated over 318 to 64 trading days before the merger announcement date using the CRSP value-weighted index for the market return).

*Change in Acquirer P/B*: *Acquirer P/B* minus the *P/B* of the acquirer measured one year prior.

*Days to Completion:* Number of days between the announcement date and the effective date of the merger.

*Excess Return:* The acquirer's return minus the market's return over the 36 months beginning the month after the merger's completion, where the CRSP value-weighted return is used for the market return.

*Nondiversifying:* An indicator variable set to 1 if the acquirer and target share the same three-digit Standard Industrial Classification (SIC) code.

*Relative Acquirer Size:* Market value of common equity of the acquirer divided by the market value of common equity of the target, both taken from CRSP, measured 20 trading days before deal announcement.

*Relative P/B:* The ratio of the acquirer's price-to-book ratio to that of the target's.

*RKRV Long-Run Value-to-Book:* The acquirer's long-run value-to-book from the market-to-book decomposition in Rhodes-Kropf, Robinson, and Vishwanathan (2005).

*RKRV Overvaluation:* The sum of the acquirer's firm-specific error and time series sector error from the market-to-book decomposition in Rhodes-Kropf, Robinson, and Vishwanathan (2005).

*TCAR(-1, +1) :* The target's three-day announcement return, defined similar to *ACAR(-1,+1)*.

*Target Leverage:* Leverage ratio of the target, defined similar to *Acquirer Leverage*.

*Target MA/BA:* The market-to-book value of assets of the target, defined similar to *Acquirer MA/BA*.

*Target P/B:* The target's price-to-book value of equity, defined similar to *Acquirer P/B*.

*Target Size:* The target's size, defined similar to *Acquirer Size*.

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