JOURNAL OF FINANCIAL AND QUANTITATIVE ANALYSIS Vol. 48, No. 4, Aug. 2013, pp. 1025–1055

doi:10.1017/S0022109013000379

Do Overvaluation-Driven Stock Acquisitions Really Benefit Acquirer Shareholders?

Mehmet E. Akbulut*

Abstract

I study the effects of overvalued equity on acquisition activity and shareholder wealth, using managers' insider trades to measure overvaluation. I find that overvalued equity drives managers to make stock acquisitions, and such acquisitions destroy value for acquirer shareholders. Overvalued stock acquirers earn negative and lower returns in the short run and substantially underperform similarly overvalued nonacquirer firms in the long run. My results do not support the idea that managers can benefit shareholders by converting overvalued equity into real assets through stock acquisitions.

I. Introduction

Do managers opportunistically engage in costly acquisition sprees for stock when they perceive their own company stock as overvalued? A growing body of empirical and anecdotal evidence seems to suggest this is the case. What is not so clear is whether such acquisitions create value for acquirer shareholders in the long run.

The positive relationship between high stock market valuations and acquisition activity is well documented: It has been known as early as Nelson (1959) that acquisition activity peaks in periods of high market valuations. More recently, Shleifer and Vishny (SV) (2003) and Rhodes-Kropf and Viswanathan (RKV) (2004) model the effect of stock market valuations on acquisition activity. Both models predict that firms will be more likely to buy other firms using stock when they are overvalued. SV also note that long-run returns to stock acquirers will be negative due to the eventual correction of overvaluation; but despite that, they

*Akbulut, makbulut@fullerton.edu, Mihaylo School of Business, California State University Fullerton, PO Box 34080, Fullerton, CA 92834. I am indebted to John Matsusaka for his generous support and encouragement. I also thank Harry DeAngelo, Jeffrey Hurok, Paul Malatesta (the editor), Pedro Matos, Kevin Murphy, David Offenberg, Micah Officer, Oguzhan Ozbas, and Ralph Walkling (associate editor and referee) for their feedback and seminar participants at University of Southern California, Loyola Marymount University, and California State University Fullerton for helpful suggestions. Earlier versions of this paper were circulated under the titles "Market Misvaluation and Merger Activity: Evidence from Managerial Insider Trading" and "Market Misvaluation and Merger Activity: What Do Managers' Insider Trades Tell Us?"

argue, such acquisitions serve the long-term interests of acquirer shareholders. Empirical tests of these models generally find support for their predictions.[1] But it is still not clear from the literature whether overvaluation-driven stock acquisitions serve the long-term interests of acquirer shareholders. The existing studies provide mixed results.[2]

Another issue of much debate in the literature is how best to measure misvaluation. One way is to measure overvaluation ex post, by looking at long-run abnormal stock returns.[3] Another way is to use accounting multiples like market-to-book (MB) ratio.[4] Alternatively, one can assume that all stock acquisitions must have been motivated by some degree of overvaluation (Lu and Savor (2009)). All of these methods have their merits and shortcomings. There is much debate about whether evidence of abnormal long-run post-event average returns implies stock market inefficiency with respect to the event.[5] Accounting multiples might be proxying for effects other than misvaluation. For example, the MB ratio may also capture risk,[6] growth opportunities, information asymmetry, or managerial discipline. While it may be true that all stock acquisitions might have been driven by overvaluation, this approach does not help one measure the extent of overvaluation within stock acquisitions.

My goal in this paper is twofold: First, I want to study the effects of overvalued equity on acquisition activity by using a new measure of misvaluation that is not based on accounting inputs or method of payment. Second, I want to examine whether overvaluation-driven stock acquisitions really benefit acquirer shareholders in the long run.

I use managers' insider trades to measure misvaluation. This approach is different from the MB and residual income model-based approaches that are prevalent in the literature. It emerges from the following natural thought experiment: If managers are trying to exchange the overvalued stock of their company for real assets through acquisitions, shouldn't they do the same with the shares they own? If this is the case, then they must be selling more and buying less than usual in their personal portfolios when they think their shares are overvalued. There is a vast insider trading literature that documents that managerial insider trades are informed trades.[7] This is because managers have better information about the true value of the firm and opportunistically use this in their trading.[8] Perhaps most

[1] See Rhodes-Kropf, Robinson, and Viswanathan (RKRV) (2005), Dong, Hirshleifer, Richardson, and Teoh (DHRT) (2006), and Lu and Savor (2009) among others.

[2] Ang and Cheng (2006), Lu and Savor (2009), and Ma, Whidbee, and Zhang (2011) find evidence for value creation through such deals, whereas Song (2007) and Fu, Lin, and Officer (2013) find the opposite result.

[3] See Loughran and Vijh (1997).

[4] For example, RKRV (2005) use MB ratio decomposition as a measure of misvaluation, whereas DHRT (2006) use the ratio of price to book value of equity (PB) and the ratio of price to residual income model value (PV).

[5] See Fama (1998), Loughran and Ritter (2000), and Mitchell and Stafford (2001).

[6] See Daniel, Hirshleifer, and Subrahmanyam (2001) and Barberis and Huang (2001).

[7] See Seyhun (1986), (1988), Rozeff and Zaman (1988), and Jeng, Metrick, and Zeckhauser (1999), among others.

[8] See the Internet Appendix (www.jfqa.org) for a detailed review of the literature on informed trading by corporate insiders.

related to my topic, SV (2003) explicitly mention increased insider selling by acquirer managers as one of the signs of overvaluation.

At this point, one might ask: Why don't managers sell all their holdings when they think the stock is overvalued? And if they sell their shares, why would they bother making acquisitions that, according to the SV (2003) model, would benefit long-run shareholders? There are at least three reasons why managers cannot freely sell their overvalued stock: First, most firms restrict how and when insiders can trade. There are vesting restrictions that prevent managers from selling part of their stock and option holdings.[9] Firms might also require a certain level of stock ownership from their managers.[10] There are also restrictions on when managers can sell stock.[11] Second, Section 10(b) of the Securities Exchange Act of 1933 and Securities and Exchange Commission (SEC) rule 10(b)-5 prohibit corporate insiders from trading on the basis of material, nonpublic information. Finally, managers may be reluctant to sell sizable portions of their holdings due to signaling and reputation reasons. Because of these limitations on insider trading, managers may find their incentives aligned more closely with those of long-term shareholders than short-term shareholders. As a result, they will still have incentive to convert overvalued shares into real assets to achieve long-term value.[12]

Despite this extensive evidence on how managers use their superior information about firm value in their trades, the existing literature on misvaluation-driven acquisitions largely ignores managerial insider trading as a way to measure misvaluation. Granted, there are several difficulties in measuring misvaluation from managerial trades. Managerial trades are infrequent in nature; most of the time managers do not trade at all. And when they do trade, they might be doing it for a variety of noninformational reasons like portfolio rebalancing after a recent stock price run-up, or due to certain individual- and firm-specific factors. The existing methods of measuring misvaluation from managerial trading do not address these problems; the typical method is to use a binary measure of managerial trading, which shows whether managers are "pure sellers" or "pure purchasers" in company stock before the event.[13] However, these measures are arbitrarily discrete and may not control for other factors that might influence managerial trading.[14]

[9]See Kahl, Liu, and Longstaff (2003) for a detailed discussion of liquidity restrictions on chief executive officer (CEO) holdings.

[10]Cai and Vijh (2007) find that for a subsample of 457 acquirer and target firms, 21.4% have explicit ownership requirements, whereas 43% state in their proxy statements that the board expects substantial ownership by top executives.

[11]Bettis, Coles, and Lemmon (2000) find for a sample of 626 firms that 78% of them have blackout periods, during which the insiders are not allowed to trade their firm's stock.

[12]One cannot rule out the possibility that managers in some firms will have fewer such restrictions allowing them to more easily dispose of their stock when it is overvalued. As a result, not all overvalued firms will follow this strategy. Also, even within the same firm, there may still be some managers who will be able to sell all their holdings, since these restrictions on insider trading will probably not affect every manager in the same way. But it would be quite surprising to observe managers, as a group, selling all their holdings, since one would expect the restrictions to bind for at least some of them. Since my measure aggregates the trades of all managers, it will capture the trades of both those who sell completely and those who, feeling the pressure of the restrictions, will not be able to sell freely.

[13]For example, Lee (1997) uses this measure for equity issues, and Song (2007) uses it for acquisitions.

[14]More comprehensive insider trading measures do exist: Core, Guay, Richardson, and Verdi (2006) develop an abnormal insider trading measure to examine the relation between insider trading

In order to get around these difficulties, I create an abnormal insider trading measure that controls for normal insider trading activities. To do this, I run quarterly cross-sectional regressions of each manager's trading on individual- and firm-level control variables. The residuals from these regressions then represent abnormal trading. I argue that those managers who are abnormally selling more (less) and buying less (more) of their own company shares perceive their firm to be overvalued (undervalued). Accordingly, higher levels of abnormal net selling represent higher levels of overvaluation, and higher levels of abnormal net buying represent higher levels of undervaluation.

I then study the effects of overvalued equity on acquisition activity and shareholder wealth using abnormal insider trading to measure misvaluation. I find that overvalued equity drives managers to make stock acquisitions, and such acquisitions destroy, rather than create, value for acquirer firm shareholders. Abnormal insider trading predicts acquisition timing and method of payment decisions as well as acquisition announcement returns and post-acquisition long-run abnormal returns. More specifically, acquirers whose managers sell more in the previous 2 quarters are more likely to attempt stock acquisitions in the current quarter, and the subsequent acquisitions have negative and lower announcement and long-run abnormal returns. For example, overvalued firms are 7.6% more likely to make a bid in the current quarter, and conditional on making a bid, they are 17.3% more likely to use stock as a method of payment. In the cross section of all acquirers, overvalued acquirers have 21% higher probability of using stock as a method of payment. In stock acquisitions, overvalued acquirers get 0.82% less announcement cumulative abnormal return (CAR). Overvalued firms that announce stock acquisitions underperform similarly overvalued firms that do not undertake any acquisitions by 17.8% and 19.4% in 3 years using buy-and-hold abnormal return (BHAR) and calendar-time portfolio regression (CTPR) methods, respectively. Deals announced by overvalued stock acquirers are perceived as having no positive synergies (and lower synergies than deals announced by stock acquirers that are not overvalued), and they result in a worsening of operating performance following the completion of the deal. This suggests that using stock acquisitions to take advantage of overvalued equity is a value-destroying strategy for acquirer shareholders in the long run.

II. Data and Method

A. Sample Construction

I search the Securities Data Company (SDC) Platinum Mergers and Acquisitions (M&A) database for all acquisition bids by public acquirers for public, private, subsidiary, and other targets[15] from Jan. 1993 to Dec. 2009 where:

and the trading strategies suggested by the operating accruals and the post-earnings announcement drift anomalies. But to the best of my knowledge, no such comprehensive measure is used in the context of misvaluation-driven acquisitions theory so far.

[15]I do not restrict my sample to acquisition attempts involving only public targets. I am primarily interested in how acquirer misvaluation affects acquisition activity and acquirer shareholder wealth; it is not my primary focus to measure target misvaluation. By including acquisition attempts of both

- Deal form is "Merger" or "Acquisition of Assets."[16]
- The deal value is at least $10 million and it represents at least 1% of the acquirer's pre-bid market value.
- The acquirer owns less than 50% of the target prior to the acquisition and buys the rest with the acquisition.
- Acquirer's share code is 10 or 11 (excluding foreign firms, American depositary receipts (ADRs), and real estate investment trusts (REITs)).
- Insider trading data for the acquirer are available in the Thomson Financial Insiders Database.
- Data on method of payment[17] are available.
- There is price and return data for both acquirer and target in the University of Chicago's Center for Research in Security Prices (CRSP) database.

These requirements result in a final sample size of 11,796 deals, of which 5,870 are acquisitions of assets and 5,926 are mergers. Next, I form a 2nd, smaller sample to measure certain managerial characteristics like total compensation and the ratio of equity to total compensation, which are not reported in the Thomson Financial Insiders Database. To get this data, I match the full sample to Compustat's Executive Compensation Database (ExecuComp) and call this the ExecuComp-matched sample. This sample has 6,402 deals, of which 3,230 are mergers and 3,172 are acquisitions of assets. Panel A of Table 1 describes the full acquisition sample.

Stock is the most common form of payment in mergers (40%), whereas cash is the dominant payment choice in acquisitions of assets (72%). Merger is the deal form of choice when acquiring public targets, whereas subsidiaries and private targets are more likely to be acquired through acquisition of assets. Stock deals are much more prevalent in the earlier half of the sample (1993–2000), peaking during the late 1990s at the height of the dot.com bubble. Panel B of Table 1 describes the ExecuComp-matched sample. Cash deals and public targets are somewhat more common in this subsample, but overall, matching to ExecuComp does not shift the sample toward a particular method of payment, deal form, or target type.

private and public targets and subsidiaries, I achieve a larger sample size, which increases the power of my tests.

[16]I do not restrict my sample to mergers only. Both deal types result in a transfer of the control rights of the assets from the seller to the acquirer. Since my aim is to examine acquirers' attempts to exchange overvalued stock with real assets, I do not make any distinction as to how the target's assets are acquired. Netter, Stegemoller, and Wintoki (2011) argue a similar point: "To the seller, the implications of an asset sale may have little in common with a merger. However, it is not clear what distinction to make, if any, among these transactions when the acquirer is the party-of-interest."

[17]The method of payment data reported by SDC are known to have discrepancies. I amend the reported method of payment data using the corrections made by Pinkowitz, Sturgess, and Williamson (2013) based on hand-collected data. I thank the authors for making the list of corrections available to me.

TABLE 1

Descriptive Statistics: Acquisition Data

Table 1 summarizes the acquisition sample by year. Acquisition sample comes from Securities Data Company (SDC) Platinum Mergers and Acquisitions Database and includes all acquisition bids and tender offers where the acquirer was listed on the NYSE, AMEX, or NASDAQ during 1993–2009. Panel A reports the results for the full sample and Panel B for the ExecuComp-matched sample. Full sample uses insider trading data from Thomson Financial Insiders Database for all managers as defined in footnote 21 of the text. ExecuComp-matched sample includes managers who are also present in the ExecuComp database, which reports data for the top 5 managers of the firm.

	Form of Deal			Method of Payment		
	Merger	Acq. of Assets	Total	Year	Stock	Cash
Panel A. Full Sample						
Method of Payment				1993	164	221
Stock	2,371	240	2,611	1994	250	289
Cash	1,750	4,250	6,000	1995	288	345
Stock and Cash	1,561	812	2,373	1996	288	390
Other	244	568	812	1997	380	425
				1998	371	496
Target's Public Status				1999	264	400
Public	3,280	37	3,317	2000	178	313
Private	2,152	2,735	4,887	2001	98	298
Subsidiary	471	3,068	3,539	2002	50	341
Other	23	30	53	2003	57	361
				2004	54	424
Deal Status				2005	46	425
Completed	5,387	5,382	10,769	2006	42	448
Withdrawn	439	129	568	2007	28	397
Pending	74	316	390	2008	25	280
Other	26	43	69	2009	28	147
Total	5,926	5,870	11,796	Total	2,611	6,000
Panel B. ExecuComp-Matched Sample						
Method of Payment				1993	57	80
Stock	1,209	120	1,329	1994	136	234
Cash	1,093	2,472	3,565	1995	155	259
Stock and Cash	817	307	1,124	1996	137	302
Other	111	273	384	1997	196	343
				1998	203	363
Target's Public Status				1999	140	356
Public	2,049	21	2,070	2000	95	282
Private	921	1,352	2,273	2001	57	307
Subsidiary	249	1,783	2,032	2002	29	330
Other	11	16	27	2003	30	346
				2004	27	347
Deal Status				2005	17	395
Completed	2,961	2,949	5,910	2006	19	368
Withdrawn	230	65	295	2007	10	363
Pending	25	133	158	2008	12	259
Other	14	25	39	2009	9	139
Total	3,230	3,172	6,402	Total	1,329	5,073

B. Misvaluation Measure Based on Managerial Insider Trading

To construct my misvaluation measure, I use insider trading data from the Thomson Financial Insiders Database, which lists the amount, type, and date of each trade as well as the title of the insider from Jan. 1993 to Dec. 2009.[18] I analyze direct open market sales, open market purchases, and purchases through

[18]Pursuant to Sections 16(a) and 23(a) of the Securities Exchange Act of 1934, and Sections 30(h) and 38 of the Investment Company Act of 1940, the corporate insiders must report changes in ownership to the SEC. The mean (median) time between the transaction date and when it becomes public (the date when it is reported to the SEC) is 29 (11) days for the entire sample period.

the exercise of options,[19] and delete inconsistent[20] and amended filings. I identify insiders who are managers by using the position descriptions in the database.[21] Since I am only interested in the managers' evaluation of their firms, I exclude institutional shareholders, trusts, large individual shareholders, and directors who are not also managers. Finally, I exclude the firms that could not be matched to the CRSP database based on the Committee on Uniform Securities Identification Procedures (CUSIP) code. This leaves 10,056 firms.

For each firm j in each quarter t, I measure abnormal insider trading using the firm's abnormal net purchase ratio (ANPR),[22] defined as

$$ANPR_{j,t} = Buy_{j,t} + Optbuy_{j,t} - Sell_{j,t},$$

where $Buy_{j,t}$ is the abnormal number of shares acquired through open market purchases during quarter t, $Optbuy_{j,t}$ is the abnormal number of shares acquired through the exercise of stock options,[23] and $Sell_{j,t}$ is the abnormal number of shares sold through open market sales, all expressed as a fraction of the number of shares of the firm outstanding at the beginning of the quarter. I calculate abnormal levels of these variables every quarter by running the following manager-level cross-sectional regression:[24]

$$\begin{aligned} Trading_{i,t} = {} & \beta_0 + \beta_1 \times Peer\ Trading_{i,t} + \beta_2 \times Self\ Trading_{i,t-4} \\ & + \beta_3 \times Ownership_{i,t} + \beta_4 \times Age_{i,t} + \beta_5 \times Tenure_{i,t} \\ & + \beta_6 \times Total\ Compensation_{i,t} \\ & + \beta_7 \times Ratio\ of\ Equity\ to\ Total\ Compensation_{i,t} \\ & + \beta_8\ Analyst\ Coverage_{j,t} \\ & + \beta_9 \times Fraction\ of\ Institutional\ Investors_{j,t} \\ & + \beta_{10} \times Conventration\ of\ Institutional\ Investors_{j,t} \\ & + \beta_{11} \times Share\ Turnover_{j,t} + \beta_{12} \times Size\ (Log\ Assets)_{j,t} \\ & + \beta_{13} \times Past\ Return_{j,t} + \beta_{14} \times Past\ Volatility_{j,t} \\ & + \beta_{15} \times Change\ in\ Volatility_{j,t} + \varepsilon_{it}. \end{aligned}$$

I run this regression every quarter separately for open market purchases, purchases through the exercise of options, and open market sales; hence, depending on the model, the dependent variable $Trading_{i,t}$ and the independent

[19]The transaction codes are "S" for open market sales, "P" for open market purchases, and "M" for purchases through the exercise of options.

[20]I delete observations with cleanse codes "A" and "S."

[21]The following position codes are used to identify managers: AV, C, CB, CEO, CFO, CI, CO, COO, CT, EVP, GC, GM, GP, H, O, OB, OD, OE, OT, OX, P, SVP, TR, VC, and VP.

[22]Similar ratios have been used extensively in the insider trading literature (see, e.g., Billett and Qian (2008), Core et al. (2006), and Beneish and Vargus (2002)).

[23]I include shares acquired through the exercise of options to better focus on sales that reflect managers' opinions about firm value, rather than sales immediately following option exercises that might be due to noninformational reasons like portfolio hedging. Billett and Qian (2008) argue the same point. See the Internet Appendix for details.

[24]I thank the referee for this suggestion.

variables *Peer Trading*$_{i,t}$[25] and *Self Trading*$_{i,t-4}$ represent number of shares acquired through open market purchases, number of shares acquired through option exercises, or number of shares sold through open market sales, all expressed as a fraction of the shares outstanding of the firm.[26] The residuals from these regressions then represent abnormal insider trading of manager i in firm j in quarter t. I then aggregate these residuals by firm to compute $Buy_{j,t}$, $Optbuy_{j,t}$, $Sell_{j,t}$, and consequently $ANPR_{j,t}$ for firm j. In the tests that follow, I always use 2 quarters worth of abnormal trading data: To see how managers were trading before a given event, I add up the ANPRs for the 2 quarters preceding the event quarter. More specifically, for each quarter t, I calculate the prior abnormal insider trading (PAIT) as

$$PAIT_{j,t} \quad = \quad ANPR_{j,t-1} + ANPR_{j,t-2}.$$

There are several advantages to computing abnormal insider trading this way. First, by running quarterly cross-sectional regressions, I allow the coefficients to change over time, which helps better account for the change in normal trading levels over time. Second, including the contemporaneous trading of a peer insider with similar individual (age, tenure, and ownership) and firm (size, past return) characteristics, as well as the past trading of the same insider, helps me control for normal trading levels across cross section and time. Third, including individual characteristics like ownership, tenure, age, form, and level of managerial compensation helps control for portfolio rebalancing, diversification, and liquidity-motivated trades of managers. Fourth, it allows controlling for certain firm characteristics that have been shown to influence insider trading activity, including stock run-up, size, volatility, and corporate governance. Managers mechanically sell more after recent increases in stock price in order to rebalance their portfolios. Managers in large firms tend to sell more.[27] Stock volatility and changes in volatility influence trading through a portfolio diversification motive.[28] Corporate governance may influence managerial trading activity as well. I use liquidity[29] (as measured by share turnover), analyst coverage, and fraction and concentration of institutional ownership as measures of corporate governance. Finally, using an abnormal insider trading measure helps me extract information from managerial inaction as well. One way managers will use their inside information about a firm's value is by not trading.[30] In fact, almost 80% of firms in the

[25] *Peer Trading*$_{i,t}$ is the trading activity of a peer insider during the current quarter. Each insider is matched to a peer based on firm size (same asset decile), past firm return (return within 10%), age (within 5 years), tenure (within 5 years), and the value of shareholdings (nearest dollar value of shareholdings, but within 50%), in that order. I also require that the firm of the peer insider is not an acquirer or a target in an acquisition during quarters $t - 4$ through $t + 1$.

[26] I normalize trading variables by dividing them by the number of shares of the firm outstanding in order to control for cross-sectional variation in the level of shares outstanding. The measurement of the rest of the independent variables is detailed in the caption to Table 2.

[27] Seyhun (1986) finds that insiders at small firms are net purchasers, while insiders at large firms are net sellers.

[28] Meulbroek (2000) shows that managers in more risky companies sell stock more aggressively.

[29] Chung, Elder, and Kim (2010) show that firms with better corporate governance have higher liquidity.

[30] Agrawal and Nasser (2012) show that insiders in takeover targets engage in profitable passive insider trading by increasing their net purchases by reducing sales more than they reduce purchases.

sample have zero trading during any given quarter. By looking at the abnormal measure of insider trading, one can infer whether nontrading is due to perceived overvaluation or perceived undervaluation.

Table 2 gives the time-series averages of the coefficients from 68 quarterly regressions of insider trading on control variables. Panel A gives results for the full sample. Almost all coefficients are significant at the 1% level, and most have expected signs. The current level of trading is strongly positively related to peer

TABLE 2

Quarterly Cross-Sectional Insider Trading Regressions

Table 2 presents the time-series averages of the coefficients from the 68 quarterly regressions of insider trading on control variables from 1993 to 2009. The *t*-statistics are based on Newey-West (1987) corrected standard errors. Panel A gives the results for the full sample and Panel B for the ExecuComp-matched sample. Full sample uses insider trading data from Thomson Financial Insiders Database for all managers as defined in footnote 21 of the text. ExecuComp-matched sample includes managers who are also present in the ExecuComp database, which reports data for the top 5 managers of the firm. The dependent variables are open market purchases during quarter t in column 1, purchases through exercise of options during quarter t in column 2, and open market sales during quarter t in column 3, all expressed as a percentage of the shares outstanding at the beginning of the quarter and winsorized at the 1% level. Peer Trading in quarter t is the trading activity (open market sales for column 1, purchases through the exercise of options for column 2, and open market sales for column 3) of a peer insider during the current quarter. Each insider is matched to a peer based on firm size (same asset decile), past firm return (return within 10%), age (within 5 years), tenure (within 5 years), and the value of shareholdings (nearest dollar value of shareholdings, but within 50%), in that order. I also require that the firm of the peer insider is not an acquirer or a target in an acquisition during quarters $t-4$ through $t+1$. Self-Trading in quarter $t-4$ is insider's trading during the same calendar quarter 1 year ago. Ownership is the shares held by the insider divided by the shares outstanding at the beginning of the quarter. Peer trading, Self-Trading, and Ownership are winsorized at the 1% level to remove the effects of outliers. Tenure is the number of days since the insider first appeared in the insider data file under his current firm. Age is the number of days since the insider first appeared in the insider data file under any firm. Analyst coverage is from Institutional Brokers' Estimate System (IBES) database and shows the number of analysts following the firm. Fraction denotes the ratio of a firm's shares held by institutional investors relative to total shares outstanding in CRSP. Concentration is the Herfindahl index calculated over the distribution of the fractions of company stock owned by institutional investors. Fraction and Concentration are measured at the beginning of the current quarter. Fraction is set to 100% if it is greater than 100% and Concentration is set to 10,000 if it is greater than 10,000 (the maximum for Herfindahl index). Data on institutional investors are obtained from CDA/Spectrum, a database of quarterly 13-F filings of money managers to the U.S. Securities and Exchange Commission. Firm size is the log of total assets (log[Compustat item 6]). Share turnover is the trading volume in quarter $t-1$ divided by the shares outstanding at the beginning of quarter $t-1$ (winsorized at 1%). Past stock return is the stock return for the previous 4 quarters. Past stock volatility is the annualized volatility of daily stock returns measured over quarters $t-4$ through $t-3$. Change in volatility is the difference between volatility measured over quarters $t-2$ through $t-1$ and volatility measured over quarters $t-4$ through $t-3$. Total compensation is TDC1 from the ExecuComp database, and it is the sum of salary, bonus, value of option grants, other annual compensation, value of restricted stock grants, long-term incentive payouts, and all other compensation. Ratio of equity to total compensation is defined as 1 − (Salary + Bonus)/TDC1. All independent variables except for Peer trading and Self-Trading are scaled by multiplying with 10^{-3}. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	1		2		3	
	Open Market Purchases		Purchases through Exercise of Options		Open Market Sales	
	Mean	*t*-Stat.	Mean	*t*-Stat.	Mean	*t*-Stat.
Panel A. Full Sample						
Peer trading in quarter t	0.0063	3.82***	0.0067	4.45***	0.0242	7.51***
Self-Trading in quarter $t-4$	0.4639	18.05***	0.2414	28.66***	0.1915	12.73***
Ownership	0.0340	4.17***	−0.0200	−2.76***	0.0003	9.69***
Tenure	−0.0001	−8.66***	0.0001	7.06***	0.0001	1.41
Age	0.0001	8.44***	0.0001	3.63***	0.0001	1.67*
Analyst coverage	−0.0020	−4.34***	−0.0080	−5.24***	0.0040	1.67*
Fraction of inst. investors	−0.4370	−9.28***	−0.0800	−0.62	4.0070	7.92***
Concentration of inst. investors	0.0002	5.56***	−0.0001	−1.71*	−0.0022	−6.41***
Share turnover	−0.0060	−2.01**	0.1408	6.41***	0.3390	5.72***
Log assets	−0.0250	−5.33***	−0.1610	−18.20***	−0.6900	−9.18***
Past return	−0.1090	−5.22***	0.4867	11.88***	1.7640	7.77***
Volatility	0.2921	7.62***	−0.4390	−5.42***	−1.0386	−3.23***
Change in volatility	0.1831	5.38***	−0.1960	−3.27***	−0.9052	−3.37***
Intercept	0.0005	7.06***	0.0018	15.55***	0.0048	8.68***
R^2	4.02%		2.77%		5.12%	
No. of obs.	68		68		68	

(continued on next page)

TABLE 2 (continued)
Quarterly Cross-Sectional Insider Trading Regressions

	1		2		3	
	Open Market Purchases		Purchases through Exercise of Options		Open Market Sales	
	Mean	*t*-Stat.	Mean	*t*-Stat.	Mean	*t*-Stat.
Panel B. ExecuComp-Matched Sample						
Peer trading in quarter *t*	0.0050	2.18**	0.0043	0.99	0.0238	5.63***
Self-Trading in quarter $t-4$	0.2209	6.61***	0.2212	17.10***	0.1892	10.49***
Ownership	0.0180	3.51***	−0.0080	−0.28	0.5000	5.75***
Age	0.0001	−5.50***	0.0001	4.09	0.0001	1.33
Tenure	0.0001	5.69***	0.0001	−1.03	−0.0001	−0.71
Total compensation	0.0596	4.97***	0.2397	7.55***	0.7540	6.90***
Ratio of equity to total compensation	−0.0970	−4.39***	−0.5910	−4.84***	−0.6466	−1.18
Analyst coverage	−0.0030	−4.92***	−0.0090	−3.36***	−0.0049	−0.54
Fraction of inst. investors	−0.2590	−6.44***	0.1871	0.90	5.4560	6.63***
Concentration of inst. investors	0.0001	4.22***	0.0000	−0.18	−0.0034	−6.47***
Share turnover	−0.0008	−0.22	−0.1830	−0.71	0.8100	1.39
Log assets	−0.0250	−5.14***	−0.2050	−10.24***	−0.8765	−6.77***
Past return	−0.1070	−3.85***	0.6960	4.85***	2.2820	6.12***
Volatility	0.2971	5.49***	0.5378	1.41	−0.6545	−0.69
Change in volatility	0.2503	4.14***	0.1258	0.67	−1.3617	−2.71***
Intercept	0.0490	1.48	0.5116	4.33	0.7170	2.12**
R^2	2.30%		4.26%		7.59%	
No. of obs.	68		68		68	

trading and self-trading in the past. Higher stock ownership makes a manager more likely to sell and less likely to purchase through option exercises. Age and firm tenure are positively related to stock purchases through option exercises and sales. Corporate governance-related variables like analyst coverage, fraction of institutional investors, and share turnover are negatively related to open market purchases, suggesting that higher levels of corporate governance result in decreased open market purchases. As expected, past return has a negative effect on open market purchases but a positive effect on purchases through the exercise of options and open market sales. Panel B gives results for the ExecuComp-matched sample, which allows me to add total compensation and ratio of equity to total compensation to the control variables. Results are mostly similar: Total compensation is positively related to purchases and sales, and managers with a high percentage of equity in total compensation purchase less through open market transactions and option exercises.

Table 3 describes the insider trading data. It covers 10,056 unique firms and 88,626 unique managers. Of these, 3,006 firms and 23,016 managers could be matched to the ExecuComp database. Panel B gives the descriptive statistics for PAIT by firm characteristics.

Negative (positive) values of PAIT denote abnormal past net selling (buying). Mean PAIT is 0.0042% of outstanding shares for all firms, suggesting managers of a typical firm are net purchasers in the previous 2 quarters. Managers of firms with high past returns are net sellers on average (–0.0067%), whereas those of firms with low past returns are net buyers (0.006%).

In Panel C of Table 3, I compare PAIT to alternative misvaluation measures like the MB ratio (DHRT (2006)) and the MB ratio decomposition

TABLE 3

Descriptive Statistics: Insider Trading Data

Table 3 presents the descriptive statistics for prior abnormal insider trading (PAIT). PAIT for each quarter is defined as the sum of the abnormal net purchase ratios (ANPRs) of the 2 preceding quarters. ANPR for a given quarter is defined as the abnormal open market purchases plus abnormal purchases through the exercise of stock options minus abnormal open market sales (all expressed as a percentage of shares outstanding) for that quarter. Abnormal open market purchases, purchases through the exercise of options, and open market sales are measured each quarter for each insider as the residuals from the quarterly cross-sectional insider-level regressions in Table 2. These residuals are then aggregated to calculate the firm-level abnormal trading for each quarter. Panel A gives the insider data coverage for the full sample and the ExecuComp-matched sample. Panel B gives descriptive statistics for all firms and by firm size and past stock return. Big (small) firms are those that are in the top (bottom) 3 asset size deciles of all public firms in CRSP as measured at the end of the 1st fiscal year ending before the current quarter. High (Low) past return firms are those whose stock return for the 1-year period before the current quarter is in the top (bottom) 3 deciles of stock returns for all public firms in CRSP. Panel C presents the correlations of PAIT with market-to-book (MB) ratio and MB ratio decomposition of RKRV (2005). The MB ratio is the ratio of year-end market value of common stock to book value of equity (CRSP price × shares outstanding/60). ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Insider Data Coverage

	Full Sample	ExecuComp-Matched Sample
No. of firms	10,056	3,006
No. of insiders	88,626	23,016
No. of firm-insider-quarters	1,185,325	313,447

Panel C. Correlations

	Full Sample	ExecuComp-Matched Sample
MB ratio	–0.0294***	–0.0196***
Firm-specific pricing error	–0.0299***	–0.0335***
Time-series sector error	–0.0081***	–0.0055***
Long-run MB ratio	–0.0315***	–0.0258***

Panel B. Descriptive Statistics

	Full Sample					ExecuComp-Matched Sample				
PAIT (% of shares outstanding)	All Firms	Large Firms	Small Firms	Low Past Return	High Past Return	All Firms	Large Firms	Small Firms	Low Past Return	High Past Return
Minimum	–0.3027	–0.2988	–0.3027	–0.3027	–0.3027	–0.2347	–0.2347	–0.2301	–0.2334	–0.2347
25th percentile	–0.0059	–0.0093	–0.0019	–0.0029	–0.0113	–0.0064	–0.0060	–0.0039	–0.0038	–0.0116
Mean	0.0042	0.0015	0.0006	0.0060	–0.0067	0.0003	0.0009	–0.0006	0.0065	–0.0062
Std. dev.	0.0004	0.0480	0.0539	0.0446	0.0664	0.0443	0.0357	0.0581	0.0352	0.0549
Median	0.0041	0.0028	0.0050	0.0048	0.0039	0.0043	0.0026	0.0086	0.0055	0.0043
75th percentile	0.0221	0.0218	0.0201	0.0222	0.0228	0.0193	0.0153	0.0263	0.0215	0.0203
Maximum	0.2520	0.2192	0.2339	0.2520	0.2385	0.1758	0.1589	0.1758	0.1582	0.1703

(RKRV (2005)).[31] PAIT is significantly negatively correlated with MB ratio, firm-specific pricing error, time-series sector error, and long-run MB ratio, making it relevant as a misvaluation measure. On the other hand, the correlation coefficients are small: −0.0294, −0.0299, −0.0081, and −0.0315, respectively,[32] suggesting PAIT might be measuring something not captured by any of these variables.

III. Results

A. Summary Statistics

For univariate analyses, I classify a firm as high seller (high buyer) in quarter *t* if its PAIT is in the bottom (top) 33% of the distribution of PAITs of all acquirers. If managerial trading activity indeed reflects managers' own beliefs about firm

[31] I follow RKRV's (2005) procedure with one exception: Instead of using 12 industry definitions, I use 49 industry definitions obtained from Kenneth French's Web site (http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/) to be consistent with the rest of my analysis.

[32] The negative coefficient is due to the fact that for PAIT, the more negative values denote higher overvaluation, whereas for MB, firm-specific pricing error, sector-specific pricing error, and long-run MB ratio, the more positive values denote higher overvaluation.

value, then managers in high-seller (-buyer) firms will have the highest degree of perceived overvaluation (undervaluation).

I start by examining acquisition characteristics sorted by acquirer's PAIT in Table 4. Panel A gives the results for all acquisitions and Panel B for stock acquisitions.[33] I find that acquirers are more likely to use stock as a method of payment when they are overvalued: 27.6% of high-seller acquirers use stock

TABLE 4

Mean Acquisition Characteristics Sorted by Acquirer's PAIT

An acquirer is labeled as High Buyer (HB) in quarter *t* if its prior abnormal insider trading (PAIT) is in the top 33% of the distribution of PAITs for all acquirers. A firm is labeled as High Seller (HS) in quarter *t* if its PAIT is in the bottom 33%. Probability of stock (cash) payment is the percentage of bids where the method of payment offered is pure stock (cash). Overvalued target is the percentage of targets with a PAIT in the bottom 33% of all targets. Public target is the percentage of targets that are publicly listed. Subsidiary target is the percentage of targets that are subsidiaries. Acquirer's and Target's cumulative abnormal returns (CARs) are measured for the 3-day window around the announcement date using the Fama-French (1993) 3-factor model estimated using return data for the 1-year period ending at day −64 relative to the announcement date. Combined CARs are calculated as the value-weighted average of acquirer and target CAR (for public targets only) weighted using day −3 market values of the acquirer and the target. Bid premium (for public targets only) is defined as [bidder's offer / target's pre-bid market value of equity) − 1], where the value of the bidder's offer is computed using, in order of availability, the sum of the value of the considerations offered, the initial offer price, or the final offer price as reported in SDC (see Officer (2003) for details). Target's abnormal return premium (for public targets only) is target's CAR calculated over the window [−63, 126] relative to the announcement day. Acquirer size is measured as the market value at day −64 relative to the announcement day (day 0). Deal size is the total dollar value of the consideration paid by the acquirer for the target. Relative size of the bid is the ratio of deal size to acquirer's size. Full sample uses insider trading data from Thomson Financial Insiders Database for all managers as defined in footnote 21 of the text. ExecuComp-matched sample includes managers who are also present in the ExecuComp database, which reports data for the top 5 managers of the firm. For each variable, the difference in means between HS and HB acquirers is computed, and the statistical significance of the difference is assessed using a 2-sample *t*-test. The *t*-statistics and differences are also reported. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Full Sample				ExecuComp-Matched Sample			
	High Sellers (HS)	High Buyers (HB)	Diff.	*t*-Stat.	High Sellers (HS)	High Buyers (HB)	Diff.	*t*-Stat.
Panel A. All Deals								
N	3,932	3,932			2,134	2,134		
Prob. of stock payment	27.6%	16.7%	10.8%	11.67***	25.1%	15.6%	10.8%	7.73***
Prob. of cash payment	47.7%	55.6%	−7.9%	−7.06***	51.2%	60.4%	−9.2%	−6.07***
Overvalued target	41%	28%	13.0%	3.77***	45%	27%	18%	2.88***
Acquirer's ann. CAR	0.06%	0.84%	−0.8%	−5.41***	−0.3%	0.5%	−0.7%	−4.13***
Target's ann. CAR	21.1%	21.2%	−0.1%	−0.09	20.5%	23.3%	−2.8%	−2.20**
Combined ann. CAR	0.7%	1.8%	−1.1%	−3.74***	0.7%	1.3%	−0.7%	−2.02**
Deal size ($millions)	833	514	319	3.67***	1,281	571	710	5.10***
Relative size	21.2%	25.1%	−4.0%	−3.78***	16.5%	19.0%	−2.5%	−1.77*
Bid premium	53.4%	53.9%	−0.5%	−0.28	52.3%	54.7%	−2.4%	−1.12
Target's abnormal return premium	23.7%	31.8%	−8.2%	−2.22**	24.3%	35.5%	−11.2%	−2.42***
Public target	30.2%	25.6%	4.7%	4.61***	33.6%	26.0%	7.6%	5.44***
Subsidiary	26.9%	32.3%	−5.4%	−5.30***	29.5%	33.2%	−3.7%	−2.58***
Panel B. Stock Deals								
N	1,084	658			535	333		
Overvalued target	45%	28%	17%	3.06***	62%	23%	39%	3.67***
Acquirer's ann. CAR	−1.12%	−0.24%	−0.9%	−2.60***	−1.50%	−0.4%	−1.1%	−2.38**
Target's ann. CAR	17.4%	16.5%	0.8%	0.62	16.8%	19.0%	−2.1%	−1.23
Combined ann. CAR	−0.4%	0.3%	−0.7%	−1.61	−0.2%	0.3%	−0.4%	−0.77
Deal size ($millions)	1,446	928	519	1.58	2,254	847	1,407	2.69***
Relative size	24.5%	32.7%	−8.3%	−3.36***	20.6%	27.2%	−6.6%	−2.63***
Bid premium	51.3%	51.3%	0.0%	−0.01	49.0%	54.1%	−5.1%	−1.49
Target's abnormal return premium	17.5%	24.5%	−7.1%	−1.24	15.0%	32.2%	−17.2%	−2.42**
Public target	51.8%	56.4%	−4.5%	−1.84*	58.7%	56.8%	1.9%	0.56
Subsidiary	6.2%	6.1%	0.1%	0.09	4.9%	5.7%	−0.8%	−0.55

[33]Cash acquisitions are reported in the Internet Appendix for brevity.

as opposed to 16.7% of high-buyer acquirers, and the difference is significant at the 1% level. Acquirers are also less likely to use cash when overvalued: 47.7% of high-seller acquirers use cash compared to 55.6% of high-buyer acquirers, and the difference is significant at the 1% level.[34] Acquirer overvaluation is negatively correlated with acquirer announcement returns: High-seller acquirers have 0.8% lower merger announcement CARs than high-buyer acquirers, and the difference is significant at the 1% level. Moreover, this difference is bigger in stock deals than in cash deals where high-seller acquirers underperform high-buyer acquirers by 0.9%, compared to 0.4% for cash deals (unreported). This suggests that acquirers in stock deals are more overvalued. I also find that overvalued acquirers spend more on deals: 833 million versus 514 million. However, there is no evidence that they are overpaying for public targets; in fact, the target's abnormal return premium (calculated for public targets only) is 8.2% lower for overvalued acquirers using the full sample and 11.2% lower for overvalued stock acquirers using the ExecuComp-matched sample.

Finally, overvalued acquirers are more likely to buy overvalued targets; Panel A of Table 4 reports that 41% of the targets of overvalued acquirers (for which PAIT data were available) are overvalued, compared to 28% for undervalued acquirers. This difference is more pronounced in stock deals.[35] The main results from Table 4 are similar when I use the ExecuComp-matched sample instead of the full sample.

Next I look at acquirer characteristics in Table 5. High-seller acquirers are typically bigger in terms of market value than high-buyer acquirers, but they have similar MB and price-to-earnings ratios, asset and sales growth rates, and return on equity. They have somewhat higher past returns, with higher firm-specific valuation error and time-series sector error but lower long-run MB ratios. Stock deals mostly have similar patterns, but it is worth noting that high-seller stock acquirers have lower MB ratios, and the difference in past returns and firm-specific valuation error disappears completely. This suggests that my misvaluation measure is not simply driven by past returns, and it captures a dimension of misvaluation not accounted for by the MB ratio or the RKRV (2005) decomposition. Finally, results are unchanged if I use the ExecuComp-matched sample.

Results from the univariate analysis suggest that acquirer misvaluation plays a role in determining acquisition characteristics like the method of payment and announcement returns. Next, I perform multivariate tests of these predictions by holding other factors constant.[36]

[34] While high-seller acquirers are less likely to use cash than high-buyer acquirers, 47.7% of them still use cash, which is higher than the percentage of high-seller acquirers using stock (27.6%). This is due to a greater use of the cash method of payment in acquisition of assets. I discuss potential reasons for this in the Internet Appendix.

[35] RKRV (2005) find a similar result and argue that correlated misvaluation leads overvalued targets to accept bids from overvalued bidders, since they overestimate the expected synergies.

[36] In the analyses that follow, using an ExecuComp-matched sample gives similar results. For brevity, I only report the results for the full sample. Results using the ExecuComp sample are available in the Internet Appendix.

TABLE 5

Mean Acquirer Firm Characteristics Sorted by Acquirer's PAIT

Panel A of Table 5 presents acquirer firm characteristics for all deals and Panel B for stock deals. An acquirer is labeled as High Buyer (HB) in quarter t if its prior abnormal insider trading (PAIT) is in the top 33% of the distribution of PAITs for all acquirers. A firm is labeled as High Seller (HS) if its PAIT is in the bottom 33%. All accounting variables are calculated over the fiscal year that ends before the beginning of the current quarter and are winsorized at the 1% level. Size is acquirer's total assets (Compustat item 6). The calculations of market-to-book (MB) ratio, firm-specific pricing error, time-series sector error, and long-run MB ratio are detailed in the caption to Table 3. Price-to-earnings ratio is the ratio of year-end stock price to earnings per share (Compustat items 24 / 58). Past stock return is the stock return for the previous 4 quarters. Past stock volatility is the annualized volatility of daily stock returns during the previous 4 quarters. Asset growth is the proportional change in assets (log[Compustat items 6 / 6(t − 1)]). Sales growth is the proportional change in sales (log[Compustat items 12 / 12(t − 1)]). Cash is the ratio of cash to total assets [Compustat items 1 / 6]. Leverage is the ratio of debt to equity (Compustat items 9 / 60). Cash flow is defined as income before extraordinary items (Compustat item 18) plus depreciation and amortization (Compustat item 14) plus research and development expense (Compustat item 46) divided by total assets (Compustat item 6). Return on equity is the ratio of earnings to average equity [Compustat items 20 / (60 + 60(t − 1)]. Fraction denotes the ratio of a firm's shares by institutional investors relative to total shares outstanding in CRSP. Concentration is the Herfindahl index calculated over the distribution of the fractions of company stock owned by institutional investors. Fraction and Concentration are measured at the beginning of the current quarter. Data on institutional investors are obtained from CDA/Spectrum, a database of quarterly 13-F filings of money managers to the U.S. Securities and Exchange Commission. Firm size is the log of total assets (log[Compustat item 6]). Fraction is set to 100% if it is greater than 100%, and Concentration is set to 10,000 if it is greater than 10,000 (the maximum for Herfindahl index). Full sample uses insider trading data from Thomson Financial Insiders Database for all managers as defined in footnote 21 of the text. ExecuComp-matched sample includes managers who are also present in the ExecuComp database, which reports data for the top 5 managers of the firm. For each variable, the difference in means between HS and HB acquirers is computed, and the statistical significance of the difference is assessed using a 2-sample t-test. The t-statistics and differences are also reported. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Full Sample				ExecuComp-Matched Sample			
	High Sellers (HS)	High Buyers (HB)	Diff.	t-Stat.	High Sellers (HS)	High Buyers (HB)	Diff.	t-Stat.
Panel A. All Deals								
N	3,932	3,932			2,134	2,134		
Size ($millions)	23,595	4,188	19,407	10.25***	33,967	4,789	29,178	9.44***
PAIT (Acquirer)	−0.0592	0.0474	−0.1065	−90.07***	−0.0405	0.0308	−0.0714	−55.43***
MB ratio	2.76	2.77	−0.02	−0.50	2.89	2.93	−0.04	−0.79
Firm-specific val. error	0.158	0.110	0.05	4.71***	0.172	0.126	0.05	3.51***
Time-series sector error	0.189	0.170	0.02	3.94***	0.205	0.168	0.04	5.78***
Long-run MB ratio	0.565	0.631	−0.07	−6.48***	0.604	0.684	−0.08	−6.07***
Price-to-earnings ratio	20.1	19.9	0.21	0.24	21.5	22.5	−1.04	−0.88
Past stock return	0.28	0.22	0.06	4.85***	0.24	0.22	0.03	1.92*
Past stock volatility	0.44	0.47	−0.03	−5.00***	0.39	0.43	−0.04	−6.85***
Asset growth	0.27	0.29	−0.02	−1.59	0.24	0.25	−0.01	−0.97
Sales growth	0.26	0.25	0.01	1.00	0.22	0.21	0.00	0.30
Cash	0.14	0.15	−0.01	−1.93*	0.13	0.15	−0.02	−3.63***
Leverage	0.16	0.19	−0.02	−5.49***	0.16	0.19	−0.02	−4.35***
Return on equity	0.11	0.11	0.00	0.46	0.14	0.13	0.01	1.36
Fraction	0.52	0.62	−0.10	−16.15***	0.63	0.73	−0.10	−14.70***
Concentration	204.10	242.62	−38.52	−6.45***	221.87	266.88	−45.01	−4.65***
Panel B. Stock Deals								
N	1,084	658			535	333		
Size ($millions)	23,655	4,909	18,746	4.03***	37,086	5,346	31,740	3.58***
PAIT (Acquirer)	−0.0461	0.0494	−0.0955	−38.89***	−0.0282	0.0288	−0.0570	−20.60
MB ratio	2.93	3.20	−0.26	−2.73***	3.27	3.44	−0.17	−1.23
Firm-specific val. error	0.237	0.217	0.02	1.04	0.273	0.243	0.03	1.03
Time-series sector error	0.234	0.206	0.03	2.38**	0.262	0.200	0.06	3.62***
Long-run MB ratio	0.513	0.643	−0.13	−5.74***	0.593	0.717	−0.12	−3.87***
Price-to-earnings ratio	20.4	21.5	−1.14	−0.55	22.7	25.5	−2.81	−0.90
Past stock return	0.33	0.34	−0.01	−0.38	0.33	0.35	−0.03	−0.68
Past stock volatility	0.46	0.53	−0.07	−5.13***	0.42	0.50	−0.07	−5.09***
Asset growth	0.33	0.42	−0.09	−2.64***	0.33	0.45	−0.12	−2.90***
Sales growth	0.35	0.33	0.02	0.64	0.32	0.34	−0.02	−0.68
Cash	0.14	0.17	−0.03	−3.00***	0.15	0.18	−0.03	−2.60***
Leverage	0.10	0.12	−0.02	−2.76***	0.11	0.14	−0.03	−2.73***
Return on equity	0.11	0.08	0.03	1.65	0.13	0.11	0.02	1.06
Fraction	0.41	0.52	−0.11	−8.79***	0.52	0.63	−0.11	−6.45***
Concentration	150.31	194.41	−44.10	−3.13***	174.40	238.08	−63.68	−2.14**

B. Misvaluation and Acquisition Timing

According to market misvaluation theory, firms will be more likely to acquire for stock (cash) when they think they are overvalued (undervalued). I test this prediction in Table 6 using a 2-stage logistic regression framework. I first examine how PAIT affects the likelihood of making an acquisition bid in the current quarter. Results using the full sample are given in Panel A. The dependent variable is set to 1 if the firm makes at least 1 acquisition bid in the current quarter, and 0 otherwise.[37] In Panel B, I limit my sample only to those firms that have announced an acquisition in the current quarter, and I try to see if firms with higher levels of abnormal insider selling are more likely to use stock as a method of payment. In these regressions, the dependent variable is set to 1 if the firm makes

TABLE 6

Times-Series Logistic Regression Estimates of the Likelihood of Making a Bid and Using Stock as a Method of Payment: Full Sample

In Panel A of Table 6, the dependent variable is a dummy variable that is set to 1 if the firm announces an acquisition in the current quarter and the sample includes all firms with nonmissing PAIT data (both acquirers and nonacquirers). In Panel B, the sample is confined only to the firms that announce an acquisition in the current quarter, and the dependent variable is set to 1 if method of payment is 100% stock, and 0 otherwise. The independent variable of interest is OVDUM, which is a dummy variable set to 1 if the PAIT for the acquirer in quarter *t* is in the bottom 33% of the distribution of the PAITs of all firms in quarter *t*. All accounting variables are calculated over the fiscal year that ends before the beginning of the current quarter. The calculations of the rest of the variables are detailed in the caption to Table 5. Full sample uses insider trading data from Thomson Financial Insiders Database for all managers as defined in footnote 21 of the text. All models include year-quarter and industry dummy variables using the Fama-French (1997) 49 industry classification obtained from Kenneth French's Web site (http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/). In each model, coefficients are shown in column 1, followed by the *z*-statistics and the marginal effects. The *z*-statistics are corrected for heteroskedasticity and firm-level clustering. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	1			2		
	Coef.	*z*-Stat.	Marg. Eff.	Coef.	*z*-Stat.	Marg. Eff.
Panel A. Likelihood of Making a Bid: Full Sample						
OVDUM	0.076	3.33***	0.0026	0.070	3.03***	0.0024
MB ratio	0.021	2.85***	0.0007			
Firm-specific valuation error				0.133	4.56***	0.0044
Time-series sector error				0.355	9.35***	0.0119
Long-run MB ratio				0.110	1.68*	0.0037
Cash	0.180	2.07**	0.0060	0.009	0.10	0.0003
Return on equity	0.306	5.44***	0.0103	0.223	4.42***	0.0075
Sales growth	0.270	12.66***	0.0091	0.250	11.65***	0.0084
Leverage	0.106	1.09	0.0036	0.293	2.70***	0.0098
Price-to-earnings ratio $\times 10^{-3}$	0.597	2.04**	0.0201	0.724	2.19**	0.0243
Fraction of institutional investors	0.929	10.66***	0.0313	0.785	9.29***	0.0263
Concentration of inst. inv. $\times 10^{-3}$	−0.255	−2.81***	−0.0086	−0.169	−2.18**	−0.0057
Firm size (log assets)	0.123	12.74***	0.0041	0.134	13.72***	0.0045
Past stock return	0.310	14.34***	0.0104	0.258	11.39***	0.0087
Past stock volatility	−0.455	−7.37***	−0.0153	−0.406	−6.48***	−0.0136
Bids made in the past year	0.441	20.90***	0.0149	0.438	20.41***	0.0147
Offers received in the past year	−0.740	−4.15***	−0.0249	−0.712	−3.92***	−0.0239
Bids made by industry firms in the past year $\times 10^{-3}$	−0.062	−0.07	−0.0021	0.040	0.05	0.0014
Offers received by industry firms in the past year $\times 10^{-3}$	−0.099	−0.04	−0.0033	−0.023	−0.01	−0.0008
Intercept	−4.417	−13.10***		−4.631	−4.49***	
No. of obs.	224,248			216,409		
Pseudo R^2	0.0728			0.0754		

(continued on next page)

[37] Note that the sample in Panel A of Table 6 includes all firms with nonmissing PAIT data, some of which never take part in acquisitions. Results are similar if the sample is limited only to acquirers.

TABLE 6 (continued)

Times-Series Logistic Regression Estimates of the Likelihood of Making a Bid and Using Stock as a Method of Payment: Full Sample

	1			2		
	Coef.	*z*-Stat.	Marg. Eff.	Coef.	*z*-Stat.	Marg. Eff.
Panel B. Likelihood of Using Stock Method of Payment Conditional on Making a Bid: Full Sample						
OVDUM	0.187	3.05***	0.0226	0.178	2.89***	0.0219
MB ratio	0.225	11.05***	0.0268			
Firm-specific valuation error				0.828	10.62***	0.1000
Time-series sector error				0.391	3.73***	0.0472
Long-run MB ratio				0.663	3.12***	0.0800
Cash	0.317	1.39	0.0377	0.540	2.33**	0.0652
Return on equity	−0.568	−3.59***	−0.0675	−0.512	−3.27***	−0.0619
Sales growth	0.160	2.85***	0.0191	0.164	2.82***	0.0198
Leverage	−2.028	−7.46***	−0.2410	−2.350	−8.23***	−0.2840
Price-to-earnings ratio $\times 10^{-3}$	−1.312	−1.49	−0.1560	−0.970	−1.18	−0.1170
Fraction of institutional investors	−0.414	−2.18**	−0.0492	−0.340	−1.72*	−0.0411
Concentration of inst. inv. $\times 10^{-3}$	−0.006	−0.06	−0.0007	−0.018	−0.14	−0.0022
Firm size (log assets)	0.103	3.85***	0.0122	0.091	3.25***	0.0110
Past stock return	0.153	2.27**	0.0182	0.059	0.86	0.0071
Past stock volatility	0.779	4.80***	0.0927	0.828	4.83***	0.1000
Bids made in the past year	0.147	4.72***	0.0174	0.117	3.77***	0.0142
Offers received in the past year	−0.265	−0.63	−0.0315	−0.208	−0.50	−0.0251
Bids made by industry firms in the past year $\times 10^{-3}$	−4.040	−1.80*	−0.4810	−3.598	−1.60	−0.4350
Offers received by industry firms in the past year $\times 10^{-3}$	14.106	2.38**	1.6780	12.658	2.13**	1.5290
Intercept	−3.355	−4.53***		10.737	10.06***	
No. of obs.	10,142			9,827		
Pseudo R^2	0.244			0.246		

at least 1 stock bid in the current quarter, and 0 otherwise. The independent variable of interest in all regressions is OVDUM (acquirer overvaluation dummy), which is set to 1 if PAIT is at the bottom 33% of the PAITs of all firms in that quarter, and 0 otherwise. A positive and significant coefficient on OVDUM means that firms whose managers were high abnormal net sellers in the last 2 quarters are more likely to make acquisition bids and, conditional on making a bid, are more likely to use stock as a method of payment. In all the models I include standard control variables from the M&A literature that have been shown to be related to the method of payment decision and the decision to be involved in a merger.[38]

The main conclusion from Table 6 is that high abnormal insider selling is associated with an increased probability of being an acquirer, and conditional on being an acquirer, with an increased probability of using stock as the method of payment. To the extent that selling is associated with overvaluation, this result supports the prediction of the misvaluation theory that overvaluation drives acquisition activity through stock bids. The coefficient of OVDUM in Panel A is 0.076 and significant at the 1% level. The marginal effect of OVDUM is 0.0026, which means that holding all other variables constant at their means, being an overvalued firm increases the probability of making a bid by 7.6%.[39]

[38]Martin (1996) finds that the likelihood of stock financing increases with higher pre-acquisition market and acquiring firm stock returns and higher growth opportunities, and it decreases with higher cash availability, higher institutional shareholdings and blockholdings, and in tender offers.

[39]A 1-unit increase in OVDUM from 0 to 1 increases the probability of making a bid from 3.40% to 3.66%. This represents a 7.6% increase in the probability of a bid.

Next, I include the RKRV (2005) decomposition of the MB ratio in model 2. As expected, the coefficients for firm-specific and time-series valuation errors and the long-run MB ratio in model 2 are positive and significant, suggesting that higher misvaluation leads to higher likelihood of stock bids. OVDUM retains its explanatory power; the coefficient is 0.070 with a slightly lower *t*-statistic of 3.03, which is significant at the 1% level. These results further attest to the value of insider trading in measuring misvaluation; insider trading does not merely proxy for the MB ratio or the RKRV decomposition of the MB ratio but rather it captures a part of misvaluation that is not reflected by those measures. I then examine the likelihood of using stock as a method of payment conditional on making a bid in the current quarter. Panel B shows that the coefficient of OVDUM is positive and significant at the 1% level in both regression specifications. The marginal effect of 0.0226 in the 1st model implies that overvalued firms making a bid in the current quarter are 17.3% more likely to use stock as a method of payment.[40] Results are robust to including RKRV decomposition of the MB ratio in model 2. In unreported results, I also find that being a high-seller firm makes cash acquisitions less likely; the coefficient for OVDUM is negative for both the full sample and the ExecuComp-matched sample, and it is significant at the 10% level (for the ExecuComp-matched sample). It seems that higher insider selling makes stock bids more likely at the expense of cash bids.

C. Misvaluation and the Method of Payment Decision in the Cross Section

The results from the time-series logit regressions in the previous section showed that firms time stock bids to coincide with periods of overvaluation. Equally of interest is to see what happens in the cross section of acquirers; according to the misvaluation theory, one should expect acquirers with higher selling (more negative PAITs) to use stock as a method of payment more often. Table 7 presents the results for the cross section of the acquisition sample. In Panel A, the dependent variable is set to 1 if the method of payment is 100% stock, and 0 otherwise. The independent variables are mostly the same as in Table 6, with the addition of target and deal characteristics variables.[41] Results confirm my expectation: Acquirers with higher levels of selling indeed use stock more often as a method of payment. In Panel A, the coefficient of OVDUM in model 1 is 0.214, and it is significant at the 1% level. The marginal effect is 0.0205, which means that a 1-unit increase in OVDUM from 0 to 1 increases the probability of using stock as a method of payment by 21%.[42]

[40]Conditional on making a bid in a given quarter, a 1-unit increase in the dummy variable OVDUM from 0 to 1 increases the probability of using stock from 12.99% to 15.24%. This represents a 17.3% increase in the probability of using stock as a method of payment.

[41]To save space, I do not include variables measuring offers received in the past year and bids made and offers received by industry firms in the past year. Results are virtually identical if these variables are included.

[42]Holding all other variables at their means, a 1-unit increase in OVDUM from 0 to 1 increases the probability of using stock as a method of payment from 9.8% to 11.8%. This represents a 21% increase in the probability of using stock as a method of payment.

TABLE 7

Cross-Sectional Logistic Regression Estimates of the Likelihood of Using Stock as Method of Payment: Full Sample

The dependent variable is a dummy that is set to 1 if the method of payment is 100% stock, and 0 otherwise. The independent variable of interest is OVDUM, which is a dummy variable set to 1 if the PAIT for the acquirer is in the bottom 33% of the distribution of the PAITs of all acquirers. Private target dummy variable is equal to 1 if the target is private, or 0 otherwise. Failed bid dummy variable is equal to 1 if the acquisition bid is eventually withdrawn by the acquirer, or 0 otherwise. Subsidiary bid dummy variable is equal to 1 if the target is a subsidiary. Multiple bidders dummy variable is set to 1 if there are competing acquirers to buy the same target, or 0 otherwise. Hostile bid dummy variable shows whether the bid was a hostile offer. An acquisition is considered hostile if the "attitude" field in SDC was marked "unsolicited" or "hostile." Toehold dummy variable is set to 1 if the acquirer owns 5% or more of the target at the announcement date. Number of acquisitions in the past year shows the number of acquisition bids made by the acquirer in the last 1 year. The calculations of the rest of the independent variables are detailed in the captions to Tables 4 and 5. Full sample uses insider trading data from Thomson Financial Insiders Database for all managers as defined in footnote 21 of the text. All models include year-quarter and industry dummy variables using the Fama-French (1997) 49 industry classification obtained from Kenneth French's Web site (http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/). In each model, coefficient is shown in column 1, followed by the *z*-statistics and the marginal effects. The *z*-statistics are corrected for heteroskedasticity and firm-level clustering. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	1			2		
	Coef.	*z*-Stat.	Marg. Eff.	Coef.	*z*-Stat.	Marg. Eff.
OVDUM	0.214	3.31***	0.02050	0.205	3.17***	0.02000
MB ratio	0.226	10.48***	0.02110			
Firm-specific valuation error				0.855	10.49***	0.08140
Time-series sector error				0.412	3.90***	0.03920
Long-run MB ratio				0.708	3.22***	0.06740
Cash	0.281	1.19	0.02620	0.489	2.05**	0.04650
Return on equity	−0.562	−3.53***	−0.05240	−0.503	−3.21***	−0.04790
Sales growth	0.099	1.74*	0.00928	0.100	1.69*	0.00951
Leverage	−1.978	−6.96***	−0.18500	−2.452	−8.45***	−0.23400
Price-to-earnings ratio $\times 10^{-3}$	−1.592	−1.73*	−0.15000	−1.077	−1.27	−0.10000
Fraction of institutional investors	−0.368	−1.92*	−0.03440	−0.293	−1.51	−0.02790
Concentration of inst. inv. $\times 10^{-3}$	−0.031	−0.30	−0.00300	−0.029	−0.26	−0.00300
Firm size (log assets)	0.052	1.84*	0.00489	0.043	1.43	0.00407
Past stock return	0.191	2.86***	0.01790	0.117	1.81*	0.01120
Past stock volatility	0.597	2.99***	0.05570	0.705	3.34***	0.06710
Relative deal size	0.242	3.94***	0.02260	0.262	4.22***	0.02500
Private target dummy	−0.934	−12.81***	−0.08310	−0.966	−13.16***	−0.08770
Subsidiary target dummy	−2.602	−23.86***	−0.18400	−2.607	−23.67***	−0.18700
Multiple bidders dummy	−0.170	−1.47	−0.01510	−0.188	−1.58	−0.01690
Hostile bid dummy	−1.419	−3.57***	−0.07750	−1.533	−3.75***	−0.08230
Toehold dummy	−0.252	−0.87	−0.02130	−0.215	−0.73	−0.01880
No. of bids in the past year	0.111	4.12***	0.01040	0.093	3.44***	0.00885
Intercept	−1.536	−2.22**		12.118	10.00***	
No. of obs.	11,091			10,777		
Pseudo R^2	0.330			0.334		

Model 2 of Table 7 adds MB-ratio-based misvaluation measures to the model. The coefficients of firm-specific valuation error, time-series sector error, and long-run MB ratio are all positive and significant. OVDUM once again retains its explanatory power; the coefficient is 0.205 and significant at the 1% level, with a marginal effect of 0.020. Taken together, results from the time-series and cross-section logit models of acquisition timing and method of payment decision support the prediction of the misvaluation theory of mergers, which says that misvaluation affects the timing and the method of payment in acquisitions.

D. Acquirer Announcement Returns

In this section I examine the effect of misvaluation on acquirer announcement date CARs. If the acquisition bid reveals information about the true value of the bidder, one should expect at least a partial correction at the time of the announcement of the bid. As a result, overvalued acquirers will receive a negative

market reaction to their announcement bids, since the market will realize and correct for at least some of the overvaluation. Alternatively, a negative CAR can mean that overvalued acquirers are more likely to make value-destroying acquisitions due to increased agency costs associated with overvalued equity.

Table 8 presents results. In all models, the dependent variable is the acquirer's 3-day cumulative announcement abnormal return. Panel A gives the results for stock acquisitions and Panel B for cash acquisitions. The independent variable of interest is once again OVDUM: A negative coefficient on OVDUM means that increased selling will result in lower announcement returns for the acquirer. Other independent variables include standard controls for announcement returns in M&A literature. The procedures for measuring the variables are detailed in the caption to Table 8.

Results in Table 8 show that increased selling is associated with lower announcement returns in stock acquisitions but not in cash acquisitions. Panel A

TABLE 8

Ordinary Least Squares Estimates of the Relation between PAIT and Acquirer's Announcement CAR: Full Sample

The dependent variable is the acquirer's 3-day announcement cumulative abnormal return (CAR) for the window [−1, 1] around the announcement day, which is measured relative to the Fama-French (1993) 3-factor model. The independent variable of interest is OVDUM, a dummy variable set to 1 if the PAIT for an acquirer is in the bottom 33% of the distribution of the PAITs of all acquirers. Rumored deal dummy variable is set to 1 if the deal was preceded by rumors. Fee dummy variable is set to 1 if the acquirer's financial advisor's fee is based on a percentage of the deal value. The calculations of the rest of the variables are detailed in the captions to Tables 4, 5, and 7. All accounting variables are measured at the end of the fiscal year immediately preceding the beginning of the quarter in which the acquisition is announced. Past stock return and past volatility are measured over the 1-year period ending before the announcement month. Full sample uses insider trading data from Thomson Financial Insiders Database for all managers as defined in footnote 21 of the text. All models include year-quarter and industry dummy variables using the Fama-French (1997) 49 industry classification obtained from Kenneth French's Web site (http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/). The *t*-statistics are calculated using White's (1980) heteroskedasticity-consistent errors and adjusting for clustering at the acquirer firm level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Panel A. Stock Deals				*Panel B. Cash Deals*			
	1		2		3		4	
	Coef.	*t*-Stat.	Coef.	*t*-Stat.	Coef.	*t*-Stat.	Coef.	*t*-Stat.
OVDUM	−0.814	−2.75***	−0.878	−2.97***	0.118	0.72	0.097	0.59
MB ratio	0.028	0.22			−0.053	−0.79		
Firm-specific valuation error			0.192	0.40			0.157	0.71
Time-series sector error			1.113	1.03			−0.206	−0.41
Long-run MB ratio			0.967	1.57			0.481	1.93*
Cash	−0.634	−0.42	−1.069	−0.69	−0.703	−1.00	−1.180	−1.67*
Return on equity	0.004	0.00	−0.165	−0.14	0.363	0.57	−0.311	−0.50
Sales growth	−0.249	−0.82	−0.289	−0.96	−0.169	−0.75	−0.232	−0.97
Leverage	0.468	0.33	0.743	0.51	0.882	1.53	0.870	1.32
Price-to-earnings ratio	−0.001	−0.26	−0.003	−0.62	0.001	0.49	0.002	0.78
Firm size (log assets)	−0.280	−2.29**	−0.295	−2.36**	−0.251	−4.46***	−0.243	−4.06***
Past stock return	0.022	0.06	−0.071	−0.20	−0.321	−1.48	−0.382	−1.69*
Past stock volatility	−0.497	−0.47	−0.360	−0.34	2.135	3.18***	2.133	3.11***
Relative deal size	0.370	0.72	0.309	0.59	1.247	3.91***	1.236	3.76***
Private target dummy	3.223	9.25***	3.102	8.86***	−0.172	−0.73	−0.106	−0.44
Subsidiary dummy	3.417	4.28***	3.633	4.50***	0.187	0.85	0.233	1.04
Failed bid dummy	−1.322	−1.91*	−1.305	−1.87*	−1.773	−4.33***	−1.797	−4.24***
Multiple bidders dummy	1.300	2.37**	1.283	2.32**	−0.234	−0.86	−0.264	−0.94
Hostile offer dummy	1.154	0.85	1.042	0.71	−0.556	−0.80	−0.593	−0.84
Toehold dummy	0.347	0.30	0.455	0.39	0.744	0.97	0.819	1.04
Number of bids in the past year	−0.131	−1.27	−0.146	−1.41	−0.120	−2.13**	−0.121	−2.12**
Rumored deal dummy	2.707	2.31**	2.575	2.17**	−1.026	−1.89*	−0.960	−1.65*
Fee dummy	−1.339	−1.04	−1.311	−1.02	0.070	0.06	−0.311	−0.24
Intercept	1.570	0.34	−8.201	−4.12***	1.099	0.34	5.796	6.76***
No. of obs.	2,376		2,357		5,726		5,491	
R^2	0.159		0.159		0.124		0.124	

shows that overvalued stock acquirers get 0.814%–0.878% lower announcement returns depending on the model. The effect is quite strong; the coefficient of OVDUM is significant at the 1% level in both models. To the extent that misvaluation is captured by managerial trades, these results mean that greater acquirer overvaluation is associated with lower cumulative abnormal announcement returns.[43]

At this point, one might ask, What if managers anticipate the poor market reaction to the bid announcement and increase their sales prior to the announcement to avoid losses? If that is the case, the observed relationship between higher managerial sales and lower announcement returns may not necessarily be interpreted as overvaluation causing the negative abnormal returns. Instead, it could mean that managers simply predict the negative market reaction in advance and offload their shares beforehand. In unreported results, I explore this possibility by looking at how managers trade before bad deals (those with an announcement return of less than –5%) and find that they sell no differently prior to bad deals versus deals that are not bad, regardless of the method of payment used.[44] I also find that OVDUM still retains its explanatory power in the announcement return regressions even when bad deals are excluded from the sample.[45] Taken together, these results suggest that the explanatory power of OVDUM is not due to informed managerial selling prior to bad deals.

OVDUM does not seem to predict acquirer returns in cash bids; its coefficients in Panel B of Table 8 are generally positive and insignificant. In fact, cash deals are the only deals where OVDUM cannot predict announcement returns; in unreported results, I find that when I exclude cash deals from my sample (leaving a total of 5,371 stock, stock and cash, and other deals) and run model 1, OVDUM has a coefficient of –0.61 with a higher *t*-statistic of –2.96. One potential explanation is the following: Both increased managerial sales before the announcement and the use of stock as a method of payment signal to the market that the firm is overvalued. If both signals are present in a deal, then the market more reliably concludes that the firm must be overvalued, and a stronger negative reaction is reflected in the announcement return. On the other hand, when the insider trading signal and the method of payment signal do not agree (i.e., increased managerial sales but use of cash as method of payment), market participants may not be able to infer overvaluation as clearly as in the previous case upon the announcement of the deal. Hence, the announcement return may or may not reflect a full correction

[43]Cai, Song, and Walkling (2011) argue that unanticipated bidders earn significantly positive returns. They show that announcement returns for initial industry bidders are positive and significant, and subsequent bidders receive a corresponding price reaction prior to and around the announcement of the initial industry bid. They then argue that announcement-period CAR will underestimate the value consequences of the merger for subsequent bidders, and they suggest adding the price impact at the announcement of the initial industry bid to the subsequent bidder's announcement CAR to account for anticipation effects. I replicate their measure and find that OVDUM still explains announcement returns even when CARs of overvalued subsequent bidders are adjusted to include the price reaction they had received at the announcement of the initial industry bid.

[44]Mean PAIT is –0.008% for bad stock deals and –0.005% for all other stock deals, and the difference is insignificant.

[45]The coefficient of OVDUM is –0.564 in model 1 and significant at the 5% level. Results are available from the author.

of overvaluation. As a result, the relation between the trading signal and the announcement return becomes weaker, resulting in an insignificant coefficient for OVDUM in the regression.[46]

E. Long-Run Abnormal Returns and Shareholder Wealth

So far it has been seen that firms with high managerial selling are more likely to make stock acquisitions, and those acquisitions are met with negative announcement returns. This can be due to a partial correction of acquirer overvaluation. Or it may simply mean that the market seems to think those acquisitions are value destroying. But is this also true in the long run? In other words, if a firm is overvalued, is it better for it to attempt stock acquisitions to take advantage of the overvalued stock rather than doing nothing? For example, Lu and Savor (2009) document that successful bidders in stock acquisitions get less negative long-run returns than failed bidders and argue that stock acquisitions create value for overvalued firms. Implicit in their conclusion is that the overvalued firms nevertheless are going to see a reversal, and they can mitigate this by making stock acquisitions. In this section I will try to answer this question by comparing the abnormal returns of overvalued acquirers to similarly overvalued nonacquirers. I employ both BHAR[47] and CTPR[48] approaches when calculating long-run excess returns to ensure my results are not merely the artifact of the particular method used.

1. Buy-and-Hold Abnormal Returns

I calculate average BHARs for high-seller acquirers in stock acquisitions for 1-, 2-, and 3-year holding periods following the merger announcement month (month t) using a matching firm approach in Table 9.[49] I examine abnormal returns relative to size and insider-trading-matched (in that order) nonacquirer control firms. This will show if, for an overvalued firm, it is better in the long run to make stock acquisitions versus doing nothing. Further details of the matching procedure are explained in the caption to Table 9.

Table 9 first reports the results for all stock acquirers, then for high-seller stock acquirers. Stock acquirers significantly underperform similarly misvalued nonacquirer firms; BHARs are −7.1% in 2 years and −12.1% in 3 years. What is more interesting is that most of this underperformance is due to high-seller acquirers: they receive −4.7% in 1 year, −11.2% in 2 years, and −17.8% in 3 years. High-buyer acquirers do not exhibit any signs of negative abnormal returns at all; in unreported results, I find that their BHARs are between 1.1% and −8.7%, and all are statistically insignificant. Similarly, BHARs for cash acquirers

[46] This does not mean that OVDUM has no explanatory power for cash deals; in fact, univariate results (see Internet Appendix, Table IA.1) show that overvalued acquirers in cash deals get much lower announcement returns than others: Their CAR is 0.70% compared to 1.14% for rest of the acquirers, and the difference is significant at the 1% level. It just means that the explanatory power is not strong enough to survive the various controls introduced in the regression setting.

[47] See Ritter (1991), Barber and Lyon (1997), and Loughran and Vijh (1997).

[48] See Fama (1998) and Mitchell and Stafford (2001).

[49] I do not use a matching portfolio approach in order to eliminate the skewness bias, which arises due to the fact that individual firm returns are more positively skewed than portfolio returns.

TABLE 9

Acquirer's Post-Merger BHARs after Stock Acquisitions: Full Sample

Table 9 presents the acquirer firm's post-merger buy-and-hold abnormal returns (BHARs) for 1-, 2-, and 3-year holding horizons. A firm is labeled as High Seller (overvalued) in quarter t if its PAIT is in the bottom 33% of the distribution of PAITs for all acquirers. Average BHARs for each category are calculated using the matching-firm approach. The procedure is as follows: Denote by t the merger announcement month. Each acquirer k is matched to a control firm c at the end of month t, and the buy-and-hold returns for the acquirer and the control firm are recorded for the next 12, 24, and 36 months, respectively. The BHAR for firm k for a holding period of q months is given by

$$BHAR_{k,q} = \prod_{m=t+1}^{q} (1 + R_{k,m}) - \prod_{m=t+1}^{q} (1 + R_{c,m}).$$

Average BHAR for a given category is then calculated by taking an equal-weighted average of the BHARs of all the firms in that category. I use as control firms all nonacquirer firms that have market values within 50% of the acquirer and have the closest PAIT. A nonacquirer firm is one that does not make any acquisitions during the 6-year window centered on the merger announcement month. If the control firm is delisted during the holding period, I use its delisting return and continue the control-firm return series by including the firm with the 2nd closest level of PAIT as the control firm. Full sample uses insider trading data from Thomson Financial Insiders Database for all managers as defined in footnote 21 of the text. The t-statistics are shown next to the average BHAR estimates. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	After 1 Year			After 2 Years			After 3 Years		
	N	Coef.	*t*-Stat.	*N*	Coef.	*t*-Stat.	*N*	Coef.	*t*-Stat.
$BHAR_{All\ Stock}$	2,548	−1.4	−0.79	2,525	−7.1	−2.12**	2,456	−12.1	−3.33***
$BHAR_{High\ Seller}$	1,067	−4.7	−1.70*	1,058	−11.2	−1.91*	1,033	−17.8	−2.88***

(not reported) are not significantly different from 0 for high-seller or high-buyer groups.

These results show that, for an overvalued firm, making stock acquisitions does not seem to be a value-creating strategy compared to staying put: Overvalued firms that attempt stock acquisitions severely underperform similarly overvalued nonacquirer firms. Finally, as a robustness check, I exclude all failed, withdrawn, and incomplete bids and recalculate BHARs for only completed acquisitions. Overvalued stock acquirers get a BHAR of −12.7% in 3 years, but the main conclusion does not change.[50]

2. Calendar-Time Portfolio Regressions

In Table 10, I calculate long-run abnormal returns using the CTPR approach, which has the advantage of taking into account cross-sectional dependence and being less sensitive to model misspecification. I first calculate abnormal returns for stock acquirers, then for a portfolio of nonacquirer firms with similar insider trading, and finally for a portfolio that buys the acquirers' portfolio and short sells the nonacquirers' portfolio. Full details of the procedure can be found in the note to Table 10.

The long-run abnormal returns for stock acquirers are reliably negative for all horizons and vary between −4.3% in 1 year (-0.36×12) and −12% in 3 years (-0.33×36) . This is in line with existing literature that stock acquisitions are met with negative long-run abnormal returns (Mitchell and Stafford (2001)).

[50]In unreported results, I run the announcement return regression in Table 8 using the 3-year BHAR as the dependent variable. For stock deals, the coefficient on OVDUM is −21.5 and significant at the 5% level. This means that controlling for deal and acquirer characteristics as well as time and industry effects, an overvalued acquirer will underperform similarly overvalued nonacquirers by 21.5% in 3 years.

TABLE 10

Long-Run Abnormal Returns Using the CTPR Method: Full Sample

Table 10 presents the estimates of average monthly abnormal returns for stock-acquirer and nonacquirer firm portfolios using the calendar-time portfolio regressions (CTPRs). Full sample uses insider trading data from Thomson Financial Insiders Database for all managers as defined in footnote 21 of the text. I calculate abnormal returns for the portfolio of stock-acquirer firms for 12-, 24-, and 36-month holding periods as follows: In each month of the sample period, I form a portfolio of all firms that announced an acquisition in the last 12-, 24-, or 36-month periods, including the current month. I then create a subportfolio of high-seller acquirers based on the ranking of the acquirer firm's prior abnormal insider trading (PAIT) as detailed in the note to Table 4. Acquirer's PAIT is calculated over the 2 quarters preceding the merger announcement quarter. Next, I match each acquirer firm to a control firm that does not make acquisitions during the 6-year window centered on the announcement month, and that has the closest PAIT to that of the acquirer. Control firms enter and exit the portfolio at the same time with their corresponding acquirer firms. I then calculate returns on the acquirer firm portfolio, the control firm portfolio, and a difference portfolio that buys acquirer firm portfolio and short sells the control firm portfolio. Portfolios are rebalanced monthly to include companies that have just announced an acquisition and drop those that have reached the end of their holding periods. For all portfolios, if there are fewer than 5 firms in a given month, each stock will carry only a 20% weight and the rest will be invested in the CRSP equal-weighted market portfolio. I then calculate equal-weighted monthly returns for each portfolio and regress them on the 3 Fama and French (1993) risk factors using the following specification:

$$R_{pt} - R_{ft} = \alpha_p + \beta_p (R_{mt} - R_{ft}) + s_p SMB_t + h_p HML_t + \varepsilon_t,$$

where α_p represents the average monthly abnormal return of the event portfolio, ε_t is an independent and identically distributed Gaussian random error, R_{pt} is the portfolio return, R_{ft} is the 1-month T-bill rate, R_{mt} is the value-weighted monthly return of the CRSP index, SMB_t is the difference in the returns of a value-weighted portfolio of small stocks and big stocks, and HML_t is the difference in the returns of a value-weighted portfolio of high book-to-market stocks and low book-to-market stocks. The *t*-statistics are shown next to the CTPR estimates. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	After 1 Year		After 2 Years		After 3 Years	
	Coef.	*t*-Stat.	Coef.	*t*-Stat.	Coef.	*t*-Stat.
$\alpha_{All\ Stock\ Acquirers}$	−0.36	−1.55	−0.39	−2.09**	−0.33	−1.90*
$\alpha_{Control\ Firms}$	0.26	1.28	0.43	2.37**	0.38	2.34**
$\alpha_{All\ Stock\ Acquirers\ minus\ Control\ Firms}$	−0.62	−2.26**	−0.82	−3.72***	−0.71	−3.82***
$\alpha_{High\ Seller\ Stock\ Acquirers}$	−0.56	−1.79*	−0.36	−1.38	−0.28	−1.33
$\alpha_{High\ Seller\ Control\ Firms}$	0.35	1.43	0.39	2.10**	0.26	1.64
$\alpha_{High\ Seller\ Acquirers\ minus\ High\ Seller\ Controls}$	−0.91	−2.23**	−0.75	−2.32**	−0.54	−2.14**

On the other hand, similarly trading nonacquirers get significant positive returns of 10.3% in 2 years (0.43×24) and 13.7% in 3 years (0.38×36). As a result, stock acquirers underperform nonacquirers by 7.4% in 1 year, 19.7% in 2 years, and 25.6% in 3 years. This underperformance is both statistically and economically significant, suggesting stock acquirers underperform similarly misvalued nonacquirer firms, regardless of the direction of misvaluation.

High-seller stock acquirers get a negative and significant return of −6.7% in 1 year (-0.56×12), pointing to a correction of overvaluation as predicted by the misvaluation theory. High-buyer stock acquirers (not reported), on the other hand, never see statistically significant negative returns. Finally, I look at how high-seller stock acquirers compare to similarly trading nonacquirer firms. They underperform nonacquirers in all horizons. The underperformance ranges from 10.9% in 1 year to 19.4% in 3 years.[51]

Results from CTPR-based long-run abnormal returns confirm my earlier findings: Overvalued firms attempting stock acquisitions fare much worse than overvalued firms not making stock acquisitions. These findings raise doubts as to whether attempting a stock acquisition is a value-creating activity for an overvalued firm.

[51] High buyers show signs of underperformance as well, but the magnitudes are lower with weaker significance.

F. Do Overvalued Acquirers Overpay?

One reason why overvalued stock acquirers might have poor short- and long-run returns could be that they are overpaying for the target. I examine this possibility in Table 11. I regress the bid premia paid for public targets

TABLE 11

Determinants of Bid Premium: Full Sample

Table 11 examines the determinants of bid premium. In column 1 (column 2) of Panel A, bid premium is regressed on OVDUM (OVDUMT) and acquirer, target, and deal characteristics. The independent variables of interest are OVDUM and OVDUMT. OVDUM (OVDUMT) is a dummy variable set to 1 if the PAIT for the acquirer (target) is in the bottom 33% of the distribution of the PAITs of all acquirers (targets). Panel B (Panel C) gives the coefficients of OVDUM (OVDUMT) for different subsamples based on the method of payment and the overvaluation of the target (acquirer). Calculations of the independent variables are detailed in the caption to Tables 4, 5, 7, and 8. Full sample uses insider trading data from Thomson Financial Insiders Database for all managers as defined in footnote 21 of the text. The *t*-statistics are calculated using White's (1980) heteroskedasticity-consistent errors and adjusting for clustering at the acquirer firm level. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	1		2	
	Coef.	*t*-Stat.	Coef.	*t*-Stat.
Panel A. All Deals				
OVDUM	0.014	0.85		
OVDUMT			0.045	1.98**
MB ratio (target)	−0.028	−4.13***	−0.025	−2.34**
MB ratio (acquirer)	0.019	3.17***	0.020	2.21**
Cash (target)	0.062	0.98	0.235	2.48**
Cash (acquirer)	−0.015	−0.18	0.016	0.13
Return on equity (target)	0.020	0.58	0.080	1.42
Return on equity (acquirer)	−0.072	−1.43	−0.090	−0.96
Sales growth (target)	0.007	0.30	0.027	0.76
Sales growth (acquirer)	0.006	0.31	−0.019	−0.61
Leverage (target)	0.271	3.79***	0.419	3.48***
Leverage (acquirer)	−0.087	−1.13	−0.040	−0.38
Price-to-earnings ratio (target)	−0.206	−0.95	0.116	0.33
Price-to-earnings ratio (acquirer)	−0.292	−1.17	−0.940	−2.56**
Firm size (target)	−0.062	−6.59***	−0.055	−4.48***
Firm size (acquirer)	0.047	5.18***	0.028	2.14**
Past stock return (target)	−0.037	−2.23**	−0.092	−2.62***
Past stock return (acquirer)	0.057	2.73***	0.057	1.84*
Past stock volatility (target)	0.194	4.16***	0.184	2.20**
Past stock volatility (acquirer)	−0.084	−1.21	−0.097	−0.81
Relative deal size	0.066	3.22***	0.027	1.12
Subsidiary dummy	−0.192	−2.59***	−0.117	−1.06
Failed bid dummy	0.000	0.00	0.001	0.04
Multiple bidders dummy	0.050	2.10**	0.043	1.47
Hostile offer dummy	0.060	1.28	0.024	0.48
Toehold dummy	−0.091	−1.44	0.080	0.83
No. of acquisitions in the past year	−0.002	−0.29	−0.009	−0.86
Rumored deal dummy	0.010	0.23	0.035	0.72
Fee dummy	−0.018	−0.45	−0.039	−0.67
Intercept	1.545	5.19***	−0.002	−0.01
No. of obs.	2,127		1,023	
R^2	0.246		0.359	

	All Deals			Stock Deals		
	N	Coef.	*t*-Stat.	*N*	Coef.	*t*-Stat.
Panel B. Coefficients for OVDUM in Model 1 for Different Subsamples						
Target overvaluation:						
All targets	2,127	0.014	0.85	807	0.032	1.11
Overvalued targets	341	0.002	0.04	154	−0.05	−0.42
Not-overvalued targets	682	0.028	1.03	267	−0.05	−0.72
Panel C. Coefficients for OVDUMT in Model 2 for Different Subsamples						
Acquirer overvaluation:						
All acquirers	1,023	0.045	1.98**	421	0.037	0.76
Overvalued acquirers	383	0.014	0.34	179	0.032	0.29
Not-overvalued acquirers	640	0.074	2.36**	242	0.179	2.67***

on acquirer and target characteristics,[52] as well as dummy variables showing whether acquirer and target are overvalued (OVDUM and OVDUMT). I first present the full regression results in Panel A for all deals. I then run these regressions for different subsamples based on the method of payment and the overvaluation of the acquirer and the target and report the coefficients of OVDUM and OVDUMT in Panels B and C. The main message from Table 11 is that overvalued acquirers do not overpay, regardless of the method of payment or target overvaluation. Panel B shows that the coefficient of OVDUM is insignificant for all deals, stock deals,[53] and deals involving overvalued and not-overvalued targets. On the other hand, overvalued targets do receive higher bid premia: Panel C shows that they receive 4.5% higher premia for all deals (the coefficient of OVDUMT is 0.045). But further partitioning the sample by the overvaluation of the acquirer reveals that it is the not-overvalued acquirers that overpay for the overvalued targets. They pay 7.4% higher premia for overvalued targets in all deals and 17.9% higher premia in stock deals.[54] The conclusion from this section is that overvalued acquirers do not overpay for the targets. Hence, overpaying for the target does not seem to be the reason for the observed wealth destruction from overvalued stock acquisitions.

G. Do Overvalued Acquirers Make Bad Deals?

Another reason why overvalued stock acquirers experience shareholder value destruction could be that they simply make bad deals with low (or even negative) synergies. Following Harford, Humphery-Jenner, and Powell (2012), I explore this possibility by looking at combined (acquirer + target) cumulative abnormal announcement returns (combined CARs) and post-acquisition operating performance in Table 12.

Panel A of Table 12 reports combined announcement returns calculated over days −1 to +1 around the announcement day for stock deals. The combined CAR for stock deals made by overvalued acquirers is negative and insignificant, suggesting that such deals do not have positive synergies on average. For stock acquirers that are not overvalued, the combined CAR is 0.62% and significant at the 5% level, pointing to positive synergies in these deals. As a result, the combined CAR for overvalued acquirers is a full 1% lower than that for not-overvalued acquirers, and the difference is significant at the 1% level. To the extent that combined CAR reflects the synergies from the merger, this means that overvalued stock acquirers make deals resulting in lower synergies.

Panel B of Table 12 indicates the change in abnormal operating performance for the combined firm for 1-, 2-, and 3-year horizons starting at 1 year after the effective date. One difficulty with calculating abnormal operating performance in general is the measurement of ex ante profitability. For M&As, this is even more problematic, since there are 2 separate firms before the merger and 1 combined firm afterward. I use the approach of Hoberg and Phillips (2010) to circumvent

[52] See Edmister and Walkling (1985) for a similar model.

[53] OVDUM is insignificant for cash deals as well. Cash deals are omitted for brevity.

[54] They do not overpay in cash deals; the coefficient of OVDUMT is positive but insignificant.

TABLE 12

Synergies and Operating Performance: Full Sample

Panel A of Table 12 reports the combined firm 3-day cumulative abnormal return (CAR) for the window [−1, 1] around the announcement day for overvalued and not-overvalued acquirers. Combined CAR is the weighted sum of acquirer's and target's [−1, +1] cumulative abnormal returns using their market values at day −2 as weights. Since its calculation requires target's stock return data, combined CAR is only available for deals involving public targets. Panel B reports average change in operating performance for the combined firm over 1-, 2-, and 3-year horizons, starting at the 4th quarter (quarter 4) after the deal completion quarter (quarter 0). Change in operating performance is measured as performance-matched quarterly return on assets (ROA) averaged over 1-, 2-, or 3-year horizons minus performance-matched ROA for quarter 4 using the matching procedure in Lie (2005). Please refer to the Internet Appendix for the details of the matching procedure. ROA is defined as Compustat items 13/(6 − 1). Full sample uses insider trading data from Thomson Financial Insiders Database for all managers as defined in footnote 21 of the text. One-tailed (2-tailed) *p*-values are reported in parentheses (square brackets). Differences in medians are tested using a Wilcoxon sign-rank test. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Panel A. Combined CAR[−1, +1]

	All Deals				
	N	Mean	*t*-Stat.	Median	*z*-Value
All acquirers	2,778	1.42%	11.89***	0.84%	11.89***
Overvalued acquirers	1,007	0.70%	3.86***	0.41%	3.80***
Not-overvalued acquirers	1,771	1.82%	11.78***	1.19%	11.03***
Difference		−1.12%	4.52***	−0.78%	−4.36***
	Stock Deals				
	N	Mean	*t*-Stat.	Median	*z*-Value
All acquirers	1,121	0.21%	1.10	0.07%	0.58
Overvalued acquirers	457	−0.39%	−1.45	−0.20%	−1.40
Not-overvalued acquirers	664	0.62%	2.43**	0.33%	1.87*
Difference		−1.01%	−2.66***	−0.53%	−2.26**

Panel B. Change in Operating Performance Using Lie's (2005) Matching Procedure

	All Deals				Stock Deals			
	N	1-Year	2-Year	3-Year	*N*	1-Year	2-Year	3-Year
All acquirers	9,254	−0.09% (0.035)	−0.10% (0.023)	−0.10% (0.023)	1,968	−0.18% (0.060)	−0.21% (0.050)	−0.18% (0.081)
Overvalued acquirers	3,110	−0.14% (0.017)	−0.19% (0.006)	−0.18% (0.009)	832	−0.40% (0.003)	−0.55% (0.001)	−0.51% (0.003)
Not-overvalued acquirers	6,144	−0.06% (0.171)	−0.05% (0.202)	−0.06% (0.189)	1,136	−0.02% (0.454)	0.03% (0.424)	0.06% (0.638)
Difference		−0.08% [0.447]	−0.13% [0.196]	−0.13% [0.222]		−0.38% [0.105]	−0.58% [0.025]	−0.58% [0.027]

this problem entirely.[55] Specifically, I measure the abnormal performance for the combined firm for 1-, 2-, and 3-year horizons starting at 4 quarters after the quarter when the deal becomes effective. This effectively requires accounting data up to 4 years after the effective date and thus reduces the sample size and the power of my tests, biasing the analysis toward not detecting abnormal performance. But it also ensures that the starting numbers reflect the completion of the deal and avoids the issues with ex-ante profitability. Finally, this method has the additional advantage of allowing the calculation of abnormal operating performance for deals involving

[55]Hoberg and Phillips (2010) argue that using post-effective changes in operating performance is conservative and helps avoid the problem of measuring ex ante profitability, as well as the confounding effects of other structural changes, like selling off divisions, which often occur at the transaction date. They also argue that using post-effective changes in operating performance assumes profitability accrues over time, which is a reasonable assumption since new products require time to build, and synergies require time to materialize.

private and subsidiary targets as well, since it does not require matching the target firm to a control firm before the merger.[56]

I calculate the abnormal operating performance for a given quarter as the difference between the combined firm's return on operating assets (ROA; Compustat items $13/(6-1)$) and ROA of the performance-matched control firms. I use the performance matching method in Lie (2005) to match each combined firm to a control firm that is not involved in acquisitions using data for the 4 quarters following the effective quarter (quarter 0).[57] I then calculate the average change in abnormal operating performance for 1-, 2-, and 3-year horizons (quarter 4 to quarters 8, 12, and 16, respectively) as the average quarterly performance-matched ROA during the 1-, 2-, and 3-year horizons minus the performance-matched ROA in quarter 4. Panel B of Table 12 gives the change in performance-matched ROA for 1-, 2-, and 3-year horizons for all deals and stock deals. Overvalued acquirers suffer deterioration in operating performance regardless of the method of payment: The change in performance-matched ROA is -0.14% in 1 year, -0.19% in 2 years, and -0.18% in 3 years, all significant at the 5% and 1% levels. Overvalued stock acquirers face a much sharper decline in operating performance: -0.40% in 1 year, -0.55% in 2 years, and -0.51% in 3 years, all significant at the 1% level. Acquirers that are not overvalued do not exhibit any signs of abnormal performance change; change in performance-matched ROA is close to 0 and insignificant for all cases. The difference in the change in performance-matched ROA between overvalued and not-overvalued stock acquirers is -0.58% for 2- and 3-year horizons and significant at the 5% level. These results are consistent with Fu et al. (2013), who document a -0.93% decline in ROA for overvalued stock acquirers and an insignificant change for acquirers that are not overvalued.

To summarize, combined CARs show that overvalued stock acquirers are not perceived by the market to be doing deals with positive synergies, and the post-acquisition worsening in operating performance seems to support the market's conjecture. Compared to stock acquirers that are not overvalued, overvalued stock acquirers make deals with lower synergies and worse subsequent operating performance. In short, overvalued stock acquirers indeed seem to be making bad deals,[58] and this could be one of the reasons for the observed short- and long-run value destruction.

IV. Discussion

This paper fits in a fast-growing literature examining the consequences of overvalued equity. Moeller, Schlingemann, and Stulz (2005) document the massive loss of shareholder value in the stock acquisitions of the late 1990s, while Jensen (2005) details the agency costs associated with overvalued equity.

[56] The results are similar if the sample is restricted only to deals involving public targets.

[57] See the Internet Appendix for the details of the matching procedure.

[58] One reason for making such bad deals could be that acquirers rush into making deals without proper due diligence in order to take advantage of overvaluation before it disappears. I leave this for future research.

SV (2003) and RKV (2004) build models showing how overvalued equity can drive acquisition activity. Numerous papers empirically examine the consequences of overvalued equity using different methods to calculate overvaluation.[59] However, there does not seem to be a consensus on whether overvaluation-driven stock acquisitions create or destroy value for the acquirer shareholders in the long run. In the context of the studies mentioned above, I believe the current paper makes four distinct contributions to the literature on misvaluation and acquisition activity: First, it uses a new method to measure overvaluation; using managerial insider trading circumvents the problems associated with estimating the firm's true value. Second, this new measure has incremental explanatory power over the commonly used misvaluation measures like the MB ratio and the RKRV (2005) decomposition of the MB ratio. Third, compared to the studies cited above, the sample used in this paper is by far the largest and most representative of M&A activity in the economy. Existing studies of misvaluation in M&As only concentrate on mergers between public acquirers and targets resulting in a much narrower sample.[60] I use a far bigger sample of 11,796 deals by including private and subsidiary targets as well as acquisitions of assets. As a result, I extend the tests of misvaluation theory to a more representative sample and show for the first time that misvaluation plays a role in acquisitions involving private targets as well.[61] Fourth, the analysis in this paper addresses the unresolved question of whether overvaluation-driven stock acquisitions really benefit the acquirer shareholders. This is achieved by comparing the long-run abnormal returns of stock acquirers to a control group of similarly overvalued firms that do not make any acquisitions. The results show that notwithstanding the reversal of misvaluation, the shareholders of stock acquirers are worse off in the long run. This value destruction seems to be due to overvalued stock acquirers making bad deals with lower synergies, which result in a worsening of operating performance, rather than overvalued stock acquirers overpaying for the targets. This casts a doubt on the ability of managers to increase long-term shareholder value through overvaluation-driven stock acquisitions.

V. Conclusion

In this paper, I try to answer two main questions: Does overvalued equity drive managers to make stock acquisitions? Second, do these acquisitions create value for acquirer shareholders, both in the short and long term? The answer to the 1st question is yes; overvalued equity seems to drive stock acquisitions. Using managerial insider trading as a way to measure overvaluation, I find that firms

[59] See RKRV (2005), DHRT (2006), Ang and Cheng (2006), Song (2007), Ma et al. (2011), Lu and Savor (2009), and Fu et al. (2013). Khan, Kogan, and Serafeim (2012) use buying pressure by mutual funds with large capital inflows to measure overvaluation. Their measure has the advantage of being relatively exogenous, but compared to insider trading, it is a less direct measure and may have limited power in detecting the cases of overvaluation that are not driven by buying pressure from mutual funds with high inflows.

[60] Among the studies cited, RKRV (2005) has the biggest samples size: 4,325 mergers between public acquirers and targets. Netter et al. (2011) examine the implications of data screens on M&A research and find that much of the research in M&A focuses on such samples, which represent less than 5% of the domestic acquisition activity.

[61] My main results hold for both private and public targets separately.

whose managers abnormally sell more are more likely to acquire other firms for stock, and among all acquirers, those with high-seller managers are more likely to use stock as a method of payment. Answering the 2nd question is a bit more involved. In the short run, overvalued acquirers in stock acquisitions get negative and lower announcement returns. These negative returns may be due to a partial correction of the acquirer's overvaluation at the announcement. But one cannot rule out the possibility that these acquisitions are simply viewed as value destroying for acquirer shareholders. In the long run, overvaluation will be corrected completely, so one expects to see negative abnormal returns to overvalued stock acquirers. But the more relevant question is this: If the overvaluation will be corrected in the future no matter what, wouldn't acquirer shareholders be better off if they converted their overvalued equity to real assets through stock acquisitions? The results suggest just the opposite: In 3 years, high-seller stock acquirers significantly underperform high-seller nonacquirers using BHAR and CTPR methods, probably because they make bad deals with lower synergies. This suggests that the underperformance of high-seller stock acquirers is not due to the correction of overvaluation; rather, it reflects the value consequences of attempting the acquisition itself.

So the answer to the 2nd question is no: Stock acquisitions driven by overvaluation do not seem to create shareholder value; in fact, they destroy shareholder value both in the short and long run.

References

Agrawal, A., and T. Nasser. "Insider Trading in Takeover Targets." *Journal of Corporate Finance,* 18 (2012), 598–625.

Ang, J., and Y. Cheng. "Direct Evidence on the Market-Driven Acquisitions Theory." *Journal of Financial Research*, 29 (2006), 199–216.

Barber, B. M., and J. D. Lyon. "Detecting Long-Run Abnormal Stock Returns: The Empirical Power and Specification of Test Statistics." *Journal of Financial Economics*, 43 (1997), 341–372.

Barberis, N., and M. Huang. "Mental Accounting, Loss Aversion, and Individual Stock Returns." *Journal of Finance*, 56 (2001), 1247–1292.

Beneish, M., and M. Vargus. "Insider Trading, Earnings Quality, and Accrual Mispricing." *Accounting Review*, 77 (2002), 755–791.

Bettis, C.; J. Coles; and M. Lemmon. "Corporate Policies Restricting Trading by Insiders." *Journal of Financial Economics*, 57 (2000), 191–220.

Billett, M. T., and Y. Qian. "Are Overconfident CEOs Born or Made? Evidence of Self-Attribution Bias from Frequent Acquirers." *Management Science*, 54 (2008), 1037–1051.

Cai, J.; M. H. Song; and R. A. Walkling. "Anticipation, Acquisitions, and Bidder Returns: Industry Shocks and the Transfer of Information across Rivals." *Review of Financial Studies*, 24 (2011), 2242–2285.

Cai, J., and A. M. Vijh. "Incentive Effects of Illiquid Stock and Option Holdings of Target and Acquirer CEOs." *Journal of Finance*, 61 (2007), 1891–1933.

Chung, K. H.; J. Elder; and J. Kim. "Corporate Governance and Liquidity." *Journal of Financial and Quantitative Analysis*, 45 (2010), 265–291.

Core, J. E.; W. R. Guay; S. A. Richardson; and R. S. Verdi. "Stock Market Anomalies: What Can We Learn from Repurchases and Insider Trading?" *Review of Accounting Studies*, 11 (2006), 49–70.

Daniel, K. D.; D. Hirshleifer; and A. Subrahmanyam. "Overconfidence, Arbitrage, and Equilibrium Asset Pricing." *Journal of Finance*, 56 (2001), 921–965.

Dong, M.; D. Hirshleifer; S. Richardson; and S. H. Teoh. "Does Investor Misvaluation Drive the Takeover Market?" *Journal of Finance*, 61 (2006), 725–762.

Edmister, R. O., and R. A. Walkling. "Determinants of Tender Offer Premiums." *Financial Analysts Journal*, 41 (1985), 27–37.

Fama, E. F. "Market Efficiency, Long-Term Returns and Behavioral Finance." *Journal of Financial Economics*, 49 (1998), 283–306.
Fama, E. F., and K. French. "Common Risk Factors in the Returns on Stocks and Bonds." *Journal of Financial Economics*, 33 (1993), 3–56.
Fama, E. F., and K. French. "Industry Costs of Equity." *Journal of Financial Economics*, 43 (1997), 153–193.
Fu, F.; L. Lin; and M. Officer. "Acquisitions Driven by Stock Overvaluation: Are They Good Deals?" *Journal of Financial Economics*, 109 (2013), 24–39.
Harford, J.; M. L. Humphery-Jenner; and R. Powell. "The Sources of Value Destruction in Acquisitions by Entrenched Managers." *Journal of Financial Economics*, 106 (2012), 247–261.
Hoberg, G., and G. Phillips. "Product Market Synergies and Competition in Mergers and Acquisitions: A Text-Based Analysis." *Review of Financial Studies,* 23 (2010), 3773–3811.
Jeng, L. A.; A. Metrick; and R. Zeckhauser. "The Profits to Insider Trading: A Performance-Evaluation Perspective." NBER Working Paper No. 6913 (1999).
Jensen, M. C. "Agency Costs of Overvalued Equity." *Financial Management*, 34 (2005), 5–19.
Kahl, M.; J. Liu; and F. Longstaff. "Paper Millionaires: How Valuable Is Stock to a Stockholder Who Is Restricted from Selling It." *Journal of Financial Economics*, 67 (2003), 385–410.
Khan, M.; L. Kogan; and G. Serafeim. "Mutual Fund Trading Pressure: Firm-Level Stock Price Impact and Timing of SEOs." *Journal of Finance*, 67 (2012), 1371–1395.
Lee, I. "Do Firms Knowingly Sell Overvalued Equity?" *Journal of Finance*, 52 (1997), 1439–1466.
Lie, E. "Operating Performance Following Open Market Share Repurchase Announcements." *Journal of Accounting and Economics*, 39 (2005), 411–436.
Loughran, T., and J. Ritter. "Uniformly Least Powerful Tests of Market Efficiency." *Journal of Financial Economics*, 55 (2000), 361–389.
Loughran, T., and A. M. Vijh. "Do Long-Term Shareholders Benefit from Corporate Acquisitions?" *Journal of Finance*, 52 (1997), 1765–1790.
Lu, Q., and P. G. Savor. "Do Stock Mergers Create Value for Acquirers?" *Journal of Finance*, 64 (2009), 1061–1097.
Ma, Q.; D. A. Whidbee; and W. Zhang. "Value, Valuation, and the Long-Run Performance of Merged Firms." *Journal of Corporate Finance*, 1 (2011), 1–17.
Martin, K. J. "The Method of Payment in Corporate Acquisitions, Investment Opportunities, and Management Ownership." *Journal of Finance*, 51 (1996), 1227–1246.
Meulbroek, L. K. "Does Risk Matter? Corporate Insider Transactions in Internet-Based Firms." Harvard Business School Working Paper 00-062 (2000).
Mitchell, M., and E. Stafford. "Managerial Decisions and Long-Run Stock Performance." *Journal of Business*, 73 (2001), 287–329.
Moeller, S.; F. P. Schlingemann; and R. M. Stulz. "Wealth Destruction on a Massive Scale? A Study of Acquiring-Firm Returns in the Recent Merger Wave." *Journal of Finance*, 60 (2005), 757–782.
Nelson, R. *Merger Movements in the American Industry 1895–1956*. Princeton, NJ: Princeton University Press (1959).
Netter, J. M.; M. Stegemoller; and M. B. Wintoki. "Implications of Data Screens on Merger and Acquisition Analysis: A Large Sample Study of Mergers and Acquisitions from 1992–2009." *Review of Financial Studies*, 24 (2011), 2316–2357.
Newey, W., and K. West. "A Simple, Positive Semi-Definite, Heteroskedasticity and Autocorrelation Consistent Covariance Matrix." *Econometrica*, 55 (1987), 703–708.
Officer, M. "Termination Fees in Mergers and Acquisitions." *Journal of Financial Economics*, 69 (2003), 431–467.
Pinkowitz, L. F.; J. Sturgess; and R. G. Williamson. "Do Cash Stockpiles Fuel Cash Acquisitions?" *Journal of Corporate Finance*, 23 (2013), 128–149.
Rhodes-Kropf, M.; D. T. Robinson; and S. Viswanathan. "Valuation Waves and Acquisition Activity: The Empirical Evidence." *Journal of Financial Economics*, 77 (2005), 561–603.
Rhodes-Kropf, M., and S. Viswanathan. "Market Valuation and Merger Waves." *Journal of Finance*, 59 (2004), 2685–2718.
Ritter, J. "The Long-Run Performance of Initial Public Offerings." *Journal of Finance*, 46 (1991), 3–27.
Rozeff, M. S., and M. A. Zaman. "Market Efficiency and Insider Trading: New Evidence." *Journal of Business*, 61 (1988), 25–44.
Seyhun, H. N. "Insiders' Profits, Costs of Trading, and Market Efficiency." *Journal of Financial Economics*, 16 (1986), 189–212.
Seyhun, H. N. "The Information Content of Aggregate Insider Trading." *Journal of Business*, 61 (1988), 1–24.

Shleifer, A., and R. W. Vishny. "Stock Market Driven Acquisitions." *Journal of Financial Economics*, 70 (2003), 1–29.
Song, W. "Does Overvaluation Lead to Bad Mergers?" AFA 2007 Chicago Meetings Paper (2007).
White, H. "A Heteroskedasticity-Consistent Covariance Matrix Estimator and a Direct Test for Heteroskedasticity." *Econometrica*, 48 (1980), 817–838.