

Does acquirer cash level predict post-acquisition returns?

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Abstract This paper investigates whether an acquirer's pre-announcement cash level can predict post-acquisition returns. Harford (1999, *Journal of Finance*, 54, 1969–1997) shows that some cash-rich acquirers have lower announcement period returns than other acquirers, suggesting the market partially anticipates poor future performance. This paper shows that the acquirer's cash level is also strongly and negatively predictive of post-acquisition returns, indicating that the announcement response is incomplete. Post-acquisition return on net operating assets (RNOA) is significantly decreasing in acquirer cash, suggesting that the market responds to subsequent poor operating performance as it is reported. Overall, these results are consistent with the market's inattention to a less prominent accounting signal (acquirer cash) but attentiveness to a more prominent accounting signal (RNOA), as proposed by Hirshleifer and Teoh (2003, *Journal of Accounting Economics*, 36, 337–386).

Keywords Acquisitions · Cash accumulation · Post-acquisition returns · Market efficiency

JEL Classifications G34 · G14 · M41

1 Introduction

Jensen (1986) predicts that firms with excess cash flows will tend to make value-destructive investment decisions, and subsequent research generally supports his hypothesis (for example, Richardson 2006). Harford (1999) investigates acquisitions as a specific value-destructive decision by firms that have accumulated cash

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and shows that returns to unexpected acquisition announcements by cash-rich firms are negative. However, Harford does not investigate post-acquisition returns. Announcement period returns capture only the market's initial response to an acquisition; if the market does not fully recognize the implications of an acquirer's cash level on future performance, then post-acquisition returns will be predictable based on this information. This paper looks at post-acquisition returns to determine whether the market fully anticipates the "bad news" revealed when a high-cash acquirer announces an acquisition.

In an efficient capital market, all value-relevant public information should be quickly and fully impounded into stock price (Fama 1970). However, a growing body of research from accounting (Bernard and Thomas 1989; Sloan 1996; Hirshleifer et al. 2004) and the acquisitions literature (see Agrawal and Jaffe 2000) indicates that the market does not respond completely to some public information. Hirshleifer and Teoh (2003) model one explanation for this phenomenon as limited investor attention; they argue that investors with limited attention are likely to attend to more salient, easily processed information and may miss less prominent information (see also Griffin and Tverksy 1992). This study examines whether evidence of limited attention exists with respect to acquisitions.

Investors' limited attention suggests that market prices are more likely to impound prominent information, such as net income, than less prominent information, such as the implications of the acquirer's announcement cash level. The acquirer's cash level is available in the financial statements of the acquirer, but is rarely mentioned in the acquisition announcement. Further, *ex ante*, it is unclear whether accumulated cash is a positive signal or a negative signal.¹ It is significant that this less prominent (or less easily understood) information is available earlier than the more prominent information of post-acquisition net income. If some investors overlook (or are unaware of) the implications of announcement period acquirer cash, they may still respond to the more prominent signal of fundamental performance as it is reported on the acquirer's subsequent income statements without recognizing that this drop in performance was predictable based on earlier information. Accordingly, I hypothesize that post-acquisition returns are decreasing in acquirer cash level and that post-acquisition return on net operating assets (RNOA) is also decreasing in acquirer cash level.

I find that acquirer cash has a significantly negative relationship with post-acquisition returns and with post-acquisition RNOA. These results suggest that a significant portion of investors do not understand the implications of a high cash balance on the announcement date. The stock price of the high-cash acquiring firm is therefore temporarily overstated, with the correction occurring as investors respond to the more prominent signal of earnings when they are reported in the post-acquisition period.

To measure the economic significance of my results, I calculate returns to various implementable investment strategies based on my findings. An implementable

¹ For example, Keynes (1936) articulates several reasons for holding cash, including bridging the gap between incurring costs and receipt of proceeds, and for unforeseen contingencies. Myers and Majluf (1984) reason that cash can mitigate the negative effects of information asymmetry between investors and managers.

strategy of shorting negative-signal acquisitions (specifically, stock-consideration, friendly, high-acquirer-cash acquisitions) and going long in positive-signal acquisitions (nonstock, hostile, nonhigh-cash) yields annualized abnormal returns of 20.5%.² To alleviate concerns that the significance of my results is overstated because of cross-correlation in buy-and-hold returns (Bernard 1987), I show that these results also hold under alternative methodologies that control for cross-correlation.

This paper contributes to the accounting literature by introducing another setting where the market appears to not fully impound information into stock prices on a timely basis (Bernard and Thomas 1989; Sloan 1996) and is consistent with the behavioral model of Hirshleifer and Teoh (2003, 2005). It also adds acquirer cash as another predictive variable for post-acquisition returns (see Agrawal and Jaffe 2000, for a review of prior research into post-acquisition returns). The empirical analysis of comparing announcement returns and post-announcement returns can be used to investigate other phenomenon where information is revealed to the market at a specific date but where the market may fail to fully impound all implications of that information until later.

These findings extend the debate on disclosure versus recognition by showing that the attention of investors can vary even between recognized items. These findings may be useful to standard setters because they suggest that even recognition in the financial statements is not adequate if the item is not understood by investors or is otherwise ignored. Similarly, my results are useful to financial statement analysis instructors because they provide an example of why trading strategies based on fundamentals can be profitable even though the information used is publicly available.

This paper proceeds as follows. The next section reviews related prior research and discusses my motivation. Section 3 describes my methodology and data. Section 4 presents the results, and Section 5 concludes.

2 Previous research and motivation

2.1 Cash holdings, future profitability, and acquisitions

Jensen's (1986) free cash flow theory posits that firms generating excess cash are likely to make value-destructive investment decisions. This seminal paper has spawned a literature that generally supports Jensen's conclusions. Pinkowitz and Williamson (2002) find that a firm's cash balance has a contemporaneous value that varies based on the firm's investment opportunities and level of financial distress; the market places a lower value on cash holdings for distressed firms and firms with fewer growth opportunities. Richardson (2006) finds that firms with high levels of free cash flow are more likely to over-invest. Oler and Picconi (2005) show that firms with extremely high cash levels suffer significantly negative future returns

² For comparison, a strategy based on only stock consideration and hostility yields annual abnormal returns of 11.1%. Therefore, the addition of information on acquirer cash level increases annual abnormal returns by about 9.4%.

relative to firms with less extreme levels but do not investigate whether acquisitions are associated with those returns.

Harford (1999) investigates acquisitions as a specific value-destructive investment that high-cash firms pursue. He shows that the announcement period returns of high-cash acquirers are significantly lower than the announcement period returns of other acquirers, if the announcement was a surprise. I build on his results by investigating whether the announcement period market response with respect to acquirer cash is complete. If the initial market response is not complete, then post-acquisition returns will be predictable based on the acquirer's cash level.

2.2 Market efficiency and predicting post-acquisition returns

The semi-strong form of the efficient markets hypothesis posits that *all* value-relevant publicly available information is impounded into stock price shortly after it becomes available (Fama 1970). Beaver (1981), however, points out that a more rigorous definition of market efficiency must consider informational signals separately. The market may be more efficient with respect to one signal (for example, net income) and less efficient with respect to another signal (for example, accruals). If investors suffer from limitations in cognitive processing power, they are likely to attend to information that is more salient (that is, more prominent) and easily understood rather than information that is less salient or more difficult to understand (see Griffin and Tverksy 1992). Hirshleifer and Teoh's (2003) model of the effect of limited investor attention on stock prices suggests that market prices are a weighted average of the beliefs of both inattentive and attentive investors. In an acquisition setting, one signal that may be relevant but less prominent is the cash level of the acquiring firm.

There are two reasons to suspect that the implications of the acquirer's cash balance will not be fully impounded into its stock price in spite of being publicly known at the announcement date. First, prior research shows that two other information signals—the form of consideration given and the nature of the takeover (both known at announcement)—predict post-acquisition returns, indicating that the announcement date response is incomplete (Loughran and Vijh 1997). If investors underestimate the implications of these two signals, both of which are often explicitly stated when the acquisition is announced, they will also likely miss relevant but less prominent information that is rarely referred to in the announcement, such as the acquirer's cash level.³

Second, guidance to investors on how to evaluate the acquirer's cash balance is limited and contradictory. Although Jensen's (1986) free cash flow theory suggests that accumulated cash is a negative signal for acquisition performance, accounting textbooks routinely assert that having more cash is desirable because it increases the

³ One factor that suggests the limited attention hypothesis may not hold is the lack of evidence to support "EPS myopia" as an explanation for negative post-acquisition returns. Rau and Vermaelen (1998) investigate whether the acquirer's fixation on the EPS effect of the acquisition causes them to overpay for targets in accretive (that is, EPS-increasing) acquisitions. However, they do not find evidence to support this explanation. The fact that the market is able to "see through" possible EPS effects suggests that I will not find evidence of a relationship between acquirer cash and post-acquisition returns.

firm's financial flexibility (for example, Kieso et al. 2004, 171). In their guide to acquisitions professionals, based on research from the strategic management literature, Hitt et al. (2001) report that they “do not see a downside with regard to slack in acquisitions... [from] high levels of cash (p. 44).” Other research also suggests the beneficial aspects of cash. Keynes (1936) articulates the transactions-motive for holding cash (to bridge the gap between disbursements and receipts) and the precautionary-motive (a precaution in case of sudden opportunities or threats that require a cash outlay). Both motivations suggest that a lack of cash is undesirable, while a surplus of cash is not. Myers and Majluf (1984) argue that cash can reduce the problems associated with information asymmetry within the firm; a firm with ample cash can take advantage of positive-NPV investment opportunities while a firm with limited cash may forgo opportunities. Ex ante, it may be difficult to make strong predictions as to whether cash will be beneficial or harmful in an acquisition setting. Therefore, at least some investors will likely not view high cash as bad news when the acquisition is announced and will be surprised when post-acquisition performance is below their expectations. More formally, I expect to find a negative relationship between announcement-period acquirer cash and post-acquisition returns. Figure 1 outlines the measurement windows I examine (announcement, interim, and post-acquisition), with the timing of RNOA reporting.

2.3 Acquirer cash and post-acquisition RNOA

If the market does not fully impound information from the acquirer's cash level into its stock price upon announcement, it may respond to post-acquisition RNOA as it is reported because RNOA is more prominent and easier to understand. The acquisitions literature investigating post-acquisition fundamental performance

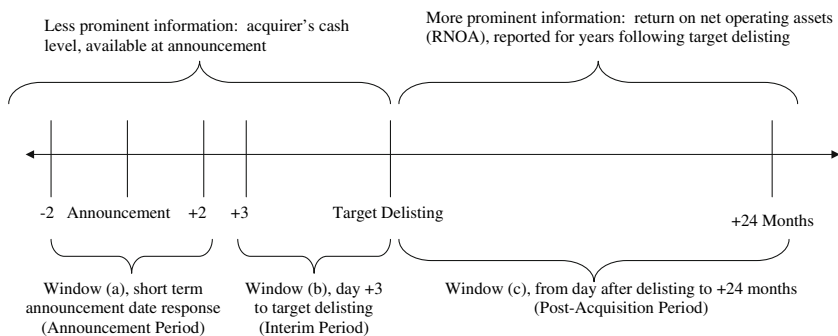


Fig. 1 Returns measurement windows. This figure presents the measurement windows used in this paper in conjunction with the availability of public information related to the acquirer. The announcement period window begins two trading days before the acquisition is announced and ends two trading days after the announcement. The interim window begins three trading days after the announcement and ends on the day the target firm is delisted. The post-acquisition period begins on the day following the target delisting and ends at the end of the month falling 24 months after the target delisting. The less prominent signal, acquirer cash level, is part of the background information available for the acquirer available when the acquisition is announced. The more prominent signal, return on net operating assets (RNOA), is reported in the years following the target delisting

generally corroborates results from stock price studies. Both Linn and Switzer (2001) and Ghosh (2001) show that cash acquisitions show greater subsequent improvements in operating performance than stock acquisitions.⁴ Harford (1999) finds that high-cash acquirers report lower return on assets than low-cash acquirers in the post-acquisition period. However, his test does not control for other factors that could explain changes in performance (such as the form of consideration or nature of the takeover) and does not show explicitly whether post-acquisition return on assets is decreasing in acquirer cash.⁵ I build on his results, with the expectation that post-acquisition RNOA is significantly decreasing in the acquirer's announcement-period cash level.

2.4 Other factors explaining post-acquisition returns

Harford (1999) also shows that high-cash acquirers are more likely to diversify but does not investigate possible relationships between diversification and announcement-period returns or between diversification and post-acquisition performance. Some prior research indicates that diversifications tend to be more value-destructive than non diversifications (Morck et al. 1990; Moeller et al. 2004).⁶ This suggests that the negative relationship between acquirer cash and announcement-period returns that Harford documents could be driven by diversifications, or by an interaction between cash level and diversification. If the market does not fully recognize the bad news associated with diversification on the announcement date, then post-acquisition returns will be lower for diversifications.

Prior research has found a number of other factors that possibly explain announcement period and post-acquisition returns; I control for these factors in my analysis. Specifically, Travlos (1987), Servaes (1991), and Bhagat et al. (2005) find that stock consideration elicits a negative announcement period response. Loughran and Vijh (1997) and Rau and Vermaelen (1998) show that stock consideration also predicts negative post-acquisition returns.⁷ Loughran and Vijh (1997) also show that

⁴ Healy et al. (1992) also investigate post-acquisition fundamental performance but find that stock acquisitions appear to outperform cash acquisitions. However, their small and non random sample makes extrapolation of their results difficult. Also, paying cash for the target firm's stock is not the same as the acquirer having a high cash balance at the time the acquisition is announced, because a low-cash acquirer can borrow funds to finance a cash acquisition and a cash-rich acquirer could still choose to issue stock instead of paying cash.

⁵ Harford's (1999) test shows that firms he classifies as having excess cash underperform on average, but he does not show that performance is decreasing in cash level.

⁶ However, the literature is far from unanimous on this issue; for example, see Villalonga (2004), and Campa and Kedia (2002). In a more recent paper, Bhagat et al. (2005) argue that diversifying acquisitions in themselves are not value-destructive but that they signal bad news about the bidder's stand-alone prospects.

⁷ However, Rau and Vermaelen (1998) argue that their data fits more closely with their "performance extrapolation hypothesis," where the market anticipates that the acquirer's superior pre-acquisition performance will continue into the future when, in fact, it does not. Because an acquirer with overvalued stock because of performance extrapolation is likely to offer that stock as consideration in an acquisition (see Shleifer and Vishney 2003), the performance extrapolation hypothesis is consistent with stock consideration signaling poor post-acquisition returns that both Loughran and Vijh (1997) and Rau and Vermaelen (1998) identify.

hostile takeovers outperform in the post-acquisition period. Rau and Vermaelen (1998) show that glamour firms (that is, firms with a low book-to-market, or BTM, ratio) underperform value firms (firms with a high BTM ratio), suggesting the need to control for book-to-market (see also Fama and French 1993). Relative target size is positively related to announcement-period returns (Asquith et al. 1983; Bhagat et al. 2005). Moeller et al. (2004) find that smaller acquirers enjoy higher announcement-period returns than larger acquirers.

Erickson and Wang (1999) find that acquirers in stock-for-stock acquisitions show evidence of income-increasing accruals before the acquisition announcement, and Louis (2004) finds that post-acquisition returns are decreasing in pre-acquisition abnormal accruals. This suggests the need to control for both accruals and net operating assets, which can be expressed as the sum of accruals over time (Hirshleifer et al. 2004).⁸ The role of momentum in short-term continuation (Jegadeesh and Titman 1993) and long-run reversals (DeBondt and Thaler 1985) suggests the need to control for momentum in my analysis as well. Finally, Opler et al. (1999) find that sales growth is a significant predictor of capital expenditures (another means to grow the firm, as opposed to acquisitions). Therefore, I also include sales growth as a control variable in my multivariate analysis.

3 Data description and methodology

3.1 Data description

To test my hypothesized relationship between acquirer cash and post-acquisition performance, I draw a sample of acquisitions from CRSP for years 1972–1995 and from Thomson Financial’s SDC Platinum M&A database (SDC) for 1996 to 2003.⁹ From CRSP, I select all target firms delisted because of a merger or acquisition and exclude ADRs, REITs, and closed-end funds. I also exclude targets trading at less than \$3 per share on their final trading date. SDC reports the acquirer name and cusip number, the form of consideration, the announcement date, and the nature of the acquisition. Because these data are not reported by CRSP, I determine the acquirer name and form of consideration using *CCH Capital Changes Reporter* (CCH) for my CRSP-drawn dataset. Also, for CRSP data, I use public-media search engines to determine the announcement date and the nature of the acquisition.¹⁰ SDC does not provide the acquirer’s permno, and so for SDC data, I search for the acquirer permno by matching on cusip.¹¹ My selection methodology limits my dataset to acquisitions that are actually consummated, and I do not examine

⁸ More precisely, net operating assets can be decomposed into cumulative operating accruals and cumulative investment (equation 3 in Hirshleifer et al. 2004).

⁹ Data collection is more convenient with the SDC dataset, but that dataset is less complete for earlier years.

¹⁰ Specifically, I use the Wall Street Journal Index, Dow Jones Online (later renamed Factiva), and Lexis-Nexis.

¹¹ To keep my SDC-drawn sample consistent with my CRSP-drawn sample, I also require that the target firm have a CRSP permno.

announcement-period returns for acquisition announcements that do not come to fruition.¹²

I exclude acquirers that are in the financial services industry (SIC code 6xxx) and acquirers that are classified as utilities (SIC code 49xx). Each target and acquirer must have a non-negative cash balance, positive total assets, positive shareholders' equity, and an SIC code provided by Compustat ("dnum"). Where available, I add each firm's GICS (Global Industry Classification Standard) codes by Standard & Poor's.¹³ I have 2,226 acquirers that meet my data requirements (1,176 from CRSP and 1,050 from SDC), from 1972 to 2003. Table 1 provides descriptive statistics for acquirer and target firms for the variables that I consider and control for in my analysis. Because my data span a 32-year period, I adjust market capitalization to 1995 dollars using the Consumer Price Index.

Book-to-market ratios for stock acquirers are significantly lower than those for nonstock acquirers, indicating that firms offering stock tend to be glamour firms that are more likely to be overvalued. Acquirers have a median cash balance of 8% of total assets. Median relative target size is about 14% of the relative capitalization of the acquirer.

3.2 Calculating acquirer cash and defining high cash

I measure cash level using cash and short-term investments reported by Compustat, scaled by total assets, as of the firm's most recent financial statements available at the last month-end at least 30 days before the announcement.¹⁴ In contrast, most related prior research uses excess cash, defined as cash above levels predicted by a model of normal cash levels (Opler et al. 1999; Harford 1999; Faleye 2004). My approach can be criticized for not considering cross-sectional variation in required cash levels; however, this criticism is mitigated by my use of peer firms matched on cash level (discussed below).¹⁵ I define an acquirer as high-cash if it falls within the top 20% of acquiring firms in the current year, ranked by cash level. However, to form an implementable trading strategy, I also use cutoffs based on prior years' acquisitions to avoid any peek-ahead bias.

3.3 Other variable calculations

I define a diversification as an acquisition where the first four digits of the acquirer's and target's primary GICS codes differ; if the acquirer and target do not both have

¹² Asquith (1983) compares returns for the announcement and interim periods for both consummated and un consummated acquisitions.

¹³ GICS codes are generally superior to SIC codes for use in capital markets research (Bhojraj et al. 2003).

¹⁴ I assume a three-month lag between the fiscal year-end and the time that financial statements are publicly available.

¹⁵ My approach avoids the estimation error inherent in imposing a model to estimate excess cash. Other benefits of my approach include its simplicity and a reduced loss of observations from the additional data requirements of the estimation model.

Table 1 Acquirer and acquisition statistics

Panel A: Acquirer and acquisition characteristics

	Number	Market capitalization		Book-to-market		Cash		Relative target size		Announcement momentum	
		Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean
All	2,226	1,239	7,859	0.392	0.562	0.075	0.147	0.144	0.162	0.078	0.138
Nonstock	1,297	1,171	7,204	0.482	0.657	0.064	0.119	0.127	0.332	0.052	0.091
Stock	929	1,380	8,773	0.288	0.429	0.104	0.186	0.138	0.297	0.125	0.203
<i>p</i> -value		0.04	0.17	<0.01	<0.01	<0.01	<0.01	0.26	0.16	<0.01	<0.01
Friendly	2,010	1,278	8,298	0.377	0.549	0.077	0.151	0.126	0.301	0.087	0.145
Hostile	216	897	3,773	0.554	0.678	0.062	0.112	0.184	0.472	0.048	0.073
<i>p</i> -value		0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	0.07	<0.01
Same industry	1,296	1,172	8,456	0.351	0.483	0.082	0.163	0.156	0.341	0.085	0.141
Different ind.	930	1,346	7,027	0.474	0.672	0.070	0.125	0.100	0.284	0.073	0.133
<i>p</i> -value		0.65	0.18	<0.01	<0.01	0.02	<0.01	<0.01	0.03	0.57	0.68
Nonsmall aq.	1,932	1,679	9,043	0.373	0.520	0.072	0.141	0.102	0.230	0.089	0.142
Small acquirer	294	77	79	0.622	0.835	0.096	0.188	0.539	0.890	0.018	0.110
<i>p</i> -value		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.28
Nonhigh cash aq.	1,818	1,433	8,389	0.415	0.575	0.052	0.082	0.125	0.306	0.082	0.128
High cash aq.	408	637	5,499	0.302	0.501	0.406	0.435	0.162	0.367	0.071	0.181
<i>p</i> -value		<0.01	0.06	<0.01	0.32	<0.01	<0.01	0.01	0.06	0.69	0.09

Table 1 continued

	Number	Net operating assets		Accruals		Sales growth	
		Median	Mean	Median	Mean	Median	Mean
		All	0.680	0.721	0.058	0.159	0.151
Nonstock	1,297	0.676	0.703	0.049	0.103	0.121	0.238
Stock	929	0.685	0.746	0.085	0.238	0.199	0.404
<i>p</i> -value		0.22	0.02	<0.01	<0.01	<0.01	<0.01
Friendly	2,010	0.681	0.725	0.060	0.168	0.155	0.320
Hostile	216	0.668	0.683	0.049	0.081	0.108	0.191
<i>p</i> -value		0.33	0.05	<0.01	<0.01	<0.01	<0.01
Same industry	1,296	0.681	0.720	0.066	0.174	0.169	0.323
Different industry	930	0.678	0.723	0.052	0.140	0.133	0.285
<i>p</i> -value		0.80	0.87	<0.01	0.04	<0.01	0.11
Non-small aq.	1,932	0.677	0.720	0.059	0.157	0.148	0.301
Small acquirer	294	0.711	0.726	0.049	0.173	0.194	0.349
<i>p</i> -value		0.63	0.84	0.13	0.58	0.49	0.22
Non-high cash aq.	1,818	0.709	0.763	0.053	0.119	0.137	0.258
High cash acquirer	408	0.493	0.535	0.114	0.340	0.250	0.527
<i>p</i> -value		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Table 1 continued

	Number	Announcement returns		Interim returns		Post-acquisition returns	
		Median	Mean	Median	Mean	Median	Mean
All	2,226	-0.012	-0.013	-0.004	-0.001	-0.101	-0.052
<i>p</i> -value		<0.01	<0.01	0.09	0.60	<0.01	0.06
Nonstock	1,297	-0.001	-0.001	-0.006	-0.002	-0.052	-0.005
Stock	929	-0.024	-0.031	-0.001	0.000	-0.165	-0.118
<i>p</i> -value		<0.01	<0.01	0.86	0.55	<0.01	0.09
Friendly	2,010	-0.013	-0.014	-0.005	0.000	-0.116	-0.069
Hostile	216	-0.001	-0.001	-0.002	-0.013	0.000	0.104
<i>p</i> -value		0.04	0.01	0.40	0.06	<0.01	0.09
Same industry	1,296	-0.015	-0.018	-0.005	0.001	-0.149	-0.094
Different industry	930	-0.006	-0.006	-0.003	-0.004	-0.051	0.006
<i>p</i> -value		<0.01	<0.01	0.62	0.35	<0.01	0.12
Nonsmall aq.	1,932	-0.012	-0.015	-0.003	0.001	-0.095	-0.076
Small acquirer	294	-0.003	-0.003	-0.007	-0.017	-0.163	0.105
<i>p</i> -value		0.18	0.15	0.01	0.06	0.44	0.06
Nonhigh cash aq.	1,818	-0.008	-0.010	-0.004	0.000	-0.072	-0.026
High cash acquirer	408	-0.023	-0.027	-0.005	-0.006	-0.213	-0.170
<i>p</i> -value		<0.01	<0.01	0.45	0.45	<0.01	0.09

Table 1 continued

	Number	Pre-Acquisition RNOA		Post-Acquisition RNOA	
		Median	Mean	Median	Mean
All	1,998	0.143	0.157	0.111	0.081
<i>p</i> -value		<0.01	<0.01	<0.01	<0.01
Nonstock	1,187	0.137	0.154	0.113	0.100
Stock	811	0.151	0.161	0.108	0.054
<i>p</i> -value		0.031	0.52	0.17	<0.01
Friendly	1,801	0.144	0.156	0.110	0.077
Hostile	197	0.134	0.170	0.118	0.120
<i>p</i> -value		0.62	0.28	0.15	<0.01
Same industry	1,146	0.145	0.168	0.105	0.069
Different industry	852	0.138	0.143	0.118	0.097
<i>p</i> -value		0.03	0.01	<0.01	<0.01
Nonsmall aq.	1,752	0.147	0.171	0.116	0.095
Small acquirer	246	0.102	0.062	0.072	-0.014
<i>p</i> -value		<0.01	<0.01	<0.01	<0.01
Nonhigh cash aq.	1,670	0.134	0.144	0.111	0.091
High cash acquirer	328	0.241	0.225	0.115	0.031
<i>p</i> -value		<0.01	<0.01	0.97	<0.01

Table 1 continued

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
Panel D: Correlations (Pearson—lower triangle; Spearman—upper triangle)																			
1 BHAR, announcement																			
2 BHAR, interim	-0.04																		
3 BHAR, post-aq.	-0.02	-0.02																	
4 Pre-acquisition RNOA	0.04	0.02	-0.01																
5 Post-aq. RNOA	0.10	0.06	0.18	0.42															
6 Acquirer cash	-0.11	-0.01	-0.08	0.05	-0.22														
7 Aq. cash × diff. industry	-0.04	-0.04	-0.05	0.01	-0.12	0.56													
8 Different ind. dummy	0.06	-0.02	0.04	-0.05	0.07	-0.11	-0.11												
9 Stock	-0.16	0.01	-0.05	0.02	-0.11	0.19	0.07	0.00											
10 Hostile	0.04	-0.03	0.05	0.02	0.06	-0.07	-0.03	0.01	-0.24										
11 Relative target size	0.07	-0.04	0.04	-0.08	-0.10	0.02	0.02	-0.05	-0.03	0.08									
12 Small acquirer dummy	0.04	-0.05	0.05	-0.16	-0.17	0.09	0.05	-0.01	-0.03	0.02	0.37								
13 Announcement momentum	-0.07	0.00	0.00	-0.06	-0.05	0.08	0.09	-0.01	0.13	-0.05	-0.04	-0.03							
													-0.01	0.01	0.01	0.03	0.03	0.09	-0.26

Table 1 continued

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
<i>Panel D: Correlations (Pearson—lower triangle; Spearman—upper triangle)</i>																			
14 Net operating assets	0.01	0.01	-0.02	-0.13	-0.12	-0.31	-0.13	0.00	0.05	-0.03	0.03	0.00	0.00		0.35	0.36	-0.13	0.09	
15 Accruals	-0.05	0.01	-0.07	0.04	-0.23	0.29	0.16	-0.04	0.17	-0.07	0.03	0.01	0.04	0.50		0.50	-0.02	-0.20	
16 Sales growth	-0.05	-0.01	-0.04	-0.03	-0.21	0.24	0.13	-0.03	0.15	-0.07	0.04	0.03	0.07	0.48	0.60		-0.08	-0.26	
17 Acquirer size	0.00	-0.01	-0.03	0.14	0.09	-0.02	-0.03	-0.03	0.03	-0.05	-0.12	-0.12	0.02	-0.11	-0.01	-0.05		-0.36	
18 Acquirer BTM	0.04	-0.01	0.01	-0.11	-0.03	-0.10	-0.08	0.11	-0.13	0.04	0.27	0.13	-0.13	0.02	-0.07	-0.09	-0.12		

This table presents descriptive statistics for the acquirers and the acquisitions studied in this paper. Acquirer and acquisition characteristics are shown in Panel A, univariate abnormal returns are shown in Panel B, univariate RNOA are shown in Panel C, and correlations are shown in Panel D. Abnormal returns are calculated using a reference portfolio of four peer firms matched on the basis of pre-announcement industry, size, book-to-market, and cash level. *P*-values for medians reflect the Wilcoxon two-sample test, and *p*-values for means reflect a two-sided *t*-test for means for all variables except for post-acquisition returns, which are determined through bootstrapping. *P*-values of less than 0.05 are in bold. In Panel D, correlations significant at the 5% level or better are shown in bold. High-cash firms are identified using cutoffs set at the 80th percentile of acquirers in the current year. Variable definitions and calculations are provided in the Appendix

GICS codes available, I use the first 2 digits of their SIC code.¹⁶ To investigate whether the negative impact of high cash on post-acquisition returns is stronger for diversifications, I form an interaction variable by multiplying acquirer cash level by a dummy variable set to one if the acquisition is diversifying (and zero otherwise).

I control for the form of consideration with a dummy variable set to one if the acquirer offers its own voting stock as consideration to the target shareholders and define an acquisition as hostile if there is evidence from related news articles that target managers resisted the acquisition. I define relative target size as the ratio of target market capitalization to acquirer market capitalization. Following Moeller et al. (2004), I define a small acquirer as a firm with market cap below the 25th percentile of NYSE firms as of the previous year.

I calculate the acquirer's announcement period momentum as the buy-and-hold returns to the acquirer from month -6 to the most recent month-end at least 30 days before the acquisition announcement. I define net operating assets (NOA) and return on net operating assets (RNOA) following Nissim and Penman (2001) and define accruals following Richardson et al. (2005).¹⁷ I winsorize RNOA at the 4% level (see Harford 2005), and I winsorize NOA, accruals, and sales growth at the 2% level. For convenience and brevity, all variable calculations are shown, with Compustat annual item numbers, in the appendix.

3.4 Peer firm selection and abnormal returns calculations

I estimate abnormal returns using a portfolio of four peer firms matched with the acquirer based on industry, market capitalization, book-to-market ratio, and cash level. Peer firms are selected from a universe of firms meeting the same criteria as my acquisition database (that is, a firm must be listed in both CRSP and Compustat, with a stock price of \$3 or more, excluding ADRs, REITs, closed-end funds, utilities, and financial firms). I control for industry because prior research has found that acquisitions tend to cluster by industry (Mitchell and Mulherin 1996). This procedure also controls for possible size and book-to-market effects (Fama and French 1993). I control for cash level to mitigate concerns that the results I find are attributable to *all* firms with relatively high cash balances, regardless of whether they undertake acquisitions.

To form my portfolio of peer firms, I group all potential matches into five book-to-market portfolios and then group each book-to-market portfolio into five size portfolios (based on market capitalization) by industry. I select up to 12 firms from

¹⁶ Diversifications (sometimes referred to as conglomerate acquisitions) have been defined a number of different ways in prior research. The strictest definition is employed by Agrawal et al. (1992), who define an acquisition as "conglomerate" if the primary SIC codes of the acquirer and target do not match on all four digits. Harford (1999) uses 19 industry groupings. Moeller et al. (2004) define a conglomerate acquisition as one where the first two digits of the acquirer's and target's primary SIC codes differ. I use a definition similar to Moeller et al.'s, modified to accommodate the use of GICS. My results are very similar if I use only SIC codes.

¹⁷ Results using the direct (that is, statement of cash flows) approach are similar to results using the indirect (that is, balance sheet) approach.

the same industry/BTM/size portfolios for each acquirer, ranked by their closeness to that acquirer's cash level. Possible matches cannot have been acquirers themselves within a three-year window before the announcement date (but could become targets or acquirers after that date). To ensure a reasonable match on cash level, I define industry using the acquirer's 4-digit GICS code (or 2-digit SIC code, if a GICS code is unavailable). If there are fewer than 12 matches found using this definition of industry, I relax my definition (for example, from the first 4 digits of the firm's GICS code to the first 2 digits) until I have found enough matching firms. This methodology ensures that my matches are as close as possible to the acquirer in terms of industry, BTM, size, and cash level and also ensures that sufficient matching firms are available for all of my acquirers.¹⁸

I use the first four matches for each acquirer to form a control portfolio of peer firms. If any of those firms is delisted before my 24-month post-delisting window closes, I draw the next closest match and so on.¹⁹ If all 12 possible matches are delisted before the window closes, I use CRSP's equal-weighted with-dividend returns as a replacement. This procedure ensures that I do not have any peek-ahead bias in my selection of matching firms, because all 12 possible matches were selected using information available before the announcement of the takeover.

Most of my analysis is based on acquirer buy-and-hold abnormal returns (BHARs), calculated by accumulating buy-and-hold returns for the acquirer and then subtracting buy-and-hold returns for my peer portfolio, accumulated over the same period.²⁰ A histogram of long-run acquirer BHARs (not shown) indicates the presence of outliers in the data. To reduce the influence of these outliers and to ensure that I draw accurate inferences from my multivariate analysis, I use a methodology for robust regressions developed by Huber (1973). Specifically, I use Huber's M-Estimation technique to reduce the influence of outliers in the dependent variable.²¹

Lyon et al. (1999) note that determining the significance of long-run returns is treacherous, and ordinary test statistics can be misspecified (see also Barber and Lyon 1997; Kothari and Warner 1997). To ensure that the significance of buy-and-hold returns for Tables 1 and 5 is not overstated, I use a bootstrapping technique as follows:²² I replace each acquiring firm with a randomly selected nonacquiring firm (a "pseudo-acquirer") from the same industry/size/book-to-market portfolio as was used

¹⁸ As I mention in the results section, my conclusions are the same if I select matching firms on the basis of industry and cash only (ignoring size and BTM).

¹⁹ I also include the delisting return for any delisted peer firm in my returns calculations.

²⁰ I use daily returns from day -2 (that is, two days before the announcement) until the first month-end after the target delisting. After that point, to mitigate the effect of bid-ask bounce, I use monthly returns. If the acquirer is delisted before the end of the 24-month period, I include the delisting return in the BHARs, and I invest any remaining funds into the portfolio of peer firms.

²¹ In ordinary OLS, the influence of outliers increases with the square of the error term, but in Huber's robust regression, the influence of outliers is limited to a fixed amount. My approach is similar to that of Aboody et al. (2004), page 256. My results are similar when OLS is used, but outliers significantly reduce the power of OLS. I also include more conventional Fama-MacBeth regressions in my results section.

²² This technique is consistent with the proposed method of Lyon et al. (1999), pages 173–175, except that I do not bootstrap from my initial dataset of acquirer returns. This is because the initial sample is nonrandom (unlike their sample). Results are similar when I bootstrap from the initial sample but are predictably biased because the mean and median long run returns for my acquiring firms are negative.

to select my peer firms above (excluding the 12 peers I use to calculate abnormal returns). I re-run my analysis with the random pseudo-acquirer, resulting in a new dataset of abnormal returns. I then run 1,000 bootstraps, to create a dataset of 1,000 observations randomly selected for my pseudo-acquirers. I establish a p-value for each returns measure in Tables 1 and 5 by determining where the actual skewness-adjusted *t*-statistic falls within the bootstrapped dataset (for example, if the *t*-statistic was -2.0 and my bootstrapped dataset showed *t*-statistics of -2.1 as observation #32 and -1.97 as observation #33, then the significance of my observation would be 0.033).²³

I use a number of additional techniques to establish and confirm my results. The details of these additional tests are presented with my results in the following section.

4 Results

4.1 Univariate analysis

Univariate results (Table 1, Panel B) indicate that, on average, acquirers marginally underperform in the post-acquisition period (mean two-year BHAR is 5.2 percent, $p = 0.06$). Stock acquisitions underperform nonstock acquisitions in the long run (-11.8% vs. -0.5% , $p = 0.09$), and hostile acquisitions, though far less frequent, outperform friendly ($+10.4\%$ vs. -6.9% , $p = 0.09$). High-cash acquirers appear to underperform relative to nonhigh-cash acquirers in the post-acquisition period (mean returns are -17.0% vs. -2.6% , $p = 0.09$; median returns are similar and highly significant). For stock versus nonstock and high-cash versus nonhigh-cash, the announcement-period response is in the same direction as the long-run returns, suggesting a market underreaction. Correlations from Table 1, Panel D also suggest that the high-cash acquirer underperforms in the post-acquisition period (the Pearson correlation between post-acquisition returns and acquirer cash level is -0.08 , $p < 0.01$). Thus, Table 1 provides some evidence that high-cash acquirers underperform.

RNOA decreases from the pre-acquisition period to the post-acquisition period for all acquisitions (Panel C of Table 1). Pre-acquisition RNOA is higher for high-cash acquisitions than for nonhigh-cash acquisitions and the decrease in RNOA between the pre- and post- periods is more pronounced for high-cash acquisitions (for means, the decrease is 19.4%, from 22.5% to 3.1%, versus a decrease of 5.3% for nonhigh-cash firms). The correlation between acquirer cash and post-acquisition RNOA is -0.22 ($p < 0.01$). This raises the possibility that the market may be more disappointed with the post-acquisition performance of high-cash acquirers than the performance of other acquirers.²⁴

²³ I use the same technique to establish the significance of my combined returns in Table 5, except that I bootstrap actual returns rather than skewness-adjusted *t*-statistics.

²⁴ Harford (2005) notes that tests of operating performance are inherently noisy (page 556). To reduce the influence of outliers, I winsorize RNOA at the top and bottom 4% levels. NOA, accruals, and sales growth are winsorized at the 2% level.

4.2 Multivariate analysis

In this section, I test whether evidence of high-cash acquirer underperformance in the post-acquisition period holds in a multivariate setting. Table 2 reports my results, using robust regressions.²⁵

Panel A shows that, after controlling for other factors, announcement period returns are not significantly decreasing in acquirer cash. The interaction variable for acquirer cash and diversification is significantly greater than zero, suggesting that the initial market reaction to acquirer cash on announcement is positive if the target firm is in a different industry. Interestingly, diversification itself appears to be greeted positively on announcement as well. The market responds negatively to stock acquisitions (consistent with Servaes 1991), but the estimated coefficients for hostility and for small acquirers are not significantly different from zero after controlling for other factors. The estimated coefficient is significantly negative for relative target size, acquirer momentum, and sales growth.

Results from Panel B suggest that there is little market reaction to the variables I consider over the interim period. The estimated coefficient on the interaction between acquirer cash and diversification is also negative (but not significantly different from zero), hinting that the market may reverse its initial opinion on the benefits of high cash when diversifying. The estimated coefficients on relative target size and on the small acquirer dummy are significantly negative, suggesting that the market may become aware of problems for smaller acquirers (both relative to target size and in absolute terms) in the interim period.

Bhagat et al. (2005) point out that the announcement period return is a function of both the market response to the acquisition and the market's assessment of the probability that the acquisition will occur. Uncertainty about whether the acquisition will be consummated is resolved over the interim period. Because my data include only consummated acquisitions, a more complete picture of the market's response is found in combining the announcement and interim periods (Panel C). Most inferences from Panel A flow though to the analysis of the combined period in that the stock dummy loads negatively, as does relative target size.

As hypothesized, acquirer cash level is a significant predictor of negative abnormal returns in the post-acquisition period (Panel D; the estimated coefficient is -0.37 , $p < 0.01$), regardless of whether the acquisition is diversifying. Overall, the market appears to miss the implications of high cash on announcement (although the estimated coefficient for cash is negative, it is not significantly different from zero in Panel A), and acquirer cash is significantly associated with returns in the post-acquisition period. This is consistent with the concept of limited attention. Stock acquisitions continue to underperform, consistent with the findings of Loughran and Vijh (1997).²⁶

²⁵ I include year and industry dummies in this regression that are not shown.

²⁶ In addition, I consider whether the addition of a dummy variable set to one if the acquirer used the pooling method (and zero otherwise) has any effect on my results. The pooling method could only be used when the acquirer offered only voting stock, creating a confound between stock and pooling. When both a stock and pooling dummy are included, both load with significantly negative coefficients for announcement period returns, but neither is significant for post-acquisition returns. Both estimated coefficients, however, are negative. The use of the pooling method was disallowed by FAS141, effective June 30, 2001.

Table 2 Abnormal returns over announcement, interim, and post-acquisition periods

Dependent variable	Panel A: Announcement acquirer BHAR, day -2 to +2	Panel B: Interim acquirer BHAR, day +3 to target delisting	Panel C: Combined acquirer BHAR, day -2 to target delisting	Panel D: Post-acquisition acquirer BHAR, TG delisting +1 to 24 months
Acquirer cash	-0.020 [0.132]	-0.004 [0.823]	-0.032 [0.395]	-0.373 [<0.001]
Aq. cash × diff. ind.	0.043 [0.023]	-0.039 [0.139]	0.018 [0.738]	-0.028 [0.862]
Dif. ind. dummy	0.008 [0.012]	-0.005 [0.255]	-0.012 [0.218]	0.021 [0.447]
Stock	-0.022 [<0.001]	0.000 [0.994]	-0.035 [<0.001]	-0.068 [0.016]
Hostile	-0.002 [0.674]	-0.003 [0.734]	0.008 [0.616]	0.049 [0.298]
Relative target size	-0.007 [0.006]	-0.011 [0.005]	-0.025 [0.001]	-0.004 [0.864]
Small aq. dummy	0.006 [0.206]	-0.018 [0.008]	-0.026 [0.060]	-0.092 [0.025]
Announcement momentum	-0.009 [0.019]	0.005 [0.372]	-0.012 [0.262]	0.027 [0.392]
Net operating assets	0.003 [0.544]	0.008 [0.311]	0.013 [0.425]	-0.090 [0.063]
Accruals	-0.002 [0.767]	0.002 [0.767]	-0.022 [0.173]	-0.050 [0.306]
Sales growth	-0.009 [0.002]	-0.008 [0.141]	-0.012 [0.253]	-0.046 [0.147]
Intercept	-0.010 [0.500]	0.048 [0.022]	0.095 [0.026]	0.208 [0.101]
Observations	2,226	2,226	2,226	2,226
Adjusted R-square	2.1%	-0.2%	0.8%	3.1%

This table presents the results of robust regressions (Huber 1973) on acquirer buy-and-hold abnormal returns over the announcement period (day -2 to day +2 relative to the announcement date, Panel A), the interim period (day +3 to target delisting, Panel B), a combined window from announcement to delisting (Panel C), and the post-acquisition period (delisting day +1 to +24 months, Panel D). Abnormal returns are calculated using a reference portfolio of four peer firms matched on pre-announcement industry, size, book-to-market, and cash level. Year and industry dummies are not shown. All variables are defined in the appendix. *P*-values are shown in square brackets under the estimated coefficients, and estimated coefficients with *p*-values of 0.05 or lower are in bold.

My results are robust to variations in my matching methodology and to variations in my method of analysis.²⁷ Another concern with using a pooled regression (especially a robust regression that is not common in the literature) is that only a few dominant years could be driving my results. To alleviate these concerns, I re-run my analysis for the post-acquisition using Fama-MacBeth monthly regressions. To implement Fama-MacBeth, I take each month from January 1, 1972, to December 31, 2005, (that is, two years after the delisting of my final target firm) and run 408 monthly regressions where the dependent variable is my peer-portfolio-adjusted monthly acquirer return. Each acquirer is added for the month following the target delisting and is removed after 24 months. As with Table 2, I include industry dummies. To avoid giving undue influence to months with very few acquisitions, I include only months with 5 or more acquirers in my final calculations. I report the time-series average for my estimated coefficients for the remaining 388 months with sufficient observations.²⁸ Results are shown in Table 3.

Results using the Fama-MacBeth approach are very similar to those using the pooled approach in Table 2. Most important, the negative estimated coefficient on acquirer cash is significantly less than zero (-2.2 , $p = 0.036$). Results for stock consideration and net operating assets are consistent with Table 2 as well, but not quite as strong.

4.3 Return on net operating assets

The negative relationship between post-acquisition returns and acquirer cash and the change in RNOA values from the pre- to the post-acquisition period suggest that the acquirer's fundamental post-acquisition performance may be lower than market expectations. To provide more evidence to support this explanation, I next investigate post-acquisition return on net operating assets for acquirers. Following Harford (1999), I control for pre-acquisition performance by including average RNOA for years -2 and -1 relative to the acquisition (see also Barber and Lyon 1996). My dependent variable, average RNOA for years $+1$ and $+2$ (that is, the first two complete fiscal years following the acquisition), coincides roughly with my two year horizon for post-acquisition returns. In addition, results from Richardson (2006) and Oler and Picconi (2005) suggest that all high-cash firms might

²⁷ Specifically, my results are similar (and generally stronger) after removing the top and bottom 5% of acquirers, ranked by the difference between acquirer values and peer firm values for size, book-to-market, and cash level to remove the worst-fitting matches. Results are also very similar if I select my peer firms on the basis of cash and industry only (ignoring size and book-to-market), if I use only SIC codes to define industry (instead of using GICS and SIC), or if I include only the first acquisition of each acquiring firm and exclude subsequent acquisitions. When OLS is used instead of robust regressions, I find that acquirer cash loads significantly negatively in the post-acquisition period ($p = 0.01$), but the overall p -value on the regression's F -value is marginal ($p = 0.095$).

²⁸ For ease of presentation, I multiply the average estimated coefficients by 100. I exclude the interaction variable "Acquirer Cash \times Diff. Ind." here; when it is included, neither acquirer cash nor the interaction loads significantly because of multicollinearity problems. Results are very similar when raw acquirer returns (with acquirer size and book-to-market added as additional controls) instead of peer adjusted returns.

Table 3 Fama-MacBeth regressions—Post-acquisition period

Dependent variable	Abnormal monthly acquirer returns, TG delisting +1 to 24 months
Acquirer cash	-2.247 [0.036]
Different industry dummy	-0.133 [0.379]
Stock	-0.425 [0.081]
Hostile	0.119 [0.696]
Relative target size	0.607 [0.038]
Small acquirer dummy	-0.201 [0.580]
Announcement momentum	0.410 [0.334]
Net operating assets	-1.460 [0.065]
Accruals	0.094 [0.948]
Sales growth	0.920 [0.198]
Intercept	1.485 [0.079]
Number of observations	388

This table presents results for Fama-MacBeth monthly regressions of abnormal returns on both acquisitions variables and control variables. Observations are added beginning with the first full month following the target delisting, and are removed 24 months after target delisting. Every month where five or more observations are available, the cross-section of abnormal returns (calculated by subtracting the mean monthly returns of four matching firms from the monthly acquirer raw returns) is regressed on the same variables in Table 2. Estimated coefficients are multiplied by 100 for ease of presentation. Mean estimated coefficients are reported, with *p*-values reported underneath. Industry dummies are not shown. Figures for *p*-values of 0.05 or lower (2-tailed test) are in bold

underperform, not just acquirers. Therefore, I add the mean RNOA reported by my portfolio of peer firms as additional explanatory variables.²⁹ Results are shown in Table 4.

Both regressions show that post-acquisition RNOA is significantly decreasing in acquirer cash level, after controlling for other factors, although this is somewhat mitigated for high-cash diversifications. Post-acquisition RNOA is increasing for diversifications, although this result does not hold for OLS. RNOA is also marginally decreasing in relative target size, but increasing in acquirer momentum (again, only for the robust regression). Acquirers with higher accruals and sales growth (robust only) also have lower RNOA. Firms with higher pre-acquisition RNOA continue to report higher post-acquisition RNOA. Post-acquisition RNOA for peer firms also has significant explanatory power for acquirer RNOA, but the significant loading on acquirer cash suggests that high-cash acquirers perform even worse than nonacquirer high-cash firms.³⁰

²⁹ Consistent with my winsorizing of acquirer RNOA, I winsorize the RNOA of peer firms at the 4% level. Pre- and post-acquisition RNOA for peer firms are defined based on target's delisting date. To avoid unnecessary loss of observations, I include acquirers and peers where year -2 and/or +2 are missing, although my results are similar when these observations are excluded.

³⁰ In untabulated results, I find that my results are robust to the inclusion of a dummy variable signaling extreme prior performance (identified by prior RNOA being more than three standard deviations from the mean for any given year) and the inclusion of an interaction variable of prior RNOA and the extreme RNOA dummy.

Table 4 Post-acquisition return on net operating assets

Dependent variable	Panel A: Robust Post-acquisition acquirer RNOA	Panel B: OLS Post-acquisition acquirer RNOA
Acquirer cash	-0.290 [<0.001]	-0.245 [<0.001]
Acquirer cash × different industry	0.174 [<0.001]	0.153 [0.070]
Different industry dummy	0.013 [0.016]	0.007 [0.408]
Stock	0.001 [0.900]	-0.028 [0.001]
Hostile	0.002 [0.794]	-0.009 [0.392]
Relative target size	-0.008 [0.051]	-0.013 [0.095]
Small acquirer dummy	-0.011 [0.168]	-0.039 [0.010]
Announcement momentum	0.033 [<0.001]	-0.002 [0.919]
Net operating assets	-0.012 [0.226]	0.005 [0.812]
Accruals	-0.083 [<0.001]	-0.083 [0.004]
Sales growth	-0.033 [<0.001]	-0.025 [0.169]
Prior RNOA	0.586 [<0.001]	0.349 [<0.001]
Prior matching portfolio RNOA	0.041 [0.027]	0.002 [0.959]
Post matching portfolio RNOA	0.192 [<0.001]	0.254 [<0.001]
Intercept	0.024 [0.280]	0.116 [0.005]
Number of observations	1,998	1,998
Adjusted <i>R</i> -square	12.5%	35.3%

This table presents the results of robust (Panel A) and OLS (Panel B) regressions of average year +1 and year +2 (relative to the target delisting, where year +1 is the first full year after the delisting date) return on acquirer net operating assets (RNOA). *P*-values are shown in square brackets under the estimated coefficients, and *p*-values of 0.05 or lower are shown in bold. Year and industry dummies are not shown. All variables are defined in the appendix

These results support my reasoning about why post-acquisition returns are predictable using pre-announcement acquirer cash levels. The market does not appear to sufficiently attend to the signal inherent in the acquirer's cash level but recognizes that the high-cash acquirer is underperforming in the post-acquisition period as RNOA falls below expectations.

4.4 Economic significance

One question regarding the results from Tables 2 and 3 is whether they are economically as well as statistically significant. Put bluntly, are these results “real”? To address this concern, I calculate the returns to an implementable trading strategy based on Table 2. Table 5 presents abnormal returns from an investment strategy of shorting acquisitions that are most likely to underperform and going long on acquisitions that are most likely to out-perform. This strategy assumes that one takes a position (long or short) on the day following the target delisting and closes out that position at the month-end 24 months after the target delisting. As in Table 2, I calculate abnormal returns using peer firms selected based on industry, book-to-market, size, and cash level. The positive values for the short position represent

Table 5 Returns to investment strategies

	Panel A		Panel B		Panel C	
	Cash, consideration, nature		Cash only		Consideration and nature	
	Obs	Mean abnormal returns	Obs	Mean abnormal returns	Obs	Mean abnormal returns
Returns to short-position	247	32.5%	457	18.7%	913	12.0%
<i>p</i> -value		[0.001]		[0.004]		[0.101]
Returns to long-position	171	12.7%	1764	-1.7%	205	10.8%
<i>p</i> -value		[0.004]		[0.300]		[0.010]
Combined returns	418	45.3%	2221	17.0%	1118	22.8%
<i>p</i> -value		[0.020]		[0.036]		[0.068]

This table presents mean abnormal returns to various investment strategies. Panel A shows returns to a strategy of shorting all high-cash, stock-consideration and friendly acquisitions and going long on all nonhigh-cash, nonstock hostile acquisitions (i.e., investment criteria are “cash, consideration, and nature”). Panel B shows returns to a strategy of shorting all high-acquirer-cash acquisitions and going long on all other acquisitions (“cash only”). Panel C shows returns to a strategy of shorting only stock-consideration friendly acquisitions and going long on nonstock, hostile acquisitions (“consideration and nature”). Abnormal returns for Panels A, B, and C are calculated using a reference portfolio of four peer firms matched on pre-announcement industry, size, book-to-market, and cash level. Positions are taken on the day following the target delisting, and are closed out 24 months later. High-cash firms are identified in panels A and B using cutoffs set at the 80th percentile of acquirers in the prior year. *P*-values are determined through bootstrapping. Estimated coefficients with *p*-values of 0.05 or lower are in bold

gains from shorting the acquirer’s stock and going long on the portfolio of four peer firms. Returns to the long position represent gains to shorting the portfolio of four peer firms and going long on the acquirer. Thus, the “longs” and the “shorts” do not need to be made simultaneously for my hedge returns, and the combined returns represent overall average returns to both shorts and longs from 1972 to 2003.

I first show results to a strategy involving shorting all high-cash, stock-consideration, and friendly acquisitions and going long on all nonhigh-cash, nonstock, hostile acquisitions (Panel A). To identify high-cash acquirers, I select cutoffs at the 80th percentile of acquirers (ranked by cash level) based on prior years’ acquisitions and use these cutoffs to select candidates for “most likely to fail” and “most likely to succeed” acquisitions as they are announced.³¹ Panel B presents abnormal returns to a strategy of shorting high-cash acquirers and going long on all other acquisitions (that is, ignoring other signals of post-acquisition performance). For comparison, Panel C shows results to shorting stock-consideration, friendly acquisitions and going long on nonstock, hostile acquisitions (that is, criteria already established by prior research). Figure 2 shows selected results from Table 5 in graphical form for an extended horizon of 60 months.

³¹ Using cutoffs based on same-year acquisitions would induce a peek-ahead bias because one would have to know statistics on all acquisitions announced in a given year before determining those that are high cash.

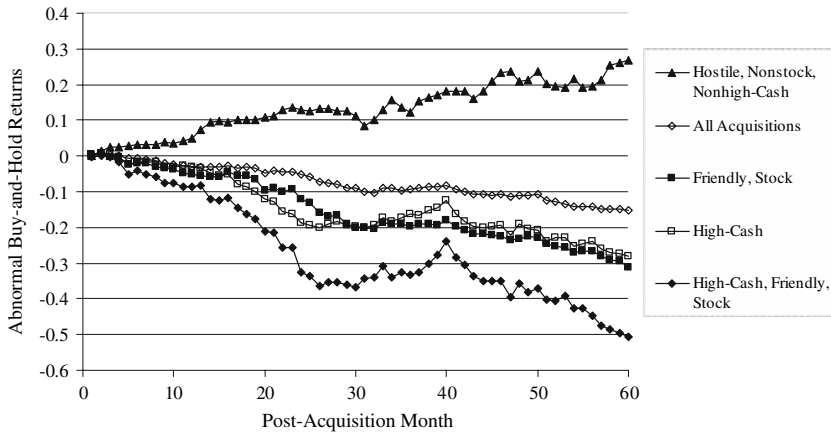


Fig. 2 Mean post-acquisition abnormal buy-and-hold returns. This figure shows mean abnormal buy-and-hold returns for selected investment strategies from Table 5. Abnormal returns are calculated using a reference portfolio of four peer firms selected on the basis of pre-announcement industry, size, book-to-market, and cash level. Returns accumulation begins with the first month following the target delisting and ends 60 months after target delisting. High-cash firms are identified using cutoffs set at the 80th percentile of acquirers in the prior year. Variable definitions and calculations are provided in the Appendix

Results from Table 5, Panel A, and Fig. 2 indicate that mean abnormal returns from investing based on the acquirer's cash level, the form of consideration, and the nature of the acquisition, generate significantly positive abnormal returns of 45.3% (20.5% on an annualized basis). Results to a high-cash strategy alone (Panel B) are smaller, at 17.0% (annualized, 8.2%). For comparison, I show the results of a strategy considering only form of consideration and nature of acquisition, which are both known from prior research. Returns to this strategy, in Panel C, average 22.8% per year (annualized, 11.1%). Therefore, the addition of a "cash rule" to previously known strategies improves annual returns by about 9.4% (20.5% less 11.1%).³²

Results in Panel A are very similar if I re-estimate returns to my investment strategy using only one peer firm instead of a portfolio of four peer firms, if I identify high-cash firms using a model of expected cash level (Opler et al. 1999), or if I define high-cash acquirers as merely acquirers with at least 20% of their total assets held in cash and cash equivalents.

4.5 Calendar-time results

The analysis in Table 5 uses an event-time approach, meaning that statistics are calculated across all acquisitions even though these acquisitions occur at different times. This investment strategy calls for higher levels of investment in periods with more acquisitions and lower levels in other periods. Another potentially serious

³² As I discuss in the methodology section, significance in Table 5 is established by bootstrapping from a portfolio of pseudo-acquirers randomly selected from the same industry, size quintile, and book-to-market quintile as each acquiring firm. Ordinary t-statistics suggest higher levels of significance.

problem with the results in Table 5 is that the significance of long-run returns can be overstated because of cross-correlation between returns (Bernard 1987; Mitchell and Stafford 2000; Kothari and Warner 2004).³³ A “calendar-time” approach treats each period as the unit of measure rather than each acquisition (Schultz 2003) and is immune to the cross-correlation problem. I re-cast the results from Table 5 into calendar-time using the average monthly abnormal return of all acquirers where the target was delisted within the prior 24 months. Another calendar-time approach advocated by Mitchell and Stafford (2000), known as the Jensen’s Alpha approach, involves regressing average monthly raw returns (less the risk-free rate) on the three Fama-French factors and reporting the intercept. Simulation results from Lyon et al. (1999) indicate that the Jensen’s Alpha approach often yields misspecified statistics with non random samples; nevertheless, I include Jensen’s Alpha numbers in Table 6 as a possible lower bound of significance for my results.

To avoid giving undue influence to periods where little acquisition activity occurred, I restrict my analysis to months with five or more acquisitions occurring within a prior two-year window. Average monthly abnormal returns (Panel A, using the same peer firms as in Tables 2 and 5) to shorting stock-consideration, friendly, high-cash acquirers are about 0.7% (annualized, about 9% per year), and average monthly abnormal returns to taking a long position on nonstock, hostile, nonhigh-cash acquisitions are about 0.6 percent. Both returns measures are highly significant. Combined, this strategy yields average abnormal returns of about 1.3 percent per month, or around 17 percent per year. Results from Jensen’s Alpha corroborate the above findings, with reduced power. Results in Panels B and C are also consistent with those in Table 5.

5 Conclusion

This study shows that acquisitions where the acquirer has a high cash balance are likely to underperform (whether or not they are diversifying). The market does not appear to fully recognize the bad news inherent in a high pre-acquisition cash balance around the announcement day, because post-acquisition returns for high-acquirer-cash acquisitions are significantly negative. These results hold after considering the previously known factors of stock consideration and hostility, as well as controlling for a number of other variables shown to have predictive power for future returns. Results using stock returns are corroborated by my analysis of post-acquisition return on net operating assets, and returns to implementable trading strategies based on these findings are significantly positive.

Overall, these results suggest that the market fails to fully incorporate the implications of the acquirer’s cash level into its stock price around announcement. This is likely because some investors do not fully attend to the information inherent in the acquirer’s balance sheet at the time the acquisition is announced (possibly because the implications of a high cash balance for an acquirer are difficult to anticipate). More investors seem to attend to the fundamental performance of the

³³ This problem is not solved by bootstrapping.

Table 6 Calendar-Time returns to investment strategies

	Panel A		Panel B		Panel C	
	Cash, consideration, nature		Cash only		Consideration and nature	
	Obs	Monthly mean abnormal returns	Jensen's alpha	Obs	Monthly mean abnormal returns	Jensen's alpha
Returns to short-position	282	0.727% [0.003]	0.205% [0.566]	349	0.391% [0.019]	0.143% [0.579]
Returns to long-position	244	0.605% [0.002]	0.539% [0.010]	390	-0.011% [0.903]	-0.049% [0.670]
Combined returns	526	1.332% [0.001]	0.744% [0.084]	739	0.380% [0.044]	0.094% [0.730]
<i>p</i> -value						
				386	0.343% [0.001]	0.235% [0.157]
				254	0.445% [0.010]	0.383% [0.034]
				640	0.788% [0.001]	0.618% [0.014]

This table presents calendar-time abnormal returns for various investment strategies. Each month from 1972 to 2005, a portfolio is formed from all acquirers based on consideration, nature, and whether the acquirer is "high-cash" where the target was delisted within the prior 24 months. The average abnormal return is calculated for each month with at least five acquisitions in the portfolio. Panel A shows returns to a strategy of shorting all high-cash, stock-consideration, friendly acquisitions and going long on all nonhigh-cash, nonstock hostile acquisitions (i.e., investment criteria are "cash, consideration, and nature"). Panel B shows returns to a strategy of shorting all high-cash, nonstock hostile acquisitions and going long on all other acquisitions ("cash only"). Panel C shows returns to a strategy of shorting only stock-consideration friendly acquisitions and going long on nonstock hostile acquisitions ("consideration and nature"). Abnormal returns are calculated using a reference portfolio of four peer firms matched on pre-announcement industry, size, book-to-market, and cash level. High-cash firms are identified in Panels A and B using cutoffs set at the 80th percentile of acquirers in the prior year. *P*-values are calculated using ordinary *t*-statistics. Jensen's Alpha is calculated by regressing the average monthly raw return for each month with five or more acquirers within the past 24 months, less the risk-free rate, on the three Fama-French factors (market, HML, and SMB), which are drawn from the Kenneth French website. *P*-values of 0.05 or lower are in bold

acquiring firm after the acquisition (proxied here by acquirer return on net operating assets). This pattern is consistent with the findings of Griffin and Tversky (1992), who show that individuals tend to overweight more prominent information and underweight less prominent information that nevertheless has superior predictive power, and are consistent with the model proposed by Hirshleifer and Teoh (2003) on limited investor attention.

There are some limitations to this research. Although I have a large dataset, I include only acquisitions where the acquirer and target are public firms with share price data available on CRSP and financial statement data available on Compustat. I consider only acquisitions where the target is 100 percent acquired. Further research could investigate whether my findings generalize to acquisitions where a minority interest remains publicly traded and acquisitions between public and private firms.

This paper adds to a growing body of research in accounting and finance that suggests that not all public information is quickly impounded into stock price (see Lee 2001; Bloomfield 2002). Acquisitions are complex events, and it should not be surprising that markets do not immediately and fully comprehend the implications of all information revealed (or already known) at the announcement (see Harrison et al. 2006). Thus, event studies on acquisitions that only consider announcement period returns may miss the full economic implications of the acquisition. More generally, research on how the market responds to new information should investigate longer-term returns as well as the short-term response.

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Appendix

Variable definitions and calculations

Stock price and shares outstanding are taken from the CRSP database. All financial statement information is taken from the combined CRSP/Compustat (annual) database provided by Wharton Research Data Services (WRDS). Information is taken as at the most recent month-end that is at least 30 days before the announcement of the acquisition. I assume a three-month lag between a firm's year-end and when financial statements are publicly available.

My multivariate BHARs are calculated as follows:

$$BHAR_i = \prod_{t=s}^e (1 + R_{i,t}) - \prod_{t=s}^e (1 + R_{mp,t}) = BHR_{firm} - BHR_{mp}$$

Table 7 Description and calculation of independent variables

Variable name	Description
Acquirer cash	Cash and short-term investments (Compustat annual item #1), scaled by total assets (item #6).
Acquirer and target in different primary industries	Dummy variable set to 1 if the acquirer and target are not in the same primary industry, defined as the first 4 digits of each firm's GICS code. If GICS is unavailable, the dummy is set to 1 if the acquirer and target do not share the same 2-digit SIC code.
Acquirer cash × different industry	Interaction variable: acquirer cash multiplied by a dummy variable set to 1 for a different-industry acquisition.
Stock dummy	Dummy variable set to 1 if the acquirer offers only its own voting stock as consideration for the acquisition.
Hostile dummy	Dummy variable set to 1 if the acquisition is resisted by target management.
Relative target size	Target market capitalization divided by acquirer market capitalization.
Small acquirer dummy	Dummy variable set to 1 if the acquirer is below the 25th percentile of NYSE firms, sorted by market capitalization.
Announcement momentum	Buy-and-hold acquirer returns, accumulated from month -6 to the closest month-end at least 30 days before the announcement of the acquisition.
Net Operating Assets (NOA)	NOA is defined following Nissim and Penman (2001, appendix), as: Net Financial Obligations (NFO) plus Common Equity (CSE) plus Minority Interest (MI), where: NFO = Financial Obligations (FO) less Financial Assets (FA) FO = debit in current liabilities (#34) + total long-term debt (#9) + preferred stock (#130) – preferred stock in treasury (#227) + preferred dividends in arrears (#242) FA = cash and short-term investments (#1) + other investments and advances (#32) CSE = common equity (#60) + preferred stock in treasury (#227) – preferred dividends in arrears (#242) MI = minority interest (#38) Simplifying, NOA is calculated as #34 + #9 + #130 - #1 - #32 + #60 + #38 I scale NOA by lagged total assets (#6). To avoid losing observations unnecessarily, I replace missing values for #34, #9, #130, #32, and #38 with zeros.

Table 7 continued

Variable name	Description
Return on Net Operating Assets (RNOA)	RNOA is defined following Nissim and Penman (2001, appendix), as: Operating Income (OI) divided by prior year NOA, where: OI = Net Financial Expense (NFE) plus Comprehensive Net Income (CNI) plus Minority Interest in Income (MII) NFE = Core NFE + Unusual Financial Expense (UFE) Core NFE = after-tax interest expense (#15 \times (1 - MTR)) + preferred dividends (#19) - after-tax interest income (#62 \times (1 - MTR)) (note that MTR = the marginal tax rate) UFE = prior marketable securities adjustment (#238 for prior year) - marketable securities adjustment (#238) CNI = net income (#172) - preferred dividends (#19) + clean surplus adjustment (CSA) CSA = marketable securities adjustment (#238) - prior marketable securities adjustment (#238 for prior year) + cumulative translation adjustment (#230) - prior cumulative translation adjustment (#230 for prior year) Simplifying, RNOA is calculated as #172 + #49 + #15(1 - MTR) - #62(1 - MTR) + (#230 - lag#230), scaled by prior year's NOA. To avoid losing observations unnecessarily, I replace missing values for #15, #49, #62, and #230 with zeros.
Prior RNOA	Average RNOA from year -2 to year -1, relative to the acquisition. To avoid losing observations unnecessarily, I use only year -1 when year -2 is missing.
Post RNOA	Average RNOA from year +1 to year +2, relative to the acquisition, where year +1 is the first full year following the target delisting. To avoid losing observations unnecessarily, I use only year +1 when year +2 is missing.
Prior matching portfolio RNOA	Average RNOA from year -2 to year -1 (relative to the target delisting date) from a portfolio of four peer firms selected on the basis of industry, size, book-to-market, and cash level. To avoid losing observations unnecessarily, I use only year -1 when year -2 is missing.
Post matching portfolio RNOA	Average RNOA from year +1 to year +2 (relative to the target delisting date) from a portfolio of four peer firms selected on the basis of industry, size, book-to-market, and cash level. To avoid losing observations unnecessarily, I use only year +1 when year +2 is missing.

Table 7 continued

Variable name	Description
Accruals	<p>Total Accruals are defined following Richardson et al. (2005), as: $TACC = \Delta WC + \Delta NCO + \Delta FIN$, where: Δ = change from prior year to current year WC = working capital = current operating assets (COA) less current operating liabilities (COL) COA = current assets (#4) – cash and short-term investments (#1) COL = current liabilities (#5) – debt in current liabilities (#34) NCO = noncurrent operating assets (NCOA) – noncurrent operating liabilities (NCOL) $NCOA$ = total assets (#6) – current assets (#4) – other investments and advances (#32) $NCOL$ = total liabilities (#181) – current liabilities (#5) – long-term debt (#9) FIN = financial assets (FA) – financial liabilities (FL) FA = short-term investments (#193) + other investments and advances (#32) FL = total liabilities (#9) + debt in current liabilities (#34) + preferred stock (#130) Simplifying, accruals are calculated as $\Delta\#6 - \Delta\#1 - \Delta\#181 + \Delta\#193 - \Delta\#130$ To avoid losing observations unnecessarily, I replace missing values for #130, #181, and #230 with zeros.</p>
Acquirer book-to-market	Total book value of common equity (item #60) divided by market capitalization.
Acquirer market capitalization	Acquirer market cap is measured as of the most recent month-end at least 30 days before the acquisition announcement. NYSE cutoffs are determined as of December 31 of the prior year.
Sales growth	Current year sales (#12) less prior year sales, divided by prior year sales.

where: $R_{i,t}$ = returns for firm i over the period beginning with day s and ending with day e , where $s = \text{day } -2$ and $e = +2$ relative to announcement for announcement period returns, $s = +3$ and $e = \text{target delisting date}$ for interim period returns, and $s = \text{day } +1$ relative to target delisting and $e = \text{end of month } +24$ for post-acquisition returns, and $R_{mp,t}$ = mean portfolio returns (from four peer firms) over the same period.

Table 7 provides details on my calculations of my independent variables.

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