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The Post-Acquisition Returns of Stock Deals: Evidence of the Pervasiveness of the Asset Growth Effect

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Abstract

A growing literature finds that firm asset growth rates are negatively correlated with subsequent stock returns. We show that the poor post-deal returns that have been documented for stock acquisitions are more precisely explained by the return effects associated with systematically larger asset growth rates for stock deals. We find a similar result for other cross-sectional and time-series acquisition effects, including poor returns for glamour deals, weakly monitored deals, and deals done during high-valuation periods. We suggest that the distinguishing characteristic associated with poor performing acquisitions is simply their tendency to grow assets.

I. Introduction

There is a large literature documenting poor post-deal returns for acquiring firms (Livermore (1935), Firth (1980), Asquith (1983), Jensen and Ruback (1983), Franks and Harris (1989), Gregory (1997), Mitchell and Stafford (2000), and Moeller, Schlingemann, and Stulz (2005)). More recently, the literature has identified that the abnormal returns associated with acquisitions are concentrated among acquirers that pay for the acquisition with firm stock (Loughran and Vijh (1997), Agrawal and Jaffe (2000), Dong, Hirshleifer, Richardson, and Teoh (2006), Ang and Cheng (2006), and Savor and Lu (2009)).[1] In support of this finding, Shleifer and Vishny (2003) propose a model of stock-driven acquisitions in which investors systematically underappreciate the incentives managers have to use richly

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[1] See also evidence of overpriced bidders in the extent of opportunistic insider trading behavior (Song (2007), Akbulut (2013)), earnings management (Erickson and Wang (1999), Louis (2004)), post-merger lawsuits (Gong, Louis, and Sun (2008)), abnormal short-selling activity (Ben-David, Drake, and Roulstone (2015)), and strategic information release (Ahern and Sosyura (2014), Kimbrough and Louis (2011)).

priced equity as an acquisition currency. The implication of their model is that the post-deal returns of firms making acquisitions with stock are poor, as investors slowly acknowledge the overpricing. The model predicts no such abnormal returns for cash deals. The Shleifer–Vishny model specifically delineates the post-deal performance of acquiring firms by form of payment.

In this paper, we propose an alternative explanation based on the simple observation that stock deals tend to be associated with greater expansion of firm assets than cash deals. Our proposal is consistent with a growing literature that finds that stock returns are negatively correlated with past asset growth rates.[2] Such a relationship between asset growth and returns is predicted in several ways: Titman, Wei, and Xie (2004), Cooper, Gulen, and Schill (2008), and Polk and Sapienza (2009) provide behavioral models, and Tobin (1969), Yoshikawa (1980), Cochrane (1991), (1996), Berk, Green, and Naik (1999), Gomes, Kogan, and Zhang (2003), Zhang (2005), Xing (2008), and Li, Livdan, and Zhang (2009) provide risk-based models. Regardless of the specific asset-growth-based model used to explain cross-sectional effects in post-deal returns, the implications are important for the received merger theory.

We test our hypothesis using a broad U.S. sample of acquiring firms from the Thomson Reuters Securities Data Company (SDC) Platinum Mergers and Acquisitions (M&A) data set over the 1981–2007 period. Our results confirm that the asset growth rate fully subsumes the explanatory power associated with the stock-deal designation. For example, sorting stock deals by asset growth rate, we find that the negative abnormal returns associated with stock deals are exclusively isolated among high-asset growth stocks. In fact, we find that there is no stock-deal effect beyond that explained by the respective firm asset growth rates.

These results are clearly inconsistent with the prediction of the Shleifer–Vishny model in that it is the asset growth rate that explains the cross section of acquiring-firm returns, not the form of payment. In related work, Mortal and Schill (2012) compare the average returns of acquiring firms to firms that grow organically at the same rate and find that the abnormal returns for both firms are comparable. Their paper also suggests a strong connection between the returns associated with acquiring firms and the more general asset growth effect in returns.

To provide a more complete picture, our investigation examines the literature for a number of other existing cross-sectional relations in acquiring-firm returns. Rau and Vermaelen (1998) observe that the abnormal returns associated with acquisitions are concentrated among acquirers that maintain rich valuation multiples. They argue that such return behavior is explained by a tendency for investors to overextrapolate past management performance into the success of subsequent acquisitions. Gaspar, Massa, and Matos (2005) observe that the abnormal returns for acquisitions are concentrated among deals in which investors

[2]See Fairfield, Whisenant, and Yohn (2003), Titman et al. (2004), Broussard, Michayluk, and Neely (2005), Anderson and Garcia-Feijoo (2006), Cooper et al. (2008), Polk and Sapienza (2009), Lyandres, Sun, and Zhang (2008), Xing (2008), Lipson, Mortal, and Schill (2011), Titman, Wei, and Xie (2010), Cooper and Priestley (2011), and Watanabe, Xu, Yao, and Yu (2013). Others who have examined acquisitions in the context of the asset growth effect include Cooper et al. (2008) and Chan, Karceski, Lakonishok, and Sougiannis (2008). Both studies maintain that asset growth is robust to excluding firms that grow through acquisitions.

are weak monitors. They argue that the acquiring-firm returns are explained by poor monitoring that provides leeway for managers to carry out value-reducing acquisitions (Firth (1980), Jensen (1986), (1993)). We examine these established relations with respect to asset growth effects and observe a similar pattern in these cross-sectional effects as that observed for stock deals: glamour firms and poorly monitored acquirers tend to maintain higher asset growth rates. Because these acquisition characteristics are correlated with firm asset growth, it is unclear whether these characteristics are associated with some independent return effect or whether the return effect is simply the characteristic's correlation with asset growth. Our tests confirm it to be the latter; variation in book-to-market (BM) ratio or share turnover maintains no independent explanatory power once we control for asset growth rates.

Last, Bouwman, Fuller, and Nain (2009) conduct a time-series test and observe that abnormal returns are concentrated among deals completed during periods of high-marketwide valuation. They conclude that their evidence is most consistent with a behavioral herding explanation. We follow their approach but observe that our nonacquiring control firms maintain the same return pattern, such that the acquiring-firm returns are no different from those of firms that grew organically at the same rate and time.

We conclude that the asset growth evidence reorients current explanations of post-acquisition returns. Although we leave for others to fully sort out the different explanations for the merger and asset growth effects, our evidence confirms that current explanations of the post-deal returns are unsatisfactory. While we do not specify whether the underlying asset growth effect documented in this paper is behavioral or risk based, our results raise the possibility that existing behavioral and risk-based models of asset growth may be generally applied to explain post-deal return patterns.

The paper is organized as follows: Section II describes the sample and data used in the study. Section III reports the main empirical tests on stock deals. Section IV examines other empirical regularities with post-deal returns. Section V discusses the findings, and Section VI concludes the paper.

II. Data

We use the Thomson Reuters SDC Platinum M&A data set to identify acquiring firms. This data set is widely used for league tables for underwriters who maintain strong incentives to have deals recognized; due to the importance of the record and the incentives of underwriters to report, it is understood to be nearly comprehensive of all underwritten corporate merger activity announced after 1980. Our sample of firms is all U.S. Center for Research in Security Prices (CRSP)–Compustat nonfinancial firms over the 1981–2007 period, domiciled in the United States and with a share price greater than $5 at the end of the pre-merger calendar year.

Because annual asset growth is observed yearly and is a critical component of our empirical design, our unit of observation is firm-year. Using the SDC data set, a firm-year is classified as a merger firm-year if at least 1 M&A transaction of majority or remaining interest by a U.S. firm is reported effective during the

firm's fiscal year. For our purposes, we follow the literature in not considering tender offers as mergers, although the number of tender offers is so small this decision has no bearing on our results. We classify a firm-year as an acquisition year if the acquisition deal value (or the sum of all deal values in the case of multiple acquisitions) exceeds 5% of the beginning of year market capitalization of the acquiring firm. The 5% threshold is used to improve the discriminatory power of the tests by avoiding trivial acquisitions.

We define cash and stock deals based on the payment method reported in SDC. We classify firms that pay for any portion of the acquisition with stock as "stock deals," and those that pay for deals exclusively with cash as "cash deals." We do not classify deals where either SDC does not report the form of payment or the firm affected multiple deals in the same year, where some of the deals were paid for at least in part with stock while others were paid for completely with cash. As a result of these two effects, the payment type of one third of the acquisition events is not reported, so these firms are not used in tests where the payment classification is used. Panel A of Table 1 provides the frequency distribution of the acquisition sample by year. Overall, we have 8,121 total-acquisition-firm years with 2,583 stock-deal years, and 2,553 cash-deal years.

Our tests require a set of nonacquisition control firms. We start with all CRSP–Compustat firms and classify a firm as a control firm if it has not completed an acquisition of any size in the particular year or in the previous 3 years. We consider a firm as having had an acquisition if such an event is identified by the SDC data set or the firm acquisitions item from the statement of cash flows is greater than 0. Our approach generates 26,343 control firm-year observations.

We provide summary statistics on firm characteristics by category in Panel B of Table 1. Deal value is as reported by SDC. Market value of equity is from CRSP and is shares outstanding multiplied by share price as of December of the calendar year during which we count deals. The book-to-market ratio is as defined in Davis, Fama, and French (2000) and is the book value divided by market value of equity as of December. Book value of equity is stockholders' equity (data item SEQ) minus preferred stock plus deferred taxes and investment tax credit (data item TXDITC). Preferred stock is computed in the following order, depending on data availability: redemption value (data item PSTKRV), liquidation value (data item PSTKL), or stock capital (data item PSTK). Total assets correspond to Compustat data item AT. The asset growth rate is defined as the percentage growth in total assets net of cash (data item CHE). The removal of cash from total assets eliminates asset growth that is generated without any real investment such as an equity or debt offering where the proceeds are not yet invested in real assets. Although defining asset growth with or without cash in this panel makes little difference, the specific definition does matter for subsequent tests.[3]

[3]For these tests, control firms are matched with acquiring firms based on asset growth net of cash. When cash growth is included as part of asset growth, the extreme asset growth control firms have a significant portion of their growth that is attributed to cash growth, not operating growth. To create a better operating-asset-based definition of growth, we exclude cash in the definition of asset growth. This is discussed in more detail in footnote 6. Since Cooper et al. (2008) find that cash growth does not

TABLE 1

Sample Summary

Acquisition events are obtained from SDC over the 1981–2007 period and are defined as total deal value for all mergers in a given firm-year greater than 5% of the bidders' market value of equity; they do not include tender offers. The column Stock contains firm-years where all acquisitions for the firm within a year were paid for with stock or a mixture of stock and cash. Cash refers to firm-years where all acquisitions for the firm within a year were paid for with cash only. Panel A contains the frequency distribution of firm-years. Panel B contains the mean of the annual median values for the various firm characteristics for the merger sample. The firm characteristics included in Panel B are Deal value, the total value of merger deals completed in a given firm-year; Market cap, the market value of equity as of Dec. 31; Book-to-market ratio as defined in Davis et al. (2000); Assets, the total book assets; Asset growth rate, the percentage change in total assets net of cash; Deal/Cap, the proportion of the total value of merger deals completed during the year to the market capitalization in the previous year; Deal/Assets, the total value of merger deals as a proportion of total assets in the previous year; and Age, the number of years since the firm first reported positive assets in Compustat.

Panel A. Frequency Distribution of Firm-Years

		Payment Type	
Year	All Acquirers	Stock Deals	Cash Deals
1981	60	33	2
1982	104	44	0
1983	143	58	1
1984	193	85	1
1985	151	49	40
1986	147	35	75
1987	124	30	69
1988	151	38	80
1989	188	43	92
1990	171	45	69
1991	160	45	59
1992	232	84	64
1993	300	94	95
1994	400	133	112
1995	436	160	120
1996	531	195	140
1997	615	219	148
1998	701	231	191
1999	541	198	142
2000	480	200	141
2001	357	143	101
2002	301	100	89
2003	253	55	114
2004	356	70	149
2005	342	74	143
2006	344	58	164
2007	340	64	152
Total	8,121	2,583	2,553

Panel B. Firm-Year Characteristics

		Payment Type	
	All Acquirers	Stock Deals	Cash Deals
Deal value ($m)	70.56	69.56	92.70
Market cap ($m)	389.3	376.0	641.2
Book-to-market ratio	0.568	0.527	0.650
Assets ($m)	439.5	320.2	1,008.7
Asset growth rate	0.33	0.41	0.27
Deal/Cap	0.19	0.22	0.18
Deal/Assets	0.22	0.34	0.16
Age	13	11	16

We also report total Deal value as a percentage of the market value of equity as of December and as a percentage of total assets. Finally, *Age* is the number of years since the firm reported assets for the first time on Compustat.

maintain any meaningful effect on returns, subtracting growth in cash from total asset growth should make the growth effect from mergers, which is mostly operational, more comparable to that of organic growth.

Although we see that acquiring firms tend to be larger and faster growing than control firms, the size differential is greatest among the cash deals and the growth rate differential is greatest among the stock deals. The book-to-market ratio is lowest for stock deals and age is highest for cash deals. Of particular interest to our study is the asset growth rate differential between stock and cash deals. Stock deals are associated with average asset growth rates of 41%, whereas cash deals are associated with lower asset growth rates of 27%. The Deal/Cap and Deal/Assets ratios follow a similar pattern with larger values for stock deals. This variation in asset growth rates motivates our subsequent tests in providing an alternative explanation for the variation in returns across stock and cash deals.

III. Stock-Deal Returns

A. Post-Deal Returns Event Study

We begin our tests with a simple event study of returns of acquirers over the calendar year following the completion of a stock or cash deal. In Table 2, we report the 12-month cumulative mean gross returns for firms starting in January following the acquisition year. We begin in January for several reasons. First, firms may make several acquisitions in a single year. To avoid duplicate annual observations, we aggregate all same-year acquisitions into a single firm-year observation. Second, unlike acquisitions, asset growth cannot be identified with a particular date. In order to match acquisition growth with nonacquisition growth of the same magnitude, we must measure growth over a period of time rather than as a single event. We choose to do this on an annual basis in order to conform to the asset growth literature that has also measured asset growth on an annual basis.

TABLE 2

Cumulative Returns for Stock and Cash Deals

Table 2 reports cumulative average annual gross returns for stock and cash deals and matched control firms for U.S. stocks over the 1981–2007 period. Cash deals are those acquisitions where payment was made entirely with cash. Stock deals are those in which stock was used as payment for some portion of the deal. Matched control firms are comprised of all U.S. stocks in the same respective size and book-to-market (BM) ratio groupings, or asset growth decile, that have not completed an acquisition in the current or the past 3 years. For size, we group firms into three groups, using NYSE 20th and 50th percentiles as breakpoints. For BM, we group firms into quintiles. Returns are from Jan. to Dec. in the year after merger completion. We report *t*-statistics of the null hypotheses in which the difference is equal to 0. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

		Size and BM-Ratio-Matched Control			Asset-Growth-Matched Control		
Method of Payment	Acquirer Return	Control Return	Difference	*t*-Statistic	Control Return	Difference	*t*-Statistic
Full Sample (1981–2007)							
Stock	0.0500	0.1408	−0.0905***	−6.98	0.0561	−0.0057	−0.44
Cash	0.0815	0.0969	−0.0151	−1.64	0.0512	0.0305***	3.22
Early Sample (1981–1989)							
Stock	0.0574	0.1215	−0.0640***	−3.34	0.0708	−0.0133	−0.68
Cash	0.0397	0.0615	−0.0224	−1.09	−0.0037	0.0425**	2.00
Mid Sample (1990–1998)							
Stock	0.1038	0.1743	−0.0702***	−3.60	0.1107	−0.0061	−0.31
Cash	0.1291	0.1710	−0.0410***	−2.63	0.1377	−0.0076	−0.47
Late Sample (1999–2007)							
Stock	−0.0206	0.1069	−0.1272***	−5.46	−0.0186	−0.0020	−0.09
Cash	0.0543	0.0456	0.0087	0.65	−0.0045	0.0588***	4.29

For stock deals, the cumulative annual return is 5.0%. For cash deals, the annual return is substantially higher at 8.2%. The 5.0% earned by stock-deal investors is low, especially when compared to the 5.1% return investors could have earned investing in U.S. Treasury Bills over this same period.

As an alternative return benchmark, we follow Fama and French (1993) and Rau and Vermaelen (1998) and match each merger firm with a portfolio of control firms based on the size and book-to-market ratio of the merger firm in a given year. To create these benchmarks, we use the full sample of firms (acquiring firms and control firms) to create annual size and book-to-market ratio breakpoints. For size breakpoints, we follow Fama and French (2008) and split the sample at the 20th and 50th percentiles based on New York Stock Exchange (NYSE) listed firms. Book-to-market ratio is split into same-sized quintiles using the whole sample. Using these annual breakpoints, we form control-firm portfolios based on all nonacquiring control firms within the same annual size and book-to-market ratio groupings. The control firms used are firms that have not had any acquisition event in the current year nor in the past 3 years.

For this control group, the cumulative return over the same subsequent calendar year is 14.1% for the stock deals and 9.7% for the cash deals. Using these calendar-time returns as benchmarks, the abnormal return for stock deals is -9.1% (t-statistic $= -6.98$) for the stock deals and -1.5% (t-statistic $= -1.64$) for the cash deals. Consistent with the literature, the abnormal returns associated with acquisitions are clearly concentrated among stock deals. The pattern is generally similar with subsample periods. We disaggregate the results by three periods: 1981–1989, 1990–1998, and 1999–2007. Across these three periods, we find that the stock deals underperform the size and book-to-market comparable portfolios with abnormal annual returns of -6.4% (t-statistic $= -3.34$), -7.0% (t-statistic $= -3.60$), and -12.7% (t-statistic $= -5.46$), respectively. There is no evidence of abnormally poor returns among cash deals except in the middle period where the difference in portfolio returns is -4.1% (t-statistic $= -2.63$).

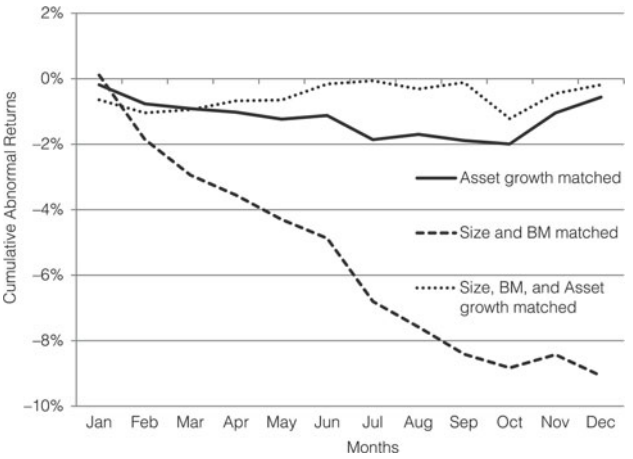
Motivated by the asset growth literature and the variation in asset growth rates across the merger and nonmerger samples, we propose an alternative matching procedure based on the asset growth rate of the acquirers. We establish 10 annual breakpoints using the full sample of firms. Using these breakpoints, we form portfolios of control firms that mirror the same asset growth rate as the acquirers. Matching the asset growth rate of the stock deals, the cumulative 12-month return of the control sample is much lower at 5.6% and the associated t-statistic on the difference is insignificant at -0.44. For the subsample periods, there is no evidence of significant cumulative abnormal returns for asset-growth-rate-matched deals with differences of -1.3% (t-statistic $= -0.68$), -0.6% (t-statistic $= -0.31$), and -0.2% (t-statistic $= -0.09$), respectively, for the early, mid, and late periods. For the full sample, the mean return for cash deal control firms is 5.1%, such that the difference is positive and significant. The difference is also positive and significant in the subsample tests, but only for the early and late periods. The asset-growth-rate-matched abnormal return for cash deals suggests that cash acquisition firms outperform nonacquisition firms that grow at similar rates. This is a curious result, though it is not robust, as it fails to remain in portfolio-based tests, suggesting that these results are due to clustering.

Figure 1 reports monthly cumulative abnormal returns for stock deals matched with nonacquiring control firms based on the two matching criteria described above: i) book-to-market ratio and size, and ii) asset growth rate. The figure shows that over the subsequent calendar year, the choice of benchmark maintains a dramatic effect on the inference. The stock acquirers show strong underperformance when compared against a size and book-to-market ratio-based control sample, but show no abnormal effect when compared against an asset-growth-rate-based control sample. For completeness, we also matched control firms with a three-way match (size groupings, book-to-market quintiles, and asset growth deciles). For size breakpoints, we follow Fama and French (2008) and split the sample at the 20th and 50th percentiles based on NYSE listed firms. Since there are some instances where it is not possible to match on three characteristics (i.e., there are instances where there are literally no control firms that match across the three dimensions), these observations are not included in the three-way matched result in Figure 1. The cumulative abnormal return plot for the three-way match specification looks comparable to that of the asset-growth-rate-only control. Our interpretation is that it is the asset-growth-rate matching that matters most with respect to abnormal returns.

FIGURE 1

Cumulative Mean Abnormal Returns for Stock Deals in Event Time

Figure 1 reports simple average cumulative abnormal returns for stock-deal acquirers matched with firms based on three different matching criteria. Matched firms are comprised of all U.S. stocks in the same i) size and book-to-market ratio group; ii) asset growth group; or iii) size, book-to-market ratio, and asset growth group that have not completed a deal in 3 years. Returns are measured from Jan. to Dec. in the year after deal completion.



B. Portfolio Returns

To remove any cross-correlation bias in the standard errors (Mitchell and Stafford (2000)), in the next set of tests we form calendar-time portfolios of acquirers. In these tests, an acquiring-firm portfolio is formed in which firms enter the portfolio at the end of December of the year an acquisition is completed and exit the portfolio 3 years later. The firms in the portfolio are weighted in two ways: equal-weighted and value-weighted by the firm's market capitalization at the end

of the merger year. We form acquiring-firm portfolios for both stock deals and cash deals. The results are reported in Panel A of Table 3. The monthly returns for the stock-deal acquirers are 0.36% (equal-weighted) and 0.40% (value-weighted). The cash-deal acquirer portfolio returns are substantially higher: 0.66% (equal-weighted) and 0.90% (value-weighted).

TABLE 3

Monthly Portfolio Returns

Table 3 reports mean calendar-time gross portfolio returns for acquirers and matched control firms for U.S. stocks over the 1981–2007 period. The table includes results for equal-weighted (EW) and value-weighted (VW) portfolios. We form calendar-time acquiring-firm portfolios in which firms enter the portfolio in the calendar year (Panel A) or calendar month (Panel B) following an acquisition and exit the portfolio 36 months later. For Panels A and B, matching control portfolios are comprised of all U.S. stocks in the same respective size and book-to-market (BM) ratio groupings, or asset growth decile, that have not completed a deal in the current or the past 3 years. For size, we group firms into three groups, using NYSE 20th and 50th percentiles as breakpoints. For BM ratios, we group firms into quintiles. All benchmark portfolios are rebalanced annually starting in January after merger completion and held for 36 months. In Panel C, we match using a single control firm by taking the closest BM firm of the set of firms in the same size group. We group firms into three size groups, using NYSE 20th and 50th percentiles as breakpoints. We match on asset growth by taking the firm with the closest growth in assets. The numbers in parentheses are *t*-statistics of the null hypothesis in which the difference is equal to 0. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Stock Deals		Cash Deals	
	EW	VW	EW	VW
Panel A. Portfolios Formed at Merger Year t + 1 with Portfolio-Matched Control				
Acquirer portfolio	0.0036	0.0040	0.0066	0.0090
Size and BM-ratio-matched control portfolio	0.0069	0.0078	0.0068	0.0064
Difference	−0.0033***	−0.0039***	−0.0002	0.0026
	(−2.86)	(−2.81)	(−0.11)	(1.34)
Asset-growth-rate-matched control portfolio	0.0035	0.0036	0.0051	0.0061
Difference	0.0001	0.0003	0.0015	0.0029
	(0.12)	(0.15)	(0.71)	(1.07)
Panel B. Portfolios Formed at Merger Month t + 1 with Portfolio-Matched Control				
Acquirer portfolio	0.0025	0.0045	0.0070	0.0091
Size and BM-ratio-matched control portfolio	0.0069	0.0078	0.0068	0.0064
Difference	−0.0043***	−0.0033**	0.0001	0.0027
	(−3.10)	(−2.00)	(0.07)	(1.34)
Asset-growth-rate-matched control portfolio	0.0035	0.0036	0.0051	0.0061
Difference	−0.0009	0.0009	0.0019	0.0030
	(−0.80)	(0.41)	(0.90)	(1.07)
Panel C. Portfolios Formed at Merger Year t + 1 with Single-Firm-Matched Control				
Acquirer portfolio	0.0036	0.0040	0.0066	0.0090
Size and BM-ratio-matched control portfolio	0.0068	0.0081	0.0044	0.0046
Difference	−0.0032**	−0.0042**	0.0023	0.0044*
	(−2.43)	(−2.27)	(1.03)	(1.79)
Asset-growth-rate-matched control portfolio	0.0034	0.0042	0.0018	0.0028
Difference	0.0001	−0.0002	0.0049	0.0062*
	(0.11)	(−0.07)	(1.56)	(1.72)

As a benchmark, we construct a size and book-to-market ratio matched portfolio, by forming a benchmark portfolio of portfolios that match each firm on size (using the NYSE 20th and 50th percentile breakpoints) and book-to-market ratio (based on full-sample book-to-market ratio quintiles) at the end of the calendar year in which the merger was completed. This benchmark portfolio is held for 3 years. The difference in monthly returns between the stock acquirer portfolio and the size and book-to-market-ratio-matched portfolio is −0.33% (*t*-statistic = −2.86) and −0.40% (*t*-statistic = −2.81), respectively, for the equal- and value-weighted portfolios. These findings establish evidence in this econometric framework that is consistent with past evidence of stock-deal

underperformance. In like manner, the difference in returns for the cash deals is statistically insignificant.

As an alternative benchmark, we form asset-growth-control-firm portfolios that match the acquirer samples in the same manner as the size and book-to-market ratio matching procedure conducted in the last test. The asset-growth-control-firm portfolios are delineated based on asset growth deciles of the full-sample breakpoints. The control firm portfolio is, thus, balanced to maintain the same average asset growth rate as the merger portfolio. We find that returns associated with these asset-growth-rate-matched portfolios are systematically lower, such that the abnormal returns for the stock-deal portfolios are no longer statistically significant. The equal-weighted and value-weighted asset-growth-adjusted returns for stock deals are 0.01% (t-statistic = 0.12) and 0.03% (t-statistic = 0.15), respectively. The results for cash deals are statistically similar to those for size and book-to-market ratio matched portfolios.

In the acquisition literature, it has been common to measure returns beginning the calendar month following the acquisition rather than the calendar year following the acquisition event. In this paper, we choose to rebalance on an annual basis, because asset growth is not defined by a specific date but rather is aggregated on a periodic basis. We select an annual basis in order to follow the asset growth literature. In order to test the impact of this specification, we rerun the tests in Panel A with acquisition portfolios that rebalance monthly. Specifically, we follow Mitchell and Stafford (2000) in forming portfolios on a monthly basis that contain all firms that have completed an acquisition in the past 36 months. We report the results of these revised portfolios in Panel B of Table 3. The revised monthly returns for the stock deals are slightly lower for the equal-weighted portfolio (decline from 0.36% to 0.25%) and slightly higher for the value-weighted portfolio (increase from 0.40% to 0.45%). The benchmark returns are the same since the annual data do not allow monthly rebalancing. The inference from the revised abnormal returns is identical to that of the annual rebalanced portfolios: the abnormal returns concentrated among the stock deals are explained by variation in asset growth rates.

We note that although our control firm portfolio approach reduces estimation error, it exhibits lower variance than the event firms, which, in the presence of outliers, could bias the estimates of abnormal returns. To address this concern, we match each merger firm to a single firm. We match on size and book-to-market ratio, by taking the closest book-to-market-ratio-matched firm of the set of firms in the same size grouping. We compute size cutoffs as in Fama and French (2008). We match on asset growth by taking the firm with the closest growth in assets. We report these revised results in Panel C of Table 3. These results are qualitatively similar to those of Panel A. Stock deals maintain returns that are significantly lower than those of a size and book-to-market-ratio-matched portfolio, while returns are indistinguishable from those of an asset-growth-matched portfolio. Cash deals maintain returns that are indistinguishable from 0 for both matching portfolios on an equal-weighted basis. In the case of the value-weighted cash-deal portfolio, the cash deals actually outperform the control firms.

As an alternative benchmark, we now turn to a factor model approach. In Table 4, we repeat our analysis using risk-adjusted portfolio returns following

TABLE 4

Factor Model Regression Estimates

Table 4 reports 3- and 4-factor model regressions with post-deal portfolio returns alone (regressions 1, 2, 4, and 5) and stacked with matching portfolio returns (regressions 3 and 6). The reported coefficients are from time-series regressions of the acquiring-firm portfolio returns, respectively, on Fama–French 3- and 4-factor models, where the fourth factor is an asset growth factor denoted SMG for "shrink minus grow." To form the asset growth factor, we follow the method of Fama and French (1993) by independently ranking the whole sample of firms on total asset growth, book-to-market ratio, and size, and delete any firm that had a merger and acquisition in the past 3 years. We then compute portfolio returns for January to December on the 12 portfolios grouped on asset growth and book-to-market terciles, and size groupings. We form a size and book-to-market neutral growth factor by taking the average of returns in each month of all size and book-to-market ratio portfolios with low-asset growth and subtract the corresponding average returns of all size and book-to-market ratio portfolios with high-asset growth. Matched portfolios are comprised of all U.S. stocks in the same asset growth decile that have not completed a deal in the current or the past 3 years. Firms remain in the portfolio for 36 months starting in January after merger completion or fiscal year–end. We subtract the risk-free rate from returns. For the stacked regressions, we include an indicator variable for the merger portfolio and interact the indicator variable with each of the risk factors to allow for variation in all the coefficients across the two portfolios. The numbers in parentheses are *t*-statistics of the null hypothesis in which the coefficients are equal to 0. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Stock Deals			Cash Deals		
	1	2	3	4	5	6
Intercept	−0.0030**	−0.0021	−0.0012	−0.0009	0.0001	0.0000
	(−2.20)	(−1.49)	(−0.88)	(−0.49)	(0.04)	(−0.03)
Acquirer			−0.0008			0.0001
			(−0.43)			(0.06)
RMRF	1.2072***	1.1850***	1.0869***	1.0487***	1.0242***	1.0447***
	(36.62)	(34.96)	(32.30)	(23.19)	(21.95)	(26.98)
SMB	0.8154***	0.8073***	0.9261***	0.5605***	0.5517***	0.8963***
	(18.30)	(18.22)	(21.05)	(9.17)	(9.05)	(17.71)
HML	−0.0167	0.0324	−0.0282	0.4732***	0.5273***	0.0631
	(−0.33)	(0.59)	(−0.52)	(6.71)	(7.01)	(1.01)
SMG		−0.2055**	−0.2762***		−0.2263**	−0.2098**
		(−2.50)	(−3.38)		(−2.00)	(−2.23)
Acquirer × RMRF			0.0980**			−0.0205
			(2.06)			(−0.37)
Acquirer × SMB			−0.1188*			−0.3447***
			(−1.91)			(−4.82)
Acquirer × HML			0.0607			0.4643***
			(0.79)			(5.26)
Acquirer × SMG			0.0707			−0.0164
			(0.61)			(−0.12)
Adj. R^2	0.88	0.88	0.89	0.68	0.68	0.80

the Fama–French (1993) 3-factor model (regressions 1 and 4). The conclusions are now familiar: stock-deal portfolio returns are systematically poor using standard benchmarks (intercept of −0.0030, *t*-statistic = −2.20), and no abnormal performance is observed for cash deals. To measure the impact of asset growth, we add an additional asset growth factor (SMG for "shrink minus grow") to the Fama–French model. The additional factor is computed following the same method as the construction of the SMB (small-minus-big) and HML (high-minus-low) factors.[4] The 4-factor model intercept is −0.0021 (*t*-statistic = −1.49) for the stock deals and 0.0001 (*t*-statistic = 0.04) for the cash deals. The coefficient on both stock and cash deals is highly significant statistically with a value of −0.2055 (*t*-statistic = −2.50) for stock deals and −0.2263 (*t*-statistic = −2.00)

[4]We have also constructed an asset growth factor based on organic rather than total asset growth. To form the organic asset growth factor, we follow the same approach but delete any firm that completed an acquisition in the past 3 years. The results using this alternative specification are fully comparable to those reported in Table 4.

for cash deals. This suggests that much of the abnormal return in stock deals can be explained by a loading on an asset growth factor.[5]

To further examine the differences between acquiring portfolios and nonacquiring growth portfolios, we form a control portfolio that is based on firms with the same asset growth rate decile. We stack the portfolio returns of the merger and control portfolios and regress the two series on an intercept, the 3 Fama–French (1973) factors, and our asset growth factor. To compare the coefficients of the merger and control portfolios, we add an intercept for the acquiring-firm portfolio and interactions with each risk factor. This allows for variation in the intercept and each of the risk factors across the two portfolios. These regression estimates are reported in regressions 3 and 6 of Table 4 for stock deals and cash deals, respectively. Using the interaction terms, we note that for stock deals, there is a statistically significant difference between the loadings on the market and the size factors (stock acquirers maintain more exposure to the market factor and less exposure to the size factor). However, there is no statistical difference between the BM factor loadings or the asset growth factor loadings. The coefficient on the interaction term for the asset growth factor is 0.0707 (t-statistic $=$ 0.61) for the stock deals. For the cash deals, there is a significant difference between the loadings on the size and the BM factor (cash acquirers maintain less exposure to the size factor and more exposure to the BM factor). Again, there is no statistical difference between the asset growth factor loading for acquirers and control firms. The coefficient on the interaction term for the asset growth factor is -0.0164 (t-statistic $= -0.12$). We interpret this evidence as consistent with the other evidence in the paper that acquired growth and organic growth are similar in their return characteristics.

The cross section of asset growth rates associated with stock deals varies widely, with some acquirers greatly expanding their balance sheet in the acquisition year, while a substantial number of acquirers actually shrink their balance sheet in the year of acquisition. This cross-sectional variation allows us to investigate the independent return effects to acquiring firms across various rates of asset growth. To do so, we form portfolios based on terciles of asset growth. With these independent sorts, we generate a clean test of the dual effects of stock deals and asset growth. We begin this analysis by sorting the stock acquirer firms and control firms into three groups based on annual breakpoints of the full sample population of asset growth rate.

Panel A of Table 5 reports various firm characteristic statistics for the stock deals by asset growth rate tercile. The low-asset growth stock deals tend to be associated with larger deals and larger firms. The mean of the yearly median asset growth rates are -6%, 10%, and 55%, respectively, for the acquirers, by order of increasing growth rate. To better appreciate the source of the asset growth rate, we

[5]We note that when we repeat some of the other tests presented in this paper using a 4-factor model, the inference is not always the same as with the characteristic-based matching procedure. We note that when we find that the 4-factor model fails to explain the cross-sectional variation in post-deal returns, one is unable to discriminate between the explanation that asset growth does not explain post-deal returns and the explanation that a factor model does not explain asset growth. We conclude that the 4-factor model fails to explain as completely the conclusions of this paper as does a characteristic-based matching procedure.

decompose the asset growth rate into four asset-side components and separately four financing-side components following Cooper et al. (2008).

For the left-hand side of the balance sheet, we compute growth in cash (Compustat data item CHE), noncash current assets, property plant and equipment (data item PPENT), and other assets. We present the cash growth rate in this panel, even though, as described earlier, we do not use it in the total asset growth rate calculation. Each of the growth measures is computed as the yearly change in the specific item scaled by total assets. The current assets amount is computed net of cash (data item ACT minus CHE). The other assets line item is computed as total assets minus property plant and equipment minus current assets (where cash is included in current assets). On the liabilities and equity side, we compute the change in stock, retained earnings (data item RE), debt, and current liabilities, each scaled by total assets. Stock is common stock (data item CEQ) plus minority interest (data item MIB) plus preferred stock (data item PSTK) minus retained earnings (data item RE). Debt is long-term debt (data item DLTT) plus short-term

TABLE 5

Portfolio Returns for Stock and Cash Deals by Asset Growth Group

Table 5 reports summary statistics and returns for calendar-time portfolios of stock acquisitions, cash acquisitions, and control firms for U.S. stocks over the 1981–2007 period. Acquisitions are sorted into asset growth terciles based on whole sample breakpoints. Panel A reports the statistics for stock deals, and Panel B reports statistics for cash deals. Some variables are defined in Table 1. The number of stocks is the number of merger years. The rows, starting with cash growth to growth in retained earnings, contain the components of growth in total assets as defined in Cooper et al. (2008). The table also reports monthly gross equal-weighted portfolio returns. Returns are for 36 months starting in January after merger completion or fiscal year–end. We present the average of monthly gross equal-weighted portfolio returns. Matched portfolios are comprised of all U.S. stocks in the same respective size and book-to-market (BM) ratio groupings, or asset growth decile, that have not completed a deal in the current year or the past 3 years. For size, we group firms into three groups, using NYSE 20th and 50th percentiles as breakpoints. For BM ratios, we group firms into quintiles. The numbers in parentheses are *t*-statistics of the null hypothesis in which the difference is equal to 0. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Low-Asset Growth Deals	Medium-Asset Growth Deals	High-Asset Growth Deals
Panel A. Stock-Deal Portfolios			
Number of stocks	201	381	2,001
Summary Statistics			
Deal value ($m)	213.9	60.6	78.6
Market cap ($m)	615.0	491.9	402.6
Book-to-market ratio	0.66	0.63	0.49
Assets ($m)	1,277.4	635.9	314.9
Asset growth rate	−0.056	0.099	0.546
Deal/Cap	0.249	0.133	0.261
Deal/Assets	0.183	0.146	0.427
Age	18.1	17.1	9.9
Cash growth	0.027	−0.000	0.008
Noncash current asset growth	−0.029	0.030	0.158
PPE growth	−0.005	0.026	0.104
Other asset growth	−0.009	0.026	0.192
Operating liabilities growth	0.006	0.028	0.122
Debt financing growth	0.000	0.008	0.104
Stock financing growth	0.061	0.054	0.221
Retained earnings growth	−0.096	−0.021	0.042
Monthly Mean Returns			
Acquirer portfolio	0.0091	0.0067	0.0037
Size and BM-ratio-matched control portfolio	0.0075	0.0077	0.0076
Difference	0.0017	−0.0011	−0.0039***
	(0.63)	(−0.65)	(−3.21)
Asset-growth-rate-matched control portfolio	0.0102	0.0085	0.0034
Difference	−0.0011	−0.0018	0.0004
	(−0.42)	(−1.00)	(0.30)

(continued on next page)

TABLE 5 (continued)
Portfolio Returns for Stock and Cash Deals by Asset Growth Group

	Low-Asset Growth Deals	Medium-Asset Growth Deals	High-Asset Growth Deals
Panel B. Cash Deal Portfolios			
Number of stocks	233	555	1,765
Summary Statistics			
Deal value ($m)	71.6	89.2	82.3
Market cap ($m)	563.1	868.1	445.0
Book-to-market ratio	0.735	0.777	0.544
Assets ($m)	841.8	1,730.4	524.5
Asset growth rate	−0.034	0.100	0.397
Deal/Cap	0.123	0.108	0.217
Deal/Assets	0.073	0.077	0.233
Age	17.5	19.8	13.8
Cash growth	0.006	−0.003	−0.011
Noncash current asset growth	−0.019	0.023	0.108
PPE growth	−0.001	0.027	0.094
Other asset growth	−0.005	0.033	0.141
Operating liabilities growth	−0.001	0.024	0.076
Debt financing growth	−0.014	0.032	0.186
Stock financing growth	0.003	0.003	0.013
Retained earnings growth	−0.017	0.026	0.054
Monthly Mean Returns			
Acquirer portfolio	0.0090	0.0083	0.0051
Size and BM-ratio-matched control portfolio	0.0076	0.0083	0.0072
Difference	0.0014	0.0000	−0.0021
	(0.63)	(−0.01)	(−0.92)
Asset-growth-rate-matched control portfolio	0.0100	0.0083	0.0035
Difference	−0.0010	−0.0001	0.0016
	(−0.42)	(−0.03)	(0.59)

debt (data item DLC). The current liabilities item is computed as total assets (data item AT) minus retained earnings (data item RE) minus stock minus debt.

For the high-asset growth stock deals, the majority of the balance sheet growth comes through increases in noncash current assets, such as accounts receivable and inventory and other asset growth. Among the high-growth acquirers, the decomposition of the asset growth rate is 1% cash growth, 16% noncash current assets growth, 10% property, plant, and equipment (PPE) growth, and 19% other asset growth. As a point of comparison, in untabulated results, the numbers for the nonacquirer control firms are, respectively, 2% cash growth, 18% noncash current assets growth, 12% PPE growth, and 1% other asset growth. The comparison shows that other asset growth, for example, growth in goodwill, is, as expected, not as large a part of nonmerger firm growth. For the low-asset growth group, the decomposition of asset growth for the acquiring firms is 3% cash growth, −3% noncash current asset growth, −1% PPE growth, and −1% other asset growth. Clearly, the noncash current asset amount is a major driver of asset growth across both groups of firms. It is worth noting that the low-asset growth acquirers are associated with earnings losses as the retained earnings growth is −9.6%.

For the left-hand side of the balance sheet, the high-growth stock-deal firms finance growth with 12% contribution from operating liabilities, 10% debt financing, 22% equity financing, and 4% retained earnings. The magnitude of the equity financing growth suggests that new equity issues may play a role in the returns of stock deals. For comparison purposes, in untabulated results, the growth rates of

the control firms are, respectively, 9%, 5%, 8%, and 9%, for operating liabilities, debt financing, equity financing, and retained earnings.[6] In Section III.C, we establish that our findings are not solely due to growth in firm equity.

We report equal-weighted return statistics, for the portfolios over the sample period, by asset growth group. In increasing order of asset growth rate, the mean monthly return values are 0.91%, 0.67%, and 0.37% for the stock-deal sample. We match the acquiring firms to the control sample using size and book-to-market ratios. The abnormal returns are 0.17% (t-statistic = 0.63), −0.11% (t-statistic = −0.65), and −0.39% (t-statistic = −3.21), respectively, for the low-, medium-, and high-asset growth portfolios. The test demonstrates that abnormal returns are not significant for all stock deals, but rather are concentrated among high-asset growth deals. We note that although the loss-generating, low-asset growth acquirers maintain the highest gross returns of 0.91%, the returns are statistically similar to those of firms with comparable size and book-to-market ratio, suggesting that these returns do not maintain an abnormal return premium due to their operating losses.

To test whether asset growth explains the variation in abnormal returns, we match each stock-deal portfolio to a control-firm portfolio with matching asset growth rate. The returns associated with these portfolios are 1.02%, 0.85%, and 0.34%. This pattern in returns is similar to that of the stock-deal portfolios such that the differences in returns are insignificantly different from 0.

In Panel B of Table 5, we report the results of the other half of the double-sort test: cash deals. In this test, we note that the dispersion in growth rate is less than that with stock deals. This may be due to the tendency for cash deals to be conducted by larger acquirers and for smaller targets. The dispersion in asset growth rate varies from −3% for the low-growth acquirers to 40% for the high-growth acquirers. We observe that on the asset side, the relative contribution of the various components of the balance sheet to growth is similar to that of stock deals. On the right-hand side of the balance sheet, the asset growth for high-growth cash deals tends to come disproportionately from debt growth. The debt growth value for high-growth cash deals is 19%, whereas it is 10% for stock deals.

The cash-deal portfolios generate mean gross monthly returns of 0.90%, 0.83%, and 0.51%, respectively, for the low-, medium-, and high-growth portfolios. After adjusting for the size and book-to-market ratio characteristics of the portfolios, we find that the abnormal returns are 0.14%, 0.00%, and −0.21%, respectively, by increasing the asset growth rate group. The abnormal returns are not statistically significant at conventional levels. Still there exists a modest, non-statistically significant asset growth effect in cash deals. When adjusting for the asset growth rates, the returns remain insignificant with differences of −0.10%, −0.00%, and 0.16%, for the three asset growth groups, respectively.

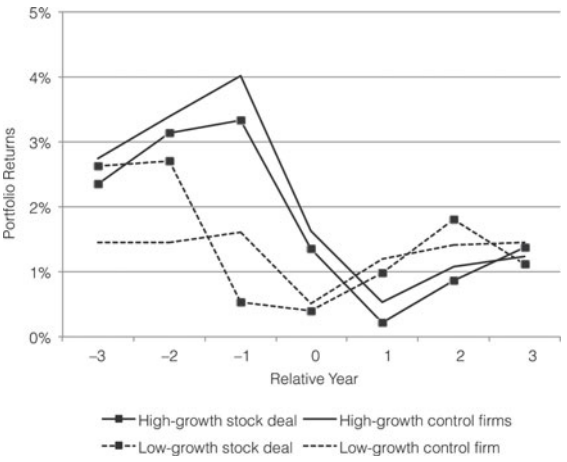
[6]This decomposition establishes the importance of using noncash asset growth as our matching variable. If we use total asset growth in this table, the decomposition numbers for the high-growth quintile become 20% cash growth, 12% noncash current asset growth, 7% PPE growth, and 1% other asset growth. Such matching biases the control firms toward firms that raise cash through debt and equity offerings. Since we want to distinguish the asset growth effect from long-run return effects associated with equity or debt offerings, we choose to exclude cash and focus on operating assets.

To examine the return performance of the portfolios over a larger event window, we plot the mean monthly returns of the two extreme asset growth portfolios (high growth and low growth), for both stock acquirers and growth-matched control firms, for the 7 years surrounding the year of the sort. These plots are reported in Figure 2. We observe that over this long horizon, the high-growth acquirer portfolios behave in a manner similar to the nonmerger portfolios, with very high returns prior to the sorting year, followed by a similar pattern of low returns following the sorting year. The opposite is true for the low-growth portfolios, with relatively low returns prior to the sorting year and high returns after. The return reversal pattern of the plot suggests that, controlling for the firm asset growth rate, the returns to stock acquirers do not appear to be substantially different from those of firms that grow at similar rates without acquisitions.

FIGURE 2

Mean Monthly Portfolio Returns for Stock Deals in Event Time

Figure 2 plots the mean monthly portfolio returns for stock-deal acquirers and nonacquiring control firms during the 7 years surrounding the sorting year. We sort firms into asset growth terciles in year 0 based on the overall sample. Portfolio returns are for each calendar year relative to the sorting year. The figure depicts the highest and lowest growth terciles.



C. Cross-Sectional Regressions

We now examine the stock-deal effect, using a Fama–MacBeth (1973) cross-sectional regression approach that simultaneously controls for other firm characteristics in a way that portfolio sorts do not allow. Moreover, this approach is able to incorporate the entire panel of firms rather than focusing on the extremes in any characteristic. In this test, we pool the acquirer and control samples and estimate monthly cross-sectional regressions of firm returns regressed with log book-to-market ratio and log market capitalization as control variables. We introduce four test variables in turn: two binary dummy variables for stock and cash deals and two relative size variables for stock and cash deals. The stock and cash merger dummy variables, D(StockDeal) and D(CashDeal), are indicator variables for the

firm having done a stock deal or a cash deal in the year. The relative size variables, StockDeal/Cap and CashDeal/Cap, are equal to the natural log of 1 plus the aggregate value of stock deals or cash deals completed relative to the market value of firm equity. If the firm effected multiple mergers in a given year, then the deal value is the total amount spent in all deals performed in that year. The monthly returns on the left-hand side of the regression are from January to December of a given year, while the independent variables are as of the previous year. The monthly cross-sectional regression observations are equally weighted.

We report the time-series average of the monthly coefficients in Table 6. Consistent with the literature (Loughran and Vijh (1997), Savor and Lu (2009)), we find that the abnormal returns associated with acquirers tend to be concentrated among deals paid for with stock. Consistent with the literature and the predictions of Shleifer and Vishny (2003), the coefficients on both stock-deal variables are negative and significantly different from 0 in both specifications (regressions 1 and 2), but this is not the case for the coefficients on both cash-deal variables. The coefficient on the stock merger dummy suggests that the monthly returns of stock-deal firms are 0.6 percentage points lower than those of similar nonacquiring firms.

We now add the firm's asset growth rate to the right-hand side of the regression and reestimate the equations. In both regressions 3 and 4 of Table 6, we find that the coefficient on the asset growth rate is negative and highly statistically significant, but the addition of the asset growth rate reduces the cross-sectional explanatory power of the stock-deal variables, such that the form of payment is no longer statistically significant. In unreported tests, we repeat the same exercise with regressions weighted by firm market capitalization and find similar results. These tests confirm the results of the earlier portfolio tests in establishing that it is not the terms of the payment that explain variation in post-deal returns, but rather the growth rate in firm's assets.

The long-run underperformance of equity offerings (Loughran and Ritter (1995)) may provide an alternative explanation that our asset growth rate variable may be simply proxying for the growth rate in assets associated with equity offerings. This hypothesis appears germane due to the high level of contemporary growth in equity observed in Panel A of Table 5. To test for this effect, we add growth in equity to the baseline regressions. Growth in equity is computed net of growth in retained earnings, as in Table 5. In regressions 5 and 6 of Table 6, we find that the coefficient on the growth in equity variable is significant. Despite the explanatory power of the growth in equity variable, we observe that the addition of equity growth has a minimal effect on the stock merger deal variables, and in fact, under these new specifications, the coefficients on cash deals are now significant. We conclude that firm growth in equity capital does not subsume the explanatory power of acquisitions.

In regressions 7 and 8 of Table 6, we add both growth in equity and growth in debt to the regression. Debt issuance has also been shown to be associated with poor subsequent returns (Spiess and Affleck-Graves (1999)), though not in the context of acquisitions. The growth-in-debt variable is defined as in Table 5. When both debt and equity growth are included, the explanatory power of all merger variables loses significance. Curiously, it is the coefficient on growth in

TABLE 6

Cross-Sectional Regressions with Monthly Returns

Table 6 reports Fama–MacBeth (1973) cross-sectional regressions of monthly returns on various firm characteristics. The Book-to-market ratio, Market cap, and Asset growth rate are defined in Table 1. Stock (Cash) dummy is an indicator variable indicating firm-years where all acquisitions were financed with at least some stock (100% cash). StockDeal/Cap (CashDeal/Cap) is the sum of the deal values in firm-years where all acquisitions were financed with at least some stock (100% cash). Growth in equity (debt) refers to change in total equity that is not due to growth in retained earnings (debt) as a proportion of initial total assets. Growth in the various asset side components is as computed in Cooper et al. (2008). Acquired asset growth is defined as the total deal value acquired by the firm within the year divided by the lagged value of total assets. The nonacquired asset growth is defined as the difference between the change in total assets and the total deal value acquired by the firm divided by the lagged value of total assets. To control for outlier effects in the regression, all variables, with the exception of dummy variables, are log transformed and winsorized at the 1% and 99% levels. The log market cap has also been divided by 1000. Because the StockDeal/Cap and CashDeal/Cap ratios, and the asset growth rate and respective components, can take nonpositive values, we add 1 to these variables before taking the log. Coefficient estimates are time-series averages of regression coefficients, obtained from monthly cross-sectional regressions. The standard errors are adjusted for serial correlation. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	1	2	3	4	5	6	7	8	9	10	11	12	13
Intercept	0.009*	0.009*	0.010*	0.010*	0.010**	0.010**	0.011**	0.011**	0.010*	0.010*	0.010*	0.010*	0.010*
Book-to-market ratio	0.003**	0.003**	0.002*	0.002*	0.002	0.002	0.002	0.002	0.002*	0.003**	0.002*	0.002*	0.002*
Market cap	0.397	0.391	0.443	0.459	0.213	0.204	0.184	0.170	0.468	0.450	0.412	0.433	0.427
D(StockDeal)	−0.006***		−0.002		−0.004***		−0.002		−0.004***		−0.002		−0.004**
StockDeal/Cap		−0.013***		−0.000		−0.007*		0.003		−0.006		0.001	
D(CashDeal)	−0.003		0.000		−0.003**		−0.001		−0.001		0.001		−0.000
CashDeal/Cap		−0.006		0.003		−0.021*		−0.009		−0.002		0.008	
Asset growth rate			−0.014***	−0.015***									
Growth in equity					−0.012***	−0.012***	−0.012***	−0.013***					
Growth in debt							−0.020***	−0.023***					
PPE growth									−0.020***	−0.021***	−0.016***	−0.017***	
Cash growth											−0.001	−0.001	
Current assets growth											−0.008**	−0.009**	
Other assets growth											−0.011***	−0.013***	
Acquired asset growth													−0.008**
Nonacquired asset growth													−0.010***
R^2	0.022	0.021	0.025	0.025	0.028	0.027	0.030	0.029	0.025	0.024	0.032	0.032	0.026

debt that maintains the largest magnitude for both regressions. Clearly, the effect documented in this table is not exclusively an equity offering effect, but can be explained by the combined external financing component of debt and equity.

To further investigate the explanatory power of various components of the balance sheet, we follow the decomposition framework of Cooper et al. (2008) reported in Table 5. We begin by adding only PPE growth to the right-hand side of the regression. In regression 9 of Table 6, we observe that the added PPE growth regressor exerts only modest impact on the explanatory power of the stock merger dummy. Stock mergers continue to underperform after controlling for growth in firm-fixed assets. This is not the case when stock deals are defined in relative terms, as a percentage of market capitalization. In regression 10, we observe that the explanatory power for relative stock deals drops to insignificance once PPE growth is included. These tests suggest that PPE growth captures the features of the stock-deal effect for relatively large deals but not for all deals.

We now add the other components of total asset growth: cash growth, noncash current-asset growth, and other asset growth. Consistent with Cooper et al. (2008), we find that each of the decomposed measures, except for cash, maintains independent explanatory power in the cross section. Their inclusion, however, drives out any independent explanatory power of any of the acquisition variables. In untabulated tests, we find that although the stock-deal effect is fully explained by asset growth, none of the individual components of asset growth is able to fully explain the effect. The poor returns of stock deals are best characterized as an association with firms that are expanding their debt and equity financing or are expanding their overall operating assets. We discuss the implications of this in Section V.

As a final investigation, we disaggregate asset growth into acquired asset growth and nonacquired asset growth. The acquired asset growth is defined as the total deal value acquired by the firm within the year divided by the lagged value of total assets. The nonacquired asset growth is defined as the difference between the change in total assets and the total deal value acquired by the firm divided by the lagged value of total assets. As with other growth rates, we add 1 to both values of asset growth and log transform them.

In regression 13 of Table 6, we report the coefficient estimates from a specification that includes both forms of asset growth. We note that both forms as asset growth maintain negative and significant coefficients that are similar in magnitude with -0.008 on the acquired asset growth and -0.010 on the nonacquired asset growth. These coefficients are not statistically different from each other as the test of their difference has a t-statistic of 0.57. Curiously, with the decomposed asset growth, the coefficient on stock dummy remains negative and significant. Although not reported, if we include total asset growth, neither the coefficient on acquired asset growth nor the nonacquired asset growth maintains independent explanatory power beyond that already explained by total asset growth.

In untabulated results, we repeat the regression tests using panel regressions with cluster-adjusted standard errors, as in Petersen (2009). Specifically, we estimate a panel regression with date-fixed effects and standard errors clustered at the firm level. Petersen finds that in the presence of time effects, Fama and MacBeth (1973) standard errors are unbiased. However, if there were to be within-firm

correlation in returns, results could potentially be biased. The results obtained under Fama–MacBeth and clustered regressions are, for the most part, consistent with each other, the main exception being that with the panel approach, the coefficient on cash deals is marginally negative in the base case (regressions 1 and 2 of Table 6) and then positive in the regressions that include total asset growth (regressions 3, 4, and 8). Although some of these results are inconsistent with prior literature, none of these differences affects the inferences of our tests.

IV. Examining Variation in Acquirer-Firm Returns Across Other Dimensions

Having examined stock deals in some detail, we now turn to several other cross-sectional effects for acquisition returns that have been identified in the literature. Our objective follows in the same vein, in examining whether the characteristics of the deal maintain any explanatory power in returns above that contained in the acquirer's asset growth rate.

A. Glamour Deals

We begin with the glamour-deal effect of Rau and Vermaelen (1998); they document that acquisitions by firms with low-BM ratios (glamour firms) tend to be associated with particularly poor returns. They claim this finding is consistent with managers and the market overextrapolating the acquiring firm's valuation ratio with respect to the target firm. To replicate their result, we sort our full panel of acquirers into terciles based on their book-to-market ratio. In Panel A of Table 7, we report summary statistics of the acquirer firms by book-to-market ratio tercile. The mean book-to-market ratio varies from 0.30 for the glamour group to 0.60 for the middle group to 1.10 for the value group. Of particular interest across these terciles is the observation that the asset growth rate of the acquirers is correlated with the book-to-market ratio. The asset growth rate varies from 25% for the value deals to 32% for the middle group to 40% for the glamour acquirers. The variation in asset growth rate motivates a reexamination of the glamour-acquirer effect, to see how important the asset growth rate is in explaining the cross-sectional relation.

Following the methodology of the tests in Table 3, we form calendar-time portfolios by tercile group. We begin by reporting the mean monthly return for each book-to-market ratio tercile portfolio. These mean returns are 0.29%, 0.49%, and 0.62% for the terciles in order of increasing book-to-market ratio. The evidence is consistent with Rau and Vermaelen (1998): the worst returns are concentrated among glamour acquirers. If we match the acquirer returns by size and book-to-market ratio, however, we find that the acquirers continue to underperform the benchmarks across all three terciles. In our sample, acquirers tend to underperform regardless of book-to-market ratio tercile with t-statistics of -3.27, -3.48, and -2.65, respectively, for the low, medium, and high-BM ratio groups. Since each tercile maintains a substantial mean growth in assets, we now match each acquirer with an asset-growth-rate-matched portfolio following our earlier matching procedure. When we compare the mean asset-growth-rate-matched portfolio return with the mean acquirer portfolio return, we find that the difference

in returns is not significant. Across the various book-to-market ratio levels and as the asset growth rate varies, the nonacquiring firms maintain comparable returns to those of acquiring firms. Given the past literature, this comparability of returns is particularly noteworthy for the glamour deals.

To further investigate the glamour-firm effect, we break the glamour-firm tercile into three tercile groups (sorting firms independently into 9 groups), based on the asset growth rate following the same procedure of the analysis in Table 5. Since acquisition frequency is correlated with asset growth, the number of glamour stocks in the high-asset growth group is much larger (2,188 firm-years) than that in the low-asset growth group (150 firm-years). We report summary statistics for the three groups in Panel B of Table 7. We find that the asset growth rate for the low-growth group is −5%, and the asset growth rate for the high-growth group is 51%. We form calendar-time portfolios as before and report the mean monthly gross returns. We find that the low returns associated with glamour deals are concentrated in the acquiring firms with high-asset growth rates. The mean returns are 0.23% for the high-growth group and 0.53% for the low-growth group.

When we control for the returns of firms with similar size and book-to-market ratio, the abnormal return for the high-asset growth glamour group is −0.37% per month (t-statistic = −3.58), whereas the returns for the low-asset growth rate firms are at the same level as those of firms with similar size and

TABLE 7

Portfolio Returns for Glamour and Value Deals by Asset Growth Rate

Table 7 reports statistics for calendar-time portfolios of glamour, medium, and value acquisitions and control firms for U.S. stocks over the 1981–2007 period. Panel A reports the statistics for three groups sorted by level of firm book-to-market (BM) ratio. Panel B reports statistics for low-BM ratio deals only, sorted into asset growth terciles, and Panel C reports statistics for high-BM ratio deals only, also sorted into asset growth terciles. Variables are as defined in Table 1. Number of stocks is the number of merger years. Returns are for 36 months starting in January after merger completion or fiscal year–end. We present the average of monthly gross equal-weighted portfolio returns. Matched portfolios are comprised of all U.S. stocks in the same respective size and BM ratio groupings, or asset growth decile, that have not completed a deal in the current year or the past 3 years. For size, we group firms into three groups, using NYSE 20th and 50th percentiles as breakpoints. For BM ratios, we group firms into quintiles. The numbers in parentheses are t-statistics of the null hypothesis in which the difference is equal to 0. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Book-to-Market Ratio Tercile		
	(Low) 1	2	(High) 3
Panel A. All Firms Years by Book-to-Market Ratio Terciles			
Number of stocks	2,659	3,038	2,424
Summary Statistics			
Deal value ($m)	73.8	75.6	69.0
Market cap ($m)	596.7	424.3	253.3
Book-to-market ratio	0.298	0.602	1.099
Assets ($m)	315.0	491.5	634.2
Asset growth rate	0.400	0.322	0.250
Deal/Cap	0.163	0.195	0.240
Deal/Assets	0.321	0.198	0.156
Age	10.9	14.6	15.0
Monthly Mean Returns			
Acquirer portfolio	0.0029	0.0049	0.0062
Size and BM-ratio-matched control portfolio	0.0060	0.0079	0.0093
Difference	−0.0031***	−0.0029***	−0.0031***
	(−3.27)	(−3.48)	(−2.65)
Asset-growth-rate-matched control portfolio	0.0040	0.0051	0.0060
Difference	−0.0011	−0.0002	0.0002
	(−0.91)	(−0.13)	(0.15)

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TABLE 7 (continued)

Portfolio Returns for Glamour and Value Deals by Asset Growth Rate

	Low-Asset Growth Deals	Medium-Asset Growth Deals	High-Asset Growth Deals
Panel B. Glamour Firms Only (Lowest Book-to-Market Ratio Tercile)			
Number of stocks	150	321	2,188
Summary Statistics			
Deal value ($m)	104.1	81.2	76.4
Market cap ($m)	855.1	1,246.4	579.3
Book-to-market ratio	0.287	0.303	0.294
Assets ($m)	901.4	999.4	298.9
Asset growth rate	−0.045	0.104	0.508
Deal/Cap	0.147	0.089	0.182
Deal/Assets	0.179	0.128	0.382
Age	16.6	18.8	10.2
Monthly Mean Returns			
Acquirer portfolio	0.0053	0.0058	0.0023
Size and BM-ratio-matched control portfolio	0.0054	0.0064	0.0060
Difference	−0.0001	−0.0007	−0.0037***
	(−0.03)	(−0.41)	(−3.58)
Asset-growth-rate-matched control portfolio	0.0098	0.0080	0.0030
Difference	−0.0045*	−0.0022	−0.0007
	(−1.73)	(−1.20)	(−0.52)
Panel C. Value Firms Only (Highest Book-to-Market Ratio Tercile)			
Number of stocks	261	527	1,636
Summary Statistics			
Deal value ($m)	55.5	54.5	92.1
Market cap ($m)	342.9	352.6	278.9
Book-to-market ratio	1.219	1.135	1.079
Assets ($m)	882.9	826.3	654.1
Asset growth rate	−0.046	0.092	0.418
Deal/Cap	0.198	0.141	0.355
Deal/Assets	0.072	0.072	0.260
Age	20.4	19.1	13.1
Monthly Mean Returns			
Acquirer portfolio	0.0085	0.0059	0.0056
Size and BM-ratio-matched control portfolio	0.0093	0.0092	0.0093
Difference	−0.0008	−0.0034**	−0.0037***
	(−0.35)	(−2.47)	(−2.82)
Asset-growth-rate-matched control portfolio	0.0099	0.0082	0.0043
Difference	−0.0014	−0.0023	0.0013
	(−0.70)	(−1.58)	(0.78)

book-to-market ratio, with a mean abnormal monthly return of −0.01% (t-statistic = −0.03). The underperformance associated with glamour firms appears to be concentrated exclusively among high-asset growth firms. To further examine the nature of the abnormal returns, we match the acquiring-firm portfolio to a nonacquiring portfolio that maintains a comparable asset growth rate. We observe that the mean abnormal return disappears once an asset growth rate control firm portfolio is used as the benchmark. This finding calls into question the nature of the book-to-market ratio in explaining acquiring-firm returns.

To further emphasize this point, we also examine in detail the value acquirers. According to the Rau and Vermaelen (1998) argument, one would not anticipate these firms to exhibit any underperformance. To conduct our test, we partition value acquirers into three groups based on their asset growth rate. The asset growth rate for these firms varies from −0.5% to 42%, whereas the book-to-market ratio is above 1 in all three groups. In Panel C of Table 7, we report the returns associated with these value acquirers. The mean monthly returns vary from

0.85% to 0.59% to 0.56%, respectively, for the low-, medium-, and high-asset growth rate groups. When these returns are compared to the mean returns from portfolios matched on size and book-to-market ratio, we observe large abnormal negative returns associated with the value acquirers that maintain high-asset growth rates. The difference in returns is −0.08% (t-statistic = −0.35), −0.34% (t-statistic = −2.47), and −0. 37% (t-statistic = −2.82), respectively, for the low-, medium-, and high-asset growth rate groups. Value acquirers maintain poor returns when they also maintain high-asset growth rates. When we match the portfolio on asset growth rate, the portfolio returns are similar and insignificantly different from 0. It appears that the variation in asset growth rate explains the glamour deal effect.

B. Poorly Monitored Deals

We now turn to the evidence of Gaspar et al. (2005), who show that acquiring-firm underperformance is concentrated among firms with lower incentives to monitor the firm. The proxy they use for investor monitoring incentive is a measure of the investment horizon of a firm's investors. Specifically, the measure is computed as the portfolio churn rates for each of the firm's investors, and then averaged across all investors to find the inverse of the typical investment horizon in a firm. Gaspar et al. argue that short-term investors (those that rapidly turn over their investment in the firm) are unlikely to maintain the long horizon associated with careful corporate monitoring.

In Table 8, we examine the interaction between investor turnover and the acquisition effect. We obtain data used in the Gaspar et al. (2005) tests.[7] Using our full sample of firms merged with the turnover data, we find annual tercile breakpoints in investor turnover and use these breakpoints to sort the acquirer firm-years into investor turnover terciles. We report summary statistics by tercile in Panel A. Across the terciles, investor turnover increases from 0.18 in the low-turnover portfolio to 0.21–0.28 in the high-turnover portfolio.

We report the mean gross monthly portfolio return for each tercile. The mean returns are 0.40%, 0.58%, and 0.22% for the turnover terciles in order of increasing investor turnover. The evidence is consistent with Gaspar et al. (2005): the worst returns are concentrated among high-turnover (low-holding period) acquirers, and these are the firms one would anticipate to have little incentive to monitor. If we match the acquirer returns by size and book-to-market ratio, we find that the acquirers continue to underperform the benchmarks, particularly for the high-turnover acquirers. The mean abnormal return for the high-turnover portfolio is −0.51% (t-statistic = −4.88). Curiously, we also observe underperformance in the low-turnover tercile with abnormal return of −0.28%.

In looking at the firm characteristics by tercile, we observe a correlation between a firm's investor turnover level and its asset growth rate. Specifically, the asset growth rate increases from 29% for the low-turnover acquirers to 30% and 43%, respectively, for the medium- and high-turnover acquirers. This observation motivates a test of the explanatory power of investor turnover in the context of

[7] We thank Pedro Matos and José-Miguel Gaspar for providing this data.

the asset growth rate. To begin this examination, we match each acquirer with an asset-growth-rate-matched portfolio. When we subtract the mean asset-growth-rate-matched portfolio return from the mean acquirer portfolio return, we find that the differences in returns drop substantially. The *t*-statistic for the high-turnover firms drops from −4.88 to −1.69. The results again suggest that the firms growing organically at the same rate as the high-turnover firms maintain largely similar long-run stock returns.

To further investigate the turnover effect, we independently sort the high-turnover tercile into three groups based on the asset growth rate, as we did with the glamour deals. We report these results in Panel B of Table 8. Again we find that asset growth provides the dominant explanation for the cross-sectional variation in returns. The low returns associated with high-turnover deals are concentrated in the high-asset growth group with a mean portfolio return that is 0.13% versus a return of 0.40% for the low-asset growth group deals. When we control for the returns of firms with similar size and book-to-market ratio, the abnormal return for the high-asset growth group is −0.71% per month (*t*-statistic = −4.98). The low-asset growth rate firms maintain returns statistically at the same level as those of firms with similar size and book-to-market ratio. We now turn to the asset-growth-rate-matched returns. We find that the mean abnormal return for the high-growth and high-turnover portfolio is no longer significant once an asset growth rate control firm portfolio is used as the benchmark (*t*-statistic = −1.21).

TABLE 8

Portfolio Returns for Low- and High-Turnover Deals by Asset Growth Rate

Table 8 reports statistics for calendar-time portfolios of low-, medium-, and high-turnover acquisitions and control firms for U.S. stocks over the 1981–2007 period. Panel A reports the statistics for three groups of monitoring level defined by investor turnover. Panel B reports statistics for high-turnover deals only, sorted into asset growth terciles, and Panel C reports statistics for low-turnover deals only, also sorted into asset growth terciles. Variables are as defined in Table 1. Number of stocks is the number of merger years. Returns are for 36 months starting in January after merger completion or fiscal year–end. We present the average of monthly gross equal-weighted portfolio returns. Matched portfolios are comprised of all U.S. stocks in the same respective size and book-to-market (BM) ratio groupings, or asset growth decile, that have not completed a deal in the current year or the past 3 years. For size, we group firms into three groups, using NYSE 20th and 50th percentiles as breakpoints. For BM ratios, we group firms into quintiles. The numbers in parentheses are *t*-statistics of the null hypothesis in which the difference is equal to 0. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Low Turnover	Medium Turnover	High Turnover
Panel A. All Firms by Level of Turnover			
Number of stocks	2,125	2,837	2,928
Summary Statistics			
Deal value ($m)	113.8	97.9	49.1
Market cap ($m)	597.8	594.8	265.6
Book-to-market ratio	0.567	0.567	0.522
Assets ($m)	722.5	650.0	267.6
Asset growth rate	0.289	0.298	0.426
Deal/Cap	0.188	0.189	0.209
Deal/Assets	0.195	0.208	0.283
Age	17.6	14.2	9.4
Turnover	0.179	0.214	0.279
Monthly Mean Returns			
Acquirer portfolio	0.0040	0.0058	0.0022
Size and BM-ratio-matched control portfolio	0.0068	0.0073	0.0073
Difference	−0.0028***	−0.0015	−0.0051***
	(−3.35)	(−1.57)	(−4.88)
Asset-growth-rate-matched control portfolio	0.0048	0.0048	0.0040
Difference	−0.0007	0.0011	−0.0018*
	(−0.48)	(0.75)	(−1.69)

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TABLE 8 (continued)

Portfolio Returns for Low- and High-Turnover Deals by Asset Growth Rate

	Low-Asset Growth Deals	Medium-Asset Growth Deals	High-Asset Growth Deals
Panel B. Highest Turnover Tercile			
Number of stocks	196	399	2,333
Summary Statistics			
Deal value ($m)	38.6	36.4	54.0
Market cap ($m)	214.5	301.9	274.0
Book-to-market ratio	0.792	0.678	0.494
Assets ($m)	334.7	421.5	261.0
Asset growth rate	−0.052	0.101	0.558
Deal/Cap	0.208	0.130	0.235
Deal/Assets	0.141	0.109	0.362
Age	12.1	12.7	8.7
Turnover	0.279	0.278	0.280
Monthly Mean Returns			
Acquirer portfolio	0.0040	0.0061	0.0013
Size and BM-ratio-matched control portfolio	0.0077	0.0077	0.0071
Difference	−0.0036	−0.0016	−0.0058***
	(−1.16)	(−1.03)	(−4.98)
Asset-growth-rate-matched control portfolio	0.0089	0.0072	0.0029
Difference	−0.0048	−0.0011	−0.0016
	(−1.55)	(−0.71)	(−1.21)
Panel C. Lowest Turnover Tercile			
Number of stocks	187	405	1,533
Summary Statistics			
Deal value ($m)	213.3	96.2	125.5
Market cap ($m)	1,701.2	819.1	571.5
Book-to-market ratio	0.752	0.662	0.525
Assets ($m)	2,954.6	1, 278.5	665.1
Asset growth rate	−0.049	0.095	0.426
Deal/Cap	0.160	0.116	0.232
Deal/Assets	0.112	0.086	0.278
Age	20.5	25.0	16.0
Turnover	0.182	0.181	0.177
Monthly Mean Returns			
Acquirer portfolio	0.0053	0.0060	0.0030
Size and BM-ratio-matched control portfolio	0.0067	0.0073	0.0067
Difference	−0.0013	−0.0013	−0.0037***
	(−0.64)	(−1.04)	(−3.94)
Asset-growth-rate-matched control portfolio	0.0092	0.0075	0.0034
Difference	−0.0039*	−0.0015	−0.0004
	(−1.96)	(−0.91)	(−0.22)

In Panel C of Table 8, we provide the results of a similar exercise for the low-turnover acquirers. Again we find similar results. The lowest returns among low-turnover acquirers are among the firms with the highest asset growth rates, even when we control for the size and book-to-market ratio of the acquiring firm. The abnormal return for the high-growth, low-turnover firms is -0.37% (t-statistic $= -3.94$). When we control for the large asset growth rate of these low-turnover acquirers (growth rate of 43%), we observe no difference in returns, -0.04% (t-statistic $= -0.22$). As a side point, we observe that the low-asset growth, low-turnover acquirers maintain returns that are similar to the size and book-to-market-ratio-matched portfolio but lower than the asset-growth-matched portfolio. Overall, our results suggest that the asset growth maintains important explanatory power, in capturing the cross-sectional effects of both valuation levels and investor turnover, documented in the literature for acquiring firms.

C. Boom-Year Deals

Bouwman et al. (2009) observe that acquirers that execute their acquisitions during nonbust years (years associated with relatively high price-to-earnings (PE) ratios) tend to do particularly poorly. We use our portfolio setup to create acquiring-firm portfolios based on the state of market valuation. In effect, each acquisition is categorized by year into three market states: boom, neutral, and bust years based on the market PE ratio defined by the Standard & Poor's 500 index.[8] We use the annual average of monthly data on the market PE ratio. Because the market PE ratio has a strong upward trend over the sample period, we detrend the data, in the same spirit as Bouwman et al. (2009). We first remove the best straight-line fit from the PE ratio series, and then we subtract from the residuals their 5-year moving average. The top half of the above-median years are classified as high-valuation markets, and the bottom half of the below-median years are classified as low-valuation markets. All other years are classified as neutral-valuation markets.

We report the mean returns for the portfolios organized around these three classifications in Table 9. The boom-year mergers are associated with monthly returns of 0.49%. When matched against size and book-to-market ratio control portfolios, the monthly abnormal return is -0.37% (t-statistic $= -2.93$). Acquiring firms during neutral years also tend to underperform the benchmark with monthly

TABLE 9

Portfolio Returns for Boom- and Bust-Year Deals

Table 9 reports statistics for calendar-time portfolios of boom-year, bust-year, and neutral-year acquisitions and control firms for U.S. stocks over the 1981–2007 period. Boom years, neutral years, and bust years are defined based on the prevailing PE ratio for the market in aggregate. Variables are as defined in Table 1. Number of stocks is the number of merger years. Returns are for 36 months starting in January after merger completion or fiscal year–end. We present the average of monthly gross equal-weighted portfolio returns. Matched portfolios are comprised of all U.S. stocks in the same respective size and BM ratio groupings, or asset growth decile, that have not completed a deal in the current year or the past 3 years. For size, we group firms into three groups, using NYSE 20th and 50th percentiles as breakpoints. For BM ratios, we group firms into quintiles. The numbers in parentheses are t-statistics of the null hypothesis in which the difference is equal to 0. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Boom Year (High-Market PE)	Neutral Year (Neutral-Market PE)	Bust Year (Low-Market PE)
Number of stocks	2,403	3,647	2,071
Summary Statistics			
Deal value ($m)	83.3	46.9	110.9
Market cap ($m)	401.5	228.0	751.6
Book-to-market ratio	0.554	0.618	0.469
Assets ($m)	479.6	302.5	712.5
Asset growth rate	0.339	0.325	0.316
Deal/Cap	0.202	0.194	0.175
Deal/Assets	0.253	0.205	0.224
Age	13.1	13.3	12.8
Monthly Mean Returns			
Acquirer portfolio	0.0049	0.0060	0.0021
Size and BM-ratio-matched control portfolio	0.0086	0.0092	0.0039
Difference	−0.0037***	−0.0031***	−0.0018
	(−2.93)	(−3.05)	(−1.51)
Asset-growth-rate-matched control portfolio	0.0052	0.0067	0.0000
Difference	−0.0002	−0.0007	0.0021
	(−0.12)	(−0.45)	(1.18)

[8]We obtain the market PE ratio data from Robert Shiller's Web site (www.irrationalexuberance.com/index.htm).

abnormal returns of −0.31% (t-statistic = −3.05). Mergers during bust years are not associated with any abnormal return. These findings are comparable to those of Bouwman et al. (2009). Following our other tests, we now match these with asset-growth-rate-matched portfolio returns. In this case, we find again that the asset-growth-rate-matched portfolio returns are also low for the boom and neutral years, such that the abnormal return for these years is no different between merger firms and nonmergers firms. For the bust years, we find that the returns of the asset-growth-rate-matched portfolios are very similar, with a difference of just 0.02% (t-statistic = 1.18).

In summary, our tests show that the standard cross-sectional and time-series results in the merger literature are all subsumed by systematic asset growth effects. Stock deals, weakly monitored deals, glamour-firm deals, and deals effected during high-valuation periods are all systematically associated with larger asset growth rate effects. Once we control for this systematic variation in firm growth rate, we find that the returns associated with these deals are comparable to those that grow organically at the same rate. Consequently, there appears to be little unique about stock deals, weakly monitored deals, glamour-firm deals, or deals effected during high-valuation periods. This empirical finding reorients the merger literature's view on what explains post-deal returns and possibly suggests that explanations for post-deal returns and post-greenfield investment returns are linked to each other.

V. Discussion

The finding that stock, glamour, and poorly monitored deals are not unique has profound implications for existing merger theory. In what might be called the "cheap currency" hypothesis, Shleifer and Vishny (2003) and Rhodes-Kropf and Viswanathan (2004) propose that managers observe firm mispricing, and opportunistically acquire relatively underpriced target shares, using relatively overpriced firm stock. There is large empirical support for the notion that stock-deal acquirers are richly priced (Loughran and Vijh (1997), Agrawal and Jaffe (2000), Dong et al. (2006), Ang and Cheng (2006), and Savor and Lu (2009)).[9] We establish several empirical facts that are inconsistent with the cheap currency theory. First, we claim that it is not the terms of the deal (e.g., stock deal) that are associated with abnormal acquisition returns but rather the magnitude of the asset growth rate. Past research suggests that the acquiring-firm returns are concentrated among stock deals, but we find that this result is more precisely because stock deals are commonly associated with systematically larger asset growth rates. In fact, we find that stock deals that do not also have high-asset growth rates maintain no return underperformance.

Moreover, firms that grow organically at the same rate as do our sample of stock deals maintain similar returns. Since it is uncommon to pay for greenfield investment with equity (i.e., managers rarely compensate a factory construction

[9] See also evidence of overpriced bidders in the extent of opportunistic insider trading behavior (Song (2007), Akbulut (2013)), earnings management (Erickson and Wang (1999), Louis (2004)), post-merger lawsuits (Gong et al. (2008)), abnormal short-selling activity (Ben-David et al. (2015)), and strategic information release (Ahern and Sosyura (2014), Kimbrough and Louis (2011)).

contractor with firm stock), it is unlikely that the cheap currency hypothesis applies to organic asset growth even though the return effects are similar to the merger effects. One might propose a more broadly defined "asset growth" view of the cheap currency hypothesis in that inflated equity induces both organic and merger investment that is financed with "cheap" equity (Jensen (2005), Gilchrist, Himmelberg, and Huberman (2005)). Our evidence is inconsistent with this view as stock-financed growth appears to generate no more return effect than debt-financed growth. There is no evidence that the use of cheap stock plays a role in either the merger or asset growth effects. There appears to be no unique systematic role for the issuance of, or payment with, equity in the returns associated with investment.

Rau and Vermaelen (1998) propose an "acquisition optimism" hypothesis in which investors maintain systematically optimistic performance expectations for acquisitions by managers with strong past returns or valuation ratios. Bouwman et al. (2009) observe that the effect of such optimism on merger pricing is particularly acute during periods of marketwide bullishness. Our finding that the abnormal post-deal returns of glamour firms or glamour periods disappear once we control for the larger asset growth rate associated with these firms and periods again might prompt a broader interpretation of the acquisition optimism hypothesis to that of an "investment optimism" hypothesis. However, as Lipson et al. (2011) find that there is no evidence of a glamour effect in the asset growth effect, one can reject such an investment optimism hypothesis in which investors maintain systematically optimistic performance expectations for all investment by managers with strong valuation ratios. As a result, the evidence does not support a broader interpretation of the acquisition optimism hypothesis, as there does not tend to be an interactive return effect between valuation ratio and asset growth rates.

Last, Firth (1980) and Jensen (1986) propose an "agency cost underestimation" hypothesis in which investors underappreciate the incentives of managers to engage in acquisitions. Gaspar et al. (2005) find that deals completed by firms with investors with weak monitoring incentives, as proxied by the investment horizon of a firm's institutional shareholders, are associated with lower post-deal returns. Firth (1980), Harford, Humphery-Jenner, and Powell (2012), and Fu, Lin, and Officer (2013) find that management benefits from bad acquisitions. Titman et al. (2004) propose such a model of organic investment where investors systematically underreact to managerial empire building. We use the Gaspar et al. measure to examine ownership structure effects using investor turnover estimates. We again find the returns to be similar for organic and acquired growth regardless of the level of investor monitoring.

Our findings are inconsistent with the three prevailing explanations for post-acquisition returns. Rather, our results suggest that there is a commonality between the merger and asset growth effects and that an explanation for post-acquisition returns should also consider the asset growth effect. Our results further suggest that explanations for post-deal returns and post-greenfield investment returns might be linked to each other, though this may not necessarily be the case. We leave it for others to sort out the similarities and the differences between the asset growth and merger effects.

VI. Conclusions

We examine the well-documented finding of poor post-deal stock returns for corporate acquisitions in which the form of payment is company stock rather than cash. We propose that with respect to the cross-sectional variation in post-deal returns, it is the rate of balance sheet expansion that explains the variation, not the form of payment. We base our hypothesis on the two simple observations that stock deals maintain high-asset growth and that asset growth is inversely related to future returns. We find that those stock deals with high-asset growth are associated with low returns, while those with low growth are associated with high returns. Moreover, we find that post-deal returns become indistinguishable from 0 after controlling for asset growth.

Moreover, we find that other prominent cross-sectional effects, such as the relatively poorer returns for weakly monitored deals, or glamour firm deals, appear to be due to the systematically larger firm asset growth rate that tends to be associated with these firms. Other than the asset growth rate, the other characteristics of the deal or acquirer appear to maintain little effect on returns. In addition, we find that the cyclical effect of merger firms to maintain particularly low returns during high-market valuation years also disappears after controlling for asset growth.

Our findings sharpen our understanding of merger and investment theory as they suggest that it is not the received deal characteristics that explain post-deal returns, but rather the characteristics associated with asset growth. These findings are inconsistent with the three prevailing explanations for post-acquisition returns and suggest that there is a commonality between the merger and asset growth effects. Although we leave for others to fully sort out the different explanations for the merger growth and greenfield growth effects, our evidence provides an interesting empirical observation that asset growth rates explain the variation in acquisition returns. Our paper emphasizes that the center of the acquisition debate is more powerfully focused on the broader phenomenon, the asset growth effect in returns.

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