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Acquisition finance and market timing☆

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ABSTRACT

Bidders have an incentive to pay with stock when their shares are overvalued, but target firms should be reluctant to accept such overvalued payment. In a sample of 2978 acquisitions, we find that stock payment is readily accepted only when the bidder can justify the financing decision in terms of such economic fundamentals as optimal capital structure. Yet even when the fundamentals justify stock payment, paying with cash is common. In that way, firms can preclude paying with undervalued stock and are more likely to experience positive long-term excess returns.

1. Introduction

Stock-financed acquisitions coincide with periods of high market valuation (Dong et al., 2006; Rhodes-Kropf et al., 2005) and negative long-term returns (Agrawal et al., 1992; Asquith, 1983; Loughran and Vijh, 1997; Rau and Vermaelen, 1998). It is easy to conclude that overvalued acquirers have an incentive to pay with stock, but it is less obvious why target firms should accept stock payment if it provides a clear signal of overvaluation. Possible explanations range from investor irrationality (Shleifer and Vishny, 2003) and correlation in valuation errors (Rhodes-Kropf and Viswanathan, 2004) to shareholder inertia (Baker et al., 2007) and governance problems in the target firm (Hartzell et al., 2004). However, most of these arguments are better suited for transactions with dispersed shareholders (e.g., equity issues) than for acquisition transactions, in which the acquirer must negotiate with the target's management and financial advisors.

Acquisition finance can be driven by motives other than market timing (i.e., paying with overvalued stock). Harford et al. (2009) and Uysal (2011) show that, when a bidder's leverage is higher than “optimal”, it is less likely to finance a bid with debt than with equity. Other factors affecting acquisition finance include the taxation of cash and stock offers (Gilson et al., 1988), risk sharing (Hansen, 1987), and differences in SEC requirements (Martin, 1996). We argue that target firms will be less concerned about the bidder's potential overvaluation in stock-financed acquisitions when that payment choice can be explained by such “rational” motives. For example, an overlevered bidder can justify equity financing in terms of moving to an optimal capital structure. But if the bidding firm proposes to pay with stock in the absence of such a rational justification, the target's

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management will (reasonably) conclude that the stock is overvalued. In that case the target will demand more shares (i.e., the acquiring firm must pay a higher premium) to compensate for the implied discount, which eliminates the bidder's advantage in such a financing strategy.

In short, we expect that bidders can pay with overvalued stock only if they can justify doing so. In contrast, there should be no problem paying with cash even if prediction models forecast equity financing. The choice of cash payment may indicate that the bidder's stock is undervalued, but that would be irrelevant to the target firm because a cash transaction price is not sensitive to the acquirer's stock price. Technically, we estimate a model that aims to predict acquisition finance using a variety of variables proposed in the literature. Any such prediction model will make errors, and if these errors are random then we should observe stock acquisitions where cash was predicted and cash acquisitions where stock was predicted. However, if the target's management views deviations from that model as evidence of bidder overvaluation, then we should see fewer unexpected stock-financed deals than unexpected cash-financed deals.

In line with this intuition, we find that only 1% of our sample acquirers make stock financing decisions that cannot be justified by a prediction model—a conclusion that is robust to various model specifications. Issuing stock when it cannot be justified (e.g., in terms of moving to an optimal capital structure) is nearly impossible. A closer look at the rare cases in which this does occur reveals that nearly all involve tender offers made directly to the shareholders. Many such offers are viewed as hostile, and target firms may well seek to defend themselves by attracting competing bids ("white knights").

In contrast, acquirers are able to pay with overvalued stock (and they experience long-term negative excess returns, which is consistent with overvaluation) when that payment choice can be justified. The stock-financed bid of a young and high-growth firm, for instance, is unlikely to attract suspicion even if its stock is overvalued. In other words, acquirers can benefit from market timing if they can convincingly explain the equity payment method. The target's management is less reluctant to accept unexpected cash payment, which is consistent with the argument that the value of cash is not sensitive to information. Cash payment when the model instead predicts stock payment occurs in about 10% of our sample. We find that these transactions are driven by undervaluation, as the bidder's stock experiences significant positive excess returns during the two years after the acquisition announcement.

This paper makes three principal contributions. First, we develop a model that predicts acquisition finance, based on empirical and theoretical contributions from the capital structure and acquisition finance literature, which takes both acquirer and target leverage into account. The model predicts the acquisition financing choice in 89% of the cases examined and improves the Pseudo-R^2 by 38% compared to previous models that only consider the acquirer's leverage. Second, the prediction errors are clearly asymmetric: firms are 10 times as likely to pay cash when the prediction model forecasts equity financing than to issue equity when the model predicts cash payment. Hence timing acquisitions—as reflected by long-run negative excess returns after equity-financed acquisitions—is not possible unless the bidder can convince the target firm's management that equity finance makes economic sense. Finally, the extensively documented evidence that cash-financed acquisitions are followed by long-term positive excess returns[2] must be qualified: this generalization holds only when the economic fundamentals predict equity financing. In other words, firms that are *expected* to pay cash do not exhibit such positive returns.

Many empirical studies investigate acquisitions. Our paper primarily builds on three strands of this literature. Harford et al. (2009) and Uysal (2011) document a link between the acquirer's capital structure and acquisition finance. We extend their prediction model with information on the target firm and use it as a basis for our analysis on deviations from predicted leverage, the focus of our paper. In particular, we link such deviations to information asymmetry and show that undervalued acquirers succeed in market timing while overvalued acquirers only succeed if they have fundamental reasons to pay with equity. This result not only extends the analysis of the capital structure literature, but also provides an explanation why rational target managers accept overvalued shares. In doing so, it provides a framework that reconciles the market timing literature (e.g., Dong et al., 2006; Rhodes-Kropf et al., 2005; Shleifer and Vishny, 2003) with the non-behavioral side of the literature. Finally, our methodology builds on the literature on expectations in merger announcements (Cornett et al., 2011; Cremers et al., 2009; Eckbo et al., 1990, and Malatesta and Thomoson, 1985). These papers predict merger candidacy and link subsequent returns to the surprise effect of the announcement. We adapt their methodology to a different topic, the payment method in M&A: we predict the financing method and link subsequent returns to the information effect in expected and actual payment method.

The rest of the paper is organized as follows. In Section 2 we formulate testable hypotheses. Section 3 describes the data. In Section 4, we describe in detail our predictions of the acquisition finance method. Section 5 documents announcement returns. Section 6 examines the extent to which long-term stock price behavior is consistent with our theory's predictions. In Section 7 we summarize our conclusions.

2. Hypotheses development

2.1. The acquisition process

Consider the following stylized acquisition process. The bidder makes an offer and specifies whether it will be paid in cash or stock. The target's management either accepts or renegotiates the price. If the deal is closed then the acquirer pays the agreed-upon price in the agreed-upon structure, and the two entities are combined into one firm. The capital structure of the combined firm

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[2] See, for example, Asquith (1983), Loughran and Vijh (1997), Rau and Vermaelen (1998), Agrawal et al. (1992), and Dong et al. (2006).

depends on the leverage of acquirer and target as well as on the payment method. The resulting capital structure may be suboptimal, the costs of which are incurred by the combined firm.

The bidder's management seeks to minimize not only the transaction price but also the subsequent costs of deviating from an optimal capital structure. The target's management, however, seeks mainly to maximize the transaction price. This assumption is realistic if the target's management acts on behalf of long-term shareholders and/or is incentivized with equity compensation or takeover-related bonuses (see Hartzell et al., 2004 for a description of the prevalence and effects of related governance provisions).

To derive predictions on market timing, we consider potential information asymmetry concerning the bidder's value. In particular, the bidder may be over- or undervalued by the market but has superior knowledge about its own valuation. The target firm naturally knows less about the bidder than does the bidder itself, hence the information asymmetry. In contrast, the potential costs of a suboptimal capital structure are common knowledge. We will use this information scenario to predict the “expected payment method” using a variety of variables proposed by the literature.

We now make two types of predictions. The first concerns financing behavior; the second deals with long-term, post-acquisition stock price behavior.

2.2. Predictions about financing behavior

We consider four possibilities based on the combinations of two payment methods and two stock valuations; see Table 1. Market participants use observable information to predict the choice of payment method; in the empirical tests, we replicate this prediction by regressing the payment method on firm and transaction characteristics. The acquirer, in contrast, has private information about its own valuation. Hence market timing considerations can either validate or refute the predictions, since acquirers have incentives to pay with overvalued stock and to avoid paying with undervalued stock.

We predict that bidders are likely to pay with cash when this decision is forecast by the prediction model. To see why, consider the two cases of misvaluation. When cash is predicted and the bidder's shares are undervalued, the market timing recommendation is consistent with the prediction model and so there is no reason to deviate from either. In contrast, when cash is predicted and the bidder's shares are overvalued, the bidder may prefer paying with equity. However, such a financing proposal (against the cash prediction) will reveal to the target firm that the bidder is overvalued, which makes market timing impossible: the bidder is forced to increase the consideration and thus fails to obtain enough benefit to compensate for the cost of deviating from the predicted choice of financing. As a consequence, the bidder may decide to pay with cash or to cancel the bid. So one strong prediction we make is that no equity-financed acquisitions will transpire when the fundamentals indicate that it is optimal to pay with cash. Our first formal hypothesis is thus as follows.

Hypothesis 1 (H1). If the prediction model recommends cash payment, then bidders will pay with cash.

In cases where the model predicts that the bidder should pay with stock, bidders whose shares are sufficiently undervalued may well pay with cash. The reason is that a transaction price paid in cash is not affected by the bidder's stock value, to which the target's management is indifferent if being paid with cash. Indeed, target shareholders can even use their cash payment to buy the bidder's shares. In contrast, firms for which the model predicts payment via stock will use equity if it is correctly valued or overvalued. In this case, the target's management cannot presume that market timing has determined the acquisition financing choice and so cannot reasonably request additional compensation. Therefore, market timing becomes feasible when the bidder can “hide behind” the prediction model. This leads us to propose the following hypothesis.

Hypothesis 2 (H2). If the prediction model recommends equity payment, then valuation motives may outweigh concerns about fundamentals; hence both cash- and equity-financed acquisitions will be observed.

2.3. Predictions about long-term excess returns

Table 2 summarizes our predictions on long-term excess returns. Arguments based on the trade-off theory predict that there will be no significant long-term excess returns; that is, anything affecting the firm's value will have already occurred by the time of announcement. Long-term excess returns are instead an effect of market timing: we expect positive (resp. negative) long-term returns if the firm was undervalued (resp. overvalued).

Table 1
Predictions for the choice of payment method.

Optimal financing predicted with public information	Private information about acquirer valuation	Payment method prediction
Cash	Undervalued	Cash
Cash	Overvalued	Cash
Equity	Undervalued	Cash or equity
Equity	Overvalued	Equity

Table 2
Predictions for long-term announcement returns.

Payment method		Return prediction		
Predicted	Actual	Trade-off	Market timing	Combined
Cash	Cash	0	+	0
Cash	Equity	0	−	−
Equity	Cash	0	+	+
Equity	Equity	0	−	−

In the presence of both market timing and capital structure concerns, predictions are different from these stylized ones described so far. Hypothesis 1 predicts that most firms pay with cash if they are expected to do so; this includes undervalued, correctly valued, and overvalued firms. Overvalued firms prefer to pay with overvalued stock, but they cannot without revealing to the target's management that the stock is overvalued and thus inducing it to ask for a higher premium. In other words, observed cash payment in congruence with the prediction does not provide any additional information about valuation and so cannot predict any significant long-term excess returns. This notion is formalized as follows.

Hypothesis 3 (H3). If bidders pay with cash and if such payment is predicted by the model, then long-term excess returns will not be significantly different from zero.

Even when the publicly available data predicts equity issuance, some heavily undervalued firms may want to pay with cash. If the market underreacts, we should observe positive long-term returns for these undervalued firms. That dynamic is captured in our next hypothesis.

Hypothesis 4 (H4). If the model predicts that bidders pay with stock and if bidders instead pay with cash, then long-term excess returns will be positive.

Overvalued firms that should pay with stock (according to the prediction model) have two reasons to issue stock: fundamentals and market timing. Therefore, such a firm can always cite fundamentals as justification for its choice of payment, which means that the target firm cannot infer the bidder's true motivation on the basis of that choice alone. Consequently, market timing is possible. We expect that some overvalued firms will use this opportunity to issue overvalued stock, which means that we should observe negative long-term returns after equity-financed acquisitions.

Hypothesis 5 (H5). If bidders pay with stock in accordance with the model's prediction, then long-term excess returns will be negative.

3. Data

Our sample of mergers and acquisitions is drawn from the Securities Data Corporation (SDC) mergers and acquisitions database. To be included in our sample, a transaction must have been completed; the first announcement date must lie between 1 January 1980 and 31 December 2005; both acquirer and target must be US public companies; the acquirer must not operate in the financial or real estate sector; and at least 50% of the target must be acquired by the bidder. This last criterion is necessary to ensure that the acquirer consolidates the target firm's balance sheet after the transaction. Accounting data come from Compustat and stock market data from the Center for Research in Securities Prices (CRSP). To reduce noise created by data errors, we Winsorize all variables at 1% and 99% levels unless they have a natural bound (as with percentages). Appendix A gives an overview of all variables and their definitions.

Taking the restrictions into account generates a sample of 2978 acquisitions. This is comparable with numbers reported in the literature: Netter et al. (2011) document that 3100 acquisitions between 1992 and 2009 were between acquirers and targets that are both public and on CRSP. Our sample is more restrictive because we require certain data for both target and acquirer. This is because we want to predict the pro-forma balance sheet—and subsequently the pro-forma "optimal" leverage—as accurately as possible. Our analysis is therefore most applicable for mergers between firms with high information quality, and the reader must be careful in extrapolating our results to acquisitions where information on the target firm is scarce or not available. In fact, our analysis is likely to be less relevant outside our sample, where cash payment is more prevalent: target firms outside the sample are often smaller and therefore have less impact on the subsequent capital structure, which makes cash financing easier. They are also often less liquid or even private, which makes them less likely to demand payment in equity.

Our sample contains 787 cash transactions, 1396 equity transactions, and 795 hybrid transactions. A summary of the statistics is given in Table 3. The transactions were paid with a median of 82% in stock (mean of 61%) and with a median premium of 30% (mean of 38%). The acquirer's median market capitalization of equity is $957 million (mean of $8775 million). The target's median market capitalization is $307 million (mean of $3931 million), which is comparable to the median of $386 million reported for the sample of Hartzell et al. (2004).

Table 3
Descriptive statistics. This table reports descriptive statistics. Panel A gives transaction characteristics, while Panels B and C report (respectively) acquirer and target characteristics. Panel D reports statistics for leverage ratios and (Lambda), where L^* is the predicted leverage for the combined firm as calculated using the methodology described in Appendix A. The terms L(Cash) and L(Equity) are the pro forma leverage ratios of the combined firm if we assume, respectively, cash and equity payment. Lambda is the difference between predicted and optimal leverage assuming cash payment *minus* the difference between predicted and optimal leverage assuming equity payment: $|L(\text{Cash}) - L^*| - |L(\text{Equity}) - L^*|$.

Variables	All transactions					Subsample median		
	Mean	Median	S.D.	Min.	Max.	Cash	Equity	Hybrid
Panel A: Transaction characteristics								
Stock paid	61%	82%	43%	0%	100%	0%	100%	53%
Premium (%)	38	30	43	−50	229	35	27	28
Relative size	62%	51%	42%	5%	117%	48%	52%	53%
Panel B: Acquirer characteristics								
Leverage	45%	40%	34%	−40%	100%	32%	53%	42%
Market leverage	41%	22%	54%	−45%	100%	17%	34%	23%
Market/book	2.91	1.42	4.91	0.57	39.20	1.56	1.27	1.47
Market cap (m US$)	8775	957	12,405	166	38,611	1290	865	953
Total assets (m US$)	9261	1484	23,453	5	165,493	1668	1466	1410
Panel C: Target characteristics								
Leverage	48%	44%	33%	−40%	100%	35%	55%	50%
Market leverage	55%	35%	103%	−103%	100%	24%	40%	37%
Market/book	2.54	1.19	5.52	0.30	46.53	1.30	1.13	1.23
Market cap (m US$)	3931	307	5653	48	17,039	256	315	347
Total assets (m US$)	6674	612	20,414	4	151,067	468	624	737
Panel D: Leverage ratios and lambdas								
L^*	34.0%	39.3%	18.3%	−6.0%	71.5%	43%	29%	44%
L(Cash)	63.7%	65.2%	18.5%	32.2%	90.1%	58%	69%	69%
L(Equity)	36.6%	38.3%	19.9%	3.8%	65.6%	44%	32%	39%
Lambda	4.9%	2.3%	15.2%	−41.9%	83.0%	2%	2%	5%
Observations			2978			787	1396	795

To compare the total size of target and acquirer firms, we compute their respective enterprise value as the sum of net debt and the market value of equity. The ratio of the target's enterprise value divided by the buyer's ("*relative size*") has a median of 51% (mean of 62%). This nontrivial relative size means that the bidder cannot simply look at its own capital structure when deciding on the payment method; rather, it must compute pro forma post-acquisition (combined) leverage ratios to judge whether equity or cash payment is appropriate. Overall, target firms are more levered than are acquirers: targets have a median market leverage ratio of 35% (mean of 55%) whereas acquirers have a median market leverage ratio of 22% (mean of 41%).

We also report the median characteristics for the subsamples of all-cash, all-stock, and hybrid transactions. Of the 2978 transactions in our sample, 1396 (47%) were paid entirely in stock and 787 (26%) were paid entirely in cash. The all-cash acquisitions commanded a higher premium (median of 35%, versus 27% for all-stock acquisitions) but were similar in relative size (median of 48%, versus 52% for all-stock acquisitions). Targets of all-cash transactions are smaller than targets of all-stock transactions (median of $256 million, versus $315 million for all-stock acquisitions). The hybrid payment transaction's characteristics are intermediate between those of the all-cash and all-stock transactions.

4. Predicting acquisition finance

Is acquisition finance driven by fundamental reasons, or do acquirers sometimes finance transactions in an unexpected way consistent with market timing? To test for these possibilities, we develop a prediction model for the choice of acquisition finance. As a first step, we introduce a measure of the equity-versus-cash payment's contribution to an optimal capital structure. We then develop our prediction model using this measure and other drivers of payment methods proposed in the acquisition finance literature.

4.1. Acquisition finance and capital structure: a measure

In an acquisition, two independent entities—each with their own capital structure and set of characteristics—are combined into one single entity. This emerging firm is likely to be quite different from either of its predecessors. These effects would be unaccounted for if we focused on the effects of the acquisition financing method on pre-acquisition *bidder* leverage, as is common in the acquisition finance literature (e.g., Harford et al., 2009; Uysal, 2011). Instead, we build pro forma balance sheets based on both cash and stock payment and then compare the pro forma leverage to the optimal leverage specified by empirical models of capital structure. This approach allows us to identify which financing method is expected to be better, and to what extent, for the resulting capital structure. Our aim here is simply to identify the expected financing choice from the perspective of market participants at the time of the announcement; that is, we advance no opinion as regards what would actually constitute an optimal capital structure.

First, we follow Kayhan and Titman's (2007) approach to predicting optimal leverage; see Appendix B. This cross-sectional leverage prediction model has been widely used in related literature as the basis for leverage prediction (e.g., Chang and Dasgupta, 2009; Harford et al., 2009). To demonstrate the robustness of our results, we repeat the analysis with a series of alternative models. In essence, our measure L^* of optimal leverage is estimated as the fitted value of a "firm characteristics" regression using all firms listed on Compustat.

Second, we build hypothetical balance sheets for the *combined* firm to calculate the consequences of the acquisition financing choice. To estimate the combined firm's optimal leverage ratio, we build its pro forma balance sheets using the methodology described in Appendix B. We calculate the post-acquisition leverage ratios of the combined firm conditional upon paying with equity, L(Equity), and upon paying with cash, L(Cash), as follows:

$$L(\text{Equity}) = \frac{\text{Debt}_A + \text{Debt}_T}{\text{Debt}_A + \text{Debt}_T + \text{Equity}_A + \text{Transaction value}}, \quad (1)$$

$$L(\text{Cash}) = \frac{\text{Debt}_A + \text{Debt}_T + \text{New debt issued}}{\text{Debt}_A + \text{Debt}_T + \text{Equity}_A + \text{Transaction value}}; \quad (2)$$

here the subscripts A and T denote (respectively) acquirer and target.

Third, we calculate the *leverage deviation* as the absolute difference between L^* and L(Cash), which we call Δ(Cash), and between L^* and L(Equity), which we call Δ(Equity). Finally, we create a variable that compares the effects of cash and stock payment directly; this variable is denoted by Λ and calculated as $\Delta(\text{Cash}) - \Delta(\text{Equity})$. When Λ is positive (resp. negative), equity (resp. cash) payment is better for the subsequent capital structure.

Three notes are in order. First, we calculate debt as net debt—that is, after adjusting for excess cash. Normal (non-excess) cash is estimated using average ratios of cash to assets in the acquirer industry (see Appendix B). Second, we use book values for our base-case scenario (and show later that our results are robust to using market values instead). Our results are robust also to calculating debt with or without deducting cash. Third, Λ is correlated with the relative size of the target: larger targets are likely to have a higher impact on the subsequent capital structure. It is therefore important that we control for target size in our subsequent analysis.

4.2. Predicted and actual leverage

We report statistics for our leverage predictions in Panel D of Table 3. For the target–acquirer combinations in our sample, we obtain a predicted optimal leverage L^* for the combined firm with a median of 39% (mean of 34%). Median pro forma leverage ratios assuming cash and equity payment, L(Cash) and L(Equity), are respectively 65% and 38% (mean of 64% and 37%). Initial confirmation that such capital structure concerns could be critical for the choice of acquisition finance method is that the optimal leverage L^* is higher (median of 43%) for deals paid in cash than for deals paid in equity (median L^* of 29%).

Actual leverage after completion of the acquisition is in line with our pro forma leverage calculations. We report post-transaction median leverage ratios in Table 4. Acquirers who pay with cash have a median book leverage of 49% (market leverage of 30%) after the acquisition becomes effective, compared with the pro forma book leverage ratio of 58%. Acquirers who pay with equity have a median book leverage of 36% (market leverage of 16%), compared with the pro forma ratio of 32%. In the subsequent two years, cash acquirers gradually pay down their debt, while equity acquirers stay on a similar level or increase their leverage.

The magnitude of the deviations from optimal leverage resulting from cash versus equity payment (Λ) suggests that capital structure concerns are relevant for the choice of payment method. The mean Λ is 5% (median of 2%). Recall that Λ denotes the extent to which the leverage resulting from cash payment deviates from optimal as compared with equity payment. A positive Λ means that, ceteris paribus, more firms should prefer equity payment. Consistently with this prediction, equity represents 47% and cash 26% of the acquisition payment in our sample.

Table 4
Post-acquisition leverage development. This table reports the median leverage ratio in the three years after the acquisition becomes effective.

Year relative to effective year	Median post-acquisition leverage						Predicted leverage		
	Book values			Market values			L(*Cash*)	L(*Equity*)	L^*
	0	1	2	0	1	2			
All	44.4%	43.2%	43.0%	26.9%	24.7%	26.6%	65%	38%	39%
Cash	48.9%	46.1%	44.6%	30.1%	29.8%	28.6%	58%	44%	43%
Equity	36.0%	36.3%	36.5%	16.3%	16.7%	19.4%	69%	32%	29%
Hybrid	50.0%	46.8%	46.7%	34.5%	34.0%	34.1%	69%	39%	44%

4.3. Selection to become an acquirer

Uysal (2011) shows that deviations from optimal leverage affect the probability to become an acquirer. Because acquirer leverage also affects the pro-forma deviations from optimal leverage of the combined entity, we use a Heckman (1979) procedure to control for the selection into the acquirer sample. We use a specification based on Uysal's selection estimation but with a twist: we argue that not only the acquirer's leverage matters, but also the leverage of potential targets. On the one hand, acquirers may prefer underleveraged target firms because they have a greater debt capacity that allows for the financing of the transaction with cash. On the other hand, acquirers that deviate from optimal leverage can use target firms with the opposite deviation to move closer to optimal leverage. Like Uysal, we use "leverage deficit", the difference between actual and optimal leverage, to measure deviations from optimal leverage, and identify firms in the upper and lower quartile of the deficit as "over-"and "underleveraged" firms. We use the industry average of these measures for the availability of over- and underleveraged target firms.

We report results in Table 5, with a baseline regression without interactions in column 1. Acquirers that deviate more from optimal leverage are significantly less likely to become acquirers. The coefficients on the under- and overleveraged acquirer dummies are both negative and significant. The availability of target firms in the same industry also affects the probability of becoming an acquirer significantly: firms in industries with more underleveraged firms are more likely to become an acquirer. We

Table 5
Predicting acquisitions. This table shows the results for prediction of the acquisition decision. All columns report Probit regressions in which the dependent variable equals 1 if a firm undertakes an acquisition in that year. The Table reports coefficients and *z*-statistics for the regression (adjusted for standard errors clustered by firm and year) as well as the number of observations. ***, **, and * stand for statistical significance at the 1%, 5%, and 10% levels, respectively.

	Firm	Industry	(1)	(2)	(3)	(4)
Firm leverage	*Underleveraged*		−0.16***		−0.17***	
			(−5.35)		(−5.43)	
	Overleveraged		−0.15***		−0.15***	
			(−4.43)		(−4.57)	
	Deficit					−0.01
						(−0.24)
Industry leverage		*Underleveraged*	0.01***	0.00**		
			(3.37)	(1.97)		
		Overleveraged	0.00	0.00		
			(0.2)	(1.57)		
		Deficit			−0.17	−0.30
					(−0.7)	(−1.45)
		Average leverage	−0.40**	−0.41**	−0.40*	−0.41*
			(−2.07)	(−2.12)	(−1.76)	(−1.81)
Interactions	*Underleveraged*	*x Overleveraged*		−0.02***		
				(−3.95)		
	Overleveraged	*x Underleveraged*		0.00		
				(−0.78)		
	Underleveraged	*x Underleveraged*		0.01***		
				(3.04)		
	Overleveraged	*x Overleveraged*		0.00		
				(−0.6)		
	Underleveraged	*x Deficit*			−0.81**	
					(−2.54)	
	Overleveraged	*x Deficit*			0.25	
					(0.75)	
	Deficit	*x Deficit*				1.08**
						(2.15)
Firm characteristics	*Sales*		0.00***	0.00***	0.00***	0.00***
			(8.4)	(8.66)	(8.4)	(9)
	Stock returns		0.04***	0.05***	0.04***	0.05***
			(6.91)	(7.14)	(6.82)	(7.4)
	Market/book		0.00	0.01	0.00	0.01
			(0.4)	(0.54)	(0.37)	(0.83)
	ROA		0.41***	0.44***	0.40***	0.47***
			(5.69)	(5.99)	(5.53)	(6.42)
Industry characteristics		*Merger #*	−0.15***	−0.15***	−0.16***	−0.16***
			(−4.85)	(−4.85)	(−4.96)	(−4.97)
		Herfindahl	−0.95***	−0.97***	−1.37***	−1.35***
			(−2.85)	(−2.91)	(−4.41)	(−4.36)
	Intercept		−2.52***		−2.45***	−2.53***
			(−10.58)		(−10.05)	(−10.4)
	Year fixed effects		Yes	Yes	Yes	Yes
	Industry fixed effects		Yes	Yes	Yes	Yes
Pseudo R-squared			7.87	7.78	7.76	7.57
Observations			41,530	41,530	41,530	41,530

control for the average leverage in the industry, which has significant negative impact, consistent with the argument that higher leverage makes it harder to finance acquisitions.

In column 2, we replace the acquirer leverage characteristics with interaction terms of the firm and industry over- and underleverage dummies. Industries with more underleveraged potential targets are more likely to attract underleveraged acquirers, and industries with overleveraged targets are less likely to do so. This suggests that acquirers do not necessarily look out for targets that are complimentary to them in terms of leverage deviation. On the contrary, underleveraged targets are generally more popular, even with underleveraged acquirers.

Extreme leverage deviations may matter more for acquirers than potential targets. We replace the industry dummies with a continuous measure, the leverage deficit, in columns 3 and 4. In column 3, we interact the deficit with the acquirer over- and underleverage dummies, and in column 4 with the acquirer deficit. The results are consistent with the results reported in column 2. Underleveraged firms are significantly more likely to become acquirers if the average industry leverage is below the optimal level (column 3), and the interaction of acquirer and industry deficit is significantly positive (column 4). We use the specification reported in column 4 to compute the Inverse Mills ratio to control for selection in the analysis below.

Overall, our estimations improve upon the explanatory power, with a Pseudo-R^2 in the range between 7.6% and 7.9% compared to 5.4% in Uysal (2011). This indicates that target leverage indeed plays a role for the decision to become an acquirer.

4.4. Other control variables

The Kayhan and Titman (2007) model is designed to predict capital structure in general and abstracts from other acquisition-specific considerations. Eckbo (2009) provides an overview of the acquisition finance literature. Based on this literature, we introduce a number of control variables that make our tests more specific to acquisition finance.

First, tender offers and hostile transactions are typically financed with cash. This choice reflects the more straightforward nature of making fixed offers directly to investors. If the offer is in stock, the SEC registration process is more tedious slows down the speed of the offer process. In the meantime, the value of the bid fluctuates with the bidder's stock price and possible declines makes investors more reluctant to accept the bid. In addition, rival bidders may emerge in the meantime. So if the bidder is interested in completing the transaction quickly and is worried about possible failure, it will prefer to pay with cash. Speed may be important in tender offers (Martin, 1996) and in hostile offers. We include indicators for both tender offers and hostile transactions.

Second, according to Hansen's (1987) risk-sharing hypothesis, the bidder can share the post-acquisition performance risk with the target by paying with stock. This strategy can be especially beneficial when the transaction value is large. Hence we control for the size of the target relative to the bidder and also control for the premium.

Third, managers and other shareholders that own a significant share of the target firm may want to retain control over the resulting firm and therefore prefer stock payment (Ghosh and Ruland, 1998). Baker et al. (2007) argue that individual investors are inert and hence more willing than institutional shareholders to accept acquirer stock as a form of payment. We control for these hypotheses by including dummy variables set equal to 1 for (respectively) insider ownership, institutional ownership, and block ownership amounting to more than 5% of the target's stock. Another ownership related hypothesis (Gilson et al., 1988) involves tax considerations: if a firm pays with cash, then the selling shareholders are subject to capital gains taxes; if it pays with stock, then shareholders can defer their gains. To the extent that bidders must compensate (via a higher bid price) target shareholders for higher capital gains taxes, bidders will prefer stock payment. However, this tax issue is more relevant for individuals than for institutional shareholders; hence we predict that, when individuals (resp. institutions) own more shares, they will prefer stock (resp. cash).

Fourth, the governance structure of the target firm may affect its management's attitude toward the negotiation. Hartzell et al. (2004) describe governance provisions that affect target management's willingness to accept acquisition offers, and Gompers et al. (2003) provide an index (the so-called G-index) of such provisions. In particular, classified boards will make it difficult for the acquirer to win a hostile bid. At the other extreme, “golden parachutes”—management severance agreements that are triggered by a change in control—incentivize the target's management to accept takeover offers. As mentioned previously, it is typical for a hostile bidder to pay with cash because doing so facilitates the negotiation process. We therefore expect more stock offers in the acquisition of firms with a high G-index (more insulated management), with classified boards, and without golden parachutes.

Fifth, target shareholders may be reluctant to accept illiquid acquirer stock. We control for this factor by using Amihud's (2002) illiquidity measure. All else equal, the likelihood of cash being used to finance the transaction is increasing in the illiquidity of the bidder's stock.

Sixth, Eckbo (2009) and Sudarsanam (1995) describe the relation between transaction structure characteristics and the choice of payment method. When multiple bidders participate in a contest, an acquirer may prefer cash payment because it facilitates the filing process. That being said, an acquirer that already owns some shares of the target (a so-called toehold) before the bid probably enjoys a smoother negotiation process and is less concerned about speed. Lockup periods and termination fees could also affect the need for a faster process. In order to test for the relevance of these characteristics, we add several dummy variables to control for the existence of competing bidders, toeholds, lockup periods, and termination fees.

Seventh, maximizing shareholder value may be a low priority for some managers—namely, those who prefer equity financing to debt financing because the latter prevents them from spending free cash flow on negative-NPV projects (Jensen, 1986). In particular, Harford (1999) shows that acquirers with excess cash are more prone to conduct value-destroying acquisitions. We control for agency costs by adding acquirer cash in excess of the industry average (normalized by assets) as an explanatory variable. Assuming that excess cash adequately captures agency costs, we expect that firms with excess cash will prefer equity financing.

Finally, macroeconomic factors (Harford, 2005) and time-specific sentiments (Zhang, 2009) could affect the target's willingness to accept equity as payment. To control for such effects, we include year fixed effects with the other control variables.

4.5. Predicting acquisition finance: results

To predict the method of payment, we regress the percentage of stock used as payment on Λ while controlling for all other variables that have been shown to affect the method of payment. The term Λ, our measure for the capital structure effect of different payment methods, is constructed as the difference between the deviation from optimal leverage after stock- versus cash-financed acquisitions. That is, if we hold everything else constant then equity payment is optimal if $\Lambda > 0$ and cash payment is optimal if $\Lambda < 0$. Hence there should be a positive relation between Λ and the percentage of stock paid.

We find support for the hypothesis that firms view acquisition finance in terms of moving toward an optimal capital structure (as described by the Λ measure). Column 1 in Panel A of Table 6 reports the coefficients for the Tobit regression of the percentage of stock paid on Λ and for the control variables. The coefficient for Λ is positive and is both statistically and economically significant: increasing Λ by one standard deviation increases the probability of paying with stock by 13% ($z = 5.15$).

Of all the control variables considered, tender offers have the greatest explanatory power. With all other variables set at their means, a tender offer raises the predicted probability of cash payment to 100% ($z = -21.57$). This finding is consistent with the argument that the speed required in tender offers motivates acquirers to pay with cash. In some specifications, bidders with institutional ownership are significantly more likely to pay with cash, in line with the notion that such investors prefer that their shares not be diluted. Acquirers with more liquid shares are more likely to pay with stock—their stock is likely to be more appreciated by the target shareholders. Transactions involving multiple bidders are more likely to be paid in cash, consistent with the argument that doing so facilitates the negotiation process. Transactions with lockup agreements are more likely to be paid in equity; this accords with the idea that such clauses protect targets from large movements in the stock price (and hence in the premium). The coefficient on the Inverse Mills ratio is significantly negative, which suggest that the selection into becoming an acquirer is relevant for the choice of payment method.

Panel B of Table 6 reports the classification of our sample into anticipated cash and equity transactions and compares the prediction with the actual payment method. We predict a stock or cash payment if the Tobit model estimates a probability of 1 that the payment will be in stock or cash (respectively); otherwise, we predict a hybrid offer. For example, if the prediction is 100% stock and the actual payment method was cash, we classify the transaction as unpredicted cash. If the prediction is 100% cash (0% stock) and the actual payment was in cash, we classify the transaction as predicted cash payment. We do not report hybrid predictions or actual hybrid payments, for which the prediction accuracy is not binary and not the focus of this paper. For example, an actual cash transaction with a prediction of 45% stock classified as predicted hybrid transaction and therefore not reported. We repeat the analysis as a Probit estimation to check that our results do not depend on assigning acquirers with a 100% probability of paying stock (cash) as predicted stock (cash) payers—rather than some other, less conservative cutoff level that would still work in a Probit model. We find little difference in the prediction for nonhybrid cases.

Overall, the Tobit specification with control variables correctly predicts the payment method in 89% of our sample. The Pseudo-R^2 is 18.6%, an improvement compared to the previous literature: for example, Uysal (2011) reports a Pseudo-R^2 of 13.5%.[3] In only 1% of the transactions in which the cash payment is predicted did firms pay with stock, or 12% of the transactions in which the prediction differs from actual payment. This means that 82% of all unanticipated payment decisions involve paying cash rather than following the prediction to issue stock. Thus the two types of deviation from the optimum financing method are highly asymmetrical. When the model predicts cash payment, almost all firms follow the recommendation. These results are consistent with Hypothesis 1 and 2.

It is important to show that our results do not change when we control for acquirer overleverage, as suggested in Uysal (2011), or when we change the manner of constructing Λ. Column 2 of Table 6 controls for acquirer overleverage in the manner constructed by Uysal (2011). The coefficient of the variable is not significant, and it does not improve the prediction power of the model. Columns 3–6 of Table 6 provide robustness checks of our payment method regressions, using alternative methods to estimate Λ. In particular, Λ varies with the relative size of the transaction: it is larger for larger target firms and smaller for small target firms. This is because smaller target firms are less relevant for the acquirer's capital structure, and therefore it is important to control for the relative size of the target among the control variables. In column 3, we explicitly remove this size effect from Λ by normalizing it with relative size (in other words L(Cash)-L(equity)). This reduces the effect of Λ by a factor of 5 and decreases the accuracy of the model to a Pseudo-R^2 of 18.4%, but does not change the baseline results. Our conclusions also do not change when we use the leverage prediction models of Fama and French (2002) (see column 4 of the table), when we use market values instead of book values of leverage (column 5), or when we do not deduct excess cash when computing leverage (column 6). Finally, our conclusions remain unaltered when we exclude hybrid transactions (column 7). For this last regression we use a Probit specification and define an anticipated stock (cash) transaction as one for which the predicted probability of paying stock

[3] The power of our test may be reduced if many firms issue shares—in a separate transaction—to refinance a cash offer. Of the 2978 firms in our sample, 269 announced a secondary equity issue in the same year as the M&A announcement, of which 43 were classified by Dealogic as “use of proceeds for acquisitions”. Only eight of these transactions were made by sample firms that we classified as making cash-financed acquisitions. Discussions with practitioners suggest that some potential acquirers issue equity well *before* bidding, which would mean that we have already incorporated their (well-equipped) post-issuance capital structure in our analysis.

Table 6
Payment method prediction. This table shows the results for prediction of the payment method. All columns (except for column 7, which excludes hybrid transactions) report Tobit regressions in which the dependent variable is the percentage of stock used as payment; in column 7, we use a Probit regression in which the dependent variable equals 1 for pure stock payment and 0 for pure cash payment. Panel A reports coefficients and *z*-statistics for the regression as well as the number of observations. ***, **, and * stand for statistical significance at the 1%, 5%, and 10% level, respectively. Panel B reports the fraction of anticipated and unanticipated cash and equity transactions. For the Probit specification in column 7, we classify a prediction as cash (stock) if the predicted probability of using the observed payment method exceeds 50%. For the Tobit specifications, we classify a prediction according to the predicted percentage of stock. Predictions for hybrid transactions are omitted.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Main Tobit	Acquirer overleverage Tobit	Relative Lambda Tobit	Fama–French Tobit	Market values Tobit	Gross debt Tobit	Excl. hybrids Probit
Panel A: Main regression (dependent variable = percentage of equity used in payment)								
Lambda		0.83***	0.78***	0.15***	0.49***	0.52***	0.94***	1.39***
		(5.15)	(4.35)	(4.12)	(5.82)	(6.34)	(5.73)	(5.43)
Acquirer overleverage			0.06					
			(0.59)					
Tender offer		−1.74***	−1.74***	−1.74***	−1.70***	−1.67***	−1.73***	−2.63***
		(−21.57)	(−21.57)	(−21.48)	(−21.12)	(−20.79)	(−20.96)	(−18.78)
Hostile		−0.10	−0.10	−0.06	−0.13	−0.07	−0.17	0.49
		(−0.53)	(−0.53)	(−0.29)	(−0.65)	(−0.36)	(−0.81)	(1.35)
Premium		0.00	0.00	0.00	0.00	0.00	0.00	0.00*
		(−0.93)	(−0.94)	(−0.69)	(−0.55)	(−0.46)	(−0.97)	(−1.85)
Relative size		0.04	0.05	0.03	0.00	−0.05	0.00	0.07
		(0.68)	(0.7)	(0.38)	(0.02)	(−0.69)	(0.01)	(0.76)
Insider owned		0.07	0.07	0.05	0.09	0.06	0.09	−0.01
		(1.2)	(1.19)	(0.77)	(1.52)	(1.06)	(1.42)	(−0.15)
Institutional O.		−0.11**	−0.10**	−0.07	−0.07	−0.04	−0.11**	−0.03
		(−2.08)	(−2.02)	(−1.45)	(−1.29)	(−0.75)	(−2.15)	(−0.4)
Blockholders		0.00	0.00	0.00	0.00	0.00	0.00	0.01*
		(0)	(0.02)	(0.38)	(0.44)	(0.64)	(−0.06)	(1.71)
G-index		0.02	0.02	0.02	0.02	0.02	0.01	0.04
		(1.34)	(1.32)	(1.41)	(1.55)	(1.25)	(0.99)	(1.58)
Classified board		−0.19	−0.18	−0.20	−0.22*	−0.22*	−0.17	−0.25
		(−1.45)	(−1.44)	(−1.56)	(−1.72)	(−1.7)	(−1.33)	(−1.28)
Golden parachute		−0.08	−0.08	−0.09	−0.10	−0.08	−0.05	−0.30
		(−0.66)	(−0.65)	(−0.74)	(−0.85)	(−0.66)	(−0.37)	(−1.58)
Acquirer illiquidity		−0.39**	−0.40**	−0.41**	−0.46***	−0.43**	−0.41**	−0.72***
		(−2.28)	(−2.29)	(−2.36)	(−2.65)	(−2.49)	(−2.41)	(−2.8)
Multiple bidders		−0.36**	−0.36*	−0.35*	−0.35*	−0.35*	−0.31*	−0.65**
		(−1.97)	(−1.96)	(−1.93)	(−1.94)	(−1.94)	(−1.69)	(−2.23)
Toehold		−0.09	−0.09	−0.09	−0.08	−0.06	0.00	−0.21
		(−0.48)	(−0.47)	(−0.5)	(−0.43)	(−0.32)	(−0.01)	(−0.79)
Lockup		0.46***	0.46***	0.44***	0.42***	0.37***	0.45***	0.58***
		(4.73)	(4.66)	(4.52)	(4.24)	(3.73)	(4.57)	(3.56)
Termination fees		0.04	0.04	0.06	0.08	0.08	0.01	0.19**
		(0.65)	(0.67)	(1)	(1.36)	(1.31)	(0.11)	(2.02)
Excess cash		0.04	0.04	0.04	0.04	0.03	0.05	0.04
		(0.82)	(0.88)	(0.76)	(0.8)	(0.54)	(1.12)	(0.58)
Mills		−0.39***	−0.39***	−0.33***	−0.31***	−0.22***	−0.45***	−0.43***
		(−5.02)	(−4.98)	(−4.19)	(−3.94)	(−2.7)	(−5.68)	(−3.76)
Intercept		0.49***	0.49***	0.43***	0.36***	0.29**	0.47***	0.24
		(3.91)	(3.96)	(3.42)	(2.86)	(2.27)	(3.8)	(0.68)
Year fixed effects		Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations		2978	2978	2978	2978	2978	2978	2183
Panel B: Predicted and realized payment method								
Prediction	Actual							
Cash	*Cash*	23%	22%	22%	22%	22%	21%	22%
Stock	*Stock*	66%	66%	66%	67%	67%	68%	60%
Stock	*Cash*	10%	10%	10%	10%	10%	10%	14%
Cash	*Stock*	1%	1%	1%	1%	1%	1%	4%
Pseudo R-Squared		18.58	18.59	18.42	18.71	18.82	18.60	38.33

(cash) exceeds 50%. Overall, the significance of the other control variables is similar across specifications (the results for other specifications are available upon request).

Panel B shows that, regardless of the specification, the fraction of unanticipated stock payment never exceeds 4%. In fact, it is as low as 1% in all specifications that include hybrid transactions. When we exclude hybrid transactions (column 7) the prediction is less precise, which results in a greater number of unanticipated cash transactions (14%, versus 10% in the other specifications). These results are clearly consistent with hypotheses 1: almost no acquirer pays with stock if they are not expected to do so.

Table 7
Descriptive statistics by prediction. This table reports means for the characteristics of transactions grouped by predicted outcome. The values given are the means and the *t*-statistics for when the means differ.

Panel A: Average transaction characteristics by prediction — Stock

	Anticipated stock	Unanticipated stock	*t*-statistic
Revision	10.6%	13.6%	(0.45)
…By (%)	2.06	2.19	(0.01)
Hostile	0.4%	9.1%	(5.48)***
Tender offer	0.0%	72.7%	(52.76)***
Multiple bidders	1.2%	4.5%	(1.35)
Observations	1450	30	

Panel B: Average transaction characteristics by prediction — Cash

	Anticipated cash	Unanticipated cash	*t*-statistic
Revision	10.8%	4.5%	(−2.32)**
…By (%)	15.23	4.90	(−1.25)
Hostile	8.3%	0.0%	(−3.74)***
Tender offer	67.5%	0.0%	(−120)***
Multiple bidders	12.0%	3.8%	(−2.9)***
Observations	486	216	

4.6. Characteristics of transactions with unanticipated financing

We find that very few—24 out of 2978—firms succeed in paying with stock when they were expected to pay with cash. Yet we predicted to find none: if there is no apparent reason to pay with equity, should the decision to do so not convey to the target's management that the acquirer is overvalued? And should the target management not refuse to sell unless the bidder changes its method of payment?

Table 7 compares the transaction characteristics of expected and unexpected transactions. Panel A reports the comparison for equity transactions. Note that most of the univariate comparisons are not statistically different owing to the small number of unexpected equity bids.[4] If equity payment was not expected then 11.8% of bids are revised, compared with 10.5% for expected equity bids. Unexpected equity bids are revised by an increase in the bid price of on average 3.3%, compared with 1.7% for expected ones. Unexpected equity bids are significantly more likely to be hostile: SDC classifies 11.8% of them as hostile, compared with 0.4% for expected equity deals. Almost all (94%) of the unanticipated equity bids involve tender offers, whereas none of the anticipated equity transactions does. This need not mean that the tender offer was successful. However, almost all the bidders that unexpectedly bid with stock do make an offer directly to shareholders in lieu of negotiating with the target's management. Multiple bidders were involved in 5.9% of unanticipated equity bids, compared with only 1.2% of anticipated equity bids.

These results suggest that target firms resist equity payment when the bidder cannot justify it on the basis of publicly available data. Whereas some bidders respond by paying cash or revising their bid upward, others try to circumvent managerial opposition via hostile tender offers. Our results are consistent with the hypothesis that the managers of target firms correctly interpret economically unjustified equity bids as signals of overvaluation and thus, in resisting unanticipated equity bids, are acting in the interests of long-term shareholders.[5]

For comparison, we report transaction characteristics for cash transactions in Panel B. Much of the univariate statistics mirror the characteristics of our prediction model. Because cash transactions are faster to close, they are often the preferred method in difficult negotiations. Therefore, we predict cash payment for hostile offers. This is also apparent in the univariate statistics: anticipated cash

[4] Given the very small sample, a more in-depth discussion of examples may be illustrative. One example is Johnson & Johnson's $1.6 billion acquisition of Cordis, a manufacturer of cardiology devices. A major player in its own market, Cordis was still so small compared to Johnson & Johnson that it “would not even make a dent in the bottom line for the prosperous healthcare company” (Robin Sidel, “Cordis Reports Record Earnings, Mum of Takeover Bid,” Reuters, 20 October 1995). Under these circumstances, it was not obvious why Johnson & Johnson made a stock-swap bid rather than a cash offer. During the negotiations, the payment method was temporarily changed to cash—albeit at a discount ($100 per share compared to $105 in the stock bid). The management of Cordis resisted publicly, introduced poison pill provisions, and searched for white knights. It did so with added desperation when a rare acquirer candidate proved unlikely owing to antitrust concerns. In the end, the lack of other bidders and another increase in the bid put too much pressure on Cordis, and the deal closed at $109 a share (in Johnson & Johnson stock). Another example of an unanticipated equity transaction was May Department Store's bid for Associated Dry Goods, which mirrored the negotiations between Johnson & Johnson and Cordis in many ways. Associated's management publicly resisted May's stock bid, trying to increase the price and “sweeten the merger offer to include cash as well as stock” (Isadore Barmash, “May Will Sell Part of Project in West,” *New York Times*, 12 July 1986). It also introduced a poison pill and searched for a white knight, and it promised a restructuring and the selling off of certain assets to improve shareholder value. May changed its bid to a cash tender offer (for 51% of the shares)—at a discount of 10% to the stock bid. The tender offer was not successful, in part because of the discount and the newly introduced poison pill. After a month of negotiations, the deal closed with an exchange ratio up by 15% compared to the initial bid. Yet in the meantime the price of May's stock had fallen from $88 to $59, so the resulting premium was only marginally higher than the initial bid despite the higher exchange ratio. May did try to explain why stock was better than cash—namely, the firm could then use the “pooling of interests” accounting method, which in turn would allow it to postpone depreciating the value of Associated to its book value (Scott Kilman, Steve Weiner, Hank Gilman, and Daniel Hertzberg, “Associated Dry Goods Expected to Seek Other Suitors or Higher May Stores Bid,” *Wall Street Journal*, 24 June 1986). This argument fared better with the general public than with the target's management, however. Indeed, why should such an argument be valid for May but not for other acquirers?

[5] And in their own interests, if they must agree to a lockup after the acquisition.

transactions are revised more often, more likely to be hostile, often tender offers and often involve multiple bidders. Note that the two subsamples of predicted stock transactions—unanticipated cash transactions and anticipated stock transactions—are similar in their characteristics. It is the subsample of unanticipated stock that stands out most, both compared to anticipated stock transactions and anticipated cash transactions.

5. Announcement returns

Before we move on to the long-term returns, it is interesting to have a brief look at short-term announcement returns. Our hypotheses on long-term returns, motivated by the findings of the previous literature, assume that mispricing will become evident in the long-term. However, it is possible that investors anticipate some of these developments. This should be reflected in announcement returns. In contrast to long-term returns, announcement returns should also reflect any direct effect of the payment method choice on firm value. In particular, if acquirers deviate from the payment method predicted under optimal capital structure considerations, the market should penalize them for the perceived suboptimal choice.

We therefore report the results of an event study. For this purpose, we compute the cumulative abnormal returns (CAR) over a period of three days, starting on the day before the announcement and ending on the day after the announcement. CARs are calculated using the standard event study methodology of Brown and Warner (1985), employing the market model with the equally weighted Center for Research in Security Prices (CRSP) index as the market portfolio. The parameters of the market model are estimated over 255 trading days, ending 42 days before the announcement. We then regress the CAR on dummy variables that indicate the payment decision.

Table 8 reports the results. Column 1 indicates that anticipated cash payment generates positive and anticipated stock payment negative excess returns. This is in line with the previous literature which reports higher announcement returns for cash compared to

Table 8
Acquirer announcement returns. This table reports the results of OLS regressions where the dependent variable is cumulative announcement returns for the acquirer. The returns are estimated for a three-day-window around the announcement date in all but column 3. In column 3, the returns are estimated for 41 days before up to 126 days after the transaction. The table reports coefficients and *t*-statistics for the regression as well as the number of observations.

	(1)	(2)	(3)	(4)	(5)
Window	(−1,1)	(−1,1)	(−41,126)	(−1,1)	(−1,1)
Anticipated cash	0.008**	0.005	0.003	0.004	0.004
	(2.05)	(0.65)	(0.48)	(0.62)	(0.6)
Anticipated stock	−0.02***	−0.015***	−0.012***	−0.014***	−0.014***
	(−9.71)	(−4.12)	(−3.32)	(−3.84)	(−3.84)
Unanticipated cash	0.002	0.003	0.002	0.004	0.003
	(0.33)	(0.47)	(0.26)	(0.57)	(0.57)
Unanticipated stock	−0.02	−0.018	−0.021	−0.018	−0.019
	(−1.4)	(−1.24)	(−1.44)	(−1.25)	(−1.27)
Acquirer deficit				−0.008	
				(−1.49)	
Underlevered acquirer					0.006*
					(1.8)
Overlevered acquirer					0
					(0.02)
Tender offer		0.008	0.008	0.009	0.009
		(1.27)	(1.34)	(1.3)	(1.29)
Relative size		−0.019***	−0.018***	−0.02***	−0.02***
		(−8.78)	(−8.02)	(−8.84)	(−8.87)
Hostile		0.014	0.011	0.015	0.015
		(1.26)	(1.05)	(1.29)	(1.3)
Diversifying		−0.003	−0.003	−0.003	−0.003
		(−1.28)	(−1.24)	(−1.23)	(−1.22)
Acquirer ln sales		−0.003***	−0.003***	−0.003***	−0.003***
		(−4.37)	(−4.41)	(−4.27)	(−3.99)
Acquirer leverage		0.012	0.011	0.015*	0.013*
		(1.61)	(1.57)	(1.95)	(1.73)
Acquirer market/book		0	0	0	0
		(−0.19)	(−0.71)	(0.15)	(−0.01)
Acquirer ROA		0.009	0.022*	0.008	0.007
		(0.7)	(1.74)	(0.61)	(0.59)
Acquirer runup		0.008*	0.001	0.008*	0.015
		(1.91)	(0.37)	(1.93)	(1.26)
Herfindahl		−0.018	−0.024	−0.02	−0.022
		(−0.84)	(−1.13)	(−0.96)	(−1)
Year F.E.		YES	YES	YES	YES
R-squared	3.7	9.3	8.4	9.3	9.31
N	2546	2546	2381	2546	2546

equity transactions (for example, Andrade et al., 2001). Unanticipated cash transactions are not associated with significant abnormal returns. According to our hypothesis, these transactions are made by undervalued acquirers and therefore should be followed by positive long-term returns. However, these transactions are also suboptimal from a capital structure point of view: these acquirers chose to pay with cash although equity payment would have resulted into a better capital structure. These effects may offset each other. The coefficient on unanticipated stock payment is not significant, not surprising considering the small number of observations.

In column 2, we add control variables commonly used in the literature, for example Uysal (2011). Adding the control variable removes the significance of the anticipated cash dummy: the difference between cash and stock payment is now primarily driven by the anticipated stock transactions. The other results remain similar to before. The sign of the control variables is comparable to the ones reported in the literature. In column 3, we increase the return window to 41 days before and 126 days after the transaction. This only marginally alters coefficients, but not the significance. In columns 4 and 5, we add leverage deviations introduced by Uysal (2011) to the list of control variables: acquirer overleverage in column 4 and dummies for under- and overlevered acquirers in column 5. Controlling for these variables only marginally changes our results, not surprising since these variables are important determinants of anticipation dummy variables.

It may be tempting to conclude that markets always consider issuing equity worse than cash, regardless of the predictions of the trade-off theory. So, although target management may be aware of the trade-off prediction, the market may not be aware of this decision framework. However, this interpretation should be qualified by the fact that announcement returns reflect the market's assessment of the NPV of the acquisition, and there is no reason why the NPV should be identical in all subgroups. For example, the NPV of the acquisition will depend on the relative bargaining power of bidder and target (Betton et al., 2009; Boone and Mulherin, 2008) and managerial motives for the acquisition (Morck et al., 1990; Roll, 1986). Negative announcement returns in equity financed acquisitions could also be the result of the fact that arbitrageurs tend to short the bidder's stock short, as shown by Mitchell et al. (2004). It is therefore important that we also discuss the long-term post-acquisition returns.

6. Long-term post-acquisition returns

If bidders deviate from the predicted financing method because of market timing considerations then we expect that, at least in some subsamples, bidders will experience long-term significant abnormal returns. In this sense, the market timing theory is a behavioral theory: it assumes that markets may underreact to company-specific events such as acquisitions.

We employ the "returns across time and securities" (RATS) methodology proposed by Ibbotson (1975) while assuming that normal returns are generated by the Fama and French (1993) three-factor model. Specifically, we run the following regression for every month j relative to the event month 0 ($j = 1, \ldots, 24$):

$$\left(R_{i,t}-R_{f,t}\right) = a_j + b_j\left(R_{m,t}-R_{f,t}\right) + c_jSMB_t + d_jHML_t + \varepsilon_{i,t}, \quad (3)$$

Here $R_{i,\,t}$ is the monthly return on security i in month t; $R_{f,\,t}$ and $R_{m,\,t}$ are (respectively) the risk-free rate and the return on the equally weighted CRSP index; and $\mathrm{SMB_t}$ and $\mathrm{HML_t}$ are the month-t return on size and book-to-market factor, respectively. The numbers reported are sums of the intercepts of cross-sectional regressions over the relevant event time periods. The advantage of this methodology is that it takes into account changes in the stock's riskiness both before and after the acquisition—a consequence of the post-acquisition factor loadings being allowed to change from month to month.

Panel A of Table 9 reports the long-term abnormal returns for the bidder 24 months after the announcement month. Fig. 1 shows the cumulative abnormal returns during that period for the subsamples of unpredicted cash payers, predicted cash payers,

Table 9

Post-acquisition long-run abnormal returns. This table reports cumulative long-run abnormal returns for the merged firms—at 6, 12, and 24 months after the announcement month—for the subsamples of acquirers who paid with cash or stock and were (respectively) predicted or not predicted to do so. The subsample of unpredicted stock payers is suppressed owing to the limited number of observations. Panel A reports returns calculated using the Ibbotson (1975) returns across time and securities (RATS) method as well are returns calculated using the Fama and French (1993) three-factor model. See the text for details. Reported values are sums of the intercepts of cross-sectional regressions over the relevant event time periods; the standard error for a window is the square root of the sum of the squares of the monthly standard error. Panel B reports monthly average announcement returns of equally weighted calendar-time portfolios using the Fama and French (1993) three-factor model. In this model, acquirers who have announced an acquisition in the past 6 (12, 24) calendar months form the basis of the calendar-time portfolio. A single time-series regression is run with the excess return of the calendar portfolio as the dependent variable and the return on the three factors as the independent variables (the excess market return, the book-to-market and size factors). The table reports means (and t-statistics if the means are different from zero).

Payment method		Panel A: Ibbotson RATS (in months)			Panel B: Calender-time (in months)		
Prediction	Actual	(1,6)	(1,12)	(1,24)	(1,6)	(1,12)	(1,24)
Cash	*Cash*	2.49%	4.54%**	2.90%	2.16%	3.00%*	−0.52%
		(1.51)	(1.98)	(0.9)	(1.25)	(1.9)	(0.53)
Stock	*Stock*	0.90%	0.09%	−4.41% *	0.39%	−0.88%	−7.10% *
		(0.87)	(0.06)	(−1.94)	(0.11)	(−0.21)	(−1.77)
Stock	*Cash*	5.77%***	12.52%***	24.48%***	3.22%*	8.47%***	16.19%***
		(2.65)	(3.79)	(5.07)	(1.81)	(3.08)	(3.84)
Cash	*Stock*		NA			NA	

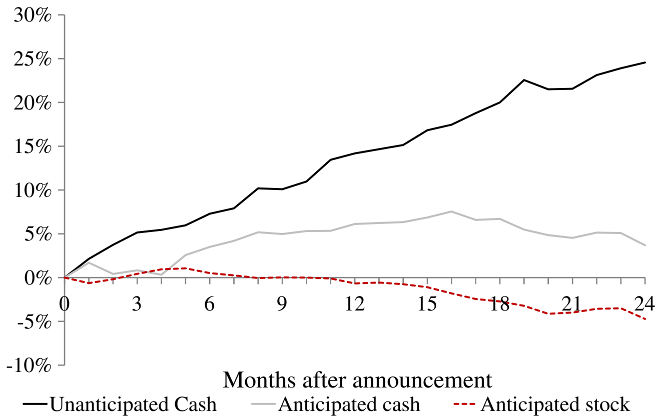

Fig. 1. Long-run abnormal returns after acquisition announcements. Cumulative abnormal returns based on the Fama–French three-factor model and RATS; see text for description of the methodology.

and predicted stock payers. (We omit unpredicted equity transactions because the small number of observations induces too much fluctuation in the graph.) When bidders follow the model prediction and pay with cash, long-term abnormal returns are −1.78% ($t = -0.67$) after 24 months; as expected, this value is not significantly different from zero. Some bidders may be undervalued and others overvalued, but on average there is no reason to conclude that managers are timing the market. If the bidder is overvalued then it cannot issue stock because choosing that mode of payment will reveal the overvaluation. Hence it is preferable to follow the prediction and pay with cash.

However, when bidders were expected to pay with stock, but decided to pay with cash (unanticipated cash payers), it must be that they believed that their stock was undervalued. The significant 24-month post-announcement return of 8.42% ($t = 3.67$) is consistent with this hypothesis. Finally, when bidders pay with stock and were expected to do so, 24-month post-acquisition abnormal returns are −13.23% ($t = -8.98$); this finding is consistent with our hypothesis that overvalued firms can time the market successfully—even when seeking to acquire a sophisticated target—if their payment choice can be justified via publicly available data.

As an additional test we implement the Fama and French (1993) calendar-time portfolio approach as advocated by Fama (1998) and Mitchell and Stafford (2000). The results when employing this approach are given in Panel B of Table 9. Much as with the RATS method, we find significantly positive long-term returns for unpredicted cash payers of 11.10% ($t = 2.72$). Predicted cash payers have significantly positive returns of 3.18% ($t = 2.13$) after 12 months, but they fall to −0.15% after 24 months ($t = 0.73$). For anticipated stock payers we find significantly negative abnormal returns of −7.54% ($t = -2.13$). Overall, the calendar-time approach confirms our findings from the RATS approach.

7. Conclusions

In this paper we examine the extent to which acquisition finance can be explained by market timing or by fundamental reasons proposed in the literature on capital structure and acquisition finance.

Consistently with the literature, we find that in 89% of the transactions acquirers make financing decisions that can be explained by various prediction models. Even so, some acquirers deviate from the payment method predicted by such models. These deviations are not symmetric: whereas many predicted stock payers deviate by paying cash, hardly any predicted cash payers deviate by paying stock—and, when they do, their bids are often hostile and usually fail. This finding is consistent with the hypothesis that the target firm's management identifies stock-paying deviators as overvalued. Hence overvalued bidders are unable to compensate for the cost of deviating from the model prediction by paying with overvalued stock, although they might take advantage of their overvaluation by (falsely) claiming that their choice of payment method is driven by fundamental economic motives.

Long-term abnormal returns after the announcement provide further support for the influence of both trade-off and market timing arguments. In the two years after the announcement of unpredicted cash payment, abnormal returns are significantly positive; this finding supports the view that these acquirers were undervalued and thus chose to deviate from the trade-off model. Long-term abnormal returns are not positive after the announcement of predicted cash payment, however. Finally, abnormal returns are significantly negative for anticipated stock payers—in line with our hypothesis that heavily overvalued firms in this group attempt to hide behind explaining stock issuance in terms of economic fundamentals.

Our principal conclusion is that market timing is possible in an acquisition context if it is driven by fundamental economic motives. Further research should examine whether this conclusion holds also for other events that change a firm's capital structure.

Appendix A. Variable definitions

Amihud illiquidity	Amihud is for acquirer *i* during quarter *t* is defined as: $Amihud_{it} = \min\left[\frac{1}{M_{it}}\sum_{d=1}^{M_{it}}\left(\frac{\lvert R_{id}\rvert}{dv_{id}}, \frac{29.75}{0.3C_{t-1}}\right)\right]$. Here, R_{id} is the return of stock *i* during day *d*, dv_{id} is its dollar volume in millions of dollars (number of shares traded during day *d* times the stock price at the end of day *d*) and M_{it} is the number of valid observations during quarter *t*. C_{t-1} is the total market capitalization at *t-1* divided by the total market capitalization at the end of July 1962. This variable is Winsorized at 1% and 99% levels.
Classified boards	…equals one if the target firm's boards of directors is divided, for the purpose of election, into separate classes and zero otherwise.
Deficit	Difference between actual and predicted leverage.
Diversifying	…equals one if acquirer and target are in different industries.
Excess cash	Value of the sum of acquirer and target cash in excess of the industry average.
Golden parachutes	…equals one if the target firm has a severance agreement with its executives contingent upon a change in corporate control and zero otherwise.
Governance	The index by Gompers et al. (2003) measured for the target firm.
Herfindahl	Herfindahl index.
Hostile	… equals one if the board officially rejects the offer but the acquirer persists with the takeover and zero otherwise.
Insider ownership	… equals one if more than 5% of the target firm's shares are held by insiders who have to file the SEC forms 3, 4, 5 or 144, as reported by Thomson Reuters.
Institutional ownership	Fraction of target firm ownership by institutions who file the SEC form 13F.
Λ (*Lambda*)	Difference between predicted and optimal leverage assuming cash payment minus the difference between predicted and optimal leverage assuming equity payment, $\lvert L(\text{cash}) - L^*\rvert - \lvert L(\text{equity}) - L^*\rvert$.
Leverage	…equals net debt over assets in the year prior to the announcement. Net debt is calculated as the sum of current liabilities and long-term debt minus cash above the industry average level (normalized by assets). If current liabilities or long-term debt are not available, net debt is calculated as total debt less other liabilities, deferred taxes and investment tax credit, and cash. Both nominator and denominator are Winsorized at 1% and 99% levels.
LN sales	Natural logarithm of sales. Sales is Winsorized at 1% and 99% levels.
LN assets	Natural logarithm of total assets. Assets is Winsorized at 1% and 99% levels.
Lockup	…equals one if the transaction includes a lockup agreement and zero otherwise.
Market/book	(Market value of equity + book value of assets – book value of equity)/book value of assets. This variable is Winsorized at 1% and 99% levels.
Market cap ($)	The average of the closing prices 42–30 days prior to the announcement times the number of shares outstanding. This variable is Winsorized at 1% and 99% levels.
Market leverage	Book net debt divided by the average market value of assets 42–30 days prior to the announcement. Net debt is calculated as the sum of current liabilities and long-term debt minus cash above the industry average level (normalized by assets). If current liabilities or long-term debt are not available, net debt is calculated as total debt less other liabilities, deferred taxes and investment tax credit, and cash. Both nominator and denominator are Winsorized at 1% and 99% levels.
Multiple bidders	…equals one if other bidders also seek to acquire the target firm and zero otherwise.
Overlevered	…equals one if deficit is in the highest quartile.
Net debt	Sum of current liabilities and long-term debt minus cash above the industry average level (normalized by assets). If current liabilities or long-term debt are not available, net debt is calculated as total debt less other liabilities, deferred taxes and investment tax credit, and cash. This variable is Winsorized at 1% and 99% levels.
Premium	Transaction value less the average of the target's market value four weeks prior to announcement divided by the latter. This variable is Winsorized at 1% and 99% levels.
R&D/sales	Research and development expense divided by sales. Both nominator and denominator are Winsorized at 1% and 99% levels.
R&D dummy	…equals one if the firm has R&D expense and zero otherwise.
Relative size	Average of the target's enterprise values 42–30 days prior to announcement divided by the acquirer's enterprise value. Both nominator and denominator are Winsorized at 1% and 99% levels.
Revision	…equals one if the percentage change from the final price paid per share to the initial price offered per share equals zero.
Revision by (%)	Average revision in percent of the total transaction value.
ROA	Return on assets. This variable is Winsorized at 1% and 99% levels.
Runup	Cumulated abnormal returns 42–30 days prior to the announcement. This variable is Winsorized at 1% and 99% levels.
SGA/sales	Sales and general administrative expenses divided by sales. Both nominator and denominator are Winsorized at 1% and 99% levels.
Stock paid	Reported percentage of equity in payment according to SDC.
Stock returns	Annual stock returns, Winsorized at 1% and 99% levels.
Tangibility	Property, plant, and equipment divided by sales. Both nominator and denominator are Winsorized at 1% and 99% levels.
Taxshield	Depreciation and amortization over total assets. Both nominator and denominator are Winsorized at 1% and 99% levels.
Tender offer	…equals one when a tender offer is launched for the target and zero otherwise. A tender offer is a formal offer of determined duration to acquire a public company's shares made to equity holders.
Termination	…equals one if the transaction includes a termination agreement and zero otherwise.
Toehold	…equals one if the acquirer owns more than 0.5% of the target prior to the transaction, and zero otherwise.
Total assets	Book value of the firm (in million US dollars). This variable is Winsorized at 1% and 99% levels.
Transaction value	The total value of consideration paid by the acquirer, excluding fees and expenses, in million US$. The dollar value includes the amount paid for all common stock, common stock equivalents, preferred stock, debt, options, assets, warrants, and stake purchases made within six months of the announcement date of the transaction. Liabilities assumed are included in the value if they are publicly disclosed. Preferred stock is only included if it is being acquired as part of a 100% acquisition. If a portion of the consideration paid by the acquirer is common stock, the stock is valued using the closing price on the last full trading day prior to the announcement of the terms of the stock swap. If the exchange ratio of shares offered changes, the stock is valued based on its closing price on the last full trading date prior to the date of the exchange ratio change. This variable is Winsorized at 1% and 99% levels.
Underlevered	…equals one if deficit is in the lowest quartile.

Appendix B. Leverage prediction

We adopt the methodology of Kayhan and Titman (2007) to predict leverage, and we check for robustness using the methodology of Fama and French (2002). The cited literature constructs a proxy for an “optimal” leverage ratio as the predicted value from a regression of debt ratios on variables shown to be relevant for leverage. Our dependent variable, the leverage ratio, is based on net debt adjusted for operating cash. Because the literature uses both debt including non-operating cash and debt excluding all cash, we run our regressions for each measure. In the following paragraphs we describe the independent variables.

Profitability

As Graham (2000) points out, firms that are more profitable pay more taxes and so benefit more from debt tax shields. This seems at odds with the empirically documented negative relation between profitability and leverage (as reported, e.g., in Friend and Hasbrouck, 1988; Titman and Wessels, 1988). Such a negative relation can be explained by profitable firms using retained earnings to finance new projects because they need not issue debt (Kayhan and Titman, 2007). A strategic argument, as discussed by Bolton and Scharfstein (1990), suggests that a more profitable firm prefers low leverage ratios because they deter the entry of potential rivals. Myers and Majluf (1984) show that the negative relation is consistent with a “pecking order” theory whereby firms prefer internal to external funds. Hovakimian et al. (2001) and Strebulaev (2007) demonstrate that the negative relation is consistent with adjustment costs: firms that become profitable can adjust their leverage only with some delay; meanwhile the increasing profitability increases firm value, which in turn reduces leverage.

Investment opportunities

Myers (1977) argues that firms with larger growth and investment opportunities should avoid debt because their expected costs of financial distress are relatively higher. We include the market-to-book ratio and also the R&D expense (as a ratio of sales) to proxy for growth and investment—as suggested, for example, by Long and Malitz (1985) and Bradley et al. (1988). Because R&D expenses are not reported by all firms, we include a dummy variable to indicate when they are available.

Potential collateral value

Firms offering more collateral have easier and cheaper access to debt and so are expected to have higher leverage. As others have explained (see Long and Malitz, 1985; Titman and Wessels, 1988), such collateral is more valuable the *higher* is the value of tangible assets, total assets, and sales and the *lower* is the advertising (or selling) cost as a fraction of sales: the former factors can themselves serve as collateral, and the latter makes the firm's assets more unique (or less deployable for banks). Uniqueness is also associated with the market-to-book ratio and R&D expenses.

Tax shields

Firms may be able to forgo interest tax shields if they can instead use depreciation deductions to save taxes. Following Fama and French (2002) and Flannery and Rangan (2006), we use the ratio of depreciation and amortization over book assets as a proxy for tax shields *other* than leverage for their respective specifications.

Firm size

Larger firms should have more debt capacity (Long and Malitz, 1985; Titman and Wessels, 1988).

Year effects and Fama–French industry fixed effects

These variables account for, inter alia, the time-varying cost of debt, market preferences for leverage, and economic conditions. The Fama–French industry classification is coarser than the Standard Industrial Classification (SIC) system, which allows us to avoid some industry measurement problems (as identified by Hoberg and Phillips, 2010).

The results given in Table A1 are consistent with those reported in the previous literature. In particular, leverage is significantly negatively related to proxies for growth opportunities (e.g., market-to-book ratio, R&D expenditures) and positively related to the importance of tangible assets. Return on assets—a measure of profitability—is negatively related to leverage, which goes against the prediction that profitable firms pay more taxes and therefore issue more debt. However, the negative association we find is consistent with the pecking order theory (Myers and Majluf, 1984): highly profitable firms prefer internal to external finance. Strebulaev (2007) shows that this preference is in accordance with the dynamic trade-off theory with adjustment costs: if leverage cannot be increased instantaneously, then an increase in profitability will raise the firm's value and thus lower its leverage. Bolton and Scharfstein (1990) suggest that a more profitable firm prefers low leverage ratios because they deter the entry of potential rivals.

Table A1
Predicting leverage. This table reports coefficients and (in parentheses) the corresponding statistics used for leverage ratio prediction. The reported numbers are derived using a Tobit specification in which the predicted value of the leverage ratio is restricted to be below 1. Columns 1, 2, and 5–8 show regression results based on the specification used in Kayhan and Titman (2007); columns 3 and 4 show regression results based on the specification used in Fama and French (2002). Columns 1–4 give results based on leverage for when debt is net of cash above the industry average level (normalized by assets); columns 5 and 6 are based on leverage calculated with total debt; and columns 7 and 8 are based on leverage net of all cash. Columns 1, 3, 5, and 7 use book values whereas and columns 2, 4, 6, and 8 use market values. The sample consists of all firms listed in Compustat between 1979 and 2005. All independent variables are from the year *prior* to observation of the dependent variable. The statistics for year and industry dummies are suppressed.

Dependent variable: Leverage	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Kayhan & Titman		Fama & French		Kayhan & Titman (gross debt)		Kayhan & Titman (debt net of all cash)	
	Book	Market	Book	Market	Book	Market	Book	Market
ROA	−0.40***	−0.42***	−0.15***	−0.11***	−0.38***	−0.44***	−0.54***	−0.49***
	(−40.63)	(−43.18)	(−19.08)	(−14.8)	(−43.52)	(−47.54)	(−48.44)	(−44.42)
Market/book	−0.01***	−0.05***	−0.03***	−0.05***	−0.01***	−0.06***	−0.02***	−0.04***
	(−9.21)	(−57.97)	(−29.19)	(−56.99)	(−7.99)	(−63.77)	(−21.9)	(−35.99)
Tangibility	0.10***	0.08***			0.08***	0.05***	0.21***	0.18***
	(14.12)	(10.94)			(11.55)	(7.55)	(24.14)	(21.32)
R&D/sales	−0.17***	−0.16***	−0.17***	−0.15***	−0.06***	−0.07***	−0.28***	−0.21***
	(−15.88)	(−14.09)	(−28.23)	(−25.74)	(−6.22)	(−6.85)	(−23.36)	(−17.79)
R&D dummy	−0.04***	−0.04***	0.00	−0.01	−0.04***	−0.04***	−0.05***	−0.04***
	(−12.03)	(−13.88)	(0.66)	(−1.53)	(−12.45)	(−14.42)	(−12.48)	(−11.1)
SGA/sales	−0.09***	−0.12***			−0.06***	−0.08***	−0.12***	−0.15***
	(−13.89)	(−18.68)			(−9.87)	(−13.74)	(−17.46)	(−22.09)
LN sales	0.03***	0.00			0.03***	0.01***	0.04***	0.01***
	(43.08)	(1.17)			(47.6)	(14.05)	(50.49)	(13.37)
LN assets			0.01***	0.02***				
			(12.25)	(22.64)				
Taxshield			0.91***	0.70***				
			(21.88)	(18.19)				
Intercept	0.21***	0.42***	0.60***	0.33***	0.23***	0.64***	0.13***	0.34***
	(5.39)	(10.21)	(17.96)	(8.37)	(6.69)	(18.61)	(2.94)	(7.62)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	41,530	41,362	50,414	50,267	46,934	46,934	46,934	46,934

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Moreover, in the leverage regression there is a negative coefficient for selling expenses. These expenses are also associated with more unique products, which are less suitable as collateral and are therefore associated with lower leverage levels. Sales and total assets are positively correlated with leverage, which is consistent with the argument that larger firms have more debt capacity. The coefficient for depreciation is positive, against the conjecture that it may serve as an alternative tax shield to debt. Fama and French (2002) also document positive coefficients for depreciation (and negative coefficients, too, with a different sample); they remark that depreciation is a poor proxy for tax shields. Our results are not significantly different when calculating debt net of all cash versus not deducting cash at all.

Appendix C. Pro forma balance sheets

We illustrate the methodology used for the pro forma balance sheets with the following example. On 11 November 2005, the media company McClatchy announced its takeover of Knight Ridder, the second-largest newspaper publisher at that time. Although Knight Ridder had been publicly searching for a potential buyer, McClatchy's interest was surprising: not only was McClatchy viewed as being too risk averse for takeovers on that scale, it was also half the size of Knight Ridder (Lieberman, 2006).

Calculating pro forma variables: Example of McClatchy–Knight Ridder transaction				
Variable	Bidder	Target	Pro forma assuming payment with...	
(in $ millions)	(McClatchy)	(Knight Ridder)	Equity	Cash
Debt	656	2751		
Book equity	1216	1447	1216 + 4572 = 5788	1216
Book assets	1872	4198		
Cash	3	24		
Non-operating cash	0	0	max (27–9% * 9195; 0) = 0	max (27–9% * 9195; 0) = 0
Market value equity	1323	4279	1323 + 4572 = 5895	1323
Transaction value		4572		

(*continued on next page*)

(*continued*)

Calculating pro forma variables: Example of McClatchy–Knight Ridder transaction

Variable	Bidder	Target	Pro forma assuming payment with...	
(in $ millions)	(McClatchy)	(Knight Ridder)	Equity	Cash
Net debt	656	2751	656 + 2751 = 3407	656 + 2751 + 4572 = 7979
Book value of assets	1872	4198	1872 + 2751 + 4572 = 9195	9195
Enterprise value	1979	7030	1979 + 2751 + 4572 = 9302	9302
Leverage	35%	66%	3407/9195 = 37%	7979/9195 = 87%
Market leverage	50%	64%	3407/9302 = 37%	7979/9302 = 86%

We begin by describing how leverage is calculated. Both firms are in the “printing and publishing” industry (Fama–French industry 8), which has an average cash-to-assets ratio of 9%. This means that neither McClatchy nor Knight Ridder has much non-operating cash, and their leverage is simply debt over assets (i.e., debt over enterprise value).

For the pro forma sums, we assume that the bidder (McClatchy) seeks to acquire the target (Knight Ridder) using either 100% cash or 100% equity. Let us consider the effect of each payment method, first on the bidder and then on the target. The value of the bid (i.e., the amount of value paid for the target) is represented by the transaction value—here, $4572 million.

If the bidder pays with equity, then it will fund the transaction value through the exchange of its own shares to acquire the target. The result will be an increase in both the book value and the market value of McClatchy stock by exactly the amount of the transaction value. When the balance sheets of the two companies are combined (or “consolidated”) upon acquisition, the target's equity is replaced with the bidder's equity payment. The bidder must likewise take on the acquired target's debt. In this example, the target's capital structure features a large amount (66%) of debt; hence the bid generates a post-acquisition book leverage ratio that is higher than the bidder's pre-acquisition leverage.

Suppose instead that the bidder chooses to pay for the acquisition with cash. In this case, the bidder must first raise debt in order to finance the purchase and then also assume the target firm's debt. This dynamicis reflected in the significant additional debt held by the combined entity and the reduction in the target's equity by the amount of the transaction value—thus, its shareholders have been “bought out”. An important effect of such transactions is on the leverage structure of the combined entity: its debt as a share of total book value rises to 87% in book terms or 86% in market terms (as compared with 35% and 50%, respectively, for the pre-acquisition bidding firm).

In reality, McClatchy paid a mix of cash and stock. It financed the cash payment by raising bank debt, and it announced plans to reduce the resulting high debt level by selling more than a third of Knight Ridder's 32 newspapers.

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