Do firms have leverage targets? Evidence from acquisitions

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Abstract:

In the context of large acquisitions, we provide evidence on whether firms have target capital structures. We examine how deviations from these targets affect how bidders choose to finance acquisitions, the valuation effects of those decisions, and how bidders adjust their capital structure following the acquisition. We find that when a bidder's leverage is over its target level, it is less likely to finance the acquisition with debt and more likely to finance the acquisition entirely with equity. Bid announcement returns reveal that movements away from an optimal capital structure reduce firm value. Following cash acquisitions that over-lever the firm, managers actively move the firm back to its target leverage, reversing 75% of the acquisition's leverage effect within 5 years. Attempts to mitigate under and overinvestment problems are important determinants of bidders' decisions to maintain a target capital structure. Overall, our results are strongly consistent with a model of capital structure that includes a target level and adjustment costs.

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1 Introduction

Theory and subsequent empirical evidence renders conflicting views on the extent to which firms have meaningful target capital structures. Explanations of financing choices based on market timing have recently joined the pecking order theory as alternative models with some empirical support. We provide evidence on the importance firms and market participants place on leverage targets vs. pecking order or market timing concerns by examining bidders that engage in takeovers that have the potential to significantly affect their capital structure.

We study 1,538 takeovers that are announced and completed between the beginning of 1981 and the end of 1998 in which the target is at least 20% of the bidder's size. We refer to such acquisitions as large acquisitions. To determine how close a firm is to its target capital structure, we follow Kayhan and Titman (2005) and calculate over every year a firm's leverage deviation as the difference between its actual debt ratio and its predicted debt ratio, which is our proxy for its unobservable target ratio.

Studying capital structure decisions around large acquisitions allows us to provide unique insights into these decisions. First, it enables us to determine the role of leverage targets in financing decisions that can radically alter a firm's capital structure. Second, examining market reactions at the announcements of large acquisitions allows us to make novel inferences on the valuation effects of suboptimal capital structures. These valuation effects provide insights into why managers care about leverage targets. Finally, analyzing post-acquisition changes to a bidder's capital structure after debt-financed large acquisitions permits us to complement other investigations of whether firms rebalance their capital structures such as Kayhan and Titman (2005), Leary and Roberts (2005), and Flannery and Rangan (2006).

Many theories of corporate financing posit that firms have target capital structures. For instance, the static tradeoff theory hypothesizes that this target is reached when firms trade off tax benefits of debt financing against financial distress costs (Modigliani and Miller (1963)). Agency models show that target leverage levels are set so that agency costs of debt and equity financing can be minimized (Jensen and Meckling (1976), Myers (1977), and Stulz (1990)). Finally, signaling models provide intuition that target capital structure is driven by costs and benefits of using capital structure to signal a firm's value to market participants (Ross (1977)).

In contrast, the pecking order model developed in Myers and Majluf (1984) and Myers (1984) presents an alternative to the view that managers strive to maintain target debt levels. Their model demonstrates the importance of information asymmetry between managers and market participants in driving financing choices. Due to the fact that adverse selection costs are highest when firms try to issue equity, the pecking order model concludes that managers prefer internal financing, debt financing and equity financing, in that order.

Results on the empirical relevance of the concept of target leverage are mixed. For instance, Titman and Wessels (1988), Rajan and Zingales (1995), Graham (1996), Kayhan and Titman (2005), Leary and Roberts (2005), and Flannery and Rangan (2006) provide evidence consistent with the proposition that firms behave as though they have target capital structures. However, a widely documented finding supporting the pecking order model is that there is a negative association between past profitability and current debt ratios. Also, consistent with the predictions of this model, Shyam-Sunder and Myers (1999) report that external debt financing is mainly driven by the internal financing deficit.[1] Finally, Baker and Wurgler (2002) and Welch

[1] Frank and Goyal (2003) reexamine this issue and conclude that net equity issues rather than net debt issues closely track the financial deficit, contrary to the predictions of the pecking order theory.

(2004) report that changes to a firm's capital structure are largely the result of its stock returns or cumulative attempts by the firm to time the market.

We find that in the planning of large acquisitions, bidders give consideration to their target capital structure. After controlling for other determinants of the method of payment, the probability that a firm pays for an acquisition entirely with cash is negatively associated with the firm's pre-acquisition leverage deviation. Because we also show that most large acquisitions paid for with cash are financed with new debt issues, this suggests that a firm is unlikely to make a cash offer and take on more debt when it is already overleveraged.[2] We also document that a positive leverage deviation makes it more likely that a firm uses only equity to pay for an acquisition.[3] Thus, when firms' debt levels are high relative to their target debt levels, they prefer to finance acquisitions with equity rather than debt.

Our evidence also shows that the greater the increase in the leverage deviation during the pre-acquisition year, the less likely is a bidder to use cash to pay for the acquisition and the more likely is the bidder to pay for the acquisition with stock. This is consistent with the proposition that the effect of recent financing decisions on the firm's deviation from its optimal capital structure affect how managers make the method of payment decision. For instance, if, prior to a bid, a firm's leverage is trending above its target, managers respond to this trend by being less likely to make a cash offer that would lead to even more leverage.

Our analysis of the method of payment decision in large acquisitions provides only minimal support for pecking order or market timing explanations for this decision. Prior work shows that equity issuances are more likely when macroeconomic indicators are unusually strong

[2] See also Bharadwaj and Shivdasani (2003) for evidence that most cash offers are debt financed.
[3] Since 39% of our sample acquisitions are mixed or other payment, this is not simply the opposite of the cash tests. We focus on the pure cash and pure equity acquisitions where the predictions of the hypotheses are unambiguous.

or firms experience abnormal runups in their stock price. Presumably, this occurs because during such instances asymmetric informational problems with market participants are reduced or firms are trying to sell overvalued equity. However, we find that the level of leading economic indicators is unrelated to the decisions to pay for an acquisition with all cash or with all equity. Also, we show that while an abnormal runup in a firm's stock price decreases the likelihood of an all cash bid, acquisitions that are entirely equity financed are not more common following such runups. Finally, our examination of post-acquisition long-run industry stock return performance does not support a market timing explanation for the method of payment used in large acquisitions.

We also examine the determinants of the merger-induced change in a bidder's leverage Here, we find further evidence consistent with firms striving to maintain a target capital structure. We document that the merger-induced change in a bidder's leverage is negatively associated with the both the level of the leverage deviation at the end of the pre-acquisition year and the change in the leverage deviation during that year. Moreover, this change in leverage caused by the merger is also positively associated with the merger-induced change in a bidder's predicted debt ratio. Thus, bidders are more likely to engage in a leverage-increasing acquisition transaction if their target leverage increases as a result of the transaction. Likewise, supporting static tradeoff theory and the concept of target leverage we document a positive association between a bidder's pre-acquisition year tax expenses and both whether cash is used to pay for a large acquisition and the merger-induced change in the bidder's leverage. This suggests the more valuable are interest tax shields to a bidder, the more likely is the bidder to increase financial leverage via a large acquisition.

Myers' (1977) model demonstrates that the potential of underinvestment makes it more costly for a growth firm to be overleveraged than for a mature firm. He discusses the fact that the problem exists due to costly contracting. We find that the negative (positive) association between a bidder's pre-acquisition leverage deviation and the likelihood the bidder pays for a large acquisition with cash (equity) is most pronounced for bidders with more important growth prospects. Likewise, the negative association between this deviation and the merger-induced change in actual leverage is stronger if a bidder has larger growth opportunities. These findings suggest that it is particularly important for firms with larger growth prospects to avoid over-leverage. Consistent with this proposition, Graham and Harvey (2001) report that CFOs of high growth firms place significant importance on the maintenance of a target debt-to-equity ratio.

Given that our findings provide evidence that bidders consider their target capital structure when making large acquisitions, we examine market participants' reactions to such offers. We find the stock market reacts negatively to cash offers made by bidders with positive leverage deviations. Consistent with contracting theory based predictions, we document that this result is driven by overleveraged bidders with large growth opportunity sets.

For firms with few investment opportunities, increases in leverage are preferred. We find that the market also reacts negatively when underleveraged bidders with low growth opportunities announce equity-financed acquisitions. This explanation is consistent with the Jensen (1986) proposition that higher debt levels help to minimize contracting costs in firms with low growth opportunities because it reduces free cash flow available to managers.

We also examine bidders' leverage deviations prior and subsequent to the acquisition. For both cash and equity deals, bidders are slightly underleveraged prior to engaging in large acquisitions. Not surprisingly, for equity deals during the acquisition year and the years

subsequent to the acquisition, the leverage deviation changes only slightly. However, if cash is used as the method of payment, bidders become overleveraged by about twelve cents per dollar of book assets at the end of the acquisition year. By the fifth year after cash deals, they are only overleveraged by three cents per dollar of assets. Thus, the shock to a bidder's capital structure resulting from financing a large acquisition with debt is not permanent. Instead, during the years after the acquisition the firm moves its leverage back towards the target level. This result is consistent with recent findings in Kayhan and Titman (2005), Leary and Roberts (2005), and Flannery and Rangan (2006) that subsequent to shocks to their leverage, firms make attempts to rebalance their capital structure. Also, this finding is supportive of a model of capital structure that allows for costly adjustment.

Finally, for cash acquisitions we examine the determinants of the post-acquisition change in the leverage deviation. Bidders with a higher pre-acquisition leverage deviation are more likely to reverse the effect of the acquisition on their leverage. This is consistent with our findings suggesting it is suboptimal for bidders with positive leverage deviations to make leverage increasing cash acquisitions. Further supporting static tradeoff theory and the concept of target leverage, we document that the higher a bidder's ex-ante bankruptcy risk, the more it reduces its leverage deviation following a cash acquisition. Consistent with our other evidence showing that growth opportunities affect the cost of deviating from an optimal capital structure, we find that the larger are a bidder's growth opportunities, the more it reduces its excess leverage following a cash acquisition.

In sum, our results concerning financing decisions in large acquisitions imply that firms attempt to minimize deviations between actual and target debt levels. However, our findings provide only minimal support for pecking order or market timing explanations for these

decisions. The evidence that during the years subsequent to cash deals, bidders actively move their leverage back towards the target further supports static tradeoff theory and the hypothesis that firms have leverage targets. Additionally, our results indicate that attempts to reduce contracting costs are important determinants of firms' decisions to maintain a target capital structure.

Our analysis of announcement returns allows us to show that deviations from optimal capital structures are priced and that returns at the announcement of investment decisions reflect whether the investment's financing moves the firm closer to or further from its optimal capital structure. Moreover, we show that the size of the firm's growth opportunities is important in determining the cost of capital structure deviations. Specifically, market participants are critical of overleveraged growth firms that further increase their leverage and of firms with negative leverage deviations coupled with marginal investment opportunity sets.

Lastly, our findings also increase the understanding of what determines the method of payment used in corporate takeovers. Prior work shows that this choice can be driven by factors such as growth opportunities (Martin (1996)), agency considerations (Jensen (1986) and Harford (1999)), equity overvaluation (Shleifer and Vishny (2003) and Rhodes-Kropf and Viswanathan (2004)), the need to mitigate information asymmetry about the bidder or target (Hansen (1987), Fishman (1989), and Eckbo, Giammarino, and Heinkel (1990)), or strategic considerations in the face of potential competition for the target (Berkovitch and Narayanan (1990)). However, despite the inherent connection between the method of payment and the method of financing the acquisition, there is minimal evidence on the extent to which a firm considers its pre-acquisition leverage and the potential change in its leverage resulting from the acquisition when deciding

which method of payment to use. Our evidence suggests that capital structure considerations are an important part of the method of payment decision.

The remainder of the paper is organized as follows. The next section reviews related work and discusses testable hypotheses. Section 3 discusses methodological issues. Section 4 presents our empirical results. Finally, Section 5 concludes.

2 Related literature and hypothesis development

2.1 Support for pecking order and market timing explanations of capital structure

Empirical support of pecking order and market timing models of capital structure is a challenge for the view that target capital structures play a strong role in financing decisions. The pecking order model assumes that corporate financing is a function of the sensitivity of a firm to asymmetric information problems between itself and market participants. The more severe are these problems the stronger is the firm's propensity to have a preference for internal financing over debt financing and debt financing over equity financing. Market timing models predict that a firm's capital structure is affected by its attempts to sell overvalued securities.

Empirical findings consistent with the pecking order model include the Titman and Wessels (1988), Baskin (1989), and Rajan and Zingales (1995) finding that there is a negative association between past profitability and debt ratios. Also, Choe, Masulis, and Nanda (1993) provide evidence that firms are more likely to issue equity during periods when macroeconomic conditions are stronger and, as a result, asymmetric information problems are lower. Similarly, Korajczyk, Lucas, and MacDonald (1991) show that equity issuances are more likely when a firm is performing unusually well and it is able to convey good news about itself to market

participants. Finally, Shyam-Sunder and Myers (1999) report that external debt financing is largely driven by the internal financing deficit.

Baker and Wurgler (2002) and Welch (2004) provide evidence that a firm's previous stock returns are the most important determinants of its capital structure. Further, Baker and Wurgler (2002) show that in the security issue decision managers often exploit information asymmetries to benefit current shareholders. Specifically, managers have a higher propensity to sell shares when the firm's market-to-book ratio is higher. Moreover, the effects on capital structure of manager's attempts to time the market are persistent.

2.2 Evidence supporting the existence of target capital structures

Empirical work also provides support for the prediction that firms have target capital structures. For example, there is evidence that debt ratios are related to firm characteristics such as firm size, growth opportunities, liquidation value of assets, and the marginal tax rate in ways that are consistent with static tradeoff and agency theory predictions (Titman and Wessels (1988), Rajan and Zingales (1995), Graham (1996), and Hovakimian, Opler, and Titman (2001)). Moreover, work such as Jung, Kim, and Stulz (1996), Helwege and Liang (1996), and Frank and Goyal (2003) which specifically tests pecking order theory predictions finds little support for these predictions.

There is also evidence that over time capital structures revert back toward target levels (Jalilvand and Harris (1984), Fama and French (2002), Kayhan and Titman (2005), Leary and Roberts (2005), Flannery and Rangan (2006)) and that leverage tends to be surprisingly stable over long periods (Lemmon, Roberts, and Zender (2006)). Kayhan and Titman (2005) show that even the effects of stock price changes and financial deficits on a firm's debt ratio are eventually

at least partially reversed. Myers (1984), Fischer, Heinkel, and Zechner (1989), and Roberts (2002) argue that it is important to take into account adjustment costs when assessing whether firms have target capital structures. Consistent with this argument, Leary and Roberts (2005) and Flannery and Rangan (2006) document that after allowing for costly adjustment the evidence is supportive of firms actively rebalancing their capital structures to stay within an optimal range.

2.3 Hypothesis development

An important hypothesis underlying static tradeoff theory is that firms try to minimize deviations between actual and target debt levels. We refer to this hypothesis as the *target capital structure hypothesis.* The empirical analyses in this study are designed to test this hypothesis in the context of large acquisitions that have the potential to significantly affect a bidder's capital structure. A testable prediction of this hypothesis is that a firm's deviation from its optimal capital structure impacts how it finances acquisitions and thus the method of payment used for acquisitions. A related prediction is that market reactions to announcements of large acquisitions are a function of how the acquisition's financing affects the deviation between a firm's actual and optimal debt level. Finally, another testable prediction of this hypothesis is that if an acquisition significantly increases this deviation, the effect is not permanent. Instead, during the period subsequent to the acquisition, the firm adjusts its debt level back towards its optimal level.

Conversely, the pecking-order and market timing hypotheses predict that acquisition financing decisions will be driven by factors other than the bidder's deviation from its capital structure. The pecking-order hypothesis predicts that the bidder will be more likely to use cash, the greater is its internal slack, the greater is the information asymmetry about its value, and the worse are general economic conditions that would affect overall risk premiums assigned to

information asymmetry. The market-timing hypothesis predicts that bidders are more likely to use equity when they have higher valuations.

Our research design also allows us to test whether the nature of a firm's growth opportunity set is related to the firm's attempts to minimize the deviation from its optimal debt level. In Myers (1977) firms with more growth opportunities suffer from the largest underinvestment problems if their debt level becomes too high. This problem exists because it is too costly to contract around it or renegotiate existing debt contracts as needed. However, Jensen (1986) argues that higher leverage helps to reduce contracting costs in firms with low growth opportunities because interest payments reduce free cash flow available to managers. A testable prediction of this *contracting cost hypothesis* is that the importance of minimizing positive deviations between a firm's actual and target debt level is most pronounced for firms with many growth opportunities. Likewise, it is more important for firms with marginal growth prospects to minimize negative deviations between actual and target debt levels.

The pecking-order hypothesis predicts that high-growth firms will face greater information asymmetry problems and will be more likely to use internal slack or debt financing for acquisitions. The market-timing hypothesis does not make predictions specific to growth prospects.

2.4 Relation to the method of payment literature

Our hypotheses focus on the financing implications of the method of payment in acquisitions. However, there is a long strand of literature focusing on strategic and informational factors affecting the method of payment decision. Theoretical work by Hansen (1987), Fishman (1989), and Eckbo et al. (1990) develops conditions under which information asymmetry about

the bidder, target or both would lead to a preferred method of payment or mix of payments. Berkovitch and Narayanan (1990) show that cash is preferred in a setting where there is competition for the target. Our hypotheses will only find support if financing effects are strong enough to have a role in the method of payment choice in spite of these other factors. Our empirical specifications will attempt to control for the effects hypothesized in these models by including the empirical constructs used by those authors to test their models, including bidder leverage and measures of information asymmetry about the bidder and target.

3 Sample and methodology

3.1 Sample construction and description

We identify the takeovers in our sample from Securities Data Corporation's (SDC) U.S. Mergers and Acquisitions database. Takeovers are announced and completed between the beginning of 1981 and the end of 1998 (we need several years of post-acquisition data for our analysis). To be included in our sample, we require the relative size of the market value of the target's assets to the bidder's assets to be at least twenty percent. Also, we require that during the year prior to the acquisition we have necessary Compustat and CRSP data for the acquirer. This leaves us with a sample of 1,538 acquisitions.

Panel A in Table 1 shows that there is heterogeneity with regard to method of payment. Large acquisitions are paid for with cash and common stock 39 and 22 percent of the time, respectively. A payment consisting of a mix of equity and cash is used 19 percent of the time. Finally, 20 percent of the time other payment types are used.

Panel B in Table 1 provides information on the number of large acquisitions made by bidders over our sample period. Prior work such as Schipper and Thompson (1983), Fuller,

Netter, and Stegemoller (2002), and Klasa and Stegemoller (2006) documents that many bidders are frequent acquirers who make a series of acquisitions over several years. Consequently, it is important to understand the frequency with which bidders are likely to make large acquisitions. Panel B shows that 55 percent of the acquisitions we study are made by bidders who make only one large acquisition over our sample period. Also, this panel documents that 26 percent of the acquisitions in our sample are made by bidders who make two large acquisitions, while the remaining 19 percent of acquisitions are made by bidders who make three or more large acquisitions over our sample period.

Finally, Panel C in Table 1 provides information on the public status of the target. The target is a public firm 30 percent of the time. The remaining targets are evenly split between targets that are a subsidiary of another firm and targets that are private.

3.2 Measurement of the leverage deviation

The leverage deviation is defined as the difference between a firm's actual and predicted book leverage in a given year.[4] To calculate a firm's predicted leverage we use predicted values from the same Tobit regression model used in Kayhan and Titman (2005). The variables that are used to predict leverage are profitability, asset tangibility, research and development expense, selling expense, firm size, market-to-book assets, and industry specific dummies. Our analysis differs from Kayhan and Titman (2005) in that we estimate separate annual regressions to predict

[4] A number of factors lead us to use book rather than market leverage in our analyses. First, whereas large acquisitions are likely to mainly affect book leverage via the change to the bidder's debt burden, such acquisitions affect market leverage both by this change and by the effect of the acquisition on the bidder's stock price. Consequently, using book leverage allows us to focus more closely on whether method of financing choices for large acquisitions are consistent with the concept of target leverage. Second, Myers (1977) argues that a firm's assets in place are a better indicator of the amount of debt the firm can support than are assets not yet in place, the present value of the firm's growth opportunities. Further, he argues that because of this, it is more practical for managers to set target debt ratios in terms of book than market values. Consistent with Myers' (1977) argument, Fama and French (2002) point out that whereas most predictions of trade-off and pecking order models apply directly to book leverage, only some predictions carry over to market leverage.

leverage instead of estimating a pooled regression model. Due to the length of our sample period, we believe that the use of separate annual regression models is more appropriate for our analysis. For comparison with Kayhan and Titman (2005), we present the mean coefficients from our year-by-year regressions in the appendix.

4 Empirical findings

4.1 Bidder and target firm characteristics

Table 2 provides median values for selected bidder and target firm characteristics. These statistics are provided for all deals and for deals in which cash or equity was the sole method of payment used. Panel A shows that bidder firms tend to have a higher value for book assets when cash is used as the method of payment. The median inflation-adjusted values for cash and equity deals are $176 and $94 million, respectively. However, the median inflation-adjusted market value of the bidder's equity is slightly higher for equity than cash deals. The values are $129 million for cash deals and $149 million for equity deals. The higher ratios of market-to-book assets for bidders paying with equity documented in Panel A supports the idea that such bidders have larger growth prospects, consistent with Martin (1996). However, this finding is inconsistent with pecking order predictions that bidders with substantial growth prospects are likely to have larger information asymmetry problems so that they are more likely to choose internal slack or debt to finance an acquisition.

Panel A also documents that bidders paying with equity are less leveraged. Book leverage, defined as long-term debt plus debt in current liabilities scaled by book assets, and long-term debt scaled by book assets are 0.24 and 0.18 for cash deals. For equity deals the respective values are 0.14 and 0.10. However, the pre-acquisition year leverage deviation is

similar between both deal types. Bidders are slightly underleveraged regardless of whether cash or equity is used to pay for an acquisition. Specifically, the leverage deviation is -0.02 and -0.03 for cash and equity deals, respectively.

We also provide statistics for the leverage deviations of the bidders in the top and bottom deviation quintiles (we will use these quintiles in some of our later specifications). The median leverage deviations for the bottom and top leverage deviation quintiles are -0.19 and 0.24, respectively. Consistent with the finding for the entire sample, within these subsamples leverage deviations do not differ depending on whether cash or equity is the form of payment for an acquisition.

Panel A reports that the median merger-induced change in a firm's leverage deviation, the change in the leverage deviation from year-end -1 to 0 relative to a large acquisition, is 0.12 and 0.00 for cash and equity deals, respectively. These findings show that large acquisitions paid for with cash are debt financed and result in important increases to a bidder's leverage deviation. They also indicate that large acquisitions that are stock financed do not markedly affect a bidder's capital structure. As long as the target is not significantly overleveraged itself, a stock swap acquisition with the assumption of target debt would not make the bidder overleveraged. This is true for the median equity bidder since the acquisition does not increase its financial leverage.

Panel A also shows that operating performance is the same for both deal types. Operating income/book assets is 0.16 regardless if cash or equity is used to pay for a large acquisition. Finally, Panel A reports that median cash/total book assets is 0.13 for equity deals, but only 0.06 for cash deals. This univariate result is likely due to the correlation, confirmed earlier, between growth prospects and equity financing of acquisitions. High growth firms tend to hold more cash

(see Kim, Mauer, and Sherman (1998), Opler, Pinkowitz, Stulz, and Williamson (1999), and Mikkelson and Partch (2003)). The lower cash holdings for bidders who pay for a large acquisition with cash further implies that these bidders will need to use debt to finance their acquisitions.

Panel B in Table 2 provides information on target characteristics. The median market value of the target is 91 and 81 million dollars for cash and equity deals, respectively. The relative size of the market value of the target's assets to the market value of the bidder's assets is higher for equity than cash deals. For cash deals this ratio is 0.36 while for equity deals this ratio is 0.43.

Finally, Panel C reports statistics for announcement returns. For all large takeovers we find that, consistent with prior work, announcement returns are lower when the method of payment is equity. Also, consistent with the findings in Fuller, Netter, and Stegemoller (2002) and Officer (2006), we confirm that bidders earn positive announcement returns when acquiring private and subsidiary targets.

4.2 The choice between cash and equity

Table 3 presents results from probit models that examine whether a firm's leverage deviation is related to the decision to pay for a large acquisition entirely with cash.[5] The models control for size using the natural logarithm of CPI-adjusted total book assets. The relative value of the equity of the target to that of the bidder is included as a control for a bidder's propensity to use its own equity in large acquisitions of target equity. We control for the public status of the target as this may influence the method of payment used for the acquisition. Also, there is likely

[5] We acknowledge that there is likely to be a group of bidders that choose to not make large acquisitions due to capital structure considerations. Consequently, our research design only allows us to make inferences about the effect of capital structure considerations on large acquisitions that are actually completed.

to be more information asymmetry regarding the value of private or subsidiary targets and less competition for these targets. Thus, controlling for the public status of the target allows us to partially control for these factors. If the bidder uses cash to pay for a large acquisition it will likely need to raise debt. Thus, the method of payment decision for large acquisitions is likely to be similar to the decision faced by managers of whether to issue debt or equity. Consequently, and to test the relevance of the pecking order and market timing hypotheses in the financing of large acquisitions, we also include variables that come from the Jung, Kim, and Stulz (1996) test of these hypotheses in the context of the decision to issue debt or equity. To control for potential tax shields and a bidder's costs of financial distress in the context of the static tradeoff model, we include tax expenses/book assets, the standard deviation of the bidder's daily stock returns over the year prior to the initial takeover announcement, and the ratio of long-term debt/book assets. We can test for pecking order effects using the value of the leading economic indicators prior to the announcement, the bidder's internal slack (cash/book assets) and growth opportunities/ information asymmetry (market-to-book assets). Further, the bidder's market-to-book assets ratio and its market-adjusted one-year pre-announcement return can test the predictions of the market-timing hypothesis.

The results for the first model in Table 3 show that the pre-acquisition year leverage deviation is significantly negatively associated with the likelihood a bidder uses cash to finance an acquisition. Bharadwaj and Shivdasani (2003) report that debt is used to finance most cash offers. Additionally, the Table 2 results show that large acquisitions paid for with cash are debt financed and markedly increase a bidder's leverage deviation. Consequently, the significant negative coefficient on the leverage deviation variable indicates that when a firm is already

overleveraged it has a lower propensity to pay for a large acquisition with cash and take on even more debt.

The results for the second model in Table 3 document that the change in the pre-acquisition year leverage deviation is also significantly negatively associated with whether a bidder uses cash to pay for a large acquisition. Thus, managers consider the recent trend in how the firm's debt level is deviating from its target level when deciding if they should pay for a large acquisition with cash. For example, if a firm becomes more overleveraged during the pre-acquisition year, managers are likely to avoid increasing leverage further with a cash offer.

We also find that the documented effects of the pre-acquisition year leverage deviation and the change in the deviation during this year are economically significant. For example, a one standard deviation increase (decrease) in the pre-acquisition leverage deviation results in a decrease (increase) of approximately 6.0 percent in the probability a bidder uses cash to pay for a large acquisition. This is sizeable considering a base-level unconditional probability of 39%. Similarly, a one standard deviation increase (decrease) in the change in the leverage deviation during the pre-acquisition year results in approximately a 3.9 percent decrease (increase) in the probability cash is used to pay for a large acquisition.

The third and fourth models in Table 3 provide evidence on whether the results documented in models 1 and 2 are strongest for bidders with large growth opportunity sets. Because such bidders are more likely to suffer from underinvestment problems as a result of having too high a debt load, they may be more likely to give importance to maintaining target debt levels. Consistent with this proposition, the results for the third and fourth models in Table 3 show that the coefficients on variables that interact a firm's ratio of market-to-book assets with the pre-acquisition year leverage deviation or the change in the pre-acquisition year leverage

deviation are significantly negative. This shows that if a bidder has excess or increasing leverage in the presence of significant growth opportunities, it prefers not to pay for a large acquisition with cash. We also note that the results for these two models are inconsistent with pecking order predictions. The pecking order model predicts that in the absence of sufficient slack, firms with greater asymmetric information problems prefer debt over equity financing. However, because higher market-to-book indicates a high percentage of value coming from growth and other intangibles, high market-to-book firms usually have larger information asymmetry. Thus, for high market-to-book firms, this pecking order model would predict a weaker, rather than stronger negative association between the pre-acquisition leverage deviation and the likelihood of financing a large acquisition with debt.

The results for all four of the models in Table 3 show that the likelihood that cash is used to pay for a large acquisition is positively associated with pre-acquisition year tax expenses/book assets and negatively related with the pre-acquisition standard deviation of bidder returns. This supports static tradeoff theory and the concept of target leverage as it is evidence that the more valuable are interest tax shields to a bidder, the more likely is the bidder to structure the financing of a large acquisition in a leverage-increasing way. Further, it is evidence that the higher are the bidder's expected financial distress costs, the less likely is the deal to be financed in a way that increases financial leverage.

The results for all of the models in this table also show that the market-adjusted one-year pre-announcement bidder return is significantly negatively associated with whether an acquisition is paid for entirely with cash. This provides some support to the market timing hypothesis for the method of payment used in large acquisitions, and to the pecking order hypothesis if one believes that high returns imply declining premiums on information

asymmetry. The bidder's market-to-book ratio is negatively related to all cash deals, but only in the final two specifications where market-to-book is also interacted with the bidder's leverage deviation. Further inconsistent with the pecking order hypothesis, the bidder's internal slack and the level of the leading economic indicators is unrelated to whether cash is used to pay for a large acquisition.

Table 4 presents results of models that explain the choice to finance a large acquisition entirely with equity.[6] The control variables are the same as for the models in Table 3. Models 1 and 2 in Table 4 show that all equity bids are more likely when the bidder's pre-acquisition year leverage deviation is positive or it has increased its leverage deviation during this year. This is consistent with overleveraged bidders choosing equity financing to avoid further leverage increases.

Again, the effects of the pre-acquisition year leverage deviation and the change in the deviation during this year are economically significant. A one standard deviation movement in the pre-acquisition leverage deviation (change in leverage deviation) alters the probability a bidder uses only equity to pay for a large acquisition by 6.2% (4.6%) in the same direction. This compares to a baseline unconditional probability of 22%.

The third and fourth models in Table 4 include variables that interact the bidder's ratio of market-to-book assets with the pre-acquisition year leverage deviation and with the change in the pre-acquisition year leverage deviation. The coefficients on both interaction variables are significantly positive. This implies that if a bidder has excess leverage and significant growth opportunities, it is even more likely to pay for a large acquisition with equity.

[6] Again, we note that since 39% of our sample acquisitions are mixed or other payment, this is not simply the opposite of the cash tests. We focus on the pure cash and pure equity acquisitions where the predictions of the hypotheses are unambiguous.

We note that all four models in Table 4 also show that the market-adjusted one-year pre-announcement bidder return and the level of the leading economic indicators are not associated with whether an acquisition is entirely equity financed. These findings cast doubt on pecking order or market timing explanations for the method of payment used in large acquisitions. However, the results for all of the Table 4 models also show that market-to-book assets is positively associated with whether only stock is used to finance a large acquisition. Although, this finding is similar to the one reported in Martin (1996) and supports his argument that bidders with larger growth prospects prefer to use stock to pay for acquisitions, it is also consistent with the market timing explanation. To further examine the plausibility of the market timing explanation, we re-estimate all of the models in Tables 3 and 4, adding the 12- or 24-month post-acquisition equally-weighted stock returns of the firms sharing the same two-digit SIC code as the sample firm (raw or market-adjusted). In untabulated results, we find no evidence that industry stock return performance is worse (better) subsequent to large acquisitions paid entirely with equity (cash). Also, the inclusion of post-acquisition industry stock return variables does not qualitatively affect any of the other Table 3 and 4 results.

4.3 Valuation effects of leverage changes

Because the Table 3 and 4 results show that overleveraged bidders avoid making leverage-increasing cash bids we study announcement returns to examine the market's reaction to such bids. If firms have optimal capital structures and deviations from a firm's optimum have value implications, then returns at the announcements of large acquisitions should be a function

of a bidder's pre-acquisition year leverage deviation and the effect of the acquisition on this deviation. Managers may make decisions that cause a firm to deviate from its optimal capital structure for strategic reasons related to the bid or because, due to agency conflicts, they are choosing a capital structure that is optimal for themselves, but not for outside stockholders.

The models in Table 5 are OLS regressions explaining cumulative abnormal returns at initial acquisition announcements. The control variables are the same as those in the models presented in Tables 3 and 4. The independent variable of interest in the first model is a variable that interacts a dummy variable for whether a bidder makes a cash bid with the firm's pre-acquisition year leverage deviation. The coefficient on this interaction variable is significantly negative, indicating that the market penalizes overleveraged bidders that pay for large acquisitions with cash. As a robustness test, in the second model in Table 5 we test for sensitivity to the definition of excess leverage. We replace the interaction variable used in the first model with an interaction variable that identifies cash bidders with a pre-acquisition year leverage deviation in the top quintile of sample observations. Like the result for the first model, we find that this interaction variable is significantly negatively associated with announcement returns.

Given that the Table 3 and 4 results show that overleveraged bidders with significant growth opportunities are the most likely to avoid making a cash offer, we examine the effect of bidder growth opportunities on announcement returns. To do so, we split our sample into subsamples based on whether a bidder's pre-acquisition year market-to-book assets ratio is below or above the sample median. In the third and fourth models in Table 5 we run the same OLS regressions used in models 1 and 2 on the low market-to-book subsample. In the fifth and sixth models we run these regressions on the high market-to-book subsample.

The results from the third and fourth models show that for the low market-to-book assets subsample there is no value effect for cash offers by bidders with excess leverage, whether measured continuously (model 3) or as the top quintile of leverage deviation (model 4). In contrast, the findings for the fifth and sixth models document that for the high market-to-book assets subsample announcement returns are significantly lower for cash offers by bidders with excess leverage. These results show that the announcement return effects are primarily driven by the subsample of firms with larger growth opportunities. This supports a contracting cost explanation for the valuation effects of moving further from an optimal capital structure. Because costs resulting from underinvestment problems are largest for overleveraged firms with large growth opportunities, such bidders lose value when they make cash offers.

Table 6 again examines announcement returns, but with a focus on variation in returns for bidders paying with equity. Our hypotheses predict that bidders whose leverage is significantly below their target level, but pay for a large acquisition with equity should have the lowest returns. Specifically, we create a variable identifying equity bids by bidders with pre-acquisition year leverage deviations in the lowest quintile for all sample observations and predict a negative coefficient on that variable. This interaction variable is meant to capture instances when the market expects that cash will be used to pay for a large acquisition so that an underleveraged bidder will increase its leverage, but instead the bidder uses equity as the method of payment. The first model in Table 6 provides results for the entire sample. The second and third models report the results, respectively, for subsamples comprised of bidders with pre-acquisition year market-to-book ratios below or above the median sample value.

The Table 6 findings show it is only in the low market-to-book subsample that the coefficient on the interaction variable is significantly negative. This finding supports contracting

theory predictions that it is especially suboptimal for firms with marginal growth opportunities to have a negative leverage deviation. In particular, value is reduced when low-growth bidders with significant negative leverage deviations do not make the leverage-increasing choice of cash payment.

The high market-to-book subsample results show that the coefficient on the interaction variable is positive and weakly significant. This further supports contracting theory predictions. When high growth bidders execute an acquisition without using leverage-increasing cash, the market reacts positively, even when the bidders are underleveraged. In other words, the market prefers that these bidders remain underleveraged, rather than pay for a large acquisition with cash which could likely swing the firm over its leverage target.

4.4 Explaining the change in leverage resulting from large acquisitions

Our results so far show that when financing a large investment such as an acquisition, managers behave as if they have a target capital structure and that deviations from this capital structure are costly. In this section, we examine the actual change in leverage resulting from an acquisition to provide further evidence on the existence and importance of a target capital structure. Subsequently, in the next two sections, we will move past the immediate effect of the acquisition financing and study how managers adjust their capital structure in the years following the acquisition.

Table 7 presents results of models explaining the change in book leverage from year -1 to 0 relative to large acquisitions. Particularly, we are interested in the importance of the pre-acquisition leverage deviation and the merger-induced change in the firm's optimal level of book leverage. The latter variable is measured as predicted book leverage in year +1 relative to a large

acquisition (from our annual cross-sectional regressions predicting book leverage) minus predicted book leverage in year -1. We use year +1 instead of year zero to calculate the change in predicted book leverage because our model uses firms' characteristics in year *t* to predict leverage in year *t+1*. Year 0 is the first year-end where the combined firm characteristics will be available. We note that the control variables used in the Table 7 models are the same as those that are used in the Table 3-6 models.

The results for the first model in Table 7 show that the change in book leverage resulting from a large acquisition is significantly negatively associated with the pre-acquisition year leverage deviation. Managers are less likely to structure an acquisition transaction which significantly increases book leverage the more a firm is already over its target leverage. The inferences are unchanged if we replace the pre-acquisition deviation level with the pre-acquisition change in deviation (model 2). The results for the first two models also show there is a significant positive relation between the merger-induced changes in optimal and actual book leverage. Managers are more likely to structure a leverage-increasing acquisition transaction if their firm's target leverage increases as a result of the acquisition. Both of these results support the hypothesis that managers make financing decisions in the context of a target leverage ratio.[7]

The magnitude of the coefficients in the first two models of Table 7 suggest that the documented effects are economically important. For instance, if the pre-acquisition year leverage deviation per dollar of book assets is 10 cents higher, the merger-induced change in book leverage is reduced by approximately 4 cents per dollar of book assets. Similarly, if the change in

[7] We note that over our sample period the purchase accounting method in which the target's assets are marked up to market value is used for cash acquisitions, while for stock deals the pooling method in which the target's assets are not marked up is typically used. The use of the purchase accounting treatment for cash deals could lead to a smaller increase in the book leverage deviation subsequent to such deals. This could potentially bias our results against rather than in favor of finding significant relations between the merger-induced change in book leverage with the pre-acquisition leverage deviation and the merger-induced change in the firm's optimal level of book leverage.

the leverage deviation during the pre-acquisition year is 10 cents higher, the merger-induced change in book leverage is reduced by approximately 2 cents per dollar of book assets. Finally, the coefficients on the change in optimal leverage variable shows that in financing large acquisitions, bidders incorporate about half of the change to the merged firm's new optimal leverage.

The third and fourth models in Table 7 include interaction variables of the bidder's ratio of market-to-book assets with the pre-acquisition year leverage deviation and with the change in the pre-acquisition year leverage deviation. The coefficient on the interaction variable in the third model is significantly negative. Consistent with the Table 3 and 4 evidence, this suggests attempts to minimize contracting costs help explain why firms strive to maintain a target capital structure.

Lastly, we point out that, consistent with the Table 3 findings, the results for all four of the models in Table 7 indicate there is a positive association between the merger-induced change in book leverage and pre-acquisition year tax expenses/book assets. This further supports static tradeoff theory and the target capital structure hypothesis as it is evidence that when interest tax shields are more valuable, a bidder is more likely to use a large acquisition as a means to increase financial leverage.

4.5 Evolution of leverage deviations and financial deficits around acquisitions

Tables 8 presents median statistics on the evolution of leverage deviations and financial deficits over the period from years -5 to +5 relative to a large acquisition. In order to make changes in these measures comparable from year to year from the pre-acquisition year onwards, we only provide statistics for takeovers made by bidders who remain on Compustat over the

years -1 to +5 relative to the acquisition. Table 8 presents results for large acquisitions made by bidders who either make only one such acquisition over our sample period or are making their first large acquisition in our sample period.[8]

Panel A in Table 8 shows that during the pre-acquisition year the majority of sample firms are underleveraged. The leverage deviation for all acquirers is -3 cents per dollar of assets. For cash and equity bids the leverage deviation is -4 cents and -3 cents per dollar of assets, respectively. This evidence is consistent with the existence of some unused debt capacity for a majority of bidders making large acquisitions.

This panel also shows that at the end of the acquisition year the leverage deviation for all sample firms is 8 cents per dollar of assets. For cash and equity bids the leverage deviation at the end of this year is +12 cents and -1 cent per dollar of assets. This is consistent with the Table 2 evidence for the full sample that indicates cash bids, but not equity bids, result in an important increase in the leverage deviation.

Finally, Panel A shows that whereas for equity deals the leverage deviation changes only slightly from years 0 to +5 relative to the acquisition, for cash deals the leverage deviation reverts toward zero over this period. For cash deals the leverage deviation decreases to 3 cents per dollar of assets by year +5. Thus, during the five years subsequent to cash deals bidders reverse 75% of the effect of the acquisition on their leverage, consistent with the target capital structure hypothesis. However, the length of time it takes to achieve this reversal is consistent with the idea that firms face adjustment costs when trying to rebalance their capital structures (Leary and Roberts (2005) and Flannery and Rangan (2006)).

[8] We repeat the analysis for large acquisitions made by bidders who make only one large acquisition over our sample period. The results are very similar.

Panel B reports annual changes in the leverage deviation. For cash deals there is some evidence that during the years prior to large acquisitions there are significant decreases in the leverage deviation. Thus, the Table 8 results not only suggest there is unused debt capacity prior to large acquisitions, but also indicate that this capacity may in part come about during the years immediately prior to a large acquisition.

Consistent with the Panel A results, Panel B also shows that there is a large increase (14 cents per dollar of assets) in the leverage deviation resulting from cash acquisitions, but only a marginal change (1 cent per dollar of assets) in the leverage deviation from stock-financed acquisitions.[9] Finally, Panel B shows that, consistent with acquirers trying to rebalance their capital structure subsequent to all large acquisitions and to large acquisitions paid for with cash, there are significant decreases in the leverage deviation during years +1, +2, +4, and +5 relative to such acquisitions. In contrast, the leverage deviation does not significantly change during any of the five years subsequent to large acquisitions paid for with equity.

Panels C, D, and E provide information on the total financial deficit/book assets, the financial deficit from debt financing/book assets, and the financial deficit from equity financing/book assets. The financial deficit from debt financing is long-term debt issuance minus long-term debt reduction. Similarly, the financial deficit from equity financing is the sale of common and preferred stock minus purchase of common and preferred stock. Thus, the total financial deficit is defined as the sum of the financial deficits from debt and equity financing.

We examine the financial deficit statistics to determine whether changes in the leverage deviation over time are related to financial deficits. Since cash acquisitions have the most

[9] Purchase vs. pooling accounting would not explain the finding that the leverage deviation markedly increases subsequent to cash deals, but only marginally increases after stock deals. To the contrary, the use of the purchase accounting treatment for cash deals could lead to a smaller increase in the book leverage deviation subsequent to such deals.

substantial increase in leverage deviation, we focus our discussion of the relation between changes in the leverage deviation and financial deficits there. For cash deals the change in the leverage deviation during the acquisition year and the financial deficit from debt during this year are closely related. As noted earlier, during this year the median change in the leverage deviation is approximately 14 cents per dollar of assets. Most of the increase in the leverage deviation occurs as a result of new debt issues since during the acquisition year the financial deficit covered by debt is also approximately 14 cents per dollar of assets.

However, although the financial deficit from debt is negative during all of the years from years +1 to +5 relative to the acquisition year, the magnitude and statistical significance of the financial deficit values indicate that debt reduction is only one of several factors causing the leverage deviation to decrease over this period. Other corporate restructuring events and internal growth taking place subsequent to the takeover likely also play a role in the decrease of the leverage deviation during the five years subsequent to cash deals.

4.6 Explaining the post-acquisition change in the leverage deviation

Table 9 provides evidence on the determinants of the change in the leverage deviation from year 0 to years +3, +4, and +5 with respect to the year when a large cash acquisition takes place. The results of this analysis provide insights into what leads bidders to reverse the effect of a cash acquisition on their leverage. The Tables 3, 4, and 7 results show that a bidder above its target leverage is unlikely to pay for a large acquisition with cash and take on even more debt. Further, our announcement return findings indicate that the market penalizes bidders that are already over their leverage target, but still finance a large acquisition with cash. Putting together these two sets of results, we predict that after an overleveraged bidder pays for a large

acquisition with cash, it makes an effort to quickly undo the effect of the acquisition on its leverage. Thus, we focus our attention on two variables that measure a bidder's excess leverage. The first is the pre-acquisition leverage deviation (models 1, 3 and 5) and the second is the immediate post-acquisition (year 0) leverage deviation. While the second more directly captures the degree of excess leverage that the bidder would like to reverse, it is also subject to the criticism that it could be mechanically related to the dependent variable (post-acquisition change in leverage deviation).

Leary and Roberts (2005) and Flannery and Rangan (2006) argue that subsequent to shocks to its capital structure, adjustment costs affect a firm's ability to quickly rebalance its capital structure. In our models we include two proxies for adjustment costs used in Leary and Roberts (2005). First, we include a variable measuring the firm's bankruptcy risk. As in Graham (1996) and Leary and Roberts (2005) we use a modified unlevered version of the Altman-Z score based on Mackie-Mason (1990). We construct our variable measuring bankruptcy risk as does Graham (1996). This variable is defined as (total book assets)/(3.3 times earning before interest and taxes + sales + 1.4 times retained earnings + 1.2 times working capital). Our second proxy for adjustment costs is a dummy variable for whether the firm has an S&P credit rating that is BBB or higher. We note that the Table 9 models include all of the control variables used in our previous models.

Consistent with our predictions, the results for models 1, 3, and 5 in Table 9 show that the higher a bidder's pre-acquisition leverage deviation, the more the bidder reduces its leverage deviation subsequent to a cash acquisition. Thus, if an already overleveraged bidder pays for a large acquisition with cash, perhaps because the circumstances of the acquisition make this

necessary, the bidder is likely to make a concerted effort to reverse the acquisition's effect on its leverage.

These three models further document that the bankruptcy risk measure is significantly negatively related to post-acquisition changes in the leverage deviation. Thus, bidders making large cash acquisitions that face greater bankruptcy risk prior to the acquisition are more likely to significantly reduce their leverage after the acquisition. This further supports static tradeoff theory predictions that firms have target debt ratios determined by trading-off bankruptcy costs against the benefits of debt.

The results of models 1, 3 and 5 also show that the bidder's pre-acquisition year market-to-book assets ratio is significantly negatively related to the change in the bidder's leverage deviation from year 0 to years +3, +4, and +5 relative to the acquisition year. This indicates that bidders with more growth opportunities are more likely to reduce their debt levels to move them back toward their target level after paying for a large acquisition with cash. Consequently, these results are consistent with our earlier results providing evidence that the minimization of contracting costs is an important determinant of firms' decisions to maintain a target capital structure.

The results for models 2, 4, and 6 in Table 9 document that the year 0 post-acquisition leverage deviation variable is significantly negatively associated with subsequent changes in the leverage deviation. The magnitude of the coefficients on this variable in the three models are consistent with managers actively rebalancing their capital structures toward more optimal levels following large cash acquisitions. For instance, the coefficient on the post-acquisition leverage deviation variable in model 6 indicates that roughly 60 percent of a bidder's post-acquisition leverage deviation is reversed five years after the deal.

Like the model 1, 3, and 5 results, the model 2, 4, and 6 results also indicate that firms facing higher pre-acquisition bankruptcy risk reduce their leverage more after large acquisitions paid for with cash. Thus, our results on post-acquisition leverage changes are consistent with the results in Leary and Roberts (2005) showing that firms are significantly more likely to make leverage decreasing adjustments to their capital structure, the higher is their debt and their unlevered bankruptcy risk.

5 Conclusion

We provide evidence on capital structure targets in the context of 1,538 large acquisitions. Such acquisitions can potentially markedly alter a firm's capital structure. Using an unbiased estimate of the bidder's optimal capital structure, we are able to explore how deviations from that optimum affect how it chooses to finance an acquisition, the valuation effects of that decision, and how it adjusts its capital structure following the acquisition.

Our evidence suggests that firms have target capital structures, managers try not to move too far from them, and that deviations from these optima have real value implications. Overleveraged firms are more likely to choose equity and underleveraged firms to choose cash to pay for a large acquisition. Cash payment significantly increases the leverage of the combined firm, pushing it well above its target leverage on average. Firms respond by reducing their leverage back toward their target level in the years immediately following the acquisition. Within five years, they have reversed 75% of the effect of the acquisition financing. A firm's speed of adjustment back to its target level and the effect of a firm's deviation from its optimal capital structure on its acquisition financing choice are related to the size of its growth opportunities, supporting the importance of contracting costs. Further, the market reaction to the

announcement of a bid helps us understand why managers care about their target capital structure and actively seek to stay close to it. There are clear negative valuation effects from financing decisions that move a firm further away from its target capital structure. Again, these effects are related to the bidder's growth opportunities.

Our tests provide little evidence in support of either pecking order or market timing explanations of corporate financing decisions. Overall, our evidence is strongly consistent with a model of capital structure that includes a target level and adjustment costs.

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Table 1: Method of payment, multiple acquirer, and target public status characteristics

The sample consists of 1538 takeovers that are announced and take place between the beginning of 1981 and the end of 1998 in which the relative size of the target to the bidder is at least 20 percent.

	Fraction of sample
Panel A: Method of payment characteristics	
Cash is the method of payment	0.39
Equity is the method of payment	0.22
A combination of cash and equity is the method of payment	0.19
Other payment types are used	0.20
Panel B: Multiple acquirer characteristics	
Fraction of acquirers making one large acquisition	0.55
Fraction of acquirers making two large acquisitions	0.26
Fraction of acquirers making three or more large acquisitions	0.19
Panel C: Target public status characteristics	
The target is a public firm	0.30
The target is a subsidiary of another firm	0.35
The target is a private firm	0.35

Table 2: Bidder, target, and announcement return characteristics

The sample consists of 1538 takeovers that are announced and take place between the beginning of 1981 and the end of 1998 in which the relative size of the target to the bidder is at least 20 percent. All accounting variables are measured during the fiscal year prior to the initial announcement of the takeover bid. Target relative size is calculated as market value of target assets/market value of bidder assets. Book leverage equals long-term debt plus debt in current liabilities scaled by book assets. Leverage deviation is actual book leverage minus predicted book leverage from a regression model predicting book leverage. Merger-induced change in the leverage deviation is the change in the leverage deviation from year -1 to 0 relative to the acquisition. The announcement return is the cumulative abnormal return (market model error) over the three day window from day -1 to +1 relative to the initial acquisition announcement.

	All deals	Cash payment	Equity payment
Panel A: Median bidder characteristics			
CPI adjusted total book assets (millions)	112.73	175.88	94.26***
CPI adjusted market value of equity (millions)	98.72	128.83	148.59
Market-to-book assets	1.33	1.24	1.74***
Book leverage	0.21	0.24	0.14***
Long-term debt/total book assets	0.15	0.18	0.10***
Leverage deviation	-0.02	-0.02	-0.03
Leverage deviation of bottom deviation quintile	-0.19	-0.19	-0.19
Leverage deviation of top deviation quintile	0.24	0.25	0.24
Merger-induced change in leverage deviation	0.06	0.12	0.00***
Operating income/book assets	0.15	0.16	0.16
Cash/total book assets	0.07	0.06	0.13***
Panel B: Median target characteristics			
CPI adjusted target value (millions)	69.78	91.06	80.89
Target relative size	0.39	0.36	0.43***
Panel C: Median announcement returns			
All targets	0.012	0.012	-0.004***
All public targets	-0.008	0.000	-0.034***
All subsidiary targets	0.024	0.018	0.002
All private targets	0.025	0.021	0.023

***, **, and * represent significance at the 1, 5, and 10 percent levels, respectively, for two-tailed Wilcoxon rank-sum tests to determine whether distributions differ between cash and equity deals.

Table 3: Predicting cash bids

Logit models predicting when the method of payment is cash only. The sample consists of 1538 takeovers that are announced and take place between the beginning of 1981 and the end of 1998 in which the relative size of the target to the bidder is at least 20 percent. The dependent variable equals one if the method of payment is all cash and equals zero otherwise. All accounting variables are calculated as of the fiscal year prior to the first announcement of a takeover. Leverage deviation is actual book leverage minus predicted book leverage from a regression model predicting book leverage. Relative size of target to bidder firm uses equity values to measure size. Standard deviation of bidder returns is the standard deviation of daily bidder returns over the year prior to the initial takeover announcement. Market-adjusted one-year pre-announcement bidder return is measured from month -13 to -1 relative to the initial takeover announcement.

Dependent Variable = 1 if Payment is Cash Only				
Intercept	-0.304 (0.127)	-0.264 (0.184)	-0.126 (0.533)	-0.085 (0.675)
Pre-acquisition year leverage deviation	-0.344 (0.014)		0.241 (0.183)	
Pre-acquisition year change in leverage deviation		-0.286 (0.007)		0.040 (0.752)
Pre-acquisition year leverage deviation*Market-to-book assets			-0.281 (0.000)	
Pre-acquisition year change in leverage deviation*Market-to-book assets				-0.180 (0.000)
Natural logarithm of CPI adjusted book assets	0.014 (0.212)	0.015 (0.160)	0.013 (0.217)	0.013 (0.228)
Relative size of target to bidder	0.009 (0.200)	0.009 (0.219)	0.006 (0.392)	0.005 (0.505)
Target is a private firm dummy	0.065 (0.094)	0.068 (0.080)	0.057 (0.143)	0.057 (0.147)
Target is a subsidiary dummy	0.335 (0.000)	0.334 (0.000)	0.322 (0.000)	0.320 (0.000)
Standard deviation of bidder returns	-1.830 (0.066)	-2.222 (0.024)	-2.000 (0.045)	-2.213 (0.025)
Long-term debt/total assets	0.419 (0.005)	0.178 (0.054)	0.240 (0.120)	0.151 (0.103)
Leading economic indicator	-0.000 (0.945)	-0.000 (0.996)	-0.000 (0.773)	-0.001 (0.733)
Market-adjusted one-year pre-announcement bidder return	-0.085 (0.005)	-0.086 (0.005)	-0.080 (0.008)	-0.074 (0.016)
Market-to-book assets	-0.005 (0.445)	-0.006 (0.340)	-0.078 (0.000)	-0.083 (0.000)
Cash/book assets	-0.120 (0.166)	-0.106 (0.225)	-0.063 (0.475)	-0.025 (0.780)
Tax expenses/book assets	0.994 (0.013)	0.909 (0.023)	1.407 (0.001)	1.404 (0.001)
Pseudo-R^2	0.113	0.112	0.128	0.127
N	1349	1337	1349	1337

Marginal effects estimates are presented. Significance levels for whether estimates are different from zero are in parentheses.

Table 4: Predicting equity bids

Logit models predicting when the method of payment is equity only. The sample consists of 1538 takeovers that are announced and take place between the beginning of 1981 and the end of 1998 in which the relative size of the target to the bidder is at least 20 percent. The dependent variable equals one if the method of payment is all equity and equals zero otherwise. All accounting variables are calculated as of the fiscal year prior to the first announcement of a takeover. Leverage deviation is actual book leverage minus predicted book leverage from a regression model predicting book leverage. Relative size of target to bidder firm uses equity values to measure size. Standard deviation of bidder returns is the standard deviation of daily bidder returns over the year prior to the initial takeover announcement. Market-adjusted one-year pre-announcement bidder return is measured from month -13 to -1 relative to the initial takeover announcement.

Dependent Variable = 1 if Payment is Equity Only				
Intercept	0.261 (0.085)	0.252 (0.094)	0.157 (0.309)	0.137 (0.372)
Pre-acquisition year leverage deviation	0.358 (0.000)		-0.065 (0.619)	
Pre-acquisition year change in leverage deviation		0.338 (0.000)		0.116 (0.262)
Pre-acquisition year leverage deviation*Market-to-book assets			0.177 (0.000)	
Pre-acquisition year change in leverage deviation*Market-to-book assets				0.101 (0.000)
Natural logarithm of CPI adjusted book assets	-0.013 (0.119)	-0.016 (0.043)	-0.011 (0.168)	-0.013 (0.115)
Relative size of target to bidder	0.002 (0.608)	0.002 (0.619)	0.004 (0.420)	0.005 (0.331)
Target is a private firm dummy	-0.131 (0.000)	-0.129 (0.000)	-0.127 (0.000)	-0.124 (0.000)
Target is a subsidiary dummy	-0.328 (0.000)	-0.326 (0.000)	-0.318 (0.000)	-0.317 (0.000)
Standard deviation of bidder returns	-0.589 (0.392)	-0.404 (0.549)	-0.188 (0.786)	-0.056 (0.934)
Long-term debt/total assets	-0.560 (0.000)	-0.318 (0.000)	-0.421 (0.000)	-0.285 (0.000)
Leading economic indicator	-0.002 (0.154)	-0.002 (0.107)	-0.002 (0.170)	-0.002 (0.168)
Market-adjusted one-year pre-announcement bidder return	0.012 (0.413)	0.009 (0.523)	0.005 (0.729)	0.003 (0.851)
Market-to-book assets	0.012 (0.005)	0.014 (0.001)	0.050 (0.000)	0.050 (0.000)
Cash/book assets	0.117 (0.054)	0.095 (0.115)	0.063 (0.317)	0.026 (0.678)
Tax expenses/book assets	-0.241 (0.399)	-0.167 (0.555)	-0.427 (0.132)	-0.371 (0.188)
Pseudo-R^2	0.151	0.152	0.173	0.170
N	1349	1337	1349	1337

Marginal effects estimates are presented. Significance levels for whether estimates are different from zero are in parentheses.

Table 5: Valuation effects of acquisition financing decisions: focus on cash

The sample consists of 1538 takeovers that are announced and take place between the beginning of 1981 and the end of 1998 in which the relative size of the target to the bidder is at least 20 percent. Models 1 and 2 include all observations. Models 3 and 4 include observations for bidders with a pre-acquisition year market-to-book assets ratio below the sample median. Models 5 and 6 include observations for bidders with a pre-acquisition year market-to-book assets ratio above the sample median. The dependent variable is the cumulative abnormal return (market model error) over the three day window from day -1 to +1 relative to the initial acquisition announcement. Cash payment dummy equals one if the payment is all cash and equals zero otherwise. High pre-acquisition year leverage deviation dummy equals one if the value for this variable is in the first quintile of all sample year observations. All accounting variables are calculated as of the fiscal year prior to the first announcement of a takeover. Leverage deviation is actual book leverage minus predicted book leverage from a regression model predicting book leverage. Relative size of target to bidder firm uses equity values to measure size. Standard deviation of bidder returns is the standard deviation of daily bidder returns over the year prior to the initial takeover announcement. Market-adjusted one-year pre-announcement bidder return is measured from month -13 to -1 relative to the initial takeover announcement.

	All Observations		Low M/B		High M/B	
Intercept	-0.056 (0.209)	-0.052 (0.250)	-0.060 (0.324)	-0.053 (0.383)	-0.093 (0.170)	-0.081 (0.229)
Cash payment dummy	0.001 (0.822)	0.007 (0.266)	0.003 (0.665)	0.002 (0.802)	-0.001 (0.908)	0.013 (0.211)
Pre-acquisition year leverage deviation	-0.020 (0.577)		-0.006 (0.924)		-0.057 (0.236)	
Cash payment dummy*Pre-acquisition year leverage deviation	-0.083 (0.019)		-0.041 (0.396)		-0.117 (0.019)	
High pre-acquisition year leverage deviation dummy		-0.000 (0.976)		-0.012 (0.527)		0.005 (0.797)
Cash payment dummy* High pre-acquisition year leverage deviation dummy		-0.029 (0.085)		0.003 (0.904)		-0.067 (0.011)
Natural logarithm of CPI adjusted book assets	-0.001 (0.688)	-0.007 (0.759)	-0.001 (0.836)	-0.001 (0.811)	-0.000 (0.906)	-0.000 (0.936)
Relative size of target to bidder firm equity	0.009 (0.067)	0.009 (0.069)	0.009 (0.090)	0.009 (0.093)	0.005 (0.446)	0.006 (0.391)
Target is a private firm dummy	0.046 (0.000)	0.047 (0.000)	0.037 (0.003)	0.037 (0.003)	0.051 (0.000)	0.053 (0.000)
Target is a subsidiary dummy	0.051 (0.000)	0.050 (0.000)	0.030 (0.007)	0.029 (0.008)	0.073 (0.000)	0.073 (0.000)
Standard deviation of bidder returns	1.379 (0.000)	1.349 (0.000)	1.316 (0.001)	1.305 (0.001)	1.447 (0.027)	1.346 (0.034)
Long-term debt/total assets	0.071 (0.058)	0.045 (0.092)	0.033 (0.538)	0.030 (0.405)	0.129 (0.018)	0.074 (0.063)
Leading economic indicator	-0.000 (0.838)	-0.000 (0.827)	-0.000 (0.763)	-0.000 (0.728)	0.000 (0.866)	0.000 (0.910)
Market-adjusted one-year pre-announcement bidder return	-0.035 (0.000)	-0.035 (0.000)	-0.014 (0.291)	-0.014 (0.295)	-0.039 (0.001)	-0.037 (0.001)
Market-to-book assets	0.002 (0.149)	0.002 (0.183)	0.029 (0.206)	0.029 (0.214)	0.002 (0.365)	0.002 (0.340)
Cash/book assets	-0.007 (0.772)	-0.005 (0.831)	-0.024 (0.399)	-0.023 (0.423)	0.017 (0.634)	0.019 (0.594)
Tax expenses/book assets	-0.092 (0.332)	-0.098 (0.297)	-0.246 (0.142)	-0.238 (0.154)	-0.032 (0.798)	-0.060 (0.612)
R^2-adjusted	0.140	0.138	0.144	0.144	0.150	0.147
N	1340	1340	673	673	667	667

Significance levels for whether estimates are different from zero corrected for heteroskedasticity using White's (1980) correction are in parentheses.

Table 6: Valuation effects of acquisition financing decisions: focus on equity

The sample consists of 1538 takeovers that are announced and take place between the beginning of 1981 and the end of 1998 in which the relative size of the target to the bidder is at least 20 percent. Model 1 includes all observations. Model 2 includes observations for bidders with a pre-acquisition year market-to-book assets ratio below the sample median. Model 3 includes observations for bidders with a pre-acquisition year market-to-book assets ratio above the sample median. The dependent variable is the cumulative abnormal return (market model error) over the three day window from day -1 to +1 relative to the initial acquisition announcement. Equity payment dummy equals one if the payment is all equity and equals zero otherwise. Low pre-acquisition year leverage deviation dummy equals one if the value for this variable is in the lowest quintile of all sample year observations. All accounting variables are calculated as of the fiscal year prior to the first announcement of a takeover. Leverage deviation is actual book leverage minus predicted book leverage from a regression model predicting book leverage. Relative size of target to bidder firm uses equity values to measure size. Standard deviation of bidder returns is the standard deviation of daily bidder returns over the year prior to the initial takeover announcement. Market-adjusted one-year pre-announcement bidder return is measured from month -13 to -1 relative to the initial takeover announcement.

	All Observations	Low M/B	High M/B
Intercept	-0.039 (0.380)	-0.052 (0.398)	-0.061 (0.356)
Equity payment dummy	-0.018 (0.050)	-0.004 (0.815)	-0.028 (0.012)
Low pre-acquisition year leverage deviation dummy	0.007 (0.411)	0.015 (0.200)	-0.001 (0.919)
Equity payment dummy*Low pre-acquisition year leverage deviation dummy	-0.004 (0.811)	-0.067 (0.033)	0.035 (0.085)
Natural logarithm of CPI adjusted book assets	-0.001 (0.755)	-0.001 (0.734)	-0.000 (0.909)
Relative size of target to bidder firm equity	0.009 (0.070)	0.010 (0.053)	0.004 (0.578)
Target is a private firm dummy	0.043 (0.000)	0.035 (0.006)	0.048 (0.000)
Target is a subsidiary dummy	0.045 (0.000)	0.028 (0.009)	0.066 (0.000)
Standard deviation of bidder returns	1.335 (0.001)	1.339 (0.001)	1.310 (0.043)
Long-term debt/total assets	0.027 (0.272)	0.016 (0.624)	0.048 (0.168)
Leading economic indicator	-0.000 (0.762)	-0.000 (0.728)	-0.000 (0.929)
Market-adjusted one-year pre-announcement bidder return	-0.034 (0.000)	-0.015 (0.267)	-0.037 (0.002)
Market-to-book assets	0.003 (0.092)	0.030 (0.205)	0.002 (0.195)
Cash/book assets	-0.006 (0.816)	-0.027 (0.371)	0.018 (0.613)
Tax expenses/book assets	-0.085 (0.358)	-0.217 (0.198)	-0.046 (0.697)
R^2-adjusted	0.139	0.152	0.146
N	1340	673	667

Significance levels for whether estimates are different from zero corrected for heteroskedasticity using White's (1980) correction are in parentheses.

Table 7: Explaining the merger-induced change in book leverage

The sample consists of 1538 takeovers that are announced and take place between the beginning of 1981 and the end of 1998 in which the relative size of the target to the bidder is at least 20 percent. The dependent variable is the change in book leverage from year -1 to 0 relative to an acquisition. All accounting variables are calculated as of the fiscal year prior to the first announcement of a takeover. Leverage deviation is actual book leverage minus predicted book leverage from a regression model predicting book leverage. Merger-induced change in optimal book leverage is the change in predicted book leverage from year -1 to +1 relative to an acquisition. Relative size of target to bidder firm uses equity values to measure size. Standard deviation of bidder returns is the standard deviation of daily bidder returns over the year prior to the initial takeover announcement. Market-adjusted one-year pre-announcement bidder return is measured from month -13 to -1 relative to the initial takeover announcement.

Dependent Variable: Leverage in the year following the merger minus leverage in the year prior to the merger				
Intercept	0.060 (0.317)	0.096 (0.114)	0.074 (0.215)	0.107 (0.077)
Pre-acquisition year leverage deviation	-0.382 (0.000)		-0.317 (0.000)	
Pre-acquisition year change in leverage deviation		-0.224 (0.000)		-0.202 (0.000)
Pre-acquisition year leverage deviation*Market-to-book assets			-0.031 (0.006)	
Pre-acquisition year change in leverage deviation*Market-to-book assets				-0.011 (0.247)
Merger-induced change in optimal book leverage	0.472 (0.005)	0.441 (0.005)	0.488 (0.004)	0.450 (0.004)
Natural logarithm of CPI adjusted book assets	-0.007 (0.021)	-0.003 (0.351)	-0.008 (0.015)	-0.003 (0.288)
Relative size of target to bidder	0.002 (0.439)	0.002 (0.295)	0.002 (0.470)	0.002 (0.335)
Target is a private firm dummy	0.010 (0.361)	0.015 (0.201)	0.009 (0.436)	0.014 (0.246)
Target is a subsidiary dummy	0.050 (0.000)	0.053 (0.000)	0.048 (0.000)	0.051 (0.000)
Standard deviation of bidder returns	-0.027 (0.930)	-0.290 (0.346)	-0.102 (0.743)	-0.323 (0.301)
Long-term debt/total assets	0.026 (0.611)	-0.264 (0.000)	0.006 (0.910)	-0.266 (0.000)
Leading economic indicator	0.000 (0.732)	0.000 (0.681)	0.000 (0.707)	0.000 (0.699)
Market-adjusted one-year pre-announcement bidder return	-0.003 (0.684)	-0.000 (0.968)	-0.002 (0.817)	0.000 (0.970)
Market-to-book assets	0.007 (0.003)	0.005 (0.104)	0.001 (0.697)	0.001 (0.826)
Cash/book assets	-0.038 (0.178)	-0.031 (0.283)	-0.031 (0.281)	-0.025 (0.408)
Tax expenses/book assets	0.296 (0.014)	0.231 (0.060)	0.310 (0.010)	0.247 (0.047)
R^2-adjusted	0.183	0.163	0.186	0.163
N	1226	1219	1226	1219

Significance levels for whether estimates are different from zero corrected for heteroskedasticity using White's (1980) correction are in parentheses.

Table 8 – Median leverage and financial deviations from years -5 to +5

The sample consists of 1538 takeovers that are announced and take place between the beginning of 1981 and the end of 1998 in which the relative size of the target to the bidder is at least 20 percent. If a firm makes more than one large relative size acquisition over our sample period the results for only the first acquisition are included in the analysis. Results are only presented for acquisitions in which the acquiring firm remains in Compustat from years -1 to +5 relative to the acquisition year. The leverage deviation is actual book leverage minus predicted book leverage from a regression model predicting book leverage. Total financial deficit is sale of common and preferred stock plus long-term debt issuance minus purchase of common and preferred stock minus long-term debt reduction. Financial deficit from debt financing is long-term debt issuance minus long-term debt reduction. Financial deficit from equity financing is sale of common and preferred stock minus purchase of common and preferred stock. Number of observations appears under the median values.

Year relative to acquisition	-5	-4	-3	-2	-1	0	1	2	3	4	5
Panel A: Leverage deviation											
All	-0.0199	-0.0206	-0.0360[b]	-0.0246	-0.0328[a]	0.0774[a]	0.0590[a]	0.0517[a]	0.0473[a]	0.0414[a]	0.0270[a]
	381	424	478	552	559	559	559	559	559	559	559
Cash Payment	-0.0080	-0.0244	-0.0361	-0.0161	-0.0406[b]	0.1236[a]	0.0978[a]	0.0960[a]	0.0914[a]	0.0547[a]	0.0295[a]
	168	185	200	226	229	229	229	229	229	229	229
Equity Payment	-0.0552[c]	-0.0648[a]	-0.0547	-0.0399[c]	-0.0345[b]	-0.0127	-0.0327	-0.0189	-0.0371	-0.0352	-0.0276
	65	71	87	111	112	112	112	112	112	112	112
Panel B: Change in leverage deviation from previous year											
All	-0.0098[a]	-0.0050	-0.0087[a]	-0.0060	-0.0143[a]	0.0631[a]	-0.0150[a]	-0.0090[b]	-0.0088	-0.0056[b]	-0.0087[c]
	343	381	424	478	552	559	559	559	559	559	559
Cash Payment	-0.0050	-0.0099	-0.0136[a]	-0.0012	-0.0189[a]	0.1387[a]	-0.0289[a]	-0.0133[b]	-0.0044	-0.0104[a]	-0.0110[c]
	154	168	185	200	226	229	229	229	229	229	229
Equity Payment	-0.0055	-0.0107	-0.0095	-0.0192[b]	-0.0002	0.0123[b]	-0.0086	-0.0085	-0.0153	0.0024	-0.0025
	60	65	71	87	111	112	112	112	112	112	112
Panel C: Total Financial deficit/book assets											
All	0.0000	-0.0003[c]	0.0017[a]	0.0007[a]	0.0012[a]	0.0998[a]	0.0126[a]	0.0019[a]	-0.0021[b]	-0.0049	-0.0058[b]
	341	366	415	488	494	492	479	485	472	476	469
Cash Payment	-0.0078	-0.0048	-0.0033	0.0000	-0.0013	0.1485[a]	-0.0032[c]	-0.0021	0.0092	-0.0062	-0.0088[b]
	156	158	174	202	206	206	196	207	202	205	192
Equity Payment	0.0063[b]	0.0002	0.0085[a]	0.0094[a]	0.0099[a]	0.0424[a]	0.0218[a]	0.0116[a]	-0.0043	-0.0047	-0.0060
	56	63	79	99	95	98	98	96	87	88	92
Panel D: Financial deficit from debt financing/book assets											
All	-0.0053[a]	-0.0350[c]	-0.0024[b]	-0.0018	-0.0023	0.0520[a]	-0.0005[b]	-0.0025	-0.0007	-0.0037[b]	-0.0041[a]
	363	396	443	516	522	527	515	518	510	518	503
Cash Payment	-0.0079[c]	-0.0042	-0.0048[b]	-0.0019	-0.0024	0.1410[a]	-0.0088	-0.0054	-0.0018	-0.0057[c]	-0.0045[c]
	162	170	184	209	216	218	209	215	211	217	204
Equity Payment	-0.0028	-0.0056[c]	-0.0004	-0.0035	-0.0013	0.0000[b]	0.0000[c]	0.0000[a]	-0.0049	-0.0021	-0.0028
	58	65	81	103	101	106	105	101	97	100	101
Panel E: Financial deficit from equity financing/book assets											
All	0.0006[a]	0.0005[a]	0.0007[a]	0.0006[a]	0.0010[a]	0.0024[a]	0.0021[a]	0.0005[a]	0.0003[a]	0.0000[a]	0.0001[c]
	358	391	446	518	527	518	521	521	516	512	520
Cash Payment	0.0000[b]	0.0003[a]	0.0002[b]	0.0000[c]	0.0000	0.0010[a]	0.0011[a]	0.0001[c]	0.0000	0.0000	0.0000
	161	170	187	216	217	216	214	216	216	215	212
Equity Payment	0.0032[a]	0.0054[a]	0.0039[a]	0.0051[a]	0.0043[a]	0.0115[a]	0.0071[a]	0.0017[c]	0.0021	0.0004	0.0026[c]
	61	68	84	106	103	103	104	106	100	98	101

a, b, and c, represent significance at the 1, 5, and 10 percent levels, respectively, for the Signed-ranks test statistic.

Table 9: Explaining the change in the leverage deviation from years 0 to +3, +4 and +5 subsequent to large acquisitions paid for with cash

The sample consists of 343 takeovers that are announced and take place between the beginning of 1981 and the end of 1998 in which the relative size of the target to the bidder is at least 20 percent and the method of payment is cash. Also, all bidders are required to have data on Compustat from years 0 to +5 relative to the acquisition. The dependent variable in models 1 and 2, 3 and 4, and 5 and 6 are the changes in the leverage deviation from years 0 to +3, +4, and +5, respectively. All accounting variables are calculated as of the fiscal year prior to the first announcement of a takeover. Bankruptcy risk score is measured as in Graham (1996) and equals (total book assets)/(3.3 times earning before interest and taxes + sales + 1.4 times retained earnings + 1.2 times working capital). Bond rating dummy takes a value of one if a firm has an S&P credit rating of BBB or better and takes a value of zero otherwise. Leverage deviation is actual book leverage minus predicted book leverage from a regression model predicting book leverage. Relative size of target to bidder firm uses equity values to measure size. Standard deviation of bidder returns is the standard deviation of daily bidder returns over the year prior to the initial takeover announcement. Market-adjusted one-year pre-announcement bidder return is measured from month -13 to -1 relative to the initial takeover announcement.

Dependent variable	Leverage deviation Δ from year 0 to +3		Leverage deviation Δ from year 0 to +4		Leverage deviation Δ from year 0 to +5	
Intercept	0.077 (0.585)	0.104 (0.406)	-0.015 (0.917)	0.033 (0.795)	-0.036 (0.821)	0.011 (0.938)
Bankruptcy risk score	-0.003 (0.003)	-0.002 (0.008)	-0.003 (0.017)	-0.002 (0.048)	-0.003 (0.025)	-0.002 (0.065)
Bond rating dummy	-0.039 (0.216)	-0.030 (0.275)	-0.043 (0.195)	-0.033 (0.247)	-0.038 (0.263)	-0.028 (0.356)
Market-to-book assets	-0.040 (0.002)	-0.008 (0.586)	-0.049 (0.000)	-0.019 (0.160)	-0.044 (0.021)	-0.008 (0.585)
Pre-acquisition leverage deviation	-0.173 (0.080)		-0.240 (0.036)		-0.250 (0.013)	
End of acquisition year leverage deviation		-0.515 (0.000)		-0.510 (0.000)		-0.590 (0.000)
Natural logarithm of CPI adjusted book assets	-0.000 (0.977)	-0.008 (0.279)	0.007 (0.362)	-0.000 (0.983)	0.002 (0.812)	-0.007 (0.455)
Relative size of target to bidder firm equity	-0.013 (0.159)	0.012 (0.291)	-0.010 (0.229)	0.013 (0.184)	-0.020 (0.112)	0.008 (0.551)
Target is a private firm dummy	-0.010 (0.708)	-0.019 (0.442)	-0.000 (0.987)	-0.008 (0.756)	-0.003 (0.929)	-0.012 (0.675)
Target is a subsidiary dummy	-0.003 (0.883)	-0.010 (0.627)	0.010 (0.669)	0.003 (0.892)	0.003 (0.895)	-0.005 (0.834)
Standard deviation of bidder returns	0.741 (0.381)	0.877 (0.263)	1.497 (0.098)	1.541 (0.059)	0.433 (0.707)	0.520 (0.619)
Long-term debt/total assets	-0.029 (0.782)	0.068 (0.319)	0.010 (0.935)	0.049 (0.453)	-0.098 (0.432)	-0.029 (0.738)
Leading economic indicator	-0.000 (0.962)	-0.000 (0.912)	0.000 (0.990)	-0.000 (0.904)	0.001 (0.394)	0.001 (0.408)
Market-adjusted one-year pre-announcement bidder return	-0.013 (0.644)	-0.038 (0.128)	-0.029 (0.329)	-0.054 (0.044)	0.028 (0.439)	-0.001 (0.968)
Cash/book assets	-0.170 (0.015)	-0.156 (0.016)	-0.129 (0.086)	-0.112 (0.126)	-0.206 (0.026)	-0.188 (0.025)
Tax expenses/book assets	-0.301 (0.381)	-0.218 (0.459)	-0.282 (0.407)	-0.194 (0.506)	-0.603 (0.214)	-0.504 (0.215)
R^2-adjusted	0.058	0.224	0.071	0.219	0.113	0.278
N	335	335	335	335	335	335

Significance levels for whether estimates are different from zero corrected for heteroskedasticity using White's (1980) correction are in parentheses.

Appendix: Estimation of a model of book leverage

This table summarizes the results of estimating a tobit model to predict book leverage (debt/book assets) for a firm. The model is from Kayhan and Titman (2005). The value of predicted leverage is restricted to lie between 0 and 1. The values for predicted leverage used in this study are estimated on a yearly basis using the cross-section of Compustat firms from 1976 to 2004. Industry dummies using the Fama and French (1997) industry definitions are included. This table presents the time-series means of the coefficient estimates from the 29 yearly regressions. The p-values refer to a test of the hypothesis that the time-series mean is equal to zero, using the time-series standard error of the mean estimate for each coefficient.

Market-to-book of assets$_{t-1}$	-0.013
	(0.000)
(Property, plant and equipment / book assets)$_{t-1}$	0.270
	(0.000)
(Operating income before depreciation / book assets)$_{t-1}$	-0.219
	(0.003)
(R&D / sales)$_{t-1}$	-0.001
	(0.945)
Dummy for no R&D expense$_{t-1}$	0.041
	(0.000)
(Selling expense / sales)$_{t-1}$	-0.014
	(0.255)
Ln (Sales)$_{t-1}$	0.011
	(0.000)
Number of observations (mean number of firms in yearly regressions)	3762