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How do firms value debt capacity? Evidence from mergers and acquisitions

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ABSTRACT

We examine how capital structure considerations affect acquisition pricing and valuation. We find that debt capacity improvement is value-enhancing for all acquirers when they gradually reveal their growth opportunities to the market. This is reflected in the long-run stock market returns, both 12- and 24-months after acquisition announcement. While both overlevered and underlevered acquirers benefit from an increase in debt capacity resulting from the merger, only overlevered acquirers pay higher premiums to increase debt capacity. Underlevered acquirers do not pay a premium for it; instead they consider market timing opportunities. Results are robust for alternative definitions of leverage and debt capacity improvement.

1. Introduction

We study how a firm's capital structure concerns affect its investment decisions. While earlier research (e.g., Harford et al., 2009; Uysal, 2011; Vermaelen and Xu, 2014) documents the impact of target capital structure on acquisition likelihood and financing, limited evidence exists on how post-merger capital structure preferences affect acquisition pricing and valuation. One of the merger motives is to increase the debt capacity of the combined firm (Weston et al., 2001), and empirical evidence shows that firms increase their leverage after merger, presumably as a result of increased debt capacity (Ghosh and Jain, 2000). However, the value that acquirers and investors associate with this source of financing gain is still unexplored. One way for a firm to augment its debt capacity is to change its asset mix. By making acquisitions, a firm may change its asset mix sufficiently to alter the resulting borrowing capacity of the merged firm. Thus, if the acquisition enhances the borrowing capacity for the acquiring firm either through the target's excess debt capacity or an increase in the merged firm's optimal leverage, then the acquirer would gain a financing benefit from an investment decision[1]. We investigate whether and how much acquirers pay to gain merger-driven financing benefits.

In a related line of research based on the notion of financial flexibility, DeAngelo et al. (2017) find that firms deleverage to gain financial flexibility and restore the option to borrow in the future. In the case of a merger, however, the capital structure of the combined firm depends on the leverage of each party as well as on the payment form. The acquirers may, through their choice of the payment method, achieve two objectives: the acquisition of more assets (the target firm); and an opportunity to rearrange the capital structure. The latter may create debt capacity or leverage slack[2]. Given asymmetric benefits and the costs of deviations from optimal leverage for overlevered and underlevered firms (Korteweg, 2010), firms value the option to be able to borrow in the future (DeAngelo et al., 2011). This preference may explain the

[1] Borrowing capacity of the combined firm can increase due to a reduction in the probability of financial distress. The decrease in the variability of cash flows is also known as the co-insurance effect; see Lewellen, 1971; Levy and Sarnat, 1970; and Kim and McConnell, 1977.

[2] Faulkender, Flannery, Hankins, and Smith (2012) argue that, "*Even if leverage adjustment costs were equal for under- and overlevered firms, the benefits may be asymmetrical. Underlevered firms forego tax benefits of leverage and have little concern with financial distress costs. Yet potential financial distress costs loom quite large for overlevered firms. There is no theoretical reason why the net tax benefit minus expected financial distress costs should be symmetrical around the firm's optimal leverage ratio, and therefore no reason to maintain that the absolute distance from target leverage fully captures a firm's incentives to adjust.*"

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faster leverage adjustment for overlevered compared to underlevered firms (Harford et al., 2009).

We hypothesize two different acquirers' financial motivations based on their pre-merger excess leverage. Overlevered firms aim to reduce leverage and increase debt capacity, which in turn reduce expected distress cost of debt and create the option to make future value increasing investments. Acquirers without excess debt capacity are willing to pay a higher premium for this potential gain. They expect a net value gain from utilizing the added debt capacity after the incremental premium. On the other hand, underlevered acquirers do not face a binding debt constraint. They would instead choose to optimize the financial aspect of acquisitions by timing the market.

Acquirers are known to engage in market timing when making acquisitions (Baker and Wurgler, 2002). For example, firms offer stocks when they are overvalued (Shleifer and Vishny, 2003; Rhodes-Kropf et al., 2005; Dong et al., 2006; Ang and Cheng, 2006). Given that the opportunity from issuing overvalued stock is temporary, while gains from increasing debt capacity can be postponed and recaptured at a later time, underlevered acquirers may choose to offer a higher premium to induce targets to accept their overvalued stocks. In contrast, acquiring firms whose stocks are not overvalued, find reducing debt and increased debt capacity in the combined firm to be a more desirable financial strategy.

Using a sample of 1,810 U.S. M&A deals completed between 1990 and 2013, we find that debt capacity improvement has value-enhancing effects for all types of acquirers as observed in long-run stock returns; however, different types of acquirers value these benefits differently. Throughout this paper, we construct two measures of increase in debt capacity around a merger. A first of these is the increased debt capacity through a reduction in leverage, which we define as the pro forma pre-merger leverage of the target and acquirer minus post-merger leverage. We report evidence supporting our predictions. We observe that overlevered acquirers, in need of borrowing capacity, offer higher premium for the reduction in leverage of the combined firm. Underlevered acquirers, however, do not pay a premium even for leverage-increasing combinations. Our second proxy for increased debt capacity is the change in optimal leverage, which is defined as the difference between the combined firm's optimal debt ratio and the acquirer's optimal debt ratio in the pre-merger year end (year -1). Our results also confirm that overlevered acquirers offer a higher premium to increase post-merger optimal leverage and debt capacity. Regression results for the premium equation are strongly statistically significant for the overlevered but not for the underlevered acquirers; overlevered acquirers value deleveraging and restoring the option to borrow. Specifically, a one standard deviation decrease in leverage causes the merger premium to increase by seven percentage points for the overlevered acquirers, while the same significance is not observed for the underlevered acquirers, economically nor statistically.

Consistent with prediction of the market timing hypothesis, acquisition premiums are shown to be positively correlated with stock overvaluation for underlevered acquirers only when they pay with stock. In sum, overlevered acquirers choose to pay higher premiums for acquisitions that would increase debt capacity and create financial flexibility, irrespective of their stock valuation. In contrast, underlevered acquirers choose to pay with overvalued equity to capture the gain from the uncertain and possibly short market-timing window.

We investigate at various points of time after the acquisitions how the stock market incorporates the incremental value to the acquisition due to the addition of the option to invest from added debt capacity. We find the average market response at announcement is not significant, in which the premiums paid are neither penalized nor rewarded. This suggests that at the time of the acquisition announcement, the market is unaware of the potential synergy gains that the increased debt capacity can generate. However, if true asymmetric information prevails in which acquirers do have superior growth options, the gradual revelations of these investment opportunities would be reflected in the higher average longer term abnormal returns to the stocks of the acquirers increasing debt capacity. Indeed, we find significantly higher 12–24-month post-announcement returns for all acquirers that increase their borrowing capacity. Combined with the insignificant announcement returns, this is evidence of investor under-reaction to new information about debt capacity.

To complete our analysis, we account for potential endogeneity between the merger premium and the method of payment by running a Two-Stage Least Square (2SLS) regression. Following Faccio and Masulis (2005) and Chemmanur et al. (2009), we use the size of the acquiring firm as the instrumental variable, and our results remain robust to this test. In further robustness tests, we replicate the analysis using book leverage instead of market leverage and use *Change in Optimal Leverage* in the place of *Change in Leverage*. Our findings are consistently robust and qualitatively unchanged.

Our contribution is manifold. Firstly, we add to the literature examining the relationship between investment and capital structure decisions through the choices made by the acquirers. Harford et al. (2009) show that deviations from target leverage levels affect acquisition finance and capital structure adjustments. Uysal (2011) shows that overlevered firms make the most value-enhancing acquisitions and that overleverage constrains acquirers' ability to make acquisitions, pay with cash, and offer a higher premium. Yet, existing research does not address the relation between debt capacity improvement, especially after acquisitions, and value creation; nor does it examine the possibility that acquirers may have different motives and preferences for debt capacity improvement, and therefore might value these preferences differently. We contribute to this literature by showing that the increase in debt capacity via the creation of leverage slack creates value in the long-run when the acquirers gradually reveal to the markets growth opportunities that they better understand due to asymmetric information. Thus, we present evidence of how firms, under asymmetric information with superior investment opportunity, deal with the situation by acquiring financial flexibility in the form of extra debt capacity for possible future investment outlay. This result, however, is confirmed not only for overlevered acquires, but for any acquisition that results in debt capacity improvement. Our study further expands previous findings. In particular, we show that the premium offered to a target firm depends not only on the extent of the acquirer's overleverage, but also on how the deal may affect the merged firm's capital structure and, in particular, debt capacity. We extend previous studies by identifying and differentiating acquirers' motives and show, for the first time that overlevered acquirers with potential growth opportunities consider restoring the option to borrow and gaining financial flexibility more valuable, given their more pressing need to increase debt capacity. These acquirers offer a higher premium in deals that decrease leverage ratios and expand their debt capacities.

Our paper refines the results of Vermaelen and Xu (2014), which shows that acquirers are able to pay with overvalued stock when such financing decision can be justified by motives relating to the achievement of optimal capital structure. We clarify that overlevered acquirers offer a higher premium in order to gain borrowing capacity, irrespective of their stock's valuation, while underlevered acquirers pay higher premiums only to take advantage of equity overvaluation, irrespective of debt capacity improvement. Jointly, these findings show, empirically, that the investment decision is affected by its financial consequences, conditional on the acquirer's motives.

We further expand the findings of Harford and Uysal (2014), who show that financially constrained (nonrated) firms pursue better acquisitions than rated acquirers on average, as they experience better stock market returns both at announcement and in the long-run. In our paper we show that the value of financing benefits is greater for firms that restore the option to borrow in the future and create leverage slack, regardless of whether or not they are financially constrained.

The rest of the paper proceeds as follows: Section II describes the sample selection procedure and methodology. Section III discusses our main empirical findings and presents several robustness tests. Section IV concludes.

2. Sample and methodology

We extract our M&A sample from the Securities Data Corporation (SDC) database of Thomson Financial. We include all M&A deals announced and completed in the U.S. market between January 1st, 1990 and Dec. 31st, 2013 where both the acquiring and the target firms were publicly listed on the U.S. stock markets. For a deal to make it into our sample, it should have resulted in a transfer of control, so the percentage of shares acquired after completion must be at least 50%. We exclude all financial and utility firms (SIC 6000-6999 and 4900-4949 respectively), per the M&A and capital structure literatures (Hovakimian et al., 2001; Fama and French, 2002; Flannery and Rangan, 2006; Uysal, 2011). We collect share price data from the Center for Research in Security Prices (CRSP) database, and accounting and financial information from COMPUSTAT. To reduce the effect of errors caused by outliers, we winsorize all the variables at the 1% and 99% levels. The final sample consists of 1810 acquisitions.

We estimate optimal leverage from a fitted regression following Kayhan and Titman (2007) with industry fixed effects [3,4,5]. A firm is considered overlevered (underlevered) if its leverage is higher (lower) than its estimated optimal leverage ratio; that is, if it has positive (negative) excess leverage. We propose two measures to proxy for the increase in debt capacity: *Change in Leverage* and *Change in Optimal Leverage,* which we define as follows:

1) *Change in Leverage* is defined as pro forma pre-merger leverage of the target and acquirer minus post-merger leverage. Leverage slack is created when there is reduction in leverage.
2) *Change in Optimal Leverage* is the combined firm's optimal leverage ratio minus the acquirer's optimal leverage ratio in year (−1). We estimate the combined firm's optimal debt ratio following Vermaelen and Xu (2014) by constructing hypothetical financial ratios for the acquirer and target firms and including them in our yearly regressions to obtain a fitted value of the combined firm's leverage.

We present a detailed procedure explaining the estimation of optimal leverage in Appendix B.

We estimate market reaction to acquisition announcements via the daily cumulative abnormal returns (*CAR*) and the buy-and-hold abnormal return (*BHAR*). We calculate *CAR* [−1, +1] as the 3-day cumulative abnormal returns using the market model over the [−210, −21] interval with the CRSP value-weighted index returns as the benchmark. Following Bhojraj et al. (2009), we calculate the buy-and-hold abnormal return (*BHAR*) for each firm as:

$$BHAR_i = \prod_{t=1}^{T}(1 + R_{it}) - \prod_{t=1}^{T}\left(1 + R_{benchmark,\ t}\right),$$

where $R_{benchmark,t}$ is the return on a matched portfolio at month t, and R_{it} is the stock return of firm i at month t[6].

Panel A of Table 1 reports the annual sample statistics for mean Leverage and Excess Leverage for acquirers, targets, and the combined entity. The panel shows that both parties are underlevered in most of the sample years.

Panel B reports a summary of deal, target, and acquirer statistics. The average transaction value in our sample is approximately $1148 million, with a median of $205 million. On average, the equity (cash) fraction in the consideration offered is 48% (40%). The mean premium is 50.63%. The average combined entity enjoys increased optimal leverage compared to the acquirer pre-merger optimal leverage (31.24% vs. 30.14%). Furthermore, the mean (median) leverage of the combined firm is 31.32% (28.65%) which is also a function of large deal size and a relatively high debt-financed cash fraction. The relative size of the target to acquirer is substantial with a mean of 48.95%, implying that the deals are expected to have a significant impact on the acquirer's future prospects. Finally, the valuation of acquiring firms is quite large compared to target firms, with mean (median) *M/B* ratio of 4.72 (2.91) vs. 3.13 (1.99).

3. Results

A. Univariate

Our approach differs from other related studies in that ours distinguish between how underlevered and overlevered acquirers respond to the leverage consequences of mergers. These two types of acquirers differ in their investment opportunities (Uysal, 2011) and their urgency to create leverage slack, and therefore may value the possibility to increase debt capacity differently. More specifically, we hypothesize that both over- and underlevered acquirers with investment opportunities value the ability to borrow when needed ('the option value of excess debt capacity') and are willing to pay a premium for a target that can add incrementally more debt capacity to the merged firm. However, because the debt constraint may be binding for the overlevered acquirers, they are willing to pay more for the debt capacity created. We conduct an empirical analysis of the hypothesis and report the results below. We use both measures of acquirer's leverage gain that we defined earlier: *Change in Leverage* and *Change in Optimal Leverage*.

1. Change in Leverage and Merger Premium:

Panel A of Table 2 reports univariate comparisons of acquisition premiums, stock market returns, and other characteristics for under- and overlevered acquirers, which are further divided into whether or not the deal results in an increase in debt capacity. Under our first measure, *Change in Leverage*, an acquirer manages to increase debt capacity if the pro forma pre-merger leverage of the target and acquirer exceeds its post-merger leverage; i.e., an actual reduction in leverage.

[3] We believe that the notion of 'optimal' leverage to an average firm is closer to our regression-based estimate in the sense that the predicted leverage may not be the elusive true optimal (which is still subject to controversy in the literature). What we need in this paper is not the true optimal, but rather is what the firm considered as optimal at the time the acquisition decision was made, where an empirical relation with existing firm's leverage decisions captures the idea better.

[4] Studies applying Kayhan and Titman (2007) for leverage prediction include, among others, Chang and Dasgupta (2009), Harford, Klasa, and Walcott (2009), Uysal (2011), Vermaelen and Xu (2014).

[5] For robustness, we also rerun our tests with the Fama and French (2002) estimation models, and we use several definitions for the dependent variable including book leverage, market leverage, and net leverage, defined, as in Vermaelen and Xu (2014), as leverage net of the firm's excess cash. In additional robustness tests, we use industry median leverage as a proxy for optimal leverage. Results are unchanged.

[6] To do so, we match each acquirer in our sample to a matched portfolio constructed following the Fama and French (1993) procedure of 25 equally-weighted Size/Book-to-Market (B/M) portfolios at the beginning of the announcement year using the Size/(B/M) breakpoints from Kenneth French's website.

Table 1
Summary statistics. The table presents summary statistics of 1810 acquisitions between 1990 and 2013 resulting from the intersection of the Securities Data Corporation (SDC) database, CRSP, and Compustat. Financial and utility firms (SIC 6000-6999 and 4900-4949, respectively) are excluded. To be included in the sample, transactions must be completed, deal value must be at least $1 million, both the acquiring and target firms must be publicly listed on the U.S. stock markets, the percentage of shares held in the target by the acquirer six month prior to announcement must be less than 50%, and the percentage of shares acquired after completion must be at least 50%. Panel A reports the annual leverage statistics for our sample, reported for acquirers, targets and the combined entity. Panel B reports the descriptive statistics of the sample containing mean, median, standard deviation (STD), for various deal, acquirer and target characteristics. Dollar values are in millions. Variable definitions are in the Appendix.

Panel A – Annual leverage statistics

		Acquirer		Target		Combined firm
Year	N_{obs}	Market leverage	Excess leverage	Market leverage	Excess leverage	Expected combined leverage
1990	42	0.303	−0.052	0.373	0.023	0.337
1991	32	0.331	−0.052	0.445	0.039	0.371
1992	27	0.303	−0.025	0.385	0.010	0.333
1993	42	0.300	−0.024	0.397	0.019	0.331
1994	62	0.292	0.003	0.326	−0.003	0.317
1995	99	0.324	−0.016	0.355	0.002	0.353
1996	97	0.275	−0.041	0.317	−0.015	0.298
1997	130	0.276	−0.029	0.300	−0.004	0.302
1998	177	0.250	−0.029	0.316	0.009	0.285
1999	159	0.256	−0.038	0.298	−0.002	0.290
2000	122	0.253	−0.047	0.374	0.017	0.288
2001	98	0.283	−0.022	0.383	0.017	0.304
2002	74	0.219	−0.061	0.309	−0.008	0.248
2003	73	0.280	−0.011	0.341	0.006	0.324
2004	70	0.269	0.002	0.284	−0.019	0.320
2005	79	0.236	−0.013	0.249	0.007	0.296
2006	72	0.235	−0.009	0.239	−0.012	0.306
2007	81	0.233	−0.020	0.205	−0.032	0.323
2008	55	0.212	−0.034	0.232	−0.029	0.295
2009	52	0.345	−0.029	0.392	−0.005	0.394
2010	54	0.272	−0.012	0.289	−0.008	0.343
2011	33	0.373	0.031	0.319	−0.016	0.422
2012	43	0.313	−0.014	0.320	−0.026	0.390
2013	37	0.426	−0.014	0.326	−0.037	0.500

Panel B – Deal, Acquirer, and Target Characteristics

Variables	Mean	Median	STD
Deal characteristics and combined firms			
Deal value ($ mil)	1148	205	2939
Relative size	0.4891	0.2072	0.7396
Share fraction	0.4811	0.4642	0.4558
Cash fraction	0.3999	0.0316	0.4489
Industry relatedness	0.6306	1.0000	0.4827
Hostile	0.0127	0.0000	0.1121
Change in optimal leverage	0.0091	0.0010	0.0480
Change in leverage	0.0515	0.0280	0.1537
Optimal leverage	0.3124	0.2837	0.1644
Final Offer Premium relative to day −40	0.5063	0.4079	0.4520
Acquirer characteristics			
$Assets_{MV}$	17,386	2088	42,521
OCF-to-$Assets_{MV}$	0.0563	0.0680	0.0845
M/B	4.7187	2.9142	6.5855
Optimal leverage	0.3014	0.2672	0.1693
Excess leverage	−0.0269	−0.0344	0.0843
Market leverage	0.2697	0.2371	0.1874
$BHAR_{12}$	−0.1353	−0.1396	0.4463
$BHAR_{24}$	−0.2630	−0.3058	0.6132
CAR[−1, +1]	−0.0124	−0.0063	0.0870
Target characteristics			
$Assets_{MV}$	1277	217	3485
OCF-to-$Assets_{MV}$	0.0166	0.0601	0.1708
M/B	3.1308	1.9904	5.1421
Optimal leverage	0.3264	0.2899	0.1895
Excess leverage	−0.0003	−0.0181	0.1155
Market leverage	0.3197	0.2795	0.2239

Supporting our hypothesis, overlevered acquirers do pay a higher average premium if the merger leads to a decrease in leverage and an increase in the option value of increased debt capacity. The mean (median) premium is 56.79% (46.88%) when there is a decrease in leverage vs. a mean (median) of 46.18% (38.24%) when there is increase in leverage. The difference in means (medians) is statistically significant at the 1% (5%) level. Also consistent with our hypothesis, underlevered acquirers do not pay a statistically significant higher premium for combinations that increase debt capacity.

The stock market consequences of these acquisitions are more nuanced. The stock market initially appears not to differentiate

Table 2
Increase in Borrowing capacity. The table presents the univariate analysis of the difference in characteristics between the subsamples of Overlevered vs. Underlevered acquirers grouped by whether the bid presents a potential increase in borrowing capacity using two different approaches. Underlevered (Overlevered) firms are defined as those whose market leverage is below (above) optimal leverage. The merger premium (Premium relative to day −40) is calculated as the final offer price relative to the target firm's share price on day −40. Panel A reports results of *Change in Leverage* (Δ Leverage) defined as pro forma pre-merger leverage of the target and acquirer minus post-merger leverage; deals with (without) leverage slack are defined as having Decrease (Increase) in Leverage. Panel B uses reports results of increased borrowing capacity through the *Change in Optimal Leverage*, which is defined as the combined firm optimal debt ratio minus the acquirer's optimal debt ratio in year (−1). Variable definitions are in the Appendix.

Panel A: Change in leverage and acquirer excess leverage

Acquirer excess leverage	Underlevered acquirer						Overlevered acquirer					
Δ Leverage	DECREASE		INCREASE				DECREASE		INCREASE			
N_{obs}	430		811		*P*-value Mean Diff	*P*-value Median Diff	220		349		*P*-value Mean Diff	*P*-value Median Diff
Deal and Combined Firm's Charac.	Mean	Median	Mean	Median			Mean	Median	Mean	Median		
Final Offer Premium	0.5360	0.4484	0.5205	0.4215	0.5701	0.4593	0.5679	0.4688	0.4618	0.3824	0.0079	0.0235
$BHAR_{12}$	0.0414	0.0175	−0.1870	−0.1988	0.0001	0.0000	0.0396	0.0177	−0.2063	−0.2135	0.0001	0.0000
$BHAR_{24}$	−0.0119	−0.0457	−0.3382	−0.3562	0.0001	0.0000	−0.0119	−0.0197	−0.3868	−0.3818	0.0001	0.0000
CAR[−1, +1]	−0.0186	−0.0091	−0.0150	−0.0058	0.4295	0.4953	−0.0131	−0.0013	−0.0130	−0.0084	0.9863	0.5663
Δ Leverage	0.0670	0.0444	−0.1198	−0.0773	0.0001	0.0000	0.1128	0.0857	−0.1238	−0.0911	0.0001	0.0000
M/B	5.6589	3.5130	4.9877	3.3736	0.0712	0.2718	3.0112	1.9004	3.1107	2.2048	0.7759	0.0125

Panel B: Change in Optimal Leverage and Acquirer Excess Leverage

Acquirer Excess Leverage	Underlevered Acquirer						Overlevered Acquirer					
Change in Optimal Leverage	DECREASE		INCREASE				DECREASE		INCREASE			
N_{obs}	521		722		*P*-value Mean Diff	*P*-value Median Diff	261		306		*P*-value Mean Diff	*P*-value Median Diff
Deal and Combined Firm's Charac.	Mean	Median	Mean	Median			Mean	Median	Mean	Median		
Final Offer Premium	0.5155	0.4187	0.5204	0.4265	0.8557	0.8140	0.4482	0.3812	0.5495	0.4465	0.0072	0.0239
$BHAR_{12}$	−0.1185	−0.1349	−0.1132	−0.1356	0.8344	0.7904	−0.1338	−0.1093	−0.0993	−0.0957	0.3475	0.5538
$BHAR_{24}$	−0.2456	−0.2867	−0.2336	−0.2906	0.7450	0.7980	−0.2614	−0.2835	−0.2537	−0.2600	0.8880	0.8904
CAR[−1, +1]	−0.0227	−0.0108	−0.0135	−0.0063	0.0646	0.1044	−0.0123	−0.0087	−0.0122	−0.0055	0.9943	0.6778
Change in Optimal Leverage	−0.0237	−0.0084	0.0312	0.0137	0.0000	0.0000	−0.0231	−0.0099	0.0401	0.0220	0.0000	0.0000
M/B	4.5952	3.0489	4.7252	3.1891	0.6886	0.4641	3.3339	2.0639	2.8177	2.0762	0.1519	0.6109

between acquirers with increasing versus decreasing leverage, for under- and overlevered acquirers. Partly, it is due to the asymmetric nature of potential gains for the acquirer from exercising the option to utilize the newly created debt capacity; investors may not know and/or believe the profitable utilization of funds. Partly, even for those who may find the higher premium for debt capacity as a credible signal, they may consider potential gains to be just enough to offset the significantly higher premium paid. However, longer returns for 12-month and 24-month horizons vindicate the acquirers as their growth opportunities are gradually revealed. For the overlevered acquirers, the mean (median) 12-month *BHARs* is 3.96% (1.77%) when the merger results in a decrease in leverage vs. a mean (median) of −20.63% (−21.35%) when there is an increase in leverage. The difference in means (medians) is statistically significant at the 1% (1%) level, reflecting the value creation of increased borrowing capacity for overlevered bidders. For the 24-month *BHARs*, the difference in returns between acquisitions that create leverage slack and those that do not is substantial as well; their differences in both means and medians are significant at the 1% level.

A somewhat unexpected result is that we find the same longer term gains to the underlevered acquirers that have also increased debt capacity but do not pay premiums for the extra debt capacity[7]. This suggests that, though overlevered acquirers consider relaxing the debt constraint more valuable and are willing to pay a premium for the option, the source of longer term gain is the existence and gradual revelation of growth opportunities, which are not dependent on debt capacity[8].

2. Change in optimal leverage and merger premiums:

Panel B of Table 2 reports univariate results using the second measure, *Change in Optimal Leverage*. Agreeing with the hypothesis and the results in Panel A, overlevered acquirers offer higher premiums in acquisitions that increase optimal leverage and create additional borrowing capacity. The mean (median) premium paid for targets is 54.95% (44.65%) for overlevered acquirers that increase optimal leverage as opposed to a mean (median) premium of 44.82% (38.12%) for those that do not. The difference in mean (median) is significant at the 1% (5%). Similar to Panel A, for underlevered acquirers the difference in premium paid is not statistically significant.

B. Multivariate analysis:

1. Merger premium and increase in debt capacity

Table 3 reports results of the merger premium regressions on *Change in Leverage* and other independent variables for three samples: the full sample, the overlevered sub-sample, and the underlevered sub-sample[9]. The independent variables consist of two groups. The first are variables to capture the role of added debt capacity on the overlevered firms, including *Acquirer Excess Leverage*, and its two interaction terms: its interaction with the variable, *Change in Leverage*; and its interaction with the variable, *Relative*

[7] The lack of significant announcement effect could be partly explained by the generally higher premium paid by the underlevered acquirers.

[8] However, it is the exercising of the option to invest that is dependent on having excess debt capacity.

[9] To save space, we report the analysis based on one measure, Change in Leverage. The results using the other measures also produce similar conclusion. We report the expanded results in an online appendix.

Table 3
Acquisition Premiums, Change in Leverage, and the Use of Overvalued Equity. The table presents OLS regressions with year fixed effects of the acquisition premium offered on the change in leverage after accounting for the use of overvalued shares and other control variables. The dependent variable is the merger premium, which is calculated as the final offer price relative to the target firm's share price on day −40. *Change in Leverage* (Δ Leverage) is defined as pro forma pre-merger leverage of the target and acquirer minus post-merger leverage. *T*-statistics are between brackets. Variable definitions are in the appendix.

	All	Underlevered	Overlevered
Intercept	0.630***	0.652***	0.547***
	[9.55]	[8.15]	[5.36]
Δ Leverage	0.250***	0.0562	0.438***
	[2.93]	[0.53]	[3.36]
Δ Leverage * Acq. excess leverage	2.293***		
	[2.82]		
Acq. excess leverage	−0.407**		
	[−2.23]		
Relative size * Acq. excess leverage	0.713***		
	[3.34]		
Shares * Acq. M/B	0.0426***	0.0495***	0.0322
	[3.06]	[3.05]	[1.08]
Shares	−0.0209*	−0.0195	−0.0248
	[−1.68]	[−1.27]	[−1.18]
Mixed	−0.0102	−0.00486	−0.031
	[−0.37]	[−0.14]	[−0.66]
Industry relatedness	−0.0011	0.00658	0.00511
	[−0.05]	[0.24]	[0.13]
Toehold	−0.0367	−0.0363	0.00819
	[−0.67]	[−0.51]	[0.10]
Hostile	0.0762	0.144	0.0132
	[0.97]	[1.49]	[0.10]
Relative size	−0.0460*	−0.0970***	0.038
	[−1.73]	[−2.86]	[0.94]
Competed	0.112**	0.0571	0.178**
	[2.00]	[0.81]	[2.01]
Acquirer characteristics			
Ln (EqMV)	−0.0092	−0.00713	−0.00543
	[−1.37]	[−0.88]	[−0.47]
M/B	0.0299**	0.0484***	−0.0185
	[2.26]	[3.02]	[−0.81]
ROA	−0.000302	−0.26	0.193
	[−0.00]	[−1.00]	[0.49]
OCF-to-Assets$_{MV}$	0.935**	1.153**	0.517
	[2.32]	[2.25]	[0.83]
Tangible sassets	−0.0164	−0.102	0.169
	[−0.21]	[−1.04]	[1.32]
R&D/Sales	−0.00749	−0.0167	−0.000625
	[−0.22]	[−0.37]	[−0.01]
Selling Exp./Sales	0.102**	0.0963**	0.108*
	[2.46]	[2.12]	[1.86]
Target characteristics			
M/B	−0.0269***	−0.0276***	−0.0168*
	[−5.22]	[−4.58]	[−1.71]
ROA	−0.322***	−0.321***	−0.286**
	[−4.24]	[−3.56]	[−1.99]
Tangible assets	−0.153**	−0.125	−0.290**
	[−2.08]	[−1.38]	[−2.40]
R&D/Sales	0.00786***	0.00813***	−0.00606
	[2.72]	[2.73]	[−0.38]
Selling Exp./Sales	−0.0011	0.00298	−0.0194
	[−0.18]	[0.45]	[−1.12]
Year fixed effect	YES	YES	YES
N_{obs}	1582	1094	557
Adj. R^2	0.073	0.071	0.04

***, **,* denote significance at the 1%, 5% and 10% level, respectively.

Size. The latter is included because the relative size of the target to the acquirer determines the contribution of the target's excess capacity.

Other controls include a set of dummy variables that take the value of one if: the acquirer and target are in the same industry (*Industry-Relatedness*); the acquirer had at least a 5% ownership stake in the target before acquisition (*Toehold*); the acquisition is hostile as per the SDC definition (*Hostile*); there is a competing bidder as reported in the SDC (*Competed*); the payment method is pure equity (*Shares*), or a mixed offer of cash, equity and other forms (*Mixed*); and zero otherwise. In addition, we include deal, acquirer, and target characteristics: the relative size of the target's market value of equity to the acquirer's market value of equity (*Relative Size*); the natural logarithm of the market value of equity of the acquirer (*Ln (Eq.MV)*); the return on assets (*ROA*); the market-to-book ratio (*M/B*); operating cash flow (*OCF)-to-Assets$_{MV}$; Asset Tangibility*; Research and Development (*R&D)-to-Sales*; and the ratio of Selling, General and Administrative expense to Sales.

We also incorporate in our regression a variable to test whether market timing plays a role in explaining method of payment and premium paid. Market timing gains to the acquirers are realized when they offer overvalued stocks as the form of payment. For the underlevered acquirers, we expect gains from market timing have greater value and urgency than further reducing the already low leverage. In the case of acquirers with overvalued stock, which is expected to be temporary, the window of opportunity for a timing gain has a short duration. We include the interaction term for market to book ratio (*M/B*), a proxy for overvaluation, and the share payment dummy (*Shares*), which together indicate the acquirer pays in overvalued stocks. These variables are predicted to cause a higher premium offered, as shareholders of the target are expected to form expectations that acquirer's stocks are more likely to be overvalued when they are offered stocks and the acquirer's valuation is high. We are aware that overvaluation of an acquirer's stocks may introduce a complication in interpreting and reconciling announcement and longer term results. When shares are overvalued, market based leverage may appear low, causing excess debt capacity to appear high. Acquiring a target that can provide additional debt capacity could prove to be value increasing after the overvaluation episode is over and share price returns to its normal lower level with correspondingly higher leverage. Thus, during the negotiation, the acquirer may be coy, not appearing to value the target's ability to generate excess debt capacity for the merged firm and hence not offer a premium for it. As a result, these underlevered acquirers with growth opportunities adding debt capacity could report value gain in the longer term, which we verify later.

We find support for our main hypothesis that acquirers are willing to pay a higher premium for debt capacity increasing combinations. *Change in Leverage*, defined as a decrease or gain in debt capacity, is positively and significantly related to premium, which is in line with the univariate observations.

We take a closer look at the effect of acquirer's debt capacity, or lack thereof, in the form of the variable *Acquirer Excess Leverage*; i.e., the extent to which the acquirer is over- or underlevered. The variable alone, with a negative coefficient, says that overlevered acquirers pay lower premiums, consistent with the finding of Uysal (2011). However, when the acquisition gives the acquirer an opportunity to acquire debt capacity, as in the interaction terms *Acquirer Excess Leverage* x *Change in Leverage* and *Acquirer Excess Leverage* x *Relative Size*, we find positive coefficients that are significant at the 1% level. That is, overlevered acquirers pay higher premiums if they reduce overall leverage and/or realize larger relative gain.

Alternatively, in a more direct approach, we divide the sample into over- versus underlevered acquirers. This allows us to concentrate on two separate sample-sensitive issues: the value of adding debt capacity to the overlevered acquirers; and evidence of market timing with stocks as payment among the overvalued but underlevered acquirers. The results for the underlevered and overlevered acquirers are presented separately in columns 2 and 3, respectively. The coefficient on *Change in Leverage* increases in both magnitude and significance for the overlevered acquirers, but is not statistically significant for the underlevered acquirers. A one standard deviation increase in the *Change in Leverage* (an increase in

debt capacity) is associated with a close to seven percentage point increase in premium.

We also find support for market timing in the underlevered sample. The interaction term between the share overvaluation proxy and the share payment dummy *Shares*Acq.M/B* is positive and significant at the 1% level. A one standard deviation increase in the acquirer *M/B* ratio, or over valuation, when paying with acquirer's stocks leads to twenty-eight percentage point increase in the merger premium. This effect is after the market adjustment for perceived overvaluation of acquirer and targets; positive (negative) coefficients for the *M/B* ratio of the acquirer (target) firms.

We conduct robustness tests for two key variables. As alternate measure of stock overvaluation, we use the firm specific valuation error of the acquiring firm, obtained from the decomposition of the *M/B* ratio following Rhodes-Kropf et al. (2005), and observe the same results. We also replicate the table, replacing the debt capacity increase variable, *Change in Leverage*, with the variable, *Change in Optimal leverage*, and obtain similar results[10].

2. Stock market valuation of increased borrowing capacity?

The research questions that follow the findings above are: a) Do the investors in the stock market believe overlevered firms pay too much (or just the right amount) for the increased debt capacity? In other words, are overlevered acquirers perceived to receive a net gain after premium paid for adding debt capacity? b) Do acquirers' attempts to time the market elicit stock market conjecture that their shares are overvalued? Or, do acquirers engaging in market timing in acquisition payment gain in the short term? c) If the acquirer's motivation to add debt capacity is due to its inside information regarding superior investment opportunities about which the market may not yet know, will we observe positive longer term returns for acquirers that add debt capacity? We use two methodologies: the Stock Market Announcement Returns (*CARs*); and the Buy-and-Hold Abnormal Returns *BHARs*. Results are reported in Tables 4 and 5.

2.1 Announcement returns

How does the market form expectations of the acquirer at the announcement? On the one hand, the market may not be able to compute an acquirer's gain in debt capacity and hence may regard the higher premium as evidence of overpayment for the acquisition. The resulting prediction is a negative announcement effect. On the other hand, the market may be able to understand the implication of extra debt capacity but may or may not fully incorporate its option value, and the announcement effect hence may be zero (option value to offset the higher premium paid), or positive (option value greater than the higher premium). Otherwise, the market may not be aware of the potential implication of the increased debt capacity, in which case, it won't react.

Table 4 presents regressions of acquirer stock market announcement returns calculated as the three-day acquirer cumulative abnormal stock return. All models include our main variable of interest, *Change in Leverage*, and the same set of control variables as in Table 3.

The estimated coefficients show that *CAR* is not associated with *Change in Leverage* for all groups examined in the table. The result may suggest that, in the eyes of the market's investors, an acquirer's expected gain from added debt capacity is just enough to offset the premium paid. Alternatively, the lack of a significant impact of debt capacity increase on the acquirer CAR suggests that at the time of the acquisition announcement, the market is unaware of the potential synergy gains that the increased debt capacity can produce. Due to the presence of asymmetric information, in which investors may not have the same information on future opportunities that the management has, the market may have to gradually learn of management's plan over time. The gradual revelation of the acquirer's investment opportunities and its exercise of the option to use the additional debt capacity may ultimately be incorporated into share prices over time. Thus, longer term returns complete the shorter term returns. The results for longer term returns are presented in the next section[11].

Acquirers engaged in market timing by offering overvalued stocks for payment may not elicit a positive market response for several reasons: a) Acquirers with already high market valuation that choose to offer stocks for payment may reveal overvaluation to the stock market, at least partially. b) Shareholders of the target firms may also form the same conjecture and then demand higher premium to compensate for a possible downward correction in acquirer's stocks. c) There could be an interaction of these two responses; lower share prices would reduce the value of the offer and the target may demand compensation, such as a more favorable exchange ratio. Indeed, we find that the regression coefficients for the market timing variables, stock payment dummy (*Shares*), and the interaction between acquirer overvaluation and pure equity payment *Shares*Acq. M/B*, are significantly negative in all models. However, overvalued acquirer paying with stocks may still report a net gain if the listed reasons fail to account for the full extent of overvaluation; i.e., market timing could still be successful after prices return to normal.

The ability of the target to drive the capital structure of the combined firm, on the other hand, has a positive and highly statistically significant effect on announcement returns, as is observed in the interaction between *Relative Size* and *Acquirer Excess Leverage*.

2.2 Buy-and-hold abnormal returns performance: Longer term returns

Thus far, we find that the stock market is capable of discerning the value increasing potential of increased debt capacity, as evidenced by not penalizing these acquirers for paying higher premiums. Since the potential value increase is a function of both asymmetric information and uncertainty, if the acquirers have truly superior investment opportunities that the market has not been able to incorporate into the share prices, the resolution of uncertainty and information asymmetry over time will result in a stock up valuation. In the following we test for this time resolution of information asymmetry hypothesis by estimating longer term returns, for 12 and 24 months. The choice of the time interval is a compromise. Although it is not long enough to observe actual investment in these opportunities, the market is capable to incorporate the information into share prices. Longer intervals entail too much risk of both Type 1 and Type 2 estimation errors (Ang and Zhang, 2014).

In Table 5, we present regressions of stock market portfolio-matched buy-and-hold abnormal returns (BHAR) of the acquirer for two post-announcement periods, namely 12 and 24 months. All models include Change in Leverage and the same set of control variables as in Table 3.

The results in Table 5 show that debt capacity increasing acquirers gain in the long-run (12 and 24 months after announcement). Both under- and overlevered acquirers adding debt capacity during the acquisitions gain in the long-run, which suggests that when these acquirers designed the terms of the acquisitions, they had asymmetric knowledge of future investment opportunities that are gradually disseminated to the stock market. Combined with the insignificant announcement acquirer stock returns, this is evidence of investor under-reaction to new information about debt capacity. In fact, the table shows that a one standard deviation

[10] These tables are available in an Internet Appendix.

[11] The misvaluation of acquisitions in the short run is likely to be corrected, and hence price reversals may be observed in the long-run (Uysal, 2011).

Table 4
Acquirer Stock Market Announcement Returns and Change in Leverage. The table presents OLS regressions with year fixed effects of the acquirer stock market announcement returns on the Change in Leverage (Δ Leverage) and other control variables. The dependent variable is the three-day acquirer cumulative abnormal stock returns CAR [−1, +1]. *Change in Leverage* (Δ Leverage) is defined as pro forma pre-merger leverage of the target and acquirer minus post-merger leverage. T-statistics are between brackets. Variable definitions are in the appendix.

	All	Underlevered	Overlevered
Intercept	−0.00421	−0.00732	0.0315
	[−0.31]	[−0.48]	[1.11]
Δ Leverage	0.0107	0.00542	0.0193
	[0.79]	[0.34]	[0.83]
Δ Leverage * Acq. Excess Leverage	0.13		
	[1.15]		
Acq. excess leverage	−0.0288		
	[−1.08]		
Relative size * Acq. excess leverage	0.0886***		
	[2.84]		
Shares * Acq. M/B	−0.0109***	−0.0108***	-0.0125**
	[−4.89]	[−4.37]	[-2.35]
Shares	−0.0111***	−0.0105***	-0.0164***
	[−5.79]	[−4.63]	[-4.70]
Mixed	−0.0222***	-0.0178***	-0.0391***
	[−5.30]	[−3.60]	[-4.93]
Industry relatedness	0.00208	-0.000185	0.00774
	[0.62]	[-0.05]	[1.23]
Toehold	0.00788	0.00953	0.013
	[0.94]	[0.92]	[0.89]
Hostile	0.00389	0.00285	0.0123
	[0.32]	[0.20]	[0.54]
Relative size	-0.0200***	-0.0273***	-0.0132*
	[-5.01]	[-5.61]	[-1.96]
Competed	-0.00613	-0.00537	-0.0166
	[-0.72]	[-0.53]	[-1.09]
Acquirer characteristics			
Ln (EqMV)	-0.00127	-0.000832	-0.00410**
	[-1.18]	[-0.67]	[-1.99]
(M/B)	-0.00115	-0.000554	-0.000651
	[-0.57]	[-0.23]	[-0.17]
ROA	-0.0476	-0.0786**	0.0222
	[-1.49]	[-2.12]	[0.35]
OCF-to-Assets$_{MV}$	0.134**	0.111	0.148
	[2.24]	[1.54]	[1.39]
Tangible assets	0.00902	0.0195	-0.0118
	[0.78]	[1.41]	[-0.56]
R&D/Sales	-0.00936*	-0.0211***	0.0215***
	[-1.89]	[-3.27]	[3.29]
Selling Exp./Sales	0.0100*	0.00485	0.0106
	[1.83]	[0.75]	[1.14]
Target characteristics			
M/B	-0.00122	-0.000809	-0.00294*
	[-1.55]	[-0.92]	[-1.90]
ROA	-0.0202*	-0.0221*	-0.0168
	[-1.83]	[-1.75]	[-0.76]
Tangible assets	0.0101	0.00793	0.0143
	[0.93]	[0.61]	[0.73]
R&D/Sales	-0.000568	-0.000516	-0.00256
	[-1.29]	[-1.19]	[-1.00]
Selling Exp./Sales	0.000381	0.000313	-5.78E-05
	[0.41]	[0.33]	[-0.03]
Year fixed effect	YES	YES	YES
N_{obs}	1660	1143	583
Adj. R^2	0.103	0.121	0.098

***, **,* denote significance at the 1%, 5% and 10% level, respectively.

change (decrease) in leverage is associated with an 18.6 percentage point increase in the 12-month BHAR for overlevered acquirers, and a 19.9 percentage point increase for underlevered acquirers; similar results appear in the 24-month BHAR. The positive longer run performance for debt capacity increasing acquirers reported in this study is noteworthy in view of the generally neutral or even negative longer term results for acquirers found in previous studies.

Consistent with Table 4, the table also reflects a negative market reaction to potential equity overvaluation and market timing, as is observed in the negative coefficients on the interaction between the M/B ratio and the share payment dummy for the whole sample. This reflects again the market correction for the acquirers' stock overvaluation.

3. Does access to debt markets affect the need and the valuation of increasing debt capacity?

Table 5
Long Term Buy-and-Hold Acquirer Stock Returns and Change in Leverage. The table presents OLS regression of the Long Term Buy-and-Hold Acquirer Stock Returns (BHARs) on the Change in Leverage (Δ Leverage) and other control variables. The dependent variable is the BHAR, which is calculated as in Bhojraj, Hribar, Picconi and Mcinnis (2009). *Change in Leverage* (Δ Leverage) is defined as pro forma pre-merger leverage of the target and acquirer minus post-merger leverage. *T*-statistics are between brackets. Variable definitions are in the appendix. ***, **,* denote significance at the 1%, 5% and 10% level, respectively.

	All $BHAR_{12}$	All $BHAR_{24}$	Underlevered $BHAR_{12}$	Underlevered $BHAR_{24}$	Overlevered $BHAR_{12}$	Overlevered $BHAR_{24}$
Intercept	−0.251***	−0.359**	−0.176**	−0.442***	−0.345***	−0.710***
	[−3.70]	[−2.49]	[−2.22]	[−4.04]	[−2.64]	[−3.87]
Δ Leverage	1.225***	1.659***	1.292***	1.657***	1.213***	1.587***
	[17.87]	[13.43]	[15.50]	[14.51]	[11.31]	[10.76]
Δ Leverage * Acq. excess leverage	−0.992*	−0.172				
	[−1.73]	[−0.14]				
Acq. excess leverage	−0.400***	−0.286				
	[−2.95]	[−1.19]				
Relative size * Acq. excess leverage	0.195	0.085				
	[1.23]	[0.25]				
Shares * Acq. M/B	−0.0207*	−0.0581**	−0.0062	−0.0147	−0.0429*	−0.0514
	[−1.82]	[−2.55]	[−0.48]	[−0.83]	[−1.80]	[−1.59]
Other controls	YES	YES	YES	YES	YES	YES
Acquirer characteristics	YES	YES	YES	YES	YES	YES
Target characteristics	YES	YES	YES	YES	YES	YES
Year fixed effect	YES	YES	YES	YES	YES	YES
N_{obs}	1662	858	1144	1128	593	579
Adj. R^2	0.233	0.321	0.239	0.267	0.27	0.315

***, **,* denote significance at the 1%, 5% and 10% level, respectively.

Table 6
Acquisition Premiums and Change in Leverage – The Effect of Debt Rating. The table presents OLS regression of the acquisition premium offered on the Change in Leverage (Δ Leverage) and other control variables subject to whether the acquiring firm has credit rating on Standard and Poor's credit rating data of BBB or higher in year (−1). *Change in Leverage* (Δ Leverage) is defined as pro forma pre-merger leverage of the target and acquirer minus post-merger leverage. *N* is the number of observations. *T*-statistics are between brackets. Variable definitions are in the appendix.

		Non-Rated			Rated		
		All	Underlevered	Overlevered	All	Underlevered	Overlevered
Intercept		0.573***	0.592***	0.448	0.820***	0.840***	0.265
		[3.85]	[3.52]	[1.44]	[6.03]	[5.00]	[0.93]
Δ Leverage		0.332**	0.076	0.426*	0.208*	0.0946	0.550***
		[2.37]	[0.45]	[1.90]	[1.78]	[0.65]	[2.97]
Δ Leverage * Acq. excess leverage		2.632**			1.515		
		[2.31]			[1.30]		
Acq. excess leverage		−0.722**			0.167		
		[−2.45]			[0.70]		
Relative size * Acq. excess leverage		0.942***			0.411		
		[3.11]			[1.24]		
Shares * Acq. M/B		0.0289	0.0361	0.0248	0.024	0.0259	0.0544
		[1.27]	[1.35]	[0.55]	[1.11]	[1.08]	[0.90]
Other controls	YES		YES	YES	YES	YES	YES
Acquirer characteristics	YES		YES	YES	YES	YES	YES
Target characteristics	YES		YES	YES	YES	YES	YES
Year fixed effect		YES	YES	YES	YES	YES	YES
N_{obs}		745	541	262	837	553	295
Adj. R^2		0.087	0.087	0.033	0.156	0.148	0.242

***, **,* denote significance at the 1%, 5% and 10% level, respectively.

3.1 The effect on the relation between premium and debt capacity.

We take a closer look at the proposition that overlevered acquirers are willing to pay a premium to add debt capacity. Implicit is the possibility that these acquirers may find other avenues of obtaining debt or debt capacity more challenging. Examples are acquirers who may not have easy access to the debt market. This notion still needs supporting empirical evidence, as it is the extent to which an acquirer is overlevered that really matters. The ability to access capital markets may not enable acquirers to relax the debt constraint once it is binding. That is, access to capital markets may ease obtaining financing for firms with debt capacity, but all overlevered firms would find adding more debt equally difficult.

To proxy for debt access, we follow the literature and use a variable indicating whether the acquirer has a credit rating or not. The literature uses credit ratings to proxy for financial constraints. The existence of credit rating is suggested to reduce information asymmetry, therefore easing firms' access to capital markets to raise funds whenever their investment needs call for it (Whited, 1992; Gilchrist and Himmelberg, 1995; Almeida et al., 2004; Koziol and Lawrenz, 2010; Campello and Chen, 2010).

In Table 6, we explore whether having an S&P credit rating affects the value of increased borrowing capacity to the acquirers

Table 7A
Panel A: Long Term Buy-and-Hold Acquirer Stock Return, Change in Leverage FOR RATED Acquirers. The table presents OLS regression of the Long Term Buy-and-Hold Acquirer Stock Returns on the Change in Leverage (Δ Leverage) and other control variables exclusively for acquirers that have a credit rating on Standard and Poor's credit rating data of BBB or higher in year (−1). *Change in Leverage* (Δ Leverage) is defined as pro forma pre-merger leverage of the target and acquirer minus post-merger leverage. *T*-statistics are between brackets. Variable definitions are in the appendix.

	All $BHAR_{12}$	All $BHAR_{24}$	Underlevered $BHAR_{12}$	Underlevered $BHAR_{24}$	Overlevered $BHAR_{12}$	Overlevered $BHAR_{24}$
Intercept	−0.245**	−0.720***	−0.201	−0.685***	−0.273	−0.687**
	[−2.27]	[−4.85]	[−1.60]	[−3.96]	[−1.38]	[−2.50]
Δ Leverage	1.250***	1.654***	1.270***	1.663***	1.285***	1.540***
	[11.87]	[11.37]	[10.06]	[9.70]	[7.84]	[6.51]
Δ Leverage * Acq. excess leverage	−0.883	−0.605				
	[−1.13]	[−0.55]				
Acq. excess leverage	−0.319	−0.490*				
	[−1.50]	[−1.68]				
Relative size * Acq. excess lev.	0.122	0.264				
	[0.55]	[0.87]				
Shares * Acq. M/B	−0.00869	−0.0177	0.0183	0.00321	−0.0745**	−0.0815*
	[−0.50]	[−0.75]	[0.91]	[0.12]	[−2.22]	[−1.74]
Other controls	YES	YES	YES	YES	YES	YES
Acquirer characteristics	YES	YES	YES	YES	YES	YES
Target characteristics	YES	YES	YES	YES	YES	YES
Year fixed effect	YES	YES	YES	YES	YES	YES
N_{obs}	795	778	571	561	288	277
Adj. R^2	0.212	0.241	0.222	0.243	0.229	0.219

***, **,* denote significance at the 1%, 5% and 10% level, respectively.

Table 7B
Panel B: Long Term Buy-and-Hold Acquirer Stock Return, Change in Leverage FOR NON-RATED Acquirers. The table presents OLS regression of the Long Term Buy-and-Hold Acquirer Stock Returns on the Change in Leverage (Δ Leverage) and other control variables exclusively for acquirers that DO NOT have a credit rating on Standard and Poor's credit rating data of BBB or higher in year (−1). *Change in Leverage* (Δ Leverage) is defined as pro forma pre-merger leverage of the target and acquirer minus post-merger leverage. *T*-statistics are between brackets. Variable definitions are in the appendix.

	All $BHAR_{12}$	All $BHAR_{24}$	Underlevered $BHAR_{12}$	Underlevered $BHAR_{24}$	Overlevered $BHAR_{12}$	Overlevered $BHAR_{24}$
Intercept	−0.235**	−0.359**	−0.0621	−0.213	−0.26	−0.0107
	[−2.20]	[−2.49]	[−0.49]	[−1.21]	[−1.04]	[−0.02]
Δ Leverage	1.228***	1.659***	1.345***	1.720***	1.056***	1.554***
	[13.20]	[13.43]	[11.93]	[11.00]	[6.51]	[7.76]
Δ Leverage * Acq. excess leverage	−1.137	−0.172				
	[−1.23]	[−0.14]				
Acq. excess leverage	−0.440**	−0.286				
	[−2.41]	[−1.19]				
Relative size * Acq. excess lev.	0.303	0.085				
	[1.16]	[0.25]				
Shares * Acq. M/B	−0.0348**	−0.0581**	−0.0279	−0.0459*	0.0078	−0.0442
	[−2.03]	[−2.55]	[−1.51]	[−1.82]	[0.15]	[−0.68]
Other controls	YES	YES	YES	YES	YES	YES
Acquirer characteristics	YES	YES	YES	YES	YES	YES
Target characteristics	YES	YES	YES	YES	YES	YES
Year fixed effect	YES	YES	YES	YES	YES	YES
N_{obs}	867	858	573	567	305	302
Adj. R^2	0.246	0.321	0.26	0.289	0.264	0.419

***, **,* denote significance at the 1%, 5% and 10% level, respectively.

by replicating Table 3 for Rated vs. Non-Rated acquirers. The coefficient on *Change in Leverage* is positive and statistically significant for the overlevered acquirers but not for the underlevered acquirers, irrespective of the existence of a credit rating. Our findings corroborate our earlier results about the importance of debt capacity improvement and suggest that overlevered acquirers in particular place a high value on enhancing their borrowing capacity, whether or not they are financially constrained, reiterating the benefits of restoring the option to borrowing in the future. We also replicate the analysis using *Change in Optimal Leverage* as dependent variable, and observe comparable results[12]. These results imply that acquirers' difficulty in accessing capital markets is not a main driver of value for borrowing capacity improvement in acquisitions.

3.2 The effect of debt rating on the long-run stock returns of debt capacity improvement.

Our earlier tests show that the market learns to incorporate higher valuation for acquirers with debt capacity to invest as they gradually reveal their superior investment opportunities. To test whether easy access to the capital market matters, we replicate Table 5 and report separate results for Rated (Table 7A, Panel A), and Non-Rated acquirers (Table 7B, Panel B).

The evidence suggest that the positive and statistically significant relation between debt capacity creation and the 12-months

[12] Results are in the online appendix in Table 6.A.

and 24-months *BHAR* is now confirmed for all acquirers, both overlevered and underlevered, Rated and Non-Rated. The results confirm that relaxing current and potentially binding debt constraint is the primary reason for value creation for firms with future investment opportunities, regardless of the difficulty in accessing the capital market.

4. Additional robustness tests

We extend our analysis to deal with a potential endogeneity issue between the premium offered and the payment form through a Two-Stage Least Square (2SLS) regression using the size of the acquiring firm as an instrumental variable (Faccio and Masulis, 2005; Chemmanur et al., 2009). We observe that the positive and strongly statistically significant relationship between *Change in Leverage* and merger premium is preserved, again, mainly for overlevered bidders. We alternatively use book leverage instead of market leverage in our estimations and we find robust results.

We also consider various market conditions that may drive acquirers, and cause overlevered acquirers, to pay a high price for the increased debt capacity. We replicate Table 3 with various market condition controls: tight financial markets; M&A liquidity; financial crisis; and bear stock market. Our conclusions are not altered[13].

4. Conclusion

Using a sample of 1810 U.S. M&A deals completed between 1990 and 2013, we study how capital structure considerations affect acquisition pricing and valuation. We extend previous studies by identifying and differentiating acquirers' motives and find that overlevered acquirers with a pressing need to increase debt capacity consider restoring the option to borrow and gaining financial flexibility more valuable than underlevered acquirers do. Specifically, we provide evidence that overlevered acquirers offer a much larger premium when there is an associated increase in debt capacity. Underlevered acquirers, however, do not appear to value increased debt capacity in negotiation, and this is reflected in the insignificant relation between merger premium and *Change in Leverage*. In contrast, we observe that underlevered acquirers who have higher valuation than overlevered acquirers do pay significantly higher premiums when using their overvalued stocks as the acquisition currency. We therefore observe a dichotomy: while overlevered acquirers are primarily concerned with increasing borrowing capacity and are willing to pay a higher premium in acquisitions to achieve this goal, underlevered acquirers tend to exploit market timing as acquirer's overvaluation has a more significant effect on merger premium.

Our findings also reveal that enhanced borrowing capacity is value-enhancing no matter the pre-merger excess leverage of acquirers as shown in the positive relation between debt capacity improvement and the buy-and-hold abnormal stock price returns (*BHARs*) in the 12–24 months following the acquisition announcement for both underlevered and overlevered acquirers. While stock market announcement returns (*CARs*) do not seem to reflect the value gain from debt capacity improvement, the positive capital structure effects on firm value are reflected in long-run stock returns in the 12–24 months following the announcement. These results indicate that the market may not initially perceive the full added value of increased borrowing capacity until the firms gradually reveal their superior investment opportunities in the future, 12–24 months after announcement. Thus, we find evidence of how firms, under asymmetric information with superior investment opportunity, deal with the situation by acquiring financial flexibility in the form of extra debt capacity for possible future investment outlay. Overall, our results expand previous findings that overlevered acquirers engage in the most value-enhancing acquisitions (Uysal, 2011) by showing that the value gains from increased debt capacity are enjoyed by all types of acquirers when the latter can put these additional debt capacity into good use via financing good projects. Finally, all our results are confirmed for acquirers regardless of whether they have easy access to capital markets or not.

[13] All of these tables are available in the Internet Appendix

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jbankfin.2018.10.017.

Appendix A. Variable definitions

$Assets_{BV}$	Book value of Total Assets (Item AT).
$Assets_{MV}$	Market Value of Assets and is defined as liabilities(Item LT) minus balance sheet deferred taxes and investment tax credit (Item TXDITC) plus Preferred Stock (as defined below) plus Market Equity (Item CSHO*Item PRCC_F).
Bear Market	We classify the period Mar. 13, 2000 to Sept. 30, 2002 as a Bear Market period[a] (Goldfarb, Kirsch and Miller, 2007).
Book Debt	Total Assets (Item AT) minus Book Equity.
Book Equity	Total Assets (Item AT) minus liabilities (Item LT) plus balance sheet deferred taxes and investment tax credit (Item TXDITC) minus Preferred Stock.
Book Leverage	Book Debt over Total Assets (Item AT).
CAR [−1, +1]	This is the 3-day cumulative abnormal returns estimated using the market model over the [−210, −21] interval using the CRSP value-weighted index returns as the benchmark. The statistical significance of the returns is tested using the Patell (1976) test corrected for time-series and cross-sectional variation of abnormal returns.
Change in Leverage	Pro forma pre-merger leverage of the target and acquirer minus post-merger leverage.
Change in Optimal Leverage	We compute this as the difference between the combined firm optimal debt ratio and the acquirer's optimal debt in year (−1).
Competed	Dummy equal to one of there was a competing bidder for the target firm as reported in Thomson Financial, and zero otherwise.
Credit Rating Dummy	Dummy equal to one if the acquirer has a Standard and Poor's credit rating of BBB or higher in year (−1), and zero otherwise.
Deal value	Total consideration paid as reported in SDC.

(*continued on next page*)

EBITDA/$Assets_{BV}$	Operating income before depreciation (Item OIBDP) over Total Assets (Item AT).
EqMV	Market Value of Equity calculated as (Item CSHO*Item PRCC_F).
Excess Leverage	Market Leverage minus Optimal Leverage (as defined above).
Final Offer Premium relative to day -40	Pre run-up premium calculated as [(Final Offer price / P_{-40}) −1].
Financial Crisis	Dummy equal to one for deals announced between July 1st, 2007 and Dec. 31st, 2008, and zero otherwise. It is used to classify deals as falling in the financial crisis period (this classification is in line with Beltratti and Stulz, 2012).
Firm-Specific Error	Based on breaking down the Ln (M/B) ratio as in the Rhodes-Kropf et al. (2005) model; measures misevaluation due to Firm-specific factors.
Hostile	Dummy equal to one if indicated as Acquisition is Hostile in the SDC database, and zero otherwise.
Industry M&A liquidity	Value of all acquisitions transactions of over $1million for each year and in the same two-digit SIC code divided by the total book value of assets of all Compustat firms in the same two-digit SIC code and year (Schlingemann et al., 2002).
Industry Relatedness	Dummy equal to one if the acquisition is between firms with the same two-digit SIC code, and zero otherwise.
$L_{(Cash\ Fraction)}$	Potential post-acquisition leverage ratio of the combined firm, which is conditional on the cash fraction in the method of payment after considering that cash paid is obtained through new borrowing.
$Leverage_{t-1}$	Leverage ratio (book leverage or market leverage depending on the model used in the Leverage prediction regression) in year (−1) relative to the merger announcement year.
$Ln(Assets_{BV})_{t-1}$	Natural Logarithm of Total Assets in year (−1), relative to the merger announcement year.
$Ln(Sales)_{t-1}$	Natural logarithm of Sales in year (−1), relative to the merger announcement year.
M/B	Market to Book ratio: Market value of Equity calculated as share price multiplied by number of shares outstanding Divided by Book value of shareholders equity.
Market Leverage	Book Debt over Market Value of assets (as defined above).
Mixed	Dummy equal to one if the method of payment is a mixed offer of cash, equity, and other forms.
OCF-to-$Assets_{MV}$	Operating Cash flow to MV of Assets Ratio and the Operating cash flow is sales minus cost of goods sold, selling and general administrative expenses, and working capital change, items (SALE-COGS-XSGA-WCAPCH).
Optimal Leverage	The predicted value of the leverage regression presented in Table C.1.
$R\&D\ Exp./Sales_{t-1}$	R&D expenses (Item XRD) over Total Sales (Item Sale).
$R\&D\ Missing\ Dummy_{t-1}$	Dummy equal to one if COMPUSTAT reports R&D expense (Item XRD) as missing, and zero otherwise.
Relative size	Target market value of equity divided by acquirer market value of equity.
ROA	Net Income (Item NI) over Total Assets (Item AT).
Selling Exp./Sales	Selling, general and administrative expense (Item XSGA) over sales (Item SALE).
Share Fraction	The fraction of shares in the method of payment, as reported by Thomson Financial
Shares	Dummy equal to one if the method of payment is Pure Share, and zero otherwise.
Spread	Proxy for capital liquidity, following Harford (2005); this is the spread between the average rate on commercial and industrial loans and the Federal Funds rate, provided by the Federal Reserve Senior Loan Officer's (SLO) survey.
Tangible Assets ($PPE/Assets_{MV}$)	Net property, plant and equipment (Item PPENT) over $Assets_{MV}$ (defined above).
Taxshield ($Deprec./Assets_{BV}$)	Depreciation (Item DP) over Book value of Assets (Item AT).
Market-to-Book ratio of $Assets_{t-1}$	Market Value or $Assets_{MV}$ (as defined above) over book value of Total Assets (Item AT).
Toehold	Dummy equal to one for deals where the acquirer had at least 5% ownership in the target firm prior to the acquisition, and zero otherwise.

[a] This classification is meant to differentiate this period from the financial crisis period, during which the stock market also suffered a large decline.

Appendix B. Predicting optimal leverage

To estimate optimal leverage levels, we use all Compustat firms with non-negative book equity then we run yearly regressions, between 1990 and 2013, of leverage on capital structure determinants following the methodology of Kayhan and Titman (2007) with industry fixed effects. Additionally, similar to Vermaelen and Xu (2014), we build hypothetical financial ratios for the acquirer and target firms and include those in our yearly regressions in order to estimate the hypothetical optimal leverage of the combined firm[14]. We illustrate with an example of how the hypothetical financial ratios are calculated. On Feb. 21, 2007, U.S. – **Whole Foods Market Inc.** (Whole) announced an offer to acquire the entire share capital of common shares of **Wild Oats Markets Inc.** (WO), an owner and operator of natural and organic food supermarkets, for $18.5 in cash per share, or a total value of $586.752 mil, including the assumption of $106 mil in liabilities. We collect Compustat data for each party (such as Compustat items PPENT, OIBDP, XSGA, SALE, AT) and we calculate the pro forma values as the sum of values for each firm, then financial ratios are calculated as presented at the bottom of the table. These ratios, in addition to other capital structure determinants, are included in our yearly regressions to estimate the hypothetical optimal leverage of the combined firm.

	Wild oats markets inc.	Whole foods market inc.	Hypothetical values
Tangible assets	178.87	1054.61	1233.47
EBITDA	41.04	376.05	417.10
Selling exp.	312.80	1418.37	1731.17
Sales	1123.96	4701.29	5825.25
Book assets	418.87	1889.30	2308.17
$(Tangible\ Assets/Assets_{BV})_{t-1}$	42.70%	55.82%	53.44%
$(EBITDA/\ Assets_{BV})_{t-1}$	9.80%	19.90%	18.07%
$(Selling\ Exp.\ /Sales)_{t-1}$	27.83%	30.17%	29.72%

We use the fitted value resulting from these regressions as the optimal leverage ratio of the individual firm and the hypothetical merged firm. Deviations from optimal leverage are given by Excess Leverage as the actual leverage ratio minus the predicted leverage ratio.

Appendix C. Additional tables

The table presents the results of estimating a Tobit model to predict leverage ratios. The value of predicted leverage is restricted to be between zero and one. This table presents the time series means of the coefficient estimates from the yearly regressions of the cross-section of Compustat firms from 1989 to 2013 of target leverage ratio over key financial measures in the literature. Observations with negative Book Value of Equity have been deleted. Industry dummies using the Fama and French 48-industry definitions are included. We exclude financial firms (6000-6999) and regulated utilities (4900–4949). In Models (1), (2), (3), and (4), we use the Kayan and Titman (2007) model, while in Models (5) and (6) we employ the Fama and French (2002) model. The dependent variable in models (1), (3), and (5) is Market Leverage, while it is Book Leverage in Models (2), (4), and (6). Following Lemmon et al. (2008), we include lagged leverage to account for firm fixed effects. Only in Models (3) and (4) do we use Net Leverage as in Vermaelen and Xu (2014) (VX Leverage), which is leverage net of excess cash, where excess cash is cash above the industry average. *P*-values are reported in parentheses. Variable definitions are in the Appendix. (Table C.1).

[14] Alternatively, as a measure of the optimal debt ratio of the combined entity, we apply the corresponding ratio of the acquiring firm and we get similar results.

Table C.1
Target capital structure regressions.

	Kayhan and Titman		Kayhan and Titman(VX Leverage)		Fama and French	
	Market value (1)	Book value (2)	Market value (3)	Book value (4)	Market value (5)	Book value (6)
Intercept	0.0804***	0.0867***	0.0672***	0.0799***	0.0828***	0.0832***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$(EBITDA/\ Assets_{BV})_{t-1}$	−0.0390***	−0.0854***	−0.0482***	−0.0849***	−0.0355***	−0.0851***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Market-to-Book ratio of $Assets_{t-1}$	−0.0018**	−0.0047***	−0.0041***	−0.0051***	−0.0018**	−0.0045***
	(0.014)	(0.000)	(0.000)	(0.000)	(0.018)	(0.000)
$(R\&D\ Exp./Sales)_{t-1}$	−0.0030***	−0.0005	−0.0039***	−0.0029*	−0.0036***	−0.0022**
	(0.001)	(0.615)	(0.000)	(0.040)	(0.000)	(0.027)
$R\&D\ Missing\ Dummy_{t-1}$	0.0096***	0.0031**	0.0106***	0.0070***	0.0105***	0.0035***
	(0.000)	(0.013)	(0.000)	(0.000)	(0.000)	(0.007)
$(Tangible\ Assets/\ Assets_{BV})_{t-1}$	0.0165***	0.0143***	0.0212***	0.0123***		
	(0.003)	(0.000)	(0.0018)	(0.000)		
$(Selling\ Exp.\ /Sales)_{t-1}$	−0.0016*	0.0030***	0.0000	0.0072***		
	(0.058)	(0.008)	(0.9715)	(0.000)		
$Leverage_{t-1}$	0.8247***	0.8180***	0.8241***	0.7957***	0.8284***	0.8198***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Ln(Sales)_{t-1}$	0.0014**	0.0044***	0.0024***	0.0060***		
	(0.017)	(0.000)	(0.000)	(0.000)		
$Taxshield_{t-1}$					−0.0906***	0.0731***
					(0.000)	(0.001)
$Ln(Assets_{BV})_{t-1}$					0.0020***	0.0046***
					(0.002)	(0.000)
Industry fixed effects	YES	YES	YES	YES	YES	YES

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