

Leverage and the Complexity of Takeovers

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Abstract

There is scant empirical evidence on how the leverage of target firms affects gains to their shareholders, although there are several widely cited economic theories offered in the literature. The limited available evidence shows that shareholders of targets with greater leverage experience higher returns. However, even this observed effect of debt on takeovers cannot be distinguished from a mere mechanical *pure leveraging effect*, leaving the economic explanations untested. Consequently, we adopt an alternative approach here to examine if targets' debt truly matters in takeovers. We report that acquisition processes involving targets with higher leverage tend to be significantly more complex in several ways. We find that such acquisitions tend to take a longer time to consume, are more likely to be associated with multiple bidder auctions, and experience greater revisions in offer prices. Finally, we find that factors that make takeovers more complex also lead to greater target gains.

Keywords: target's leverage, target returns, takeover complexity

JEL Classifications: G32, G34

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1. Introduction

Stulz (1988), Harris and Raviv (1988), and Israel (1992) argue that higher target leverage results in greater gains to target shareholders. Shares of outside investors with a low reservation price can be bought out using debt, leaving more voting power with incumbent management with higher reservation prices. As a result, a successful bidder must pay a higher premium to take over a highly levered target.¹ On the other hand, Shastri (1990) and Israel (1991) claim that target debt can actually reduce target shareholders' acquisition gains. They assume that target debtholders can capture a share of total takeover gains. Thus, the more debt the target issues, the smaller is the portion of the gains left to be distributed between acquiring and target shareholders. Even though the predictions regarding the impact of debt on takeover gains differ across models, the general implication is that debt matters and brings additional complexity to takeovers.²

Billett and Ryngaert (1997) provide arguably the only direct test of the link between target leverage and takeovers.³ Studying a sample of successfully acquired companies, they find evidence consistent with the predictions of Stulz (1988), Harris and Raviv (1988), and Israel (1992), since their findings show that targets with higher leverage earn significantly greater returns. However, the same findings are also consistent with a so-called *pure leveraging effect*. Higher leverage, they argue, simply reduces the number of shares over which the same dollar takeover gains are spread. As a result, the percentage gains to equity are mechanically raised, even if leverage does not play a strategic role in takeovers or lead to any extraordinary profits for target shareholders. In an alternative approach, instead of studying a link between gains and debt, we directly test how debt affects the takeover process. Our major findings below show that debt introduces complexity to the takeover process in several ways:

- (1) We find that it takes significantly longer to complete merger deals involving targets with higher leverage. All else being equal, an increase in leverage from 25th to 75th percentile translates into approximately a three-week delay in the takeover resolution for our sample of firms.
- (2) The delay in takeover resolution is also accompanied by other events that suggest that negotiations are more complex for targets with higher leverage.

¹ Stulz (1988) also claims that companies may over-lever in order to make themselves unattractive targets since an acquisition of a highly levered target would exhaust a bidder's borrowing capacity.

² Consistent with this, Roe (1987) argues that debt serves as a real impediment to acquisition efforts by bidders, especially if the debt is dispersed and risky. Such debt benefits from a *coinsurance effect*, which is reduction in risk because of acquisition by a less risky bidder.

³ There is other indirect evidence regarding the probability of receiving a takeover offer and target leverage. Unfortunately, even this evidence is mixed. Palepu (1986) finds a positive relation between target's leverage and takeover probability, while Cudd and Duggal (2000) find a negative relation. Mikkelsen and Partch (1989) find no significant link. In addition, Billett (1996) shows that the probability of receiving a bid falls when a firm's public debt rating declines.

Our findings show that acquisitions involving targets with more debt are also more likely to be associated with multiple bidders. The result is consistent, for example, with Stulz (1988) whose model implies that shareholders of highly levered targets can better consolidate their votes, and consequently increase their bargaining power. As a result, they are able to hold out for a higher price from other bidders.

- (3) Target shareholders in our sample receive positive or negative adjustments to offers for their shares. We find that these adjustments are more likely if the target company has higher leverage. Once again, these results suggest that highly levered targets are more difficult to price. Positive price adjustments are consistent with Stulz (1988), and a stronger bargaining power of target shareholders. On the other hand, negative price adjustments support the model proposed by Israel (1991), based on stronger bargaining power of target bondholders.
- (4) We find that the factors that make the merger negotiations more complex, multiple bidders and price adjustments, also influence target and total gains.
- (5) Finally, we find that target leverage itself is significantly positively related to *total* takeover gains. This finding cannot be explained by a pure leveraging effect.

Overall, our findings are consistent with the theoretical papers suggesting that target leverage is a significant factor influencing outcomes of completed takeovers beyond the pure leverage effect.⁴

The rest of the paper is organized as follows: in Section 2, we describe our sample. The analysis of transaction time is provided in Section 3. In Section 4, we examine the determinants of multiple bidder auctions, as well as changes to the offer price. Sections 5 and 6 contain the analysis of takeover target returns and the total takeover returns. Concluding remarks are presented in Section 7.

2. Data

The sample of the successful takeover targets comes from the *SDC Worldwide Mergers and Acquisitions Database*. In order to be able to compare the results of this study to those presented in Billett and Ryngaert (1997), the initial acquisition announcement date must be between 1981 and 1995. Both the target and the bidder must be on the CRSP daily return tape for 280 days prior to the initial announcement, and have leverage data on COMPUSTAT for the fiscal year immediately preceding the initial announcement. We also require that the acquisition of the target be material

⁴ Our results thus complement findings of other studies that present *indirect* evidence of the strategic importance of target's leverage in the takeover process. For example, Garvey and Hanka (1999) find that firms significantly decrease their use of leverage following the adoption of state antitakeover laws. Safieddine and Titman (1999) discover that the leverage of targets of *withdrawn* acquisitions sharply increases during takeovers.

for the bidder. Therefore, we put restrictions on the relative size of the target (similar to that in Bradley, Desai, and Kim, 1988). Both the total assets and the market value of equity of the target (measured at the fiscal year-end) must be at least 10% of the bidder values. The takeover target cannot be a regulated utility firm (SIC 4900–4999) or a financial institution (SIC 6000–6999). In addition, the takeover target cannot be in default on its debt. Lastly, we retain only those acquisitions for which both the *Moody's Manual* debt data and data on insider ownership (officer and director holdings gathered from proxy statements) of the targets are available. The final sample consists of 250 successful takeover targets.

Table 1 reports the summary statistics for the 250 takeover targets in our sample. The mean and median of liabilities to market assets are 42.07 and 43.67%, respectively. Reflecting lower book values for equity, the mean and median of liabilities to book assets are 53.14 and 53.20%, respectively. These values are similar to the numbers reported in previous studies examining capital structure (Rajan and Zingales, 1995; Billett and Ryngaert, 1997). The insider ownership (mean of 16.76% and median of 10.71%) and bidder foothold (mean of 1.35% and median of 0%) for our sample are comparable to those reported in Billett and Ryngaert (1997).

Since the theories linking capital structure and takeover outcomes deal primarily with corporate *financing* (rather than operating) decisions, the definition of leverage used throughout the study utilizes only the values of securities that most likely influence firm's *financing* decisions. We consider total long-term debt (which excludes capitalized leases and short term debt), common stocks and preferred stocks. Total leverage is thus defined as follows:⁵

$$\text{Total leverage} = \text{Total debt} / (\text{Total debt} + \text{Market value of equity} + \text{Preferred Stock})$$

Panel A shows that the target companies with nonzero leverages (211 cases out of original 250) employ, on average, 25%, of debt compared to the value of all the financing securities.

Selected merger characteristics for our sample are described in Panel B. The results show that targets on average gain significantly (mean and median target abnormal returns are approximately 25%), while the bidders on average lose about 3% of their value as a consequence of the acquisition.⁶ The acquisition, however, creates

⁵ Preferred stock is included in the broad definition of equity in this leverage measure. Since this study deals with debt levels, incorporation of preferred stock into the numerator of leverage could complicate the analysis and the interpretation of results. More importantly, Dennis and McConnell (1986) show that many target preferred stockholders actually have voting rights during acquisitions.

⁶ The abnormal returns are estimated using the market model. The estimation period for the market model is from –280 to –60 days before the event date. In a manner similar to Stulz, Walkling, and Song (1990) and Billett and Ryngaert (1997), we cumulate abnormal returns from five days before the initial announcement date of the acquisition to five days after the final revision in the terms of the offer (available from SDC). We also compute the abnormal returns using the mean-adjusted model (utilizing both –5 to 5 and –10 to 10 windows). The values of abnormal returns were virtually the same.

Table 1

Sample description

Financial characteristics are obtained from CRSP and COMPUSTAT using the most recent information prior to the original announcement date of the acquisition. Market value of assets is measured as (total assets – book value of equity + market value of equity). Target leverage is measured as (Total debt)/(Market value of equity + Preferred stock + Total debt). Total debt is the value of debt disclosed in firm annual report footnotes and *10K* reports, less the value of capital leases. Free cash flows are estimated using the methodology of Lehn and Poulsen (1989). Insider ownership is measured as the holdings of officers and directors reported in the latest proxy statement prior to the acquisition announcement. Bidder ownership in target prior to the announcement is obtained from *SDC Mergers & Acquisitions* database. Abnormal returns are measured using market model returns from five days prior to the original announcement date to five days after the final revision in the terms of the offer. Total abnormal returns are measured as the market value-weighted sum of target and bidder returns. Bidder share of target market value is excluded from the computation of target market value. Total takeover gain is the sum of target and bidder dollar gains. The dollar gains are the product of abnormal return and MV of equity. Statistical significance is measured using *t*-test (mean) and sign rank test (median). Transaction time is measured as the number of days between the original announcement and effective dates of a takeover. Targets have debt dominated by banks if banks provide the greatest proportion of company's debt (compared to public and private nonbank debt shares).

Panel A: Financial, and ownership characteristics

Variable	N	Mean	Median	Min.	Max	SD
Total assets (1995 \$Mil)	250	924.59	193.06	5.89	18,022.04	2,108.55
MV of equity (1995 \$Mil)	250	623.90	158.63	4.81	13,056.76	1,462.55
Sales (1995 \$Mil)	250	1,098.90	201.81	2.04	29,925.16	2,786.96
Total liab./(MV of assets) (%)	250	42.07	43.67	1.30	93.38	21.49
Total liab./Total assets (%)	250	53.14	53.20	2.14	196.32	23.70
Total leverage (nonzero values)	211	0.2724	0.2485	0.0012	0.8991	0.2052
M/B of assets	248	1.53	1.23	0.55	6.51	0.91
Free CF/Total assets (%)	237	5.55	7.10	-73.30	45.10	12.81
Insider ownership (%)	250	16.76	10.71	0.01	80.90	16.51
Bidder ownership in target (%)	250	1.35	0.00	0.00	38.40	4.50

Panel B: Merger characteristics

Variable	N	Mean	Median	Min.	Max	SD
Target abnormal return (%)	250	25.91***	25.94***	-78.90	134.46	28.61
Bidder abnormal returns (%)	250	-2.62*	-3.02***	-101.10	168.66	22.50
Total abnormal returns (%)	250	4.46***	3.95***	-78.42	138.79	19.29
Transaction time (days)	250	148.7	126	8	639	91.2

Variable	Number of cases	Proportion of the sample
Stock acquisition (pure stock financing)	105	0.420
Multiple bidder merger	54	0.216
Antitakeover defense used	9	0.036
Hostile takeovers	23	0.092
Takeover challenged by Lawsuit(s)	50	0.200
Takeover with positive offer price adjustments	65	0.260
Takeover with negative offer price adjustments	22	0.080
Targets with debt dominated by banks	143	0.572

***, **, * denotes the statistical significance from zero on 1, 5, and 10% levels.

significantly positive total takeover gains (approximately 4% of the combined value of the bidder and the target). In order to avoid double counting, we exclude the target shares owned by the bidder from the computation of target market equity. These findings on total returns are consistent with the view that takeovers create shareholder value, and that the targets capture most of the takeover gains (Jensen and Ruback, 1983; Bradley, Desai, and Kim, 1988; Stulz, Walkling, and Song, 1990).

The *SDC Mergers and Acquisitions Database* (particularly the *SDC Acquisition Synopsis*) and the *Wall Street Journal Index* were used to examine other merger characteristics reported in Panel B. A relatively sizeable portion of our sample mergers is associated with pure stock offers (42% of the sample firms), multiple bidder auctions (22%), and legal challenges to the takeover process (20%). Hostile takeovers as well as takeovers where the target company launched an explicit anti-takeover defense are relatively rare in our sample. Eighty-seven targets (35% of the total sample) experienced changes in offer prices, with 65 of those changes being positive. The median takeover transaction time (from the announcement until the completion) is approximately four months.

3. Debt levels and the length of takeover negotiations

Table 2 provides the analysis of the determinants of takeover transaction time. This is our first proxy for transaction complexity and is measured as the number of days between the original announcement and the effective completion date. The results are consistent with the prediction that target firm's leverage increases the complexity of takeovers in ways beyond a pure premium-leveraging role. The length of takeover process is regressed on relative target/bidder size, target leverage, dummy variables for stock acquisitions, multiple bidders and legally-challenged acquisitions. The robustness of this basic specification is checked by adding determinants directly affecting the target's bargaining power such as antitakeover defense and hostile takeover dummies, insider and bidder stock ownership (models 3–5), as well as target growth opportunities and free cash flows (models 4–5).

Most importantly, the results show that takeover resolution time is positively related to target leverage. All else being equal, the statistically significant coefficient for target leverage (>60) can be translated into approximately a three-week delay in resolution time when leverage increases from the 25th to 75th percentile for our sample (the inter-quartile range for the leverage of full sample of 250 targets is 0.34). The increase in negotiation complexity is consistent with Stulz (1988), where increases in leverage bring about greater bargaining power to target management, and with Israel (1991), where the leverage increase adds to the negotiation power of the bondholders.

Table 2 also reports that acquisitions involving multiple bidders or legally-challenged takeovers consume a longer period to complete. Similarly, transactions involving stock as the means of payment take longer (probably because cash may be a preferred consideration from the target shareholders' point of view). The

Table 2

Takeover transaction time

This table contains cross-sectional ordinary least-square regression results for the sample of 250 completed acquisitions between 1981 and 1995. The dependent variable is the number of days between the original announcement and completion dates of the takeover. Relative equity size is the ratio of target equity to bidder equity. Target leverage is measured as (Total debt)/(Market value of equity + Preferred stock + Total debt). Total debt is the value of debt disclosed in firm annual report footnotes and 10K reports, less the value of capital leases. Target insider holdings are measured as stock ownership of officers and directors from the last proxy statement before the announcement. Bidder foothold is measured as bidder stock ownership in target at the announcement date as reported by *SDC*. Free cash flows are measured as in Lehn and Poulsen (1989). Bank dominated debt dummy equals to one if the majority of target's debt was provided by banks (as opposed to public or private nonbank lenders). *p*-values of heteroskedasticity-adjusted *t*-tests in parentheses.

Model	1	2	3	4	5
Intercept	92.68*** (0.0001)	96.54*** (0.0001)	72.84*** (0.0001)	71.97*** (0.0001)	71.37*** (0.0001)
Relative size	7.09 (0.4518)	7.98 (0.3948)	9.20 (0.3312)	10.68 (0.2573)	10.89 (0.2456)
Target leverage	65.36*** (0.0056)	62.46*** (0.0087)	64.54*** (0.0052)	61.91** (0.0137)	87.58** (0.0016)
Target leverage * (bank-dominated debt dummy)					-41.66 (0.2411)
Stock acquisition	39.99*** (0.0023)	35.71*** (0.0068)	44.42*** (0.0008)	43.61*** (0.0024)	41.58*** (0.0035)
Multiple bidders	57.80*** (0.0013)	60.18*** (0.0008)	60.82*** (0.0006)	59.47*** (0.0009)	59.40*** (0.0009)
Acquisition challenged by Lawsuit(s)	38.84** (0.0167)	43.46*** (0.0091)	46.13*** (0.0057)	41.37** (0.0149)	42.21** (0.0128)
Used antitakeover defense		-14.81 (0.6462)	-17.40 (0.6217)	-6.31 (0.8639)	-6.51 (0.8563)
Hostile takeover		-30.28 (0.1094)	-36.38* (0.0955)	-38.18 (0.1204)	-38.74 (0.1063)
Sq. root (insider holdings)			3.45 (0.2326)	2.95 (0.3237)	3.54 (0.2403)
Sq. root (bidder foothold)			14.98*** (0.0003)	15.23*** (0.0005)	15.05*** (0.0004)
Target M/B of assets				4.51 (0.5303)	4.18 (0.5584)
Target FCF/Total assets				-75.50 (0.1224)	-76.64 (0.1118)
Adjusted R ²	0.143	0.148	0.172	0.159	0.160
N	250	250	250	235	235

***, **, * denotes the statistical significance of difference from zero on 1, 5, and 10% levels.

significance of the coefficient of the bidder foothold does not necessarily imply that bidder holdings make the negotiations more difficult. Instead, bidders may *ex ante* take stakes in targets where they expect the negotiations to be more complex or difficult.

Model 5 tests whether the link between target leverage and transaction time depends on the identity of the target's main lender. Target leverage enters the model by itself and also interacted with a dummy variable equal to one if the majority of company's debt was provided by banks as opposed to public or private nonbank lenders (the data regarding lender identity were collected from *Moody's* manuals, footnotes to annual reports or *IOK* reports). According to Billett (1996), negotiations with more dispersed debtholders are more complicated. Similarly, Diamond (1991) argues that more concentrated debt has lower agency costs. Thus, we expect the coefficient on the interactive term (leverage \times dummy) to be significantly negative (since banks tend to lend a relatively larger share of total debt, and thus their holdings are more concentrated, Houston and James, 1996). Even though the results of model 5 suggest that leverage dominated by public or private nonbank lenders provides a greater obstacle to successful acquisition completion, the difference with respect to the impact of bank-dominated debt (measured by the interactive term leverage \times dummy) is not statistically significant.

4. Target debt, multiple bidders, and changes in offer price

Table 3 provides further tests of the impact of target leverage on the takeover process by studying the link between target leverage, occurrence of multiple-bidder auctions, and the likelihood of observing either positive or negative changes in the price offered for target shares. The results of Probit regressions (models 1 and 2) suggest that target leverage positively influences the probability of multiple bidder auctions. In addition, multiple bidder auctions are more likely if the acquisition involves stocks as a form of payment or if there are legal challenges to the takeover process. As documented in models 3 and 4, the presence of multiple bidders significantly influences the probability of observing positive offer price adjustments. In addition, increases in offer price are more likely in cases of hostile takeovers (with increases in offer price meant to sway resistant target management) and mergers where the bidder has a bigger foothold in the target (arguably because such bidders anticipate tougher negotiating). Overall, the results of models 1–4 are consistent with the theoretical predictions of Stulz (1988) that the leverage increases seem to increase target bargaining power.

Models 5 and 6 in Table 3 suggest that the probability of observing negative offer price adjustments is positively related to target leverage too. One of the reasons for the bidders to adjust the offer downward may be the increased bargaining power of debtholders. As such, these results appear to be also consistent with Israel (1991). The conclusion does not contradict the results of models 1–4. Instead, it suggests that both effects (increasing of bargaining power of stockholders and debtholders) are not mutually exclusive and that target debt may play multiple roles in acquisition resolution.

Altogether, the results presented in Table 3 suggest that targets with higher leverage are not only involved in more complex acquisitions, but also that this increased

Table 3

Target debt, multiple bidders, and changes in offer price

This table contains results of probit estimation of relationship between target debt, presence of multiple bidders, and changes in offer price for the sample of 250 completed acquisitions between 1981 and 1995. Relative equity size is the ratio of target equity to bidder equity. Target leverage is measured as (Total debt)/(Market value of equity + Preferred stock + Total debt). Total debt is the value of debt disclosed in firm annual report footnotes and 10K reports, less the value of capital leases. Target insider holdings are measured as stock ownership of officers and directors from the last proxy statement before the announcement. Bidder foothold is measured as bidder stock ownership in target at the announcement date as reported by SDC. Price change dummy equals to one if the offer price for target shares was changed sometime during the acquisition process. Free cash flows are measured as in Lehn and Poulsen (1989) *p*-values of heteroskedasticity-adjusted *t*-tests in parentheses.

Model	Dependent variable: Multiple bidder dummy					
	1	2	3	4	5	6
Intercept	-0.9955*** (0.0001)	-0.9148*** (0.0024)	-0.6720*** (0.0009)	-0.9990*** (0.0031)	-1.8462*** (0.0001)	-2.3522*** (0.0001)
Relative size	0.1058 (0.3206)	0.0849 (0.4409)	-0.0068 (0.9547)	-0.0995 (0.5136)	-0.1804 (0.4775)	-0.1182 (0.6351)
Target leverage	0.9741** (0.0400)	1.0102** (0.0356)	-0.6102 (0.2432)	-0.4319 (0.4419)	0.9148* (0.0983)	0.9261* (0.0940)
Stock acquisition	-0.8183*** (0.0002)	-0.7745*** (0.0007)	-0.9707*** (0.0001)	-0.6369** (0.0116)	0.6731*** (0.0083)	0.7970*** (0.0043)
Multiple bidders			1.2703*** (0.0001)	1.3497*** (0.0001)	0.0031 (0.9923)	0.0031 (0.9926)
Acquisition challenged by Lawsuit(s)	0.7156*** (0.0011)	0.6208*** (0.0077)	0.6403*** (0.0077)	0.5371** (0.0478)	0.0368 (0.9015)	0.1120 (0.7160)
Used antitakeover defense		0.3134 (0.5518)		-0.0788 (0.9073)		7.3445 (0.9997)
Hostile takeover		0.2148 (0.5471)		1.3470*** (0.0011)		-6.9136 (0.9997)
Sq. root (insider holdings)		-0.0307 (0.5594)		-0.0124 (0.8252)		0.0855 (0.1772)
Sq. root (bidder foothold)		-0.0054 (0.9499)		0.2235*** (0.0097)		0.1476 (0.1822)
-1 × log(likelihood)	112.5	111.5	103.8	90.9	69.3	67.7
N	250	250	250	250	250	250

***, **, * denotes the statistical significance of difference from zero on 1, 5, and 10% levels.

complexity represents itself via factors that can significantly influence the division of takeover gains—multiple bidder auctions and the higher incidence of changes in the offer price for target shares. However, it is not immediately clear whether any of those variables should be directly related to takeover gains. For example, the occurrence of positive (negative) adjustments to the offer price may be a consequence of systematic under (over) bidding on the part of initial bidders for targets with higher leverage. Such mispricings may need to be corrected through the entry of alternative bidders (which may also explain why multiple bidder auctions are more common in cases of mergers involving more highly levered targets). In the next two sections, therefore, we examine whether these consequences of higher takeover complexity do indeed systematically influence gains to targets, as well as the values of total takeover gains.

5. Takeover complexity and target acquisition gains

In order to examine and isolate the impact of leverage and of the factors related to the complexity of takeover negotiations (multiple bidders, offer price changes) on target equityholders, other factors affecting shareholder returns should be taken into account. Appendix A lists control variables identified by previous research as determinants of takeover returns, along with a brief discussion. While it is not necessary to include all known determinants of target gains, we want to control for those variables that are likely to be correlated with the primary variables of interest (leverage, multiple bidder, and offer price change dummies). The inclusion of such variables could introduce multicollinearity and make the coefficient of those variables insignificant. It is, however, the more conservative approach.

Similarly to Stulz, Walkling, and Song (1990), our regression models also include total takeover gains as the proportion of target assets to control for any gains unaccounted for by other explanatory variables. This has one very important consequence. The regression coefficients of the remaining variables can be interpreted as the effect of these determinants on the target's abnormal returns conditional on the value of total takeover gains.⁷ Like Stulz, Walkling, and Song (1990), we also allow for a different effect of positive and negative total gains on the target abnormal return.

⁷ The theoretical models discussed above typically study the link between target leverage and the *proportion* of gains (rather than abnormal returns) captured by target shareholders. Unfortunately, it is extremely difficult to create and interpret a variable measuring the proportion of gains captured by a target company (especially in case of mergers with negative bidder or total gains). Therefore, testing the impact of abnormal return determinants *conditional on total gains* provides the best empirical technique to test the general conclusions of the theoretical models. Incidentally, Stulz, Walkling, and Song (1990), who study the impact of ownership structure on target gains, include total gains as the determinant of target gains because of the same reason.

5.1. Primary independent variables of interest

The independent variables of interest are total leverage, multiple bidders dummy, as well as dummy variables identifying the positive and negative changes in the offer price.

The basic regression equation has the following form:

$$\begin{aligned} \text{Target's abnormal return} = & a_0 + a_1 \times \text{target's size} + a_2 \times \text{bidder's size} \\ & + a_3 \times \text{positive change in offer price dummy} \\ & + a_4 \times \text{negative change in offer price dummy} \\ & + a_5 \times \text{target's leverage} \\ & + a_6 \times \text{antitakeover defense dummy} \\ & + a_7 \times \text{hostile takeover dummy} \\ & + a_8 \times \text{targ. inside holdings} \\ & + a_9 \times \text{bidder foothold} \\ & + a_{10} \times \text{stock acquisition dummy} \\ & + a_{11} \times \text{multiple bidders dummy} \\ & + a_{12} \times \text{total takeover gains (positive)} \\ & + a_{13} \times \text{total takeover gains (negative)} \end{aligned}$$

5.2. Results

Table 4 presents the results of the regression analysis of the impact of leverage, factors related to takeover complexity, merger characteristics, and target firm financial variables on target abnormal returns.⁸ The results strongly support predictions of a significant impact of target leverage on the takeover outcomes (Stulz, 1988). Target gains are not only influenced by the target's leverage itself (models 3 and 4), but also by the factors related to the complexity of takeovers (which have been shown to be significantly related to target's leverage in Table 3). Models 1 and 2 suggest that a positive change in the offer price is on average associated with a target equity gain of 15%, while a reduction in the offer price leads on average to a 12% drop in target's stock abnormal gains. The positive price change dummy remains significant even in model 4 where target's leverage is explicitly controlled for, diminishing concerns that the impact of this dummy variable is related to pure premium leveraging. As for

⁸The analysis in this and the next sections is restricted to the subsample of 211 targets with positive leverage, since the regression models in this case provide a more direct test of the impact of leverage and leverage changes on takeover gains.

Table 4

Takeover complexity and gains to targets

This table contains cross-sectional weighted least-square regression results for the sample of 211 targets which have positive leverage. The dependent variable is target abnormal returns estimated using market model from five days before the initial announcement to five days after the final revision in terms of the offer. Target leverage is measured as (Total debt)/(Market value of equity + Preferred stock + Total debt), where total debt is the value of debt disclosed in firm annual report footnotes and *10K* reports, less the value of capital leases. Total takeover gain is the sum of target and bidder dollar gains normalized by target assets. Target insider holdings are measured as stock ownership of officers and directors from the last proxy statement before the announcement. Bidder foothold is measured as bidder stock ownership in target at the announcement date as reported by *SDC*.

Model	1	2	3	4
Intercept	0.24163*** (0.0067)	0.30117*** (0.0007)	0.24269*** (0.0044)	0.17348** (0.0475)
Ln(Target total assets)	-0.04828** (0.0188)	-0.04269** (0.0403)	-0.05182** (0.0135)	-0.05418*** (0.0056)
Ln(Bidder total assets)	0.04234** (0.0133)	0.03373* (0.0596)	0.04181** (0.0138)	0.04785*** (0.0040)
Positive price change dummy	0.15261*** (0.0002)			0.15349*** (0.0001)
Negative price change dummy		-0.11755* (0.0748)		-0.09108 (0.1670)
Target leverage			0.21231*** (0.0027)	0.23469*** (0.0011)
Used antitakeover defense dummy	0.21263*** (0.0001)	0.24967*** (0.0002)	0.20684*** (0.0025)	0.21243*** (0.0001)
Hostile takeover dummy	-0.00526 (0.9219)	0.04563 (0.4537)	0.06854 (0.2667)	0.00973 (0.8607)
Sq. Root (target insider holding)	-0.00392 (0.6750)	-0.00783 (0.3904)	-0.00925 (0.2894)	-0.00408 (0.6538)
Sq. Root (bidder insider holding)	-0.00842 (0.5989)	-0.00437 (0.7788)	-0.00519 (0.7176)	-0.00497 (0.7163)
Stock acquisition dummy	-0.09456*** (0.0027)	-0.11479*** (0.0002)	-0.11232*** (0.0001)	-0.07912*** (0.0081)
Multiple bidders dummy	-0.04129 (0.2359)	0.01726 (0.6378)	0.01965 (0.5865)	-0.04275 (0.2100)
Total gains if positive	0.10256*** (0.0001)	0.12334*** (0.0001)	0.13252*** (0.0001)	0.11063*** (0.0001)
Total gains if negative	0.03138* (0.0822)	0.02201 (0.2569)	0.01445 (0.4220)	0.02004 (0.2188)
Adjusted R^2	0.2146	0.1745	0.1923	0.2469

***, **, * denotes the statistical significance of difference from zero on 1, 5, and 10% levels.

the impact of total leverage, the findings in models 3 and 4 suggest that the increase of leverage from the 25th to the 75th percentile for our sample (the change of 0.32) results in as much as 7.5% increase in target gains.

The only important factor that is not significantly related to target gains in any of the models is the dummy indicating multiple bidder auctions (even though the variable

coefficient has the expected positive sign predicted in Appendix A). However, the impact of this variable may be incorporated in the effects of other regressors and/or influenced by multicollinearity among explanatory variables (e.g., Table 3 documents that multiple bidder auctions and occurrences of increases in offer prices are positively related). When the multiple bidder dummy enters the regression with the total gain as the only other control variable, it is statistically significant at 5% level.

Consistent with prior literature (see Appendix A), Table 4 shows that target abnormal returns are significantly positively related to the bidder size and usage of antitakeover mechanisms by the target. The findings also show that target returns are negatively affected by target size and use of stocks as the means of payment. Furthermore, target gains are positively related to the value of total takeover gains if these gains are positive, but they are unrelated to total gains if the gains are negative.⁹ All the other regressors, except for insider ownership, enter with expected coefficient signs. The negative coefficient on insider ownership, albeit not significant, is inconsistent with the results of Stulz, Walkling, and Song (1990). The difference could arise from the different sample used, since they study a much earlier period, 1968–1986. However, our negative relationship is consistent with the findings of Billett and Ryn gaert (1997) and Chaplinsky and Niehaus (1994), who use samples of takeovers from the 1980s.

6. Takeover complexity and total acquisition synergies

Table 5 presents the results of a regression analysis analyzing the determinants of the value of total takeover gains (measured as the value-weighted average of target and bidder returns). The results show that all three primary variables of our interest—target leverage, positive and negative changes in offer price for target equity—are significantly related to total acquisition gains. For example, an increase of target leverage from the 25th (0.10) to the 75th (0.42) percentile is associated with as much as 3.1% increase in the combined value of synergies, while mergers involving a positive change in the offer price generate on average between 5 and 6% greater total value. These results are interesting because:

- (1) They cannot be explained by pure premium leveraging. Instead, they suggest that higher target leverage is associated with greater value creation, not just the same value distributed over smaller number of shares.

⁹ The use of total takeover gains as a regressor can create concerns since it includes a transformation of the dependent variable. Therefore, we performed several sensitivity tests using alternate specifications of total gains (as suggested by Stulz, Walkling, and Song, 1990). The results were similar to those presented in Table 4. For example, we re-estimated the regressions in Table 4 using just normalized bidder gains (i.e., bidder's total gain divided by the target assets) as well as by a dummy variable equal to one if the total takeover gains were positive. These variables do not pose any econometric concerns, since they do not contain any transformation of target returns. The coefficients for leverage, as well as for offer price change dummies had exactly the same significance as the results presented in Table 4 under each of the alternative specifications.

Table 5

Takeover complexity and total acquisition synergies

This table contains cross-sectional weighted least-square regression results for the sample of 211 completed acquisitions between 1981 and 1995 with positive leverage. The dependent variable are market value weighted abnormal returns of both the target and the bidder estimated using market model from five days before the initial announcement to five days after the final revision in terms of the offer. Target leverage is measured as (Total debt)/(Market value of equity + Preferred stock + Total debt), where total debt is the value of debt disclosed in firm annual report footnotes and *10K* reports, less the value of capital leases. Total takeover gain is the sum of target and bidder dollar gains normalized by target assets. *p*-values of heteroskedasticity-adjusted *t*-tests in parentheses.

Model	1	2	3	4	5
Intercept	0.02830 (0.4489)	0.05350 (0.1531)	-0.00558 (0.7402)	0.01990 (0.6300)	0.01768 (0.6668)
Ln(Target total assets)	0.02530** (0.0328)	0.02688** (0.0236)		0.02345** (0.0435)	0.02179* (0.0592)
Ln(Bidder total assets)	-0.02412** (0.0226)	-0.02735*** (0.0089)		-0.02349** (0.0248)	-0.02182** (0.0360)
Positive price change dummy	0.06191** (0.0315)				0.05301* (0.0635)
Negative price change dummy		-0.12996*** (0.0045)			-0.11744*** (0.0092)
Target leverage			0.09827** (0.0433)	0.08003* (0.0833)	0.08702* (0.0655)
Used antitakeover defense dummy	0.04608 (0.4590)	0.07918 (0.1887)	0.02826 (0.6730)	0.03880 (0.5646)	0.06863 (0.2379)
Hostile takeover dummy	0.03703 (0.2533)	0.06013* (0.0810)	0.09135*** (0.0047)	0.07481** (0.0299)	0.04353 (0.1825)
Multiple bidders dummy	0.01033 (0.6766)	0.03265 (0.1219)	0.04168* (0.0546)	0.03359 (0.1195)	0.00937 (0.7057)
Adjusted R^2	0.0795	0.0954	0.0598	0.0688	0.1131

***, **, * denotes the statistical significance of difference from zero on 1, 5, and 10% levels.

- (2) Equally importantly, the findings presented in Table 5 suggest that higher target leverage introduces a trade-off for target shareholders. On the one hand, higher target leverage leads to greater returns for target shareholders (because of the impact of leverage itself, or because of increased takeover complexity). On the other hand, the fact that higher-levered targets are associated with higher total gains suggests that the likelihood of a successful acquisition falls as target leverage rises. The bidders may realize that they will lose a valuable portion of total gains either because of increased bargaining power of target shareholders (Stulz, 1988) or of target bondholders (Israel, 1991) when taking over highly-levered targets. That means that successful acquisitions of targets with high proportions of debt can be materialized only if pursued by arguably relatively small group of superiorly performing bidders. Such acquirers have to be able to generate gains

with such a high total value that even the increasingly smaller portion of total gains captured by the bidders is large enough to at least cover their acquisition costs. The results presented in Table 5 are consistent with this hypothesis.

The results in Tables 4 and 5 jointly suggest that target's leverage influences the takeover outcome beyond pure premium leveraging of target abnormal returns. Target leverage increases the complexity of takeovers, and ultimately leads to greater takeover gains for target shareholders, but also a smaller probability of successful takeover completion. This conclusion implies that there indeed exists an optimal capital structure for every company. Such capital structure should maximize the expected takeover premium equal to the expected target abnormal returns provided that the takeover materializes multiplied by the probability of successful takeover.

7. Conclusion

Several widely cited studies (e.g., Stulz, 1988) predict that higher target leverage will increase the bargaining power of target shareholders, while other noted works such as Israel (1991) posit that higher target leverage will improve the bargaining position of target bondholders. Either way, target leverage will affect not only gains to target stockholders, but also total takeover gains. The empirical evidence of these hypotheses has been relatively rare. The arguably most important study of the relation between target leverage and target gains (Billett and Ryngaert, 1997) in fact concludes that the higher target gains associated with higher leverage are the consequence of pure premium leveraging of target abnormal returns. That is, the same dollar gains are mechanically distributed over smaller number of shares in companies with high proportion of debt in their capital structures. The implication is that target leverage does not influence takeover outcomes in any meaningful way.

This study provides empirical evidence on the actual link between target's leverage and takeover outcomes that goes beyond pure premium leveraging of target gains. We show that target leverage causes takeover negotiations to become more complex. First, negotiations involving targets with higher leverages take longer to conclude. Second, such negotiations more often involve multiple bidders or changes in offer price for target shares. In addition, we show that the higher takeover complexity is associated with significant changes in gains to targets: Both leverage and positive changes in offer prices affect target gains positively. Last, we show that acquisitions involving higher-levered targets are associated with greater values of total gains. Not only is such a result not explained by pure premium leveraging, but this result also suggests that takeovers of higher-levered companies are undertaken by bidders with superior abilities to create gains.

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Appendix A

Control variables influencing target gains

Variable proxy	Possible relationship to leverage (<i>discussion</i>)	Predicted relationship to target gains (<i>discussion</i>)
Target size <i>Ln(Target Total assets)</i>	Positive: Titman and Wessels (1988) (<i>larger firms are more stable, profitable, and they have advantage in lower flotation costs</i>)	Negative: Billett and Ryngaert (1997), Houston and Ryngaert (1994), Jarrell and Poulsen (1989) (<i>target investors may care more for dollar rather than percentage returns, bidders may be more apt to overpay in acquisitions of smaller targets</i>) Positive: Stulz, Walkling, and Song (1990) (<i>large targets have stronger negotiating power</i>)
Bidder size <i>Ln(Bidder Total assets)</i>		Positive: Billett and Ryngaert (1997), Houston and Ryngaert (1994), Jarrell and Poulsen (1989) (<i>larger bidders have better expertise and opportunities to create synergies</i>) Negative: Stulz, Walkling, and Song (1990) (<i>large bidders have stronger negotiating power</i>)
Target insider holdings <i>Ownership of officers and directors reported in proxy statement</i>	Positive: Stulz (1988) (<i>target managers increase debt to increase the relative value of their ownership stake</i>) Negative: Agrawal and Knoeber (1996) (<i>leverage and insider ownership are substitutes in solving agency problems</i>)	Positive: Stulz, Walkling, and Song (1990) (<i>higher bargaining power of target management leads to higher target acquisition gains</i>)

(continued)

Appendix A (continued)

Variable proxy	Possible relationship to leverage (<i>discussion</i>)	Predicted relationship to target gains (<i>discussion</i>)
Bidder foothold (i.e., bidder's ownership of target stocks) <i>Bidder foothold (reported by SDC) prior to the initial announcement date</i>		Positive: Stulz, Walkling, and Song (1990) (<i>bidders with prior stock ownership in targets have stronger negotiating power vis-à-vis targets</i>)
Presence of multiple bidders <i>Multiple bidder dummy (multiple bidder presence as reported by SDC)</i>		Positive: Billett and Ryngaert (1997), Bradley, Desai, and Kim (1988) (<i>the ultimate winner of multiple bidder auction tends to pay higher price for the target</i>)
Antitakeover defense used by the target <i>Dummy for used antitakeover defense(s) (as reported by SDC)</i>		Positive: Billett and Ryngaert (1997), Comment and Schwert (1995), Brickley, Coles, Terry (1994) (<i>used antitakeover defense increases target's bargaining power</i>)
Negative attitude of target management toward acquisition <i>(Dummy for hostile takeovers as reported by SDC)</i>		Positive (<i>ability to express resistance toward takeover is a sign of stronger target's bargaining power</i>)
Usage of stocks as a means of payments in acquisition <i>Pure stock offers dummy (as reported by SDC)</i>		Negative: Travlos (1987) (<i>bidders using stocks to pay target shareholders are unlikely to pursue value-enhancing acquisitions.</i>)