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M&A Activity and the Capital Structure of Target Firms

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Abstract

Using a large sample of European acquisitions, we find that acquired firms substantially close the gap between their actual and optimal leverage ratios. The bulk of this adjustment occurs quite rapidly – within a year of the acquisition. The typical over-levered firm adjusts its debt-to-assets ratio from 34.4% in the year before acquisition to 20% in the year after. (The adjustment is smaller, but still quite rapid, for targets that had been under-leveraged.) These adjustments occur primarily through debt issuances or retirements. We also investigate whether target firms' pre-merger leverage contributes to the probability of them being acquired. We find that firms further away from their optimal leverage are more likely to be acquired: for an average firm, an increase in the absolute leverage deviation from 1% to 10% of total assets increases the probability of being acquired by 4.1% to 5.6% (The larger effect applies to over-leveraged firms.) Overall, our results provide support for the trade-off theory of capital structure and suggest that financial synergies have a significant role in the typical European acquisition decision.

JEL Codes: G30, G32, G34.
Keywords: M&A, target capital structure, leverage deficit.

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1. Introduction

The finance literature includes a long-standing debate about how firms choose their capital structures. The debate has two main components. First, do firms prefer a specific leverage ratio? Second, if they do, why don't they stay close to that ratio at all times? The trade-off theory of capital structure asserts that each firm has an optimal leverage that balances the effects of tax savings against executive compensation and bankruptcy costs. Previous literature has estimated target leverage ratios and Korteweg (2010) and Van Binsbergen et al. (2010) show that deviating from a firm's target leverage ratio impairs its value, particularly for over-leveraged firms. Why, then, do firms maintain leverage ratios – especially excessively high ratios – far from their targets?[1] Fischer et al. (1989) suggested that transaction costs can rationally limit a firm's ability to achieve its target leverage quickly.[2] (See also Leary and Roberts (2005).) In line with the transaction costs argument, Faulkender et al. (2012) show that firms with cash flows significantly exceeding their leverage deviation adjust their leverage considerably faster, especially if they are over-leveraged. A development that shocks a firm's adjustment costs would therefore provide an ideal venue for testing the tradeoff hypothesis. Merger transactions may provide such a shock.

In this study, we assemble a set of European merger transactions and examine how the acquired firms' leverage ratios substantially change, relative to their targets. The existing literature has studied primarily U.S. mergers between two publicly-traded firms that combine into a single entity. The acquired firm is either merged into a new company or the target becomes an internal division of the acquirer. In either case, the acquired firm's balance sheet ceases to be publicly available. Relying on U.S. data also precludes broad-based studies of mergers involving private (non-traded) firms, whose financials are difficult to collect. European data provide a more complete view of merger-related leverage changes for two reasons. First, many European firms are privately held, and this is particularly true for firms being acquired. Regardless of ownership status, all European firms report financial statements that are available through Bureau van Dijk's Amadeus database. Second, it is unusual for a European acquirer to consolidate a target into a single "parent" firm or conglomerate. European

[1] Many empirical estimates of "partial adjustment" models provide some support for the trade-off theory, but estimate adjustment speeds that are viewed as "too slow" for an important influence on firm value. Can leverage targets be very important, it is asked, if the typical firm moves so slowly toward them? (Fama and French, 2002; Baker and Wurgler, 2002; Welch, 2004; Iliev and Welch, 2010).

[2] Another possibility is that the typical firm's value function is not very sensitive to leverage, and hence managers don't worry much about it.

target firms are likely to continue operating as distinct corporate entities after they have been acquired, and most European countries require subsidiaries to continue financial reports even after a majority of their shares has been acquired by another entity. We can therefore observe leverage changes for acquired firms before vs. after their acquisitions. By merging the Bureau van Dijk's Zephyr database (listing acquisitions) with the financial statements provided by Amadeus, we can study both public and privately-held acquirers and targets.[3] Our dataset includes 6,083 European target firms during the time period 1999 – 2015. We use this dataset to investigate whether a firm's deviation from its leverage target affects its probability of being acquired and whether the acquisition affects the target firms' capital structures.[4]

Previous authors have concluded that leverage-related mis-valuations may affect firm value and hence the participants in merger activity. Harford et al. (2009), Vermaelen and Xu (2014) and Uysal (2011) have evaluated the impact of leverage on acquisitions. Uysal (2011) concludes that being over-leveraged reduces the likelihood that a firm will be an acquirer, perhaps because a mis-leveraged (under-valued) firm's equity is less valuable. We explore, for the first time, the effect of leverage deviations on potential targets: under-valued firms may be more attractive targets if the acquirer has the resources to correct the target's leverage-based mis-valuation. Specifically, we test:

H1: Mis-leveraged (and therefore under-valued) potential targets are more likely to be acquired.

We estimate a target leverage ratio for each potential target firm, and compute its deviation from the estimated optimal leverage. We find that both positive and negative deviations increase the probability of being acquired. The effect is stronger for over-leveraged firms, whose probability of becoming a target stands about 5.6% ($p < 0.01$) above that of the small-deviation firms. Under-leveraged firms' acquisition probability increases by slightly less – 4.1% ($p < 0.01$).

[3] Access to the private firms' information is crucial: our final database includes 80% private acquiring firms and 90.8% privately-owned targets.

[4] We also conducted an analysis of capital structure changes of the acquiring firms using their unconsolidated accounts. The results are in line with the findings of Harford et al. (2009) – acquiring firms leverage up at the time of the acquisition but reverse most of the acquisition's leverage effect within five years. We do not report these results, but they are available upon request.

Being acquired by a larger firm may mitigate financial frictions and permit the acquired firm to reach its target leverage rate more rapidly.[5] We therefore test:

H2: Newly-acquired firms adjust unusually quickly toward their target leverage ratios.

To test these hypotheses, we divide target firms into three groups: "over-leveraged" firms whose pre-merger deviation from target exceeds +1% of assets, "under-leveraged" firms whose deviations fall below –1% of assets, and "optimized" firms whose deviation from target leverage lies within 1% of assets.[6] We find that an acquired firm quickly and substantially moves toward its target leverage, consistent with the notion that the acquisition has reduced leverage adjustment costs. The typical firm reduces its deviation from target quite substantially. A previously over-leveraged (under-leveraged) target firm's leverage falls (rises) by about 14.4% (8.5%) in the year following an acquisition, and it remains at the new level for at least five years.[7]

Finally, following up on the distinction reported by DeAngelo et al. (2011), Faulkender et al. (2012) and others, we also test whether a firms' extent of convergence to its leverage target depends on whether the subsidiary was previously over- or under-leveraged:

H3: After being acquired, over-leveraged firms adjust toward their optimum more quickly than under-leveraged firms.

We find that the leverage adjustment is faster for over-leveraged firms but not dramatically so. Figure 1 shows that both over-leveraged and under-leveraged firms substantially converge to their optimal debt ratios between one and two years after being acquired.

The paper proceeds as follows. Section 2 briefly explains why European acquirers may continue to care about their subsidiaries' leverage ratios. The next section describes our data sources and provides sample summary statistics. Section 4 explains our econometric methods and discusses the results. Section 5 reports robustness checks, and Section 6 concludes.

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[5] Erel et al. (2015) conclude that European firms act as if being acquired reduces their financial constraints.

[6] 23% of our acquired firms have precisely zero leverage. Strebulaev and Yang (2013) evaluate the "puzzle" of zero-leverage firms, which constitute 10.2% of nonfinancial firms in the CRSP-Compustat universe.

[7] Prior research has established that an acquiring firm's leverage rises following an acquisition due to an increase in their debt capacities (Bruner, 1988; Ghosh and Jain, 2000; Harford et al., 2009). Some authors find that this leverage increase is permanent (Bruner (1988) and Ghosh and Jain (2000)), but Harford et al. (2009) find that three-quarters of the increased leverage following a cash acquisition dissipates within five years.

2. Capital structure in a European context

The question naturally arises whether an acquired subsidiary should choose the same leverage once it has joined a larger business group. Here, the differences between U.S. and European forms of corporate organization are important. In the typical U.S. acquisition, the acquired firm becomes part of a larger corporate entity, making its leverage largely irrelevant. In our European sample, however, targets generally tend to remain legally separate firms even after the acquisition.[8] A preference for maintaining legally independent subsidiaries rather than divisions within a merged company can arise from limited liability considerations (Khanna and Yafeh, 2007; Belenzon et al., 2018) or for tax or regulatory reasons (Kandel et al., 2013). Posner (1976) argues that preserving limited liability within business groups is an important consideration that has often been overlooked in the finance literature. (See also Cestone and Fumagalli, 2005). Leaving acquired firms within a group as legally distinct entities may prevent one group member's difficulties from affecting other members (Beaver et al., 2018). This suggests that groups have strong incentives to manage credit risk at both the group and subsidiary level.[9]

Our paper is related to a recent paper by Erel et al. (2015), who study the effect of European group membership on acquired subsidiaries' financial constraints. They find that the target firms' measures of financial constraint decline after they are acquired, perhaps because they can issue securities more readily or perhaps because the larger firm's internal capital market becomes available to finance good projects at the acquired target firm. (Stein (1997) and Belenzon and Berkovitz (2010) also discuss the importance of internal capital markets.) Erel et al. (2015) document that acquired firms tend to increase their cash holdings and that their sensitivity of cash holdings to cash flow declines. Furthermore, investments rise and become less sensitive to cash flow after the target firm is acquired. These results imply that better access to business group's internal capital markets helps to mitigate financial frictions affecting small firms. We hypothesize that this reduction of financial frictions could also permit more rapid convergence to optimum leverage. The (rather scarce) existing literature on subsidiaries' capital structure offers mixed conclusions. Kim et al. (2006) find that Korean group firms adjust their capital structure faster than stand-alone firms. Similar results are reported by Dewaelheyns and Hulle (2012) for private Belgian firms. However, Ghose (2017)

[8] In some cases, an acquirer purchases only a portion the target's outstanding share.

[9] If being acquired substantially affects a firm's optimal leverage, our analysis should not yield strong results. In fact, we find that newly acquired firms move quickly toward their target leverage, consistent with the idea that even subsidiary firms in our sample care about their balance sheet composition.

and Ghose and Kabra (2017) report slower adjustment for Indian group firms, compared to their stand-alone counterparts.

We find that acquisitions facilitate the rebalancing of target firms' capital structures, bringing them closer to their optimal levels, especially if the firm has been over-leveraged. The results reported here enhance the broader literature on capital structure by providing support to the trade-off theory: reducing financial constraints hastens the speed with which firms move toward their leverage targets. The fact that acquisition targets adjust their capital structure promptly after an acquisition event highlights the importance of maintaining optimal leverage ratios even for European subsidiary firms. Our methodology avoids an important criticism of some leverage studies, which report significant, but arguably slow, adjustment speeds toward target leverage.

3. Data

The paper utilizes data from several sources to study the balance sheets of European firms that are acquired between 1999 and 2015. Data on M&A transactions come from the Zephyr database, which covers European deals from 1997 onwards. We consider only European M&A deals because we need the acquired firms' financial accounts after the acquisition. As in Erel et al. (2015) and Netter et al. (2011), about 90% of our target firms are privately owned. Accounting information is available through the Amadeus database for both public and private European firms. Zephyr and Amadeus provide a common identifier to ensure accurate matching of firms between datasets.

Since the use of the Amadeus database is relatively novel, we provide further information about it before proceeding.[10] Amadeus is a commercial database that contains information on more than 20 million companies across 34 Western and Eastern European countries. The Amadeus database permits cross-country comparisons for 26 balance sheet items, 26 income statement items and 32 financial ratios. The database includes the most recent ten years of financial data for active and dead firms. Unfortunately, firms are dropped from the database four years after their last filing. We collect historical data from old Amadeus publications in order to eliminate survivorship bias and to record historical values of such firm-level

[10] Erel et al. (2015) also provide a good description of the data available in Amadeus, which is slowly gaining popularity among academics. It has been used in recent papers by Klapper et al. (2006), Bena and Ortiz-Molina (2013), Erel et al. (2015), Frésard et al. (2017). For more information about Bureau van Dijk, see http://www.bvdep.com/.

information as company type (private, public unquoted, publicly quoted, etc.) and ownership information, which are recorded in the database only for the most recent year.

Our Zephyr sample includes M&A deals involving European target firms over the period from 1999 to 2015. We exclude firms which are subject to specific government regulation, agriculture (NACE 2 01, 02, and 03), the regulated utility industry (NACE 2 35, 36), and financial and insurance firms (NACE 2 64, 65, and 66).[11] We further restrict the sample in two ways. First, we retain only deals in which the acquiring firm's resulting stake exceeds 50% of voting shares, to ensure that a new owner has adequate control over the firm's activities. Second, we must exclude Zephyr transactions with missing acquisition year or identification number for target firms because we cannot match such transactions to the Amadeus accounting information. The final sample includes only one acquisition event for more than 96% of target firms participating in M&A activities, which allows us to estimate a relatively clean effect of the acquisition on the firm's capital structure. The resulting dataset consists of 6,083 acquisition targets from 22 European countries from 1999 to 2015. Panel A of Table 1 reports descriptive statistics for the sample of target firms (+/–5 years around the acquisition). The sample firms' average leverage ratio is about 0.18. An average firm is about 23 years old, with an 11.1% annual sales growth, and capital expenditures equal to 5.2% of assets. Panels B and C of Table 1 report the number of acquired firms by country and industry respectively. About 18% of the transaction targets are French, 12% are Swedish, and 10% are Italian. 20% of acquirers are public firms, more than 90% of targets are private. Panel C reports that the most common target industries are manufacturing (about one-third of all targets) and wholesale-retail trade (about one-sixth).

4. Methodology and Empirical Results

4.1. Estimating firm leverage targets

Analyzing the M&A effects on target firm capital structure requires the identification of over-leveraged and under-leveraged firms. We start by calculating the actual leverage ratio of each firm, defined as the ratio of short-term debt plus long-term debt to total assets. Since the vast majority of firms in our sample are private firms, we can measure leverage using only book values. Previous studies suggest that reliance on the book values is not a serious limitation

[11] NACE Rev. 2 groupings are analogous to SIC or NAIC codes in the U.S. See https://ec.europa.eu/eurostat/web/nace-rev2 for details.

(e.g., Rajan and Zingales, 1995; Leary and Roberts, 2005; Faulkender et al., 2012). We model the optimal leverage ratio for each firm as a function of the determinants of capital structure used in previous studies:

$$L^*_{i,t} = \beta X_{i,t-1} + \theta_i + \tau_t + \varepsilon_{i,t}, \quad (1)$$

where L^*_{it} is firm's *i*'s optimal book debt ratio at time *t*,

X_{it-1} is a vector of four firm-specific characteristics identified in Rajan and Zingales (1995) as the major determinants of firms' leverage ratios: firm size, asset tangibility, growth, and profitability. Variable definitions are provided in Table A.

θ_i is a set of firm effects, and

τ_t is a set of (annual) time fixed effects.

Larger firms and those with more tangible assets may find it easier to borrow and therefore would tend to have higher leverage. Firms with higher profits may have higher retained earnings and hence lower leverage.[12] Faster-growing firms, *ceteris paribus*, may need to raise more external capital in the form of either debt or equity. We employ a fixed effect model to control for firm-specific unobserved heterogeneity, which explains a large portion of the cross-sectional variation in leverage ratios (Flannery and Rangan, 2006; Lemmon et al., 2008). Time fixed effects control for time-varying macroeconomic conditions over the sample period. Recall that our target and acquiring firms come from a total of 22 countries, which may differ substantially in their tax laws or bankruptcy codes. We therefore estimate a separate leverage regression (1) for each country, using the whole universe of firms available in Amadeus.[13]

These country-specific regression results are available upon request. We use the estimated coefficients to compute each firm's target leverage. The average predicted target leverage differs substantially from country to country. The lowest average target leverages are observed in Hungary (0.033), Slovak Republic (0.066), and Bulgaria (0.078). The highest are observed in Ireland (0.314), Spain (0.311) and Portugal (0.303). Having computed an estimated target leverage for each firm, we also calculate a leverage deviation ("***LevDev$_{i,t}$***") as the firm's actual leverage minus its fitted target in a given year.

[12] This effect may be mechanical (Hovakimian et al., 2001), or it may reflect a decision to protect future profits by maintaining low leverage. We return to this question briefly in Table 5.

[13] Other authors (e.g. Harford et al. (2009) and Uysal (2011)) estimate a separate cross-sectional regression for leverage each year and use the estimated coefficients to construct leverage targets. We discuss alternative methods for generating target leverage estimates in section 5 below.

*4.2 The effect of leverage deficit (**LevDev**) on the likelihood of being acquired*

To analyze whether a firm's leverage deficit affects its acquisition prospects (***H1***), we follow Bena and Li (2014) in constructing a *country-, year-, industry- and size-matched control sample* of potential acquisition targets. For each target firm acquired in year *t*, we randomly select up to five matching control firms that

- were neither an acquirer nor a target over the entire sample period from 1999 to 2015,
- operated in the same country and industry (based on 2-digit NACE Rev. 2 grouping) in the year preceding the transaction, and
- had total assets within 10% of the target's.

Such matching creates a group of potential acquisition targets that captures M&A clustering in time (Mitchell and Mulherin, 1996; Maksimovic et al., 2013) and by industry (Andrade et al., 2001; Harford, 2005). We can identify at least one comparable match for 4,770 (out of 6,083) target firms in our sample.[14] Descriptive statistics for the target firms and their matches are reported in Table 2.

To test whether leverage measures affect the likelihood of being acquired, we estimate a logit regression using a cross-section of data for acquired and matching firms from the pre-acquisition year:

$$Acquired_{i,m,t} = \alpha + \beta L_{i,m,t-1} + \gamma X_{i,m,t-1} + \vartheta_c + \mu_j + \tau_t + \mu_j \times \tau_t + \varepsilon_{i,m,t}. \quad (2)$$

where $Acquired_{i,m,t}$ equals unity if firm *i* is actually acquired in deal *m* and 0 otherwise.

$L_{i,m,t-1}$ represents alternative measures of firm *i*'s leverage at time *t*-1: its leverage ratio, its | $\boldsymbol{LevDev_{it-1}}$ | or a dummy variables indicating that it is over- ($\boldsymbol{LevDev_{it-1}} > 1\%$ of TA) or under- ($\boldsymbol{LevDev_{it-1}} < -1\%$ of TA) leveraged;

$X_{i,m,t-1}$ is a set of firm-level characteristics measured at the end of the pre-acquisition year: asset size, growth, ROA, proportion of intangible assets, cash holdings, cash flow and industry median leverage.

ϑ_c, μ_j, and τ_t are country, industry, and time fixed effects.

[14] We use the full set of 6,083 acquired firms in subsequent analyses that do not rely on matched, un-acquired firms.

Table 3 reports estimation results for regression (2) using the full sample of actual targets and their matches. The reported numbers represent the explanatory variables' average marginal effects on the probability of being acquired.

The first column of Table 3 indicates that higher leverage reduces the probability of a firm being acquired. The average marginal effect of –0.051 represents the average partial effect of $Leverage_{i,t-1}$ on the probability of being acquired for all the observed values of the covariates. We then evaluate the effect keeping firm characteristics at their mean values. For an average firm in the sample, the probability of being acquired decreases by 1.6 percent as $\boldsymbol{Leverage_{i,t-1}}$ moves from 25th to 75th percentile. Stulz (1988) identifies two reasons why high target firm leverage might discourage an acquisition. First, high leverage reduces the target's ability to issue additional debt, which might be of interest to an acquirer. Second, debt covenants may restrain the power of an acquiring firm to manage target assets. The other explanatory variables in column (1) carry coefficients that are consistent with the existing literature (e.g., Bena and Li, 2014): the probability of being acquired increases significantly with the firm's size, and its proportion of intangible assets, while decreasing significantly with cash flow.

Column (2) evaluates the effect of the absolute value of leverage deviation ($|\boldsymbol{LevDev_{it-1}}|$) on the probability of being acquired. The estimated average marginal effect for $|\boldsymbol{LevDev_{it-1}}|$ is 0.453 for a firm evaluated at its own covariate values.[15] We also estimated the change in acquisition probability for a firm with mean covariate values: moving from the 10th percentile to 25th percentile of $|\boldsymbol{LevDev_{it-1}}|$, the average firm's acquisition probability increases by 0.42%. The move from 25th percentile to 75th percentile adds 3.5%. Finally, going from 75th percentile to 90th percentile adds to the probability another 3.8%. We therefore observe that the absolute deviation from the optimal leverage is associated with higher probability of being acquired, consistent with the hypothesis that acquiring firms may be planning to increase the target's value by adjusting its leverage.

Columns (3) and (4) of Table 3 investigate whether positive and negative leverage deviations have different effects on the probability of being acquired. Column (3) expresses leverage deviation discretely via dummy variables categorizing each firm as either over- or under-leveraged by at least 1% of total assets. (Potential target firms that do not deviate from their target leverage by more than 1% of total assets are the omitted category.) These estimated coefficients indicate that over-leveraged (under-leveraged) firms are 5.6 (4.0) percentage

[15] Using the mean value of LevDev, an increase in acquisition probability for a typical firm of about 5 – 10%.

points more likely to become targets than firms with small deviation. A Wald test indicates that these two estimated coefficients differ significantly ($p < 0.01$), suggesting that leverage deviations have a greater effect on acquisition probability when the firm is over-leveraged. Column (4) examines the combined effect of leverage and $|\boldsymbol{LevDev_{it-1}}|$ on a firm's acquisition probability by adding to the specification in column (2) two dummy variables identifying firms in the lowest and highest leverage terciles.[16] The estimated effect of $|\boldsymbol{LevDev_{it-1}}|$ remains roughly unchanged, while the dummy variable coefficients indicate that firms in the top leverage tercile are significantly ($p < 0.01$) less likely to be acquired than firms in the bottom leverage tercile.

The results in Table 3 indicate that the amount of leverage and leverage deviation play an important role in determining the likelihood of becoming an acquisition target. Their access to financial markets may be inhibited by their higher proportion of intangible assets and lower cash flows. Such limited access is consistent with their higher (precautionary?) cash balances. Overall the results in Table 3 are consistent with hypothesis **H1**.

4.3. Leverage Changes Following an Acquisition

If being acquired reduces leverage adjustment costs, we should see a discrete move toward target leverage shortly after a firm is acquired (**H2**). Table 4 describes the target's leverage for the eleven-year period centered on the year of deal completion ("Year 0"). See also Figure 2. We separate target firms into three groups:

Optimized firms have $|\boldsymbol{LevDev_{it}}| < 1\%$ of total assets at t = –1.

Over-leveraged firms have $\boldsymbol{LevDev_{it}} > 1\%$ of total assets at t = –1.

Under-leveraged firms have $\boldsymbol{LevDev_{it}} < -1\%$ of total assets at t = –1.

Optimized firms have no reason to change their leverage, and the left four columns in Table 4 exhibit no significant change in their mean or median leverage around Year 0. By contrast, mis-leveraged firms move quite aggressively toward their optimal leverage ratios soon after being acquired. The middle four columns in Table 4 describe the leverage history of ***Over-leveraged*** target firms. Their leverage had been rising for five years preceding acquisition, but in the year after the acquisition ***Over-leveraged*** targets' mean leverage falls from 34.4% of TA to 20.0%. The decline continues in subsequent years. Mean leverage for the five post-acquisition years (16.4%) is 11.8 percentage points ($p < .001$) lower than the average for years [–5, –1]. The largest change (14.4 percentage points) occurs around the acquisition event, years

[16] Including the leverage measure itself generates substantial multicollinearity because $|LevDev|$ varies with leverage.

[–1,+1]. The rightmost four columns of Table 4 report how acquisition affects the leverage of previously ***Under-leveraged*** firms. Their mean leverage had been falling for the five years preceding acquisition. During Year 0, however, these firms' mean leverage increased by 5.3%. The post-acquisition average leverage for years [+1, +5] (20.4%) exceeded the pre-acquisition average (16.1%) by 4.3 percentage points ($p < .001$). Once again, the largest change occurred around the deal's completion, in the interval [–1, +1]. Table 4 thus establishes that acquired firms' mean capital structures move toward their targets around the acquisition date. Similar patterns are observed for median leverage.

We confirm the univariate results in Table 4 with a multivariate regression model estimated separately for acquired firms with different pre-acquisition ***LevDev*** in year t = –1:

$$Leverage_{i,t} = \alpha + \beta After_{i,t} + \gamma X_{i,t-1} + \delta Z_{i,t} + \theta_i + \tau_t + \varepsilon_{i,t}, \quad (3)$$

where $\boldsymbol{After}$ is a binary variable that takes a value of one after the acquisition [0, +5]. The estimated coefficient on ***After*** captures the effect of acquisition on leverage.

$\boldsymbol{X}$ represents three alternative sets of firm-level leverage determinants, suggested by theory and by recent studies (for example, Brav (2009));

$\boldsymbol{Z}$ is a set of country-level variables that account for variation in external finance availability: total private credit to GDP, stock market capitalization to GDP and nominal GDP growth (Erel et al., 2015),

θ are a set of firm fixed effects to control for unobserved firm heterogeneity and

τ are a set of time fixed effects to control for changing macroeconomic conditions,

ε is a random error term.

We estimate (3) using three alternative sets of explanatory variables ($X_{i,t-1}$) drawn from theory and recent studies (e.g. Brav (2009)). Each set of explanatory variables produces similar conclusions about acquisition effects on leverage. Given our multi-country setting, we first control only for the four Rajan and Zingales (1995) factors from regression (1). We view this as our main specification. To check the robustness of our estimates, we further control for some additional factors employed by previous studies: capital expenditures over total assets, firm age, and the proportion of short-term debt in total debt. Capital expenditures over total assets serves as an additional indicator of firm growth and the need for external funds. Firm age is important because firms known to the market may have better access to capital. They tend to pay lower interest rates and are less likely to pledge collateral (Petersen and Rajan, 1994; Berger and Udell, 1995; Petersen and Rajan, 2002). The proportion of short-term debt in total

debt proxies for contracting problems: credit constrained firms are often unable to issue long-term debt (Faulkender and Petersen, 2006). Finally, ROA may reduce leverage if it is accompanied by higher retained earnings. Because this association may be mechanical (Hovakimian et al., 2001), we estimate regressions with and without ROA among the explanatory variables.[17] Estimated ***After*** coefficients are unaffected by this change.

In Table 5, columns (1) – (3) report results for the subsample of target firms very close (+/– 1% of TA) to their leverage targets. The coefficient of interest (on ***After***) is positive but neither large nor statistically significant, indicating that *Optimized* target firms do not change their leverage following the acquisition event. Columns (4) – (6) present results for the subsample of target firms that had been over-leveraged before the acquisition. The significantly negative coefficients on ***After*** indicate that these firms reduce their leverage after the acquisition by nearly 9.0 percentage points (nearly one-half of a standard deviation). Columns (7) – (9) report results for the subsample of previously-under-leveraged, acquired firms. As expected, these firms significantly increase their leverage following the acquisition, by roughly 4 percentage points (varies between 3.9 and 4.7 percentage points). These conditional leverage changes are consistent with acquired firms experiencing lower adjustment costs following their acquisition.[18] In that way, the results are consistent with the dynamic trade-off theory (Hennessy and Whited, 2005; Leary and Roberts, 2005; Lemmon at al., 2008). The observed leverage changes provide further support to results reported in Table 3 that mis-levering might at least partially motivate some acquisitions. This seems particularly true for over-leveraged targets.

In addition, we test whether these results are sensitive to acquirers' capital structure.[19] We find no support to this conjecture. Over-leveraged targets decrease their leverage and under-leveraged targets increase their leverage following the acquisition regardless of acquirers' mis-leverage. Acquiring firms, in turn, leverage up at the time of the acquisition but reverse most of the acquisition's leverage effect within five years.[20] Our findings suggest that acquirers do not pay attention exclusively to consolidated leverage. Instead, value is created

[17] The negligible effect of including ROA among our regressors can be seen by comparing the estimated coefficients on ***After*** in columns (2) vs. (3), (5) vs. (6), and (8) vs. (9) of Table 5.

[18] Our results are also consistent with the findings of Erel et al. (2015), who show that European target companies become less constrained after their acquisition.

[19] Our inability to observe financials for non-European acquirers limits our sample to only 1854 within our 6083 acquisitions.

[20] These unreported these results are available upon request.

through leverage optimization at both the acquirer and the subsidiary level, which fits the limited liability setting of European business groups.

We next investigate the time patterns of leverage changes by examining leverage changes across a variety of post-acquisition windows. The following regression specification has been adapted from Harford et al. (2009) to fit private firms:

$$\Delta LevDev_{i,t} = \alpha + \beta L_{i,-1} + \gamma L_{i,-1} \times X_{i,-1} + \delta X_{i,-1} + \varphi Z_{i,t} + \vartheta_c + \mu_j + \varepsilon_{i,t} \quad (4)$$

Where Δ***LevDev***$_{i,t}$ is the change in the leverage deviation over the alternative interval [–1, 0], [–1,3], or [–1, 5], where year 0 is the deal completion year.

L denotes a vector of three leverage-related variables:

- The firm's leverage at t = –1,
- ***Over-leveraged***, a dummy variable equal to unity if the firm's ***LevDev*** > 1% of TA at t = –1, else zero.
- ***Under-leveraged***, a dummy variable equal to unity if the firm's ***LevDev*** < –1% of TA at t = –1, else zero.

X includes ***Bankruptcy risk score*** to proxy for the cost of re-balancing the firm's leverage (Leary and Roberts, 2005). (A higher value of the ***Bankruptcy risk score*** indicates greater financial distress.).

Z is the set of three country-level variables defined following equation (3) above.

All regressions include country (ϑ_c) and industry (μ_j) fixed effects.

Table 6 presents these results for three different intervals around the acquisition: [–1, 0], [–1, 3] and [–1, 5]. Odd-numbered columns (1, 3, and 5) report the basic specification, which indicate that ***LevDev*** falls for ***Over-leveraged*** firms and rises for ***Under-leveraged*** firms. In other words, firms act to reduce their leverage deviations after being acquired. These results are consistent with Hypothesis **H2**. Comparing leverage adjustments across different time intervals yields further conclusions related to Hypothesis **H3**. First, the estimated coefficients in column (1) indicate that ***Over-leveraged*** firms close significantly ($p < 0.01$) more of their ***LevDev*** before the end of the event year than ***Under-leveraged*** firms do. However, over longer post-event periods (columns (3) and (5)) ***Over-*** and ***Under-leveraged*** firms' changes are statistically indistinguishable. Second, the magnitudes of ***Over-*** and ***Under-leveraged*** target

firms' adjustments become effectively identical by the end of year *t*+3. There is little further adjustment in years 4 and 5. Empirical support for Hypothesis **H3** therefore varies with the assumed timeframe.

The even-numbered columns ((2), (4), and (6)), indicate how these changes are dependent on firm leverage and bankruptcy risk score. The results suggest the change in ***LevDev*** is mainly driven by over-leveraged target firms reducing their leverage aggressively following the acquisition event. This result holds for each considered interval. The ***Bankruptcy risk score*** is mainly insignificant across specifications, indicating that firm risk does not affect post-acquisition leverage adjustments.

4.4. Changes in outstanding debt and equity

Having shown that acquired firms make big leverage adjustments, we now investigate how those leverage changes are implemented. Rebalancing capital structure involves a change in retained earnings, debt, or shares outstanding. In order to identify the main avenues of leverage adjustment, we examine security issues and redemptions. A firm is defined as issuing (retiring) debt if the sum of its short- and long-term debt increases (decreases) by more (less) than 5% (–5%).[21]

Figure 2 presents the proportion of acquired firms issuing and retiring large amounts of debt during each of the eleven years centered on their acquisition date. We separate firms into three groups, depending on their pre-acquisition ***LevDev***. An important difference between ***Over-leveraged*** and ***Under-leveraged*** targets is clearly indicated by the sharp issuance changes manifested at $t = 0$ in Panels B and C. The solid line in Panel B indicates that fewer than 40% of ***Over-leveraged*** target firms retired debt each year before the acquisition. Following the acquisition more than 60% of over-leveraged target firms retire debt. Reinforcing this change, the dashed line in Panel B indicates that approximately 53% of ***Over-leveraged*** target firms issued debt annually before their acquisition, vs. only 20% after. Changes during the acquisition year ($t = 0$) are particularly evident. In Panel C of Figure 2, ***Under-leveraged*** target firms exhibit the opposite changes. The proportion of these firms issuing debt increases by 25% following the acquisition, and the proportion retiring debt decreases by 23%. While trends are less pronounced for ***Under-leveraged*** firms over time, there is a clear change in firms' debt

[21] Previous authors applying the same methodology include Hovakimian et al. (2001), Korajczyk and Levy (2003), Leary and Roberts (2005) and Brav (2009). We also tested an alternative definition of issuing (retiring) debt when an absolute change in debt exceeds 5% of beginning-of-period total assets. The results are similar and available upon request.

activity following the acquisition event in both groups. At the same time, no clear change in debt issuance and retirement patterns is observed for ***Optimized*** firms. Figure 3 reports similar information about large changes in equity capital. The patterns in Panels B and C are similar to those in Figure 2, but more muted. Comparing Figures 2 and 3 strongly suggests that firms adjust their leverage primarily by changing the amount of outstanding debt.

We further explore the univariate patterns in Figures 2 and 3 by estimating a logit regression for large debt or equity changes:

$$I_{i,t} = \alpha + \beta_1 Over\text{-}leveraged_{i,-1} + \beta_2 Under\text{-}leveraged_{i,-1} + \gamma Deficit_t + \delta X_{i,t-1} + \vartheta_c + \mu_j + \tau_t + \varepsilon_{i,t} \quad (5)$$

where $I_{i,t}$ is alternatively one of the following four indicator variables:

***D-retire*$_{i,t}$** equals unity if firm *i* retires net debt worth more than 5% of its beginning-of-period total debt, otherwise zero.

***D-issue*$_{i,t}$** equals unity if firm *i* issues net debt worth more than 5% of its beginning-of-period total debt, otherwise zero.

***E-retire*$_{i,t}$** equals unity if firm *i* reduces its equity capital more than 5% of its beginning-of-period equity capital, otherwise zero.

***E-issue*$_{i,t}$** equals unity if firm *i* increases its equity capital more than 5% of its beginning-of-period equity capital, otherwise zero.

Over-leveraged = 1 for a firm that was over-leveraged (as defined above) at t = –1, else zero.

Under-leveraged = 1 for a firm that was under-leveraged (as defined above) at t = –1, else zero.

$\boldsymbol{Deficit_{i,t}}$ proxies for a firm's need for external financing with a measure of industry-average fixed investments: the average change in fixed assets minus (cash and equivalents at the beginning of the period plus profit), divided by total assets for all firms in the same industry (except firm *i*).

$\boldsymbol{X_{i,t-1}}$ is a set of firm-level characteristics lagged one year: asset size, growth, bankruptcy risk score and net working capital.

Country (ϑ_c), industry (μ_j) and time (τ_t) fixed effects are included.

Table 7 reports the estimation results for (5) for debt changes in Panel A and for equity changes in Panel B, over five alternative time intervals. Columns 1–5 of Panel A compare the probability of debt retirement by ***Over-leveraged*** and ***Under-leveraged*** target firms relative to

the omitted firms (with small leverage deviations). Results from the shortest time interval ([-1,0] in column (1)) indicate that ***Over-leveraged*** acquired firms are on average 15 percentage points more likely to retire debt in the acquisition completion year (Year 0) than optimized acquired firms are. This difference drops sharply and becomes insignificant for longer time intervals in columns (2) – (5). ***Under-leveraged*** targets, in turn, are about 11 percentage points less likely to retire debt up to year t+3. (See columns (1), (2), and (4).) No significant differences are observed between the two groups by year t+5.

Columns 6–10 of Panel A report the debt issuance regressions. As expected, ***Under-leveraged*** firms are 11.2 percentage points more likely than optimized target firms to issue debt during year 0 and 7.7 percentage points more likely by year t+3. ***Over-leveraged*** targets are correspondingly less likely to issue debt, but this effect is significant only in the shortest time interval [-1,0]. Across all 10 columns of Table 7, coefficients for the firm-level control variables generally carry the predicted signs. Target firms retire debt when their industry shows a cash flow surplus ($\boldsymbol{Deficit_{it}} > 0$) and issue debt when the industry shows a cash flow deficit ($\boldsymbol{Deficit_{it}} < 0$). Faster-growing firms are more (less) likely to issue (retire) debt, consistent with firms raising capital to fund new investments.

The first two rows in Panel B of Table 7 indicate that a firm's leverage status has no significant effect on its change in net equity subsequent to the firm's acquisition. Except for column (6), the leverage dummy variables carry insignificant coefficients. Equity changes are associated with ***Deficit*** in the same way debt changes are, but growth has no effect on equity issuances or retirements. We conclude (again) that target firms' leverage re-balancing around acquisition involves primarily changes in the amount of debt outstanding.

5. Robustness tests

We have repeated our basic analysis using a variety of regression specifications and alternative variable definitions in order to establish the robustness of conclusions about acquired firms' leverage adjustments.

Cross-country differences. Institutional differences might make cross-border deals different from those completed within a single national jurisdiction. We investigate potential effects of cross-border deals in two ways. First, we repeat the main regression specification for the subset of acquisitions for which both firms resided in the same country. Panel A of Table 8 indicates that the results are very similar to those in Table 5: leverage falls (rises) significantly

after acquisition for over- (under-) leveraged firms and remains unchanged for those with optimized leverage. We also repeated the specification from Table 5 for the subset of cross-country mergers, with the addition of fixed effects for the target's and the acquirer's countries. Panel B of Table 8 continues to indicate that acquired firms move toward their leverage targets following acquisition. We conclude that our findings are not driven by cross-country factors affecting cross-border acquisitions.

Placebo test. While we attribute the changes in acquired firms' leverage to the acquisition event, it is possible that capital structure policies would have changed even without the acquisition. To see whether this is the case, we use the target firms and their matched firms from Section 4.2 to estimate:

$$Leverage_{im,t} = \alpha + \beta_1 After_{it} + \beta_2 After_{i,t} \times Treated_{im,t} + \beta_3 Treated_{im,t} + \gamma X_{im,t} + \theta_{im} + \tau_t + \varepsilon_{im,t}, \quad (7)$$

where $Treated_{im} = 1$ if the firm is an actual target firm and 0 otherwise.

$After_{it} = 1$ for years after the acquisition and 0 otherwise.

The coefficient on the interaction term $\boldsymbol{After_{i,t} \times Treated_{im,t}}$ measures the difference in leverage between actual targets and controls belonging to match *m*. The estimation results are presented in Table 9, which can be compared to Table 5. Only the ***Treated*** (acquired) firms manifest significant changes in their capital structures. Accordingly, our results cannot be explained by changes in capital structure policies that do not involve the acquisition.

Partial adjustment model. Many recent papers estimate leverage via a partial adjustment model rather than the simple FE specification (1). To test whether our results are sensitive to this choice, we estimate a partial adjustment model of the target firms' leverage with firm fixed effects (Flannery and Rangan, 2006):

$$L_{i,t} - L_{i,t-1} = \lambda\left(L^*_{i,t} - L_{i,t-1}\right) + \varepsilon_{i,t}, \quad (8)$$

where $L_{i,t} - L_{i,t-1}$ is the actual change in a firm's leverage,

$L^*_{i,t} - L_{i,t-1}$ is the distance between the firm's leverage and its target.

λ captures the speed of adjustment to the target leverage ratio.

Target leverage is a function of one-year lagged leverage determinants ($X_{i,t-1}$) and firm fixed effects (θ_i):

$$L^*_{i,t} = \beta X_{i,t-1} + \theta_i. \quad (9)$$

Combining equations (8) and (9) we get

$$L_{i,t} = (\lambda\beta)L_{i,t} + (1-\lambda)L_{i,t-1} + \lambda\theta_i + \varepsilon_{i,t}. \quad (10)$$

Eq. (10) is estimated in first differences using Generalized Method of Moments (GMM), where all regressors are assumed to be endogenous and year dummies are included to reduce contemporaneous autocorrelation. The use of numerous instruments may bias coefficient estimates. We therefore have reduced the number of instruments by collapsing the lagged untransformed control variables as suggested by Roodman (2009). Hansen's *J* statistic (= 28.17, p-value 0.210) fails to reject the null hypothesis that the overidentifying restrictions are valid. Moreover, the Arellano-Bond test statistic for second order autocorrelation across firms (AR(2) = 1.16, p-value 0.245) suggests that the instruments are valid (Roodman, 2009). The estimated annual speed of adjustment of book leverage in the sample of target firms is 28.1%, which is in the vicinity of previous estimates for the complete set of Compustat firms (Leary and Roberts, 2005; Flannery and Rangan, 2006; Faulkender et al., 2012, or Huang and Ritter, 2009).[22] Table 10 reports the results of estimating specification (3) with leverage targets calculated from a dynamic panel regression. Compared to Table 5, the estimated coefficients are a bit smaller in absolute value, but the coefficients manifest a similar pattern and significance levels.

No change in total assets. An acquired firm's post-acquisition leverage change could result from the new parent changing the target's asset size. For example, the new parent might liquidate some target firm assets or move some of the parent's assets to the target's balance sheet. Either change could directly affect the target's post-acquisition leverage despite being caused by some other consideration than leverage optimization. To address this concern, we re-estimate regression (3) for a subsample of mergers for which the target's total assets changed by less than 10% in the two years following the acquisition. Table 11 reports results that are similar to those in Table 5, suggesting that our leverage adjustment results reflect true leverage changes rather than large asset shifts.

Diversifying transactions. Some acquisitions constitute operational decisions, such as purchasing a competitor or a supplier. Other acquisitions may be valued primarily for their diversification effects, as when a parent acquires a firm that may have little to do with its existing lines of business. Kaplan and Weisbach (1992), for example, find that firms involved in diversifying acquisitions are almost four times more likely to later divest the acquisition than

[22] We do not report GMM estimation results for space considerations, but they are available upon request.

were firms that had acquired related targets. The pressure to adjust an acquired firm's leverage might vary with the parent's reason for making the acquisition. We therefore classified our mergers into those representing horizontal, vertical and diversifying transactions, using the methodology of Fan and Goyal (2006) and Ahern and Harford (2014). We then replicated Table 5 for sub-samples of each merger type: over-leveraged horizontal mergers, under-leveraged vertical mergers, and so forth. In untabulated results, we continue to find that over- (under-) leveraged firms reduce (raise) their leverage following all types of acquisitions.

6. Conclusion

The paper analyzes the effect of acquisitions on the capital structure of European target firms, most of which are not publicly traded. Merging firm-level financial information from Amadeus with merger information from the Zephyr database, we construct a dataset of 6,083 European acquisitions over the period 1999–2015. Because European firms must generally report financial information regardless of their ownership status, these data allow us to observe target firms' balance sheets before and after the acquisition event. We estimate an optimal leverage ratio for each potential target firm and investigate how deviations from this target interact with several dimensions of the acquisition event.

We find that firms with larger deviations from target (optimal) leverage are more likely to be acquired, presumably because the acquirer can reduce the target firm's cost of adjusting its leverage. By moving target firms closer to their optimal leverage, the new parent increases the subsidiary's market value (Korteweg, 2010). This effect on takeover probability is slightly (and significantly) larger for over-leveraged potential targets, but the same qualitative effect occurs for under-leveraged potential targets: they are more likely to be acquired than are similar firms with near-optimal leverage ratios.

We also find that newly-acquired firms move rapidly toward their target leverage in the year or two following acquisition, presumably by taking advantage of the acquirer's capital market access and/or its internal capital market. To the extent that this adjustment occurs through securities issuance, the largest changes occur in outstanding debt. Previously over-leveraged (under-leveraged) firms are more likely to retire (issue) debt post-acquisition. By contrast, post-acquisition equity changes are virtually unrelated to leverage deviations.

The rapid leverage adjustment we document carries important implications for the tradeoff theory of capital structure. First, it shows that our computed targets are economically meaningful to the new subsidiary firms. (In Europe, even subsidiaries seem to care about their

leverage.) Second, such discrete, rapid changes in observed leverage are consistent with the hypothesis that costly adjustment had previously prevented the target firms from moving closer to their optimal leverage ratios.

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Table A. Variable Definition

Variable	Definition
Leverage	= total debt (short- and long-term) to total assets, where short-term debt is short-term debt to credit institutions + part of long-term financial debts payable within the year, bonds, etc.; long-term debt is long-term debt to credit institutions (loans and credits), bonds.
ST Debt	= short-term debt scaled by total debt.
Target Leverage	= the fitted value of the leverage regression in Eq.(1), winsorized at zero and unity.
LevDev	Actual leverage less computed target leverage.
Over-leveraged (Under-leveraged)	= over-leveraged (under-leveraged) is a dummy variable equal to 1 if ***LevDev LevDev*** > +1% (< –1%) of total assets in the year prior to the acquisition and 0 otherwise. The omitted category is "optimized" firms whose |***LevDev***| < 1%.
Size	= log of total assets.
Growth	= $Sales_t$ / $Sales_{t-1}$.
Capex	= capital expenditures scaled by total assets.
Tangibility	= tangible fixed assets scaled by total assets.
Profitability	= EBIT scaled by total assets.
Age	= year minus year of incorporation.
Median industry leverage	= median leverage in each 2-digit NACE industry each year.
Intangibility	= intangible fixed assets scaled by total assets.
Deficit	= an average change in fixed assets minus (cash and equivalents at the beginning of the period plus profit), divided by total assets of all firms in the same industry (except the i^{th} firm).
Net working capital	= (work in progress + trade debtors + other current assets − trade creditors)/total assets.
Bankruptcy risk score	= inverse Altman Z-score adjusted for private firms (Altman, 2013). The model for manufacturing firms is (Z') and for service firms is (Z''). We use NACE classification to determine whether the firm belongs to the manufacturing (10-33) and non-manufacturing. $Z' = 0.717\ (X_1) + 0.847(X_2) + 3.107(X_3) + 0.420(X_4) + 0.998(X_5)$, $Z'' = 6.56\ (X_1) + 3.26(X_2) + 6.72(X_3) + 1.05\ (X_4)$, where $X_1$is the working capital to total assets ratio; X_2 is the retained earnings to total assets; X_3 is EBIT to total assets ratio; X_4 is the book value of equity to book value of total liabilities ratio; X_5 is the sales to total assets ratio.
Private Credit/GDP	= private credit by deposit money banks to GDP. Source: Global Financial Development Database, World Bank.
Market Cap/GDP	= value of listed shares to GDP. Source: IMF International Financial Statistics.
GDP Growth	= annual percentage of nominal growth rate of GDP in local currencies. Source: World Bank.

Figure 1. Deviation from the optimal leverage

This figure shows the evolution of the sample mean deviation from the optimal leverage from years –5 to +5 around an acquisition event for three sets of firms based on their deviation from target leverage at t=-1. "Optimized" firms at their leverage targets prior to acquisition (|*LevDev*| < 1% of TA), firms that are under-leveraged prior to acquisition (*LevDev* < –1% of TA) and firms that are over-leveraged prior to acquisition (*LevDev* > 1% of TA).

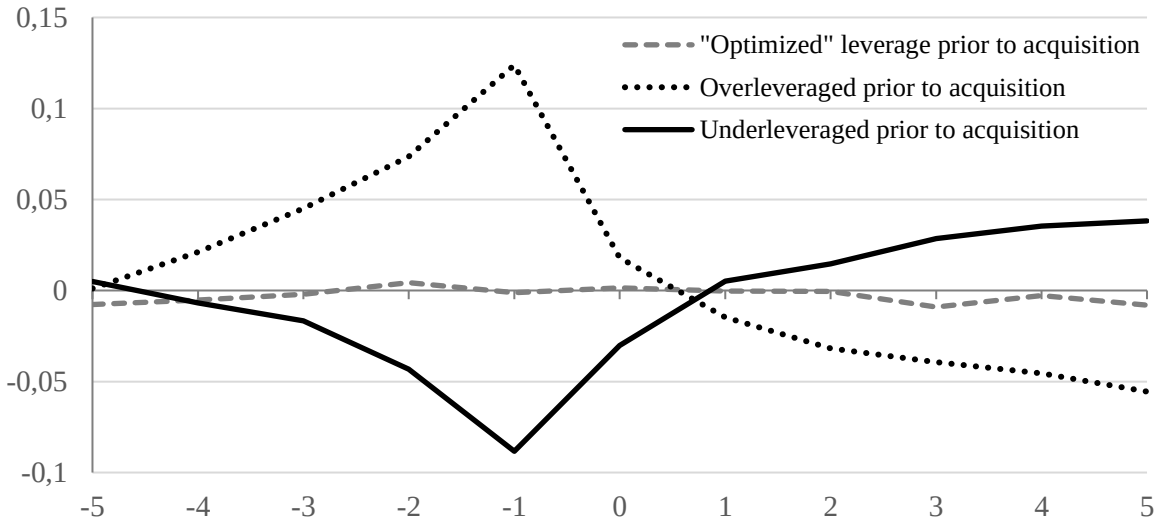


Figure 2. Debt issuance and retirement

Figure shows the percentage of firms that were involved in debt issuance or debt retirement activity from years –5 to +5 around the acquisition. Panel A focuses on firms at their leverage target (|*LevDev*|<1% of TA) prior to acquisition, Panel B covers firms that are over-leveraged prior to acquisition (*LevDev* > 1% of TA) and Panel C – firms that are under-leveraged prior to acquisition (*LevDev* < –1% of TA).

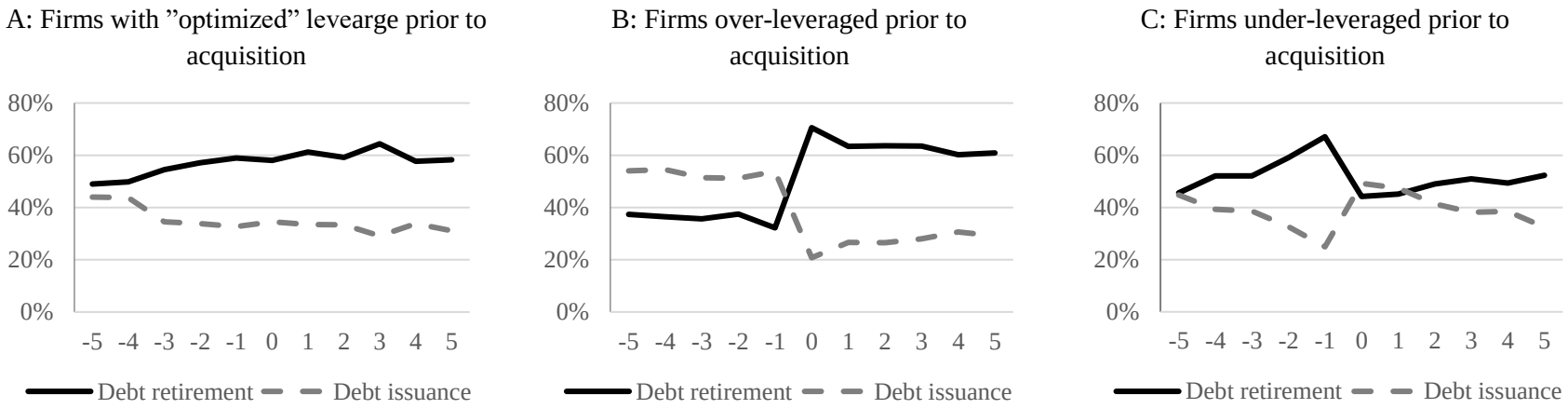
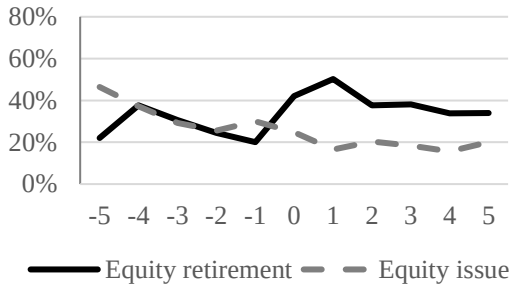


Figure 3. Equity capital changes

Figure shows the percentage of firms that were involved in equity issuance or equity retirement activity from years –5 to +5 around the acquisition. Panel A focuses on firms at their leverage target (|*LevDev*|<1% of TA) prior to the acquisition, Panel B covers firms that are over-leveraged prior to acquisition (*LevDev* > 1% of TA) and Panel C – firms that are under-leveraged prior to acquisition (*LevDev* < –1% of TA).

A: Firms with ”optimized” levearge prior to acquisition



B: Firms over-leveraged prior to acquisition

C: Firms under-leveraged prior to acquisition

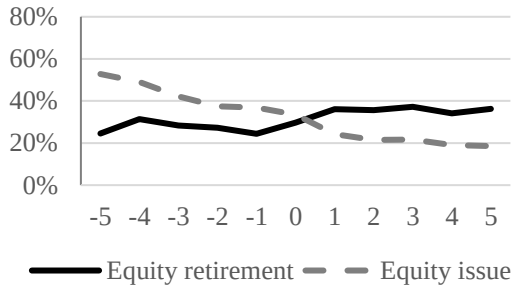


Table 1
Descriptive Statistics

Panel A provides summary statistics for the main variables used in the econometric analysis. Information about M&A deals is collected for 1999 to 2015. The statistics are provided for target firms over the years –5 to +5 around an acquisition. Panel B displays statistics on acquisitions of European targets, reported by the Zephyr database, with at least one year of financial data available in the Amadeus database before and after the acquisition. The characteristics are tabulated by country. The statistics are as of the last fiscal year-end before the deal was completed. Panel C shows the number of completed deals per industry. The definitions of all variables are provided in Table A.

Panel A: Entire sample summary statistics of target firms (from –5 to +5 years around the acquisition)

				Distribution		
Variable	*N*	Mean	St Dev	*5th*	*50th*	*95th*
Ln (Total Assets)	47,457	16.51	2.034	13.19	16.49	19.92
Leverage	47,457	0.180	0.209	0.000	0.102	0.618
LevDev	47,457	0.0002	0.126	-0.187	-0.007	0.227
Tangibility	47,404	0.222	0.237	0.001	0.133	0.729
Return on assets	47,298	0.039	0.171	-0.201	0.040	0.269
Growth	44,763	1.111	0.693	0.537	1.035	1.722
CAPEX/Total Assets	42,799	0.052	0.121	-0.097	0.029	0.278
Firm Age	31,664	23	18	5	18	57
Private Credit/GDP	46,908	92.14	36.23	44.27	90.09	168.2
Market Cap/GDP	42,989	64.65	33.35	14.02	65.79	121.8
GDP Growth	47,457	1.346	2.904	-4.188	1.687	5.603

Panel B: Characteristics of acquisitions across targets' countries

Target country	No of deals	Leverage		Domestic deals (%)	Private target (%)	Public acquirer (%)
		Mean	Median			
Austria	49	0.231	0.227	34.69%	91.84%	30.61%
Belgium	468	0.184	0.128	44.87%	96.58%	19.66%
Bulgaria	535	0.092	0.000	71.96%	91.59%	3.93%
Czech Republic	259	0.120	0.033	37.84%	94.98%	15.06%
Germany	283	0.213	0.141	42.40%	80.21%	26.86%
Estonia	85	0.280	0.250	50.59%	95.29%	8.24%
Spain	568	0.299	0.273	61.97%	96.13%	14.96%
Finland	306	0.220	0.172	67.65%	95.42%	10.78%
France	1,121	0.115	0.054	68.15%	89.56%	21.59%
United Kingdom	414	0.275	0.209	53.86%	88.89%	25.60%
Greece	37	0.287	0.297	48.65%	72.97%	40.54%
Croatia	48	0.229	0.181	47.92%	72.92%	35.42%
Hungary	54	0.157	0.041	42.59%	98.15%	16.67%
Ireland	9	0.327	0.276	33.33%	100.00%	11.11%
Italy	622	0.215	0.181	55.14%	92.77%	25.40%
Lithuania	21	0.124	0.088	42.86%	85.71%	23.81%
Latvia	97	0.238	0.186	46.39%	94.85%	10.31%
Netherlands	20	0.243	0.155	60.00%	65.00%	15.00%
Poland	202	0.130	0.090	58.42%	81.19%	36.14%
Portugal	92	0.315	0.313	56.52%	93.48%	18.48%
Sweden	738	0.150	0.033	63.14%	88.89%	24.12%
Slovak Republic	55	0.124	0.067	36.36%	80.00%	25.40%
Average	*6,083*	0.1828	0.1081	58.38%	90.83%	19.99%

Panel C: Number of acquisitions per industry section of NACE Rev 2

Target industry	N
Accommodation and food service activities	125
Activities of extraterritorial organizations and bodies	3
Administrative and support service activities	290
Arts, entertainment and recreation	58
Construction	346
Information and communication	619
Manufacturing	2,190
Other service activities	39
Professional, scientific and technical activities	682
Real estate activities	328
Transportation and storage	314
Water supply; sewerage, waste management and remediation activities	50
Wholesale and retail trade; repair of motor vehicles and motorcycles	1,039
Total	*6,083*

Table 2
Descriptive statistics for targets and their matches in a year before the acquisition

The table displays the descriptive statistics for target firms that have at least one matched firm. For each target firm of a deal completed in year *t*, we randomly select up to five matching control firms that were neither an acquirer nor a target over a sample period, operating in the same country and industry based on a 2-digit NACE Rev. 2 grouping in the year preceding the transaction, and whose total assets do not deviate by more than 10% from the total assets of a given target.

	Target Firms (Treated)				Matched Firms (Control)				Difference
Variables	Mean	Median	St Dev	*N*	Mean	Median	St Dev	*N*	(t-test)
Leverage	0.179	0.104	0.207	5,260	0.188	0.1	0.224	22,165	-0.009***
LevDev	0.003	-0.004	0.127	5,260	-0.002	-0.004	0.101	22,165	0.005***
Ln(Total Assets)	15.93	16.05	1.925	5,260	15.67	15.81	1.879	22,165	0.26***
Growth	1.163	1.064	0.789	4,885	1.154	1.062	0.827	19,903	0.009
CAPEX/TA	0.046	0.029	0.158	4,786	0.059	0.033	0.167	20,011	-0.013***
ROA	0.048	0.048	0.185	5,260	0.06	0.046	0.147	22,019	-0.012***
Intangibility	0.043	0.002	0.111	5,237	0.029	0	0.096	22,048	0.014***
Tangibility	0.221	0.13	0.24	5,260	0.252	0.152	0.269	22,144	-0.031***
Cash Flow	0.07	0.075	0.192	4,778	0.083	0.069	0.17	19,952	-0.013***
Cash/TA	0.126	0.057	0.167	5,126	0.132	0.05	0.19	21,326	-0.006**
Firm Age	20	16	17	3,498	20	16	16	15,053	0.000

Table 3
Probability of being acquired

The table presents logit analysis. The estimations are conducted on the sample of the target and matched firms. The dependent variable in the logit models takes the value of one if the firm is an actual target firm and zero otherwise. Firms are classified as over-leveraged prior to acquisition if ***LevDev*** > 1% of TA and under-leveraged prior to acquisition if ***LevDev*** < –1% of TA. The reported estimates are average marginal effects. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level correspondingly. Variable definitions are provided in Table A.

Independent Variables	(1)	(2)	(3)	(4)
Leverage $_{t-1}$	-0.051***			
	(0.015)			
$\|LevDev_{t-1}\|$		0.453***		0.500***
		(0.032)		(0.033)
Bottom leverage tercile$_{t-1}$				-0.015**
				(0.007)
Top leverage tercile$_{t-1}$				-0.048***
				(0.007)
Over-leveraged $_{t-1}$			0.056***	
			(0.008)	
Under-leveraged $_{t-1}$			0.040***	
			(0.008)	
Ln(Total Assets) $_{t-1}$	0.016***	0.015***	0.016***	0.015***
	(0.002)	(0.002)	(0.002)	(0.002)
Median Industry Leverage $_{t-1}$	-0.071	-0.102*	-0.102*	-0.081
	(0.056)	(0.055)	(0.054)	(0.055)
Growth $_{t-1}$	0.002	0.001	0.002	0.001
	(0.004)	(0.004)	(0.004)	(0.004)
ROA $_{t-1}$	0.005	0.028	0.014	0.026
	(0.035)	(0.035)	(0.035)	(0.036)
Intangibility $_{t-1}$	0.209***	0.188***	0.199***	0.195***
	(0.025)	(0.026)	(0.025)	(0.026)
Cash Flow/Total Assets $_{t-1}$	-0.089**	-0.077**	-0.086**	-0.085**
	(0.035)	(0.036)	(0.034)	(0.036)
Cash/Total Assets $_{t-1}$	0.024	0.058***	0.056***	0.047***
	(0.018)	(0.017)	(0.018)	(0.018)
Country FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes	Yes
Pseudo R-squared	0.025	0.034	0.027	0.036
N	21472	21472	21472	21472

Table 4
Univariate leverage analysis around acquisition

This table shows acquired firms' leverage values in relation to the year the acquisition is completed (year 0) and tests of the differences for various windows. We differentiate between firms at their leverage targets (|***LevDev***| <1% of TA) prior to the acquisition, firms that are over-leveraged prior to acquisition (***LevDev*** > 1% of TA) and firms that are under-leveraged prior to acquisition (***LevDev*** < –1% of TA). ***, **, and * denote statistical significance at the 1%, 5%, and 10% level correspondingly. Variable definitions are provided in Table A.

	Optimized Target Firms				*Over-leveraged* Target Firms				*Under-leveraged* Target Firms			
Timeline	Mean	Median	St Dev	N	Mean	Median	St Dev	N	Mean	Median	St Dev	N
-5	0.088	0.007	0.151	432	0.234	0.202	0.209	1,037	0.203	0.140	0.206	1,270
-4	0.084	0.003	0.147	526	0.255	0.224	0.210	1,260	0.187	0.131	0.200	1,577
-3	0.086	0.000	0.161	640	0.275	0.246	0.214	1,514	0.172	0.113	0.190	1,928
-2	0.084	0.001	0.157	783	0.300	0.274	0.213	1,834	0.146	0.081	0.175	2,268
-1	0.065	0.000	0.139	1,105	0.344	0.311	0.208	2,225	0.100	0.032	0.144	2,753
0	0.067	0.000	0.152	1,105	0.237	0.192	0.218	2,225	0.153	0.063	0.197	2,753
1	0.065	0.000	0.156	1,105	0.200	0.128	0.217	2,225	0.185	0.100	0.219	2,753
2	0.088	0.001	0.170	638	0.177	0.098	0.206	1,795	0.194	0.121	0.217	2,213
3	0.087	0.000	0.171	470	0.160	0.082	0.194	1,508	0.209	0.136	0.230	1,828
4	0.097	0.001	0.179	361	0.148	0.062	0.187	1,245	0.213	0.141	0.230	1,490
5	0.087	0.000	0.169	276	0.135	0.048	0.180	1,046	0.217	0.145	0.232	1,269
Total				7,441				17,914				22,102
Averages for Period -5 to -1	0.082	0.002		3,486	0.282	0.252		7,870	0.161	0.100		9,796
Averages for Period +1 to +5	0.085	0.000		2,850	0.164	0.084		7,819	0.204	0.129		9,553
Change	0.003	-0.002			-0.118***	-0.168***			0.043***	0.029***		
Averages for Period -3 to -1	0.079	0.000		2,528	0.306	0.277		5,573	0.139	0.076		6,949
Averages for Period +1 to +3	0.080	0.001		2,213	0.179	0.103		5,528	0.196	0.119		6,794
Change	0.001	0.001			-0.127***	-0.174***			0.057***	0.043***		
Averages for Period -2 to -1	0.075	0.000		1,888	0.322	0.293		4,059	0.123	0.057		5,021
Averages for Period +1 to +2	0.076	0.001		1,743	0.188	0.113		4,020	0.190	0.110		4,966
Change	0.001	0.001			-0.134***	-0.180***			0.067***	0.053***		
Change in leverage -1 and +1	0.000	0.000			-0.144***	-0.183***			0.085***	0.085***		

Table 5

Leverage changes following acquisition

This table reports estimation results from regression (3) examining leverage changes after the acquisition event. The sample covers the period of +/– 5 years around the acquisition event. ***After*** is a dummy variable that takes a value of one after the deal is completed [0, +5] and zero otherwise. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level correspondingly. Variable definitions are provided in Table A.

	Dependent Variable = Acquired firm's Leverage$_t$								
	Optimized Target Firms			*Over-leveraged* Target Firms			*Under-leveraged* Target Firms		
Independent Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
After	0.0001	0.005	0.005	-0.090***	-0.086***	-0.089***	0.047***	0.039***	0.039***
	(0.003)	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.003)	(0.004)	(0.004)
Ln(Total Assets) $_{t-1}$	0.006*	-0.008	-0.007	0.042***	0.048***	0.051***	0.037***	0.023***	0.026***
	(0.003)	(0.005)	(0.005)	(0.004)	(0.005)	(0.005)	(0.003)	(0.005)	(0.005)
Tangibility $_{t-1}$	0.099***	0.097***	0.095***	0.113***	0.138***	0.130***	0.130***	0.105***	0.091***
	(0.018)	(0.025)	(0.025)	(0.015)	(0.020)	(0.020)	(0.014)	(0.019)	(0.019)
Growth $_{t-1}$	-0.001	-0.003	-0.002	-0.000	-0.002	0.000	0.000	0.001	0.003
	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)
ROA $_{t-1}$	-0.016**		-0.016	-0.113***		-0.108***	-0.111***		-0.120***
	(0.007)		(0.011)	(0.012)		(0.017)	(0.011)		(0.016)
Capex/Total Assets $_{t-1}$		0.035*	0.035*		0.022	0.021		0.110***	0.111***
		(0.020)	(0.020)		(0.017)	(0.017)		(0.015)	(0.015)
ST Debt $_{t-1}$		0.006	0.006		0.013**	0.014**		0.006	0.007
		(0.004)	(0.004)		(0.006)	(0.005)		(0.004)	(0.004)
Firm Age $_{t-1}$		-0.008	-0.008		-0.067***	-0.064***		0.007	0.009
		(0.008)	(0.008)		(0.014)	(0.014)		(0.011)	(0.011)
Private Credit/GDP $_{t-1}$	-0.000	-0.000	-0.000	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Market Cap/GDP $_{t-1}$	0.000	0.000	0.000	0.000	0.001***	0.001***	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP Growth $_{t-1}$	-0.000	-0.001	-0.001	-0.000	0.002	0.002*	-0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Intercept	-0.013	0.325***	0.319***	-0.557***	-0.526***	-0.568***	-0.572***	-0.361***	-0.398***
	(0.062)	(0.104)	(0.102)	(0.069)	(0.099)	(0.098)	(0.059)	(0.084)	(0.082)
Firm & Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.842	0.853	0.853	0.627	0.647	0.649	0.615	0.634	0.639
N	5785	3577	3577	15505	9399	9399	19010	11757	11757

Table 6
Change in leverage deviation (*LevDev*) after acquisitions

This table contains the cross-sectional analysis of the change in the leverage deviation from the end of year –1 to the end of years 0, 3, and 5 respectively. ***Over-*** and ***Under-leveraged*** indicate whether acquired firms have (***LevDev*** > 1% of TA) or (***LevDev*** < –1% of TA) respectively in the year prior to the acquisition (year –1). ***Leverage*** is the target firm leverage in the year prior to the acquisition (–1). All accounting variables are calculated as of the year prior to the year when a takeover is completed. ***Bankruptcy risk score*** is the inverse Altman Z-score adjusted for private firms (Altman, 2013). ***, **, and * denote statistical significance at the 1%, 5%, and 10% level correspondingly. Variable definitions are provided in the Table A.

	Δ Leverage deviation					
	(-1, 0)		(-1, 3)		(-1, 5)	
	(1)	(2)	(3)	(4)	(5)	(6)
Over-leveraged	-0.067***	-0.010	-0.110***	-0.026*	-0.116***	-0.014
	(0.005)	(0.011)	(0.007)	(0.013)	(0.010)	(0.019)
Under-leveraged	0.049***	0.062***	0.118***	0.124***	0.134***	0.136***
	(0.004)	(0.006)	(0.006)	(0.009)	(0.009)	(0.012)
Leverage	-0.178***	0.0006	-0.256***	-0.042	-0.320***	-0.037
	(0.019)	(0.028)	(0.023)	(0.039)	(0.030)	(0.055)
Leverage × Over-leveraged		-0.278***		-0.381***		-0.494***
		(0.038)		(0.049)		(0.067)
Leverage × Under-leveraged		-0.081**		-0.011		-0.014
		(0.034)		(0.049)		(0.067)
Bankruptcy risk score	-0.002**	-0.0000	-0.001	0.0004	-0.002	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Bankruptcy risk score × Over-leveraged		-0.0020		-0.0023		-0.002
		(0.002)		(0.002)		(0.003)
Bankruptcy risk score × Under-leveraged		-0.0016*		-0.0012		-0.0003
		(0.001)		(0.001)		(0.002)
Private Credit/GDP	-0.0001	-0.0001	-0.0001	-0.0001	0.0004	0.0005
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Market Cap/GDP	0.0000	0.0000	-0.0007**	-0.0008***	-0.0000	0.0001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP Growth	-0.0009	-0.0011	0.0014	0.0014	0.0001	0.0009
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Country FEs	Yes	Yes	Yes	Yes	Yes	Yes
Industry FEs	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.237	0.249	0.439	0.459	0.483	0.511
N	4700	4700	3060	3060	2055	2055

Table 7
The decision to issue or retire debt and equity

This table reports the results of estimating the logit model (5) explaining acquired firms' changes in capital structure around the acquisition date. ***Over***- and ***Under-leveraged*** indicate whether acquired firms have (***LevDev*** > 1% of TA) or (***LevDev*** < –1% of TA) respectively in the year prior to the acquisition (year –1). ***, **, and * denote statistical significance at the 1%, 5%, and 10% level correspondingly. Variable definitions are provided in the Table A.

Panel A: Debt

	D-retire$_{i,t}$ = 1					*D-issue*$_{i,t}$ = 1				
	[-1;0]	[-1;3]	[-1;5]	[1;3]	[4;5]	[-1;0]	[-1;3]	[-1;5]	[1;3]	[4;5]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Overleveraged $_{t-1}$	0.153***	0.025	0.030	0.020	0.014	-0.160***	-0.028	-0.011	-0.023	0.007
	(0.023)	(0.034)	(0.045)	(0.034)	(0.046)	(0.022)	(0.032)	(0.043)	(0.032)	(0.044)
Underleveraged $_{t-1}$	-0.107***	-0.114***	-0.062	-0.111***	-0.063	0.112***	0.077**	0.021	0.077**	0.027
	(0.023)	(0.033)	(0.044)	(0.033)	(0.045)	(0.022)	(0.031)	(0.042)	(0.031)	(0.042)
Deficit $_{t}$	-0.276***	-0.314***	-0.333***	-0.337***	-0.353***	0.264***	0.342***	0.297***	0.363***	0.317***
	(0.030)	(0.047)	(0.059)	(0.049)	(0.060)	(0.031)	(0.047)	(0.060)	(0.048)	(0.061)
Bankruptcy risk score $_{t-1}$	0.010***	0.004	-0.006	0.007	0.002	-0.003	-0.006	0.002	-0.005	0.002
	(0.004)	(0.005)	(0.006)	(0.005)	(0.005)	(0.003)	(0.004)	(0.005)	(0.005)	(0.004)
Ln(Total Assets) $_{t-1}$	-0.003	-0.017***	-0.018**	-0.017***	-0.015**	-0.001	0.005	-0.002	0.005	0.000
	(0.004)	(0.006)	(0.007)	(0.006)	(0.007)	(0.004)	(0.006)	(0.007)	(0.006)	(0.007)
Growth $_{t-1}$	-0.034**	-0.037	-0.105**	-0.027	-0.106**	0.035**	0.034	0.084**	0.048*	0.089**
	(0.017)	(0.027)	(0.044)	(0.030)	(0.044)	(0.015)	(0.025)	(0.039)	(0.027)	(0.039)
Net working capital $_{t-1}$	0.039	0.023	0.055	0.022	0.020	-0.063**	-0.004	-0.035	0.003	-0.021
	(0.034)	(0.045)	(0.055)	(0.043)	(0.053)	(0.032)	(0.043)	(0.052)	(0.041)	(0.048)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo-R^2	0.110	0.08	0.105	0.082	0.104	0.127	0.088	0.107	0.09	0.111
N	4350	2782	1842	2774	1786	4347	2782	1842	2771	1786

	Panel B: Equity									
	E-retire$_{i,t}$ = 1					*E-issue*$_{i,t}$ = 1				
	[-1;0]	[-1;3]	[-1;5]	[1;3]	[4;5]	[-1;0]	[-1;3]	[-1;5]	[1;3]	[4;5]
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Overleveraged $_{t-1}$	0.003	0.011	0.013	0.017	0.005	0.029**	0.026	-0.021	0.025	-0.022
	(0.013)	(0.016)	(0.019)	(0.016)	(0.019)	(0.013)	(0.016)	(0.019)	(0.016)	(0.019)
Underleveraged $_{t-1}$	0.003	0.017	0.016	0.019	0.009	0.001	0.012	-0.006	0.013	-0.014
	(0.012)	(0.015)	(0.018)	(0.015)	(0.018)	(0.013)	(0.016)	(0.019)	(0.016)	(0.019)
Deficit $_{t}$	-0.062***	-0.102***	-0.104***	-0.120***	-0.094***	0.081***	0.101***	0.034	0.115***	0.041
	(0.016)	(0.024)	(0.030)	(0.025)	(0.030)	(0.018)	(0.027)	(0.031)	(0.027)	(0.032)
Bankruptcy risk score $_{t-1}$	-0.004**	-0.000	-0.002	0.005*	-0.001	-0.001	-0.002	-0.001	-0.007***	-0.003
	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)
Ln(Total Assets) $_{t-1}$	0.003	0.009***	-0.004	0.010***	-0.002	0.006**	0.001	-0.000	0.000	0.001
	(0.003)	(0.003)	(0.004)	(0.003)	(0.004)	(0.003)	(0.003)	(0.004)	(0.003)	(0.004)
Growth $_{t-1}$	-0.009	-0.007	-0.004	0.011	-0.006	0.010	-0.003	0.005	0.004	0.013
	(0.009)	(0.020)	(0.022)	(0.016)	(0.022)	(0.011)	(0.013)	(0.021)	(0.015)	(0.021)
Net working capital $_{t-1}$	0.074***	0.007	0.055*	-0.004	0.006	-0.099***	0.002	-0.029	-0.004	-0.008
	(0.020)	(0.026)	(0.030)	(0.024)	(0.025)	(0.021)	(0.023)	(0.029)	(0.022)	(0.026)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo-R2	0.495	0.568	0.611	0.568	0.649	0.465	0.518	0.471	0.517	0.494
N	5394	3431	2375	3398	2269	5409	3485	2301	3448	2159

Table 8
Robustness check: Cross-country differences

This table reports the results of re-estimating (3) separately for domestic and international acquisitions. The sample covers the period of +/– 5 years around the acquisition event. Panel A reports estimation results for the subsample of domestic deals by domestic business groups. Panel B presents the results for the subsample of cross-border deals accounting for the difference in corporate tax rates between target and acquiring countries by controlling for acquirer and target country fixed effects. ***After*** is a dummy variable that takes a value of one after the deal is completed [0, +5] and zero otherwise. *Basic firm-level controls* include the four Rajan-Zingales (1995) factors: firm size, asset tangibility, growth, and profitability. Specifications with *All firm-level controls* also account for ROA, capital expenditures, the proportion of short-term debt in total debt, and firm age. *Country-level controls* are total private credit to GDP, stock market capitalization to GDP and nominal GDP growth. All specifications include a set of firm and year fixed effects. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level correspondingly. Variable definitions are provided in Table A.

Dependent Variable = Acquired firm's Leverage $_t$

Panel A: Domestic deals by domestic business groups

	Optimized leverage		Over-leveraged		Under-leveraged	
	(1)	(2)	(3)	(4)	(5)	(6)
After	0.003	0.008	-0.087***	-0.089***	0.044***	0.036***
	(0.004)	(0.006)	(0.005)	(0.007)	(0.004)	(0.005)
Basic firm-level controls	Yes	Yes	Yes	Yes	Yes	Yes
All firm-level controls	No	Yes	No	Yes	No	Yes
Country-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm & Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.849	0.838	0.643	0.675	0.641	0.667
N	2955	1802	7773	4894	10222	6479

Panel B: Mergers across national borders

	Optimized leverage		Over-leveraged		Under-leveraged	
	(1)	(2)	(3)	(4)	(5)	(6)
After	0.004	0.004	-0.093***	-0.101***	0.032***	0.026**
	(0.004)	(0.005)	(0.008)	(0.010)	(0.007)	(0.010)
All firm-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Acquirer country FEs	Yes	Yes	Yes	Yes	Yes	Yes
Target country FEs	Yes	Yes	Yes	Yes	Yes	Yes
Year × Target country FEs		Yes		Yes		Yes
Year × Acquirer country FEs		Yes		Yes		Yes
Adjusted R^2	0.892	0.900	0.618	0.640	0.599	0.617
N	1789	1789	4151	4151	4678	4678

Table 9
Robustness check: Matched sample

This table presents estimates of the leverage regression using a sample of *industry-size-year-country* matched firms. For each target firm, we find a match in the year prior to the acquisition (-1). ***After*** is a dummy variable equal to unity after the deal is completed [0, +5] and zero otherwise. *Basic firm-level controls* include the four Rajan-Zingales (1995) factors: firm size, asset tangibility, growth, and profitability. Specifications with *All firm-level controls* also account for ROA, capital expenditures, the proportion of short-term debt in total debt, and firm age. *Country-level controls* are total private credit to GDP, stock market capitalization to GDP and nominal GDP growth. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level correspondingly. Variable definitions are provided in Table A.

	Dependent Variable= Leverage of acquired firms and their matches					
	Optimized		Over-leveraged		Under-leveraged	
	(1)	(2)	(3)	(4)	(5)	(6)
After	-0.002	-0.001	-0.002	-0.000	-0.001	-0.002
	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)
After × Treated	0.001	0.007*	-0.088***	-0.093***	0.055***	0.056***
	(0.003)	(0.004)	(0.003)	(0.004)	(0.003)	(0.003)
Basic firm-level controls	Yes		Yes		Yes	
All firm-level controls		Yes		Yes		Yes
Country-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm & Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.772	0.776	0.734	0.754	0.733	0.753
N	19117	14051	46563	33455	58706	43374

Table 10. Robustness check: Partial adjustment model for target leverage estimation

This table presents estimates of the leverage regression using a sample of *industry-size-year-country* matched firms. For each target firm, we find a match in the year prior to the acquisition (-1). ***After*** is a dummy variable equal to unity after the deal is completed [0, +5] and zero otherwise. Firms are assigned into Over-leveraged and Under-leveraged groups based on target leverage in year –1 estimated using GMM model. *Basic firm-level controls* include the four Rajan-Zingales (1995) factors: firm size, asset tangibility, growth, and profitability. Specifications with *All firm-level controls* also account for ROA, capital expenditures, the proportion of short-term debt in total debt, and firm age. *Country-level controls* are total private credit to GDP, stock market capitalization to GDP and nominal GDP growth. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level correspondingly. Variable definitions are provided in Table A.

	Dependent Variable = Acquired firm's Leverage $_t$					
	Optimized		Over-leveraged		Under-leveraged	
	(1)	(2)	(3)	(4)	(5)	(6)
After	-0.001	-0.001	-0.032***	-0.031***	0.023***	0.014***
	(0.006)	(0.007)	(0.003)	(0.004)	(0.004)	(0.004)
Basic firm-level controls	Yes	Yes	Yes	Yes	Yes	Yes
All firm-level controls	No	Yes	No	Yes	No	Yes
Country-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm & Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.475	0.492	0.620	0.637	0.494	0.566
N	8486	5112	22474	13956	9269	5622

Table 11: Robustness check: No change in total assets

This table reports estimation results for regression (3) when the sample is restricted to firms that changed their total assets by no more than 10% in the two years following the acquisition. ***After*** is a dummy variable that takes a value of one after the deal is completed [0, +5] and zero otherwise. *Basic firm-level controls* include the four Rajan-Zingales (1995) factors: firm size, asset tangibility, growth, and profitability. Specifications with *All firm-level controls* also account for ROA, capital expenditures, the proportion of short-term debt in total debt, and firm age. *Country-level controls* are total private credit to GDP, stock market capitalization to GDP and nominal GDP growth. All specifications include a set of firm and year fixed effects. ***, **, and * denote statistical significance at the 1%, 5%, and 10% level correspondingly. Variable definitions are provided in Table A.

	Dependent Variable = Acquired firm's Leverage $_t$					
	Optimized		Over-leveraged		Under-leveraged	
	(1)	(2)	(3)	(4)	(5)	(6)
After	-0.009	-0.011	-0.083***	-0.074***	0.031***	0.025***
	(0.007)	(0.009)	(0.008)	(0.010)	(0.008)	(0.009)
Basic firm-level controls	Yes		Yes		Yes	
All firm-level controls		Yes		Yes		Yes
Country-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm & Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.876	0.878	0.660	0.670	0.652	0.674
N	1027	730	3080	2024	3411	2270

Abstrakt

Pomocí velkého vzorku evropských akvizic ukazujeme, že získané firmy podstatně snižují rozdíl mezi jejich skutečným a optimálním dluhovým poměrem. Převážná část této úpravy nastává poměrně rychle, a to do jednoho roku od akvizice. Typická firma s vysokým dluhovým poměrem upravuje poměr dluhu k aktivům z 34,4 % v roce před akvizicí na 20 % v předchozím roce. (Posun k optimálnímu dluhu je pomalejší, ale stále poměrně rychlý, pokud jde o cílové firmy s malým dluhovým poměrem). K těmto úpravám dochází především prostřednictvím emisí dluhopisů nebo splácením úvěrů. Zkoumáme také, jak velikost dluhového poměru ovlivňuje pravděpodobnost akvizice dané firmy. Zjistili jsme, že firmy, které jsou dále od svého optimálního dluhového poměru, budou s větší pravděpodobností získány. U průměrné firmy zvýšení absolutní odchylky dluhového poměru z 1 % na 10 % celkových aktiv zvyšuje pravděpodobnost akvizice firmy o 4,1% na 5,6 % (vyšší efekt odpovídá firmám s vysokým dluhovým poměrem). Celkově naše výsledky podporují teorii kompromisu kapitálové struktury a naznačují, že finanční synergie hrají významnou roli v rozhodování o akvizicích evropských privátních firem.

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