Discussion Paper No. 14-019

M&A and the Tax Benefits of Debt-Financing

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March 2014

Abstract:
The deductibility of interest expenses from the corporate tax base creates an incentive for acquiring companies to finance a takeover with debt. In this paper, I investigate the impact of profit taxation on the financing decision in corporate acquisitions for the first time for a sample of different acquirer-countries mainly in Europe. The likelihood to observe a debt-financed acquisition is found to increase in the acquirer's tax rate. In addition, I take into account that the financing decisions of particular acquisitions might not be independent from other investment decisions. Therefore, I analyze the acquirer's capital structure development around the acquisition and find an increase in the statutory tax rate by one %-point to be associated with a stronger increase in the debt ratio by 0.55 %-points during the acquisition period.

Keywords: M&A, Business Taxation, Capital Structure, Empirical Analysis

JEL-Classification: G34, H25, H32

*The paper originated from the Research Project "Empirical Evidence for the Effect of Taxation on National and International Mergers and Acquisitions" which was financially supported by the German Science Foundation (DFG). I thank Daniel Dreßler for providing corporate income tax data.
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Non-Technical Summary

I examine the extent to which acquiring companies make use of the tax advantage of debt-financing in the acquisition period. The intuition is that companies can reduce their tax burden by means of debt-financing because interest expenses are deductible from the corporate tax base and therefore create a tax shield. In contrast, dividends, in a sense the interest payments to equity providers, are not deductible.

The relevance of interest tax shields for acquiring companies was highlighted by the French announcement of increasing taxes and at the same time restricting the deductibility of interest expenses in 2012. Private equity firms, which often undertake mainly debt-financed acquisitions, heavily complained about this notification and even threatened to leave France.

The tax advantage of debt might lead to economically inefficient high debt ratios and, therefore, to higher risk of financial distress and lower resistance to crisis. Moreover, it can make acquisitions profitable, which would not occur in a world without tax discrimination of equity. Furthermore, multinational companies face tax planning opportunities when it comes to the financing decision of corporate acquisitions due to the different tax systems and tax rates in the countries their subsidiaries are located in.

I have analyzed the financing decision in corporate acquisitions between 2001 and 2011 across many, mainly European countries. The empirical approach consisted of two parts. First, I examined the probability to observe a debt-financed deal. Second, I took a look at the acquirer-companies' debt ratio developments during the acquisition period. My findings suggest that a one %-point increase in the acquirer-country statutory tax rate is associated with an increase in the debt ratio by 0.55 %-points. Furthermore, the probability to observe an at least partly debt-financed deal increases on average by 1.58 %-points for all acquirers and by 2.03 %-points for the subsample of profitable acquirers if the tax rate increases by one %-point. Restricting the sample to multinational acquirers, I found that a possible tax consolidation in the target-country may enhance the use of equity if the acquirer is profitable, because losses of the target-company can be used to reduce the taxable profit of the acquiring company. In addition, the acquirer's tax rate effect also depends on the affiliated companies' tax rates. The higher the weighted average tax rate of affiliates outside the acquirer-country, the lower the effect of the acquirer's tax rate on its capital structure development.

Das Wichtigste in Kürze

Die vorliegende Studie untersucht anhand von Unternehmensübernahmen in mehreren, hauptsächlich Europäischen Ländern zwischen 2001 und 2011, inwiefern Erwerbergesellschaften den steuerlichen Vorteil der Fremdfinanzierung während der Übernahmephase nutzen. Fremdfinanzierung führt zu einer Reduktion der Steuerlast, da Zinsaufwendungen im Gegensatz zu Dividenden die steuerliche Bemessungsgrundlage bei der Gewinnermittlung verringern und somit als Steuerschutzschild fungieren.

Die Relevanz von Zinsen als Steuerschutzschild für Erwerbergesellschaften hat sich im Jahr 2012 bei der Ankündigung der Französischen Regierung gezeigt, Steuern auf Investmentgewinne zu erhöhen gleichzeitig und die Abzugsfähigkeit von Fremdkapitalzinsen zu begrenzen. Private Equity Firmen, die häufig hauptsächlich fremdfinanzierte Übernahmen durchführen, haben sich lautstark über diese Ankündigungen beschwert und sogar damit gedroht, Frankreich zu verlassen.

Der Steuervorteil der Fremdfinanzierung kann zu ineffizient hohen Verschuldungsgraden führen und damit die Krisenfestigkeit negativ beeinträchtigen. Darüber hinaus können fremdfinanzierte Übernahmen nur durch die steuerlichen Vorteile des Zinsabzugs profitabel werden. Weiterhin bieten sich für multinational agierende Konzerne durch über Ländergrenzen hinweg unterschiedliche Steuersystemen und insbesondere Steuersätze Steuerplanungsmöglichkeiten.

In der vorliegenden Studie wird zum Einen die Wahrscheinlichkeit für eine fremdfinanzierte Übernahme betrachtet. Zum Anderen ist die Entwicklung der gesamten Kapitalstruktur der Erwerbergesellschaften Untersuchungsgegenstand. Die Ergebnisse zeigen, dass eine ein %-Punkt Erhöhung des Körperschaftsteuersatzes im Erwerberland mit einer relativen Erhöhung des Verschuldungsgrades der Erwerbergesellschaft um 0.55 %-Punkte einhergeht. Weiterhin steigt die Wahrscheinlichkeit für eine fremdfinanzierte Übernahme bei einer ein %-Punkt Erhöhung des Steuersatzes um 1.58 %-Punkte für die Gesamtheit aller Erwerber und um 2.03 %-Punkte für die Gruppe der profitablen Erwerber. Bei einer getrennten Betrachtung von multinationalen Erwerbergesellschaften ist ein potentieller Zusammenhang zwischen der Möglichkeit der steuerlichen Konsolidierung des Erwerber- und Zielunternehmens und einer verstärkten Eigenkapitalfinanzierung zu erkennen. Dieser kann dadurch entstehen, dass bestehende Verluste des Zielunternehmens vom Erwerber genutzt werden können, um die eigene steuerliche Bemessungsgrundlage zu verringern. Darüber hinaus hängt der Effekt des Erwerberlandsteuersatzes von den Steuersätzen der verbundenen Unternehmen des Erwerbers außerhalb des Erwerberlandes ab.

1 Introduction

In September 2012, France published plans to increase taxes on investment income and to restrict the deductibility of interest expenses from the corporate tax base. This announcement led to massive complaints from fund managers. They stated that this would mean the death of private equity in France.[1] One reason for this reaction might be that acquisitions undertaken by private equity companies are often primarily debt-financed. This results in significant interest expenses due to the large deal values of acquisitions of whole companies.

In my sample, there are indeed many acquirers showing a strong increase in the interest expenses after the deal. For example, the interest expenses of Linde AG rose from EUR 145 million to EUR 271 million after the mainly debt-financed acquisition of BOC Group in 2006 because of the large deal value amounting EUR 12.2 billion. Another example is the acquisition of Cumerio sa/nv by Norddeutsche Affinerie AG in 2008 valued at EUR 543.7 million. The net interest expenses of the acquirer increased from 1.4 million EUR before the deal to EUR 20.3 million after the deal.[2]

As a result, a restriction on the deductibility of such expenses may significantly increase the tax burden of acquiring companies. The large fraction of debt-financing in certain corporate acquisitions could be attributed to the difficulty in issuing equity for large deals. However, there might also be a tax effect. The tax deductibility creates an interest tax shield and therefore incentivizes debt-financing. This debt bias is already known and has been investigated in the empirical literature[3] and over-indebtedness has received increased attention during the recent financial crisis[4]. Mergers and acquisitions are a special case of large investments and have experienced increasing importance with respect to foreign direct investment (FDI) in the last decades.[5] Therefore, I have analyzed to what extent the financing decision in corporate acquisitions and the capital structure of acquiring companies are influenced by profit taxation.

I contribute to the literature by analyzing the tax effects on the financing decision in corporate acquisitions in a sample of several, mainly European acquirer-countries. In addition, I combine an analysis of the specific deal financing decisions and of the overall capital structure development of the acquiring companies in the deal period. My main

[1] See Chassany (2012).
[2] See Linde (2006) and Norddeutsche Affinerie (2009) for these figures.
[3] See the meta-study by Feld et al. (2013), for example.
[4] See Liu and Rosenberg (2013)
[5] See Desai and Hines (2003).

finding is that higher tax rates do indeed increase the acquirers' debt-to-asset ratios in the acquisition period. An analysis of deals between 2001 and 2011 with an acquirer in one of 21 European countries showed that a one %-point increase in the statutory tax rate is associated with an increase in the debt ratio by 0.55 %-points. Furthermore, the probability to observe an at least partly debt-financed deal increases on average by 1.58 %-points for all acquirers and by 2.03 %-points for the subsample of profitable acquirers if the tax rate increases by one %-point.

The remainder of this paper is organized as follows: Section 2 summarizes the recent empirical literature, section 3 develops the main hypotheses and section 4 describes the data. Section 5 illustrates the empirical approach, section 6 presents the results and section 7 concludes.

2 Literature Review

Auerbach (2002), Graham(2003) and a meta-study by Feld et al. (2013) provide overviews of the existing empirical literature on the effects of taxes on the capital structure of companies. Most of the studies find a positive relationship between the tax rate and the debt-to-asset ratio. They vary in the type of proxy employed for the marginal tax advantage of debt, the empirical methods used and the kind of firms investigated. While some studies only focus on one country (for example Graham et al. (1998) and Graham (1999), which use simulated marginal tax rates of U.S. corporations), others examine tax effects across several countries (e.g. Rajan and Zingales (1995)). In addition, some studies focus on domestic firms (e.g. Overesch and Voeller (2010)), while others analyze the financing decisions of multinational companies (e.g. Altshuler and Grubert (2003), Huizinga et al. (2008) and Møen et al. (2011)).

Desai and Hines (2003) point out, that the share of mergers and acquisitions in FDI has increased significantly in the last decades and has become the largest part of FDI, underlining the economic importance of such kind of investment. Concerning the financing decision of corporate acquisitions, there are already several papers dealing with non-tax determinants of the method of payment. Studies like Amihud et al. (1990), Martin (1996) and Gosh and Ruland (1998) examine the role of growth opportunities, managerial ownership or cash availability of the acquirer. Analyzing deals within Europe, Faccio and Masulis (2005) also investigate the countervailing effects of corporate control of managers and existing shareholders, that decrease by stock-financing and the financing constraints linked to debt. Using mergers of publicly listed U.S. firms, Ismail and Krause (2010) find

a significant impact of the correlation of acquirer and target pre-deal returns, of hostility of the merger and of defense mechanisms for the acquirer on the method of payment. Bi and Gregory (2011) focus on the over-valuation of acquirers. Madura and Ngo (2012) analyze acquisitions of private firms and find an information asymmetry effect.

The first study to investigate the tax advantage of debt-financing in corporate acquisitions is Auerbach and Reishus (1988). The authors only find a small increase of debt ratios of acquiring companies after acquisitions. In contrast, the use of tax losses and credits was found to be more relevant. However, Erickson (1998) finds that higher tax rates increase the probability to observe a debt-financed acquisition by analyzing 100 % debt-financed cash deals and 100 % equity-financed stock deals in the U.S. Dhaliwal et al. (2005) also analyze U.S. deals but take into account the possibility to finance a corporate acquisition through retained earnings. Therefore, the authors only consider cash deals. The main finding of this study is that the foreign tax credit limitations in the U.S. significantly influence the decision to use debt or internal funds for the financing of a cash deal. Another study by Gosh et al. (2011) uses a panel approach in order to analyze effects of taxes on the debt issuance of U.S. acquirers in the years after an acquisition.

In contrast to prior studies, I have examined tax effects for deals undertaken in several countries, mainly in Europe. Furthermore, I have analyzed both public and private firms and the acquisitions labeled as equity-financed in my sample refer to both cash deals and share deals. Besides the investigation of the probability to observe a debt-financed deal, I have also evaluated the development of the acquirers' debt ratios during the deal period. I found empirical evidence for a higher probability of debt-financing if the acquirer faces a high tax rate and for the impact of tax rates on the capital structure around the deal. Moreover, I have investigated the specific tax incentives for multinational companies.

3 Development of Hypotheses

Graham (2003) summarizes the main findings of Modigliani and Miller (1958, 1963) and Miller (1977): If an investment is purely equity-financed, the net earnings will be taxed with the corporate income tax rate τ^C at the company level and, in addition, dividends will be taxed at the shareholder level with the income tax rate τ^P. If the investment is debt-financed, the interest payments to the capital provider are not taxed at the company level because they are deductible from the corporate tax base. However, such payments are taxed at the level of the capital provider with the interest tax rate τ^I. Therefore, the difference in the tax burden between equity- and debt-financing of an investment with net

earnings π and the interest expenses iD is

$$\Delta TAX := TAX_{equity} - TAX_{debt}, \tag{1}$$

with

$$TAX_{equity} := \pi[\tau^C + (1 - \tau^C)\tau^P] \tag{2}$$

and

$$TAX_{debt} := (\pi - iD)\tau^C + [\pi - (\pi - iD)\tau^C - iD]\tau^P + iD\tau^I, \tag{3}$$

where i is the interest rate and D is the amount of debt, respectively. After rearranging terms we get

$$\Delta TAX = iD[\tau^C + (1 - \tau^C)\tau^P - \tau^I], \tag{4}$$

For simplicity, we now assume that τ^P and τ^I equal zero. In reality, personal taxes might be irrelevant for the financing decision if the company is very large and has diversified shareholders in different countries and tax brackets. The management then does not know and cannot take into account the taxation of individual shareholders and just considers corporate taxation.[6] In that case, equation (4) reduces to

$$\Delta TAX = iD\tau^C. \tag{5}$$

In this equation, we immediately see that the theoretical tax advantage of debt increases in the statutory corporate income tax rate. However, there are also negative aspects of debt-financing. Several studies have modeled these disadvantages, explaining why we do not observe 100 % debt-financed companies, for example, because of financial distress costs or the restricted access to the capital market due to excess demand or insufficient collaterals.[7] Yet, even if we control for these issues, the tax rate is nevertheless supposed to influence the financing decision of corporations.

This theory can be adopted for corporate acquisitions. Acquirers expect benefits by yielding synergies. In contrast, they have to bear the costs. If the deal is equity-financed and paid with cash, the cash cannot be used for dividend distribution. Alternatively, disbursing with own shares reduces the influence in the own company. If the deal is debt-financed, the interest expenses lower the distributable profits in the future and reduce the financial room to maneuver. The acquirer tries to minimize the acquisition costs.

[6] In my empirical analysis, I focused on the company taxation for the same reasons and employ personal taxation only in sensitivity analyses. Concentrating on corporate taxation is in line with the existing empirical literature on capital structure decisions of multinational companies, compare Desai et al. (2004) and Huizinga et al. (2008), for example.

[7] See Graham (2003) for an overview.

Debt-financing can be part of that strategy if the deductibility of interest expenses helps in saving taxes. Thus, ceteris paribus, a higher tax rate should positively influence the probability to use debt for the deal financing as the tax shield increases in the tax rate. Using variation of statutory tax rates across countries and over time, I state the first hypothesis:

H 1. *Acquirer-companies in high-tax countries have a higher probability to use debt to finance a corporate acquisition than companies in low-tax countries.*

In addition to the specific decision of how to finance the acquisition, I analyzed the capital structure change of the acquiring companies during the deal period. By considering the development of the debt-to-asset ratio of the acquirer, I took into account that the financing decision might not be independent of other investments undertaken in the same period. Furthermore, looking at the change of the debt ratio also gives information on how much debt is used in the acquisition period, whereas in the analysis of the probability to observe a debt-financed deal, one does not know the fraction of debt-financing. Concerning the capital structure, I state the following hypothesis:

H 2. *The debt-to-asset ratios of acquirers in high-tax countries should increase during the acquisition period compared to acquiring companies in low-tax countries.*

An acquisition is an additional investment, hence, the marginal tax incentive is relevant for the financing decision. If additional interest expenses do not further reduce the tax base, there is no incentive for debt-financing from a tax point of view. This situation is referred to as "tax exhaustion" in the literature.[8] The proposed tax effect should thus especially be observed for companies having taxable profits that can be reduced by additional interest expenses. In contrast, non-profitable acquirers have no incentive to save taxes.[9] Therefore, I state the third hypothesis:

H 3. *The effect of taxes on the probability to observe a debt-financed deal and the effect on the debt ratio depends on the profit or loss situation of the acquiring company.*

The hypotheses derived above are valid for both domestic and multinational companies. Moreover, for multinationals there are additional tax aspects of corporate acquisitions. Facing different tax systems and rates in the countries of subsidiaries locations, the opportunities for tax planning are manifold. Multinationals are found to have incentives

[8] See MacKie-Mason (1990), for example.

[9] Erickson (1998), for example, uses a trichotomous tax variable capturing if the acquirer is near tax exhaustion.

for higher internal and overall debt ratios compared to national firms especially if they are majority-owned.[10] Additionally, evidence indicates that multinationals use tax rate differences for profit shifting[11].

Ruf (2010) summarizes the tax structuring options in international acquisitions. Generally, multinationals can decide to acquire a given target-company through an acquisition vehicle in the target-country or via a subsidiary in a different country. In the first case, the profits and losses of the acquiring and the target-company can be offset, if tax consolidation is possible. The effect of consolidation opportunities on the probability to observe a debt-financed deal should be positive if the acquirer suffers a loss after a debt-financed deal due to high additional interest expenses. If a profitable acquirer-company can lower its taxable income by using target loss carry-forwards as a non-debt tax shield, the need to finance the acquisition with debt in order to further reduce the taxable income by additional interest expenses is smaller. Thus, a negative effect is expected in this situation.

Furthermore, a multinational can use tax rate differences within the group to reduce the acquisition costs. If a subsidiary in a high-tax country takes out a loan for the acquisition of a target-company in a low-tax country, the costs for the acquisition, i.e. the interest expenses, are deductible from the tax base in a high-tax country. In contrast, the earnings from the acquisition, i.e. the increased profits of the target-company due to synergies, are taxable in a low-tax country. Thus, the higher the tax rate difference between the acquirer and the target-company, the higher the incentives for debt financing. In addition, a subsidiary in a low-tax country can provide a loan to the acquisition vehicle in the high-tax country. This causes additional tax savings because interest expenses are deducted in the high-tax country (acquiring subsidiary), but interest earnings are taxable in a low-tax country (loan providing subsidiary). These considerations lead to the next hypothesis:

H 4. *The financing decision of multinational companies in the acquisition period is influenced by a possible group taxation and different tax rates within the multinational group.*

[10] See Schindler and Schjelderup (2010).
[11] See Møen et al. (2011) and Huizinga et al. (2008).

4 Data and Descriptive Statistics

For the purpose of my analysis, I have used firm-level data from Zephyr and Amadeus, two databases of Bureau van Dijk. Zephyr provides information about mergers and acquisitions and the involved parties in several countries since 1996. I used all mergers and acquisitions with one acquirer- and target-company completed between 1998 and 2011 and yielding a majority stake in the target-company. I restricted my analysis to observations in which the acquirer- and target-companies are corporations and the industry is not public administration, financial industry, activities of households as employers or activities of extraterritorial organizations. Amadeus is a firm-level database providing unconsolidated accounting data of European companies. For my final sample, I dropped observations with implausible values for the financial variables such as profit, size, EBIT, market capitalization, equity, depreciation, financial result and debt ratio.[12]

4.1 Tax Data

For the empirical analysis, I used corporate and personal tax data for the year of the completion date in the respective acquirer-country.[13] τ^C_{acq} is the corporate income tax rate that combines national and local taxes. Since in some countries interest expenses are only deductible from the base of certain taxes[14], the tax advantage of debt-financing as depicted in equation (4) changes to

$$\Delta TAX = iD[\phi\tau^C_{acq} + \tau^D_{acq} - \tau^I_{acq}], \tag{6}$$

where ϕ is the fraction of τ^C_{acq}, for which interest deductibility is possible and $\tau^D_{acq} := (1 - \phi\tau^C_{acq})\tau^P_{acq}$. Accordingly, the tax advantage of debt is

$$\Delta TAX = iD\phi\tau^C_{acq} \tag{7}$$

in the case of irrelevant personal taxation.

[12] In particular, I excluded deals from the analysis, where the acquirer shows pre- or post deal profits > thousand EUR 1.0e+07 or < thousand EUR -1.0e+07, total assets < 0 or >= thousand EUR 1.0e+09, EBIT < thousand EUR -1.0e+07 or >= thousand EUR 1.0e+09, market capitalization < 0 or >= thousand EUR 1.0e+10, shareholder funds < 0 or >= thousand EUR 1.0e+09, $D\&A_i < 0$ or >= 1, net interest result to asset ratio < 0 or > 1 or debt-to-asset ratio < 0.

[13] The tax data was collected from the European Tax Handbooks edited by IBFD and from international tax surveys provided by Ernst & Young, PwC, and KPMG. Overesch and Voeller (2010) use this data as well and describe the composition of the tax rates in detail.

[14] For example, in Germany interest expenses are fully deductible from the corporate income tax base but only partly from the local business tax (Gewerbesteuer).

Table 1: Tax variables for acquirer-countries in 2011

Acquirer-country	$\phi\tau^C_{acq}$	τ^D_{acq}	τ^I_{acq}
Austria	0.2500	0.1875	0.2500
Belgium	0.3399	0.1650	0.1500
Bulgaria	0.1000	0.0450	0.0000
Cyprus	0.1000	0.1350	0.1000
Czech Republic	0.1900	0.1215	0.1500
Denmark	0.2500	0.3150	0.4750
Estonia	0.2100	0.0000	0.2100
Finland	0.2450	0.1480	0.2800
France	0.3444	0.2052	0.3130
Germany	0.2717	0.1921	0.2638
Greece	0.2000	0.1680	0.1000
Hungary	0.1900	0.1296	0.0000
Ireland	0.1250	0.4463	0.2700
Italy	0.2751	0.1669	0.1250
Japan	0.4035	0.2601	0.5000
Korea	0.2420	0.4178	0.3850
Latvia	0.1500	0.0850	0.1000
Lithuania	0.1500	0.1700	0.0000
Luxembourg	0.2880	0.1500	0.1000
Netherlands	0.2500	0.1875	0.2500
Norway	0.2800	0.0000	0.2800
Poland	0.1900	0.1539	0.1900
Portugal	0.2750	0.1559	0.1650
Romania	0.1600	0.1344	0.1600
Russia	0.2000	0.0720	0.1300
Singapore	0.1700	0.0000	0.2000
Slovakia	0.1900	0.0000	0.1900
Slovenia	0.2000	0.1600	0.2000
Spain	0.3000	0.1470	0.2100
Sweden	0.2630	0.2211	0.3000
Turkey	0.2000	0.1400	0.1500
Ukraine	0.2300	0.0385	0.0500
United Kingdom	0.2600	0.2672	0.5000
United States	0.3787	0.1348	0.4170

In the U.S., τ^C_{acq} was 0.4007 for non-manufacturers in 2011.

In my analysis, I employed $\phi\tau^C_{acq}$, τ^D_{acq} and τ^I_{acq} as independent variables. For τ^P_{acq} and τ^I_{acq}, I used the top bracket tax rates on dividends and on interest for loans provided to companies, respectively. The assignment of personal tax rates to countries was executed by using the acquirer-country. In reality, there might in fact be many companies having shareholders abroad. Due to lack of information about the location of the shareholders of the specific companies, one cannot be sure that these tax rates really capture the personal tax burden. However, relying on the literature of home bias in investment decisions (e.g. French and Poterba (1991)) this procedure seems reasonable. Table 1 summarizes these tax variables for 2011. For comparison with Erickson (1998) and Dhaliwal et al. (2005),

I conducted robustness checks using three dichotomous tax variables, *Tax1*, *Tax2* and *Tax3*. These variables equal $\phi\tau^C_{acq}$ if the acquiring company is profitable in the pre-deal period and zero otherwise.

An acquirer is defined as a member of a multinational group, if there exists at least one 50 % corporate shareholder or 50 % subsidiary abroad.[15] In order to test H 4, I restricted the sample to acquirer-companies that are members of a multinational group and employed the following variables.

Grouptax is an indicator variable that equals one if the acquirer and the target-company are located in the same country which applies a group taxation regime. Such a regime allows an offsetting of profits and losses of different entities within a group of companies for tax purposes.[16] If the acquirer-company can offset losses arising due to high interest expenses after a debt-financed deal with profits of the target, the probability to observe a debt-financed deal should be higher. If a profitable acquirer can use an existing loss carry-forward of the target-company to reduce its taxable income, the effect is supposed to be negative because the loss serves as a non-debt tax shield.

$\phi\tau^C_{acq} - \tau^C_{tar}$ is the difference between the acquirer and the target-country tax rate.[17] The higher this difference, the higher the incentive for debt-financing because acquisition costs (interest expenses for the loan taken out for the deal) reduce the tax base in a high-tax country and the gains from the acquisition (increasing profits in the target-company due to synergies) are taxable in a low-tax country.

Finally, I controlled for the weighted average tax rate of the multinational group in the acquisition year, $\phi\tau^C_{mean}$. The mean is weighted by the numbers of affiliates per country.[18] Thus, a high value of this variable indicates that the multinational group is a high-tax group as it mainly consists of subsidiaries in high-tax countries. A higher average group tax rate is supposed to positively influence the probability to observe a debt-financed deal

[15] As I only have access to the current ownership structure of the acquiring companies in 2012, the multinational status does not vary over time. Thus, I might have classified acquirers to be part of a multinational group despite their purely domestic status in the year of the acquisition.

[16] See Dreßler and Overesch (2013) for details of this variable. They generate and employ this indicator for years 1996 - 2007. I used the same variable and added information for years 2008 - 2011. For the debt ratio analysis, I used *Grouptax2*, which equals one if at least one target-company is located in the acquirer-country and group taxation is possible.

[17] For the debt ratio analysis, I used the difference between the acquirer-country tax rate and the average tax rate of the targets acquired in the considered period, $\phi\tau^C_{acq} - \tau^C_{tarmean}$.

[18] I employed tax rates from 190 countries for this analysis and assigned it to the respective 50 % corporate shareholders and subsidiaries of the acquirer. As I only have access to the current ownership structures in 2012, there might be affiliates in the multinational group which were not part of the group in the year of acquisition. By using the weighted means the bias by a missclassification of single affiliates should not be too large.

because it is possible for other affiliates to take out a loan and provide the money to the aquiring subsidiary. For the debt ratio analysis, I used the weighted average tax rate of all affiliates in the ownership chain outside the acquirer-country, $\phi\tau^{C}_{mean\ outside}$, and interacted this variable with $\phi\tau^{C}_{acq}$. A negative interaction effect indicates that the incentive to reduce the taxable income of the acquiring company by debt-financing is higher, if there are no other affiliates in high-tax counties where the debt would lead to higher tax savings. Moreover, the multinational has a stronger incentive to provide intragroup loans to the acquiring company by a low-tax subsidiary for tax saving purposes, if there are many low-tax affiliates in the group. Definitions of all tax variables can be found in Table 11 in the Appendix and summary statistics are depicted in Table 3.

4.2 Dependent Variables

For the analysis of the probability to observe a debt-financed deal, the dependent variable is an indicator that equals one if the deal is debt-financed and zero if not. As a first step, I constructed an indicator for an at least partly debt-financed deal, $Debt_{ij}$, equaling one if one or more of the entries in the respective Zephyr variables were *leveraged buy out*, *new bank facilities*, *loan notes* or *debt assumed*, and zero if none of these information was given but at least one of the Zephyr variables provided some information about the deal financing or method of payment. In my base sample, 18.8 % of deals are labeled as debt-financed according to this definition.

Erickson (1998) distinguishes between 100 % debt-financed and 100 % equity-financed deals. Accordingly, I defined $DebtB_{ij}$ in a second step. With this variable, I also tried to separate debt-financed cash deals and equity-financed stock deals. $DebtB_{ij}$ equals one in the same cases as $Debt_{ij}$ but only if the deal has no *vendor placing* and the method of payment is not *shares*. It only equals zero if *vendor placing*, *shares*, or *cash* and no note about debt-financing are given. For some acquisitions the only available information was that cash was used as a method of payment. Those observations cannot unequivocally be classified into debt or equity-financed deals. Therefore, I employed $DebtC_{ij}$, which excludes these deals. This leads to an increase of the fraction of debt-financed deals to 43.8 %. Further details about the Zephyr variables containing information on the deal financing are provided in the Appendix.

Table 2 summarizes descriptive statistics of the dependent variables for the analysis of the probability to observe a debt-financed deal. The last two columns show the difference of the average tax rate, $\phi\tau^{C}_{acq}$, between debt-financed and equity-financed acquisitions,

Table 2: Information about deal financing

Variable	Equal 1	Equal 0	% Equal 1	ΔTax rate	P-value
$Debt_{ij}$	698	3,019	18.8%	0.005	0.020
$DebtB_{ij}$	609	2,797	17.9%	0.005	0.030
$DebtC_{ij}$	591	759	43.8%	0.015	0.000

Numbers of debt-financed and non-debt-financed deals according to $Debt_{ij}$ refer to the baseline sample in Column (1) of Table 4. ΔTax rate shows the difference of the average $\phi\tau^{C}_{acq}$ between debt-financed and non-debt-financed deals. The last column depicts the corresponding p-value of a standard t-test with unequal variances that this difference equals zero.

according to the employed definitions and the corresponding p-values using a standard t-test with unequal variances. For all definitions, the average tax rate is slightly higher for debt-financed deals with a statistically significant difference. This is a first hint towards a potential tax effect on the financing decision.

For the acquiring company's capital structure analysis, the dependent variable is $\Delta\, Debt_i$, defined as the difference between the year-end debt-to-asset ratio of the acquirer after the acquisition and the corresponding pre-deal value. The figures used to calculate this variable stem from unconsolidated statements of the respective acquiring company. The empirical link between the financing decision for the acquisitions in my sample and the development of the capital structure is given by two facts. First, $\Delta\, Debt_i$ is significantly higher in debt-financed deals than in equity-financed deals according to all my definitions of the indicator for debt-financing using a standard t-test with unequal variances. Second, a univariate analysis between the development of the debt ratio and the logarithm of the sum of deal values per acquirer in the considered period results in a positive and significant correlation. Therefore, it seems to be reasonable to analyze the capital structure development of the acquiring companies during the deal period to better understand the financing decisions with respect to acquisitions.

In the base sample with 4,389 acquirer-company-year observations, the debt ratio increases on average by 2.3 %-points during the deal period. The fraction of acquirers that increase their debt ratio is 57.3 %. In the group of low-tax acquirers (first quartile, i.e. $\phi\tau^{C}_{acq} < 26\,\%$), this fraction is only 56.6 %. For companies facing a relative high tax (last quartile, $\phi\tau^{C}_{acq} > 33\,\%$), however, it is 60.4 %. In addition, the average tax rate for increasers is 0.3 %-points higher than for decreasers. This is only a small difference but it is statistically significant on the 10 %-level and hints towards a relationship between the tax advantage of debt-financing and the financing decision regarding corporate acquisitions.

4.3 Control Variables

The variables used in my analysis are listed in Table 11 in the Appendix. The following subsections describe in detail the control variables on the firm- and country-level.

4.3.1 Firm-level data

In the empirical analysis, I controlled for several firm-level variables coming from unconsolidated statements. The logarithm of the deal value in thousand EUR of deal j, $Ln\ Deal\ value_j$, is supposed to positively influence the probability to observe a debt-financed deal because in large acquisitions the acquirer has to find multiple sources of capital to pay the price for the target-company.[19] The logarithm of acquirer i's pre-deal total assets in thousand EUR, $Size_i$, is used as a proxy for the size. Larger companies might rather be able to use retained earnings for an acquisition and it is also easier for them to issue new equity. Consequently, larger acquirers are supposed to use less debt in a corporate acquisition. A high pre-deal acquirer debt-to-asset ratio, $Initial\ debt_i$, is expected to decrease the probability to observe a debt-financed deal, because for highly leveraged companies a further debt issuance might be very costly, for example, if banks demand a higher risk premium. However, a high pre-deal debt ratio might also reflect the debt capacity of the acquirer. Therefore, it can also have a positive impact on the probability to observe a debt-financed deal. Using information about the profits before taxes, I constructed an indicator variable for loss-making acquiring companies, LCF_i. Acquirers without taxable income have no incentive to increase their leverage from a tax point of view. However, it might be difficult to issue new equity for loss-making firms and, therefore, they have to go to the capital market and perhaps pay higher risk premiums.[20] In order to get more observations, I matched the Zephyr data with Amadeus using the acquirer identification number and the year before the completion date of the considered deal for pre-deal values. Using these control variables, I got a sample of 3,717 deals between 1998 and 2011 with acquirers in 31 countries for the analysis of the probability to observe a debt-financed acquisition and a sample of 4,389 acquirers in 34 countries for the debt ratio analysis.

In addition to the aforementioned controls, I used the following variables in my analysis, which have a much smaller coverage mainly as most of them are only available in Amadeus.

[19] For the analysis of the debt ratio of the acquiring companies during the acquisition period I took the sum of all deal values for the acquisitions undertaken by the considered company in the considered year. For the allocation of deals to a considered year I used the date of completion.

[20] See Erickson (1998) and Dhaliwal et al. (2005) for a detailed discussion of all these variables.

A lower risk of financial distress might positively influence the probability to use debt for financing an acquisition.[21] In my analysis, I used Altman's (2000) Z-score as a continuous measure of the financial distress risk. However I did not include the term for retained earnings because this variable cannot be observed in my data. In addition, I excluded the market equity to book debt term analogous to MacKie-Mason (1990).[22] The variable used in my analysis is $Distress_i$. The higher this variable, the better is the acquirer's financial situation. The amount of the acquirers' pre-deal depreciation as a fraction of total assets, $D\&A_i$, is a non-debt tax shield.[23] The higher the depreciation, the stronger the decrease of taxable income. As a consequence, one can expect a negative relationship between depreciation and debt-financing. However, a high amount of depreciation may also stand for a large value of replacement investments. Such a company might have to use more debt to finance all of its investments in the considered period. The fraction of tangible assets of the acquirer, $Tangibility_i$, may have a positive impact on debt-financing as a large amount of tangibles serves as collateral. Furthermore, I employed the profitability of the acquirer measured by the pre-deal EBITDA divided by total assets, $Profitability_i$. I predict a negative relationship between this variable and the probability to observe a debt-financed deal.[24] Apart from this, I controlled for the change in depreciation, tangibility and profitability during the deal period ($\Delta\, D\&A_i$, $\Delta\, Tangibility_i$ and $\Delta\, Profitability_i$) to capture the development of these variables over time.[25] In line with former studies (e.g. Erickson (1998) and Dhaliwal et al. (2005)), I used an indicator for a loss-making target-company, LCF_j, because existing loss carry-forwards may be offset with future profits and accordingly serve as a non-debt tax shield. In this case the acquirer is expected to use less debt for the acquisition.[26] Considering all these additional variables, the sample size reduces to 940 deals and 16 acquirer-countries between 2002 and 2011 for the analysis of the probability to observe a debt-financed acquisition, and to 1,194 acquirers in 21 countries between 2001 to 2011 for the debt ratio analysis. Table 3 provides summary statistics of the independent variables used in the regression analysis. The number of observations per acquirer-country can be found in the Appendix in Table 12 for the analysis of the probability to observe a debt-financed deal and in Table 13 for the debt ratio analysis.

[21] See Gosh et al. (2011).

[22] MacKie-Mason (1990) argues that the debt ratio should be considered separately in a capital structure analysis. In addition, I only observe the market value for very few firms.

[23] See e.g. DeAngelo and Masulis (1980).

[24] See Overesch and Voeller (2010) and Gosh et al. (2011) for a discussion of the impact of this variable.

[25] The change of these variables was computed using the difference between the post- and pre-deal values in Zephyr. For the matching with Amadeus, I used the year of deal completion for post-deal values.

[26] For the analysis of the debt ratio of the acquiring companies during the acquisition period, I used an indicator that equals one if at least one of the acquired target-companies shows a loss in the pre-deal period for the acquisitions undertaken by the considered acquirer in the considered year.

Table 3: Summary statistics for independent variables

Logit analysis						OLS analysis					
Variable	Obs.	Mean	Std. dev.	Min.	Max.	Variable	Obs.	Mean	Std. dev.	Min.	Max.
$\phi\tau^C_{acq}$	3,717	0.294	0.051	0.100	0.473	$\phi\tau^C_{acq}$	4,389	0.290	0.052	0.100	0.473
$\phi\tau^D_{acq}$	3,717	0.180	0.097	0	0.479	$\phi\tau^D_{acq}$	4,389	0.173	0.097	0	0.479
$\phi\tau^I_{acq}$	3,717	0.304	0.122	0	0.590	$\phi\tau^I_{acq}$	4,389	0.284	0.126	0	0.590
Tax1	940	0.235	0.143	0	0.360	*Tax1*	1,194	0.240	0.135	0	0.360
Tax2	940	0.198	0.157	0	0.360	*Tax2*	1,194	0.212	0.148	0	0.360
Tax3	924	0.212	0.150	0	0.360	*Tax3*	1,177	0.223	0.143	0	0.360
Grouptax	770	0.594	0.491	0	1	*Grouptax2*	882	0.608	0.489	0	1
$\phi\tau^C_{acq} - \tau^C_{tar}$	762	0.003	0.040	-0.184	0.20	$\phi\tau^C_{acq} - \tau^C_{tarmean}$	875	0.004	0.039	-0.184	0.200
$\phi\tau^C_{mean}$	773	0.304	0.037	0.100	0.37	$\phi\tau^C_{mean\ outside}$	885	0.289	0.049	0.100	0.404
Deal value$_j$	3,717	0.2E+06	1.7E+06	0.1	55.3E+06	*Deal values*$_j$	4,389	0.2E+06	1.4E+06	0.1	55.3E+06
Size$_i$	3,717	11.477	2.554	1.099	18.583	*Size*$_i$	4,389	11.316	2.455	1.099	18.581
Initial debt$_i$	3,717	0.504	0.254	0	0.999	*Initial debt*$_i$	4,389	0.516	0.255	0	1
LCF_i	3,717	0.244	0.429	0	1	LCF_i	4,389	0.217	0.412	0	1
Inflation$_{acq}$	3,717	2.8	2.4	-1.3	22.5	*Inflation*$_{acq}$	4,389	3.0	2.7	-4.5	25.2
Domestic credit$_{acq}$	3,717	127.8	51.7	13.9	337.8	*Domestic credit*$_{acq}$	4,389	123.8	55.3	13.9	337.8
GDP growth$_{acq}$	3,717	2.4	2.5	-14.3	14.8	*GDP growth*$_{acq}$	4,389	2.4	2.9	-14.8	14.8
Stock market$_{acq}$	3,717	83.1	41.6	8.2	323.7	*Stock market*$_{acq}$	4,389	78.9	40.8	3.8	323.7
Distress$_i$	940	0.835	1.143	-2.926	7.054	*Distress*$_i$	1,194	1.037	1.178	-2.926	8.663
$D\&A_i$	940	0.024	0.037	-0.013	0.381	$D\&A_i$	1,194	0.027	0.035	-0.013	0.381
$\Delta\, D\&A_i$	940	-0.006	0.031	-0.381	0.174	$\Delta\, D\&A_i$	1,194	-0.004	0.024	-0.380	0.174
Tangibility$_i$	940	0.101	0.166	0	0.926	*Tangibility*$_i$	1,194	0.130	0.182	0	0.937
Δ *Tangibility*$_i$	940	-0.013	0.064	-0.573	0.549	Δ *Tangibility*$_i$	1,194	-0.014	0.073	-0.573	0.549
Profitability$_i$	940	0.042	0.121	-0.864	0.679	*Profitability*$_i$	1,194	0.061	0.118	-0.864	0.679
Δ *Profitability*$_i$	940	-0.005	0.088	-0.797	0.698	Δ *Profitability*$_i$	1,194	-0.003	0.230	-0.797	7.369
LCF_j	940	0.344	0.475	0	1	LCF_j	1,194	0.373	0.484	0	1

The table shows figures for the base sample for the logit analysis of the probability to observe a debt-financed deal with dependent variable $Debt_{ij}$ on the left-hand side. On the right-hand side, the table depicts figures for the baseline ordinary least square (OLS) debt ratio analysis with dependent variable $\Delta\, Debt_i$. The variables with a lower number of observations are not included in the base specifications due to missing data.

4.3.2 Country level data

Apart from the firm-level data, I also controlled for some time-varying acquirer-country-specific variables provided by the Worldbank. $Inflation_{acq}$ is supposed to have a positive impact on debt-financing according to DeAngelo and Masulis (1980). They state that inflation reduces the real value of tax shields. However, there are studies like Huizinga et al. (2008) that find a negative effect. The authors argue that inflation causes uncertainty about the real interest rate. Another factor is the credit market conditions, measured by the domestic credit by banks as a percentage of GDP, $Domestic\ credit_{acq}$. The hypothesis is that better credit market conditions make it easier to issue new debt for a corporate acquisition. In contrast, high valuation of domestic firms measured by the stock market capitalization of listed firms as a percentage of the GDP, $Stock\ market_{acq}$, may increase the probability to observe an equity-financed deal. The reason is that over-valuation allows firms to yield higher prices for new equity and therefore creates an incentive for equity-financing.[27] For the same reason, I controlled for the $GDP\ growth_{acq}$. In a prosperous economic environment, investors might rather choose to directly participate in companies through the equity capital market. Summary statistics for these variables are depicted in Table 3.

5 Empirical Approach

The first approach employed in this paper models the probability to observe a debt-financed acquisition. The hypothesis is that higher tax rates increase this probability. In other words, acquirers are supposed to use debt rather than equity if they face higher taxes. The dependent variable in this logit model is an indicator, $Debt_{ij}$, that equals one if the deal is at least partly debt-financed and equals zero for fully equity-financed acquisitions. Let J be the number of acquisitions in the sample and

$$V_{ij} := \alpha \cdot \phi\tau^{C}_{acq} + \boldsymbol{X}_{ij}\boldsymbol{\beta} + \delta_{acq} + \delta_t + \delta_{ind} + \epsilon_{ij} \tag{8}$$

be the unobservable part of the value of acquiring firm i that is determined by the capital structure choice for a given acquisition $j \in J$, where $\phi\tau^{C}_{acq}$ measures the tax advantage of debt in the acquirer-country, $\boldsymbol{X}_{ij}$ is a matrix of control variables, δ_{acq}, δ_t and δ_{ind} are acquirer-country-, time- and acquirer-industry-dummies[28] and ϵ_{ij} is an extreme value

[27] See Myers and Majluf (1984).

[28] Classification into one of 21 industries was conducted by using the first two digits of the NACE Rev. 2 codes ("broad structure", see Eurostat (2008)).

distributed error term. α, $\boldsymbol{\beta}$ and the δs are parameters to be estimated and are dependent on the choice of financing. The probability to observe a debt-financed deal equals

$$P(Debt_{ij} = 1) = P(V_{ij}^{\text{debt}} > V_{ij}^{\text{no debt}}) = \frac{exp(\tilde{\boldsymbol{X}}_{ij}\tilde{\boldsymbol{\beta}})}{1 + exp(\tilde{\boldsymbol{X}}_{ij}\tilde{\boldsymbol{\beta}})}, \tag{9}$$

where $\tilde{\boldsymbol{X}}_{ij}\tilde{\boldsymbol{\beta}}$ is the right part of equation (8) without ϵ_{ij}. Maximizing the log-likelihood

$$Ln\ L = \sum_{j \in J} Debt_{ij} \cdot \log(P(Debt_{ij} = 1)) + (1 - Debt_{ij}) \cdot \log(1 - P(Debt_{ij} = 1)) \tag{10}$$

with respect to $\tilde{\boldsymbol{\beta}}$ yields the estimates for the parameters of interest showing the effect of the independent variables on the probability to observe a debt-financed acquisition ($Debt_{ij} = 1$).[29]

In addition, I took a look at the development of the whole capital structure of the acquiring companies during the deal period. The dependent variable, namely the difference between the post- and pre-deal debt-to-asset ratio, $\Delta\, Debt_i$, is a continuous one. The main hypothesis here is that higher tax rates create an incentive for acquiring firms to rather increase their debt ratios during the acquisition period. The specification is the same compared to the logit model:[30]

$$\Delta\, Debt_i = \alpha \cdot \phi\tau_{acq}^{C} + \boldsymbol{X}_i\boldsymbol{\beta} + \delta_{acq} + \delta_t + \delta_{ind} + \epsilon_i. \tag{11}$$

Now the error term is supposed to be normally distributed and the parameters are estimated using ordinary least squares (OLS). These parameters now show the linear relationship between the change in the debt ratio and the independent variables.

6 Regression Results

Table 4 shows the logit regression results for the analysis of the probability to observe a debt-financed acquisition. The dependent variable is $Debt_{ij}$. Column (1) is the baseline regression including those control variables with a relatively high coverage. The tax advantage of debt, measured by $\phi\tau_{acq}^{C}$ does not seem to influence the probability to observe a debt-financed acquisition. In contrast, some control variables have significant impact.

[29] Compare Greene (2012) for equations (9) and (10).

[30] As several acquirers appear in more than one year, all variables are also time-dependent. For simplicity, I abstain from using a subscript for the year.

Table 4: Logit analysis using $Debt_{ij}$

	(1) Base	(2) Small sample	(3) Full model	(4) Profitable	(5) Interaction
$\phi\tau^{C}_{acq}$	1.3822	12.5342**	12.6811**	15.5527**	13.5962**
	(0.712)	(0.036)	(0.035)	(0.013)	(0.023)
$\phi\tau^{C}_{acq} * LCF_i$					−9.4208*
					(0.063)
Ln Deal value$_j$	0.4703***	0.5769***	0.5792***	0.6051***	0.5775***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Size$_i$	−0.1523***	−0.1704***	−0.1910***	−0.1911**	−0.1846**
	(0.000)	(0.008)	(0.010)	(0.027)	(0.013)
Initial debt$_i$	0.3203	0.6309	0.7654	0.3744	0.7370
	(0.223)	(0.177)	(0.112)	(0.490)	(0.131)
LCF_i	−0.2181**	−0.4047*	−0.4559*		2.4247
	(0.048)	(0.099)	(0.097)		(0.134)
Inflation$_{acq}$	−0.0921*	−0.0562	−0.0485	−0.0830	−0.0519
	(0.065)	(0.683)	(0.719)	(0.574)	(0.712)
Domestic credit$_{acq}$	0.0031	0.0147*	0.0165**	0.0216**	0.0167**
	(0.427)	(0.084)	(0.048)	(0.012)	(0.044)
GDP growth$_{acq}$	−0.0808**	0.0419	0.0385	−0.0070	0.0224
	(0.050)	(0.671)	(0.693)	(0.955)	(0.814)
Stock market$_{acq}$	0.0016	−0.0069	−0.0059	−0.0115	−0.0063
	(0.660)	(0.403)	(0.479)	(0.261)	(0.443)
Distress$_i$			−0.0411	0.0557	−0.0389
			(0.784)	(0.749)	(0.798)
$D\&A_i$			−4.3418	0.2372	−4.4296
			(0.386)	(0.964)	(0.381)
$\Delta\, D\&A_i$			3.8629	0.1648	3.7947
			(0.527)	(0.979)	(0.535)
Tangibility$_i$			0.7422	−0.1461	0.6895
			(0.335)	(0.856)	(0.386)
Δ *Tangibility*$_i$			−2.5072*	−2.6192	−2.5982*
			(0.094)	(0.180)	(0.087)
Profitability$_i$			−0.3800	−2.7293	−0.1692
			(0.815)	(0.243)	(0.918)
Δ *Profitability*$_i$			−0.4252	0.5344	−0.4066
			(0.746)	(0.699)	(0.758)
LCF_j			−0.2271	−0.0478	−0.2248
			(0.215)	(0.830)	(0.218)
Observations	3,717	940	940	697	940
Log-likelihood	-1,498.85	-373.52	-369.26	-284.16	-367.95
Sensitivity	18.19 %	35.86 %	35.86 %	46.67 %	36.87 %
Specificity	97.28 %	95.28 %	95.96 %	93.42 %	95.96 %
%-pts improved	1.21	3.83	4.36	6.02	4.57

The table shows logit regressions with dependent variable $Debt_{ij}$. Independent variables are defined in Table 11. In Column (1), the sample consists of domestic and cross-border deals between 1998 and 2011 with an acquirer in one of 31 countries. Column (2) restricts the sample to observations where additional control variables are not missing and Column (3) adds these controls. In Column (4), the sample only consists of profitable acquiring companies and in Column (5), an interaction term between $\phi\tau^{C}_{acq}$ and LCF_i is used to identify a difference in the tax effect for loss-making and profitable firms. All specifications include acquirer-country-, year- and industry-fixed effects. Standard errors are clustered on the acquirer-country-year level. P-values are shown in parentheses. * denotes significance at the 10 %-level, ** at the 5 %-level and *** at the 1 %-level. See Table 12 for numbers of observations per acquirer-country.

A higher deal value increases the likelihood to use debt for the deal financing since equity alone might not be sufficient. Larger acquirers are less likely to use debt. The reason can be the low costs of issuing new equity, for example, for listed firms. The negative coefficient of the loss dummy, LCF_i, indicates that acquirers without taxable income have a lower incentive to use debt for the financing of a corporate acquisition in order to reduce the tax base. $Inflation_{acq}$ has a negative impact, which is in line with the findings of former studies like Huizinga et al. (2008). Moreover, a larger $GDP\ growth_{acq}$ rate significantly lowers the probability for debt-financing, which might reflect that in good economic times it is easier for firms to issue equity because investors are less risk-averse and thus more willing to hold direct stake in companies. The other variables $Initial\ debt_i$, $Domestic\ credit_{acq}$ and $Stock\ market_{acq}$ do not significantly influence the financing decision according to my findings.

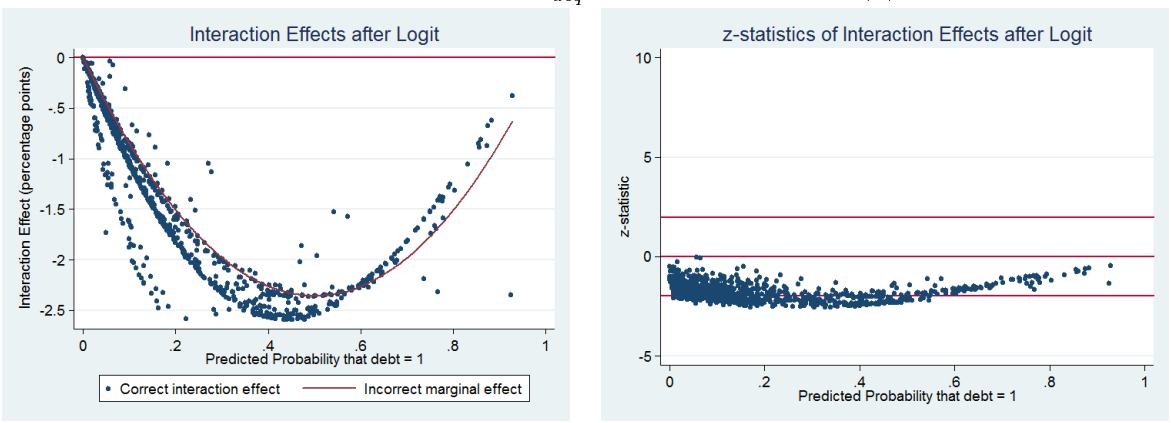
Column (2) repeats the first regression using a smaller sample with information about the full set of control variables. Results now change with respect to the tax variable. The coefficient of $\phi\tau^C_{acq}$ becomes larger and significant.[31] The results of the control variables are similar to specification (1). $Inflation_{acq}$ and $GDP\ growth_{acq}$ do not show a significant coefficient any more. In contrast, starting from Column (3), $Domestic\ credit_{acq}$ gets a positive and significant coefficient indicating that the access to the capital market is important for the financing decision, too. Column (3) adds the additional control variables with smaller coverage. Results do not materially change. Except for $\Delta\ Tangibility_i$, the new variables do not have any statistically significant impact on the financing decision.[32]

In Column (4), I restricted the sample to profitable acquirers. This is why the loss dummy, LCF_i, cancels out in this specification. The coefficient of $\phi\tau^C_{acq}$ corresponds to an average marginal effect of 2.03. Therefore, in my sample a one %-point rise in the tax rate is on average associated with a 2.03 %-points increase in the probability to observe a debt-financed deal. The average marginal effect for $Ln\ Deal\ value_j$ is 0.08, indicating that a one percent increase in the deal value increases the probability to observe a debt-financed deal by 8 %-points. For $Size_i$, the average marginal effect is -0.02. In the last column of Table 4, I used an interaction term between the tax variable and the loss dummy, $\phi\tau^C_{acq} * LCF_i$, to evaluate the difference of the tax effect between profitable and loss-making firms. Since the logit model is non-linear, the coefficients and p-values do not show the real interaction

[31] The change of the coefficient that comes from only reducing the sample size, might reflect that the results in the whole sample are driven by some outliers from countries outside Europe which do not report further information on company-specific variables. However, a selection bias cannot be ruled out.

[32] The negative coefficient of $\Delta\ Tangibility_i$ in Column (3) and (5) might reflect the non-debt tax shield generated by future depreciation.

Figure 1: Interaction effect, $\phi\tau^{C}_{acq} * LCF_i$, in Column (5) of Table 4



effects and results have to be calculated for every observation.[33] Figure 1 shows the real interaction effects and the corresponding z-statistics. The interaction effect is negative for all observations. However, regarding the significance, results are mixed. The interaction effect is only significant for a smaller part of observations. For a large group of acquisitions, especially with small or large predicted probabilities for debt-financing, the interaction is not significant.

Concerning the model fit, the *Sensitivity* (*Specificity*) at the bottom of Table 4 shows the percentage of correctly predicted debt-financed (non-debt-financed) deals. Another indicator is the *%-pts improved* figure, which shows the additional percentage of deals correctly specified by the model, compared to the random assumption that all deals are non-debt-financed. E.g. specification (4): 76.33 % of the deals in the sample are equity-financed. My model predicts 82.35 % = (76.33 + 6.02) % of financing decisions correctly.

Table 5 presents the results of the ordinary least square debt ratio analysis. The dependent variable here is the change in the debt-to-asset ratio of the respective acquirer after the deal compared to the pre-deal value, $\Delta\, Debt_i$. Apart from that, specifications are identical to Table 4. The tax variable $\phi\tau^{C}_{acq}$ significantly influences the debt ratio across all specifications. The coefficients range between 0.28 and 0.58. In specifications containing the full set of controls (column (3)-(5)), the effect is between 0.52 and 0.55. Remarkably, the tax effect does not seem to be different for profitable and loss-making firms. If I restrict the sample to profitable acquirers in Column (4), the coefficient becomes only slightly lower and the coefficient of the interaction term in Column (5) is not significant. One reason for the non-significant interaction might be that the loss dummy is not a very accurate measure to identify companies without taxable income, as my variables

[33] See Ai and Norton (2003).

Table 5: OLS analysis using $\Delta\, Debt_i$

	(1) Base	(2) Small sample	(3) Full model	(4) Profitable	(5) Interaction
$\phi\tau^C_{acq}$	0.2840**	0.5836***	0.5519**	0.5275**	0.5212**
	(0.039)	(0.010)	(0.016)	(0.024)	(0.028)
$\phi\tau^C_{acq} * LCF_i$					0.2857
					(0.480)
Ln Deal values$_j$	0.0107***	0.0092***	0.0104***	0.0106***	0.0104***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Size$_i$	−0.0125***	−0.0103***	−0.0089***	−0.0097***	−0.0091***
	(0.000)	(0.000)	(0.005)	(0.002)	(0.003)
Initial debt$_i$	−0.2462***	−0.2403***	−0.2629***	−0.2183***	−0.2616***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LCF_i	−0.0145*	−0.0231*	−0.0041		−0.0919
	(0.060)	(0.079)	(0.783)		(0.477)
Inflation$_{acq}$	0.0018	0.0024	0.0033	0.0053	0.0033
	(0.295)	(0.580)	(0.408)	(0.197)	(0.410)
Domestic credit$_{acq}$	−0.0002	0.0004	0.0003	0.0004	0.0003
	(0.357)	(0.205)	(0.278)	(0.280)	(0.307)
GDP growth$_{acq}$	0.0012	0.0009	0.0013	−0.0017	0.0013
	(0.385)	(0.802)	(0.690)	(0.575)	(0.676)
Stock market$_{acq}$	−0.0001	−0.0007**	−0.0007**	−0.0008**	−0.0007*
	(0.495)	(0.036)	(0.042)	(0.011)	(0.055)
Distress$_i$			0.0169***	0.0179***	0.0168***
			(0.003)	(0.006)	(0.003)
$D\&A_i$			−0.0554	0.1167	−0.0612
			(0.767)	(0.616)	(0.744)
$\Delta\, D\&A_i$			0.5045*	0.4750	0.4871*
			(0.087)	(0.343)	(0.096)
Tangibility$_i$			0.0658*	0.0826***	0.0653*
			(0.062)	(0.007)	(0.064)
Δ *Tangibility*$_i$			0.0233	−0.0630	0.0194
			(0.772)	(0.463)	(0.813)
Profitability$_i$			−0.0247	−0.1832**	−0.0287
			(0.761)	(0.024)	(0.723)
Δ *Profitability*$_i$			−0.0647**	−0.0432***	−0.0644**
			(0.040)	(0.006)	(0.040)
$LCFs_j$			0.0034	0.0005	0.0029
			(0.705)	(0.955)	(0.741)
Observations	4,389	1,194	1,194	927	1,194
Adj. R^2	0.17	0.15	0.17	0.15	0.17

The table shows OLS regressions with dependent variable $\Delta\, Debt_i$. Independent variables are defined in Table 11. In Column (1), the sample consists of domestic and cross-border deals between 1998 and 2011 with an acquirer in one of 34 countries. Column (2) restricts the sample to observations where additional control variables are not missing and Column (3) adds these controls. In Column (4), the sample only consists of profitable acquiring companies and in Column (5), an interaction term between $\phi\tau^C_{acq}$ and LCF_i is used to identify a difference in the tax effect for loss-making and profitable firms. All specifications include acquirer-country-, year- and industry-fixed effects. Standard errors are clustered on the acquirer-country-year level. P-values are shown in parentheses. * denotes significance at the 10 %-level, ** at the 5 %-level and *** at the 1 %-level. See Table 13 for numbers of observations per acquirer-country.

come from accounting data that might be different from tax data. Another reason can be that I only considered the short run in my analysis. In the long run, even loss-making acquirers can be very profitable. If already anticipated in the acquisition year, they might nevertheless use debt in order to offset future profits with interest expenses.

In this model, the coefficients can directly be interpreted as average marginal effects. Accordingly, the tax coefficient in Column (4) means that a one %-point tax rate increase is on average associated with an increase in the debt ratio change of 0.53 %-points. In other words, the debt ratio on average exhibits a stronger increase or weaker decrease by 0.53 %-points, compared to another acquirer facing a one %-point lower tax rate and being equal in all other considered characteristics. Compared to other studies dealing with tax effects on the capital structure, this effect is rather large, indicating that acquiring companies are particularly tax sensitive and that the tax planning opportunities in large investments are considerable.[34]

With respect to the control variables, the deal values and the size of the acquiring company have the same expected effects as in the logit analysis. If the sum of deal values of all acquisitions undertaken by the considered acquirer increases by one percent, the acquirer's debt ratio increases by additional 1.1 %-points according to Column (4). The amount of the acquirer's size coefficient is similar. The pre-deal debt ratio of the acquiring company has a negative impact on the capital structure development. A one %-point higher initial debt ratio decreases the change in the capital structure by 0.22 %-points. Another significant factor is the stock market capitalization. $Stock\ market_{acq}$ has the expected negative coefficient, although it is very small from an economic point of view. $Distress_i$ positively influences the change in the debt ratio, indicating that acquiring companies facing a lower risk of financial distress tend to use debt to finance their acquisitions. The positive coefficient of $\Delta\ D\&A_i$ might reflect that a new investment increases the need to rely on additional debt-financing. Concerning tangibility, I found a positive impact. The profitability, and the change of this variable during the acquisition period in particular, influence the development of the acquirers' capital structure in a negative way. The reason might be that profitable firms are rather able to use retained earnings to finance an investment. The other variables, namely $Inflation_{acq}$, $Domestic\ credit_{acq}$, $GDP\ growth_{acq}$, $D\&A_i$, $\Delta\ Tangibility_i$ and $LCFs_j$ do not significantly influence the change in the capital structure of the acquiring companies during the deal period, according to my findings.

[34] The predicted statutory tax rate effect on the debt ratio amounts to 0.18 in the meta-study by Feld et al. (2013). However, comparing the results of column (1) of Table 5, which uses the larger sample, with former studies, the difference of the effects is not so large.

Table 6: Multinational tax planning

	(1) Logit	(2) Logit	(3) Logit	(4) OLS	(5) OLS	(6) OLS
$\phi\tau^C_{acq}$	14.5547**	14.3820**		0.7517***	0.7443***	2.3156***
	(0.022)	(0.024)		(0.001)	(0.002)	(0.001)
Grouptax	−0.2676					
	(0.441)					
LCF_i*Grouptax*	−0.1352					
	(0.821)					
LCF_j*Grouptax*	0.7163					
	(0.156)					
$\phi\tau^C_{acq} - \tau^C_{tar}$		−2.8440				
		(0.310)				
$\phi\tau^C_{mean}$			8.3379*			
			(0.085)			
Grouptax2				−0.0220**		
				(0.023)		
LCF_i*Grouptax2*				0.0260		
				(0.247)		
$\phi\tau^C_{acq} - \tau^C_{tarmean}$					0.1334	
					(0.167)	
$\phi\tau^C_{mean\ outside}$						1.8185***
						(0.009)
$\phi\tau^C_{acq}$*$\phi\tau^C_{mean\ outside}$						−6.0715***
						(0.007)
Ln Deal value(s)$_j$	0.5741***	0.5689***	0.5763***	0.0096***	0.0099***	0.0099***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Size$_i$	−0.1847**	−0.1583**	−0.1683**	−0.0074**	−0.0071**	−0.0074**
	(0.010)	(0.035)	(0.023)	(0.038)	(0.045)	(0.037)
Initial debt$_i$	0.4567	0.1954	0.4892	−0.2258***	−0.2242***	−0.2272***
	(0.435)	(0.732)	(0.388)	(0.000)	(0.000)	(0.000)
LCF_i	−0.2916	−0.3921	−0.3436	−0.0168	0.0007	−0.0012
	(0.562)	(0.252)	(0.319)	(0.452)	(0.964)	(0.936)
Inflation$_{acq}$	0.0907	0.0897	0.1180	0.0031	0.0035	0.0043
	(0.663)	(0.668)	(0.579)	(0.596)	(0.551)	(0.449)
Domestic credit$_{acq}$	0.0191*	0.0230**	0.0179*	0.0000	−0.0000	−0.0001
	(0.076)	(0.028)	(0.090)	(0.974)	(0.905)	(0.694)
GDP growth$_{acq}$	0.1383	0.1718	0.1669	−0.0010	−0.0016	−0.0016
	(0.233)	(0.152)	(0.147)	(0.756)	(0.636)	(0.626)
Stock market$_{acq}$	−0.0040	−0.0064	−0.0077	−0.0004	−0.0004	−0.0005
	(0.657)	(0.531)	(0.353)	(0.259)	(0.343)	(0.204)
Distress$_i$	0.0572	0.0834	0.0514	0.0111*	0.0104*	0.0096
	(0.712)	(0.593)	(0.743)	(0.071)	(0.098)	(0.128)
$D\&A_i$	−7.6741	−8.0024	−7.3843	−0.0109	−0.0138	−0.0318
	(0.132)	(0.122)	(0.142)	(0.969)	(0.961)	(0.911)
$\Delta\ D\&A_i$	2.0307	1.7231	2.4095	0.5068	0.5031	0.4998
	(0.751)	(0.773)	(0.693)	(0.263)	(0.264)	(0.268)
Tangibility$_i$	1.0945	1.1188	1.1168	0.0660	0.0659	0.0746*
	(0.254)	(0.244)	(0.253)	(0.133)	(0.131)	(0.086)
Δ *Tangibility*$_i$	−2.6173	−2.7476	−2.6191	0.0244	0.0281	0.0340
	(0.206)	(0.182)	(0.224)	(0.841)	(0.812)	(0.770)
Profitability$_i$	−1.0405	−1.2273	−1.0182	−0.0269	−0.0195	−0.0222
	(0.604)	(0.525)	(0.612)	(0.708)	(0.784)	(0.752)

to be continued on the next page

Table 6: Multinational tax planning (continued)

Δ *Profitability*$_i$	−1.4894	−1.6774	−1.3590	−0.1910**	−0.1975**	−0.2051**
	(0.438)	(0.365)	(0.464)	(0.032)	(0.026)	(0.020)
TarLCF(s)	−0.6352*	−0.2197	−0.1877	−0.0055	−0.0050	−0.0055
	(0.065)	(0.271)	(0.347)	(0.545)	(0.590)	(0.543)
Observations	770	762	773	882	875	884
Log-likelihood	−304.54	−301.98	−307.13	–	–	–
Sensitivity	38.32 %	39.16 %	37.13 %	–	–	–
Specificity	93.86 %	95.30 %	95.38 %	–	–	–
%-pts improved	3.51	4.85	4.39	–	–	–
Adj. R^2	–	–	–	0.15	0.15	0.15

The table shows logit regressions with dependent variable $Debt_{ij}$ in Columns (1) to (3) based on Column (3) of Table 4 and OLS regressions with dependent variable $\Delta\, Debt_i$ in Columns (4) to (6) based on Column (3) of Table 5. Independent variables are defined in Table 11. In Columns (1) and (4), I controlled for a potential group tax regime. In Columns (2) and (5), I tested if the financing decision is sensitive to the difference between acquirer- and target-country tax rates. In Columns (3) and (6), I tested if the weighted average tax rate of the multinational group influences the financing decision. All specifications include acquirer-country-, year- and industry-fixed effects. Standard errors are clustered on the acquirer-country-year level. P-values are shown in parentheses. * denotes significance at the 10 %-level, ** at the 5 %-level and *** at the 1 %-level.

Table 6 shows regression results for specifications dealing with H4 about multinational companies' financing decisions. The sample is restricted to acquirer-companies belonging to a multinational group. The first 3 columns contain logit regressions and are based on Column (3) of Table 4. In Column (1), I controlled for *Grouptax*, an indicator variable that equals one if the acquirer and the target are located in the same country applying a group taxation regime. I interacted this variable with the loss indicators for the acquirer- and the target-company to test if the offsetting of potential losses of the target or the acquiring company is more relevant. Results do not indicate a significant relationship between a group taxation regime and the financing decision of multinational acquirers. The reason might be that the loss indicators do not show the loss situation of past or future years. It might be, for example, that the target exhibits a loss carry-forward from more than one year ago that I did not observe.

In Column (2), I controlled for the difference between the acquirer and the target-country tax rate, $\phi\tau^C_{acq} - \tau^C_{tar}$. Results do not indicate a significant impact of the tax rate differential. This might be partly explained by the fact that it is not necessarily the acquiring company that has to bear the acquisition costs. The multinational can also take out a loan by a subsidiary in another high-tax country and provide the capital in the form of equity to the acquiring entity.

In order to test how tax rates from countries other than the acquirer-country influence

the financing decision of multinational groups, I used the weighted mean tax rate of the international ownership chain of the acquirer, $\phi\tau^C_{mean}$, instead of the acquirer-country tax rate in Column (3).[35] The coefficient of $\phi\tau^C_{mean}$ is significant and positive. Thus, the tax rates of other countries, in which affiliates of the multinationals are located, seem to influence the financing decisions as well. However, the average marginal effect of 1.10 is smaller compared to specifications using $\phi\tau^C_{acq}$ of the acquirer-country.

Columns (4) to (6) show results for the OLS debt ratio analysis based on Column (3) of Table 5. In Column (4), I again controlled for a possible group taxation regime in the target-countries.[36] The difference of the acquirer's debt ratio during the acquisition period is smaller if tax consolidation is possible. This effect was only found for profitable acquiring companies. The negative coefficient of *Grouptax2* indicates that profitable acquirers which can use tax loss carry-forwards of the target to lower their taxable income tend to abstain from highly debt-financed acquisitions.[37] For loss-making acquirers the effect is not significant (using a test of joint significance of *Grouptax2* and LCF_i*$Grouptax2$). In Column (5), I controlled for the difference between the acquirer tax rate and the mean of the target tax rates in the considered year. Just like in the logit analysis, this variable does not influence the financing decisions of the acquiring companies.[38] In Column (6), I tested if the debt development of the acquiring company also depends on tax rates of affiliates of the multinational group in other countries. In particular, I interacted the acquirer-country tax rate $\phi\tau^C_{acq}$ and the weighted average tax rate of affiliates located outside the acquirer-country, $\phi\tau^C_{mean\ outside}$.[39] The coefficient of $\phi\tau^C_{acq}$ shows the effect, if the mean of the affiliates tax rates is zero. The negative interaction effect indicates that the acquirer-country tax rate effect decreases, if the tax rates of other affiliates increase. This can be explained by two reasons. Firstly, the incentive to reduce the taxable income of the acquiring company by debt-financing is higher if there are no other affiliates in high-tax counties where the debt would lead to higher tax savings. Secondly, if there are many low-tax affiliates in the group, the multinational has an incentive to provide intra-group loans to the acquiring company by low-tax subsidiaries for tax-saving reasons.

[35] I weighted this mean by the number of subsidiaries in the respective countries in order to approximate if the acquiring group is a high-tax or low-tax group.

[36] *Grouptax2* equals one if at least one target is located in the same country like the acquirer and group taxation is possible.

[37] The effect is not robust to a modification of *Grouptax2*. If this variable only equals one if at least one target-company in the respective country shows a pre-deal loss, the significance for profitable acquirers disappears. This might be due to the imprecise measure of loss situations of target-companies which relies on accounting figures of one year before the deal.

[38] Results were similar when using the minimum instead of the mean target-company tax rates.

[39] This mean is weighted by the number of affiliates per country. For the tax rates of affiliated companies I also used $\phi\tau^C$. Results did not materially change, if I employed τ^C without ϕ instead.

Sensitivity analysis

Table 7 presents sensitivity analyses for the logit approach on the basis of Column (4) of Table 4. The first two columns split the sample into small and large deals, using the median of the relative deal size as a percentage of the acquirer size for categorization.[40] The large and significant coefficient of the tax variable for the larger deals and a non-significant coefficient for the smaller deals indicate that particularly the financing decision in large deals is influenced by taxes.

In the third column, I restricted the sample to observations where the acquirer has an initial debt ratio smaller than 75 %, to capture that thin-capitalization rules might restrict the deductibility of interest expenses from the corporate tax base if the leverage of the considered company is too high.[41] In most countries applying such rules, there is a save haven, which is a pre-defined value for the debt-to-equity ratio. As long as companies stay below that value, they do not have to be concerned about limitations of interest deductibility. In most countries, this save haven amounts 3:1 or higher. Therefore, I tried to exclude all firms that might be near a critical value before the acquistion takes place by only keeping those firms showing a debt-to-asset ratio smaller than 75 %. The coefficient of $\phi\tau^C_{acq}$ remains positive and significant. However, it is not larger compared to the coefficient in Column (4) of Table 4.[42]

In specification (4), I dropped all acquirer-countries with observations for less than 3 years to control for outliers. This does not change the results. In Column (5), I introduced the personal taxation on the shareholder level into the analysis. The additional variables are the tax rate on dividend income, τ^D_{acq} and the tax rate on interest income from loans given to corporations, τ^I_{acq}. The effect of $\phi\tau^C_{acq}$ remains stable but the two additional variables do not have significant impact. The reason is either that personal taxation does not matter for most of the companies or that the shareholders are not liable to taxation in the country of the acquiring company. In Column (6), I only kept observations with

[40] The number of observations is not identical for both samples because some observations have to be dropped due to collinearity problems when further reducing the sample.

[41] Weichenrieder and Windischbauer (2008), Haufler and Runkel (2012) and Büttner et al. (2010) analyze if thin-capitalization rules result in a reduction of internal debt and whether this increases fiscal revenue. Dreßler and Scheuering (2012) evaluate the effects of the introduction of a new thin-capitalization rule in Germany in 2008.

[42] I obtained similar results when using other thresholds. The lower the threshold, the lower the coefficient of $\phi\tau^C_{acq}$. It would be desirable to find out precisely how near a company is at a critical point in the considered country. However, many countries only restrict the deductibility of interest for internal loans or do not or not only look at the debt ratio to derive if a company is treated by thin-capitalization rules or not. Since my data does not allow to distinguish between internal and external debt, I only used this rough method to extract companies that should not be concerned with limitations.

Table 7: Logit analysis using $Debt_{ij}$ - sensitivity analysis

	(1) Smaller	(2) Larger	(3) Low debt	(4) > 2 years	(5) Personal	(6) Domestic
$\phi\tau^{C}_{acq}$	−6.0395	30.4793**	11.5453*	12.7918**	16.1202**	14.8972
	(0.437)	(0.025)	(0.060)	(0.034)	(0.010)	(0.488)
τ^{D}_{acq}					3.4323	2.5107
					(0.602)	(0.821)
τ^{I}_{acq}					2.5054	5.2964
					(0.262)	(0.150)
Ln Deal value$_j$	0.1880	0.7818***	0.5857***	0.6140***	0.6139***	0.5794***
	(0.257)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Size$_i$	0.2620*	−0.2830*	−0.2046**	−0.2035**	−0.2001**	−0.2640**
	(0.099)	(0.056)	(0.036)	(0.021)	(0.024)	(0.050)
Initial debt$_i$	0.1152	1.4906**	0.4586	0.3790	0.4191	1.4147
	(0.931)	(0.027)	(0.539)	(0.503)	(0.453)	(0.122)
Inflation$_{acq}$	−0.2313	0.0983	−0.2187	−0.0720	−0.0906	0.4905
	(0.412)	(0.554)	(0.291)	(0.630)	(0.532)	(0.366)
Domestic credit$_{acq}$	0.0021	0.0447***	0.0228**	0.0253***	0.0299***	0.0375**
	(0.920)	(0.001)	(0.012)	(0.003)	(0.004)	(0.028)
GDP growth$_{acq}$	−0.3437	0.1592	−0.0984	0.0481	−0.0043	−0.1473
	(0.156)	(0.465)	(0.476)	(0.680)	(0.972)	(0.523)
Stock market$_{acq}$	−0.0379	−0.0262	−0.0057	−0.0124	−0.0072	−0.0099
	(0.138)	(0.156)	(0.637)	(0.215)	(0.514)	(0.626)
Distress$_i$	0.0054	0.0825	−0.0973	−0.0535	0.0523	−0.3384
	(0.990)	(0.676)	(0.646)	(0.759)	(0.764)	(0.191)
$D\&A_i$	−5.9354	0.4478	−4.6194	1.8563	0.1746	−7.8838
	(0.776)	(0.960)	(0.474)	(0.725)	(0.974)	(0.511)
$\Delta\, D\&A_i$	52.7138**	−3.0216	−3.1516	1.8148	0.1333	5.4546
	(0.038)	(0.737)	(0.647)	(0.786)	(0.984)	(0.652)
Tangibility$_i$	0.1274	−1.9649*	−0.1412	−0.6711	−0.0936	−0.4638
	(0.952)	(0.087)	(0.861)	(0.409)	(0.908)	(0.822)
Δ *Tangibility*$_i$	−7.9700*	−3.3290	−3.4625	−3.6169*	−2.4684	−2.3532
	(0.072)	(0.120)	(0.128)	(0.086)	(0.206)	(0.649)
Profitability$_i$	−3.4006	−2.6489	−1.3099	−2.1159	−2.6457	5.9649
	(0.644)	(0.486)	(0.623)	(0.390)	(0.257)	(0.161)
Δ *Profitability*$_i$	−9.6511	3.7158	0.1999	1.1746	0.5423	0.5030
	(0.281)	(0.160)	(0.900)	(0.419)	(0.690)	(0.868)
LCF_j	0.2368	−0.0014	−0.0023	−0.0457	−0.0599	0.1353
	(0.565)	(0.996)	(0.993)	(0.840)	(0.787)	(0.770)
Observations	324	347	600	677	697	320
Log-likelihood	−96.27	−149.35	−236.41	−271.63	−283.47	−118.42
Sensitivity	26.67 %	63.87 %	48.23 %	44.65 %	44.24 %	47.14 %
Specificity	97.49 %	90.79 %	94.34 %	93.82 %	93.61 %	95.60 %
%-pts improved	1.54	15.85	7.00	5.76	5.59	6.88

The table shows logit regressions with dependent variable $Debt_{ij}$ based on Column (4) in Table 4. Independent variables are defined in Table 11. Columns (1) and (2) split the sample into small and large deals. Column (3) restricts the sample to acquirers showing a pre-deal debt-to-asset ratio smaller then 75 %. In Column (4), all acquirer-countries with observations in less than 3 years are dropped. Column (5) introduces personal taxation into the analysis and Column (6) restricts the sample to acquirers that are independent or do not have a global ultimate owner abroad. All specifications include acquirer-country-, year- and industry-fixed effects. Standard errors are clustered on the acquirer-country-year level. P-values are shown in parentheses. * denotes significance at the 10 %-level, ** at the 5 %-level and *** at the 1 %-level.

an independent acquirer or where the acquiring company does not have a global ultimate owner in another country in order to capture the last point. For those firms, the domestic personal taxation should have a significant impact if it matters for the financing decision. However, I only observe the current ownership structure of the acquirer and not the data for the deal year. This can be the reason for the non-significant coefficient of τ^C_{acq} in this specification. In Table 7, the coefficient of *Initial debt*$_i$ becomes positive and significant in Column (2). This might reflect the debt capacity of the acquiring companies.[43]

Table 8 provides results of analogous sensitivity analyses for the debt ratio regression (4) of Table 5. Columns (1) and (2) again split the sample into smaller and larger deals. Now the median sum of deal values per acquirer and year as a percentage of the acquirers pre-deal total assets is used for separation. Remarkably, the coefficient of the tax variable is not significant in both samples, despite its significant impact in the whole sample.[44]

In Column (3), the sample is reduced to acquirers showing a pre-deal debt ratio smaller than 75 %. The coefficient of $\phi\tau^C_{acq}$ is now larger as compared to Column (4) of Table 5, indicating that the tax advantage is more relevant for firms that are not too indebted before the acquisition and therefore do not have to take into account a possible treatment by thin-capitalization rules after a debt-financed deal. Column (4) restricts the sample to acquirer-countries with observations in at least 3 years, to control for outliers which does not change results qualitatively.

In Columns (5) and (6), I controlled for personal taxation at the shareholder level in the acquirer-countries using τ^D_{acq} and τ^I_{acq}. The results indicate that personal taxation is not relevant for the financing decision of the acquiring companies in my sample, even those that have no global ultimate owner abroad (compare Column (6)).[45] The control variables show similar coefficients compared to Table 5. The only difference is that *Inflation*$_{acq}$ has a significant positive coefficient in Column (3).

[43] This result is reverse to the findings in the debt ratio analysis. However, the positive coefficient here is only found for subsamples and is not robust for other specifications.

[44] When I separated according to the absolute rather than the relative size of the deals I found that the tax variable has significant impact only for the smaller deals. For the larger deals I do not find significant tax effects even when looking at different subgroups like the 25 % largest deals or the larger deals without the highest quantiles. The reason for these results might be that I do not observe the deal values for all deals of the respective acquirers.

[45] For such firms, I argue that most personal shareholders should be residents of the country in which the company is located.

Table 8: OLS analysis using $\Delta\, Debt_i$ - sensitivity analysis

	(1) Smaller	(2) Larger	(3) Low debt	(4) >2 years	(5) Personal	(6) Domestic
$\phi\tau^C_{acq}$	0.2715	0.3802	0.6603**	0.5041**	0.5559**	0.6878**
	(0.319)	(0.441)	(0.025)	(0.030)	(0.031)	(0.029)
τ^D_{acq}					0.0966	0.2406
					(0.601)	(0.286)
τ^I_{acq}					0.0577	0.0614
					(0.505)	(0.463)
Ln Deal values$_j$	0.0021	0.0217***	0.0121***	0.0103***	0.0106***	0.0087***
	(0.427)	(0.004)	(0.000)	(0.000)	(0.000)	(0.003)
Size$_i$	−0.0026	−0.0185**	−0.0098**	−0.0094***	−0.0098***	−0.0063*
	(0.444)	(0.022)	(0.012)	(0.003)	(0.002)	(0.070)
Initial debt$_i$	−0.1006***	−0.3145***	−0.2583***	−0.2123***	−0.2178***	−0.1945***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Inflation$_{acq}$	0.0080	0.0032	0.0090*	0.0049	0.0051	0.0018
	(0.147)	(0.570)	(0.082)	(0.235)	(0.229)	(0.748)
Domestic credit$_{acq}$	0.0001	0.0008	0.0004	0.0004	0.0006	0.0007
	(0.818)	(0.280)	(0.222)	(0.263)	(0.193)	(0.144)
GDP growth$_{acq}$	−0.0016	0.0021	−0.0020	−0.0018	−0.0017	0.0010
	(0.720)	(0.686)	(0.593)	(0.562)	(0.576)	(0.804)
Stock market$_{acq}$	−0.0003	−0.0016**	−0.0014***	−0.0009***	−0.0007**	−0.0006
	(0.355)	(0.019)	(0.001)	(0.007)	(0.034)	(0.188)
Distress$_i$	0.0066	0.0318***	0.0256***	0.0183***	0.0179***	0.0209***
	(0.292)	(0.002)	(0.001)	(0.006)	(0.006)	(0.007)
$D\&A_i$	0.4536	−0.2382	0.1312	0.1593	0.1191	0.0820
	(0.143)	(0.560)	(0.628)	(0.490)	(0.608)	(0.764)
$\Delta\, D\&A_i$	0.3565	0.3285	0.4120	0.4922	0.4704	0.2924
	(0.454)	(0.637)	(0.454)	(0.332)	(0.349)	(0.632)
Tangibility$_i$	0.0415	0.1559**	0.0994***	0.0785**	0.0824***	0.0882**
	(0.198)	(0.019)	(0.005)	(0.011)	(0.008)	(0.025)
Δ *Tangibility*$_i$	0.0719	−0.0638	−0.0999	−0.0725	−0.0613	−0.0500
	(0.685)	(0.498)	(0.396)	(0.397)	(0.474)	(0.629)
Profitability$_i$	−0.1765*	−0.3279**	−0.2408***	−0.1895**	−0.1842**	−0.2094**
	(0.065)	(0.011)	(0.008)	(0.021)	(0.023)	(0.022)
Δ *Profitability*$_i$	−0.2891*	−0.0435***	−0.0466***	−0.0436***	−0.0435***	−0.0414***
	(0.053)	(0.000)	(0.006)	(0.005)	(0.006)	(0.004)
LCFs$_j$	0.0018	−0.0063	0.0019	0.0023	0.0005	0.0007
	(0.861)	(0.701)	(0.867)	(0.806)	(0.955)	(0.939)
Observations	463	464	750	900	927	687
Adj. R^2	0.06	0.21	0.17	0.14	0.15	0.12

The table shows OLS regressions with dependent variable $\Delta\, Debt_i$ based on Column (4) in Table 5. Independent variables are defined in Table 11. Columns (1) and (2) split the sample into companies acquiring relatively small and large targets. Column (3) restricts the sample to acquirers showing a pre-deal debt-to-asset ratio smaller then 75 %. In Column (4), all acquirer-countries with observations in less than 3 years are dropped. Column (5) introduces personal taxation into the analysis and Column (6) restricts the sample to acquirers that are independent or do not have a global ultimate owner abroad. All specifications include acquirer-country-, year- and industry-fixed effects. Standard errors are clustered on the acquirer-country-year level. P-values are shown in parentheses. * denotes significance at the 10 %-level, ** at the 5 %-level and *** at the 1 %-level.

Comparison to Erickson (1998) and Dhaliwal et al. (2005)

Erickson (1998) and Dhaliwal et al. (2005) use a trichotomous tax variable, which directly captures whether the acquirer is a loss-making company. The variable takes the value zero, if the company has an operating loss and a negative taxable income before the deal, and half of the statutory tax rate, if one of the two conditions is fulfilled. Only if both characteristics indicate a profitable firm, the tax variable equals the statutory tax rate.[46] In Table 9, I also employed similar kinds of variables for a better comparison with these former studies. In particular, I used three different dichotomous variables. All of them equal $\phi\tau^C_{acq}$, if the company is labeled as being profitable and zero if not.[47] *Tax1* equals zero if the acquiring company does not have a positive profit before the acquisition, i.e. if LCF_i equals one. *Tax2* equals zero if the pre-deal operating profit measured by the EBIT is negative. *Tax3* equals zero if the sum of all taxes relating to the pre-deal accounting period is less than or equal to zero. Columns (1) to (3) of Table 9 show results of logit specifications employing these dichotomous variables instead of $\phi\tau^C_{acq}$ and using the full set of control variables. Only *Tax1* shows a significant coefficient, which is in line with findings in Table 4 where the tax advantage of debt also affected the financing decision of profitable acquirers in particular. However, the coefficient is smaller using *Tax1*. Another difference compared to Table 4 is that the loss dummy for the acquirer now gets a positive and significant coefficient. The reason might be that, controlling for the tax effect of the loss carry-forward, this variable captures that firms in difficult economic situations have to finance their investments through the capital market because they do not have many retained earnings and investors avoid placing their money in such companies. However, these findings are not robust to the altered definitions of the dichotomous tax variable, which can be seen in Columns (2) and (3) of Table 9.

Columns (4) to (6) depict the same specifications for the debt ratio analysis. In these models none of the variables *Tax1*, *Tax2* and *Tax3* is found to significantly influence the financing decision of acquiring companies. This is not surprising because we already see in Table 5 that the tax advantage does not seem to differ between loss-making and profitable firms.

[46] The trichotomous tax variable was suggested by Graham (1996). It equals "zero if the acquiring firm has net operating losses and a negative taxable income in the year prior to the acquisition, one-half the top statutory tax rate if the acquiring firm had either a net operating loss, or negative taxable income in the year prior to the acquisition, and the top statutory tax rate if the acquirer had neither a net operating loss nor negative taxable income in the year prior to the acquisition", see Erickson (1998), p. 285. The definition of this variable captures if the acquirer is near tax exhaustion. As an alternative measure, Erickson (1998) uses an indicator variable for a net operating loss.

[47] I do not employ a trichotomous variable as I cannot observe the companies' tax positions by only considering accounting figures.

Table 9: Logit using $Debt_{ij}$ and OLS using $\Delta\, Debt_i$ - dichotomous tax variables

	(1) Logit	(2) Logit	(3) Logit	(4) OLS	(5) OLS	(6) OLS
Tax1	11.1965***			0.0251		
	(0.004)			(0.930)		
Tax2		−0.2770			−0.0247	
		(0.751)			(0.563)	
Tax3			−0.3266			0.0319
			(0.657)			(0.350)
Ln Deal value(s)$_j$	0.5762***	0.5734***	0.5696***	0.0104***	0.0104***	0.0102***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Size$_i$	−0.1824**	−0.1865**	−0.1835**	−0.0088***	−0.0089***	−0.0087***
	(0.013)	(0.010)	(0.013)	(0.005)	(0.005)	(0.007)
Initial debt$_i$	0.7360	0.7934*	0.7375	−0.2631***	−0.2616***	−0.2633***
	(0.133)	(0.092)	(0.124)	(0.000)	(0.000)	(0.000)
LCF$_i$	2.9674**	−0.4678	−0.4600*	0.0049	−0.0061	−0.0024
	(0.016)	(0.124)	(0.094)	(0.957)	(0.720)	(0.871)
Inflation$_{acq}$	−0.0446	−0.0156	−0.0291	0.0047	0.0048	0.0043
	(0.751)	(0.906)	(0.823)	(0.234)	(0.234)	(0.301)
Domestic credit$_{acq}$	0.0166**	0.0150*	0.0156*	0.0002	0.0002	0.0003
	(0.045)	(0.070)	(0.059)	(0.415)	(0.415)	(0.355)
GDP growth$_{acq}$	0.0280	0.0778	0.0728	0.0022	0.0021	0.0022
	(0.770)	(0.429)	(0.461)	(0.510)	(0.534)	(0.502)
Stock market$_{acq}$	−0.0075	−0.0116	−0.0129*	−0.0009**	−0.0009**	−0.0009**
	(0.324)	(0.135)	(0.093)	(0.013)	(0.012)	(0.012)
Distress$_i$	−0.0377	−0.0322	−0.0213	0.0173***	0.0177***	0.0167***
	(0.805)	(0.829)	(0.889)	(0.003)	(0.002)	(0.004)
D&A$_i$	−4.3784	−3.8194	−3.5532	−0.0517	−0.0532	−0.0685
	(0.385)	(0.443)	(0.470)	(0.784)	(0.780)	(0.719)
Δ *D&A*$_i$	3.8821	4.5209	3.9005	0.5144*	0.5078*	0.4980*
	(0.525)	(0.463)	(0.514)	(0.081)	(0.089)	(0.100)
Tangibility$_i$	0.6875	0.7753	0.7512	0.0651*	0.0676*	0.0640*
	(0.390)	(0.313)	(0.325)	(0.065)	(0.056)	(0.072)
Δ *Tangibility*$_i$	−2.6220*	−2.5726*	−2.8168*	0.0218	0.0226	0.0222
	(0.084)	(0.085)	(0.064)	(0.789)	(0.779)	(0.788)
Profitability$_i$	−0.1420	−0.3043	−0.4735	−0.0263	−0.0191	−0.0334
	(0.931)	(0.854)	(0.773)	(0.746)	(0.816)	(0.696)
Δ *Profitability*$_i$	−0.3899	−0.3279	−0.1866	−0.0646**	−0.0648**	−0.0646**
	(0.769)	(0.805)	(0.888)	(0.038)	(0.038)	(0.040)
LCF(s)$_j$	−0.2185	−0.1945	−0.1949	0.0038	0.0038	0.0046
	(0.226)	(0.280)	(0.276)	(0.671)	(0.669)	(0.607)
Observations	940	940	924	1,194	1,194	1,177
Log-likelihood	−368.06	−370.96	−367.45	–	–	–
Sensitivity	35.86 %	35.86 %	35.53 %	–	–	–
Specificity	96.09 %	94.61 %	94.50 %	–	–	–
%-pts improved	4.46	3.29	3.25	–	–	–
Adj. R^2	–	–	–	0.17	0.17	0.17

The table shows logit regressions with dependent variable $Debt_{ij}$ in Columns (1) to (3) based on Column (3) of Table 4 and OLS regressions with dependent variable $\Delta\, Debt_i$ in Columns (4) to (6) based on Column (3) of Table 5. Independent variables are defined in Table 11. Columns (1) and (4) employ *Tax1*, Columns (2) and (5) use *Tax2* and Column (3) and (6) apply *Tax3* instead of $\phi\tau^C_{acq}$. All specifications include acquirer-country-, year- and industry-fixed effects. Standard errors are clustered on the acquirer-country-year level. P-values are shown in parentheses. * denotes significance at the 10 %-level, ** at the 5 %-level and *** at the 1 %-level.

Ultimately, I chose to rely on results from Tables 4 and 5. The dichotomous tax variables implicitly assume that the tax advantage of debt only exists for firms which have taxable profits in the pre-deal period whereas by using $\phi\tau^{C}_{acq}$ and the loss dummy or an interaction, I allowed the data itself to resolve this issue.

For a better comparison of my results with the findings of Erickson (1998), I also conducted the logit analysis for modeling the probability to observe a debt-financed deal by employing another dependent variable, $DebtB_{ij}$. This variable sharply distinguishes between debt-financed deals and stock-financed acquisitions and is defined in section 4.2. Results are presented in Tables 14 to 17 in the Appendix. Generally, all results regarding the tax variables are similar to the output presented in the last sections. However, the levels of significance are lower using $DebtB_{ij}$. Some of the control variables lose significance in several specifications, for example $Size_i$. In contrast, the significance of other variables gets stronger, especially for $Domestic\ credit_{acq}$ and $Stock\ market_{acq}$. I discussed the results of specifications using $Debt_{ij}$ due to the larger coverage of this variable. Furthermore, I also employed $DebtC_{ij}$ leading to qualitatively similar results. I do not show them because of limited validity due to the very low numbers of observations (between 117 and 381, when including all control variables).

7 Conclusion

This paper evaluates the effects of profit taxation on the financing decision of corporate acquisitions. Due to the deductibility of interest expenses from the corporate tax base, acquiring companies can save taxes by financing a takeover with debt and afterwards offsetting the interest expenses with profits in the following periods. For the empirical analysis I employed two approaches.

The first approach deals with the particular decision of how to finance the considered deal. Using information from Zephyr, a M&A database provided by Bureau van Dijk, I investigated the determinants of the question of whether a corporate acquisition should be financed with debt or equity. My sample consists of 3,717 deals with acquirers in 31 countries. I found empirical evidence for the hypothesis that companies in high-tax countries rather use debt than equity compared to acquirers in low-tax countries. This effect can especially be carved out for profitable acquirers and for large deals. Limitations of this kind of analysis might be that I could not observe how much debt was used and that the financing decision of acquisitions may not have been independent from other investments of the same company around the deal.

Therefore, in a second step, I investigated the whole capital structure development of the acquiring companies during the deal period. According to my findings, the change of the debt-to-asset ratio is 0.55 %-points higher if the tax advantage of debt increases by one %-point. However, I cannot accept the hypothesis that the tax advantage is relevant especially for profitable acquirers. Since the simple loss indicator variable does not contain information about the future development and the expectations of decision-makers, this result is not surprising. Even loss-making firms might be very profitable in the future and consequently have an incentive to decrease taxable profits by additional interest expenses.

Restricting the sample to multinational acquirers, I found that a possible tax consolidation in the target-country may enhance the use of equity if the acquirer is profitable, because losses of the target-company can be used to reduce the taxable profit of the acquiring company. In addition, the acquirer's tax rate effect depends on the other tax rates that the multinational group faces: The higher the weighted average tax rate outside the acquirer-country, the lower the effect of the acquirer's tax rate on its capital structure development around the deal.

In summary, the financing decision in corporate acquisitions seems to be influenced by profit taxation leading to a larger fraction of debt-financing in high-tax countries. This could lead to economic distortions, for example, the execution of acquisitions that would not have been profitable in a world without interest deductibility.

8 Appendix

8.1 Details of Information on Deal Financing in Zephyr

The information for the dependent variables in the logit analysis was collected from three variables in the Zephyr-database. From the variable DEAL FINANCING I used entries such as *vendor placing*, *leveraged buy out* and *new bank facilities*. *Vendor placing* means that the seller of the target-company becomes a shareholder of the acquiring company after the deal and is an indicator for equity-financing. The other two entries are indicators for debt-financing. A second variable, METHOD OF PAYMENT, contains entries such as *shares*, which indicates equity-financing, and *loan notes* and *debt assumed*, which indicate debt-financing. In addition, this variable reports if the acquisition price is at least partly paid in *cash*. In a third variable, DEAL SUBTYPE, that mainly describes the kind of the deal, I also rarely found the entry *leveraged buy out*.

In contrast to Erickson (1998), Dhaliwal et al. (2005) only look at cash deals. Therefore, I also tried to identify the method of financing for cash deals. For this reason I redefined $Debt_{ij}$ and $DebtB_{ij}$ and only used deals where the variable METHOD OF PAYMENT contained *cash*. Surprisingly, the fraction of debt-financed deals remained at a very low level of about 14-15 %, compare Table 10. In contrast, in the study of Dhaliwal et al. (2005) about two third of cash deals were mainly debt-financed. In my opinion, this result indicates a data problem regarding the identification of cash deals and I therefore abstained from using these variables in further empirical analyses.

Table 10: Information about deal financing of cash deals

Variable	Equal 1	Equal 0	% Equal 1	ΔTax rate	P-value
$Debt_{ij}$, cash only	414	2,321	15.1%	0.007	0.009
$DebtB_{ij}$, cash only	340	2,028	14.4%	0.008	0.003

Numbers of debt-financed and non-debt-financed deals. ΔTax rate shows the difference of the average $\phi\tau^C_{acq}$ between debt-financed and non-debt-financed deals. The last column depicts the corresponding p-value of a standard t-test with unequal variances that this difference equals zero.

8.2 Further Figures and Tables

Table 11: Variable definitions

ΔTAX	Tax advantage of debt.
TAX_{equity}	Tax payments for equity-financed investment.
TAX_{debt}	Tax payments for debt-financed investment.
π	Net earnings
$\phi\tau^C_{acq}$	Fraction of interest expenses deductible from the corporate income tax base times the combined statutory corporate income tax rate in the completion year of the acquisition.
τ^D_{acq}	Additional taxation of dividend income on the personal level in the completion year of the acquisition, $= (1 - \phi\tau^C_{acq})\tau^P_{acq}$, where τ^P_{acq} is the personal tax rate on dividend income.
τ^I_{acq}	Additional taxation of interest income on the personal level in the completion year of the acquisition for loans given to companies.
Tax1	Dichotomous variable, $= \phi\tau^C_{acq}$ if acquirer's pre-deal profit before tax is larger than zero and zero otherwise.
Tax2	Dichotomous variable, $= \phi\tau^C_{acq}$ if acquirer's pre-deal EBIT is larger than zero and zero otherwise.

to be continued on the next page

Table 11: Variable definitions (continued)

Tax3	Dichotomous variable, $= \phi\tau^C_{acq}$ if acquirer's pre-deal taxation is larger than zero and zero otherwise.
Grouptax	Indicator variable, equals one if the acquirer and the target-company are located in the same country and the target-country applies a group taxation regime.
$\phi\tau^C_{acq} - \tau^C_{tar}$	Difference between the acquirer and the target-country tax rate in the completion year of the acquisition. If acquirer and target are located in the same country, the variable is zero.
$\phi\tau^C_{mean}$	Weighted average tax rate of the whole 50 % ownership chain of the acquirer in the acquisition year, the mean is weighted by the number of affiliates per country.
Grouptax2	Indicator variable, equals one if at least one target-company is located in the acquirer-country and group taxation is possible.
$\phi\tau^C_{acq} - \tau^C_{tarmean}$	Difference between the acquirer-country tax rate and the average tax rate of the targets acquired in the considered period.
$\phi\tau^C_{mean\ outside}$	Weighted average tax rate of all affiliates outside the acquirer-country, the mean is weighted by the number of affiliates per country.
i	Interest rate.
D	Amount of debt.
V_{ij}	Part of the value of acquiring firm i determined by capital structure choice for acquisition j.
α, $\boldsymbol{\beta}$, δ_{acq}, δ_t, δ_{ind},	Parameters to be estimated.
$\boldsymbol{X}_{ij}$,	Control variables.
ϵ_{ij}	Error term.
$P(Debt_{ij} = 1)$	Probability that acquisition j coducted by firm i is financed with debt.
$Debt_{ij}$	Dependent variable, equals one if deal j is at least partly debt-financed and zero otherwise.
$DebtB_{ij}$	Dependent variable, equals one if deal j is at least partly debt-financed and not paid with stock and zero if it is only equity-financed.
$DebtC_{ij}$	Dependent variable, equals one if deal j is at least partly debt-financed and not paid with stock and zero if it is only equity-financed. Deals for which the only information is that they were paid in cash are excluded.
Ln Deal value$_j$	Logarithm of the deal value of the acquisition in thousand EUR. For the debt ratio analysis, the logarithm of the sum of values of all acquisitions undertaken by the acquirer in the considered year is used (*Ln Deal values*$_j$).

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Table 11: Variable definitions (continued)

$Size_i$	Logarithm of the acquirer's pre-deal total assets in thousand EUR.
$Initial\ debt_i$	Acquirer's pre-deal debt-to-asset ratio (one year before the completion year).
LCF_i	Indicator variable, equals one if the acquirer's pre-deal book profit before tax is lower than zero and zero if it is equal or larger than zero.
$Inflation_{acq}$	Consumer price index in percent in the completion year of the acquisition.
$Domestic\ credit_{acq}$	Domestic credit provided by banking sector in percent of GDP in the completion year of the acquisition.
$GDP\ growth_{acq}$	Annual percentage growth rate of GDP at market prices in the completion year of the acquisition.
$Stock\ market_{acq}$	Market capitalization of listed companies in percent of GDP in the completion year of the acquisition.
$Distress_i$	$=$ (1.2 $*$ working capital + 3.3 $*$ EBIT + 1.0 $*$ sales)/total assets, pre-deal value for the acquirer, following Altman (2000) and MacKie-Mason (1990).
$D\&A_i$	Acquirer's pre-deal depreciation and amortization as a fraction of total assets.
$\Delta\ D\&A_i$	Acquirer's change in depreciation and amortization as a fraction of total assets in the completion year of the acquisition compared to the pre-deal value.
$Tangibility_i$	Acquirer's pre-deal tangible assets as a fraction of total assets.
$\Delta\ Tangibility_i$	Acquirer's change in tangible assets as a fraction of total assets in the completion year of the acquisition compared to the pre-deal value.
$Profitability_i$	Acquirer's pre-deal EBITDA as a fraction of total assets.
$\Delta\ Profitability_i$	Acquirer's change in EBITDA as a fraction of total assets in the completion year of the acquisition compared to the pre-deal value.
LCF_j	Indicator variable, equals one if the target's pre-deal book profit before tax is lower than zero and zero if it is equal or larger than zero. For the debt ratio analysis, this indicator equals one if at least one of the acquired targets shows a negative income ($LCFs_j$).

Table 12: Observations per acquirer-country - logit analysis

Country	(1) Frequency	(2) Percent	(3) Frequency	(4) Percent	(5) Frequency	(6) Percent
Austria	28	0.75	5	0.53	4	0.57
Belgium	90	2.42	41	4.36	32	4.59
Bulgaria	15	0.4	7	0.74	5	0.72
Cyprus	4	0.11	0	0	0	0
Czech Republic	16	0.43	0	0	0	0
Denmark	26	0.7	0	0	0	0
Estonia	10	0.27	0	0	0	0
Finland	146	3.93	77	8.19	49	7.03
France	438	11.78	199	21.17	168	24.1
Germany	209	5.62	42	4.47	31	4.45
Greece	66	1.78	35	3.72	31	4.45
Hungary	16	0.43	2	0.21	0	0
Ireland	11	0.3	0	0	0	0
Italy	318	8.56	161	17.13	121	17.36
Japan	40	1.08	0	0	0	0
Korea	308	8.29	0	0	0	0
Luxembourg	10	0.27	0	0	0	0
Netherlands	20	0.54	0	0	0	0
Norway	87	2.34	18	1.91	15	2.15
Poland	165	4.44	13	1.38	8	1.15
Portugal	38	1.02	15	1.6	12	1.72
Romania	39	1.05	12	1.28	10	1.43
Russia	134	3.61	0	0	0	0
Singapore	34	0.91	0	0	0	0
Slovenia	21	0.56	0	0	0	0
Spain	308	8.29	164	17.45	137	19.66
Sweden	356	9.58	147	15.64	74	10.62
Turkey	5	0.13	0	0	0	0
Ukraine	7	0.19	2	0.21	0	0
United Kingdom	704	18.94	0	0	0	0
United States	48	1.29	0	0	0	0
Total	3,717	100	940	100	697	100

The table shows the number of observations per country for the analysis of the probability to observe a debt-financed deal using $Debt_{ij}$ as the dependent variable. Columns (1) and (2) show the respective numbers for the base specification (1) of Table 4. Columns (3) and (4) refer to specification (3) of Table 4, which includes all control variables. Columns (5) and (6) depict numbers for specification (4) of Table 4, which restricts the sample to profitable acquirers.

Table 13: Observations per acquirer-country - OLS analysis

Country	(1) Frequency	(2) Percent	(3) Frequency	(4) Percent	(5) Frequency	(6) Percent
Austria	25	0.57	5	0.42	4	0.43
Belgium	122	2.78	52	4.36	41	4.42
Bulgaria	22	0.5	10	0.84	9	0.97
Cyprus	3	0.07	0	0	0	0
Czech Republic	27	0.62	11	0.92	11	1.19
Denmark	40	0.91	0	0	0	0
Estonia	33	0.75	8	0.67	8	0.86
Finland	164	3.74	64	5.36	46	4.96
France	456	10.39	224	18.76	184	19.85
Germany	222	5.06	44	3.69	34	3.67
Greece	103	2.35	49	4.1	42	4.53
Hungary	19	0.43	3	0.25	2	0.22
Ireland	7	0.16	0	0	0	0
Italy	428	9.75	239	20.02	187	20.17
Japan	66	1.5	0	0	0	0
Korea	331	7.54	0	0	0	0
Latvia	6	0.14	0	0	0	0
Lithuania	6	0.14	0	0	0	0
Luxembourg	8	0.18	0	0	0	0
Netherlands	23	0.52	1	0.08	0	0
Norway	119	2.71	19	1.59	16	1.73
Poland	249	5.67	32	2.68	23	2.48
Portugal	66	1.5	27	2.26	22	2.37
Romania	50	1.14	14	1.17	12	1.29
Russia	262	5.97	0	0	0	0
Singapore	25	0.57	0	0	0	0
Slovakia	4	0.09	1	0.08	0	0
Slovenia	28	0.64	5	0.42	5	0.54
Spain	438	9.98	236	19.77	201	21.68
Sweden	360	8.2	143	11.98	76	8.2
Turkey	5	0.11	0	0	0	0
Ukraine	10	0.23	7	0.59	4	0.43
United Kingdom	643	14.65	0	0	0	0
United States	19	0.43	0	0	0	0
Total	4,389	100	1,194	100	927	100

The table shows the number of observations per country for the debt ratio analysis using $\Delta\, Debt_i$ as the dependent variable. Columns (1) and (2) show the respective numbers for the base specification (1) of Table 5. Columns (3) and (4) refer to specification (3) of Table 5, which includes all control variables. Columns (5) and (6) depict numbers for specification (4) of Table 5, which restricts the sample to profitable acquirers.

Table 14: Logit analysis using $DebtB_{ij}$

	(1) Base	(2) Small sample	(3) Full model	(4) Profitable	(5) Interaction
$\phi\tau^{C}_{acq}$	−1.6514	8.6062	8.0917	10.5807*	9.3755
	(0.703)	(0.148)	(0.171)	(0.086)	(0.112)
$\phi\tau^{C}_{acq} * LCF_i$					−13.7596**
					(0.012)
Ln Deal value$_j$	0.4286***	0.5091***	0.5085***	0.5571***	0.5059***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Size$_i$	−0.1117***	−0.1021	−0.1124	−0.1353	−0.1024
	(0.000)	(0.125)	(0.148)	(0.127)	(0.191)
Initial debt$_i$	0.4386	0.8097	0.8933*	0.4425	0.8468
	(0.109)	(0.127)	(0.093)	(0.447)	(0.120)
LCF_i	−0.3429***	−0.5685**	−0.6352*		3.5816**
	(0.005)	(0.047)	(0.053)		(0.044)
Inflation$_{acq}$	−0.1069*	−0.0257	−0.0149	−0.0407	−0.0155
	(0.061)	(0.854)	(0.911)	(0.783)	(0.913)
Domestic credit$_{acq}$	0.0055	0.0259***	0.0283***	0.0300***	0.0288***
	(0.213)	(0.004)	(0.001)	(0.001)	(0.001)
GDP growth$_{acq}$	−0.0654	0.1020	0.0919	0.0151	0.0728
	(0.164)	(0.397)	(0.449)	(0.921)	(0.541)
Stock market$_{acq}$	0.0011	−0.0184**	−0.0186**	−0.0252**	−0.0196**
	(0.793)	(0.037)	(0.031)	(0.014)	(0.018)
Distress$_i$			0.0127	0.1212	0.0209
			(0.934)	(0.492)	(0.893)
$D\&A_i$			−2.0068	1.7786	−2.0562
			(0.738)	(0.764)	(0.737)
$\Delta\, D\&A_i$			6.9485	2.0466	7.0474
			(0.302)	(0.765)	(0.299)
Tangibility$_i$			0.7879	0.0544	0.6546
			(0.341)	(0.950)	(0.444)
Δ *Tangibility*$_i$			−3.3501*	−3.4108	−3.6108**
			(0.050)	(0.108)	(0.037)
Profitability$_i$			−0.9067	−3.1535	−0.6440
			(0.619)	(0.248)	(0.729)
Δ *Profitability*$_i$			−0.1296	0.5939	−0.1687
			(0.926)	(0.705)	(0.906)
LCF_j			−0.2542	−0.1121	−0.2705
			(0.214)	(0.632)	(0.185)
Observations	3,406	844	844	631	844
Log-likelihood	-1,324.94	-326.60	-321.19	-257.02	-319.01
Sensitivity	18.06 %	35.84 %	37.57 %	47.65 %	38.15 %
Specificity	97.57 %	95.83 %	95.23 %	94.61 %	95.38 %
%-pts improved	1.23	4.03	3.91	7.13	4.15

The table shows logit regressions with dependent variable $DebtB_{ij}$. Independent variables are defined in Table 11. Column (1) is the baseline regression. Column (2) restricts the sample to observations where additional control variables are not missing and Column (3) adds these controls. In Column (4), the sample only consists of profitable acquiring companies and in Column (5) an interaction term between $\phi\tau^{C}_{acq}$ and LCF_i is used to identify a difference in the tax effect for loss-making and profitable firms. All specifications include acquirer-country-, year- and industry-fixed effects. Standard errors are clustered on the acquirer-country-year level. P-values are shown in parentheses. * denotes significance at the 10 %-level, ** at the 5 %-level and *** at the 1 %-level.

Table 15: Multinational tax planning, $DebtB_{ij}$

	(1)	(2)	(3)
$\phi\tau^C_{acq}$	8.0815	7.9621	
	(0.174)	(0.187)	
$Grouptax$	−0.2852		
	(0.485)		
$LCF_i * Grouptax$	−0.1218		
	(0.863)		
$LCF_j * Grouptax$	0.3979		
	(0.458)		
$\phi\tau^C_{acq} - \tau^C_{tar}$		−2.5206	
		(0.428)	
$\phi\tau^C_{mean}$			5.8167
			(0.230)
$Ln\ Deal\ value_j$	0.4977***	0.4867***	0.5002***
	(0.000)	(0.000)	(0.000)
$Size_i$	−0.0910	−0.0601	−0.0778
	(0.249)	(0.467)	(0.336)
$Initial\ debt_i$	0.6212	0.3450	0.7024
	(0.333)	(0.578)	(0.254)
LCF_i	−0.4728	−0.6073	−0.5476
	(0.433)	(0.127)	(0.183)
$Inflation_{acq}$	0.2088	0.2220	0.2425
	(0.341)	(0.325)	(0.283)
$Domestic\ credit_{acq}$	0.0357***	0.0396***	0.0338***
	(0.001)	(0.000)	(0.002)
$GDP\ growth_{acq}$	0.2657*	0.2884*	0.2410
	(0.086)	(0.068)	(0.111)
$Stock\ market_{acq}$	−0.0184*	−0.0213*	−0.0199**
	(0.053)	(0.057)	(0.028)
$Distress_i$	0.1134	0.1382	0.0988
	(0.496)	(0.397)	(0.551)
$D\&A_i$	−7.4605	−7.4715	−7.1629
	(0.284)	(0.300)	(0.308)
$\Delta\ D\&A_i$	6.2973	6.0708	6.3792
	(0.362)	(0.351)	(0.350)
$Tangibility_i$	1.2968	1.3133	1.2842
	(0.228)	(0.232)	(0.249)
$\Delta\ Tangibility_i$	−3.4893	−3.6370	−3.5462
	(0.149)	(0.136)	(0.156)
$Profitability_i$	−1.2463	−1.5674	−1.2885
	(0.595)	(0.483)	(0.581)
$\Delta\ Profitability_i$	−0.3863	−0.6516	−0.3141
	(0.824)	(0.712)	(0.857)

to be continued on the next page

Table 15: Multinational tax planning, $DebtB_{ij}$ (continued)

LCF_j	−0.4736	−0.2773	−0.2234
	(0.187)	(0.210)	(0.312)
Observations	692	684	695
Log-likelihood	−260.81	−257.37	−262.49
Sensitivity	40.28 %	40.56 %	40.97 %
Specificity	95.99 %	95.93 %	96.19 %
%-pts improved	5.20	5.27	5.47

The table shows logit regressions with dependent variable $DebtB_{ij}$ based on Column (3) of Table 14. Independent variables are defined in Table 11. In Column (1), I controlled for a potential group tax regime. In Column (2), I tested if the financing decision is sensitive to the difference between acquirer- and target-country tax rates. In Column (3), I tested if the weighted average tax rate of the multinational group influences the financing decision. All specifications include acquirer-country, year- and industry-fixed effects. Standard errors are clustered on the acquirer-country-year level. P-values are shown in parentheses. * denotes significance at the 10 %-level, ** at the 5 %-level and *** at the 1 %-level.

Table 16: Logit analysis using $DebtB_{ij}$ - sensitivity analysis

	(1) Smaller	(2) Larger	(3) Low debt	(4) > 2 years	(5) Personal	(6) Domestic
$\phi\tau^{C}_{acq}$	−5.5476	24.5864*	6.3608	8.2872	13.2418**	15.6226
	(0.479)	(0.060)	(0.285)	(0.173)	(0.037)	(0.517)
τ^{D}_{acq}					7.1371	13.4875
					(0.260)	(0.217)
τ^{I}_{acq}					1.0128	1.9613
					(0.662)	(0.579)
Ln Deal value$_j$	0.1917	0.6612***	0.5391***	0.5655***	0.5637***	0.4963***
	(0.286)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Size$_i$	0.2869*	−0.1956	−0.1479	−0.1534*	−0.1430	−0.1578
	(0.084)	(0.183)	(0.152)	(0.088)	(0.114)	(0.298)
Initial debt$_i$	−0.4322	1.2996*	0.2482	0.3747	0.4524	1.0789
	(0.748)	(0.064)	(0.734)	(0.527)	(0.452)	(0.271)
Inflation$_{acq}$	−0.1177	0.1405	−0.1528	−0.0118	−0.0583	0.6162
	(0.632)	(0.407)	(0.461)	(0.938)	(0.694)	(0.298)
Domestic credit$_{acq}$	0.0048	0.0512***	0.0264***	0.0325***	0.0350***	0.0358*
	(0.833)	(0.001)	(0.005)	(0.000)	(0.001)	(0.055)
GDP growth$_{acq}$	−0.3601	0.1705	−0.1855	0.0588	0.0109	−0.2602
	(0.116)	(0.516)	(0.249)	(0.686)	(0.942)	(0.443)
Stock market$_{acq}$	−0.0508*	−0.0382*	−0.0220*	−0.0259**	−0.0197*	−0.0136
	(0.082)	(0.058)	(0.064)	(0.011)	(0.069)	(0.483)
Distress$_i$	0.0621	0.1996	−0.0305	0.0091	0.1149	−0.2271
	(0.885)	(0.287)	(0.894)	(0.959)	(0.512)	(0.430)
$D\&A_i$	−8.4067	6.5343	−2.2592	2.8066	1.6748	−14.2476
	(0.701)	(0.459)	(0.757)	(0.632)	(0.779)	(0.318)
$\Delta\, D\&A_i$	53.6644**	0.1712	−0.0302	3.4569	1.6105	12.8384
	(0.049)	(0.985)	(0.997)	(0.628)	(0.817)	(0.238)
Tangibility$_i$	0.6073	−2.2097*	−0.0129	−0.3560	0.0987	1.4122
	(0.760)	(0.074)	(0.988)	(0.680)	(0.910)	(0.545)
Δ *Tangibility*$_i$	−6.4542	−4.3606*	−3.8162	−3.9941*	−3.2783	0.1553
	(0.140)	(0.081)	(0.129)	(0.071)	(0.118)	(0.978)
Profitability$_i$	−3.7509	−4.3489	−2.4465	−2.0924	−3.1416	4.3903
	(0.608)	(0.317)	(0.441)	(0.446)	(0.246)	(0.292)
Δ *Profitability*$_i$	−14.3953	4.3538	0.0007	1.3988	0.5139	−0.6540
	(0.178)	(0.113)	(1.000)	(0.391)	(0.736)	(0.815)
LCF$_j$	0.1463	−0.0961	−0.0398	−0.1403	−0.1307	0.0082
	(0.725)	(0.781)	(0.884)	(0.556)	(0.576)	(0.987)
Observations	298	315	544	616	631	287
Log-likelihood	−92.36	−132.62	−214.11	−247.20	−256.39	−102.39
Sensitivity	31.11 %	61.54 %	46.83 %	46.90 %	45.64 %	46.67 %
Specificity	96.84 %	89.10 %	94.02 %	93.42 %	94.61 %	95.15 %
%-pts improved	2.01	13.02	6.25	6.01	6.65	5.93

The table shows logit regressions with dependent variable $DebtB_{ij}$ based on Column (4) in Table 14. Independent variables are defined in Table 11. Columns (1) and (2) split the sample into small and large deals. Column (3) restricts the sample to acquirers showing a pre-deal debt-to-asset ratio smaller then 75 %. In Column (4), all acquirer-countries with observations in less than 3 years are dropped. Column (5) introduces personal taxation into the analysis and Column (6) restricts the sample to acquirers that are independent or do not have a global ultimate owner abroad. All specifications include acquirer-country-, year- and industry-fixed effects. Standard errors are clustered on the acquirer-country-year level. P-values are shown in parentheses. * denotes significance at the 10 %-level, ** at the 5 %-level and *** at the 1 %-level.

Table 17: Logit analysis, $DebtB_{ij}$ - dichotomous tax variables

	(1)	(2)	(3)
Tax1	11.7085***		
	(0.005)		
Tax2		−0.6018	
		(0.494)	
Tax3			0.0703
			(0.933)
Ln Deal value$_j$	0.5073***	0.5038***	0.5049***
	(0.000)	(0.000)	(0.000)
Size$_i$	−0.1049	−0.1103	−0.1092
	(0.178)	(0.153)	(0.161)
Initial debt$_i$	0.8452	0.9519*	0.8196
	(0.119)	(0.070)	(0.126)
LCF_i	2.9552**	−0.7068**	−0.6179*
	(0.026)	(0.039)	(0.055)
Inflation$_{acq}$	−0.0239	0.0101	0.0068
	(0.868)	(0.940)	(0.959)
Domestic credit$_{acq}$	0.0289***	0.0276***	0.0279***
	(0.001)	(0.001)	(0.001)
GDP growth$_{acq}$	0.0695	0.1096	0.1126
	(0.564)	(0.361)	(0.351)
Stock market$_{acq}$	−0.0183**	−0.0222***	−0.0222***
	(0.022)	(0.007)	(0.008)
Distress$_i$	0.0196	0.0238	0.0218
	(0.900)	(0.877)	(0.888)
$D\&A_i$	−2.1055	−1.5879	−1.3586
	(0.730)	(0.791)	(0.815)
$\Delta\ D\&A_i$	6.9342	7.3258	6.2088
	(0.304)	(0.284)	(0.343)
Tangibility$_i$	0.6589	0.8795	0.7920
	(0.439)	(0.287)	(0.338)
Δ *Tangibility*$_i$	−3.5671**	−3.3761**	−3.6640**
	(0.039)	(0.048)	(0.037)
Profitability$_i$	−0.6664	−0.6887	−1.2279
	(0.719)	(0.715)	(0.515)
Δ *Profitability*$_i$	−0.1712	−0.0638	0.0877
	(0.904)	(0.964)	(0.950)
LCF_j	−0.2759	−0.2221	−0.2414
	(0.174)	(0.268)	(0.224)
Observations	844	844	830
Log-likelihood	−319.12	−321.64	−319.95
Sensitivity	39.31 %	36.42 %	36.42 %
Specificity	95.53 %	95.83 %	95.13 %
%-pts improved	4.50	4.15	3.73

The table shows logit regressions with dependent variable $DebtB_{ij}$ based on Column (3) of Table 14. Independent variables are defined in Table 11. Column (1) employs *Tax1*, Column (2) uses *Tax2* and Column (3) applies *Tax3* instead of $\phi\tau^C_{acq}$. All specifications include acquirer-country-, year- and industry-fixed effects. Standard errors are clustered on the acquirer-country-year level. P-values are shown in parentheses. * denotes significance at the 10 %-level, ** at the 5 %-level and *** at the 1 %-level.

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