

M&A, tax avoidance and group structures
- a tax-based analysis -

vorgelegt von

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1. INTRODUCTION

This dissertation mainly focuses on the decision to get involved in Mergers and Acquisitions and the following consequences. At its peak, in 2007, the value of cross border mergers and acquisitions exceeded the value of FDI greenfield investments and thus, accounted for more than half of foreign direct investment (FDI). As a consequence of the financial crisis, today this share was reduced to about one third, amounting to 349 bn Dollars in 2013.¹

Three separate papers are presented. The first two of these analyse tax-induced consequences of mergers and acquisitions, where the target firm is in the focus. It is analysed whether a tax advantage can be generated at the target firm, following an acquisition. If this is the case, acquisitions are favoured by the tax system and specifically those acquirers are favoured that are able to generate the highest tax advantages.

The first paper is titled 'tax avoidance as a driver of mergers and acquisitions', which is a joint research project with Martin Ruf (University of Tübingen), Christian Steffens (University of Mannheim) and Leslie Robinson (Tuck School of Business at Dartmouth). We find that following an acquisition a target firm's effective tax rate decreases significantly. This decline is even more pronounced when the acquiring firm is tax aggressive. This finding supports the hypothesis that acquiring firms are able to transport own tax characteristics to the target level. Furthermore, target firm profitability decreases after a deal. This effect is particularly strong in cross border acquisitions if targets' statutory tax rates are higher than the statutory tax rate of the acquirer.

This group of cross border deals with a clear preference of shifting profits away from the target firm, is analysed more deeply in the second paper. The paper is titled 'Effects of tax avoidance on real activity in the target country following

¹Source: UNCTAD (2014).

M&A'. The first paper shows that for this specific group of target firms profit shifting opportunities increase after the acquisition. Building on this result, I show that due to these new opportunities cost of capital decrease. A positive investment effect can be found in the target country. This positive effect is over-compensated by a negative shifting effect if the target country effectively restricts profit shifting via the manipulation of transfer prices. Target firms are found to shift real activity instead of pure profits if such a rule is in force.

Furthermore, I analyse whether tax rules in the acquiring firm's country of residence can abolish those tax incentives. For that purpose, worldwide tax systems and controlled foreign company rules (cfc) are considered. Both kinds of rules result in a different calculation formula, where the statutory tax rate in the home country determines the final tax burden instead of the subsidiary's statutory tax rate. While there is clear evidence given for the effect of cfc rules, concerning worldwide tax systems evidence is mixed.

The finding that credit systems cannot completely delete the tax advantage of profit shifting raises the question for possible reasons. Here, the third paper contributes to literature by analysing the adjustment of group structures to mitigate the negative effects of worldwide tax systems. The title of the third paper is 'Corporate Group Complexity in Territorial and Worldwide Countries'. This project bases on a common research idea with Christian Steffens (University of Mannheim) and Johannes Voget (University of Mannheim). Descriptively it can be shown that worldwide taxed groups structure foreign subsidiaries tax-optimally, concerning repatriation tax cost. Along the ownership chain, repatriation taxes and withholding taxes are avoided, up to the final repatriation to the home country of the group. Empirically there is given evidence that worldwide taxed groups are structured more complex. There is an additional holding company necessary, which stretches the ownership chain. This holding company

executes functions that commonly would be located at the group's headquarter and eases the deferral of foreign profits.

In the following, I will provide a brief overview over the relevant literature and the contributions of this dissertation. Then the databases, which I made use of, will be described and some figures on the initial samples will be presented. The core of this dissertation are three separate papers, which will be presented thereafter. Finally, I conclude with a general conclusion summarizing the most important results.

2. CONTRIBUTIONS TO EXISTING LITERATURE

Mergers and acquisitions and taxes

Dunning (1980) argues that foreign direct investment is motivated by ownership-specific advantages. A firm will only engage in foreign markets if there is a competitive advantage the firm can realize. Otherwise costly cross-border transactions and monitoring cost would be an inevitable drawback. The same is true regarding mergers and acquisitions. An acquisition will only take place if the acquirer can outbid the reservation price of the seller of the firm². Thus, the acquirer has to expect higher future cash flows than the seller would be able to generate.

There is a large empirical literature searching for sources of ownership advantages in case of mergers and acquisitions.

One strand of literature analyzes the effect of mergers and acquisitions on the operating performance of the merged firm, as reviewed by Martynova and Renneboog (2008). Despite a large number of analyses, there is no clear picture whether firms participating in mergers and acquisitions benefit, concerning their operating performance.

Another strand of literature attempts to identify specific sources of synergy gains. Ahuja and Katila (2001) document that a high knowledge base of a target firm can result in additional innovation output of the acquiring firm. This effect is especially pronounced if the knowledge bases are related, what is measured by the number of patents being in use in both firms before the acquisition. A review on studies which analyze synergy gains with respect to the demand for labor input is presented by Gugler and Yurtoglu (2004). Most studies find a reduction of the number of employees for the combined firm following mergers and

²Becker and Fuest (2010); Desai and Hines (2003).

acquisitions. Conducting a matching approach, Lehto and Böckermann (2008) find a decline in employment for manufacturing firms following cross-border acquisitions of up to 20 percent. Conyon et al. (2002) document a decline of 19 percent in case of related mergers and a less pronounced decline of 8 percent in case of unrelated mergers. These studies observe the effect on employment for the combined firm. For periods before the acquisition, employment numbers are added up for the single firms.

Auerbach and Reyshus (1988a) and Auerbach and Reyshus (1988b) are the first, who analyze tax factors as a possible motivation for mergers and acquisitions. They study the influence of loss carry forwards and excess tax credits on the decision to acquire a specific firm. They find no evidence for the relevance of the target firm's tax characteristics, but weak evidence for tax characteristics of the acquiring firm.

Devos et al. (2009) identify tax savings as a possible source for synergy gains. It is argued that a step up of the tax basis as well as interest tax shields can result in a tax advantage for the combined firm. Devos et al. (2009) find tax savings accounting for less than 17 percent of total synergies. Kaplan (1989) observes a sample of 76 management buyouts between the years 1980 and 1986. He analyzes the value of tax shields originating from an increasing use of debt or a step up of the tax basis. His results indicate that taxes can be a considerable source of wealth gains. These gains account for 21 to 140 percent of the premium the acquirer pays to pre-buyout shareholders. Blouin et al. (2005) examine changes in taxable income of U.S.-domiciled firms after their acquisition by foreign firms. They do not find evidence that international acquirers reduce taxable income more than domestic acquirers.

While taking the effective tax rate and profit shifting into account, the first two papers of this dissertation add a new source of possible tax gains to the existing literature. The first paper analyzes the change in tax avoidance at the target firm and differentiates for the three channels: Earnings management, debt shifting and transfer pricing. The second paper relates the profit shifting incentive to real effects at the level of the target firm.

The before mentioned literature examines the performance of mergers and acquisitions using financial data. I do not directly contribute to this literature. Nevertheless, it shall be mentioned that shareholder gains associated with mergers and acquisitions are also widely analyzed. A review over literature is provided by Jensen and Ruback (1983). Empirical evidence indicates large gains for shareholders of the target firm. Estimations for shareholders of the bidding firm show no clear picture. Hayn (1989) analyzes tax factors as a potential source for value gains. Her findings indicate that unused tax credits and loss carry forwards explain abnormal returns partially. Regarding asset deals, a step up of the tax basis is identified as an additional source for shareholder gains. Chow et al. (2013) show that acquisitions enhance the shareholder's value if tax aggressive acquirers acquire less aggressive target firms.

Real investment and taxes

Going back to the approach on cost of capital by Fullerton and King (1984), the influence of taxes on investment is well documented. Cost of capital denote a minimum rate of return, which is affordable to satisfy the requirements of investors. With an increasing tax burden for the investment, compared to a capital market investment, the required rate of return increases.³ As argued by Overesch (2009), profit shifting opportunities in multinational firms result in a lower tax burden and thus in reduced cost of capital in high tax countries. He

³Schreiber (2012), p. 640-645.

finds empirical evidence that inbound investments into Germany increase with a lower foreign owner's statutory tax rate. His results confirm the negative relation between profit shifting opportunities and cost of capital.

Literature also documents that international profit shifting decouples investment decisions from local tax rates. Indirect evidence is given by Grubert (2003). He finds that research and development intensive firms are more likely to invest in extremely high taxed and extremely low taxed locations. Direct evidence is found by Overesch and Schreiber (2010). For specific industries, which are characterized by a high volume of intra-firm transactions, results indicate that investments are completely tax-inelastic.

Egger et al. (2014) differentiate for tax-avoiding and non-avoiding firms, classified by an estimated ability to shift profits. His classification is based on variables explaining profit shifting opportunities. Such variables are the size of the firm, the tax-incentive to shift profits or the firm's affiliation to the research and development sector. They find that tax-avoiding firm's foreign investments show no reaction to the foreign tax rate at all. In contrast, the whole tax elasticity of foreign investment is attributed to firms without the ability to shift profits.

Based on these results, it must be expected that investment decisions depend on local tax rates if international profit shifting is restricted.

Most recently Buettner et al. (2014) test for the relation between the strictness of anti profit shifting regulations and foreign direct investment for a sample of German multinationals. They find that the existence of an interest deduction restriction in the subsidiary country results in a significant reduction of foreign direct investment. Furthermore, they find a higher tax-rate elasticity of foreign direct investment in a country if the deduction of interest payments is restricted.

This dissertation offers a very clean setting while comparing the same target firm as a purely domestic firm and after the acquisition as a member of a multinational group. This way, two effects can be related to each other: The positive investment effect and the negative shifting effect in case of a strict anti-tax avoidance regulation. Moreover, it is possible to include tax rules of the acquiring firm's country of residence into the analysis.

Group structures and the allocation of resources

The third paper contributes to literature explaining organizational structures of firms. According to Coase (1937) firms are a vehicle to reduce transaction cost. This is why specific functions are integrated into one firm. The coordination within a firm requires alternative instruments, other than the market price mechanism. Many researchers analyze whether the market price mechanism or the intra-firm process for decision making is superior.

Going back to Jensen and Meckling (1976), there is a broad interest for conflicts between shareholders and managers in the literature. Managerial behaviour must not necessarily be in line with shareholders' aims. Instead, there is some managerial discretion, where to allocate funds of the firm. This constitutes an expropriation risk for shareholders.⁴

Besides this general risk of expropriation, particular sources for information asymmetries are identified within a firm as well as between firms and shareholders.

According to Shin and Stulz (1998), the allocation of resources within diversified multi-segment firms depends less on traditional market indicators. Harris et al. (1982) highlight the importance of information asymmetries for diversified firms. For a panel of U.S. firms Rajan et al. (2000) confirm empirically that a high diversity of a firm is costly because investments are inefficiently allocated

⁴A literature review is provided in Shleifer and Vishny (1997).

between divisions. Berger and Ofek (1995) show that the value of diversified firms is about 15 percent less than a portfolio of matched single-segment firms. Morck et al. (1990) find that diversifying acquisitions result in a decrease in firm value.

The effect of decentralized decision-making processes within a firm is analyzed by Garicano (2000) and Bloom et al. (2012). Bloom et al. (2012) substantiate empirically that negative effects of a high decentralization can be overcome by an environment with high social capital ('trust').

Comparable to the literature on conglomerate diversification, Bodnar et al. (1999) argue that monitoring of managers is limited in complex, geographically diversified firms. Denis et al. (2002) analyze the effect of geographic diversification on firm values. They find that geographically diversified firms suffer a valuation discount of about equal size as multi-segment firms.

The monitoring of a firm also can be complicated by tax factors. Col and Errunza (2013) document lower abnormal returns for shareholders of firms involved in mergers and acquisitions if a tax haven company is participating. This effect is especially pronounced if the acquiring tax haven firm underlies a poor investor protection. Regarding management compensation, Black et al. (2014) show that compensation increases with the complexity of firms. However, this relation does not hold if complexity is equivalent to managerial discretion with a high risk of diversion of resources. Among other factors, the number of subsidiaries in tax havens specifies the scope of managerial discretion.

Desai and Dharmapala (2006) argue that tax sheltering eases the diversion of income. Thus, tax avoidance behaviour bears the risk of managerial diversion of firm's resources. Empirically they show that incentive compensation for managers and good governance of the firm weaken this relation. Desai et al. (2007)

argue that higher tax rates increase the risk of diversion by controlling shareholders⁵. Strong enforcement by tax authorities can be beneficial for outside shareholders. For a sample of Russian oil companies, they can show that a better tax enforcement results in higher valuations and lower control premia of firms.

The contribution of this dissertation is twofold: First, it is accounted for the length of ownership chains. This is another source for complexity, making monitoring more costly. The diversion of firm's resources is eased. Second, the system to avoid international double taxation is identified as a potential driver for firm complexity.

Tax influences on group structures

Moreover, this dissertation contributes to literature, dealing with tax drivers for group structures.

The decision, where to allocate the headquarter after a merger, is focused by Huizinga and Voget (2009). They find empirical evidence that international double taxation affects the choice, in which country to locate the headquarter of the combined firm. Firms aim to minimize the tax burden on dividend repatriations. The paper of Huizinga and Voget (2009) uses a setting, where firms have to decide between one or the other location. There is also literature on the general motivation for headquarter relocations.

Voget (2011) finds an increasing probability for relocations if repatriation taxes are raised by the home country. In the U.S., waves of corporate inversions are documented, in which U.S. firms initiate mergers to relocate their headquarters. Desai and Hines (2002) examine corporate inversions for a sample of 24 U.S. firms taking place in the years 1982 to 2002. Their findings suggest that inversions are motivated by tax savings on non-U.S. income.⁶ Seida and Wempe

⁵In their model, the expropriation of minority shareholders goes along with tax evasion.

⁶Besides, there exists literature examining effects on firm value by inversions, as done by e.g. Cloyd et al. (2003).

(2004) document a substantial decline in ETRs for firms after inversions.

The decision, where to locate subsidiaries, is considered by Buettner and Ruf (2007). They find effects for the statutory tax rate, the market size and labor cost. These factors have influence on the decision whether to establish a subsidiary in a specific country. Barrios et al. (2012) show that repatriation taxes in the parent country have a negative effect on the probability to establish a subsidiary in a specific host country. Dyreng et al. (2011) argue that decisions on the location of subsidiaries are not independent. They observe country pairs that appear particularly often. These unexpectedly frequent pairs are explained by interdependent tax characteristics, as for example bilateral treaties or mean tax burdens.

While the before mentioned literature explains the establishment of subsidiaries in specific countries, there are some other surveys differentiating for functions of single subsidiaries within ownership chains.

Mintz and Weichenrieder (2010) analyze a dataset of subsidiaries held by German parent firms in the year 2002, using a cross-section regression. For profitable firms, they find a positive relation between taxes withheld in the country of the subsidiary for dividend repatriations and the probability that the subsidiary is held via a conduit entity. This result is confirmed for the inbound case. They find mixed evidence for credit systems resulting in a higher probability of indirect holdings. Their result, that higher repatriation taxes in the home country reduce the probability of an indirect holding, contradicts expectations.

Dreßler (2012) uses a panel data set for the years 1996 to 2008 to analyze drivers for ownership structures. Concerning the influence of withholding taxes, he finds mixed evidence.

For a sample of U.S. outbound subsidiaries, Lewellen and Robinson (2013) analyze

characteristics of holding firms. Concerning tax variables, they find that firms located in tax havens are more likely to be a holding company. The probability to be used as a holding company decreases if the firm underlies worldwide taxation or a controlled foreign company rule. Analyzing ownership links, they find that predominantly specific repatriation strategies are enabled⁷. High withholding taxes make a combination of two countries more unlikely, while the existence of a tax treaty promotes the specific linkage.

The contribution of the third paper is twofold: First, the panel character of the dataset is used to measure variation over time instead of cross-country variation. Observing group structures for the years 2005 and 2012 allows to analyze changes in the regime to avoid international double taxation. Thus, a specific setting is chosen to estimate the effect of repatriation tax cost, including withholding taxes, as well as taxes raised by the home country. Second, it is accounted for the full length of the ownership chain, instead of a classification into directly and indirectly held subsidiaries. Counting the absolute number of holding companies allows to test whether group structures become more complex for tax reasons.

⁷For a discussion of different repatriation strategies please see Altshuler and Grubert (2003).

3. DATABASES

As usual for empirical analyses, the core of this dissertation is the underlying data. The following three papers base on three different databases, which shall be discussed briefly.

M&A transactions are identified using the Zephyr database, provided by Bureau van Dijk. This database contains information on the target, the seller and the acquirer, as well as deal certain characteristics – e.g. dates the deal is announced and completed, the acquired stake and the value of the deal. Zephyr has a worldwide coverage. Tables 3.1 and 3.2 contain numbers of deals for the 10 most frequent target firm’s and acquiring firm’s countries of residence.

Table 3.1: Zephyr database: Origins of target firms

Country	Frequency
United States	15,810
Great Britain	12,112
France	3,092
Germany	2,356
Netherlands	2,235
Canada	2,097
Spain	1,378
Russia	1,289
Sweden	1,120
Finland	1,034

Countries of residence of target firms. Source: Zephyr database, 2010.

Table 3.2: Zephyr database: Origins of acquiring firms

Country	Frequency
United States	14,356
Great Britain	8,931
France	2,313
Netherlands	1,783
Canada	1,666
Germany	1,615
Spain	1,050
Finland	977
Sweden	975
Russia	751

Countries of residence of acquiring firms. Source: Zephyr database, 2010.

As can be seen, the list of countries for target firms as well as acquiring firms only differs in the sort order. This is mainly explained by the fact that 72 percent of deals are reported as domestic, where the acquiring firm and the target firm are resident in the same country. I verified by hand that Zephyr usually identifies the immediate acquirer. Thus, in case of an acquisition by a holding company, this holding company will be reported and not the ultimate owner of the group. Domestic and cross-border deals can be differentiated based on the countries of residence of the target firm, the acquirer and the seller of the firm. This information alone will be imprecise in many cases. Additionally ownership data will be used, provided by the Amadeus database. Deals, where the target firm and the acquirer are resident in the same country, are also classified as cross-border if any subsidiary or owner of the acquiring firm is resident in a third country.

Information extracted from the Zephyr database is matched to the Amadeus Financials database, provided by Bureau van Dijk. The Amadeus database contains information on firm's balance sheets and profit and loss accounts. Furthermore, information is available on industry-classifications, firm's activity and legal form. In all three papers, the sample is reduced to corporations. In the context of mergers and acquisitions, only corporations guarantee that a step up of the tax basis does not influence financial parameters. Regarding group structures, the relevant tax planning strategies are based on the separation principle, which applies for corporations⁸.

The Amadeus database covers only European countries. Overall, the download for the years 1996-2009 contains 1,372,755 different firms with 7,048,992 observations, offering unconsolidated data for all dependent variables used in this dissertation⁹. Table 3.3 contains the frequencies per year. Numbers of observations steadily increase over time. This is mainly caused by better data collection and better data availability in later years¹⁰.

Table 3.3: Amadeus database: Frequencies by year

Year	Frequency
1996	3,728
1997	6,671
1998	17,824
1999	44,379

Continued on next page

⁸E.g. tax deferral depends on the delay of home country taxation on repatriated earnings, which is only given for corporations.

⁹These are: The effective tax rate, profitability, leverage, the number of employees and total assets. In fact, the sample is reduced further in each paper, as additional control variables are afforded. Moreover, information is required for a certain time period before and after acquisitions.

¹⁰For the validity of the data, this would only result in a bias if newly observed firms differ systematically from old firms in the variables of interest. It is generally assumed that this is not the case.

Table 3.3: Amadeus database: Frequencies by year

Year	Frequency
2000	206,482
2001	436,670
2002	516,748
2003	627,727
2004	666,240
2005	695,359
2006	849,537
2007	930,251
2008	1,007,674
2009	1,039,702

Numbers of observations by year. Source: Amadeus database, 2010.

Table 3.4 describes the regional distribution of the database. Unlike the Zephyr database, the Amadeus database covers especially well southern and eastern European countries. This is explained by higher disclosure requirements in these countries. The different distribution results in a large loss of observations after merging both datasets.

Table 3.4: Amadeus database: Regional covering

Country	Frequency
Spain	1,356,147
Russia	1,179,583
Italy	982,640

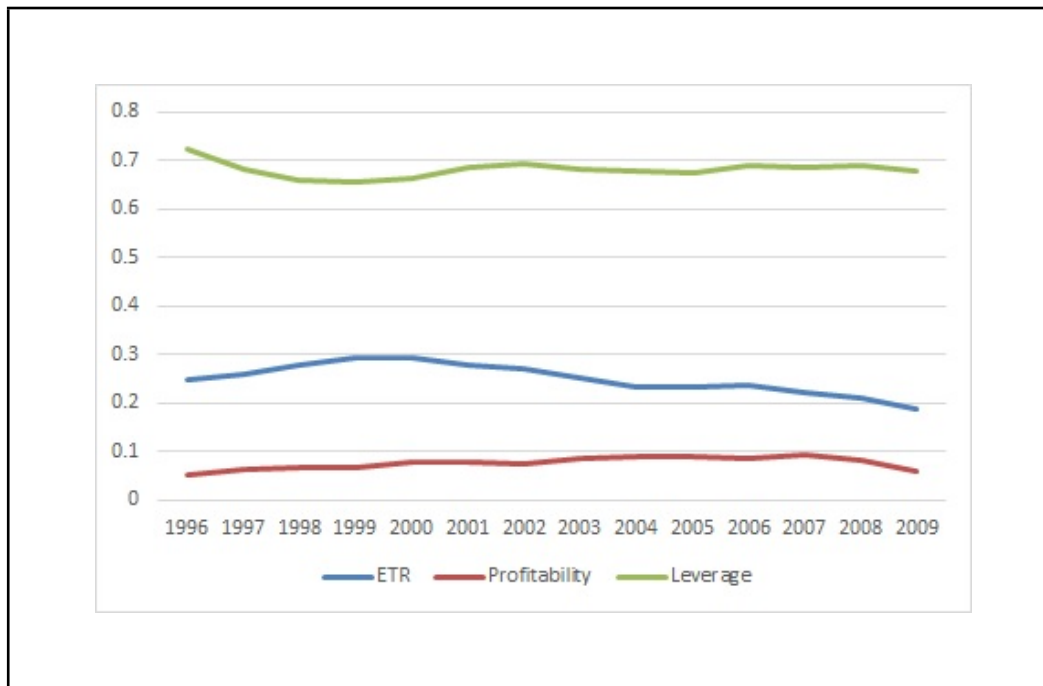
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Table 3.4: Amadeus database: Regional covering

Country	Frequency
France	517,140
Sweden	433,782
Romania	327,298
Ukraine	308,891
Great Britain	259,785
Belgium	256,051
Czech Republic	172,221

Numbers of observations by country of residence. The 10 most frequent countries are listed. Source: Amadeus database, 2010.

FIGURE 3.1. ETR, profitability and leverage over time



The following figures will provide an overview of the economic environment in the full sample. For brevity, only the main variables being used in the following three papers will be considered. Figure 3.1 shows the evolution of the effective tax rate (ETR), leverage and profitability over time. Effective tax rates fall from 29 percent in 1999 to about 20 percent in 2009¹¹. This trend reflects well cuts in corporate tax rates within this period. Leverage and profitability vary little from the year 2000 onwards¹².

¹¹The ETR is calculated as taxes paid over profit/loss before tax. Values less than 0 and above 1 are truncated to 0 and 1.

¹²Leverage is calculated as total debt over total assets. Profitability is calculated as earnings before interest and taxes over total assets. Variables are winsorized at 1 percent to control for outliers.

FIGURE 3.2. ETR, profitability and leverage over time - target firms

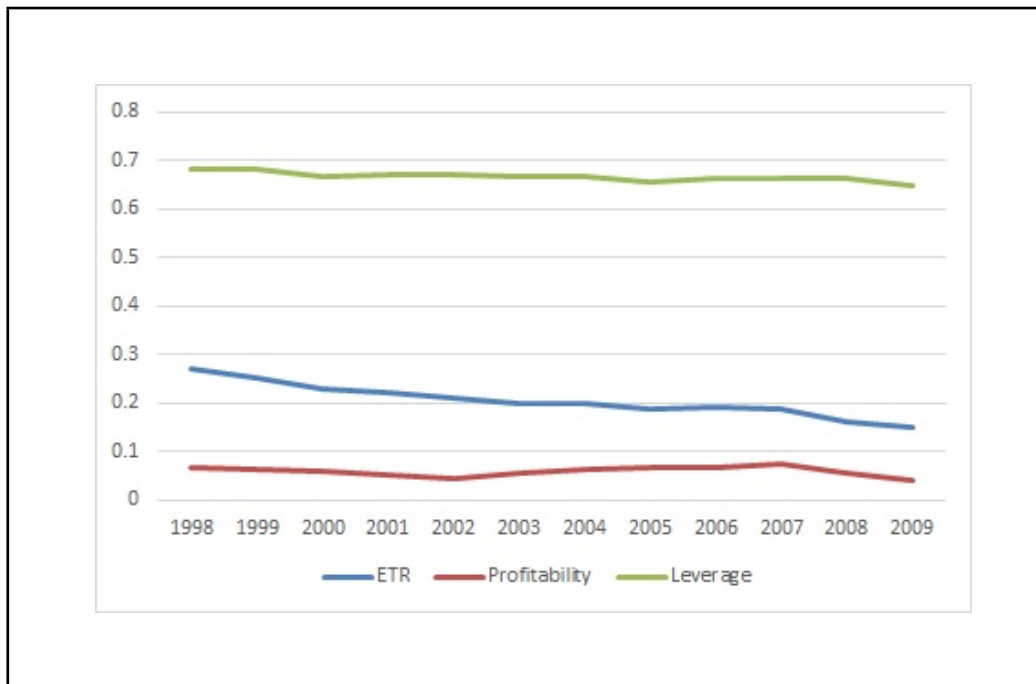


Figure 3.2 displays the evolution of the ETR, leverage and profitability for target firms¹³. The target firm's effective tax rate shows a stronger decrease compared to the whole sample. This gives a first hint for a higher level of target firm's tax avoidance following the acquisition. The time trends for the target firm's profitability and leverage are quite comparable to the whole sample. Altogether, target firms show a slightly lower profitability and leverage than the whole sample.

Figure 3.3 illustrates the evolution of the number of employees and total assets over time. Both variables show an increasing time trend. Between 1996 and 2009, the mean number of employees increases by about 60 percent from 32 employees per firm to a mean value of 53 employees. The same trend can be observed for total assets. Mean total assets increase by about 60 percent, from 7.26 million USD to 11.6 million USD.

¹³Only years with more than 100 observations are shown.

FIGURE 3.3. Number of employees and total assets over time

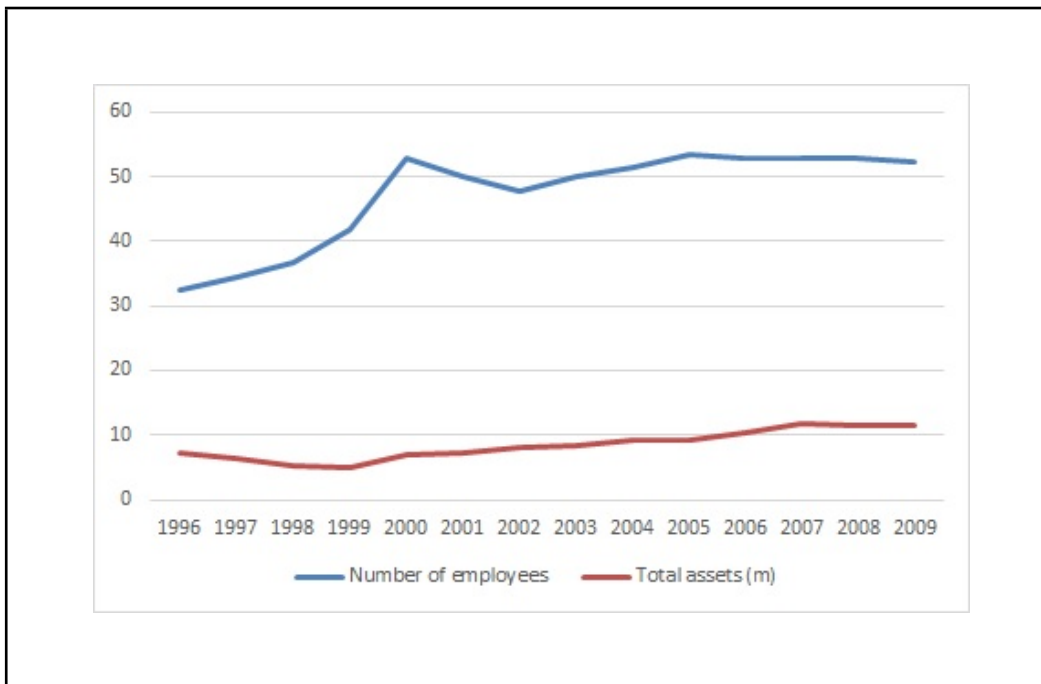


FIGURE 3.4. Number of employees and total assets over time - target firms

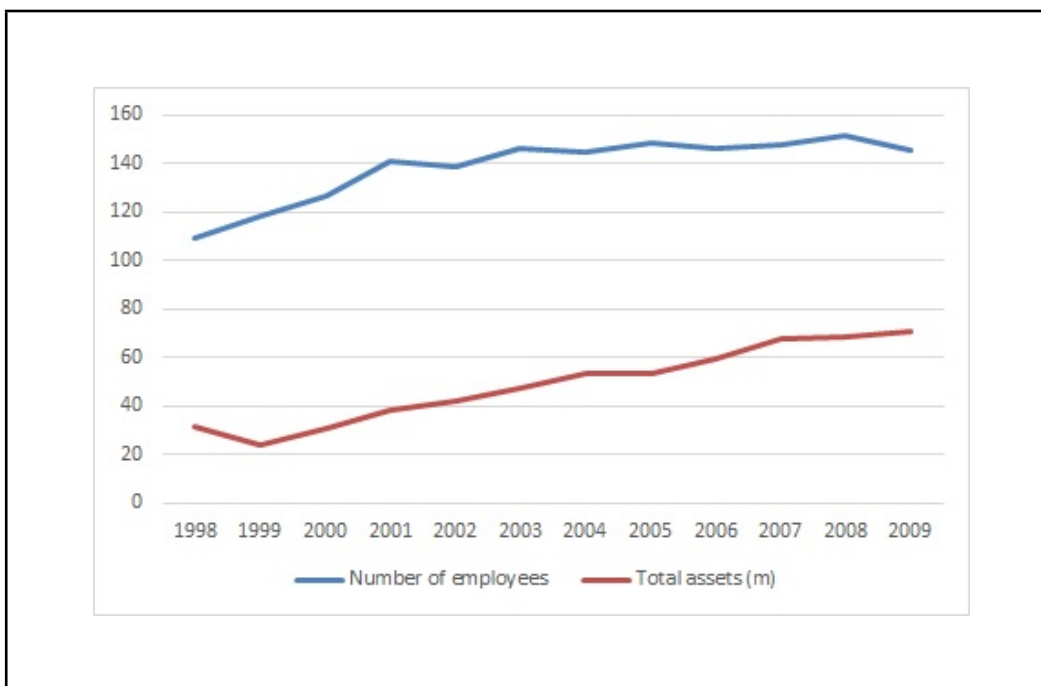


Figure 3.4 draws graphs for the mean number of employees and total assets for target firms. Both graphs show the same increasing trend as the whole sample. Target firms have a noticeably higher number of employees and a higher level of total assets than the mean firm in the full sample. This finding indicates that predominantly more mature firms are acquired.

Overall, target firms show time trends comparable to the full sample. Nevertheless, there exists a large variation between firms. The first and the second paper aim to identify systematic differences in the development of target firms, following their acquisition. In many acquisitions, tax factors will be of secondary importance. Despite, it can be shown that tax factors have explanatory power and will improve the understanding of causes and consequences for mergers and acquisitions.

Corporate group structures are analyzed using ownership data of the Orbis database, which is provided by Bureau van Dijk. This database contains information on subsidiaries as well as owners of firms. Based on this information, the complete ownership structure of groups can be reconstructed. The chain of ownership is observable for each subsidiary as well as the width of the group.

Ownership data is only provided for the recent year. For this reason, access to older data is limited. Data is used for the years 2012 and 2005, in this dissertation.

In 2005 the maximum length of a cross-border ownership chain is 9 entities, meaning that 7 holding companies are interposed between the ultimate owner and the lowest subsidiary. 44.5 percent of subsidiaries are held directly by the ultimate owner. Most holding companies are country holdings. Only 12 percent of subsidiaries are connected to the ultimate owner via at least one holding company in a third-country. For maximum, holding companies in 3 different third-countries are included in an ownership chain. 35 percent of groups have only one ownership chain. The widest group shows 89 different ownership chains. On average, a group has 3 ownership chains.

In 2012, the longest ownership chain contains 12 holding companies. 50 percent of subsidiaries are held directly by the ultimate owner. 11 percent of subsidiaries are connected via third-country holding companies. In 2012, 40 percent of groups have only one ownership chain. The widest group has 110 different ownership chains. The median group has 2 ownership chains.

Between 2005 and 2012, the number of groups with at least one subsidiary in a tax-haven country, increased from 9.2 to 13.5 percent¹⁴.

So far, only foreign subsidiaries were considered. Domestic structures are much wider. The median group has 11 purely domestic ownership chains. Thus, domestic operations are much more likely to be split up into different subsidiaries¹⁵.

These numbers show that there is variation in ownership structures over time. The third paper aims to explain this variation by tax factors. Even if there are many other factors impacting group structures, taxes are a highly significant factor.

¹⁴The definition of tax-haven countries is based on the country list in Hines and Rice (1994).

¹⁵Dreßler (2012) explains this finding by group taxation regimes, which enable to net income over different entities.

4. TAX AVOIDANCE AS A DRIVER OF MERGERS AND ACQUISITIONS?

Tax avoidance as a driver of mergers and acquisitions?¹⁶

¹⁶This paper is a joint research project with Martin Ruf (University of Tübingen), Christian Steffens (University of Mannheim) and Leslie Robinson (Tuck School of Business at Dartmouth).

4.1. **Introduction.** Mergers and acquisitions are an increasingly important form of business investment. The value of cross-border deals rose by 53 percent in 2011 to \$ 526 billion, compared to cross-border Greenfield investment projects valued at \$ 904 billion during that same year (UNCTAD (2012)). Thus, understanding the drivers of mergers and acquisitions is a key part of understanding the drivers of business investment in general.

Mergers and acquisitions take place primarily because of 'ownership advantages'. Ownership advantages arise when a change in ownership of the target firm is expected to provide a source of value creation, either by increasing the target's expected future cash flows or decreasing risk. For instance, the acquirer may believe that it is able to manage the target better than the seller. Such ownership advantages are expected to improve future cash flows, enabling the acquirer to outbid the reservation price of the initial owner and increase the likelihood that the deal takes place.

There are many possible sources of ownership advantages. While there is an extensive literature on the change in operating performance following mergers and acquisitions (see Martynova and Renneboog (2008) for a survey), the potential importance of tax management has been ignored. Lowering the target firm's tax burden is one important way that an acquiring firm can generate ownership advantages. The average firm-level effective tax rate in our sample is around 34 percent, suggesting governments lay claim to one third of pre-tax profits. If the acquirer believes it is able to minimize the target's taxes more efficiently than the initial owner, it will expect to generate a higher after-tax cash flow.

We investigate changes in the tax avoidance of targets in a sample of European mergers and acquisitions taking place between 1996 and 2009, using propensity score matching to estimate the average treatment effect. As a unique feature of our analysis we observe operating and financial data of the 'stand-alone' target firm before and after the deal by using unconsolidated accounting data. Since

we focus on European mergers and acquisitions the new tax basis of the corporation's assets post-acquisition is identical to the tax basis of the corporation's assets pre-acquisition. A step-up in the acquired assets is impossible and cannot bias our results. This is not true in the United States, since the Section 338 election allows to treat share deals as taxable asset purchases resulting in a step up. However, regulations comparable to Section 338 are not available in any of the countries we consider in our sample.

Specifically, we compare three indicators of tax avoidance at the target - effective tax rate, profitability, and leverage - before and after the deal. Our results generally show that target tax avoidance improves, resulting in lower tax payments post deal. Thus, more efficient tax management by acquirers could be a driver of mergers and acquisitions.

We first examine the potential role of acquirers in target tax avoidance following both national (acquirer and target are resident in the same country) and international (acquirer and target are resident in a different country) deals. The indicator of tax avoidance that we examine is the target firm's (accounting) effective tax rate (ETR), or tax expense divided by pre-tax income. This measure reflects tax management that generates permanent book-tax differences in the target firm.¹⁷ We find an average decrease in a target's ETR post-deal of 3 percentage points. Moreover, this decrease is especially pronounced - around 8 percentage points - following deals by tax aggressive acquirers having themselves a relatively low ETR. Thus, acquirers appear to play a significant role in determining the level of tax avoidance that a target undertakes once it becomes part of the group.

We also examine the potential role of acquirers in target tax avoidance that is only possible following international deals. While reductions in a target firm's ETR

¹⁷Permanent differences arise when a transaction affects taxable income but not book income, or vice versa. A favorable tax planning strategy would be one that lowers taxable income without lowering book income.

imply more efficient tax management at the target firm by the acquirer, ownership advantages also arise if the target firm enjoys new opportunities to reduce its tax burden by being part of a multinational group. We examine two prominent international tax planning strategies - transfer pricing and debt shifting. Here, we do not focus on the target firm's ETR because these strategies would not impact such a measure.¹⁸

To examine the use of transfer pricing, we investigate changes in target profitability. Consistent with Ravenscraft and Scherer (1989) and Clark and Ofek (1994) we find a decrease in target profitability post deal in general. Splitting the sample between high tax and low tax targets (targets facing a higher or lower statutory tax rate than the acquirer, respectively), we find a decrease in profitability only in high tax targets. This result points to international tax planning (i.e., transfer pricing) by the acquirer contributing to the observed decrease in target profitability following mergers and acquisitions.

To examine the use of debt shifting, we investigate changes in target leverage. While we do not find a significant change in target leverage post deal, we find empirical evidence consistent with use of 'debt push-down' strategies being the possible reason for this finding. In countries offering group taxation, a promising tax strategy related to mergers and acquisitions is to load a holding company with debt in order to acquire the target. As a result, the leverage of the holding company increases, while the leverage of the target remains unchanged. Group taxation then allows for consolidation when computing taxable income such that the interest expense of the holding company offsets the earnings of the target (see Section 4.4.3 for further discussion).¹⁹

¹⁸If a multinational firm uses transfer prices or debt shifting to re-allocate target profits to other members of the group, this affects both the target's book and taxable income. While these strategies may impact the consolidated ETR of the multinational firm, they will not impact the individual target firm's ETR.

¹⁹See "Kastljós: Álverin koma sér hjá skattgreiðslum" by Helgi Seljan, Icelandic National Television Commentary, March 2013, for a discussion of this strategy in Iceland by large U.S. multinational firms.

Our study is related to three distinct strands of literature. First, there is a growing literature that considers the role of tax avoidance in mergers and acquisitions.²⁰ Kaplan (1989) and Devos et al. (2009) estimate the extent to which tax savings are responsible for merger gains. Blouin et al. (2005) examine changes in taxable income of U.S.-domiciled firms after being acquired by foreign firms. Martin et al. (2012) examine the link between target tax aggressiveness and acquisition premiums. Chow et al. (2013) and Col and Errunza (2013) examine announcement returns of targets and acquirers to determine whether anticipated (future) tax avoidance is an underlying source of merger gains. These last two studies are most closely related to ours, though neither study examines the precise channel through which tax avoidance occurs post-deal. Our study documents increased tax avoidance of targets post deal with respect to the target's ETR and international profit shifting.

Second, there is extensive literature evaluating the operating performance following mergers and acquisitions as reviewed in Martynova and Renneboog (2008). The empirical evidence is mixed – 14 out of 26 studies report a post-merger decline in the operating returns of merged firms, 7 papers show insignificant changes in profitability and only 5 papers provide evidence of a significantly positive increase. Only two studies – Ravenscraft and Scherer (1989) and Clark and Ofek (1994) – focus on the post-merger operating performance of the target as we do. We find a decrease in target operating performance following takeovers (consistent with their results) and provide tax motivated transfer pricing as a partial explanation for this finding.

Third, there is a large literature on tax planning, e.g. Chen et al. (2010) with respect to ETRs, Desai et al. (2004) with respect to international debt shifting and Huizinga and Laeven (2008) for international transfer pricing. We contribute

²⁰There is also a literature that considers taxes as a source of value creation in mergers and acquisitions, however, it focuses on taxes at the transaction-level (e.g., Auerbach and Reyshus (1988b); Erickson, 1998).

to this literature by using mergers and acquisitions as a new setting in which to identify tax motivated international profit and debt shifting.

Our study points to the economic importance of tax avoidance as a driver of mergers and acquisitions. Aside from improving a firm's after-tax profit, effective tax management may be important for a firm looking to prevent a hostile takeover. Potential acquirers with more efficient tax management may be able to competitively bid for target firms. Our results also give rise to tax policy concerns. If some types of tax avoidance are only available to multinational groups (e.g., transfer pricing), then international acquirers may enjoy an exclusive ownership advantage with respect to national targets. As a result tax systems could force national firms in international takeovers.

Section 4.2 develops testable hypotheses. Section 4.3 describes the empirical methodology and the data. Section 4.4 presents empirical results. Section 4.5 concludes.

4.2. Tax avoidance as a driver of mergers and acquisitions. The initial owner of a firm will sell the firm if the offer price exceeds his reservation price (see Hansen (1987)). The initial owner's reservation price is equal to the capitalized earnings value $\frac{x}{r}$ of the expected cash x from keeping the firm, where r is the discount rate. The expected cash x^* of a potential acquirer may differ due to non-tax reasons (e.g. synergies, see Weston et al. (2004), pp. 130, for potential non tax reasons of such differences) or due to tax reasons. Regardless of the reasons, if a potential acquirer expects to generate a greater cash flow from owning the firm than the initial owner ($x^* > x$) he has an ownership advantage (see Becker and Fuest (2010); Desai and Hines (2003)). The resulting capitalized earnings value of the acquirer is $\frac{x^*}{r}$, the maximum offer price the acquirer is willing to bid. If a potential acquirer has an ownership advantage the offer price of the acquirer

exceeds the reservation price of the initial owner, implying that the deal will take place when $\frac{x^*}{r} > \frac{x}{r}$.

There are several economically significant tax reasons that a potential acquirer would expect higher cash flows than those generated by the initial owner. First, both national and international deals may provide an acquirer with the ability to lower a target's ETR through more effective tax management at the level of the target itself. Second, in the case of international deals, an acquirer may be able to re-allocate the income of a target facing a relatively high tax rate to another member of the multinational group where the income is taxed at a lower rate. This is typically accomplished through transfer pricing or debt shifting. We next describe each measure of tax avoidance in turn.

4.2.1. *Effective Tax Rate (ETR)*. Accounting ETRs are widely employed to measure the tax avoidance of firms (see summary provided in Hanlon and Heitzman (2010) and as examples the studies of Chen et al. (2010); Dyreng et al. (2010); Phillips (2003); Rego (2003); Mills et al. (1998)).²¹ An accounting ETR is impacted by tax planning strategies that generate permanent book-tax differences. Examples (see Chen et al. (2010)) of such tax planning are investments in tax-exempt or tax-favored assets, participation in tax shelters that give rise to losses for tax purposes but not for book purposes, the use of tax credits or the use of favorable depreciation schemes available for tax purposes only. Scholes et al. (2009), pp. 39-40, provide a comprehensive overview of possible book-tax differences. Moreover, we rely on a three-period average measure to mitigate the effects of transitory changes in annual ETRs.²² Such tax avoidance is possible

²¹Our ETR measure comes from Amadeus (see Section 3.1 for a discussion of our data source) and is defined as tax expense (TAXA) divided by pre-tax book income (PLBT).

²²DyrengHanlonMaydew2008 and Klassen and LapLante (2012) recognize that multi-year measures of ETRs are an improvement over single year measures. We settle on a three-year measure in our study to avoid a significant reduction in our sample size though, in some analyses, those authors consider longer periods.

for national as well as multinational firms. If a target's tax avoidance improves after an acquisition, we expect to observe a drop in the target's ETR.

If the target's effective tax rate ETR^* post-deal is lower than the target's ETR pre-acquisition, and a potential acquirer and initial owner are equally capable of generating the same pre-tax book income (denoted BI) at the level of the target, then the expected after-tax cash flow for a potential acquirer is $x^* = (1 - ETR^*)BI$ and for the initial owner is $x = (1 - ETR)BI$. Due to the lower ETR ($ETR^* < ETR$) the deal will take place because $\frac{x^*}{r} = \frac{(1-ETR^*)BI}{r} > \frac{x}{r} = \frac{(1-ETR)BI}{r}$. Empirically, if we find a lower target ETR post deal, then improved target tax avoidance by the acquirer could be a driver of the deal.

Moreover, acquiring firms differ in their tax aggressiveness. Since acquirers will benefit from their tax planning experience when restructuring the target's affairs in a tax efficient manner²³, we expect to observe a larger decrease in a target's ETR following acquisitions by tax aggressive acquirers. We thus differentiate acquirers with respect to their ETR pre-acquisition. We consider acquirers having an ETR below the country specific sample average as especially tax aggressive.

4.2.2. *Transfer pricing.* The ability to set transfer prices on intra-firm trade provides multinational firms with flexibility as to how to allocate income across national jurisdictions imposing different tax rates (see Huizinga and Laeven (2008)). The possibilities to shift profits potentially increase substantially following an international deal.²⁴ For instance, firms can alter prices charged on intragroup services or deliveries, or even create new intragroup services or deliveries. There is no data available on intragroup services and deliveries, or their pricing in Amadeus.

²³The argument in Dyreng et al. (2010), that top executives have effects on their firms' tax avoidance, is similar. Also see Chow et al. (2013), Col and Errunza (2013).

²⁴We recognize there may be opportunities to shift profits after a national deal in order to take advantage of various *sub national* rates. However, profit shifting is a significant source of tax savings in multinational firms, and hence, more likely to motivate an international deal.

So, we follow the literature on tax-motivated transfer pricing and relate a firm's profitability to its tax incentives to shift income via transfer pricing.

Profit shifting generates tax savings when income is shifted from high-tax locations to low-tax locations. International deals offer the possibility to shift profits out of the target's taxing jurisdiction for the first time. The resulting tax savings of the acquirer may constitute the ownership advantage necessary to acquire the target. The target's book income is reduced by profits shifted away (PS), while the book income of another multinational group member offering a lower tax rate τ^{ps} is increased. If the resulting new capitalized earnings value of the firm is higher than the reservation price, the deal takes place ($\frac{x^*}{r} = \frac{(1-\tau)(BI-PS)+(1-\tau^{ps})PS}{r} > \frac{x}{r}$).

First, we compare the effect of national versus international takeovers on a target's profitability. In order to separate changes in target profitability arising from transfer pricing (as opposed to debt shifting), we focus on profitability defined as earnings *before interest* and taxes (EBIT) over total assets (see Huizinga and Laeven (2008)). If the opportunity to shift profits out of the target motivated the deal, we expect to observe a decrease in the target's profitability. This decrease should be especially pronounced following international deals.

Next, we differentiate with respect to the statutory tax rate of the acquirer versus the target. If the acquirer faces a lower statutory tax rate than the target, we expect a decrease in target profitability (if instead the target's tax rate is lower, the acquirer may locate additional profits which would increase target profitability). We also examine whether target profitability decreases when any member of the acquirer's multinational group (and hence new group of the target) faces a lower statutory rate than the target.

4.2.3. *Debt Shifting.* Firm owners may choose to finance their operations with either debt or equity. For tax purposes dividends paid on equity in general do not lower taxable income, while interest paid on debt is tax deductible. From

the tax perspective of the debtor, greater interest payments would be expected to reduce its tax burden. Thus, the use of debt finance at the level of the target as a debtor is tax advantageous (see Huizinga et al. (2008)).

On the contrary this conclusion may reverse at the level of the creditor. Taxes due on dividend earnings at the level of the firm owner are frequently lower than taxes due on interest earnings. Overall the use of debt finance is thus only a worthwhile policy, if the tax rate on the resulting interest earnings is sufficiently low or even zero.

Internally²⁵ debt financing a target will not result in a lower ETR but instead in a reduction of book income and an increase in interest income II available to the firm owner. If the tax rate on interest income τ^i at the level of the creditor is lower than the firm's statutory tax rate²⁶ τ , the tax load on the firm's earnings decreases and the resulting new capitalized earnings value of the target is $\frac{(1-\tau)(BI-II)+(1-\tau^i)II}{r}$. If the new capitalized earnings value of the firm exceeds the reservation price of the initial owner ($\frac{x^*}{r} = \frac{(1-\tau)(BI-II)+(1-\tau^i)II}{r} > \frac{x}{r}$), the deal will take place.

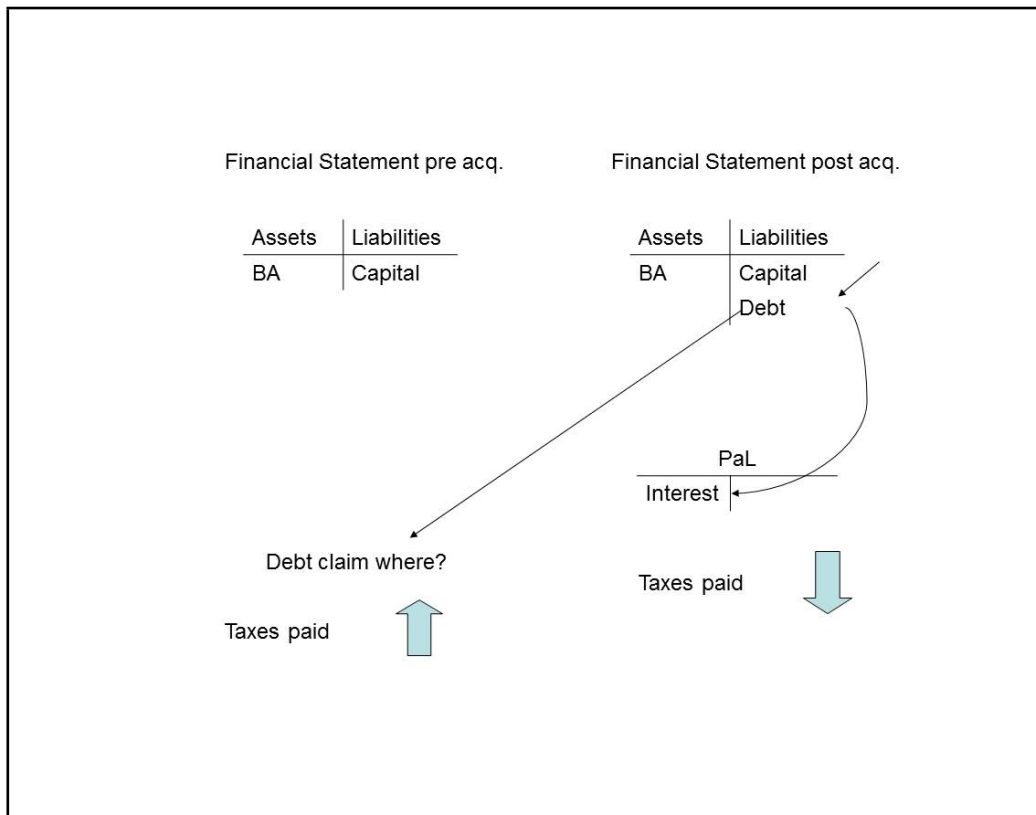
In a domestic setting the available tax rate on interest income typically is not lower than the corporate tax rate. On the contrary multinational groups benefit from the set of available corporate tax rates worldwide in establishing group members in low tax countries (see Huizinga et al. (2008)), including many zero taxed tax havens (see Hines and Rice (1994)). Figure 4.1 illustrates the argument.

If a firm uses debt instead of equity to finance its operations, the resulting interest expenses will affect book as well as taxable income. Thus nominator and

²⁵It is easier to illustrate the argument relying on internal debt finance. However, using external debt financing gives similar results: Replacing equity with external debt finance in the target allows the acquirer to use the released equity in a tax-favored location instead. This results in similar tax savings.

²⁶To simplify the argument we assume that book income is equal to taxable income. We can thus use the firm's statutory tax rate (which is relevant for debt and profit shifting incentives) in the formulas instead of the ETR.

FIGURE 4.1. Debt shifting



denominator of the ETR are likewise affected. The ETR will not or at least incompletely reflect the use of debt finance. Instead we investigate this issue considering the change in a target's leverage (total debt over total assets) following an acquisition.

If a target's tax avoidance improves after an acquisition, we expect to observe an increase in the target's leverage. This increase should be more pronounced following international mergers and acquisitions. Then a purely national target without the opportunity to debt shift income to group members in low tax countries becomes part of a multinational group due to the acquisition. Within the group of international mergers & acquisitions we expect to observe an especially

pronounced increase in the target leverage, if the acquirer or any group member of the acquirer's multinational group has a lower tax rate than the target.

The latter two channels for tax avoidance following an international deal may give rise to tax policy concerns. Since in most cases purely national firms or groups can neither use debt shifting nor transfer pricing to significantly lower their tax burden (or the costs of doing so are prohibitively high), international acquirers have a systematic tax driven ownership advantage allowing them to acquire such targets. This may contribute to the empirical finding of multinational networks trading at a premium relative to a benchmark portfolio of purely national firms (see Creal et al. (2013)).

4.3. Empirical Analysis.

4.3.1. *Data.* We extract all mergers and acquisitions taking place between 1996 and 2009 from the Bureau van Dijk Zephyr database that result in a 100 percent ownership change in the target firm. We then merge the resulting targets with the Bureau van Dijk Amadeus database containing unconsolidated financial data for European firms, allowing us to evaluate changes in the target's ETR, profitability and leverage both before and after the deal.

We then delete targets with unlimited liability, since such firms are typically organized as partnerships, leaving as our focus target corporations only. Pursuant to an acquisition a partnership's assets may be stepped up resulting in higher depreciation and lower tax payments, possibly distorting our results (see Erickson and Wang (2000)). In the United States it is possible to structure an acquisition as an asset deal even if shares in a corporation are acquired following Section 338. However, this is not the case for our study since we focus on a sample of European mergers and acquisitions excluding the United States from the sample of target countries. In none of the target countries in our sample it is possible to structure a share deal as an asset deal for tax purposes as in the United States (see KPMG

Taxation of Cross-Border Mergers and Acquisitions and IFBD Country Analysis). Since we restrict our sample to 100 percent acquisitions of shares in corporations the new tax basis of the corporation's assets post-acquisition is identical to the tax basis of the corporation's assets pre-acquisition. A step-up in the acquired assets is thus impossible and cannot bias our results.

After these steps we are left with 1,440 targets for which we observe financial statements three years before and one year after the deal. To these we add all firms available in Amadeus between 1996 and 2009 offering at least five consecutive financial statements as potential matches. We then delete all firms showing losses, since the tax planning incentives of loss firms are less clear-cut (see De Simone et al. (2014)). Out of the remaining 1,078 targets only 832 offer information on all regressors of the selection equation, thus 832 targets and 1.97 million potential matches enter the selection equation. Table 4.1 provides descriptive statistics for all variables used in the selection equation. Out of the 832 targets entering the selection equation, only 529 offer information on the outcome variables – the 3-year averages²⁷ of ETR, profitability and leverage after the deal.

Since in some cases, we anticipate especially pronounced changes in tax avoidance after international deals, we group the mergers and acquisitions in our sample into national and international. We start with information on the identity and residence of target, acquirer and vendor from Zephyr as far as available. We then identify any group members of the vendor or acquirer using the Amadeus owner database²⁸. This leaves us with the following four cases:

²⁷Thus, we consider only outcomes of targets for which we observe financial statements three years before and three years after the deal.

²⁸Firms are identified as group members, if the group parent has a total ownership in the firm exceeding 90 percent. Unfortunately the Amadeus owner database is incomplete and we are not able to observe all group members of the acquirer and the vendor. We thus may classify deals erroneously as national in some cases. We use information on the vendor to identify the group structure of the target, since the Amadeus owner database does not provide historical

TABLE 4.1. Descriptive statistics

Variable	Observations	Mean	S.D.	Min.	Max.
ETR (av)	1970957	0.3389	0.2174	0	1
Profitability (av)	1970957	0.1029	0.1234	-0.3677	0.6209
Leverage (av)	1970957	0.6835	0.2556	0.0519	1.6924
Cash (av)	1970957	0.1215	0.1414	0.0003	0.6985
High Growth	1970957	0.0728	0.2599	0	1
Log (Total Assets) (av)	1970957	14.3892	1.7631	8.6854	19.0380
Researchintensity (av)	1970957	0.0244	0.0617	0	0.4626
Tangibility (av)	1970957	0.2998	0.2430	0	0.9519
Inventories (av)	1970957	0.2075	0.2164	0	0.9392
Capital Expenditures	1970957	0.0647	0.1746	-0.5195	0.7527
Stocks traded	1970957	81.7410	64.9474	0.0357	367.0436
Log (Laborforce)	1970957	16.6526	0.9648	12.0191	18.1219
Exports	1970957	35.6822	14.3009	24.4148	99.1450
Log (GDP)	1970957	10.0173	0.5089	8.4713	10.8961
Spending on Education	1970957	4.7327	0.9647	2.4002	7.6359
Inflationrate	1970957	0.0440	0.0452	-0.0113	0.4567

For the definition and the sources of the variables see the appendix.

(1) International - International (target belonging to an international group was acquired by an international group); (2) National - National (stand-alone target or target belonging to a national group was acquired by a stand-alone acquirer or by a national group); (3) National - International (stand-alone target or target belonging to a national group was acquired by an international group); (4) International - National (target belonging to an international group was acquired by a stand-alone acquirer or a national group).

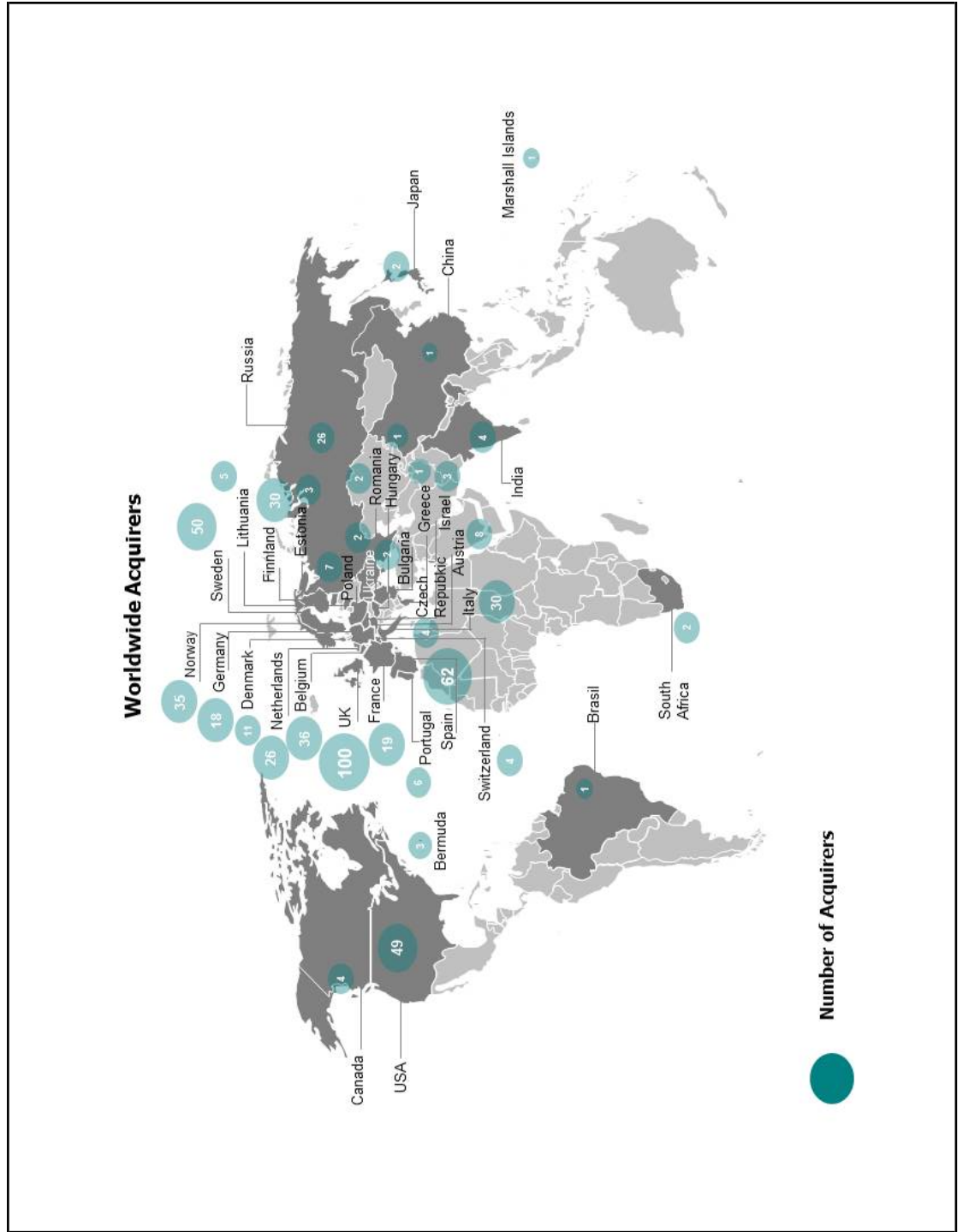
In case (1) and case (2) following our arguments in section 4.2 there is no change in tax incentives with respect to transfer pricing or debt shifting. Since case (2) is by far more frequent, we classify this kind of deals as national. In case (3) we expect increased tax incentives for transfer pricing and debt shifting. We classify these deals as internationals. Finally in case (4) we expect decreased tax

ownership data. Group members of the target identified using the Amadeus owner database are members of the new group established following the acquisition of the target.

incentives. However, since we observe only 19 deals of this type we ignore case (4) for the empirical analysis.

Figure 4.2 gives an overview of the regional origin of acquirers in our sample. By far the most acquirers come from the U.K. Interestingly, U.S. acquirers are important, even though we consider a sample of European targets only. This is consistent with other studies on international mergers and acquisitions, where typically the U.S. and the U.K. are the countries with the most acquirers (see e.g. Huizinga and Voget (2009)).

FIGURE 4.2. Regional origin of acquirers



4.3.2. *Econometric Approach.* If we observe a change in any of our variables of interest (ETR, leverage or profitability) after a deal, we would like to attribute those changes to changes in target tax avoidance carried out by the acquirer. To rule out the possibility that the change would have otherwise occurred requires a counterfactual framework. That is, we observe the change in our variables of interest after the deal and we would like to compare this to the change, if the deal had not taken place. Since it is not possible to observe this counterfactual outcome, we employ propensity score matching to construct a counterfactual control group.

The idea of propensity score matching is to identify firms being ideally identical to the target firms besides for the fact of not being sold. This is an econometric effort to replicate as close as possible the laboratory conditions available in natural sciences: There is a population of identical examination units out of which one part receives a treatment and the others not. The observed difference in the outcome variables of interest is then due to the treatment. The treatment in question here is the sale of the target firm.

Matching based on the propensity score works in two steps (see e.g. Wooldridge (2002), Chapter 18). First, we run a probit regression evaluating the probability to become a target conditional on a vector of observed covariates (selection equation). Based on the regression results we predict the probability to become a target for each firm in our sample.

Second, there are four matching methods (nearest neighbor matching, radius matching, caliper matching and kernel matching) available in order to match each treated firm with one or several control firms using the results of the selection equation. The idea is to match each target with a non-sold firm having the same probability of becoming a target based on the results of the selection equation.

Nearest neighbor matching matches to each treated firm the control firm with the closest propensity score. Caliper matching is a variation of nearest neighbor matching. It matches treatment firms with control firms only if the propensity score of both firms is within a predefined radius. By imposing a maximum tolerance level of the distance between treated and control firms, caliper matching attempts to improve the overall matching quality. Instead of matching 1 of the treated firms with its closest control firm within a radius, radius matching selects all the firms that fall within the predefined caliper. Kernel matching uses all available controls as matches, but uses weights inversely proportional to the distance between the propensity scores of treated firms and available controls. In order to make use of our large set of potential matches, we focus primarily on radius and kernel matching.

For a given propensity score, exposure to treatment is supposed to be random and therefore treated and control units should be on average observationally identical. We check this balancing property and compare the difference in the regressors of the selection equation between the sold (treatment group) and the non-sold (control group) firms. If the balancing property holds, the difference in these regressors should be considerably smaller after matching than before. Since we control for all variables typically employed for predicting targets in the literature, we expect to fulfill this condition.

Formally (see Wooldridge (2002), pp. 604-621), we are interested in measuring the average treatment effect of the treated $ATT_1 = E(y_1 - y_0 | w = 1)$. y_1 denotes the outcome (in our case the change in the ETR, the leverage or the profitability) with treatment and y_0 the outcome without treatment. w is a binary variable indicating participation ($w = 1$) in treatment (in our case being acquired) or not ($w = 0$).

A simple approach to estimate ATT_1 would be to compare the mean of the outcome variable between sold and non-sold firms. However, such an approach is

only possible if there is no self-selection into treatment: $E(y_1 | w = 1) = E(y_1)$ and $E(y_0 | w = 0) = E(y_0)$. Self-selection into treatment in our case could e.g. occur if firms having a low leverage or a high ETR are especially attractive targets. Starting from low leverage an increase in leverage is more likely to occur. Equivalently starting from a high ETR a decrease is more likely to occur. Then the observed change is not actually due to treatment but instead due to specific firms selecting into treatment. It is thus crucial that we eliminate this possibility to interpret our results.

While due to self-selection mean independence typically does not hold ($E(y_1 | w = 1) \neq E(y_1)$ and $E(y_0 | w = 0) \neq E(y_0)$), the core idea of matching is to assume mean independence conditional on a vector of covariates \mathbf{x} : $E(y_1 | w = 1, \mathbf{x}) = E(y_1)$ and $E(y_0 | w = 0, \mathbf{x}) = E(y_0)$. If selection into treatment is determined by the covariates \mathbf{x} , then controlling for these covariates allows for a meaningful comparison of outcomes between treated and non-treated firms.

We follow Rosenbaum and Rubin (1983) and predict the likelihood of being a target using a probit regression (selection equation) for all firms in our sample. The predicted probability for being acquired (the propensity score) is then the basis for finding actual targets versus non-targets with statistically identical covariates \mathbf{x} . The balancing property shows whether this procedure is successful or not.

Table 4.2 presents the results of the selection equation and the variables appearing in the model are defined in the Appendix. We use a probit estimation where the dependent variable is 1 if a firm becomes a target and zero otherwise. Targets involved in international deals could systematically differ from targets involved in national deals. We thus consider international and national takeovers as separate treatments. The matching procedure then guarantees the comparability between targets and matches irrespective of their involvement in international or national takeovers. In the second column and third column of Table 4.2 we present the

respective probit regression results. Similarly, we consider the takeovers of tax aggressive vs. non-tax aggressive acquirers as separate treatments.

In the selection equation we use a profitability measure to proxy for a firm's management efficiency as proposed in Palepu (1986). Profitability is earnings before interest and taxes (EBIT) over total assets and has a positive effect on takeover probability. Further we follow Palepu (1986) in using the log of total assets as a measure for the size of the firm. We find an increase in the likelihood to become a target with size.

Following Dietrich and Sorensen (1984) we use the firm's leverage (total debt over total assets) and capital expenditures (change over three periods in fixed assets over total assets) as controls. While Dietrich and Sorensen find no significant effects for these controls, we find leverage to have a positive, and capital expenditures to have a negative, effect on takeover probability. We further find a firm's cash holdings as a share of total assets to have a negative effect.

High growth is a dummy for firms with an above sample mean increase over three periods in total assets and affects takeover positively. Research intensity is intangible assets over total assets and only affects the international takeover probability. Tangibility defined as fixed assets over total assets has a negative effect. In addition we use inventories as a share of total assets as an indicator for firms active in trade, and find a negative effect. We include a dummy for listed firms, since listed firms may be more difficult to acquire.

All target specific controls besides for high growth and capital expenditures enter as the average over the three years preceding the takeover and are marked by (avg.). Thus the value of the controls should not yet be influenced by the takeover. We control for the target's macroeconomic environment (see Erel et al. (2012)) using stocks traded, log labor force, target country exports, log GDP, spending on education and the inflation rate. All macroeconomic controls are lagged.

We additionally control for the effective tax rate (ETR), but we do not find a significant effect. In order to control for unobserved heterogeneity, we use country, industry and time specific effects.

TABLE 4.2. Selection equation

Independent variable	All	International	National
ETR (av)	-0.098 (-1.34)	-0.045 (-0.43)	-0.108 (-1.14)
Profitability (av)	0.502 *** (4.84)	0.742 *** (5.61)	0.168 (1.11)
Leverage (av)	0.073 (1.61)	0.082 (1.34)	0.032 (0.51)
Cash (av)	-0.156 * (-1.88)	-0.191 * (-1.77)	-0.117 (-1.02)
High Growth	0.100 ** (2.26)	0.050 (0.86)	0.155 ** (2.52)
Log (Total Assets) (av)	0.150 *** (23.29)	0.147 *** (17.07)	0.128 *** (14.75)
Researchintensity (av)	0.280 ** (1.98)	0.375 ** (2.07)	0.208 (1.08)
Tangibility (av)	-0.217 *** (-4.29)	-0.334 *** (-4.93)	-0.095 (-1.40)
Inventories (av)	-0.303 *** (-4.29)	-0.316 *** (-3.50)	-0.248 *** (-2.93)
Capital Expenditures	-0.293 *** (-4.67)	-0.156 * (-1.88)	-0.368 *** (-4.34)
Listed	-0.458 *** (-2.95)	-0.549 ** (-1.98)	-0.650 ** (-2.30)
Stocks traded	0.001 *** (2.66)	0.001 * (1.93)	0.001 * (1.94)
Log (Laborforce)	2.392 *** (3.22)	3.264 *** (3.21)	1.345 (1.33)
Exports	0.021 ** (2.25)	0.021 (1.48)	0.019 * (1.78)
Log (GDP)	1.141 *** (3.35)	0.618 (1.23)	1.330 *** (2.96)
Spending on Education	0.036 (0.55)	-0.008 (-0.10)	0.052 (0.51)
Inflationrate	-2.904 *** (-3.12)	-4.326 *** (-3.40)	-1.197 (-0.88)
Country Dummy	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes
Industry Dummy	Yes	Yes	Yes
Number of Observations	1,970,957	1,896,339	1,951,755
PseudoR2	0.1325	0.1338	0.1183

Note: Results from probit regressions. The dependent variable is 1 if a firm becomes a target and zero otherwise in the column labeled 'All'. The dependent variable is 1 if a firm becomes a target due to an international takeover and zero otherwise in the column labeled 'International'. The dependent variable is 1 if a firm becomes a target due to a national takeover and zero otherwise in the column labeled 'National'. For the definition and the sources of the variables see the Appendix. T-statistics based on robust standard errors in parentheses. The symbols ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

Table 4.3 shows the balancing property based on radius matching taking all deals as treatments. Through the matching we achieve a significant reduction in bias. Thus, we believe the matching procedure works fairly well in our case.

TABLE 4.3. Balancing property - All

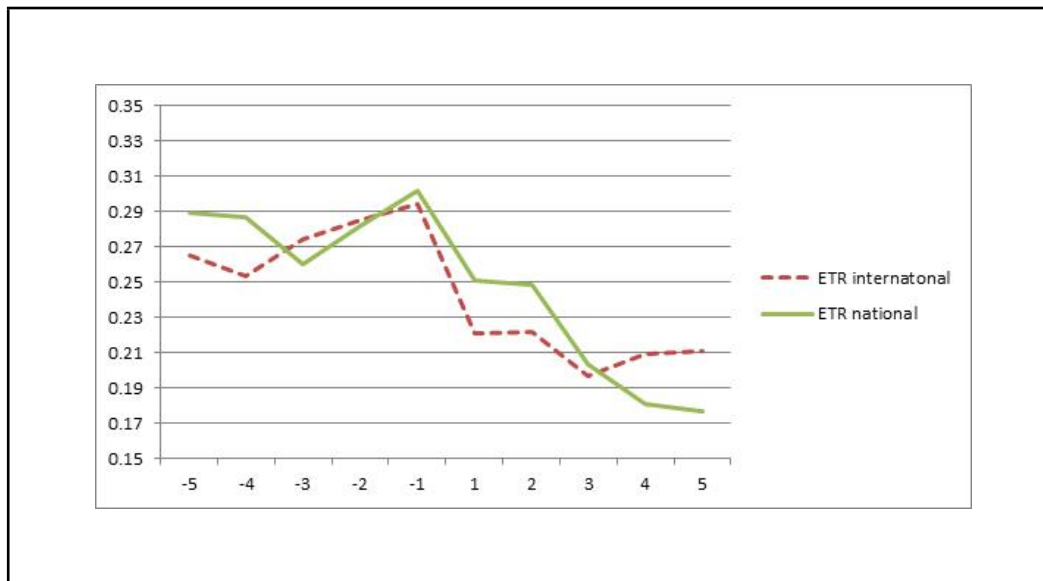
Variable	Mean		Bias %	Bias reduc- tion in %	t-test	
	Treated	Control			t-value	p-value
ETR (av)	0.284	0.283	0.5	98.4	0.09	0.924
Profitability (av)	0.103	0.113	-7.6	-352.6	-1.25	0.213
Leverage (av)	0.646	0.640	2.7	83.5	0.44	0.661
Cash (av)	0.115	0.127	-8.5	-251.8	-1.33	0.184
High Growth	0.165	0.166	-0.4	98.0	-0.06	0.950
Log (Total Assets) (av)	15.952	15.760	11.6	88.6	1.92	0.055 *
Researchintensity (av)	0.030	0.027	3.8	52.9	0.57	0.571
Tangibility (av)	0.350	0.335	5.9	69.3	0.93	0.352
Inventories (av)	0.153	0.153	-0.1	99.5	-0.03	0.979
Capital Expenditures	0.044	0.051	-3.6	74.7	-0.55	0.579
Listed	0.006	0.006	-0.6	-195.5	-0.09	0.927
Stocks traded	80.994	82.158	-2.1	92.0	-0.33	0.744
Log (Laborforce)	16.182	16.175	0.7	98.4	0.10	0.920
Exports	39.14	39.637	-3.2	87.5	-0.47	0.636
Log (GDP)	10.108	10.114	-1.3	96.0	-0.25	0.806
Spending on Education	5.415	5.439	-2.2	96.3	-0.33	0.744
Inflationrate	0.027	0.027	0.6	98.8	0.12	0.902

4.4. Results.

4.4.1. *Descriptive Evidence.* We start by providing some descriptive evidence on changes in indicators of a target's tax avoidance behavior following a takeover. Figure 4.3 shows the evolution of the mean target ETRs (defined as tax expense divided by pre-tax income) starting from five periods pre-deal to five periods post-deal.²⁹ Zero is defined as the point of time where the deal is completed. Pre-deal

²⁹For calculating the mean target ETR we consider all target observations available. The mean is thus based on fewer observations e.g. for the period five pre deal. We do not show the 3-year average here, because e.g. the period -1 result would already be affected by the deal.

FIGURE 4.3. ETR pre and post deal



the ETR fluctuates around 28 percent. Post-deal the level of the ETR decreases and fluctuates around 20 percent. This holds for both national (solid green line) and international (dashed red line) mergers and acquisitions. Figure 4.3 provides some evidence for a decreased ETR following mergers and acquisitions.

Figure 4.4 shows in the same manner the evolution of target profitability (defined as earnings before interest and taxes over total assets) starting from five periods pre-deal to five periods post-deal. There is some initial evidence for a drop following the acquisition at point of time zero. This holds for national as well as international mergers and acquisitions. Target profitability fluctuates around 9 percent pre-deal and 5 percent post-deal.

Figure 4.5 shows the evolution of target leverage (defined as total debt over total assets). Target leverage decreases steadily from five periods pre-deal to five periods post-deal for international mergers and acquisitions. There is no clear trend for national takeovers.

FIGURE 4.4. Target profitability pre and post deal

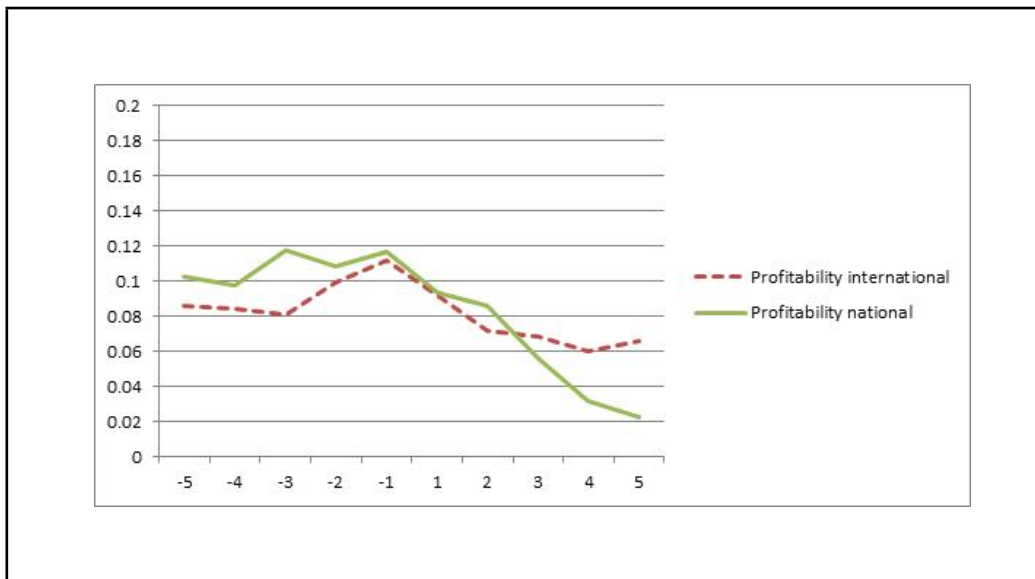
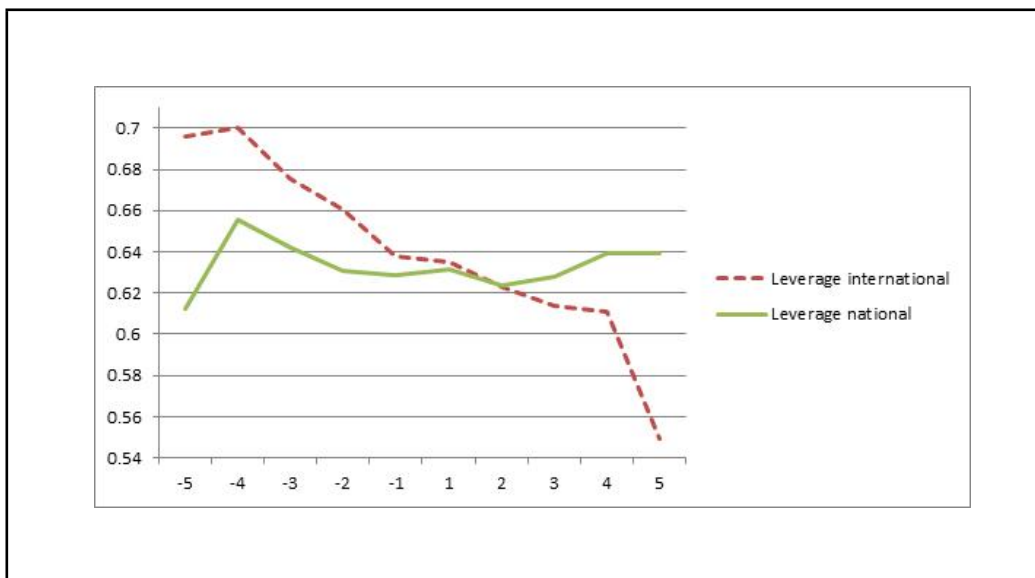


FIGURE 4.5. Target leverage pre and post deal



All these figures provide suggestive evidence on the evolution of a target's ETR, profitability and leverage post-deal. However, it is not possible to conclude on

mergers and acquisitions being causal for the observed evolution. It may well be the case that the observed evolution of a target's ETR, profitability and leverage post-deal would have occurred irrespective of the target being sold to a new owner. To interpret such a causal relationship we employ more sophisticated econometrics as described above in section 4.3.2. Using propensity score matching, we separate the change post-deal of a target's ETR, profitability and leverage caused by mergers and acquisitions from the change that most likely would have occurred irrespective of the transaction.

Since we include the average effective tax rate in the selection equation, the starting level of the ETR is identical for targets and non-targets as a result of the matching procedure as reported in table 4.3. The reported coefficients in table 4.4 and 4.5 of the average treatment effect on the treated are thus equivalent to the average treatment effect on the treated with respect to the change in ETR (comparing the average pre- and post-deal level). The same argument holds for the other outcome variables in tables 4.6 to 4.11.

4.4.2. *Main results.* Table 4.4 shows the average effect of treatment on a target's average ETR in the three years following the takeover based on propensity score matching. Comparing targets and similar non-targets, we find a decrease in the ETR. This result holds irrespective of the matching algorithm – radius or kernel – and irrespective of whether treatment is defined as all, only international or only national takeovers. The reduction is around 3 percentage points for all takeovers. A target's tax avoidance increases post-deal. The resulting reduction in tax payments is able to generate an ownership advantage. The observed decrease of the ETR cannot be due to a step up of the target's assets, since we focus exclusively on corporations as targets. If at all with corporations as targets a step up should occur with respect to the shares at the level of the shareholder (see Erickson and Wang (2000)), which would not affect the ETR.

TABLE 4.4. Average effective tax rate

Matching algorithm	All	International	National
Radius	-0.030 *** (-4.30)	-0.032 *** (-3.27)	-0.025 ** (-2.52)
Kernel	-0.037 *** (-5.23)	-0.049 *** (-4.94)	-0.042 *** (-4.18)
Number of Treated	529	249	262
Number of Untreated	1,180,076	1,142,988	1,169,431

Note: We report coefficients that correspond to the average treatment effect on the treated (ATT); T-statistics in parentheses. The outcome variable average effective tax rate (ETR) is defined as a firm's average ETR in the three years following the takeover. Since we include the average effective tax rate in the selection equation, the starting level of the ETR is identical for targets and non-targets. The reported coefficients of the average treatment effect on the treated are thus equivalent to the average treatment effect on the treated with respect to the change in ETR (comparing the average pre- and post-deal level). The 'All' column reports the coefficient based on the selection equation in Table 4.2 that considers all takeovers as treatments, the 'International' column reports the coefficient based on the selection equation in Table 4.2 that considers only international takeovers as treatments, and the 'National' column reports the coefficient based on the selection equation in Table 4.2 that considers only national takeovers as treatments. The symbols ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

Table 4.5 presents the average effect of treatment on a target's average ETR in the three years following the takeover, depending on the acquirer's tax aggressiveness. Tax aggressive acquirers are acquirers with a 3-year mean ETR below the acquirer country specific sample 3-year mean ETR in the same time period. We find a larger decrease in a target's ETR following an acquisition by a tax aggressive acquirer. While the decrease is around 8 percentage points (radius matching) or even 10 percentage points (kernel matching) following an acquisition by a tax aggressive acquirer, it is insignificant following an acquisition by a non-tax aggressive acquirer in the case of radius matching and only around 4 percentage points in the case of kernel matching. Acquirers appear to use their tax planning expertise to restructure the target's affairs in a tax efficient manner.

TABLE 4.5. Average effective tax rate - tax vs. non tax aggressive acquirer

Matching algorithm	Tax aggressive acquirer	Non tax aggressive acquirer
Radius	-0.075 *** (-3.09)	-0.012 (-0.56)
Kernel	-0.104 *** (-4.29)	-0.040 * (-1.84)
Number of Treated	50	57
Number of Untreated	1,091,839	1,107,403

Note: We report coefficients that correspond to the average treatment effect on the treated (ATT); T-statistics in parentheses. The outcome variable average effective tax rate (ETR) is defined as a firm's average ETR in the three years following the takeover. Since we include the average effective tax rate in the selection equation, the starting level of the ETR is identical for targets and non-targets. The reported coefficients of the average treatment effect on the treated are thus equivalent to the average treatment effect on the treated with respect to the change in ETR (comparing the average pre- and post-deal level). The column tax aggressive acquirer gives the coefficient considering only takeovers by tax aggressive acquirers as treatments, the column non-tax aggressive acquirers gives the coefficient considering only takeovers by non-tax aggressive acquirers as treatments. Tax aggressive acquirers are acquirers with a three-year mean ETR below the acquirer country specific sample three-year mean ETR in the same time period. The symbols ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

Table 4.6 presents the results with respect to the change in average target profitability in the three years following the takeover. Consistent with Ravenscraft and Scherer (1989) and Clark and Ofek (1994) we observe a decrease in target profitability. However, we do not find a systematic larger decrease following international takeovers as we would expect from a tax perspective.

Thus, we further differentiate takeovers with respect to the relative tax rates of the target versus the acquirer in Table 4.7. Targets facing a higher statutory tax rate relative to their acquirer are high-tax targets, and they are low-tax targets otherwise. Only in the case of a high-tax target is shifting profits out of the target an advisable strategy for the acquirer. Consistent with this expectation, we observe a decrease in target profitability for high-tax targets, while we do not

TABLE 4.6. Average profitability

Matching algorithm	All	International	National
Radius	-0.015 *** (-2.73)	-0.018 ** (-2.08)	-0.012 ** (-1.67)
Kernel	-0.014 ** (-2.50)	-0.015 * (-1.70)	-0.010 (-1.42)
Number of Treated	530	249	262
Number of Untreated	1,180,076	1,142,988	1,169,693

Note: We report coefficients that correspond to the average treatment effect on the treated (ATT); T-statistics in parentheses. The outcome variable average profitability is defined as a firm's average EBIT over total assets in the three years following the takeover. Since we include average profitability in the selection equation, the starting level of average profitability is identical for targets and non-targets. The reported coefficients of the average treatment effect on the treated are thus equivalent to the average treatment effect on the treated with respect to the change in average profitability (comparing the average pre- and post-deal level). The 'All' column results are based on the selection equation in Table 4.2 that considers all takeovers as treatments, the 'International' column results are based on the selection equation in Table 4.2 that considers only international takeovers as treatments, and the 'National' column results are based on the selection equation in Table 4.2 that considers only national takeovers as treatments. The symbols ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

find any significant change for low-tax targets. Finally, acquirers do not appear to shift profits into low-tax targets.³⁰

Table 4.8 alternately uses information on the acquirer's group structure obtained from the Amadeus owner database to differentiate between high-tax targets and low-tax targets. Targets having a statutory tax rate above the minimum tax rate faced by any member of the acquirer's group are now defined as high-tax targets. They are low-tax targets otherwise. Again, we find a significant decrease in target profitability for high-tax targets only. For legal (e.g. because of controlled foreign corporation rules) as well as practical reasons (e.g. because of established

³⁰This result may also be due to noise in the data. We precisely identify the group of high tax targets. However, due to incomplete information on the acquirer's group structure we may erroneously classify targets as low tax. This makes the correct identification of tax planning more difficult in this case.

TABLE 4.7. High tax and low tax targets

Matching algorithm	High tax	Low tax
Average profitability		
Radius	-0.052 *** (-3.59)	-0.006 (-0.60)
Kernel	-0.047 *** (-3.27)	-0.003 (-0.33)
Number of Treated	65	184
Number of Untreated	1,142,988	1,142,988
Average leverage		
Radius	0.045 * (1.77)	0.030 * (1.72)
Kernel	0.027 (1.06)	0.017 (0.92)
Number of Treated	65	184
Number of Untreated	1,142,988	1,142,988

Note: We report coefficients that correspond to the average treatment effect on the treated (ATT); T-statistics in parentheses. The outcome variable average profitability is defined as a firm's average earnings before interest and taxes (EBIT) over total assets in the three years following the takeover. The outcome variable average leverage is defined as a firm's average total liabilities over total assets in the three years following the takeover. Since we include average profitability and average leverage in the selection equation, the starting level of average profitability and average leverage is identical for targets and non-targets. The reported coefficients of the average treatment effect on the treated are thus equivalent to the average treatment effect on the treated with respect to the change in average profitability and average leverage (comparing the average pre- and post-deal level). The column high tax gives the results for high tax targets, the column low tax the results for low tax targets. Targets having a statutory rate above the acquirer's tax rate are defined as high tax targets. They are low tax targets otherwise. Results are based on the selection equation in Table 4.2 that considers all takeovers as treatments. The symbols ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

business relationships between the acquirer and the target) it is easier to shift profits from the target to the acquirer directly instead of shifting profits to a low-tax group member of the acquirer. We thus observe a lower point estimate for the decrease in profitability in table 4.8 compared to table 4.7.

Table 4.9 finally presents the results with respect to changes in the 3-year average leverage in the years following the takeover. While we find some evidence for an increase in leverage based for all deals, we do not find a systematically

TABLE 4.8. High tax and low tax targets – minimum statutory tax rate of the group

Matching algorithm	High tax	Low tax
Average profitability		
Radius	-0.027 *** (-2.67)	-0.007 (-0.53)
Kernel	-0.024 ** (-2.33)	-0.004 (-0.32)
Number of Treated	130	119
Number of Untreated	1,142,988	1,142,988
Average leverage		
Radius	0.027 (1.50)	0.041* (1.79)
Kernel	0.008 (0.48)	0.030 (1.32)
Number of Treated	130	119
Number of Untreated	1,142,988	1,142,988

Note: We report coefficients that correspond to the average treatment effect on the treated (ATT); T-statistics in parentheses. The outcome variable average profitability is defined as a firm's average EBIT over total assets in the three years following the takeover. The outcome variable average leverage is defined as a firm's average total liabilities over total assets in the three years following the takeover. Since we include average profitability and average leverage in the selection equation, the starting level of average profitability and average leverage is identical for targets and non-targets. The reported coefficients of the average treatment effect on the treated are thus equivalent to the average treatment effect on the treated with respect to the change in average profitability and average leverage (comparing the average pre- and post-deal level). The column high tax gives the results for high tax targets, the column low tax the results for low tax targets. Targets having a statutory tax rate above the acquirer's group minimum tax rate are defined as high tax targets. They are low tax targets otherwise. Results are based on the selection equation in Table 4.2 that considers all takeovers as treatments. The symbols ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

larger increase following international takeovers, as we would expect from a tax perspective. We neither find significant changes if we differentiate between high tax and low tax targets as in table 4.7. Thus, table 4.9 provides no evidence for a tax-motivated increase in target leverage.

TABLE 4.9. Average leverage

Matching algorithm	All	International	National
Radius	0.031 *** (3.02)	0.034 ** (2.34)	0.031 ** (2.03)
Kernel	0.025 ** (2.42)	0.019 (1.31)	0.015 (0.99)
Number of Treated	530	249	262
Number of Untreated	1,180,076	1,142,988	1,169,431

Note: We report coefficients that correspond to the average treatment effect on the treated (ATT); T-statistics in parentheses. The outcome variable average leverage is defined as a firm's average total liabilities over total assets in the three years following the takeover. Since we include average leverage in the selection equation, the starting level of average leverage is identical for targets and non-targets. The reported coefficients of the average treatment effect on the treated are thus equivalent to the average treatment effect on the treated with respect to the change in average leverage (comparing the average pre- and post-deal level). The 'All' column reports the coefficient based on the selection equation in Table 4.2 that considers all takeovers as treatments, the 'International' column reports the coefficient based on the selection equation in Table 4.2 that considers only international takeovers as treatments, and the 'National' column reports the coefficient based on the selection equation in Table 4.2 that considers only national takeovers as treatments. The symbols ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

4.4.3. Sensitivity analyses.

Group taxation. It is difficult to load a target with additional debt post-deal. While it is in general possible to load such debt on a target's books, the critical issue is what to do with the excess liquidity generated in doing so. Raising debt to finance the deal would be a natural candidate. However, such debt cannot enter on the books of the target, since these financial means are employed to acquire the target itself. The only feasible possibility is to distribute the retained earnings of the target and replace them with debt. This may however cause taxes on the distributions. Further, pre-deal creditors of the target may oppose to such a strategy, since it worsens their position in the case of default. Our results finding no significant change in target leverage post deal indicate that this strategy is not employed on a large scale due to such costs of debt finance.

A more tax efficient and widely applied (see Ruf (2011)) strategy is to acquire targets not directly, but instead via a holding set up in the same country as the target (debt push-down). Figure 4.6 illustrates such a strategy.³¹ As the advantage of this strategy it is possible to load the holding with debt in order to acquire the target. After the transaction the holding's interest expenses on the debt to acquire the target are consolidated with the target's earnings making use of group taxation regimes. The debt of the holding acts as if it were target debt. This reduces the incentive to load the target with debt itself and could be an explanation for us not finding clear evidence for an increase in target leverage following mergers and acquisitions.

In order to test this possibility, we consider targets located in countries offering no group taxation separately.³² In such countries the debt push down strategy does not work. Since it is not possible to load an acquiring holding tax efficiently with debt in such countries, there should be a stronger incentive to load the target itself with debt.

Indeed – when focusing on targets in countries with no group taxation regime only – we find evidence for target leverage to increase after the takeover as presented in Table 4.10. Target leverage increases by around 8 percentage points. Acquirers loading holdings instead of targets with debt in countries offering group taxation could thus be an explanation for us finding no effect on target leverage above. We are not able to split up the results in national and international mergers and acquisitions in Table 4.10, since the sample of targets in countries without group taxation regimes is too small to do so.

³¹See also Delauriere (2011), Brincker (2008), and <http://www.mondaq.com/x/539/Audit/Dutch+Debtpushdown+Structures> for a discussion of the use of debt push-down structures.

³²In our sample these are (101) targets located in Belgium (60), Bulgaria (5), Czech Republic (14), Estonia (5), Lithuania (4), Romania (10) and Slovakia (3).

FIGURE 4.6. Debt push down

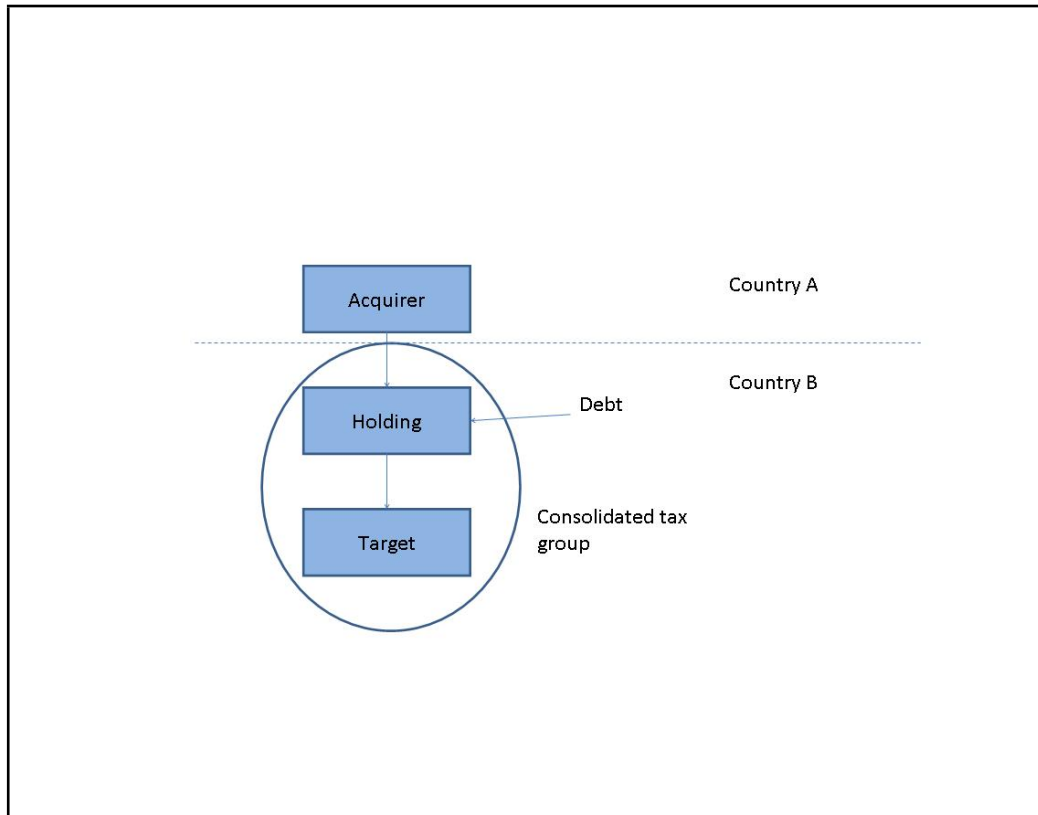


TABLE 4.10. Average leverage - countries without group taxation regime only

Radius	0.082 *** (3.32)
Kernel	0.075 *** (3.07)
Number of Treated	101
Number of Untreated	166,499

Note: We report coefficients that correspond to the average treatment effect on the treated (ATT); T-statistics in parentheses. The outcome variable average leverage is defined as a firm's average total liabilities over total assets in the three years following the takeover. Since we include average leverage in the selection equation, the starting level of average leverage is identical for targets and non-targets. The reported coefficients of the average treatment effect on the treated are thus equivalent to the average treatment effect on the treated with respect to the change in average leverage (comparing the average pre- and post-deal level). Results are based on the selection equation in Table 4.2 that considers all takeovers as treatments and on a sample including only countries without a group taxation regime. In our sample these are Belgium, Bulgaria, Czech Republic, Estonia, Lithuania, Romania and Slovakia. The symbols ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

Exact matching. As a robustness check we employ three exact matching procedures: for countries, for industries and for country-years. We thus only match targets and controls from the same country in the first case, from the same industry in the second case and from the same country and year in the third case. Table 4.11 shows the radius matching results. Results do not materially change compared to section 4.4.2. We still observe evidence for a decreased ETR following mergers and acquisitions. We find some evidence for a decrease in profitability and an increase in leverage. However, as before we neither find a systematic larger decrease in profitability nor a larger increase in leverage following international takeovers as we would expect from a tax perspective.

TABLE 4.11. Exact matching

Matching algorithm	All	International	National
Country specific			
Average ETR	All	International	National
Radius	-0.033 *** (-3.26)	-0.036 ** (-2.54)	-0.027 * (-1.83)
Average Profitability	All	International	National
Radius	-0.016 ** (-2.17)	-0.019 (-1.63)	-0.010 (-1.00)
Average Leverage	All	International	National
Radius	0.033 ** (2.24)	0.031 (1.52)	0.035 (1.62)
Industry specific			
Average ETR	All	International	National
Radius	-0.029 *** (-2.93)	-0.033 ** (-2.33)	-0.025 * (-1.72)
Average Profitability	All	International	National
Radius	-0.014 * (-1.93)	-0.018 (-1.56)	-0.011 (-1.15)
Average Leverage	All	International	National
Radius	0.032 ** (2.17)	0.034 (1.62)	0.033 (1.53)
Country-year specific			
Average ETR	All	International	National
Radius	-0.032 *** (-3.18)	-0.036 ** (-2.50)	-0.027 * (-1.89)
Average Profitability	All	International	National
Radius	-0.016 ** (-2.08)	-0.016 (-1.39)	-0.011 (-1.10)
Average Leverage	All	International	National
Radius	0.032 ** (2.20)	0.032 (1.55)	0.035 (1.61)

Note: We report coefficients that correspond to the average treatment effect on the treated (ATT); T-statistics in parentheses. Results are propensity score matching results after exact matching according to country, industry or country-year. The outcome variable average ETR is defined as a firm's average ETR in the three years following the takeover. The outcome variable average profitability is defined as a firm's average EBIT over total assets in the three years following the takeover. The outcome variable average leverage is defined as a firm's average total liabilities over total assets in the three years following the takeover. Since we include all outcome variables in the selection equation, the starting level of outcome variables is identical for targets and non-targets. The reported coefficients of the average treatment effect on the treated are thus equivalent to the average treatment effect on the treated with respect to the change in outcome variables (comparing the average pre- and post-deal level). The 'All' column results are based on the selection equation in Table 4.2 that considers all takeovers as treatments, the 'International' column results are based on the selection equation in Table 4.2 that considers only international takeovers as treatments, and the 'National' column results are based on the selection equation in Table 4.2 that considers only national takeovers as treatments. The symbols ***, **, and * denote significance at the 0.01, 0.05, and 0.10 levels, respectively.

4.5. Conclusions. More tax avoidance within targets post-acquisition increases the cash flow available to acquirers, allowing acquirers to outbid initial owners. Tax avoidance is one possible driver of mergers and acquisitions. We investigate the change in the tax avoidance of targets post-acquisition using a sample of European mergers and acquisitions taking place between 1996 and 2009.

We consider three aspects of tax avoidance: First, a target's effective tax rate (ETR) as a measure reflecting aggressive tax planning through permanent book-tax differences; second, target profitability as a proxy to measure tax induced profit shifting; third, target leverage as an indicator for tax induced debt shifting.

A target's ETR decreases by 3-percentage points post deal and even by 8 percentage points if the acquirer is particularly tax aggressive. Further target profitability decreases following mergers and acquisitions. This decrease is especially pronounced for targets having a higher statutory tax rate than the acquirer. Tax induced profit shifting is one explanation for the empirical finding of decreased target profitability.

We do not find evidence for changes in target leverage post deal in general. However, we find empirical evidence for group taxation being an explanation for this finding: Restricting our sample to targets from countries without group taxation regimes results in a significant increase in leverage post deal. In countries offering group taxation regimes acquirers may prefer to load the acquiring holding instead of the target itself with debt. This results in similar tax savings, but is easier to achieve.

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4.7. Appendix.

TABLE 4.12. Variable definitions

Name	Definition
ETR (av)	A firm's tax expense (TAXA) divided by pre-tax income (PLBT) (3-year average; for targets defined for the three years pre-deal (selection equation) and the three years post-deal (outcome variable)). The ETR is winsorized into the (0,1) interval. Source: Bureau van Dijk Amadeus Database.
Profitability (av)	A firm's Earnings before interest and tax (EBIT)/Total assets (3-year average; for targets defined for the three years pre-deal (selection equation) and the three years post-deal (outcome variable)); Source: Bureau Van Dijk Amadeus Database.
Leverage (av)	A firm's Total liabilities/Total assets (3-year average; for targets defined for the three years pre-deal (selection equation) and the three years post-deal (outcome variable)). Source: Bureau van Dijk Amadeus Database.
Cash (av)	A firm's (Cash + Cash equivalents)/Total assets (3-year average). Source: Bureau van Dijk Amadeus Database.
High Growth	Dummy variable that takes on the value 1 for a firm whose annual growth rate of 'Total assets' is above the average growth rate and 0 otherwise.
Log (Total Assets) (av)	Natural logarithm of a firm's Total assets (3-year average). Source: Bureau van Dijk Amadeus Database.
Researchintensity (av)	A firm's Intangible assets/Total assets (3-year average). Source: Bureau van Dijk Amadeus Database.
Tangibility (av)	A firm's Fixed assets/ Total assets (3-year average). Source: Bureau van Dijk Amadeus Database.
Inventories (av)	A firm's Inventory/Total assets (3-year average). Source: Bureau van Dijk Amadeus Database.
Capital Expenditures	Difference in a firm's fixed assets between one year and three years preceding the acquisition / Total assets. Source: Bureau van Dijk Amadeus Database.
Listed	Dummy variable that takes the value 1 for listed stocks and 0 otherwise. Source: Bureau van Dijk Amadeus Database.

Name	Definition
Stocks traded	Ratio of stock market capitalization to GDP of the target country. Source: World Development Indicators, Worldbank Database.
Log (Laborforce)	Total labor force comprises people aged 15 and older who meet the International Labour Organization definition of the economically active population (logarithm). Source: World Development Indicators, Worldbank Database.
Exports	Ratio of Exports of goods and services to GDP of the target country. Source: World Development Indicators, Worldbank Database.
Log (GDP)	The natural logarithm of the target's country purchase price parity (ppp) converted GDP per capita. Source: Penn World Tables.
Spending on Education	Ratio of Public expenditure on education to GDP of the target country. Source: World Development Indicators, Worldbank Database.
Inflationrate	Inflation as measured by the consumer price index of the target country. Source: World Development Indicators, Worldbank Database.

Note: All averages (avg.) are calculated for the three years preceding the acquisition. All macroeconomic variables refer to the year preceding the acquisition. All financial data is win-sorized at the 1% level.

5. EFFECTS OF TAX AVOIDANCE ON REAL ACTIVITY IN THE TARGET
COUNTRY FOLLOWING M&A.

**Effects of tax avoidance on real
activity in the target country
following M&A.**

5.1. **Introduction.** Mergers and acquisitions account for about 35 percent of global foreign direct investment³³. For this reason, it is important to understand consequences and drivers for cross border mergers and acquisitions. Regarding the ownership of firms, tax systems are neutral if the tax burden is independent of the firm's owner and not affected by any changes of ownership. In certain respects, this neutrality is suspected to be violated by taxes: We know that transaction taxes raise seller prices and result in a lock-in effect³⁴. We also know, that the reduction of ongoing profit taxes, following mergers and acquisitions, can result in an ownership advantage. This favours acquirers with a large bunch of tax planning opportunities. In this sense, multinational firms have access to an additional dimension of tax planning, compared to purely national firms. Therefore they are able to reduce a target firm's tax burden after an acquisition. Using transfer pricing and debt shifting, international tax rate arbitrage can be realized.³⁵ From the target firm's perspective, new profit shifting opportunities result in decreasing cost of capital. A positive effect can be expected on the volume of real activity.

To allocate profits to low tax countries is a well known incentive, not only following acquisitions. For decades, politicians have been enacting anti-abuse provisions to protect their tax base. If those provisions are strict, shifting of pure profits is restricted or, ideally, vanished. At the same time, cost of capital increase, up to the initial level of the stand alone target. This compensates the positive effect on the volume of real activity. Nevertheless, if profits can not be shifted directly, firms could react by shifting real activity. Thus, connected profits are equally shifted to low tax countries. If firms are able to react this way, there is still an ownership advantage for multinational firms.

³³Source: UNCTAD (2014).

³⁴Ayers et al. (2003).

³⁵Belz et al. (2013).

In this paper it is analyzed how the target firm's volume of real activity reacts to the new tax planning environment as part of a multinational group. Originally purely domestic firms are tracked after their acquisition by a multinational group. This allows to compare the situation before the acquisition to the development of the target firm thereafter, when access to international tax planning is given. Thereby, variation is exploited in tax incentives of the acquiring group and in the existence of anti-profit shifting rules in the target countries. Real activity is measured as the number of employees in the target country as well as the absolute book value of assets.

Interest deduction barriers and profit shifting regulations are considered as provisions enacted by the target country in this paper. Additionally, the setting allows to control for the regulatory environment in the country of the acquirer. The existence of tax incentives to shift profits has to be judged from the acquirer's perspective. Only from the acquirer's perspective it can be judged whether tax savings are final. Thus, the method to avoid international double taxation and, if available, cfc-rules have to be taken into account.

It can be shown, that acquisitions have systematically different effects on the target firm's volume of real activity. These differences are driven by the tax environment in the target country as well as in the country where the acquiring group is resident. The results indicate that the quantity of employees as well as the volume of total assets in a target country are significantly reduced if profit shifting is restricted. This effect is increasing with the gap between tax rates of the target firm and the acquiring group. Furthermore, there is evidence that this effect is eliminated by controlled foreign company (cfc) rules in the acquiring firm's country of residence.

Following this introduction, section 2 of the paper develops the testable hypothesis. Section 3 describes the empirical methodology and the data. Section 4 presents empirical results. Section 5 concludes.

5.2. Literature Review and Hypotheses Development. Literature states that following an acquisition, the acquirer is able to project his own characteristics onto the target firm. Jensen (1984) argues that target companies can benefit from the higher abilities of the acquiring firm's management. Following this, acquisitions ensure protection against mismanagement of firms. However, there is found no clear effect of acquisitions on the performance of target firms in literature³⁶. For specific characteristics, the transfer is well documented. Ahuja and Katila (2001) as well as Bresman et al. (1999) show that knowledge can be transferred within the newly formed firm. Erel et al. (2015) show that acquisitions can diminish financial constraints of the target firm. Concerning tax characteristics, Belz et al. (2013) analyze tax aggressiveness and tax avoidance behavior after mergers and acquisitions. The acquiring firm is not only able to bring its tax aggressiveness down to the target level. They also show that target firms adjust their tax avoidance behaviour for incentives adhered to the acquirer. The strongest effect is measured for purely national targets that were acquired by a multinational firm. Profit shifting and debt shifting are identified as the two channels for tax avoidance.

When purely national targets are integrated into a multinational group, additional instruments become accessible for tax avoidance. In comparison to the situation before the acquisition, cost of capital will decrease after the acquisition because of new profit shifting opportunities. Other factors being equal, it is efficient to expand real activity of the target firm from the acquirer's perspective. The magnitude of this effect depends on the size of the tax advantage. The conducted empirical analysis in this paper will allow to measure this effect.

In the literature is some evidence that profit-shifting decouples investment decisions from local tax rates. Grubert (2003) finds that research and development

³⁶For an overview see Martynova and Renneboog (2008).

intensive firms are more likely to invest in extremely high-tax countries and extremely low-tax countries. He argues that research and development intensive firms have more profit shifting opportunities. These opportunities lead to a reduction of the negative effect of high tax rates on investment. Overesch and Schreiber (2010) confirm this interpretation. They give evidence that the volume of investment is independent of the tax rate if firms have a specifically high scope for profit shifting.

It depends on the regulatory environment within the target country to what extent international tax planning instruments can be used. As shown by the literature, profit shifting is primarily achieved by debt shifting as well as transfer pricing³⁷. The restriction of debt shifting by thin-capitalization rules is analyzed by Buettner et al. (2012). They find a significant reduction of profit shifting through debt financing if such a rule applies. The tighter the definition of the rule is, the higher is the effect of the restriction³⁸. Lohse and Riedel (2012) confirm this finding also regarding transfer pricing. Defining categories of strictness, they find out: The stricter the rule is designed in a country, the less profit shifting through transfer pricing will be observed.

If anti-avoidance rules are strict, cost of capital increase³⁹. The upper limit is the initial level of the stand-alone target firm if profit shifting is fully eliminated. The positive investment effect is removed. Nevertheless, there is an additional negative effect on real activity.

Before the acquisition, the target firm was purely national. From a tax avoidance perspective, international tax rate arbitrage is easily accessible. The only precondition is the availability of a relatively low-taxed subsidiary. Consequently, it

³⁷E.g. Desai et al. (2004) regarding debt shifting and Huizinga and Laeven (2008) regarding transfer pricing. For a further overview over the available literature please see Heckemeyer and Overesch (2013).

³⁸The definition of tightness is based on the safe haven debt to equity ratio.

³⁹For anti-profit shifting rules as an instrument for tax competition between countries, please see e.g. Haufler and Runkel (2008) and Paeralta et al. (2006).

must be a matter of cost why some firms remain purely national. Especially the specific knowledge for implementing the necessary structure is costly, as well as more complicated tax declarations and additional documentation requirements. After the acquisition, the target firm is part of a multinational group. The necessary structure for international tax rate arbitrage is available without bearing cost of implementation. There is a clear incentive to shift profits within the group. If shifting of pure profits is not possible, there is a tax incentive to shift existing real activity as well as future investments, and thus shift the connected profits from higher to lower taxed subsidiaries. For this reason, an additional negative effect has to be expected on real activity in the target country. Real activity, which is not inseparably connected to the target country (local rents), will be shifted if a tax advantage can be generated. The extent of shifting is growing with the size of the tax advantage that can be generated by the group.

Empirical evidence is given by Buettner et al. (2014), who analyze the effect of thin-cap rules and profit shifting regulations on foreign direct investment for a panel of German multinationals. They find a significantly lower foreign direct investment and employment associated with thin-cap rules in subsidiary countries⁴⁰. Concerning transfer pricing regulations, this effect can not be confirmed by Buettner et al. (2014).

The following effects are allowed to be measured by tracking former stand-alone firms after their acquisition by a multinational firm:

- The positive investment effects, caused by new profit shifting opportunities.
- Countervailing negative effects of anti-profit shifting rules.

The incentive to shift real activity within the acquiring group also depends on the regulatory environment within the acquirer's country of residence. The acquirer evaluates the profitability of shifting based on the potential increase in after-tax earnings of the whole group. Thus, the evaluation has to be differentiated by

⁴⁰Foreign direct investment is measured as property plant and equipment.

territorial systems and worldwide systems in the acquirer's country of residence. In a territorial system, tax burdens of each subsidiary are final. There is a clear incentive to reduce tax burdens in high tax countries and shift taxable income to low tax countries. However, in a worldwide tax system, taxes being paid within the subsidiaries' countries are credited against the home country tax rate in case of repatriation. The final tax burden is independent of any shifting between differently taxed subsidiaries.

Under certain conditions, groups being taxed by a worldwide system have the same incentives as those being taxed by an exemption system. Markle (2012) finds that the difference in the volume of profit shifting vanishes if there is no pressure to repatriate earnings for multinationals in a worldwide system. Barrios et al. (2012) show a decrease in the elasticity of location decisions of subsidiaries to repatriation cost if deferral is possible. Altogether, it is not clear whether acquirers being taxed by a worldwide system necessarily act differently. For this reason, acquirers, which are established in a country with a territorial system, are allowed to have a higher incentive to shift real activity for tax reasons and thus are analyzed separately.

In a similar way, controlled foreign company rules are intended to affect the incentive of profit shifting. Again, taxes being paid in subsidiary countries are credited in case of income being classified as cfc-income, but repatriation is no precondition for taxation in the home country. Home country taxation arises as soon as profits are realized. Ruf and Weichenrieder (2013) show evidence that cfc rules have influence on the allocation of passive assets for a panel of German multinationals. Passive assets and therefore passive income are mainly allocated to countries, where cfc rules are no obstacle.⁴¹ To analyse the effect of cfc rules,

⁴¹Ruf and Weichenrieder (2013) exploit variation in the distribution of passive assets of German multinationals caused by the Cadbury-Schweppes decision of the European Court of Justice in 2006.

the sample in the empirical analysis is split into acquirers that are restricted by a cfc rule and those acquirers that are not restricted by a cfc rule.

5.2.1. *Classification of Profit Shifting Regulations.* Real activity will be shifted if the expected return exceeds expected cost of shifting⁴². The expected return depends on the reduction of the effective tax rate that can be realized in the target country. Therefore, the effective tax rate is compared to the effective tax rate after shifting.

The target firm's effective tax rate (without shifting of real activity) depends on the statutory tax rate of the target country as well as the optimum extent of profit shifting. Buettner et al. (2012) show for debt shifting, Lohse and Riedel (2012) show for transfer pricing, an increasing reduction of profit shifting, the stricter the anti avoidance rule is designed. Thus, the smaller the remaining scope for profit shifting and the higher the expected return of shifting real activity, the more likely it is for firms to shift.

The designs of thin cap rules as well as of transfer pricing regulations show substantial similarity among the majority of countries in the dataset. Nevertheless, there are systematic differences with regard to the strictness of these rules. These differences are used to define a measure of strictness.

Thin cap rules. Multinational firms have an incentive to finance relatively high taxed subsidiaries with debt capital. This debt capital is provided by low taxed subsidiaries of the same group. While the high taxed subsidiary deducts interest payments from its' tax base, these payments result in taxable interest income at the low taxed subsidiary. For this reason, tax rate arbitrage can be realized.

In our sample, most of the target countries had or introduced a restriction for the deduction of interest payments. The majority of countries defines a maximum

⁴²For a more detailed analysis of economic effects please see Luckhaupt et al. (2012)

debt to equity threshold (safe haven). Up to this threshold interest deduction is allowed. Above this threshold, a further deduction is not allowed.

Following Buettner et al. (2012), this threshold is transformed into a measure of strictness in country i for year t :

$$TC_strictness_{i,t} = \frac{1}{1+\rho_{i,t}},$$

where $\rho_{i,t}$ is the threshold for country i in year t . Originally, $\rho_{i,t}$ takes values between 1.5 (for Germany between 2001 and 2007) and infinite (all cases where no rule exists); the transformed values are between 0 (no rule exists) and 0.4 (for Germany between 2001 and 2007). The value for $TC_strictness$ increases with the strictness of the rule. As shown by table 5.1, most variation over time comes from the introduction of a thin cap rule⁴³. During the observed period, the threshold was only changed in a small number of countries.

⁴³Among the countries in the dataset these are Bulgaria (1998), Poland (1999), Romania (2002), Latvia (2003), Italy (2004) and Croatia (2005).

TABLE 5.1. Strictness of thin cap rules over time

Country	Year													
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Belgium	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
Bulgaria	-	-	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	3.00	3.00	3.00
Czech Republic	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	2.00	2.00
Germany	3.00	3.00	3.00	3.00	3.00	1.50	1.50	1.50	1.50	1.50	1.50	1.50	(b)	(b)
Estonia	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spain	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Finland	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Croatia	-	-	-	-	-	-	-	-	-	4.00	4.00	4.00	4.00	4.00
Italy	-	-	-	-	-	-	-	-	5.00	4.00	4.00	4.00	(b)	(b)
Latvia	-	-	-	-	-	-	-	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Poland	-	-	-	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Romania	-	-	-	-	-	-	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Sweden	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Slovakia	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	-	-	-	-	-	-
Ukraine	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)

Strictness of thin cap rules in target countries over time, defined as maximum debt to equity ratio allowed by the rule. (a) In Ukraine exists a limitation of interest deduction, but it cannot be expressed as a debt to equity ratio. (b) After the introduction of the interest barrier, restrictions in Germany and Italy can no longer be expressed as a debt to equity ratio.

The definition above does not allow to include values for the Ukraine. In the Ukraine, interest payments, exceeding interest income, are deductible up to a certain percentage of the net income before tax. In Germany and Italy a limited amount of interest payments is deductible from the year 2008 onwards. Rules of this kind can not be transferred into the measure of strictness without further assumptions.

In some countries internal debt is only relevant for thin cap rules, implying innocence of external debt. For purposes of this paper, this differentiation is not relevant. As shown by Desai et al. (2004), internal debt reacts particularly sensitive to tax incentives and, in each case, internal debt is included by the thin cap rule.

From the acquirer's perspective, the decision to shift real activity is based on the expected reduction of the group's effective tax rate. Thin cap rules are expected to result in an increase of the effective tax rate. This concerns profits in the target country, because shifting of pure profits is restricted. The group's incentive to shift real activity shall be modelled. For this reason, variables describing the strictness of thin cap rules have to be related to the tax incentive. Firms will only perceive thin cap rules as disadvantageous if there is an incentive to shift profits from the target country to another subsidiary. The higher this incentive is, the more likely firms are shifting real activity. This tax incentive is specified by the difference between the target country's statutory tax rate and the lowest available statutory tax rate within the acquiring group. The variable `TC_strictness` will be interacted with this difference in the empirical analysis.

The majority of thin cap rules limits the amount of debt resulting in tax deductible interest payments. It might even be considered to manipulate the interest rate. Such a manipulation of interest rates is ruled out by transfer pricing regulations.

Transfer Pricing Regulations. The second major channel for international tax rate arbitrage is the manipulation of intra-firm transfer prices. There is an incentive to manipulate the stipulated price regarding transactions within the same group. The manipulation takes place in a way that the higher taxed firm generates lower taxable income and the lower taxed firm vice versa. Again, the group is able to benefit from international tax rate arbitrage.

In the dataset, transfer pricing regulations are even more prevalent than thin cap rules among countries, as illustrated by table 5.2. The majority of countries has transfer pricing regulations for the whole period. Only the Ukraine (2001) and Latvia (2007) introduced a rule. There is a trend to more tightened transfer pricing regulations in the observed period⁴⁴.

Transfer pricing regulations are intended to adjust stipulated prices if these differ from those, which would have been agreed on by independent firms⁴⁵. This is the so called arm's length principle. The arm's length principle is substantiated by certain methods to determine the true 'price'. Methods proposed by the OECD are divided into traditional transaction methods (the comparable uncontrolled price method, the resale price method and the cost plus method) and into transactional profit methods (the transactional net margin method and the transactional profit split method).⁴⁶ All these methods rely on the idea of comparing prices either to observable market transactions, or to transactions within the same firm. Firm specific information is necessary because firm specific factors influence prices. These factors are the performed function of each participant, risk-sharing or the economic environment.

Lohse et al. (2012) classify transfer pricing regulations in 6 categories of increasing strictness, ranging from 0 to 5. Their classification is based on the existence of transfer pricing regulations, documentation and disclosure requirements. The

⁴⁴Lohse et al. (2012).

⁴⁵OECD (2010).

⁴⁶For further details to the arm's length principle and methods, please see OECD (2010).

main focus is laid on the requirement for information, becoming available for the tax authorities. The availability of information is crucial for legal enforcement. It may be assumed that the requirement for additional information is a good indicator for the severity of tax authorities and for the remaining scope for price manipulations.

In the empirical analysis, this classification is used to describe the strictness of transfer pricing regulations. Whether a strict transfer pricing rule exists is indicated by a dummy variable $Tp_dum_{i,t}$. The variable takes the value 1 if the rule is classified in country i in year t into the categories three to five and 0 otherwise. This definition copes best with the ordinal nature of the chosen classification. From category three onwards, documentation requirements are introduced in national tax law. The variable has to be interacted with the difference between the statutory tax rate of the target country and the lowest statutory tax rate being available in the acquiring group.

TABLE 5.2. Strictness of transfer pricing regulations over time

Country	Year													
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Belgium	3.00	3.00	3.00	3.00	3.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Bulgaria	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	2.00
Czech Republic	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Germany	2.00	2.00	2.00	2.00	2.00	2.00	2.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Estonia	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	4.00	4.00	4.00
Spain	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	3.00	3.00	3.00
Finland	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	3.00	3.00	4.00
Croatia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.00	4.00	4.00	4.00	4.00
Italy	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Latvia	-	-	-	-	-	-	-	-	-	-	-	2.00	2.00	2.00
Poland	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Romania	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	3.00	3.00	3.00
Sweden	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	3.00	3.00	3.00
Slovakia	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	3.00
Ukraine	-	-	-	-	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Strictness of transfer pricing regulations in target countries over time, definition follows Lohse et al. (2012). Classifications are in a range between 0 (no rule exists) and 5 (very strict).

Regulatory Environment in the Acquirer's Country. From the acquirer's perspective, consequences have to be considered for the home country tax base when deciding for or against the shifting of real activity. A shifting will only take place if tax advantages are not abolished by a reverse tax effect in the home country. Such a reverse effect could be expected in a worldwide tax system. In a worldwide tax system, foreign pre-tax earnings are taxed at the statutory corporate tax rate in the home country. Taxes paid in the source country are credited against the resulting home country tax burden. As a result, the possible tax advantage of shifting is withdrawn by the home country.

Table 5.3 presents an overview over the system to avoid international double taxation, sorted by acquirer's countries of residence.

The incentive to shift real activity to low-tax subsidiaries could still persist in a worldwide tax system: First, home country taxation accrues only if foreign earnings are repatriated. As long as foreign earnings remain abroad, no taxes become due in the home country. For this reason, multinationals with residence in worldwide systems can act like multinationals in territorial systems regarding tax avoidance⁴⁷. Second, there could be alternative ways to repatriate foreign earnings without causing repatriation taxes, e.g. by a re-qualification of dividends to a repayment of equity.⁴⁸

⁴⁷Markle (2012) finds that multinationals with residence in worldwide systems do not differ from those in territorial systems if they have no pressure to repatriate foreign earnings. Tax deferral is well documented by e.g. Desai et al. (2001) and Egger et al. (2012).

⁴⁸For a discussion of different strategies concerning the US law, please see Desai et al. (2003) and Altshuler and Grubert (2003).

Table 5.3: System to avoid international double taxation

Country	Year													
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Austria	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Belgium	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Canada	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Croatia	-	-	-	-	-	1	1	1	1	1	1	1	1	1
Cyprus	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Czech Republic	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Denmark	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Finland	0	0	0	0	0	0	0	0	0	0	0	0	0	0
France	0	0	0	0	0	0	0	0	0	0	1	1	1	1
Germany	0	0	0	0	0	1	1	1	1	1	1	1	1	1
Iceland	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ireland	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Italy	0	0	0	0	0	0	0	1	1	1	1	1	1	1
Japan	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Luxembourg	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Continued on next page

Table 5.3: System to avoid international double taxation

Country	Year													
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Netherlands	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Norway	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poland	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Russian Federation	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Slovenia	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Spain	0	0	0	0	1	1	1	1	1	1	1	1	1	1
Sweden	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Switzerland	2	2	2	2	2	1	1	1	1	1	1	1	1	1
United Kingdom	0	0	0	0	0	0	0	0	0	0	0	0	0	1
United States	0	0	0	0	0	0	0	0	0	0	0	0	0	0

System to avoid international double taxation in the acquiring group's country of residence. 0 denotes exemption system; 1 credit systems and 2 tax deduction. In the analysis, tax deduction is treated as exemption, because taxes are final in the subsidiary country.

A second reverse effect could originate from a cfc rule in the acquirer's country of residence. As in a worldwide tax system, cfc rules result in a home country taxation while crediting foreign taxes. Thus, the home country determines the final tax burden. The difference is that specifically defined cfc income is only affected. Home country taxation accrues independently of income repatriation. For this reason, cfc rules can be found in territorial systems as well as in worldwide systems.

This latter fact suggests that cfc rules are tighter than worldwide taxation and not avoidable. There are additional requirements that have to be met in order to qualify income as cfc income. Cfc rules have in common, that only low-taxed foreign income is determined to be cfc income. This is either defined by a threshold for the foreign tax burden, or by a list of tax-haven countries. Originating from one of these countries, income is supposed to be low-taxed. Applied to tax avoidance, this requirement at least raises the bottom line for low statutory tax rates in the decision, where to allocate profits.

A further constraint can be that income from passive sources is only qualified as cfc income. Dividends, interest, royalties or leases are typically subsumed under passive income. In this paper, the incentive to shift real activity is analyzed. The difference to shifting pure profits is that labor and real capital are shifted to a low-tax country. The resulting income cannot be regarded as passive income. For this reason, cfc rules restrict only the shifting of real activity if income from active sources is included in cfc income. In the empirical analysis, a restrictive cfc rule is only assumed if active income is considered by the cfc rule⁴⁹.

⁴⁹Income from active sources is included in cfc income in: Estonia, Finland, France, the United Kingdom, Iceland, Italy, Norway, Portugal and Sweden.

5.2.2. *Incentives to shift Functions.* Overall, it can be stated that after joining an international group, there is an incentive to shift a target firm's profits. If pure profits cannot be shifted, the firm will shift real activity.

Following the OECD transfer pricing guidelines⁵⁰, the shifting of functions has to comply with the arm's length principle. If there are any valuable assets transferred between two firms, this transfer can be taxed if two unrelated parties would arrange a compensation. When the transfer of an ongoing concern is evaluated, one must not simply sum up the separate values of assets. Instead, the value of the whole concern has to be considered. The guidelines demand for such a valuation, but the assessment remains difficult⁵¹. If the transaction is taxed based on market values by the target country, shifting of existing real activity will be prevented. If values remain sufficiently manipulable, shifting will continue.

Regarding future investments, however, the incentive to shift is unaffected and the target country will suffer a lower volume of real activity. Due to identical economic consequences, the shifting of existing real activity or future investments are not differentiated.

The volume of real activity is measured by the number of employees in a specific country and the value of total assets in the balance sheet. That way, the input factors labor and capital are covered. Nevertheless, shifting is only perceived in the data if one of the two variables is affected. If other factors, e.g. risk, are shifted, the arm's length price can be manipulated for transactions without affecting one of the two variables⁵². Thus, shifting effects tend to be understated in this analysis.

This analysis aims to measure two tax driven effects:

First, the positive investment effect is measured if profit shifting becomes possible

⁵⁰OECD (2010).

⁵¹Schreiber (2009).

⁵²E.g. an autonomous manufacturing unit could convert into a contract manufacturer with a low cost-plus remuneration, without affecting the number of employees or total assets.

and cost of capital decrease due to an acquisition. Second, the countervailing negative effect is measured for anti-profit shifting rules. Both effects increase with the difference between the statutory tax rates in the target country and the tax rate of the acquiring group⁵³. Both effects occur only if the tax rate in the target country is above the tax rate of the acquiring group. For this reason, the sample is reduced to those targets that are taxed with a higher tax rate than the acquiring group.

5.3. Empirical Analysis.

5.3.1. *Data.* From the Zephyr (Bureau van Dijk) database all acquisitions are extracted for the period 1997-2009. The following information is identified: The target firm, the acquirer and the seller as well as the year of acquisition. Financial data is merged from the Amadeus (Bureau van Dijk) database. The targets are only kept in the analysis if they are tagged as active for the whole period. This guarantees the reliability of financial data. Only share-deals are kept to exclude a direct influence of the acquisition on the balance sheet. Furthermore, the transaction has to be completed and the entire capital has to be acquired. Minority shareholders would negatively affect the incentive for tax avoidance. In addition, the sample is reduced to targets that do not operate in the financial services industry. The balance sheet items are not necessarily comparable for this industry. Moreover, the motivation for acquisitions can be different⁵⁴.

The analysis tracks purely national targets that become part of a multinational group. To ensure that targets were not part of a multinational group before, ownership data is exploited from the Amadeus database. In a first step, all deals are marked as international deals if the target and the acquirer are not resident in the same country. In a second step, each national deal is re-sorted to international

⁵³For the acquiring group the lowest available statutory tax rate among all subsidiaries is taken.

⁵⁴Focarelli et al. (2002).

if any member-firm within the acquiring group is located in a foreign country. Using ownership data for the seller firms, the resulting international deals are taken out of the sample if the target was already part of an international group before the acquisition.⁵⁵ The remaining deals are kept if the target country's statutory tax rate is above the minimum tax rate in the acquiring group. This condition must be fulfilled in at least one year after the acquisition. Only those deals are exposed to tax incentives as described above.

For the remaining 1.185 target firms, accounting data is required at least in the year before the acquisition as well as the year after. The year of acquisition remains disregarded, as the timing of acquisitions is highly varying within this year. A comparison is difficult for the effects in this specific year. The final sample consists of 209 target firms with 1.615 observations, offering data for all necessary variables.

To conduct this analysis, detailed tax data is necessary: Corporate tax-rates, information on anti-avoidance regulations, the system to avoid double taxation and cfc-rules are taken from the IBFD country analyses and the Worldwide Corporate Tax Guides provided by Ernst and Young. Further information on cfc-rules are derived from the Guide to Controlled Foreign Company Regimes, provided by Deloitte.

The following macro controls are included for the target country: GDP, the growth rate of GDP, the total labor-force and the rate of inflation, measured by changes in the consumer price index. These are taken from the Worldbank database. Additionally, the corruption perceptions index, provided by Transparency International, is included.

5.3.2. *Econometric Approach.* The econometric setting exploits the ability to track targets over time. Using a panel estimation approach allows to include

⁵⁵Amadeus ownership data is not provided for past periods. Thus, it is assumed that the current ownership structure did not change with respect to multinationality of the group.

target fixed effects to control for any unobserved, time-consistent, target-specific characteristics influencing the outcome variable. In addition, time-fixed effects are included to control for unexpected variation over time. The following model is chosen:

$$Y_{j,t} = \beta_0 + \beta_1 * Aftermerger_{j,t} + \beta_2 * Taxdif_{j,t} + \beta_3 * Strict_{j,t} + \beta_4 * Aftermerger_{j,t} * Strict_{j,t} + \beta_5 * Interaction_{j,t} + \beta_6 * X_{j,t} + \alpha_i + u_{j,t}.$$

$Y_{j,t}$ is the dependent variable for firm j in period t . The extent of real activity in the target country is measured by the logarithm of the number of employees ($Ln(Empl)$) and the logarithm of total assets ($Ln(Toas)$).

Aftermerger is a dummy variable equal to 0 in all periods before the acquisition and 1 afterwards. *Taxdif* is the difference between the statutory corporate tax rate in the target country and the lowest available rate in the acquiring group. At the moment of acquisition, this variable receives explanatory power. For this reason, the value is set to 0 for all periods before the acquisition. *Strict* defines the strictness of an anti-profit shifting rule. Concerning transfer pricing regulations, the variable is a dummy variable indicating whether a rule is strict (equal to 1) or not strict (equal to 0). Concerning interest deduction restrictions, the variable takes the values of the measure of strictness as defined above. *Aftermerger * Strict* has to be included as a control term. *Interaction* is the interaction term between *Taxdif* and *Strict*⁵⁶. X is a vector of time-varying control variables. α stands for time-consistent and target-specific characteristics. u is the error term.

β_1 captures the change in the dependent variable due to synergy gains caused by the acquisition. β_2 measures the investment effect of acquisitions originating in the tax incentive. As stated above, β_2 is expected to show a positive effect. High taxed targets will benefit from a lower cost of capital after acquisition by way of profit shifting. If this effect is restricted, firms have an incentive to adjust

⁵⁶Due to the definition of the variable *Taxdif*, the interaction between *Aftermerger* and *Taxdif* is perfectly multicollinear and thus not included in the model.

their investment in the target country, which is captured by β_5 . The higher the statutory corporate tax rate in the target country and the stricter the anti-profit shifting rule, the stronger is the incentive to reduce real investment. Thus, β_5 is expected to be negative.

The logarithm of sales ($Ln(Sales)$) is included as a control variable. This accounts for the importance of the market in the target country from the firm's point of view. A dummy variable ($Loss$) is added which equals to 1 if the target firm makes a loss. Loss firms could behave differently. The logarithm of GDP ($Ln(GDP)$) and the growth of GDP ($GDPgrowth$) are included to control for size and dynamics of the market in the target country. The variable $Ln(Laborforce)$ controls for the size of the labor market in the target country. Finally, it is accounted for risks in the target country. Therefore, the inflation rate ($Inflation$) and the corruption perceptions index ($Tici$) are included.

Table 5.4: Definition of variables

Variable	Definition
Ln(Empl)	Logarithm of the target firm's number of employees. Source: Amadeus Database (Bureau van Dijk).
Ln(Toas)	Logarithm of the target firm's total assets. Source: Amadeus Database (Bureau van Dijk).
Taxdif	Measure for tax incentives to shift profits to low-tax subsidiaries. Calculated as the difference between the statutory tax rate of the target country and the lowest available statutory tax rate within the same group.
Tp_dum	Dummy variable equal to 1 if a strict transfer pricing regulation is in force in the target country, equal to 0 otherwise. A transfer pricing regulation is defined as strict if the rule is classified into categories 3 to 5. Categorization follows Lohse et al. (2012).
TC_strictness	Strictness of the thin cap rule, calculated as defined in section 5.1.
Aftermerger	Dummy variable equal to 1 if the period is after the acquisition and 0 otherwise.
Interaction	Interaction term between the variables Taxdif, and the variable Tp_dum or TC_strictness.
STR	Statutory tax rate in the target country. Source: IBFD, Worldwide Corporate Tax Guides (Ernst and Young).
Ln(Sales)	Logarithm of turnover of the target firm. Source: Amadeus Database (Bureau van Dijk).

Continued on next page

Table 5.4: Definition of variables

Variable	Definition
Loss	Dummy variable equal to 1 if the target firm realized a loss in the tax statement for the respective year.
Ln(GDP)	Logarithm of GDP in the target country. Source: Worldbank.
GDPgrowth	Annual percentage growth rate of GDP in the target country. Source: Worldbank.
Ln(Labor force)	Logarithm of total labor force in the target country. Source: Worldbank.
Inflation	Rate of inflation (consumer prices) in the target country. Source: Worldbank.
Tici	Corruption Perception Index. Source: Transparency International.

Table 5.5 provides descriptive statistics for all variables entering the multivariate analysis.

TABLE 5.5. Descriptive statistics

Variable	N	Mean	SD	Min	Max
Ln(Empl)	1615	4.140	1.380	0	9.100
Ln(Toas)	1615	16.16	1.420	11.37	21.48
Taxdif	1615	0.0400	0.0700	-0.210	0.270
Tp_dum	1615	0.350	0.480	0	1
TC_strictness	1562	0.130	0.120	0	0.400
STR	1615	0.320	0.0500	0.160	0.520
Ln(Sales)	1615	16.42	1.430	9.210	20.39
Loss	1615	0.270	0.450	0	1
Ln(GDP)	1615	26.93	0.880	23.86	28.92
GDPgrowth	1615	2.330	2.530	-8.270	10.68
Ln(Labor force)	1615	16.01	0.830	14.48	17.56
Inflation	1615	0.0300	0.0200	0	0.340
Tici	1615	7.240	1.780	2.100	10

Table 5.6 depicts the regional origins of target firms. As shown, the requirement of financial data for target firms shrinks the sample exclusively to European countries, according to the regional coverage of the Amadeus database. The number of target countries is not large enough for clustering standard errors on the target country level, as argued by Petersen (2009). To overcome this shortage of clusters, in all regressions, bootstrapped standard errors are presented clustered on the target country level.⁵⁷

⁵⁷Please see Cameron et al. (2008) for further information on improved inference obtained by bootstrapping methods.

Table 5.6: Origins of target firms

Country	Number
Belgium	34
Croatia	2
Czech Republic	8
Finland	18
Germany	5
Italy	21
Poland	8
Romania	3
Slovakia	1
Spain	56
Sweden	52
Ukraine	1

Countries of residence of target firms.

For acquiring groups, a matching with financial data is not necessary. The Zephyr database has a worldwide coverage. Non-European countries are also included, as shown in table 5.7.⁵⁸

Table 5.7: Origins of acquiring groups

Country	Number
Austria	2
Belgium	7
Canada	2
Croatia	1
Curacao	1

Continued on next page

⁵⁸Additional countries are included in the calculation of the lowest available statutory corporate tax rate for each group. For brevity, these countries are not reported.

Table 5.7: Origins of acquiring groups

Country	Number
Cyprus	1
Czech Republic	1
Denmark	11
Finland	9
France	18
Germany	17
Iceland	2
Ireland	5
Italy	3
Japan	5
Korea	1
Luxembourg	2
Netherlands	20
Norway	5
Poland	2
Portugal	2
Russia	2
Slovenia	1
Spain	23
Sweden	31
Switzerland	5
United Kingdom	17
United States	13

Acquiring firms' countries of residence. Where the global ultimate owner is head-quartered in a different country, that country is reported.

5.4. Results.

5.4.1. *Main Results.* Table 5.8 contains results for the basic regressions. The dependent variable is the logarithm of the number of employees. All specifications show a positive coefficient for the variable *Aftermerger*. For this reduced sample of acquisitions, synergy gains seem to be of minor relevance⁵⁹.

Evidence is mixed for a positive investment effect of a decrease in cost of capital compared to the situation before the acquisition. The sign for the *Taxdif* coefficients switches between specifications. The coefficient is only significant in the second regression.

After the acquisition, a strict anti-profit shifting rule results in a significant reduction in the number of employees if the newly formed group has a tax incentive to shift profits out of the target country, as shown by regression 1. The coefficient for the interaction term shows a 0.51 percentage points decrease in the number of employees per percentage point in the difference of the statutory tax rates. In regression 2, the first two years after the acquisition are dropped to allow for a longer period of adjustment. The effect considerably increases, accounting for a 0.8 percentage points decrease in the number of employees per percentage point tax difference.⁶⁰

If both effects are compared, the negative effect of an anti-profit shifting regulation dominates. Overall, there is a 0.2 percentage points reduction in the number of employees.

⁵⁹The empirical literature contains mixed results. For an overview please see Gugler and Yurtoglu (2004). Newer articles document the existence of synergy gains depending on different deal and country characteristics as hostility of the acquisition (Conyon et al. (2002)) or country specific labor adjustment cost (Gugler and Yurtoglu (2004)).

⁶⁰Evaluating the interaction term, the overall effect of a strict transfer pricing regulation has to be calculated as following: $\frac{\delta \text{Ln}(\text{Empl})}{\delta \text{Strict}} = 0.06 - 0.01 - \text{Taxdif} * 0.81$. In fact, effects of the variables *Tp_dum* and *After*Tp_dum* are economically insignificant, which is why these can remain disregarded.

This result cannot be confirmed for interest deduction restrictions, as tested in regressions 3 and 4. In the context of an acquisition, profit shifting via debt shifting seems to be of minor importance⁶¹.

Apart from tax effects, the volume of sales has a strictly positive effect on the number of employees, as equally found in the organizational literature⁶². The effect of the absolute market size, measured as size of GDP, seems to have a negative effect. A positive effect is shown for the size of the labor market. This finding indicates that highly developed labor markets result in a competitive advantage. Firms with a tax loss tend to experience an increase in the number of employees, which shows that loss firms are acquired with particular interests. Furthermore, there is an incentive to set off former losses against future profits for tax reasons. The coefficients for the inflation rate indicate a negative effect of the associated risk on real investment.

Regarding total assets, coefficients for the variable *Taxdif* indicate a positive investment effect. This effect is significantly more distinct when allowing for a longer adjustment period, as done in regressions 2 and 4 (table 5.9). In the long run, a 1 percentage point tax difference results in an increase in total assets of about equal size.

This positive effect faces a negative effect if a strict transfer pricing regulation is in force. The coefficient of the variable *Interaction* is significantly negative when controlling for transfer pricing regulations. A 1 percentage point tax difference comes along with a 0.8 points decrease in total assets. Contrary to the finding above, here, the positive investment effect dominates.

⁶¹This result is supported by the finding of Heckemeyer and Overesch (2013) that transfer pricing is the dominant shifting channel.

⁶²E.g. Gugler and Yurtoglu (2004).

TABLE 5.8. Number of employees after M&A

	(1)	(2)	(3)	(4)
Aftermerger	0.0640*	0.0544	0.0740	0.0743
	(1.65)	(0.56)	(0.83)	(0.36)
Taxdif	0.197	0.616**	-0.162	-0.0909
	(0.72)	(2.00)	(-0.22)	(-0.06)
Tp_dum	0.0314	0.0629		
	(0.32)	(0.81)		
After*Tp_dum	0.00799	-0.0133		
	(0.09)	(-0.13)		
TC_strictness			-0.565	-0.980*
			(-1.42)	(-1.93)
After*TC_strictness			0.0545	-0.0254
			(0.17)	(-0.04)
Interaction	-0.510***	-0.809***	0.497	1.458
	(-2.64)	(-2.96)	(0.19)	(0.28)
STR	1.017	0.788	1.231*	0.997
	(1.49)	(0.78)	(1.73)	(0.94)
Ln(Sales)	0.436***	0.458***	0.432***	0.454***
	(7.48)	(6.97)	(6.67)	(6.51)
Loss	0.0807**	0.0798*	0.0805**	0.0764**
	(2.37)	(1.89)	(2.21)	(1.99)
Ln(GDP)	-0.511**	-0.562**	-0.396	-0.399
	(-2.16)	(-1.97)	(-1.27)	(-1.01)
GDPgrowth	0.00619	-0.00179	-0.000874	-0.00908
	(0.57)	(-0.15)	(-0.07)	(-0.77)
Ln(Labour force)	1.325***	1.272**	0.915	0.824
	(3.13)	(2.37)	(1.50)	(0.89)
Inflation	-1.894**	-2.185*	-1.580	-1.934
	(-2.12)	(-1.79)	(-1.30)	(-1.35)
Tici	0.0535	0.0586	0.0313	0.0348
	(0.73)	(0.66)	(0.34)	(0.30)
Constant	-11.02**	-9.163	-7.327	-6.039
	(-1.98)	(-1.04)	(-1.08)	(-0.47)
Observations	1615	1204	1562	1158
Number of groups	209	209	208	208
R^2	0.421	0.439	0.427	0.449

Dependent variable is Ln(Empl). Regressions 1 and 2 analyze the effect of transfer pricing regulations after an acquisition. Regressions 3 and 4 analyze the effect of thin-cap rules. Regressions 2 and 4 allow for a longer period of adjustment by dropping observations in the first two years after an acquisition. Transfer pricing regulations are defined as strict if the specific regulation is sorted into categories 3 to 5. The strictness of thin-cap rules is based on the maximum debt to equity ratio. Firm specific and year specific fixed effects are included in all regressions. Bootstrapped standard errors are clustered on the target country level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Unlike employees, assets are recorded in the balance sheet. Thus, the shifting of existing assets results in the taxation of hidden reserves. This could explain, why total assets react more inelastic than employees. Besides, results indicate that predominantly labor-intensive functions are shifted.

The importance of a market for a firm ($\ln(\text{Sales})$) is positively related to the volume of real investments. Regarding total assets, the same is true for the absolute size of the market, measured as the size of the GDP. As before, a high inflation risk is associated with lower investments in the target country.

TABLE 5.9. Total assets after M&A

	(1)	(2)	(3)	(4)
Aftermerger	0.0330 (0.69)	-0.172*** (-2.61)	0.0594 (0.63)	-0.106 (-0.95)
Taxdif	0.377*** (2.75)	1.041*** (3.98)	0.152 (0.48)	0.433 (0.91)
Tp_dum	0.00388 (0.05)	-0.00743 (-0.09)		
After*Tp_dum	0.0789 (0.84)	0.166 (1.41)		
TC_strictness			0.00948 (0.02)	-0.0179 (-0.03)
After*TC_strictness			0.171 (0.46)	0.178 (0.43)
Interaction	-0.668*** (-3.18)	-0.797** (-2.25)	-1.088 (-0.92)	0.128 (0.07)
STR	-0.382 (-0.42)	-1.056 (-0.97)	0.547 (0.71)	-0.114 (-0.12)
Ln(Sales)	0.433*** (15.95)	0.494*** (29.21)	0.436*** (15.69)	0.501*** (29.59)
Loss	0.0325 (0.91)	0.0475 (1.34)	0.0329 (0.88)	0.0495 (1.48)
Ln(GDP)	0.537 (1.33)	0.446 (1.01)	0.832** (2.36)	0.710* (1.86)
GDPgrowth	-0.00291 (-0.19)	-0.00814 (-0.51)	-0.0129 (-0.83)	-0.0198 (-1.20)
Ln(Labour force)	0.246 (0.38)	0.171 (0.29)	-0.190 (-0.28)	-0.353 (-0.55)
Inflation	-3.031** (-2.54)	-2.205 (-1.61)	-1.933* (-1.65)	-1.108 (-0.83)
Tici	0.0207 (0.28)	0.0321 (0.45)	0.00460 (0.11)	-0.00384 (-0.08)
Constant	-9.558 (-1.28)	-6.745 (-0.85)	-10.65 (-1.63)	-5.536 (-0.72)
Observations	1615	1204	1562	1158
Number of groups	209	209	208	208
R^2	0.703	0.730	0.706	0.732

Dependent variable is Ln(Toas). Regressions 1 and 2 analyze the effect of transfer pricing regulations after an acquisition. Regressions 3 and 4 analyze the effect of thin-cap rules. Regressions 2 and 4 allow for a longer period of adjustment by dropping observations in the first two years after an acquisition. Transfer pricing regulations are defined as strict if the specific regulation is sorted into categories 3 to 5. The strictness of thin-cap rules is based on the maximum debt to equity ratio. Firm specific and year specific fixed effects are included in all regressions. Bootstrapped standard errors are clustered on the target country level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

5.4.2. *Inclusion of anti-profit shifting rules in the acquirer country.* According to the results in the preceding section, firms react to transfer pricing restrictions by adjusting the quantity of employees in the target country, following an acquisition.⁶³ Consequently, the remaining question is whether the acquiring group's country of residence can influence this reaction. As argued above, worldwide tax systems could reduce the benefit of international tax rate arbitrage. Affected firms are supposed to show a lower reaction to anti-profit shifting regulations.

In table 5.10 the sample is divided according to the system used to avoid international double taxation. The first and the third column include all acquiring groups underlying a worldwide tax system. The second and the fourth column include observations, where the exemption method applies. For the number of employees as dependent variable, the negative effect of anti-transfer pricing regulations can only be proved for groups underlying an exemption system. The effect is less pronounced for the group of worldwide taxed firms. Moreover, the positive investment effect is stronger for the tax exempted group. Nevertheless, the difference between the two groups is not statistically significant for both effects, at conventional levels.

Regressions 3 and 4 analyze the effects on total assets. The negative effect for the worldwide taxed group exceeds the effect for the tax exempted group. This is against the expectations. Again, this difference is not statistically different at conventional levels.

Overall, the differentiation between worldwide taxed and tax exempted groups gives no clear picture. The results indicate that firms can partially overcome the negative incentives of worldwide tax systems. This can be explained by

⁶³As there was no evidence found for an effect of thin-cap rules, further analyses are solely based on transfer pricing regulations. None of the distinguished groups shows statistically significant effects of thin-cap rules. Results are available upon request.

deferral or alternative repatriation strategies⁶⁴. Possibly, a further differentiation by the necessity of repatriation would give further insights, analogously to Markle (2012)⁶⁵.

Compared to worldwide tax systems, cfc rules are the more specific and stricter rules to prevent international tax rate arbitrage. The repatriation of foreign earnings is no necessary precondition to tax foreign income if the limits of the cfc rule are violated.

In table 5.11 the sample is split into acquisitions, where the acquiring group underlies a cfc rule (regressions 1 and 3) and acquisitions, where such a rule does not exist (regressions 2 and 4).

The shifting of real activity will not be qualified as passive income. For this reason, cfc rules are only taken into account if active income is particularly covered by the rule.

Regarding the number of employees, there is a positive but statistically insignificant investment effect for the group, which is not covered by a cfc rule. This is shown by the variable *Taxdif* in regression 2. The coefficient indicates a 0.86 percentage points increase per percentage point tax difference. The estimated coefficient for the interaction term is significantly negative for acquisitions in this group. A 1.0 percentage point higher tax difference results in a 1.07 percentage points reduction of the number of employees in the target country if a strict transfer pricing regulation is enacted. This group exhibits the highest coefficient in this study. This effect is dominating compared to the positive, but insignificant investment effect. Overall, with a 1.0 percentage point higher tax difference, the

⁶⁴Both strategies are well documented by empirical literature. Desai et al. (2001) and Egger et al. (2012) document tax deferral. Alternative repatriation strategies are analyzed by Desai et al. (2003) and Altshuler and Grubert (2003) concerning US law.

⁶⁵This would result in a further reduction of the sample size, which is why such an analysis is left out.

TABLE 5.10. Differentiation between worldwide tax systems and exemption systems

Dependent Variable	Ln(Empl)		Ln(Toas)	
	(1)	(2)	(3)	(4)
Aftermerger	0.351*** (2.85)	-0.205* (-1.67)	-0.222 (-1.51)	-0.319*** (-4.82)
Taxdif	0.108 (0.17)	1.018 (1.56)	1.829*** (2.98)	1.385*** (5.63)
Tp_dum	0.0965 (0.75)	-0.0449 (-0.43)	0.0546 (0.43)	0.0946 (0.69)
After*Tp_dum	-0.231 (-1.17)	0.271* (1.78)	0.190 (1.38)	0.178 (0.48)
Interaction	-0.259 (-0.33)	-1.001** (-2.33)	-1.968*** (-2.71)	-0.734* (-1.88)
STR	-0.475 (-0.62)	2.787 (1.62)	-1.952 (-1.28)	0.963 (0.71)
Ln(Sales)	0.587*** (4.27)	0.375*** (9.32)	0.489*** (4.33)	0.472*** (10.27)
Loss	0.0514 (1.51)	0.101 (1.61)	-0.0917** (-2.09)	0.126*** (3.84)
Ln(GDP)	-0.615 (-1.44)	-0.725** (-2.11)	0.686* (1.80)	0.554 (0.59)
GDPgrowth	-0.0147 (-1.04)	0.0110 (0.66)	-0.0101 (-0.55)	-0.0340* (-1.82)
Ln(Labour force)	1.013 (0.76)	1.874** (2.29)	0.841 (0.78)	-2.179 (-1.54)
Inflation	-1.132 (-0.46)	-0.0202 (-0.02)	-0.225 (-0.18)	-5.850** (-2.39)
Tici	0.0393 (0.35)	0.0599 (0.63)	0.0146 (0.21)	-0.00530 (-0.05)
Constant	-4.849 (-0.19)	-14.23 (-0.97)	-22.90 (-1.14)	28.08 (1.57)
Observations	614	576	614	576
Number of groups	126	129	126	129
R^2	0.449	0.457	0.728	0.735

In regressions 1 and 3 observations are only included if the acquiring group is located in a country with a worldwide tax system. Regressions 2 and 4 include the remaining observations. In all regressions the variable Strict refers to transfer pricing regulations. Transfer pricing regulations are defined as strict if the specific regulation is sorted into categories 3 to 5. Firm specific and year specific fixed effects are included in all regressions. Bootstrapped standard errors are clustered on the target country level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

number of employees in the target country is reduced by about 0.21 percentage points. If there is a restriction by a cfc rule the effect of a transfer pricing regulation turns positive and the investment effect is diminished. Thus, if cfc rules are designed to cover active income tax incentives to shift real activity to low-tax subsidiaries are eliminated.

With respect to the volume of total assets, the investment effect is only significantly different from 0 for the group without a cfc rule. The same applies to the negative effect of a transfer pricing regulation.

TABLE 5.11. Differentiation by cfc rule

Dependent Variable	Ln(Empl)		Ln(Toas)	
	(1)	(2)	(3)	(4)
Aftermerger	0.246** (2.11)	-0.0829 (-0.67)	-0.0627 (-0.26)	-0.251*** (-3.00)
Taxdif	0.294 (0.55)	0.861 (1.57)	0.423 (0.64)	1.266*** (4.09)
Tp_dum	0.222 (1.38)	-0.0203 (-0.25)	-0.222 (-1.03)	0.0845 (0.91)
After*Tp_dum	-0.583*** (-3.30)	0.223* (1.71)	0.240 (1.26)	0.170 (0.92)
Interaction	0.846** (2.43)	-1.073*** (-3.48)	-0.461 (-0.46)	-0.776* (-1.87)
STR	-0.910 (-0.78)	1.988* (1.70)	-2.214 (-0.98)	0.0567 (0.04)
Ln(Sales)	0.621*** (5.40)	0.366*** (9.83)	0.497*** (4.27)	0.488*** (10.09)
Loss	0.146** (2.43)	0.0684 (1.44)	0.0259 (0.44)	0.0679* (1.72)
Ln(GDP)	-0.311 (-0.57)	-0.681*** (-2.76)	0.867 (1.54)	0.231 (0.43)
GDPgrowth	-0.0196 (-0.95)	-0.00660 (-0.36)	-0.00799 (-0.27)	-0.00740 (-0.48)
Ln(Labour force)	1.067 (0.46)	1.170** (2.51)	0.290 (0.17)	-0.363 (-0.42)
Inflation	-1.699 (-0.44)	-1.158 (-0.96)	-1.690 (-0.71)	-1.600 (-0.78)
Tici	0.0488 (0.28)	0.0524 (0.90)	-0.0223 (-0.24)	0.0582 (0.62)
Constant	-14.90 (-0.33)	-3.399 (-0.32)	-19.29 (-0.59)	7.109 (0.53)
Observations	492	712	492	712
Number of groups	87	122	87	122
R^2	0.512	0.453	0.735	0.737

In regressions 1 and 3 observations are only included if the acquiring group is located in a country where a cfc rule is in force. Thereby, cfc rules are only considered if active income is covered by the rule. Regressions 2 and 4 include the remaining observations. Transfer pricing regulations are defined as strict if the specific regulation is sorted into categories 3 to 5. Firm specific and year specific fixed effects are included in all regressions. Bootstrapped standard errors are clustered on the target country level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

5.5. Conclusions. This paper addresses the effect of mergers and acquisitions on the volume of real activity in the target country. Therefore, originally purely domestic target firms are tracked after their acquisition by a multinational group. Evidence is given for a positive investment effect. This effect occurs if the target firm is high taxed and cost of capital decrease after the acquisition, due to intra-group profit shifting. In the long run, the number of employees increases by 0.6, total assets by 1.0 percentage points with a 1 percentage point higher tax incentive to shift profits out of the target country.

In addition, clear evidence is given for a heavily negative shifting effect of anti-transfer pricing regulations on the volume of real activity in the target country. If profit shifting via the manipulation of transfer prices is restricted a 1 percentage point higher tax incentive results in a 0.5 percentage points decrease in the number of employees. This decrease is even stronger, amounting to 0.8 percentage points, when allowing for a three years adjustment period. Regarding total assets, this effect amounts to 0.8 percentage points in the long run.

Comparing both effects, the negative shifting effect exceeds the positive investment effect with respect to employees in the target country. In particular, labor-intensive functions are negatively affected. A negative effect concerning the restriction of debt shifting cannot be proved.

If an acquirer is able to shift profitable functions to low-tax countries, anti-profit shifting regulations do not prevent an ownership advantage for multinational groups. Instead of pure profits, real activity will be shifted between subsidiaries. The country of residence of the group's head-quarter is able to eliminate this tax incentive. Therefore, cfc rules are an appropriate instrument.

After all, it is in the hands of the country of residence of the acquiring firm to cut an ownership advantage of multinational groups, with respect to tax avoidance.

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6. CORPORATE GROUP COMPLEXITY IN TERRITORIAL AND WORLDWIDE
COUNTRIES.

Corporate Group Complexity in
Territorial and Worldwide
Countries.⁶⁶

⁶⁶This project bases on a common research idea with Christian Steffens (University of Mannheim) and Johannes Voget (University of Mannheim).

6.1. Introduction. The literature offers deep insights into potential conflicts between shareholders of a firm and managers, going back to Jensen and Meckling (1976). It is well known that managerial behaviour must not necessarily be in line with shareholders' aims. Instead, there is some managerial discretion where to allocate funds of the firm, constituting an expropriation risk for shareholders.⁶⁷ Governance systems as well as compensation schemes are intended to assure the fair share of income for shareholders. Furthermore, Desai et al. (2007) find that a better tax enforcement is able to reduce managerial diversion.

There are specific firm characteristics leading to an increased expropriation risk. Bodnar et al. (1999) hypothesize that within multinational corporations monitoring of management decisions will be more difficult as these are more complex. Denis et al. (2002) confirm that high geographic diversification of a firm is priced with a value discount. Regarding management compensation, Black et al. (2014) show that compensation increases with the complexity of firms. However, this relation does not hold if complexity is equivalent to managerial discretion with a high risk of resources' diversion. While complexity can be disadvantageous for shareholders, tax rules induce often more complex group structures.⁶⁸ This study picks up tax rules regarding profit repatriation. We test if higher repatriation tax cost lead to more complex group structures.

Group structures of corporations are driven by various factors. Besides organizational needs and control reasons, taxes can be one driver affecting the decision, how to integrate operational subsidiaries into the specific group. Besides repatriation taxes⁶⁹, taxation at the source (withholding taxes) and the taxation of capital gains have to be considered. Evidence for the importance of withholding

⁶⁷e.g. Shleifer and Vishny (1997).

⁶⁸Desai et al. (2007).

⁶⁹While this term includes taxes imposed by the source state, here only taxation by the headquarters' state of residence is referred to.

taxes is given by Dreßler (2012), Lewellen and Robinson (2013) and Mintz and Weichenrieder (2010). The influence of repatriation taxes is not yet fully analysed. Lewellen and Robinson (2013) find for a set of U.S. multinationals that ownership links within a group occur more frequently if a specific tax deferral strategy is enabled. Mintz and Weichenrieder (2010) analyze inbound investments into Germany. Inconsistent with theory, they find a lower probability for the use of holding companies if the headquarter is taxed worldwide and repatriation taxes are high.

With respect to international tax planning strategies, the benefit is constituted by the reduction of the final tax burden on foreign earnings. There exists a vast empirical literature examining tax-induced profit shifting behaviour of multinational corporations.⁷⁰ Thereby, the two most prominent shifting-channels are transfer-pricing and the allocation of debt. Both result in high taxable income in low-tax countries. Even if income taxes paid by the subsidiary can be reduced significantly, the calculation of the overall benefit has to consider total taxes in case of repatriation. Worldwide tax systems (also called credit systems) and territorial tax systems (also called exemption systems) have to be differentiated. In a worldwide system, in general, the worldwide income is taxed in the home country. In a territorial system, income is only taxed from sources within the territory of the home country. As the total tax burden can be different in both systems, the incentives for international profit shifting will be different, too. Markle (2012) finds that whether a multinational is located in a territorial country or in a worldwide country, this can affect the extent of its' profit shifting. This is not true for multinationals that are taxed worldwide and not exposed to any pressure to repatriate foreign earnings. Those are comparable in their volume of profit shifting to companies located in a territorial system. Likewise Maffini (2012) does not find a statistically significant difference between multinationals located in worldwide

⁷⁰For an overview, see Feld et al. (2013).

or territorial jurisdictions, regarding their marginal effective tax bases. These results are a contradiction to theory. Markle (2012) explains his results with the strategy of tax deferral. The existence of deferral strategies is documented by a wide literature.⁷¹ Consequently, Barrios et al. (2012) show that the elasticity of location decisions to repatriation cost is reduced significantly if the possibility of deferral is given. Additionally, there could be ways to repatriate earnings without repatriation taxes.⁷² Both tax planning strategies necessarily come along with a reaction of the ownership structure within the corporate group (group structure).

Our study is related to three strands of literature: (1) Our contribution is twofold to the growing literature concerning tax influences on group structures. First, we use a setting that allows to analyze the specific influence of repatriation cost. Using ownership data for the years 2005 and 2012 allows to track groups over time that experience a change in tax regimes. Thereby, tax regimes are subdivided into worldwide and territorial on a countrypair-level. We control for other possibly relevant tax-factors as well as for unobservable effects at the level of the group by integrating group-fixed effects.

Second, we relate tax drivers to a complexity measure, which is not yet used in this context. Complexity is defined as the number of holding companies interposed between the parent company and the operational subsidiary. By looking at the length of the ownership chain, we are able to test if tax factors yield additional legal entities and thus increase the complexity of the group.

(2) There is a large literature on firm organization from a management perspective. Mainly, this literature has in common that arguments are based on the objective to minimize transaction cost as an explanation for the origin of firms, going back to Coase (1937). As determinants of organizational structures processes of decision-making and knowledge-accumulation as well as the decision to

⁷¹See e.g. Desai et al. (2001) and Egger et al. (2012).

⁷²Altshuler and Grubert (2003) examine those strategies analytically and empirically for a sample of US multinationals.

diversify firms are identified.⁷³ Additional levels in the ownership chain also mean an additional level for decision-making and financial reporting.⁷⁴

In the corporate finance literature, outside ownership of minority shareholders is identified as a possible explanation for pyramid structures (e.g. La Porta et al. (1999), Dharwadkar et al. (2000)). Thereby, these structures bear the incentive to expropriate minority shareholders by transferring profits to the majority owner.⁷⁵

While in our dataset the majority of firms is wholly owned by its ultimate owner, the expropriation of minority shareholders has minor influence in the sense of La Porta et al. (1999). Our study highlights the impact of taxes on the construction of ownership chains as well as the profitability of the single entity.

(3) An extended literature analyses other distortions in firms' behaviour caused by worldwide tax regimes. Edwards et al. (2012) find that firms with a large amount of cash, trapped in foreign subsidiaries, are more likely to make value-destroying acquisitions. Feld et al. (2013) show that repatriation taxes reduce the competitiveness of domestic investors on the international M&A market. The effect of the tax system on location decisions is tested by: Barrios et al. (2012) and Dyreng et al. (2011) (with respect to the location of foreign subsidiaries); e.g. Smart (2011) (with respect to FDI); Huizinga and Voget (2009) analysing the location choice of headquarters in multinational mergers and Voget (2011) analysing headquarter relocations.

⁷³e.g. Garicano (2000), Aghion et al. (2013), Bloom et al. (2012).

⁷⁴Most countries split up the right of taxation between different jurisdictions by referring to the place of management. E.g. Germany would only forgo taxing the income of a foreign subsidiary if there are to a certain extent business operations in its country of residence, being responsible for daily business decisions. In our dataset only Bulgaria, Estonia, Ireland, Lithuania, Latvia, Sweden and the United States do exclusively refer to the legal origin of an entity.

⁷⁵Masulis et al. (2009) find that these incentives are diversely pronounced between different layers of an ownership chain. Their analysis indicates that the lowest entity in a chain actually exhibits the best performance. Thereby, performance is measured alternatively as Tobin's Q or return on assets.

Following this introduction, section 2 of the paper develops the testable hypothesis. Section 3 describes the empirical methodology and the data. Section 4 presents empirical results. Section 5 concludes.

6.2. Corporate Group Complexity in Territorial and Worldwide Countries. Within the framework of Devereux and Maffini (2007) firms decide on the allocation of profits in a final step.⁷⁶ Thereby, the minimization of the tax burden on repatriated earnings is necessary to evaluate entities, where profits could be allocated. In a worldwide system, foreign earnings are, at least, taxed with the home country corporate tax rate in case of repatriation. Thus, firms having their headquarter in countries with a worldwide tax system, basically, do not have an incentive to shift profits into low-tax countries.⁷⁷

6.2.1. Tax planning incentives in different systems to avoid international double taxation. The total tax burden on foreign earnings is composed of taxation at the level of the subsidiary as well as at the level of the parent. Corporate taxes are raised in source country s , amounting to the statutory tax rate cit multiplied with the pre-tax income of the entity. In addition, there can be a withholding tax in country s , calculated as the tax rate wht_s multiplied with the pre-tax income diminished by the corporate income tax burden. Differences between systems result from the taxation in the home country h .

In general, in exemption systems, taxes on the income of foreign subsidiaries are exclusively raised by the source country.⁷⁸ In some cases, home countries add a flat, non-deductible expense, calculated as a share of the received dividends ($1 -$

⁷⁶Devereux and Maffini (2007) classify the decisions of firms concerning foreign investments in four steps. First, the decision on the allocation of production at home and the export of goods, or producing abroad. Second, the selection of a specific foreign country for the production location. Third, the firm has to choose the scale of investment. Fourth, the profits are allocated within the group.

⁷⁷This does not hold in case of an excess credit.

⁷⁸Commonly, the terms territorial and worldwide taxation refer to the taxation of foreign dividends. Therefore, here subsidiaries are only considered.

exempted_h) to the parents' tax base. At most, in this dataset, the percentage to add is 5 percent of received dividends.⁷⁹ Taxes paid at source cannot be credited. In exemption systems, source taxes represent a final tax burden. The total tax burden of repatriated profits, assuming one unit earnings before tax, is calculated as $cit_s + wht_s * (1 - cit_s) + (1 - exempted_h) * cit_h * (1 - cit_s - (wht_s * (1 - cit_s)))$.⁸⁰ Thereby, cit_s stands for the corporate income tax burden in the source country, $wht_s * (1 - cit_s)$ for the withholding tax due to the repatriated dividend and $(1 - exempted_h) * cit_h * (1 - cit_s - (wht_s * (1 - cit_s)))$ represents the tax burden imposed by the parent country.

Credit systems are distinguished between limited and unlimited, and indirect and direct credit systems.⁸¹ In limited credit systems, the home country caps the creditable amount at the level of the statutory tax rate applied to foreign income. In unlimited credit systems, foreign taxes can be credited without a limitation in the total amount. As unlimited credit systems cannot be found in reality, a limited credit system is assumed. In direct as well as indirect credit systems the relation between source and home country taxation is crucial. If creditable source taxes are lower than taxes in the home country, the difference corresponds to the tax due in the home country. Otherwise, there is no additional tax liability in the home country. Indirect and direct credit systems differ in the kind of tax that can be credited. In an indirect credit system, corporate taxes and withholding taxes can both be credited. The total tax burden is calculated as $cit_s + wht_s * (1 - cit_s)$ in case of an excess credit. Otherwise it corresponds to the corporate income tax of the home country.⁸² In a direct credit system, only withholding taxes

⁷⁹5 percent have to be added in Belgium, Germany, France, Italy and Japan (Japan introduced its' 95%-exemption in 2009), 3 % in Norway. Differences exist in the definition of the tax base. Most countries take dividends net of withholding taxes as a basis. Germany and Japan do not allow for deduction of withholding taxes.

⁸⁰In case of Germany and Japan, the home country taxation has to be adjusted for the non-deductible withholding tax to $(1 - exempted_h) * cit_h * (1 - cit_s)$.

⁸¹Actually in our final dataset only indirect credit systems are available. As results can be transferred to direct credit systems, both are considered here.

⁸²The necessary condition for an excess credit is $cit_h \leq cit_s + wht_s * (1 - cit_s)$.

can be credited. Hence, the total tax burden in case of an excess credit is still $cit_s + wht_s * (1 - cit_s)$ and $cit_s + cit_h * (1 - cit_s)$ otherwise.⁸³ In each case, the final tax burden equals at least the home country corporate income tax rate. Tax burdens vary depending on characteristics of source and home country taxation. For this reason, our analysis has to be conducted on a country-pair level.

A comparison of both systems allows the conclusion that in exemption systems source taxes are always final taxes. Thus, any reduction in source taxes yields a benefit for the parent company. In a credit system, however, it depends on the relation between source and home country tax burdens. The reduction of home country taxation is beneficial as long as it does not result in an excess credit situation. In an excess credit situation, a reduction of source taxes down to the level of the home country tax can be beneficial. This is the case if cross-crediting between relatively high and relatively low taxed subsidiaries is not possible. A further reduction has only a temporary effect, ending with repatriation.⁸⁴ As illustrated in table 6.1, the mean statutory corporate tax rate for credit countries is about seven percentage points above the mean for exemption countries in both years. Table 6.2 reports mean repatriation cost, imposed by the home country. A direct ownership link is assumed. In 2005 and 2012 taxes on repatriated earnings, on average, are considerably higher for credit countries. Consequently, repatriation cost can be quite substantial. For this reason, the reduction or complete avoidance of repatriation cost is expected to be taken into consideration by multinationals. The high repatriation cost in direct credit systems reflect the interdiction to credit the source country's corporate income tax. An unrestrained incentive for international tax planning is only given if repatriation cost are (calculatoryly) vanished.

⁸³Accordingly the condition for an excess credit is $cit_h \leq wht_s$.

⁸⁴The distribution effect between tax authorities remains disregarded.

TABLE 6.1. Mean Statutory Tax Rates

System	2005	2012
Exemption System	0.3084	0.2874
Credit System	0.3786	0.3672

For the composition of countries see tables 6.3 and 6.4.

TABLE 6.2. Mean Repatriation Cost

System	2005	2012
Exemption System	0.007	0.006
Indirect Credit System	0.075	0.101
Direct Credit System	0.198	0.204

The table contains mean home country tax burdens on repatriated foreign earnings. It is differentiated into exemption and credit systems. A (hypothetical) direct ownership structure is assumed. For the composition of countries see tables 6.3 and 6.4.

6.2.2. *Strategies to adapt the tax planning environment.* In worldwide systems an additional tax planning step is necessary to adapt the same conditions as in an exemption system. Basically, there are two strategies to avoid repatriation taxes: Deferral and the switchover to the exemption system. Both result in a more complicated group structure.

Tax deferral

If repatriation taxes can be deferred by the taxpayer a valuable time advantage arises. With an increasing time period of deferral, the incentives of the taxpayer converge to those in an exemption system. In case of an infinite deferral, congruence is given. Desai et al. (2003) conclude that ownership chains enable specific deferral strategies. Notably, these are the 'triangular strategy' and the 'multiple tier strategy', which are identified by Altshuler and Grubert (2003). The triangular strategy aims to achieve a payout to the headquarter without causing repatriation taxes. Therefore, certain rules of the US tax law are exploited. In the multiple tier strategy, retained earnings of foreign subsidiaries are invested

into lower-tier subsidiaries. A repatriation is not necessary to the headquarter. This strategy is based on the fact that in a credit system foreign earnings are first taxable when being repatriated. Therefore, the multiple tier strategy applies to every credit system. While this strategy implicates further investments into subsidiaries, it is observable that US groups accumulate high amounts of cash abroad.⁸⁵ Even if foreign earnings are not reinvested, we expect that high cash reserves abroad come along with an additional layer within the ownership chain. The following quotation stems from the testimony of Apple Inc. before the permanent subcommittee on investigations of the US senate from May 21, 2013:

'AOI ('Apple Operations International') consolidates and manages a substantial portion of Apple's foreign, post-tax income through intercompany dividends. This consolidation creates economies of scale that allow AOI to obtain better rates of return with money management firms. The consolidation of funds into as few bank accounts as possible improves operational controls over cash held within and among other foreign subsidiaries. AOI allows Apple to efficiently redeploy funds to meet the needs of Apple's international operations.'

Instead of local cash reserves within single entities, the group will accumulate reserves in a holding company, located abroad. This holding company will usually be located on top of the foreign corporate structure, to allow for intercompany dividends as a cheap and flexible way of transfer. As stated in the testimony, this holding company operates as a cash-pool and therefore allows to exploit economies of scale. A high position in the ownership chain will also guarantee

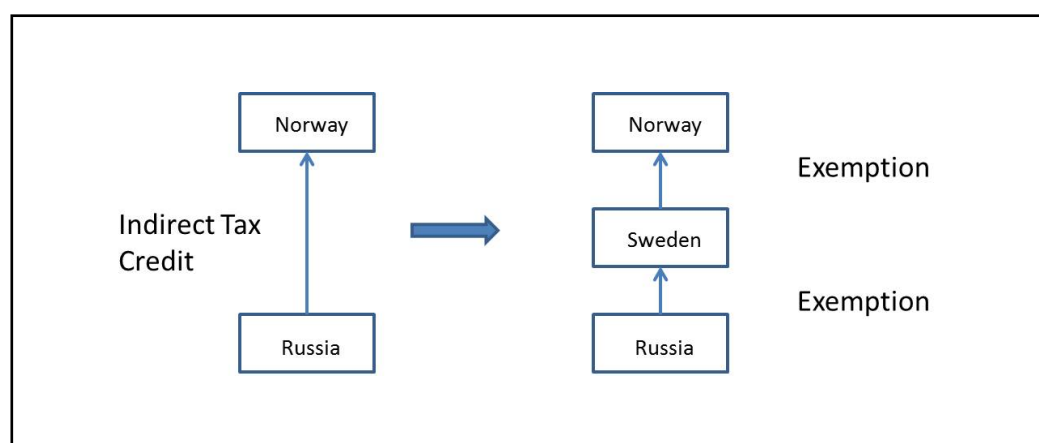
⁸⁵According to Bloomberg (Article from Mar 12, 2014, Cash Abroad Rises \$206 Billion as Apple to IBM Avoid Tax) total cash trapped abroad by US companies amounts to \$1.95 trillion at the end of 2013. This article can be found at <http://www.bloomberg.com/news/articles/2014-03-12/cash-abroad-rises-206-billion-as-apple-to-ibm-avoid-tax.html> [last downloaded 15-03-12].

a high visibility of foreign cash for shareholders and the best suitability to be pledged.⁸⁶

Switchover to exemption

As illustrated in *Figure 6.1*, in some countries the method to avoid international double taxation varies on a country-pair level. Among the countries in our dataset, Norway uses unilaterally the indirect credit method. On a bilateral level, the majority of double tax treatments, signed by Norway, allows for the exemption method. Therefore, the taxpayer has the option to insert a holding company, located in an exemption country (here Sweden) to avoid repatriation taxes. In doing so, the holding country itself has to exempt foreign dividends.

FIGURE 6.1. Switchover from credit to exemption



Another strategy to avoid repatriation taxes bases on the use of excess credits. Taxpayers are willing to offset excess credits against deficit credits under the following conditions: There have to be foreign subsidiaries in at least two different countries. One country has a tax rate higher than the home country. The other

⁸⁶In fact it can be observed that US corporations issue debt in the US to avoid repatriation taxes while foreign cash serves as collateral. For example see Apple, Bloomberg article: Apple Sells \$12 Billion of Bonds to Keep Cash Overseas, April 29, 2014, available at: <http://www.bloomberg.com/news/articles/2014-04-29/apple-returns-to-bond-market-to-scale-biggest-borrowers-ranks.html> [last downloaded 2015-03-12].

country has a lower tax rate.⁸⁷ While this strategy is appropriate to reduce repatriation taxes to a certain level, it is not suitable in an aggressive international tax planning setting. Excess credits are essential for cross-crediting but not in line with a reduction of foreign source taxes.⁸⁸

Tax deferral as well as the switchover to the exemption method enable tax payers to adapt the same tax planning calculus as in the case of an exemption system. Companies have a strong incentive to implement the strategies, as characterized above. If implemented an additional layer is necessary in the ownership chain.

For this reason, we expect groups, located in worldwide tax systems, to have longer ownership chains.

6.3. Empirical Analysis.

6.3.1. *Data.* We use ownership structures for a worldwide dataset of corporations, provided by the ORBIS database from Bureau van Dijk. Although this database is only available for the current year, we have access to data for the years 2005 and 2012. This data allows for the reconstruction of ownership links within corporate groups. Beginning with a full download, containing 5,763,675 observations for 2012, we keep only those 916,322, where the immediate shareholder is known.

We survey the whole ownership chain to separate entities fulfilling holding functions from those being purely operational. For this reason, we drop holding companies as redundant observations. We keep only those chains, where the global ultimate owner is reached.

⁸⁷As mentioned above, an immediate offsetting of excess foreign tax credits against taxes, due on income from domestic sources, is generally not allowed.

⁸⁸Contrary to the US, where cross-crediting is limited within several baskets of foreign income, UK and Japan allow an overall limitation. Thus, cross-crediting does not afford holding structures in these countries.

In this study, we focus exclusively on corporations because these are taxed following the separation principle, which is indispensable for the planning strategies in mind. The deferral strategy bases on the fact that foreign income, taxed under the separation principle, can only be taxed in case of dividend repatriation by the home country. On the contrary, partnerships' income is taxed by the home country at the moment of realisation, independent of repatriation. The switchover strategy exploits favourable bilateral tax treaties linked one to another by integrating holding-companies into the ownership chain. Contrary to corporations, partnerships are not eligible for tax treaties. These are transparent for tax purposes. Thus, the shareholders residence determines, which tax treaty is relevant, not the residence of the partnership.

We measure variation on a country-pair level. For this reason, we match the remaining 538,382 observations for the year 2012 to the 2005 dataset. We keep those 138,498 observations, where the same global ultimate owner⁸⁹ has at least one subsidiary within the same country in both years.

Observations are aggregated on the group/subsidiary country level, resulting in 35,592 observations.

Our final sample consists of 25,114 observations for which financial and macro data is available. Out of these, 14,620 observations are combinations of headquarters and subsidiaries within the same country. 10,494 observations are cross-border, which are relevant for our main tests. Ownership chains within the same country are excluded as for those repatriation taxes do not exist.

Table 6.3 contains the list of countries, where the operative subsidiaries are located.

⁸⁹Corporate groups are identified by the global ultimate owners, which are the highest entity in the chain, consisting of majority controlled ownership links. At best, these are tracked by Bureau van Dijks' internal ID numbers, which can change over time. We control for that by tracking ID numbers, using the ID-Changes database from Bureau van Dijk.

Table 6.3: List of subsidiary countries

Country	Number
Austria	142
Australia	174
Belgium	604
Bulgaria	32
Bolivia	2
Brazil	30
Canada	8
China	2
Colombia	2
Czech Republic	266
Germany	604
Denmark	418
Ecuador	4
Estonia	90
Egypt	8
Spain	800
Finland	280
France	1,250
Gabon	2
United Kingdom	2,008
Greece	8
Hong Kong	6
Croatia	44
Hungary	10
Indonesia	12
Ireland	364
Israel	2
India	46
Italy	540
Jamaica	2
Japan	18
South Korea	8
Sri Lanka	2
Lithuania	42
Luxembourg	50
Latvia	44
Morocco	12
Malawi	2
Mexico	20

Continued on next page

Table 6.3: List of subsidiary countries

Country	Number
Netherlands	850
Norway	364
New Zealand	8
Panama	2
Peru	24
Papua New Guinea	2
Pakistan	8
Poland	464
Portugal	152
Russia	42
Sweden	424
Singapore	112
Slovenia	6
Slovakia	64
Ukraine	8
South Africa	4
Zambia	2

The list of countries, where group's headquarters are located, is presented by table 6.4.

Table 6.4: List of headquarter countries

Country	Number
Austria	98
Australia	78
Belgium	510
Canada	16
Switzerland	590
Czech Republic	4
Germany	982
Denmark	306
Estonia	8
Spain	248
Finland	324
France	1,134
United Kingdom	844
Greece	32
Hungary	16

Continued on next page

Table 6.4: List of headquarter countries

Country	Number
Ireland	112
Israel	28
Italy	348
Japan	1,032
Luxembourg	80
Netherlands	448
Norway	142
Poland	2
Portugal	24
Sweden	918
Slovenia	12
Turkey	2
United States	2,156

Table 6.5: Definition of variables

Variable	Definition
Sum of holdings	Number of holding countries interposed between the headquarter and purely operative subsidiaries. Observations are aggregated on the group/subsidiary country level.
Number of chains	Number of ownership chains adding to the variable Sum of Holdings.
Treatment	Dummy variable equal to one if the headquarter/subsidiary pair is exposed to a policy change and 0 else.
After	Dummy variable equal to 1 for all 2012 observations (after the policy change) and 0 else.
Aftertreat	Interaction term between the variables Treatment and After.
Wht (effective)	Effective withholding tax rate in case of a hypothetical direct repatriation from the source country to the parent country. Source: IBFD, Worldwide Corporate Tax Guides (Ernst and Young).
Wht (statutory)	Statutory withholding tax rate in case of a hypothetical direct repatriation from the source country to the parent country. Source: IBFD, Worldwide Corporate Tax Guides (Ernst and Young).
Cgtax	Capital gains tax rate in the parent country. Source: IBFD, Worldwide Corporate Tax Guides (Ernst and Young).
Cfcrule	Dummy variable indicating if there is a cfc-rule in force in the parent country. Source: IBFD, Worldwide Corporate Tax Guides (Ernst and Young).

Continued on next page

Table 6.5: Definition of variables

Variable	Definition
Taxhaven	Dummy variable indicating if the subsidiary country is a taxhaven. Taxhavens are characterised by a corporate tax rate less or equal to 0.15.
Corporatetaxrate	Statutory corporate tax rate of the parent country. Source: IBFD, Worldwide Corporate Tax Guides (Ernst and Young).
Ln(toas)	Natural logarithm of the variable total assets of the headquarter. Source: Orbis database, Bureau van Dijk.
Ln(dist)	Natural logarithm of the simple distance between the most populated cities of the parent and the subsidiary country.
EU	Dummy variable indicating if the headquarter and the subsidiary are located within the European Union.
Ln(GDP_pc)	Natural logarithm of the GDP per capita of the parent country. Source: Worldbank.
Inflationrate	Inflationrate (cpi) of the subsidiary country. Source: Worldbank.

Table 6.6 shows descriptives for crossborder observations.

TABLE 6.6. Descriptives

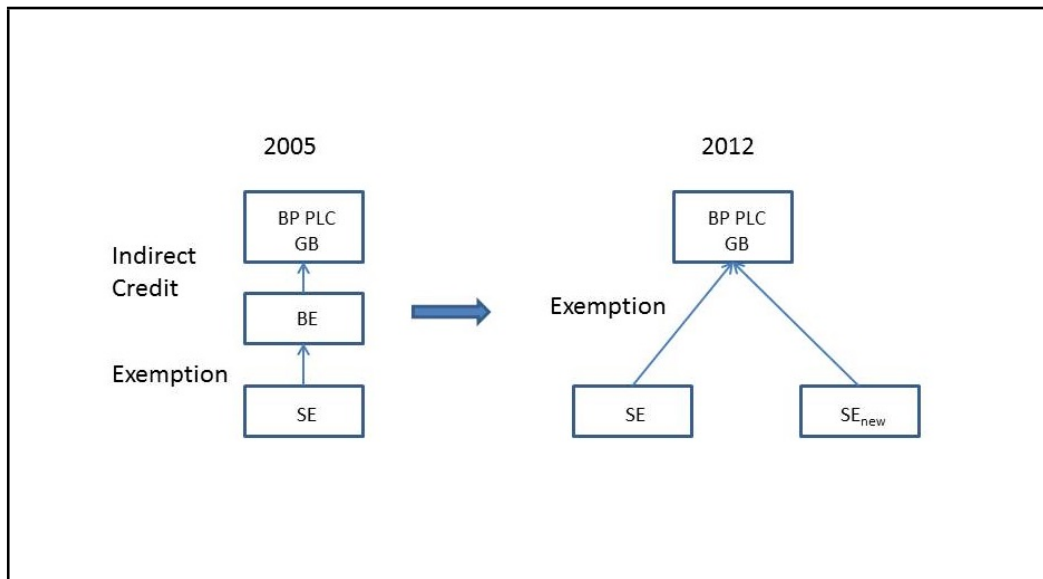
Variablename	Mean	Standard Deviation	Min	Max	N
Sum of holdings	0.275	1.071	0	30	10494
Number of chains	2.536	4.551	1	110	10494
Wht (eff)	0.00631	0.0213	0	0.245	10494
Cgtax	0.261	0.123	0	0.590	10494
Cfrule 100	0.599	0.490	0	1	10494
Taxhaven	0.0232	0.150	0	1	10494
Corporatetaxrate	0.312	0.0897	0	0.421	10494
Ln(toas)	15.01	2.405	3.236	19.81	10494
Ln(GDP/pc) 100	10.67	0.242	8.872	11.65	10494
Inflationrate	0.0268	0.0132	-0.00283	0.183	10494
Ln(dist)	7.356	1.248	4.088	9.860	10494
EU	0.556	0.497	0	1	10494

Descriptive statistics for the sample of cross-border observations. Each observation is an aggregation of multiple ownership chains on a group/subsidiary country level. For the definition of variables see table 6.5.

The structure, provided by *Figure 6.2*, is found in the dataset. For both years we reconstruct the connection between the global ultimate owner (BP PLC) and the lowest subsidiary (SE). This allows us to count the number of interposed holding countries. In this example, we observe one holding company located in Belgium for the year 2005. In 2012, the holding company is vanished in Belgium and we identify a second, newly integrated subsidiary in Sweden (SE_{new}).

To conduct our analysis, detailed tax data is needed. The information on unilateral international tax law is extracted from the IBFD country analyses and the Worldwide Corporate Tax Guides, provided by Ernst and Young. Double tax treaties in force were exploited for agreements, concerning the method to avoid international double taxation. Besides, multilateral tax treaties were screened for

FIGURE 6.2. Example



such rules⁹⁰, as well as unilateral anti-abuse rules were accounted for on a country-pair level. Information on source taxes was extracted from tax treaties. Capital gains tax rates are taken from the IBFD country analyses and the Worldwide Corporate Tax Guides, provided by Ernst and Young.

6.3.2. *Econometric Approach.* To test our first hypothesis, we define the number of third-country holdings within each ownership chain as our measure for group's complexity. As done by Dreßler (2012), holding-companies arranged in series within the same state are not counted as an additional ownership level. Regarding international taxation, those do not influence source or home country tax burdens. From an organizational point of view, the relevance of country holdings is not clear. This is the case because the above mentioned tax arguments, inducing a certain degree of autonomy, are not valid within the same tax territory.⁹¹ Our measure consists of a legal as well as a geographical component. All chains of

⁹⁰These are: EU parent-subsidiary-directive, Caricom, WAEMU, WAEC, AEUC, OCAM, UDEAC/CEMAC, Andean Community, Arab Maghreb Union and Nordic Convention.

⁹¹Especially the availability of group tax regimes allows for organizational unity.

the same group, which reach the same country at the lowest level, are aggregated and converted into an average number of holding countries interposed. This is necessary to include subsidiaries that are newly integrated into the ownership structure between 2005 and 2012.

We apply a difference-in-difference setting, referring to Ashenfelter and Card (1985). Thereby, we utilize the fact that a small number of countries changed from a worldwide system to an exemption system between 2005 and 2012. Countries with a policy change are as listed in table 6.7.

TABLE 6.7. Countries with change in method to avoid double taxation

Country	Year
Japan	2009
United Kingdom	2009
Norway	2006

Countries changing from worldwide taxation to a territorial system between 2005 and 2012. In case of Norway this change is based on a multilateral agreement (parent-subsidiary directive). Before, the system to avoid international double taxation varied on a bilateral basis in Norway.

Therefore, the treatment group is represented by all those country-pair observations, experiencing the policy change. All those observations, which are taxed in a worldwide system or a territorial system without a change, are included as control observations. This way, the change in the outcome variable of the control group, can be subtracted from the change in the treatment group. It is controlled for permanent differences between the two groups as well as a common time trend for both groups. Formally (see Greene (2012) pp. 195-198), the treatment effect is measured by

$$effect = (\bar{h}_{2012}^{treatment} - \bar{h}_{2005}^{treatment}) - (\bar{h}_{2012}^{control} - \bar{h}_{2005}^{control}).$$

\bar{h} is the mean of the count variable for the number of holding companies embedded within the ownership chains for the respective group.

The treatment effect is identified by testing the model:

$$y = \beta_0 + \beta_1 * Treatment + \beta_2 * After + \beta_3 * (Treatment * After) + \beta_4 * controls + u.$$

y is the number of third country holdings. $Treatment$ is equal to 1 for those observations being exposed to the policy change and 0 otherwise. $After$ is a period dummy variable equal to 1 for the year after the policy change, 2012, and 0 otherwise. The interaction term $Treatment * After$ is 1 for all observations in the treatment group after the policy change. Thus, β_3 is our coefficient of interest.

While OLS assumes a normal distribution and allows for positive and negative values in the outcome variable, here data is strictly positive count data. While this kind of data suggests the application of a Poisson model, consistent results generally require the equality of the conditional mean and variance. Tests indicate overdispersion in our data.⁹² We use robust standard errors in all estimations as proposed by Cameron and Trivedi (2010).

6.4. Results.

6.4.1. *Descriptive Evidence.* Table 6.8 gives an overview over the number of foreign holding companies, implemented in the reconstructed ownership chains. While the total number of crossborder ownership chains increases between 2005 and 2012 by about 100 percent, the share of indirectly held subsidiaries remained almost stable, at about 11 percent.⁹³

⁹²Estimating the equation $Var(y|x) = E(y|x) + \alpha^2 E(y|x)$ allows to test for overdispersion. For further details see Cameron and Trivedi (2010)

⁹³The share of indirect ownership structures is below the one of Dreßler (2012). This can be explained by the different handling of holding companies, as redundant observations.

TABLE 6.8. Directly vs. indirectly held subsidiaries

	2005	2012
Direct holding	15,912	30,984
Indirect holding	2,177	4,035
% held indirect	12.03	11.05

Distribution of directly and indirectly held crossborder-subsidiaries in the sample.

As shown by table 6.9, indirect crossborder holdings are much more prevalent in case of credit systems than in exemption systems. In exemption systems, their share amounts to only 9 percent. In credit systems 18 percent of crossborder ownership chains are indirect. In 2012, there are considerably more observations for exemption systems in the dataset than for credit systems. This is caused by the regional coverage of the Orbis database. The best coverage by the database is among the European countries. The prevalence of the credit system is diminished in this area.⁹⁴

TABLE 6.9. Directly vs. indirectly held subsidiaries - by system to avoid double taxation

	Exemption 2005	Credit 2005	Exemption 2012	Credit 2012
Holdings				
Direct holding	9,772	6,105	24,348	6,636
Indirect holding	985	1,192	2,533	1,502
% held indirect	9.15	16.34	9.42	18.46

Number of directly and indirectly held crossborder-subsidiaries by system to avoid double taxation.

Table 6.10 shows the average tax advantage of indirect ownership structures in case of repatriation to the headquarter. Observations are classified by the system to avoid international double taxation. Repatriation cost, in case of the real

⁹⁴In our dataset, European countries, holding on to the credit system, are Ireland, Greece, Poland and Portugal.

indirect ownership structure, are compared to a hypothetical direct ownership. For both systems, on average, repatriation tax cost increase slightly by implementing holding companies.⁹⁵ This result indicates that there are other, tax and non-tax, factors affecting the ownership structure. These are not in line with the minimization of repatriation cost and have to be controlled for.

TABLE 6.10. Tax advantage of indirect ownership - by system to avoid double taxation

System	Tax difference (av)	Max	Min
Exemption	-0.002	-0.326	0.266
Indirect Credit	-0.0002	-0.212	0.25

Average tax advantage of indirect ownership structures. Total tax payments in case of repatriation are deducted from total tax payments in the hypothetical case of a direct connection ($totaltax_{direct} - totaltax_{indirect}$). Tax payments are given for one currency unit repatriated income, based on statutory tax rates. Data used is for 2012.

In credit systems, it could be argued that repatriation tax cost are inevitable. For this reason, firms should be indifferent in where and at which layer of the ownership chain the tax is finally due. Only if a calculatory evasion is possible, firms have an incentive to structure ownership chains tax optimally, abroad.

Table 6.11 subdivides total tax burden caused by repatriation along the ownership chain. The first part is due for distributing dividends up to the first foreign holding company, immediately below the headquarter. In addition, the second part is due for the final step of repatriation to the headquarter. Both groups, on average, have nearly the same tax burden for distributions up to the highest holding level. Only the last step results in significantly higher taxes in case of credit countries. This finding indicates that companies in credit countries structure their group abroad tax efficiently. Thus, foreign source and repatriation taxes seem to be relevant for their calculations.

⁹⁵This finding is consistent with the one of Dreßler (2012).

TABLE 6.11. Composition of repatriation tax cost - by system to avoid double taxation

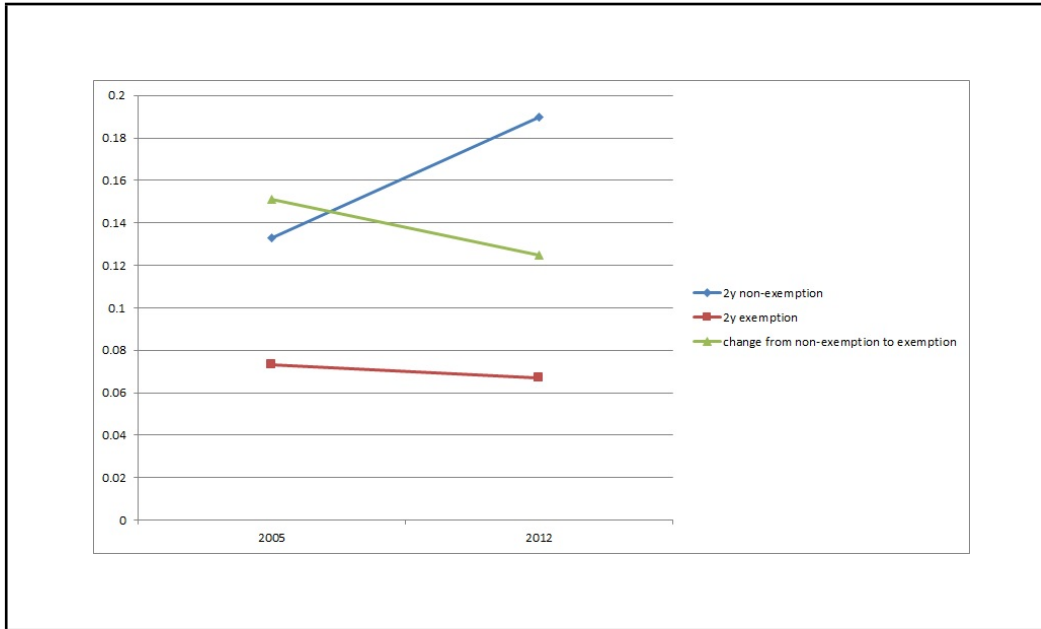
System	Tax burden caused by	
	distribution to first holding	final repatriation
Exemption	0.015	0.002
Indirect Credit	0.013	0.097

Tax burden of indirectly held crossborder-subsi-
daries is split up into two parts: (1) Taxes caused by dividend distributions up to the first foreign holding company. (2) Taxes caused by the final step of repatriation from this holding company to the headquarter. Observations are categorized by the system to avoid double taxation. Systems are only reported with more than 100 observations. Tax burdens are reported as percentage of subsidiaries' income before tax. Tax burdens include source taxes and repatriation tax. Data used is for 2012.

Even if there is evidence for the existence of tax planning incentives in worldwide systems that requires a more complex group structure, it is not yet clear if there is a higher degree of complexity in worldwide taxed groups than in territorial systems. Figure 6.3 shows trends in the average number of holding countries for the treatment and the control group. We observe a decrease in the average number of holding companies interposed for those ownership chains, which receive the policy change. In contrast, those chains, which are still subject to the credit method, show an increase in complexity.

Figure 6.4 illustrates the trend in the average number of holding countries for newly integrated subsidiaries. We identify a more pronounced decrease in complexity for this subsample, which indicates that group structures are rigid over time. Our data does not allow for retracing the exact time of integration. For this reason, we cannot exclude subsidiaries, which are integrated after 2005 but before the policy change. We would expect that in this case the structure is sticky as well. Thus, we still underestimate the reaction in the outcome variable for the group of new subsidiaries.

FIGURE 6.3. Trends in the average number of holding companies
- all firms

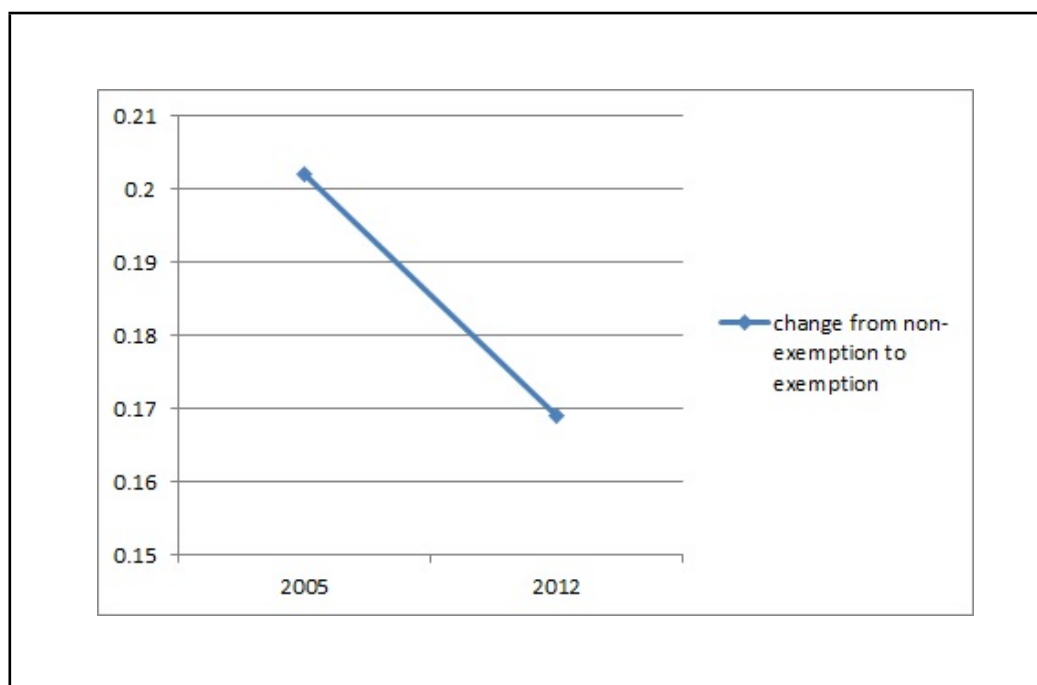


While there is some descriptive evidence that groups reduce complexity after a switch to a territorial system. We employ more sophisticated econometrics as described above in section 6.3.2 to be able to conclude on a causal relationship. The difference-in-difference estimator allows us to extract the effect of this policy-change and to exclude other factors as well as unobserved differences between the treated and the untreated.

6.4.2. *Results.* Tax exemption of foreign dividends can be defined in two ways: The first definition rests solely on the tax base of the parent country. All those combinations of the parent and subsidiary country are classified as tax exempted, where the parent country includes not more than 5 percent of foreign dividends into its' tax base.⁹⁶

⁹⁶There are several countries being considered as exemption countries that, in fact, include a small share of foreign dividends into its own tax base. In this sample, these are Belgium, Germany, France, Italy, Japan and Norway.

FIGURE 6.4. Trends in the average number of holding companies - new subsidiaries



The second definition takes into regard that despite a broader tax base there are country pairs, where the tax burden of the subsidiary results in a tax credit, high enough to outweigh the parent country tax. In these cases, there is no additional repatriation tax due at the parent. This situation is economically equivalent to tax exemption. For this reason, the tax cost definition redefines all those country pairs as tax exempted, where the additional parent country tax is less than 2 percent of the pre-tax income of the subsidiary.⁹⁷

Table 6.12 contains the results for the Poisson regressions. The dependent variable is our measure of complexity: The total number of interposed holding countries between the headquarter and the lowest subsidiary. In our dataset, observations are aggregated on a group/subsidiary-country level. For this reason,

⁹⁷2 percent equals to the maximum tax burden of exemption countries in the sample, classified by tax base definitions.

the number of holding countries is the sum over up to 110 subsidiaries of the same group within the same subsidiary country. To account for the number of ownership chains involved, we apply this number as an exposure rate.

Treatment is a dummy variable, indicating if an observation is exposed to a policy change. *After* is a dummy variable equal to 1 if the observation is in 2012 and 0 otherwise. The interaction between these two variables, *Aftertreat*, measures the causal effect of the policy change.

Although, there is little variation over the observed period, we control for a set of tax variables, which could also affect the connection between the headquarter and subsidiaries.

Well known tax practices target the reduction of withholding taxes. As these regularly rely on holding structures, we control for those incentives. *Wht(ef)* is the effective withholding tax rate in the source country for a (hypothetical) direct connection.

If withholding taxes yield a final tax burden or not depends on the system to avoid international double taxation. In case of credit systems, the relation between the two tax rates within the involved countries is crucial. In regressions (1) and (2) we rely on effective withholding taxes to take this relation into account. In regressions (3) and (4) we include the statutory withholding tax rate (*Wht(stat)*) instead.

Holding structures can be beneficial if investors have a potential exit in mind. If capital gains taxes are high in the home country, holding companies in countries with low capital gains tax rates can be used to defer capital gains abroad. Taxation can be delayed for a certain period of time.

If tax rates are lower for dividends, capital gains can be converted into dividends

out of the perspective of the home country. We include the capital gains tax rate $Cgtax$ in our regression to control for both incentives.⁹⁸

As controlled foreign company rules (cfc-rules) can be appropriate to regulate tax-planning activities of local groups, we include a dummy variable. The variable $Cfcrule$ is equal to 1 if the headquarter's country has such a rule in force and 0 otherwise.⁹⁹ If cfc-rules are binding we would expect less complex ownership structures, as tax incentives are reduced. If tax payers can escape those rules we would expect them to come along with an even more complex ownership structure.

The variable $Taxhaven$ is equal to 1 if the subsidiary country is a tax haven and 0 otherwise. Tax havens are characterized by a corporate tax rate of less than 15 percent.¹⁰⁰

The corporate tax rate, $Corporatetaxrate$, controls for tax planning incentives vis-à-vis the headquarter. The higher the tax burden of the headquarter is, the more likely the group will use its foreign subsidiaries to shift profits at expense of the headquarter.

$Ln(toas)$ is the logarithm of total assets for the headquarter and controls for the size of the group.¹⁰¹

$Ln(dist)$ is the logarithm of the geographical distance between the most populated cities in the host and home country. This serves as a measure of an organizational incentive to interpose holding companies. EU is a dummy variable equal

⁹⁸There are countries with varying capital gains tax rates, depending on the length of the holding period. We assume a short-term investment because short-term investments are usually penalized. These investments yield the highest incentive to avoid capital gains taxes. Furthermore, we assume a non-quoted company. In case, Estonia, Greece, Japan, Korea, Turkey differentiate between quoted and non-quoted companies. Again, the capital gains tax rate is highest for non-quoted companies.

⁹⁹Following the argumentation of Ruf and Weichenrieder (2013), we mark EU-countries, after the Cadbury Schweppes decision of the ECJ, as non-cfc countries.

¹⁰⁰Results are robust to the definition by a country list given by Hines and Rice (1994).

¹⁰¹If available, we rely on the consolidated balance sheet to picture the whole group. Results are robust for a reduced sample of solely consolidated accounts.

to 1 if host and home country are within the EU and 0 otherwise. $\ln(GDP/pc)$ reflects the stage of development in the home country. *Inflationrate* measures the economic risk of the host country.

All estimations apply group fixed effects to control for otherwise uncontrolled heterogeneity. Robust standard errors are clustered on the group level.

TABLE 6.12. Poisson regression - all subsidiaries

Variables	(1) taxbase	(2) repatcost	(3) taxbase	(4) repatcost
Treatment	0.371 (1.37)	0.320** (2.11)	0.526* (1.84)	0.371*** (2.61)
After	0.175 (0.87)	0.0881 (0.42)	0.219 (1.06)	0.132 (0.61)
Aftertreat	-0.771*** (-3.86)	-0.726*** (-3.60)	-0.754*** (-3.77)	-0.684*** (-3.42)
Wht (effective)	2.001 (1.35)	1.537 (0.94)		
Wht (statutory)			2.650*** (2.90)	2.481*** (2.63)
Cgtax	1.706 (1.03)	2.938* (1.67)	1.766 (1.06)	2.961* (1.68)
Cferule	0.273 (1.31)	0.293 (1.38)	0.301 (1.42)	0.315 (1.46)
Taxhaven	0.683*** (4.76)	0.657*** (4.49)	0.723*** (4.98)	0.690*** (4.68)
Corporatetaxrate	8.020*** (3.45)	7.994*** (3.44)	8.062*** (3.44)	7.961*** (3.41)
Ln(toas)	0.559** (2.48)	0.580*** (2.58)	0.557** (2.48)	0.576*** (2.58)
Ln(dist)	0.170** (2.43)	0.170** (2.47)	0.158** (2.23)	0.156** (2.23)
EU	-0.184 (-0.42)	-0.183 (-0.42)	-0.129 (-0.29)	-0.128 (-0.29)
Ln(GDP_pc)	0.980 (1.07)	1.005 (1.05)	0.949 (1.04)	0.950 (0.99)
Inflationrate	-2.684 (-0.96)	-2.041 (-0.75)	-3.239 (-1.14)	-2.758 (-0.99)
Observations	5240	5240	5240	5240
Number of groups	503	503	503	503

Results of Poisson regressions are presented. Dependent variable is the number of third country holding companies interposed between the headquarter and its' subsidiary. Observations are aggregated on a group/subsidiary country level. Number of single observations per group is used to calculate an exposure rate. The policy change from a credit system to tax exemption (Treatment) is defined basing on the tax base and alternatively on real repatriation cost, considering subsidiary's tax credits. Group fixed effects are included in all regressions. Intra-group variation in case of the tax base definition is given in Norway, where systems vary on a bilateral level. Robust standard errors are clustered on the group level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 6.12 contains the results of the Poisson estimations with the number of third country holdings as dependent variable. For all specifications, significantly negative coefficients for *Aftertreatment* show that the change from a world-wide system to an exemption system is causal for shorter cross-border ownership chains. In other words, corporate groups respond to the unfavorable credit system with a higher degree of complexity. This complexity exceeds organizational, risk and other needs.

A coefficient of -0.771 in estimation (1) means that the policy change leads to a decrease in the number of third country holdings by a factor of 0.46.¹⁰²

Confirming the results of other studies, we find a significant effect of withholding taxes on the structuring of groups. With increasing withholding tax rates, the complexity of group structures also increases.

Indeed, this is only true for statutory withholding tax rates, used in regressions (3) and (4). Concerning effective withholding taxes in regressions (1) and (2) we find a positive but insignificant effect. Statutory and effective withholding taxes differ only in credit systems. Our results indicate that independently of the method of avoidance of double taxation at the headquarter, withholding taxes are perceived as final taxes.

The coefficient for the capital gains tax rate is also positive but of unsteady significance.¹⁰³

Longer ownership chains are used to connect subsidiaries in tax haven countries to the group. This finding and the positive effect for the corporate tax rate of the headquarter point out that subsidiaries are hidden in a complex structure

¹⁰²As in the Poisson regression, the relationship between the logarithm of the dependent variable and the independent variables is estimated. The incidence ratio for coefficient β can be calculated by: e^β .

¹⁰³There is less variation for capital gains tax rates over time. Thus, our setting is not appropriate to deeply analyze the occurrence of holding structures to ease exits.

if they can be used to relocate tax base away from the headquarter. With the size of the group, the subsidiary's organizational demand increases for additional holding companies.

Also with growing geographical distance, an increasing number of holding countries can be observed.

We do not find any differences for the change in complexity between the two definitions of tax exemption. This can be explained by the fact that on average groups consist of chains into more than 4 different countries. Thus, excess credit subsidiaries and subsidiaries with positive home country repatriation tax cost are within the same group.

In case of sticky group structures, results in table 6.12 underestimate the effect of changing tax conditions. Group structures have implications on organizational processes. Structural reorganizations are costly. We expect a slow adjustment over time instead of an immediate adjustment for those subsidiaries that were integrated into the group under a worldwide system. Those companies, which were integrated after the policy change, do not bear these reorganization cost. Thus, we expect a more pronounced effect if we reduce the sample to those subsidiaries, which were integrated after 2005. For these, we compare the 2012 measure of complexity with the one of the same group/subsidiary-country pair for 2005, as it is presented in table 6.13. The coefficients for the variable *Aftertreat* are still significant in all specifications and more distinct than the coefficients regarding all subsidiaries (table 6.12). Results indicate such an underestimation caused by rigid group structures.

TABLE 6.13. Poisson regression - only new subsidiaries

Variables	(1)	(2)	(3)	(4)
	taxbase	repatcost	taxbase	repatcost
Treatment	0.140 (0.47)	0.332** (2.23)	0.294 (0.94)	0.363*** (2.74)
After	0.0396 (0.17)	-0.0667 (-0.27)	0.0941 (0.39)	-0.0127 (-0.05)
Aftertreat	-0.931*** (-4.23)	-0.848*** (-3.18)	-0.910*** (-4.13)	-0.797*** (-2.99)
Wht (effective)	2.611 (1.48)	2.298 (1.16)		
Wht (statutory)			2.969*** (2.79)	2.843** (2.55)
Cgtax	1.853 (1.03)	3.341* (1.69)	1.914 (1.07)	3.374* (1.71)
Cfcrule	0.242 (1.08)	0.255 (1.10)	0.274 (1.21)	0.280 (1.21)
Taxhaven	0.678*** (4.50)	0.643*** (4.19)	0.727*** (4.79)	0.688*** (4.47)
Corporatetaxrate	9.384*** (2.99)	9.247*** (2.96)	9.472*** (2.96)	9.277*** (2.93)
Ln(toas)	0.629** (2.48)	0.657*** (2.60)	0.627** (2.49)	0.655*** (2.61)
Ln(dist)	0.180** (2.30)	0.180** (2.35)	0.169** (2.14)	0.168** (2.16)
EU	-0.250 (-0.54)	-0.249 (-0.54)	-0.202 (-0.43)	-0.202 (-0.43)
Ln(GDP_pc)	0.731 (0.76)	0.716 (0.69)	0.677 (0.71)	0.646 (0.62)
Inflationrate	-2.608 (-0.86)	-1.951 (-0.66)	-3.305 (-1.05)	-2.775 (-0.91)
Observations	4206	4206	4206	4206
Number of groups	453	453	453	453

Results of Poisson regressions are presented. Dependent variable is the number of third country holding companies interposed between the headquarter and its' subsidiaries. Subsidiaries, integrated after 2005, are compared to those subsidiaries of the same group in the same country existing already before. Observations are aggregated on a group/subsidiary-country level. Number of single observations per group is used to calculate an exposure rate. Group fixed effects are included in all regressions. Robust standard errors are clustered on the group level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Local control group

So far, results rely on a foreign control group. This ignores possible changes in country-specific preferences. We use a local control group as a robustness check. We reduce the sample to groups being resident in Great Britain. This is the country with the most observations. While we keep the definitions of treatment, we define all purely domestic ownership chains as the control group. For this local group we count the number of domestic holding companies interposed between the headquarter and its' domestic subsidiary.

We expect group structures to react to tax cost of dividend repatriation. Those incentives do not exist in a purely national setting. Dividend distributions within a purely domestic ownership chain in 2005 as well as in 2012 were free of any additional taxes. In contrast to the cross-border case, there was no necessity given to adjust the group structure. The worldwide tax system, as well as the policy change will not affect domestic ownership chains. All country-specific factors, which influence both groups, can be eliminated.

Results, presented in table 6.14, confirm our findings. The coefficient for the variable *Aftertreat* is significantly negative for both samples, all subsidiaries and only new subsidiaries, and both definitions of tax exemption. The size of the effects is in a range between factors of -0.15 and -0.32.

TABLE 6.14. Robustness-Local control group

Variables	(1)	(2)	(3)	(4)
	all		only new	
	taxbase	repatcost	taxbase	repatcost
Treatment	-2.578***	2.833***	-2.594***	2.629***
	(-7.24)	(6.91)	(-6.86)	(8.10)
After	-0.156	-2.837	-0.00380	-2.418
	(-0.13)	(-0.74)	(-0.00)	(-0.66)
Aftertreat	-1.327**	-1.895***	-1.156*	-1.380**
	(-2.22)	(-3.17)	(-1.87)	(-2.32)
Wht (statutory)	-1.266	-35.69	-2.875	-25.18
	(-0.16)	(-1.01)	(-0.38)	(-0.71)
Cfcrule	-0.243	-1.766	0.432	-1.037
	(-0.22)	(-0.48)	(0.42)	(-0.30)
Taxhaven	-0.223	-3.337***	-0.214	-3.185***
	(-0.59)	(-7.62)	(-0.55)	(-7.18)
Ln(toas)	-0.0219	-0.0206	0.0209	0.0201
	(-0.25)	(-0.24)	(0.24)	(0.23)
Ln(dist)	0.536***	-2.148***	0.590***	-2.003***
	(4.14)	(-7.38)	(5.05)	(-6.42)
EU	1.467**	-3.471	1.517***	-3.246
	(2.42)	(-1.52)	(2.90)	(-1.56)
Inflationrate	11.72*	59.37***	13.36**	52.22***
	(1.86)	(6.64)	(2.42)	(5.25)
Observations	2508	2508	1927	1927
Number of group	877	877	686	686

Results of Poisson regressions are presented. Dependent variable is the number of third country holding companies interposed between the headquarter and its' subsidiaries. In columns (3) and (4) subsidiaries, integrated after 2005, are compared to those subsidiaries of the same group in the same subsidiary country existing already before. Observations are aggregated on a group/subsidiary-country level. Number of single observations per group is used to calculate an exposure rate. Group fixed effects are included in all regressions. Robust standard errors are clustered on the group level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

6.5. Conclusions. We hypothesize that credit systems set incentives for more complex group structures. Organizational, risk and other firm-specific factors determine group structures. Besides, groups, which are taxed worldwide, demand a higher, tax-driven degree of complexity in their ownership structure. Thereby, our measure of complexity has a legal as well as a geographical component.

Group structures are observed before and after a policy change from worldwide to source based taxation. After the policy change, structures become less complex. The number of third country holdings interposed into the ownership chain decreases by a factor of 0.46. The influence of withholding taxes can be confirmed. It is the statutory withholding tax rate, which is relevant.

More complex group structures come along with less transparency and more costly monitoring for outsiders. Complexity has an impact on the extent of managerial diversion of firm-resources.

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7. GENERAL CONCLUSIONS

Following mergers and acquisitions, a target firms' effective tax rate decreases significantly. This decrease is especially pronounced if the acquirer is tax aggressive. Moreover, the target firm's profitability decreases. This decrease is most powerful if the acquirer is low taxed, enabling profit shifting.

The new profit shifting opportunities result in a positive investment effect for the target firm. The number of employees and assets of the target firm increase.

If the target country restricts profit shifting via the manipulation of transfer pricing, real activity will be shifted instead of pure profits. This shifting effect dominates the investment effect, concerning labor intensive functions.

Consequently, the target country cannot prevent tax-induced profit shifting.

The acquirer's country of residence has an instrument to prevent tax-induced profit shifting. Controlled foreign company rules can remove the incentive.

Worldwide taxation is not suitable. Firms use specific strategies to avoid home country taxation of foreign earnings. To do so, their group structure has to be adjusted and becomes more complex.

There are good reasons, why complex group structures may not be in line with shareholder's interest. Here, future research may provide deeper insights.

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