

Tax Avoidance of Multinational Entities

An Empirical Analysis of Tax Effects on Investment, Financial
Structures and Repatriation of Profits

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Glossary and Abbreviations

acquirer GUO	GUO of the acquirer
acquirer GUO country	host country of the GUO of the acquirer
BEPS	Base erosion and profit shifting
BRIC countries	group of countries Brazil, Russia, India and China
BvD	Bureau van Dijk (data providing firm)
CEDR	consolidated external debt ratio
CFC rule	controlled foreign corporation rule
CFC rule country	country with CFC rules
CFC rule MNE	MNE with CFC rules in the country of the GUO
CIDR	consolidated internal debt ratio
CTDR	consolidated total debt ratio
DC	direct credit
DE	deduction
DFG	Deutsche Forschungsgemeinschaft (German Science Foundation)
DO	double taxation
DOI	Digital Object Identifier
DTT	double tax treaty
EBT	earnings before taxes
EBT per PPE	earnings before taxes per property, plant and equipment
EEA	European Economic Area
ES rule	Earnings-stripping rule
EU	European Union
EUR	Euro
EX	exemption
EDR	external debt ratio
FDI	foreign direct investment
GDP	gross domestic product
GDP growth	GDP growth
GDP per capita	GDP per capita
GILTI	Global Intangible Low-Taxed Income
GMM	generalized method of moments
GT regime	group taxation regime

GUO	global ultimate owner
IBFD	International Bureau of Fiscal Documentation
IC	indirect credit
IDR	internal debt ratio
IP	intellectual property
KPMG	accounting firm
LCF	loss carryforward
M&A	merger and acquisition
M&A firm	firm that entered the MiDi database through M&A (holding variables as dependent variables)/firm for which an affiliate in same country entered MiDi database through M&A (debt ratios as dependent variables); mode of entry is only observed for new entries after 2004
MiDi	Microdatabase Direct investment
MNE	multinational entity
N/A	not available
non-CFC rule country	country with no CFC rules
non-CFC rule MNE	MNE with no CFC rules in the country of the GUO
non-M&A firm	firm that entered the MiDi database through greenfield investment (holding variables as dependent variables)/firm for which no affiliate in same country entered MiDi database through M&A (debt ratios as dependent variables); mode of entry is only observed for new entries after 2004
non-PPE assets	assets other than PPE
OECD	Organisation for Economic Co-operation and Development

1. Introduction

1.1 Overview

During the last years, tax avoidance of multinational entities (MNEs) has gained considerable attention, both within the public and political debate and also within academic research. Dyreng et al. (2008) “measure tax avoidance as the ability to pay a low amount of cash income taxes [...] relative to corporate pre-tax earnings”. In this thesis, I consider three ways of tax avoidance. First, I investigate profit shifting, i.e., profit reallocations from subsidiaries in countries with a high tax rate (in the following referred to as high-tax subsidiaries) to affiliates in countries with a low one (in the following referred to as low-tax subsidiaries). Two well-known examples of this shifting are the following: First, those payments could be interests for loans that are granted to high-tax subsidiaries from low-tax subsidiaries. Second, it could be license fees for intellectual property (IP), i.e., patents or trademarks, which are assigned to the latter but used by the former. With those or other payments, the profits are shifted to subsidiaries in low-tax countries. Hence, the overall profit after taxes increases. A second way of tax avoidance is that profits in countries with high tax rates can also be reduced by external debt financing. A third example of tax avoidance is delaying the distribution of profits via dividends to periods with smaller tax rates on such dividends. Common cases of reductions of those taxes are double tax treaties (DTTs), which are targeted against double taxation.¹ Since double taxation is often not intended, this third way of tax avoidance may be considered as less critical from a fiscal perspective. As mentioned above, all those three ways of tax avoidance are investigated within this thesis. Note that, while I frame the third analysis towards tax avoidance, initially it was written with a focus on the relevance of taxes for FDI.

The consequences of tax avoidance are multifaceted. A critical consequence of tax avoidance are foregone revenues for public budgets. Though existing estimations of those effects are impaired by methodological issues (see Fuest et al. (2013) for a discussion of those issues), this aspect is prominent in the debate about tax avoidance. However, tax avoidance may also have positive effects. E.g., Fuest et al. (2018) find that employees bear a considerable part of the corporate taxes but in case of profit shifting opportunities, higher taxes do not seem to have such a negative effect on wages. Another example is that tax avoidance opportunities can lead to higher investment in those subsidiaries of MNEs that are in countries with a high tax rate

¹ Double taxation implies that the dividends are taxed by both, the country of the distributing and the country of the receiving firm (see Section 4 for a detailed discussion).

(Overesch (2009)). Furthermore, research activity of firms may increase if they have affiliates in tax havens (Schwab and Todtenhaupt (2016)).

Given this relevance of tax avoidance, I investigate in this thesis how it is conducted by firms. As mentioned above, three types of tax avoidance, i.e., profit shifting (in particular via its effects on investment and debt ratios), external debt financing and the delaying of dividend repatriations are considered. Furthermore, I analyze whether profit shifting is prevented by controlled foreign-corporation rules as a particular anti-avoidance measure. In addition, besides the first analysis, also in the third analysis I investigate investment effects of tax avoidance. The first analysis is joint work with Dr. Dominik von Hagen and the third analysis is joint work with Prof. Dr. Michael Overesch and Dr. Daniel Dreßler.²

In the following, I give a summary of the three analyses:

In the first analysis, I investigate investment of firms that at once have profit shifting opportunities, since they were initially domestic firms (a firm with no affiliates in other countries), but become part of a MNE through an acquisition. Since tax avoidance via profit shifting thereby becomes possible, the profits after taxes are higher and hence more investment projects can be realized after the acquisition. In other words, the minimum required pre-tax rate of return of those projects (the so-called cost of capital) declines. However, I rather expect those effects for firms located in countries with a high tax rate (in the following referred to as high-tax targets), since the decline in the cost of capital is smaller for firms that already have a low tax rate (low-tax targets). The acquired firms are obtained from the acquisition database Zephyr for the time period from 2008 to 2013. Data on investment as well as other firm level information are obtained from the Amadeus database. Indeed, the results of an ordinary least squares (OLS) panel regression show that after acquisitions real investment, i.e., investment in property, plant and equipment (PPE), is higher the higher the tax rate on corporate incomes. In addition, I consider the effect of controlled foreign corporation (CFC) rules, which are targeted against profit shifting. If those apply, the investment effect (higher investment in high-tax targets) can no longer be observed. Low-tax targets may however become destinations for profits shifted away from high-tax affiliates within the MNE. Indeed, the results show that after acquisitions financial revenues increase in those firms. However, I find no corresponding effect for the profit measure earnings before taxes (EBT) divided by PPE, which should decrease in the tax rate.

² Although I wrote the papers with co-authors, I use the first form singular in the section Introduction and Section 5, which is a common approach in doctoral theses.

After investigating profit shifting in general in the first part, my second analysis focuses on a specific well-known tax avoidance strategy, namely that MNEs locate debt in high-tax subsidiaries (also known as debt push down, see Jacobs (2011)). Besides profit shifting, this also includes external debt financing. Previous studies have found relatively small effects of taxes on debt-to-capital ratios of firms. In this study, I state that one explanation for those small effects may be that it is necessary to consolidate the financial structures of firms and their holdings in the same country. The simple intuition is as follows: the debt financing depends on the used capital. However, without such consolidation, a part of the capital, the equity of the firm, is counted twice, i.e., also within the capital of the holding. This leads to an underestimated debt ratio. The consolidation considers the holding and the subsidiary as one firm (also referred to as holding structure in this thesis). Consequently, the equity of the subsidiary is subtracted from the denominator of the debt ratio. The usage of holdings should be particularly relevant in case of mergers and acquisitions (M&As) because if a firm is acquired through a holding, the latter can take debt up to the market value of the firm (Ruf (2011)). At the level of the firm, debt could only be taken up to the amount of total assets, which differs from the market value through goodwill. The debt financing of the holding will cause additional interest payments, which can contribute to reduce the taxable profits of the subsidiary.

I separate this second analysis into two steps. First, I investigate whether the usage of holdings is indeed driven by tax rates, particularly in case of firms that have entered the database via M&As (in the following referred to as M&A firms). As a necessary condition, I will account for the presence of a group tax regime in the country, since otherwise the subsidiary's profits could not be offset by the holding's interest payments. This first part is done with logit regressions. Second, I measure the effect of the tax rate on the debt ratio with an OLS panel regression, both in the consolidated and unconsolidated case. Given that holdings are assumed to be more likely in case of high tax rates and the consolidation leads to an increase of the debt ratio, the effect of the tax rate on the debt ratio should increase with the consolidation. For both steps, I use firm level data from the Microdatabase Direct investment (MiDi) provided by the Deutsche Bundesbank (German Central Bank). MiDi has the advantage that it covers all German FDI (above certain reporting thresholds). This completeness of the database is guaranteed by mandatory reporting. The database includes also holdings, which is particularly relevant for this analysis. Regarding the results, I do not find the expected effect of the tax rate on the probability of holdings for the subsample of M&A firms. In other words, the results do not indicate that holdings are more likely in countries with a high tax rate (in the following referred to as high-

tax countries) in case of M&As. I argue that there may actually be such an effect, but firms in countries with a low tax rate (in the following referred to as low-tax countries) may also have holdings. However, this may be for other reasons such as the avoidance of capital gains taxes. Those two effects (for firms in high- respectively low-tax countries) may render the overall effect of taxes insignificant. In the second step, I indeed find an effect of the tax rate on the debt ratio, which is similar to previous research, and, as assumed, increases through the consolidation. Since the results indicate that this particular way of tax avoidance has started to be used only in recent years, also other explanations seem to be relevant to explain the relatively weak findings in the past. I find the results for the debt ratios only for M&A firms, which, as another contribution of this analysis, may indicate that those are more active in tax avoidance. Furthermore, the insignificant effect for non-M&A firms in this recent sample may also be related to the finding of a meta-study, according to which the reaction of firms to incentives for profit shifting has declined over the years (Heckemeyer and Overesch (2017)).

In the third analysis, I investigate how DTTs and repatriation taxes affect investment. DTTs are relevant if profits are repatriated to a firm from a foreign subsidiary via dividends or interests. In the absence of such treaties profits may be taxed twice, both by the country of the subsidiary (profit taxes and withholding taxes) and the country of the parent (profit taxes). The treaties avoid double taxation by reducing either the withholding taxes and/or the profit taxes in the country of the parent (both kinds of taxes are referred to as repatriation taxes in the analysis). The avoidance of double taxation is usually achieved by the choice of one out of two methods: the exemption respectively credit method. In case of the exemption method, the country receiving the profits does not levy a tax. In case of the credit method, it levies a tax but tax payments that have been made in the host country of the subsidiary are credited. As in the second analysis, I investigate the impact of taxes on investment. Therefore, I choose a similar empirical approach. However, I enhance the analysis by a dynamic panel estimator that accounts for the potential dependency of current investment to the investment in previous years. Furthermore, as for the second analysis, I use firm-level data from the MiDi database. The fact that this database covers virtually all German outbound investments makes it possible to include all repatriation taxes, which may also arise from intermediary firms. Those intermediary firms may be missing in other databases that are based on data searches. Accordingly, MiDi is particularly advantageous in this context.

The results do not indicate an effect for DTTs, but for repatriation taxes. The analysis shows different results for different asset types: whereas repatriation taxes exert the expected negative

effect on fixed assets, financial assets increase with those taxes. In line with previous theoretical papers, those results indicate that firms expect falling repatriation taxes and therefore, as long as taxes are high, reinvest their profits in financial assets instead of repatriating them. Thereby they avoid the high current taxes and pay lower taxes in future. The effect on financial assets is also confirmed by a positive effect of repatriation taxes on revenue reserves. The opposing effects for fixed and financial assets may further explain the insignificant effect on total assets. When treaties are enacted financial assets may be reduced in order to conduct dividend distributions while investment in fixed assets may increase. This could also be an explanation for the insignificant overall effect of such treaties in this analysis as well as for the insignificant or even negative investment effects that have been found in previous research (see, e.g., Davies (2003)).

The thesis is structured as follows. I start by describing the major contributions of the thesis to previous research and the used data sets for each analysis in the remaining part of the introduction. The three analyses then build the core of the thesis (Section 2 to Section 4). The thesis ends with concluding remarks. Please note that abbreviations and also terms that are defined specifically for the analyses in this thesis or that are probably not often used in the related literature are listed in the Section Glossary and Abbreviations.

For all three analyses, I pursued the usual structure of scientific papers. Still there is some remaining heterogeneity between the analyses with respect to the structure. For example, the first analysis has a considerably long appendix, whereas for the second analysis, alternative specifications are already included in the main part of the analysis. In the third analysis, the alternative estimations (varying variables of interest) are included in the main regression tables. One reason for those diverging structures is that the different contents also favor varying structures. For example, the second and third analysis have on average more columns per table, which is more feasible to explain the content. However, this leaves space in the main part for regressions that in the first analysis have been shifted to the appendix (e.g., those regressions that consider certain anti-avoidance measures, other than CFC rules). Another reason is that the analyses have been started at different points in time and some analyses are therefore naturally in a more evolved state. For example, due to a journal submission of the first analysis, many robustness checks have already been conducted.

1.2 Research Contribution

1.2.1 Impact of Controlled Foreign Corporation Rules on Post-Acquisition Investment and Profit Shifting in Targets

My first analysis builds on two strands of literature. First, several previous papers have considered the effect of profit shifting opportunities on investment. Desai et al. (2006) derive in a theoretical paper that MNEs with affiliates in tax havens exhibit lower cost of capital in other affiliates. Accordingly, Dharmapala (2008) shows that this may cause higher investment in the other affiliates. The effect of profit shifting on investment is also supported by empirical findings of Overesch (2009), who has shown that investment in fixed assets in German subsidiaries of MNEs increases with the tax rate differential to the direct owner's home country. The results of Egger et al. (2014b) indicate that firms do not react to the host country's tax rate, if they can conduct tax avoidance. As mentioned above, through acquisitions firms may become part of MNEs, within which such tax avoidance is possible. In accordance to that, Belz et al. (2013) find that the effective tax rates of targets decline after M&As.

Second, others investigate the effect of CFC rules on profit shifting and investment. They find that those reduce financial investment in low-tax affiliates respectively profit shifting (Altshuler and Hubbard (2003), Ruf and Weichenrieder (2012), Büttner and Wamser (2013)). Furthermore, Belz (2015) and Egger and Wamser (2015) have found detrimental effects on investment in other assets types. Whereas the former finds this effect for investment in total assets, the latter find it for fixed assets.

My analysis contributes to the previous research by combining the investigations of different asset types in one analysis, i.e., both, the effect on financial investment of firms to which profits are shifted and the effect on fixed assets of firms from which profits are shifted away. Hence, the whole picture of profit shifting is shown in one investigation, which adds to the visibility of those results, which have also been found in previous research. In addition, through this renewed consideration, the reliability of those results is increased.

1.2.2 Tax Influence on Financial Structures of M&As

My second analysis comprises an investigation on how taxes affect the financial structures of firms with a particular focus on M&As. Several papers have identified high debt financing as a tax avoidance strategy, i.e., the location of debt in high-tax subsidiaries (see, e.g., Jog and Tang (2001) or Desai et al. (2004) for early work on this topic). In a meta-study, Feld et al. (2013) find that the debt ratio increases by 3 percentage points if the tax rate increases by ten percentage points. Given that the tax rates of the countries that I include in this analysis, i.e., of the EU

and OECD countries, range from 10% for Bulgaria to 38.93% for France in 2014 (see Table 1.1, where all tax variables are presented), the effect is rather small.

Previous research has found some explanations why the effects are that small. E.g., large debt financing may lead to bankruptcy risks (Kraus and Litzenberger (1973)) or hinder the realization of new attractive investment opportunities (Myers (1977)). Furthermore, anti tax avoidance rules may prevent such profit shifting (Altshuler and Hubbard (2003), Ruf (2011), Ruf and Weichenrieder (2012), Büttner et al. (2012), Büttner and Wamser (2013)). In addition, tax rate differentials to affiliates may have to be considered (see Huizinga et al. (2008), Büttner and Wamser (2013), Overesch and Wamser (2014)). Another explanation could be that firms have other capabilities to reduce their tax base (Büttner et al. (2011)).

I however show that it is also necessary to consolidate the financial structures of holdings with their subsidiaries and that this leads to a stronger effect of taxes on the debt ratio compared to the unconsolidated case. As mentioned above, this relates also to the discussion of Ruf (2011) who has already stated that the usage of holdings for such purposes may be particularly relevant in case of M&As. Furthermore, I show that M&A firms and those stemming from greenfield investment may react differently to incentives for tax avoidance. Even in the unconsolidated case, only for the former an effect of the tax rate on the debt ratio is found. Since those findings differ from previous literature, they may indicate that it is necessary to differentiate between the two types of FDI and/or that the general extent of tax avoidance has maybe become smaller over time (Heckemeyer and Overesch (2017)).

1.2.3 The Impact of Tax Treaties and Repatriation Taxes on FDI Revisited

Several previous studies have investigated the effects of repatriation taxes respectively DTTs on FDI. But the results are not clear cut.

Some studies find insignificant or even negative effects of DTTs (Davies (2003), Blonigen and Davies (2004), Egger et al. (2006)).

The results of other papers however confirm the expectations for DTTs. They can be differentiated between those that investigate the effect of DTTs on firms decisions to start an FDI project (extensive margin) and those that investigate the effect on the amount of investment (intensive margin). Di Giovanni (2005), Davies et al. (2009), Egger and Merlo (2011) and Marques and Pinho (2014) find a positive effect (primarily) on the extensive margin. Millimet and Kumas (2007) find positive as well as negative impacts of DTTs on that margin. Behrendt and

Wamser (2018) find that the effect of DTTs decreases if the difference between the tax rate of the country of the subsidiary and the parent increases. Regarding the intensive margin, Smart (2010) shows for the case of Canada that DTTs that particularly included the switch from the credit method to the exemption method, have led to an increase of this margin. Egger and Wamser (2013) find an effect, if DTTs are accompanied by other agreements that target at economic integration. The findings of Blonigen and Piger (2014) indicate that the effects of DTTs are stronger for FDI into non-OECD countries. Petkova et al. (2018) find an effect on the intensive margin if treaties reduce the repatriation tax for direct repatriation to at least the minimum of the taxation for indirect repatriation routes. Furthermore, their results indicate an effect on FDI only for large tax reductions. Blonigen et al. (2014) find an effect on both margins, which is larger for firms using differentiated inputs (precisely, besides the extensive margin, they consider sales, which can be considered as some sort of intensive margin).

For looking at the effect of repatriation taxes in general, one can differentiate again between effects on the extensive and intensive margin. Overesch and Wamser (2009) find a negative effect on the former for withholding taxes in particular. Barrios et al. (2012) find that the effect of repatriation taxes on that margin depends, *inter alia*, on whether deferral is actually possible due to the parent country's tax legislation. With respect to the intensive margin, Hines Jr. (1996) finds that the method to avoid double taxation of the parent company in combination with different tax rates in the US at state level affects the distribution of FDI among those states. Egger et al. (2009) find the expected negative effect of withholding taxes on FDI stocks. Finally, Hong (2017) finds that FDI without an intermediary subsidiary is larger in situations where the repatriation tax is smaller than the one for repatriations via potential conduit countries.

The aim of this study is to shed light on those contradictory results, i.e., positive as well as insignificant or negative effects of DTTs. Therefore, I build on previous research that finds that firms adjust their repatriation behavior to repatriation taxes. Several papers, starting with Desai et al. (2001), find that repatriation taxes negatively affect repatriations. This may increase financial investment (Weichenrieder (1996)) and indeed, e.g., Hanlon et al. (2015) show that high repatriation taxes affect acquisition activity. Since a trend of declining repatriation taxes over time can be observed, it is reasonable to assume that firms anticipate this development and defer the repatriation of profits until such tax cuts occur. However, once the repatriation taxes are reduced, repatriations should be conducted and hence financial investment should decrease. This was indeed observed for the temporary reduction of US repatriation taxes in 2004 and 2005, which led to substantial repatriations (see, e.g., Redmiles (2008)).

Based on those considerations, I consider different asset types, which allows me to provide a potential explanation for both, the significant positive and negative as well as insignificant effects from previous research. My results confirm the previously found positive effects of taxes on financial investment, indicate a negative relationship between those taxes and fixed assets and thereby show that an insignificant effect on total assets (which is also found in this study) may be explained by the opposing effects of those two underlying asset types.

1.3 Description of Data

1.3.1 Impact of Controlled Foreign Corporation Rules on Post-Acquisition Investment and Profit Shifting in Targets

In the first analysis, I use the M&A database Zephyr and merge data on investment as well as profits from the Amadeus database. This merge is possible since both databases are from the same data provider (Bureau van Dijk) and hence the firms in both databases have the same identifiers. I consider M&As in the time period 2008 to 2013 (2008 to 2012 in case of EBT per PPE). The data from Amadeus range from 2004 to 2014 (from 2004 to 2013 in case of EBT per PPE). Similar variables could also be obtained from the MiDi database, which I use in the second and third analysis, which comprises ownership information for more firms and which would hence increase the sample. However, I focus on the change of investment and tax avoidance through acquisitions. Hence, it is necessary to observe information on those variables also before the acquisition. Through the combination of Zephyr and Amadeus, this can be achieved whereas MiDi does not provide information on the firms before the acquisition.

The dependent variables (PPE, financial revenues and EBT per PPE) as well as various control variables at the target level (an indicator, whether the target had a loss in the previous year, the target's number of employees, non-PPE assets and sales) are obtained from Amadeus.

Given that the focus of this analysis is on the change of investment and tax avoidance through acquisitions, it is necessary to identify whether observations lie before or after the acquisition. This information is based on Zephyr, where the M&A year is given. Furthermore, Zephyr provides information on the amount of shares that is acquired. This is relevant, since I consider only those acquisitions, where 100% of the shares of the target are acquired within one step. This is made in order to avoid observations where other owners potentially prevent profit shifting.

The tax variables are obtained largely from the OECD, IBFD Tax Handbooks and Ernst & Young's Worldwide Corporate Tax Guides. Several country specific control variables stem

from the World Bank (GDP, GDP growth, GDP per capita, inflation and corruption). Furthermore, the information on CFC rules are also obtained from tax guides. Table 1.1 shows the major tax variables used in my thesis.

Table 1.1: Tax variables for countries in samples for 2014

Tax variable	Statutory profit tax rate (in %)	CFC rule	Transfer pricing documentation rule	Thin-capitaliza- tion (TC) or earnings-strip- ping rules (ES)	Group taxation regime	Withholding tax towards Germany
Analyses, where the variables are used	Analysis 1*, Analysis 2, Analysis 3	Analysis 1	Analysis 1	Analysis 1, Analysis 2	Analysis 2	Analysis 2**
Australia	30	1	N/A	TC or both	1	15
Austria	25	0	0	None	1	0
Belgium	33.99	0	0	TC or both	0	0
Bermuda	0	0	N/A	N/A	N/A	N/A
Brazil	34	N/A	N/A	N/A	N/A	N/A
Bulgaria	10	N/A	N/A	TC or both	0	0
Canada	26.5	1	N/A	TC or both	0	5
Cayman Islands	0	0	N/A	N/A	N/A	N/A
Chile	20	N/A	N/A	TC or both	0	35
China	25	N/A	N/A	N/A	N/A	N/A
Colombia	25	N/A	N/A	N/A	N/A	N/A
Croatia	20	N/A	N/A	TC or both	0	0
Cyprus	12.5	N/A	N/A	None	0	0
Czech Republic	19	0	0	TC or both	0	0
Denmark	24.5	1	1	TC or both	1	0
Dominican Re- public	28	N/A	N/A	N/A	N/A	N/A
Estonia	21	1	1	None	0	21
Finland	20	1	1	ES	1	0
France	38.93	1	1	TC or both	1	0
Germany	30.175	1	1	ES	N/A	N/A
Greece	26	N/A	1	TC or both	0	0
Hong Kong SAR, China	16.5	N/A	N/A	N/A	N/A	N/A
Hungary	20.86	N/A	1	TC or both	0	0
Iceland	20	N/A	N/A	None	1	5
India	32.445	0	N/A	N/A	N/A	N/A
Indonesia	25	N/A	N/A	N/A	N/A	N/A
Ireland	12.5	0	1	ES	1	0
Israel	26.5	1	N/A	None	1	25
Italy	30.9	1	1	ES	1	0
Japan	35.71	1	N/A	TC or both	1	10
Korea, Rep.	22	N/A	N/A	TC or both	1	5
Latvia	15	N/A	N/A	TC or both	0	0
Liechtenstein	12.5	N/A	N/A	N/A	N/A	N/A
Lithuania	15	1	N/A	TC or both	0	0
Luxemburg	29.22	N/A	N/A	TC or both	1	0

Table 1.1: Tax variables for countries in samples for 2014

Tax variable	Statutory profit tax rate (in %)	CFC rule	Transfer pricing documentation rule	Thin-capitaliza- tion (TC) or earnings-strip- ping rules (ES)	Group taxation regime	Withholding tax towards Germany
Analyses, where the variables are used	Analysis 1*, Analysis 2, Analysis 3	Analysis 1	Analysis 1	Analysis 1, Analysis 2	Analysis 2	Analysis 2**
Malaysia	25	0	N/A	N/A	N/A	N/A
Malta	35	0	N/A	None	1	0
Mexico	30	N/A	N/A	TC or both	1	0
Netherlands	25	0	1	None	1	0
New Zealand	28	1	N/A	TC or both	1	15
Norway	27	1	1	ES	1	0
Peru	30	N/A	N/A	N/A	N/A	N/A
Poland	19	0	1	TC or both	1	0
Portugal	30	1	1	ES	1	0
Romania	16	N/A	N/A	TC or both	0	0
Russian Federa- tion	20	0	N/A	TC or both	N/A	N/A
Singapore	17	N/A	N/A	N/A	N/A	N/A
Slovak Republic	22	N/A	1	None	0	0
Slovenia	17	N/A	N/A	TC or both	0	0
Spain	35.25	1	1	ES	1	0
Sweden	21.5	1	1	ES	1	0
Taiwan, China	17	0	N/A	N/A	N/A	N/A
Thailand	20	N/A	N/A	N/A	N/A	N/A
Turkey	20	N/A	N/A	TC or both	0	5
Ukraine	18	N/A	N/A	ES	N/A	N/A
United Arab Emirates	0	N/A	N/A	N/A	N/A	N/A
United Kingdom	21	1	1	TC or both	1	0
United States	37.87	0	N/A	TC or both	1	0
Uruguay	25	N/A	N/A	N/A	N/A	N/A

Notes: All variables are based on information from the OECD and different tax guides, in particular the IBFD Tax Handbooks, the PWC Worldwide Tax Summaries and the Worldwide Corporate Tax Guides by Ernst & Young. Not all variables appear in each analysis, which is the main reason why they are sometimes not available (N/A) in the table. Precisely, they are not available for those countries that are not used in the analysis that uses them. In fact, such regulations may be observed for those countries. Some countries are included in the first analysis despite no information on transfer pricing documentation rules is given for them (Croatia, Latvia, Lithuania, Romania, the Russian Federation and the Ukraine). This is no considerable problem, since those rules are only exploited for a robustness check.

*In Analysis 1, slightly different tax rates are used (for Germany and Ukraine, the tax rate from the first analysis are shown, since only there the tax rate is used for those countries).

**The withholding taxes are denoted as being used only in the second analysis. In fact, they are used also in the third analysis. For the third analysis, information on withholding taxes is however given more extensively in Table A 17. In this table (Table 1.1) the withholding taxes are given for the year 2014. This year is also not used in the third analysis.

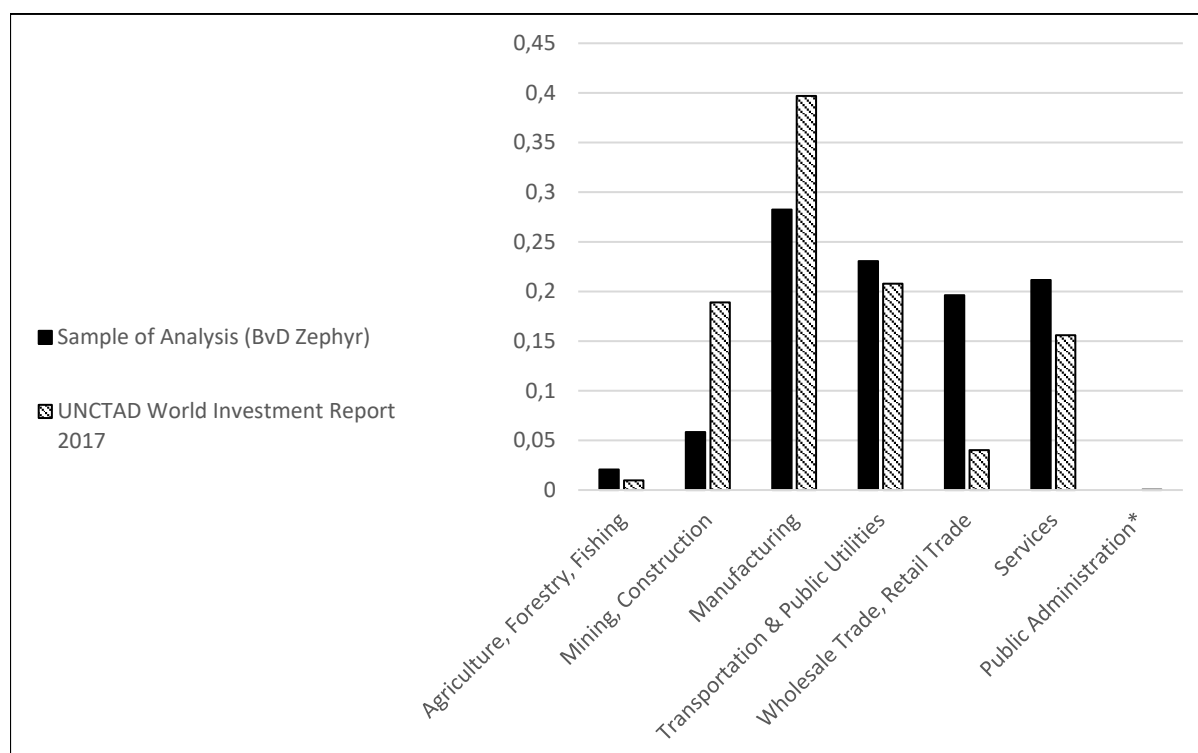
The sample is considerably reduced by several adjustments. Starting with 207,545 acquisitions for the time period 2007 to 2013, 75% are dropped since I consider only those cases where

100% of the shares are acquired at once. Further analysis could increase the number of observations by allowing for the inclusion of gradual acquisitions where finally also 100% of ownership are achieved. In addition, I have made five further large adjustments. First, I consider only unconsolidated data. Second, I drop observations with missing information on the countries of the targets, acquirers and their global ultimate owners (GUO). Given that information on GUOs is only given starting from 2008, the sample of acquisitions generally reduces to 2008 to 2013. Third, I drop information with missing information on the acquired shares. Fourth, I drop firms from the financial services sector due to special regulations on taxation in that sector. Finally, I drop several implausible observations, e.g., duplicates. Together, those adjustments reduce the sample by about another 23%. After some additional small adjustments, 213 acquisitions remain for the basic regression with PPE as the dependent variable (114 in case of financial revenues and 93 in case of EBT per PPE).

This reduction may raise concerns whether the sample is representative. Figure 1.1 shows the shares of the values of acquisitions of targets from each sector in the overall value of all acquisitions, both, for the sample (Bureau van Dijk's (BvD) Zephyr database) and based on the UNCTAD World Investment Report 2017 (UNCTAD (2017)), which measures global FDI flows.

The shares for the sectors manufacturing, transportation and public utilities as well as services are relatively similar. Whereas the share of acquisitions in the mining and construction sector is much smaller in the sample, the share for wholesale trade and retail trade is considerably larger. This may however be explained by the fact that in this sample I only investigate European targets (at least in the regressions in the main part³). In case of the mining sector, there are presumably considerably more companies outside Europe. For the trade sector, the opposite may be the case. Hence, the sample is roughly representative with respect to the sector distribution.

³ At least in one robustness check, the observations vary compared to the main part and hence theoretically (though rather unlikely) there may also be non-European targets.

Figure 1.1: Shares of sectors of targets in overall value of acquisitions

*Public Administration has no observations in the sample and accounts for about 0.04 in the UNCTAD World Investment Report 2017 (UNCTAD (2017)).

1.3.2 Tax Influence on Financial Structures of M&As

As mentioned above, I use MiDi as the database for this analysis. Precisely, I use subsidiary-level data for the period 2005 to 2014. Four kinds of data are obtained from MiDi. First, based on the identifiers of the firms and their owners, I derive ownership structures. Based on that, I define the dependent variables for the first set of regressions: two dummy variables that are equal to one if the considered subsidiary is held by a holding in the same country respectively in an intermediary country between the firm's and its parent's country. In addition, the identifiers of the MNEs are given, which facilitates the above mentioned consolidation. Second, I use balance sheet items. Here, I obtain internal, external and total debt, total capital as well as equity in order to calculate the debt ratios, which are the dependent variables in the second part of the empirical analysis. Furthermore, I calculate tangibility as a control variable based on fixed assets, intangible assets and again total capital. Third, I use items from the profit and loss account, including information on whether a firm has a loss carryforward as well as information on sales and profits (profits are used for the calculation of the debt ratios). Finally, I consider variables that denote relevant characteristics of the firms. The most important one is the mode of entry (M&A vs. greenfield investment), which I use in order to distinguish the investigated effects of the tax rate on holding structures and debt ratios for the two modes. Furthermore, I use several

other variables, such as the sector and legal form of the firm, in order to exclude firms for which I do not expect the considered effects of taxation.

Besides that, I again merge several datasets with tax variables as well as country-specific control variables. Similar to the first analysis, the tax variables are largely based on IBFD Tax Handbooks and Ernst & Young's Worldwide Corporate Tax Guides (see again Table 1.1). The additional control variables (GDP, GDP per capita, inflation and corruption) are all obtained from the World Bank.

Given that the data is based on mandatory reporting, there are no concerns about whether the data is representative. However, starting from all outbound FDI of German MNEs the sample reduces considerably for certain reasons. First, I consider observations after 2004 and until 2014, because only in those years the mode of entry can be observed. This gives a sample of 288,469 firm year observations.⁴ Since MiDi considers firms only above certain reporting thresholds and those varied over time, I apply a uniform one, total capital of at least 3 million Euros and full ownership, in order to avoid the risk of certain sample selection. Full ownership is higher than the maximum ownership value in the reporting thresholds. This far-reaching restriction of full ownership is however made for two reasons. First, high shares of ownership are often required for group tax regimes to be applicable. These in turn are needed for offsetting the subsidiary's profits by the holding's interest payments. Second, full ownership also ensures control by the owner, which may be needed in order to conduct tax avoidance. Those restrictions reduce the number of observations by about 54%. In addition, I restrict the sample to firms that are legally independent and whose parent is incorporated and legally independent (reduction by about 5%). Further, I exclude firms from sectors with special regulations on taxation and the balance sheet structure (mining, agriculture, non-profit and membership organizations, financial services sector), which reduces the sample by about 9%.⁵ Moreover, I only consider OECD and EU countries (reduction by about 5%). Finally, several minor reductions (about 17% in total) leave a sample of 30,714 observations, i.e., 11% of the initial sample (together for M&A and non-M&A firms in the unconsolidated case).⁶

⁴ Source: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank (German Central Bank), Micro-database Direct investment (MiDi) 1999-2014.

⁵ Note that those reductions (54%, 5% and 9%) are always applied for all observations of firms in the same group and host country, i.e., a observation is dropped if one of those reasons for dropping is fulfilled for any affiliate of the group in the country in at least one year. This rather cautious adjustment is made because of the applied consolidation and the consideration of firms over time.

⁶ Note that rounding leads to a sum of those percentage values of 101%. In fact, it is of course 100%.

1.3.3 The Impact of Tax Treaties and Repatriation Taxes on FDI Revisited

As in the second analysis, I use MiDi as the database also for the third one. However, since this is an earlier project, I consider observations for the time period 1996 to 2008. Like in the second analysis, information on ownership structures, balance sheet positions and from the profit and loss account are obtained from MiDi. The ownership structures are needed, in order to identify relevant DTTs, i.e., whether there are DTTs between a firm and its owner, to whom it may repatriate profits. Furthermore, the knowledge of the structures allows to determine to what extent generally taxes are raised on those repatriations. The balance sheet positions are relevant for the dependent variables since investment is measured by total, fixed and financial assets. In addition, I also consider the share of revenue reserves and nominal capital to total capital. Furthermore, profitability is obtained and used as a control variable.

As mentioned in the previous paragraph, I consider DTTs and repatriation taxes according to the ownership structures. Similar to the other analyses, I obtain those information as well as the statutory profit tax rate (which is here used as a control variable) from IBFD Tax Handbooks and Ernst & Young's Worldwide Corporate Tax Guides and again I obtain various macroeconomic control variables (GDP, GDP per capita and inflation) from the World Bank. Note that Table 1.1, which gives an overview on tax variables, does not include all tax variables that are used in this analysis. Extensive exemplary information on withholding taxes, methods of how incoming dividends are dealt with by the countries and DTTs that are used in this third analysis, are given in the Appendix (Appendix to Section 4). In addition, I use the Country Risk indicator of the OECD to measure further investment conditions.

In the following, I will describe again, how adjustments of the dataset reduce the final sample. I consider all outbound cases of the MiDi version for the years 1996 to 2008, which yields a sample of 358,395 observations.⁷ One major reduction (about 36%) is again the application of a uniform reporting threshold and/respectively the limitation to firms that are fully owned by their German parents. In addition, I restrict the sample again to firms that are legally independent and whose parent is incorporated and legally independent (about 12%). After several smaller adjustments (which together however account for about 28% of the observations), the sample comprises about 84,627 observations (about 24% of the initial sample).

⁷ Source: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank (German Central Bank), Micro-database Direct investment (MiDi) 1996-2008.

2. Impact of Controlled Foreign Corporation Rules on Post-Acquisition Investment and Profit Shifting in Targets^{8; 9}

Abstract: We investigate real investment, financial revenues and profits in formerly domestic firms once they enter a MNE through an acquisition. We argue that following the acquisition, those targets are tax-optimized in a profit shifting context if they are acquired by MNEs with no CFC rules in their headquarters' countries. In this case, we hypothesize that MNE-wide profit shifting opportunities decrease high-tax targets' cost of capital, which may have a positive effect on real investment of these targets. In addition, we hypothesize that financial revenues respectively profits of low-tax targets increase after the acquisition, since they may become destinations of profit shifting themselves. We find evidence for the effects on real investment. Further, these effects can no longer be observed in case of existing CFC rules in the acquirer's headquarters' country. This finding may suggest that CFC rules effectively mitigate MNE-wide profit shifting, which in turn has detrimental investment effects. We also find some evidence for the expected effects for financial revenues but not for the profit measure.

Keywords: Corporate Taxation, Multinational Entities, Profit Shifting, Foreign Direct Investment, Mergers and Acquisitions, CFC Rules, Empirical Analysis

JEL Classification: F23, G34, H25, H26, H32

⁸ This paper is joint work with Dr. Dominik von Hagen.

⁹ We gratefully acknowledge the constructive comments and suggestions from Julia Braun, Ron Davies, Simon Loretz, Michael Overesch, Ulrich Schreiber, Nathan Seegert, Johannes Voget and participants at the 2017 ZEW Public Finance Conference, the 2017 European Accounting Association Annual Congress and various seminars at the University of Mannheim and the Centre for European Economic Research (ZEW). We would like to thank Axel Prettl (University of Tuebingen) for sharing his CFC rule data with us. Financial support by the German Science Foundation (DFG) and the Leibniz ScienceCampus "MannheimTaxation" (a joint initiative of the ZEW and the University of Mannheim) is gratefully acknowledged. The usual disclaimer applies.

2.1 Introduction and motivation

We investigate investment and profit shifting in firms after they have been acquired by a foreign firm. Such cross-border acquisitions are an important form of FDI as in 2016, 52% of global FDI, i.e., about 828 billion USD, were conducted via such acquisitions respectively mergers (M&As)¹⁰ (UNCTAD (2017)). Further, cross-border acquisitions comprise several advantages for the acquirer and target such as tax avoidance opportunities (e.g., Belz et al. (2013)). In particular, if a formerly domestic target in a high-tax country becomes part of a MNE, this target may shift profits to affiliates in countries with a low tax rate (in the following referred to as low-tax affiliates) within the MNE after the acquisition.¹¹ Thereby, the tax burden for economic activity of this high-tax target and, consequently, its cost of capital decreases, which may enhance investment incentives in this target.¹² On the other hand, a target in a low-tax country could serve as a recipient of shifted profits. Hence, by acquiring such a low-tax target, the MNE may gain enhanced profit shifting opportunities.

However, countries try to prevent profit shifting by anti-avoidance measures. One such measure are CFC rules, which are implemented in several countries worldwide. These rules lead to an immediate taxation of the profits of low-tax subsidiaries in the MNE's headquarters' country. Consequently, profit shifting opportunities of a MNE with its headquarters in a country with effective CFC rules (in the following referred to as "CFC rule MNE") are substantially reduced compared to a MNE with no CFC rules in its headquarters' country (in the following referred to as "non-CFC rule MNE"). Those theoretical considerations serve as the starting point of our analysis: We investigate whether investment increases if a formerly domestic target from a high-tax country enters a MNE, which could be the consequence of the lowered cost of capital. Correspondingly, as mentioned above, targets in countries with low tax rates may become destinations for profit shifting. Therefore, we analyze whether profits decline with an increasing tax rate. Finally, we investigate whether the presence of CFC rules (which are targeted against such profit shifting) in an acquiring MNE has an effect on those potential outcomes.

¹⁰ In case of a M&A, two firms either join in one firm (merger) or one firm is acquired by another firm (acquisition), i.e., it becomes a subsidiary of the acquirer. There is no balance sheet information given on merged firms because they become part of other firms. Hence, we can only observe investment in acquired firms.

¹¹ Formerly domestic targets are defined as firms that are stand-alone firms or that belong to a group of firms that are all from the same country before the acquisition (see Section 2.3 for a more detailed explanation).

¹² Cost of capital is the minimum pre-tax rate of return on an investment required by the investor (Devereux and Griffith (1998)). For a more detailed explanation of the relationship between the cost of capital and investment, see Section 2.2.1.

We base our analysis on a cross-border acquisition sample from Bureau van Dijk's Zephyr and Amadeus databases. We look at real investment of targets by analyzing the development of PPE following the acquisition. Profit shifting is investigated via financial revenues and EBT per PPE. We consider acquisitions in the period from 2008 to 2013.

We contribute to existing research on the effect of profit shifting and CFC rules on investment (e.g., Ruf and Weichenrieder (2012) or Egger and Wamser (2015)), particularly by considering the whole picture of profit shifting in one sample: the effect of tax rates on the distribution of profits within a MNE and the effect of those profit shifting opportunities on real investment (see Section 2.2.2 for a detailed discussion).

Our results show that high-tax targets acquired by non-CFC rule MNEs increase their investment in PPE after the acquisition. We explain this result by MNE-wide profit shifting opportunities, which decrease the high-tax targets' cost of capital relatively more than low-tax targets' cost of capital. Regarding acquisitions of CFC rule MNEs, in line with our assumptions, we do not find a significant effect due to a lack of profit shifting opportunities. Correspondingly, we find an increase in financial revenues in low-tax targets, which supports the assumption of financial profits being shifted to low-tax subsidiaries within the MNE (though we find this effect only for the overall sample and not for non-CFC rule MNEs in particular). Finally, this effect cannot be observed for our second measure of profit shifting, EBT per PPE.

The remainder of this paper proceeds as follows. In, Section 2.2 we provide a brief review of the literature and develop our hypotheses. This is followed by information on our data in Section 2.3. Section 2.4 presents our empirical approach. Graphical analyses, regression results, extensions and robustness checks are discussed in Section 2.5. Finally, we make concluding remarks in Section 2.6.

2.2 Literature Review and Hypotheses Development

2.2.1 Literature Review on Profit Shifting and CFC Rules

A vast amount of empirical research finds evidence that MNEs engage in tax-motivated profit shifting (e.g., Huizinga and Laeven (2008), Weichenrieder (2009), Grubert (2012), Dharmapala and Riedel (2013)). The basic idea is that profits generated in high-tax subsidiaries are shifted to low-tax subsidiaries to avoid taxation in high-tax countries. One common profit shifting strategy is locating debt in high-tax subsidiaries (e.g., Newberry and Dhaliwal (2001), Desai et al. (2004), Huizinga et al. (2008), Büttner and Wamser (2013), Miniaci et al. (2014)), which leads to interest expenses in those subsidiaries and corresponding interest income in low-tax

subsidiaries. Another profit shifting strategy is setting transfer prices for intragroup transactions in a way that high-tax subsidiaries have to pay high prices to low-tax subsidiaries. This is particularly conducted by locating IP in low-tax countries or countries with favorable IP tax treatment (see, e.g., Dischinger and Riedel (2011), Karkinsky and Riedel (2012), Griffith et al. (2014)). That way, high-tax subsidiaries pay royalties for using the IP leading again to expenses in high-tax subsidiaries and income in low-tax subsidiaries.¹³ Taken together, these strategies reduce taxable income in high-tax subsidiaries and, consequently, reduce the MNE's overall tax burden. Although Heckemeyer and Overesch (2017) find that transfer pricing respectively profit shifting via royalties seems to be the dominant profit shifting channel. Yet, in general, both profit shifting channels are relevant.

The focus of this paper will be on profit shifting after acquisitions in cases where a formerly domestic target is acquired by a non-CFC rule MNE. Hence, the target, which could not shift profits before, enters a MNE that can generally engage in group-wide profit shifting. Consequently, in the years following the acquisition, the target may be tax-optimized in a profit shifting context. Belz et al. (2013) have already provided general evidence for this reasoning by showing that formerly domestic targets experience a decrease in their effective tax rates by up to 8% following an acquisition by a MNE.

In addition to profit shifting, we are also interested in the change of investment after acquisitions. We expect that the investment effect is a consequence of profit shifting, i.e., a decrease in the effective tax rate also affects the target's cost of capital. The cost of capital denotes the minimum pre-tax rate of return of an investment required by the investor (Devereux and Griffith (1998)). The cost of capital increases with an increasing tax burden of the real investment relative to the alternative (i.e., capital market) investment available to the investor. Therefore, once a target enters a non-CFC rule MNE, its cost of capital may decrease since its (effective) tax burden may decrease due to the above-mentioned profit shifting opportunities. This reasoning is supported by theoretical work of Desai et al. (2006) who show that MNEs with investments in tax havens have lower cost of capital in non-tax havens. Consequently, as Dharmapala (2008) points out, the existence of tax havens can lead to an increase in investment in non-tax havens. Empirical evidence for this reasoning is provided by Overesch (2009). He shows for high-tax German subsidiaries that real investment in these subsidiaries increases with a rising tax rate differential between the German subsidiary and the direct owner's home country. He argues

¹³ In addition, these royalty payments can be manipulated in a tax-optimal way with relative ease since objective market prices usually do not exist for those IP transfer prices.

that this is due to profit shifting out of Germany to the direct owner's country, which decreases the subsidiary's cost of capital. Also, Egger et al. (2014b) show that firms that can avoid taxes do not react to the tax rates in the host country.

A large number of countries have implemented CFC rules, which target against MNE-wide profit shifting strategies. These rules lead to an immediate taxation of low-tax subsidiary's profits in the MNE's headquarters' country. Thereby, the typical profit shifting strategies as described above become generally ineffective within CFC rule MNEs, which may also affect the above mentioned investment effects. For CFC rules to be applicable, certain requirements have to be fulfilled, which depend on the set up of those rules in the respective countries. Common requirements are ownership (for the German CFC rules, e.g., the German parent has to hold more than 50% of the shares or voting rights in the foreign subsidiary), the profits have to be passive income (e.g., income from financial portfolio investment or loans to affiliated firms) and the tax rate in the country has to be low (e.g., less than 25%). Variations in the design of CFC rules are, e.g., the inclusion of also active income or the general applicability of CFC rules except for some countries ('Whitelist').

Some empirical studies have already considered the effect of CFC rules on profit shifting behavior of MNEs. Altshuler and Hubbard (2003) investigate US CFC rules, which were tightened in the Tax Reform Act 1986. They find that after 1986 US investment in financial service subsidiaries was no longer responsive to differences in host-country tax rates with other subsidiaries. In other words, tax planning opportunities with profit shifting vehicles in low-tax countries were substantially reduced. In 1997, however, the US introduced the so-called check-the-box regulation, which may allow for an escape from CFC rules for US MNEs. Indeed, several studies (e.g., Altshuler and Grubert (2006), Mutti and Grubert (2009)) show that US CFC rules became largely ineffective in combatting profit shifting of US MNEs after 1997. Ruf and Weichenrieder (2012) investigate German CFC rules and find that these rules effectively reduce passive investment in low-tax countries. In a subsequent study, Ruf and Weichenrieder (2013) investigate the effects of the Cadbury-Schweppes ruling of the European Court of Justice in 2006 on passive investment of German MNEs. The ruling triggered a mitigation of the application of CFC rules within the European Economic Area (EEA). The authors find evidence for a relative increase in passive investment in subsidiaries in EEA countries with low tax rates and a parallel decrease in passive investment in subsidiaries in non-EEA countries. Büttner and Wamser (2013) accordingly find that the German CFC rules limit profit shifting via debt fi-

nancing. Holzmann (2014) finds that profit shifting by placing debt in high-tax countries increased through the breakup of binding CFC rules after the Cadbury-Schweppes ruling. Overall, these studies provide evidence that the presence of CFC rules reduces profit shifting opportunities of MNEs. Belz (2015) analyzes investment in formerly domestic targets following acquisitions by MNEs. He finds significant positive effects of the tax differential between the target country's tax rate and the minimum tax rate among all affiliates within the group on total assets and the employee number. If transfer pricing rules are in place, profit shifting seems to be replaced by shifting real activity. However, he finds that CFC rules may be an appropriate way to eliminate shifting real economic activity to low-tax countries if they cover also active income, i.e., such real economic activity. Finally, Egger and Wamser (2015) show that German MNEs, whose subsidiaries are subject to CFC rules, have significantly lower fixed assets than subsidiaries who are not subject to CFC rules. They conclude that binding CFC rules lead to a sharp increase in cost of capital.

2.2.2 Research Question, Contribution and Hypotheses Development

We address the questions whether real investment in firms increases due to profit shifting opportunities, whether financial revenues respectively profits of low-tax targets increase, given that they potentially become destinations of profit shifting themselves and whether CFC rules are effective in avoiding such profit shifting. We focus on targets that were domestic before the acquisition, i.e., we consider only targets that were not tax-optimized in a profit shifting context before the acquisition. We consider real investment (measured by PPE) and different measures of profit shifting (financial revenues and EBT per PPE) in our analyses. When considering PPE, we indirectly also measure potential profit shifting since we identify the part of the change of PPE that is attributable to such shifting. In case of the two other dependent variables, we presumably directly observe profit shifting (to targets in low-tax countries).

We contribute to previous literature especially through the consideration of different dependent variables in one analysis, which helps to show the whole picture of profit shifting. This picture should cover three effects. First, since we assume profit shifting opportunities for high-tax targets that enter a non-CFC rule MNE, real investment in those firms should increase. Second and third, tax rates should accordingly affect whether profits are shifted to other targets. This is investigated in the regressions with financial revenues and EBT per PPE as dependent variables. If we are able to confirm those three effects, we can be more certain that generally profit shifting is indeed conducted after such acquisitions. This adds to the visibility and reliability of the

results on profit shifting and investment effects, which have also been found in previous literature.

Based on this previous literature and the focus of the paper, we will now formulate hypotheses in the following subsections. We differentiate between two cases: First, we consider targets of non-CFC rule MNEs. Second, we consider targets of CFC rule MNEs.

2.2.2.1 Case 1: Target enters a non-CFC rule MNE

As mentioned above, in one of our two settings, we consider the case where a formerly domestic target is acquired by a non-CFC rule MNE. This has the effect that the target can generally engage in group-wide profit shifting lowering its cost of capital. This lower cost of capital should positively influence real investment.¹⁴ We expect the increase in real investment to be more pronounced with an increasing statutory profit tax rate of the target. The reasoning is as follows: If the target resides in a low-tax country, its cost of capital is already quite low, i.e., more real investment projects have already been conducted in the pre-acquisition period compared to a high-tax target with relatively high cost of capital. We, therefore, hypothesize the following:

H-1: With an increasing statutory profit tax rate of a formerly domestic target, real investment of the target increases following an acquisition by a MNE with no CFC rules in its headquarters' residence country.

Referring to the profit shifting strategies outlined in Section 2.2.1, we expect that financial revenues of a formerly domestic target in a low-tax country will increase once this target enters a MNE that can generally engage in group-wide profit shifting. The idea is that financial revenues are shifted from high-tax affiliates to the low-tax target. We, therefore, hypothesize the following:

H-2: With a decreasing statutory profit tax rate of a formerly domestic target, financial revenues of the target increase following an acquisition by a MNE with no CFC rules in its headquarters' residence country.

¹⁴ One limitation is that sellers may be aware of this advantage of the buyers and hence demand higher acquisition prices. This additional spending might reduce the funding for investment and hence counteract the effect. But we still expect investment effects since, particularly due to limited information, it is unlikely that the sellers may set the prices in a way to fully account for those advantages of the buyers. Further, the influence of the sellers on the acquisition price depends on their bargaining power.

As mentioned above, another measure of profit shifting is EBT per PPE. Here the effect may be driven by high-tax as well as low-tax targets: For high-tax targets, due to increasing investment in case of profit shifting, the denominator is expected to increase while the numerator is supposed to decrease due to reduced profits (see hypothesis H-1). In low-tax targets, which may become destinations of profit shifting, this measure should increase (see hypothesis H-2). Hence, EBT per PPE should generally decline with the tax rate and we conclude our next hypothesis:

H-3: With an increasing statutory profit tax rate of a formerly domestic target, EBT per PPE of the target decreases following an acquisition by a MNE with no CFC rules in its headquarters' residence country.

2.2.2.2 Case 2: Target enters a CFC rule MNE

In case a formerly domestic target is acquired by a CFC rule MNE, the target enters a MNE that cannot engage in group-wide profit shifting. We do not expect to observe the above described positive effect of acquisitions on high-tax target real investment as the target's cost of capital remains unchanged due to the lack of profit shifting opportunities in this case. We, therefore, hypothesize the following:

H-4a: Real investment of a formerly domestic target does not increase with the statutory profit tax rate following an acquisition by a MNE with CFC rules in its headquarters' residence country.

Moreover, as the profit shifting strategies outlined in Section 2.2.1 are not achievable within such a MNE, real investment profit shifting may be used to circumvent these limitations. In particular, if the MNE's CFC rules include only passive income (as denoted above this includes financial portfolio investment as well as loans to affiliated firms), the MNE might be eager to conduct real investment in low-tax targets because the generated active income resulting from this investment is taxed at low tax rates. This is reflected by the following hypothesis:

H4-b: With a decreasing statutory profit tax rate of a formerly domestic target, real investment of the target increases following an acquisition by a MNE with CFC rules that only include passive income.

Finally, we again consider two measures of profit shifting: financial revenues and EBT per PPE. We expect that the effect of the tax rate on those measures of a formerly domestic target does not change, when it enters a MNE that cannot engage in group-wide profit shifting. That is due

to the lack of opportunities to shift profits into low-tax targets or out of high-tax targets within the MNE. Hence, with respect to financial revenues, we state our fifth hypothesis:

H-5: Financial revenues of a formerly domestic target do not decrease with an increasing statutory profit tax rate following an acquisition by a MNE with CFC rules in its headquarters' residence country.

Accordingly, we also expect no effect of the tax rate on EBT per PPE:

H-6: EBT per PPE of a formerly domestic target does not decrease with an increasing statutory profit tax rate following an acquisition by a MNE with CFC rules in its headquarters' residence country.

There are also other regulations targeted against profit shifting, such as thin-capitalization or earnings-stripping rules and transfer pricing documentation rules. Because of those rules, even in the absence of CFC rules profit shifting may not be possible. Therefore, we account for those rules in the extensions part.

2.3 Data

We investigate the above-mentioned hypotheses with an empirical analysis. Our data is taken from the Zephyr database (Bureau van Dijk), which contains worldwide acquisition transactions and provides information on the countries of the direct acquirer and target as well as acquired shares of the target. We select all completed acquisitions through which at once 100% of the target shares were acquired (ensuring that the MNE has enough influence on the firm to conduct profit shifting) and which took place in the period 2008 to 2013 (2008 to 2012 in case of EBT per PPE). This however reduces the sample by about 75%. Future research could relax this restriction by allowing also for acquisitions, where the 100% ownership is achieved through multiple acquisition steps. This could increase the sample size and hence the statistical power. Before 2008 we do not have information on GUOs, so we cannot investigate the effects of CFC rules.

To answer our research question on the effect of CFC rules on target investment following acquisitions, we have to merge target financial data, which are not provided in the Zephyr database. Therefore, we merge PPE, financial revenues and EBT from the Amadeus database (Bureau van Dijk) using Bureau van Dijk identification numbers, which link Zephyr with Amadeus. For our regression analysis, we require at least one observation before and after the acquisition per target firm. We do not consider observations in the acquisition year since the

exact acquisition dates vary within the acquisition years between the acquisitions. Further, we exclude targets from the financial services sector due to special regulations on their balance sheet structure, which may bias our results. In addition, we consider only targets with unconsolidated financial data since we are interested in the investment effects only at the target-level. Finally, we exclude targets that have an accumulated loss over our considered period. Further, we exclude observations that have an extraordinarily small or large EBT per PPE, i.e., we drop observations with an EBT per PPE within the 1%-percentile or above the 99%-percentile. Information on those target financial data, which we consider before and after the acquisitions, are given for the years 2004 to 2014 (for 2004 to 2013 in case of EBT per PPE).

Further, we need to ensure that the target was a domestic one before the acquisition and becomes part of a MNE through the acquisition. To address this data set requirement, we use ownership data of the target and direct acquirer provided by Amadeus in the following way: For the target, we merge its GUO before the acquisition. We keep the acquisition in our data set if the target GUO has only domestic subsidiaries.¹⁵ If the target is the GUO itself or a stand-alone firm, we follow the same logic. Also for the direct acquirer, we merge its GUO before the acquisition. We keep the acquisition in our data set if the acquirer GUO is from another country than the target or has non-domestic subsidiaries (besides possible domestic subsidiaries). This is necessary so that the GUO or affiliates are in other countries. Only then, profits may be shifted. If the direct acquirer is the GUO itself, we follow the same logic.

To investigate the effect of acquirer GUO CFC rules on target investment following acquisitions, we collect data on whether the acquirer GUO's residence country applies CFC rules or not and – in case of binding CFC rules – whether only passive or passive and active income is taxed in the acquirer GUO's residence country. We split our final sample into two parts for our regression analysis (see Section 2.4). In the first part, we analyze target investment, financial revenues and profits following the acquisition if the acquirer GUO resides in a non-CFC rule

¹⁵ Note that the information on whether the GUO has subsidiaries from certain countries is based on data from 2016. It is reasonable to assume a persistence of corporate structures over time. Regarding those GUOs that are not a part of MNEs in 2016, one can assume that a group that once was a MNE presumably didn't become such a domestic group afterwards. Regarding those GUOs that are part of a MNE in 2016, one can assume that, given that many firms already exist for many years, those were with a large probability also a MNE several years ago. However, it may not necessarily be the case and hence we may underestimate the effect (some targets may already have been part of MNEs before the acquisition and some may have entered groups that were actually no MNEs).

country (hypotheses H-1, H-2 and H-3). In the second part, we analyze those measures if the acquirer GUO resides in a CFC rule country (hypotheses H-4a, H-4b, H-5 and H-6).¹⁶

Due to quite demanding data set requirements (financial and/or GUO data are often missing) our final sample consists of 1,505 observations (213 acquisitions) in case of PPE as the dependent variable. For financial revenues respectively EBT per PPE the sample reduces to 731 (515) observations. In about two thirds of the cases, the acquirer GUO comes from a CFC rule country. The number of observations before and after an acquisition varies across firms. Though for a considerable number of firms (at least 50) we have observations for 6 years before and 4 years after an acquisition (5 years before and 3 years after for financial revenues and 3 years before and 2 years after for EBT per PPE).

Table 2.1 shows the origins of the acquirer GUOs and targets in our sample and information on CFC rules based on a regression with PPE as the dependent variable and CFC rule as well as non-CFC rule MNEs included. The cells on CFC rules of the table are always denoted as not available (N/A) if there are no GUOs from that country. For each country, the number of GUOs and targets that appear in our sample and are located in the respective country are listed. Australia, e.g., is the host country of 10 GUOs but no firms in Australia have been acquired. Note that Zephyr is global in coverage, whereas Amadeus, besides exceptions, only contains financial data for European firms. Therefore we generally do not observe targets outside Europe (at least in the regressions in the main part¹⁷). In line with Di Giovanni (2005), we observe that countries with the largest financial markets (US and United Kingdom) have the most acquirer GUOs in our acquisition sample. For all those countries, where we observe targets, it is reasonable to expect real investment effects as outlined in Section 2.2.2 because those countries are presumably sufficiently large economies to perform real activity.

Table 2.1 shows also that almost all developed countries (if, e.g., OECD membership is considered as a criterion for development) have CFC rules. Certain countries are exemptions, i.e., developed countries without CFC rules, namely Austria, Belgium, the Czech Republic, Ireland, Netherlands, Poland and Switzerland. The US have CFC rules, but, as mentioned before, those have de facto become ineffective through the so-called check-the-box regulation, so we do not

¹⁶ Note that, in our sample, CFC rules either do exist or do not exist for each acquirer's headquarters' country throughout the whole considered period. We therefore exclude acquisitions with an acquirer GUO from China as China introduced CFC rules in 2008 and, hence, cannot be grouped into the CFC or non-CFC rule country sample in our considered period.

¹⁷ At least in one robustness check, the observations vary compared to the main part and hence theoretically (though rather unlikely) there may also be non-European targets.

consider the US as a country with CFC rules (potential changes from the 2018 US tax reform are not considered since the dataset goes only up to 2014). Since those countries (at least de facto) have no CFC rules, we can be confident that it is not the difference between developed and other countries that actually determines the effect that we assign to CFC rules. As mentioned above, the Cadbury-Schweppes ruling triggered a mitigation of the application of CFC rules within the EEA. The rules may even be considered to be ineffective since the requirements for their non-applicability have become relatively low. However, the minimum achievable tax rate is only the lowest one within the EEA. Hence, shifting profits to a country with a smaller tax rate is still not possible and the EEA countries are considered as CFC rule countries also after the ruling. If we would still see an increase of real investment in high-tax countries for targets of CFC rule MNEs, we could adapt this classification of EEA countries. However, our results (as described in Section 2.5) show that this is not the case.

Table 2.1: Origins of acquirer GUO and target firms.

Country	Number of deals with acquirer GUO residing in the country	Number of targets	Existence of CFC rules in acquirer GUO country (yes/no)
Australia	10	0	1
Austria	1	4	0
Belgium	3	9	0
Bermuda	4	0	0
Canada	4	0	1
Cayman Islands	1	0	0
Croatia	0	1	N/A
Czech Republic	1	6	0
Denmark	1	1	1
Estonia	1	4	1
Finland	6	9	1
France	6	17	1
Germany	13	26	1
Greece	0	2	N/A
Hungary	0	1	N/A
India	6	0	0
Ireland	4	2	0
Israel	5	0	1
Italy	5	10	1
Japan	2	0	1
Latvia	0	2	N/A
Lithuania	3	1	1
Malaysia	1	0	0
Malta	1	0	0
Netherlands	9	10	0
New Zealand	1	0	1
Norway	4	7	1
Panama	1	0	0
Poland	2	3	0
Portugal	1	2	1
Romania	0	2	N/A
Russian Federation	4	6	0
Slovak Republic	0	1	N/A
Spain	7	5	1
Sweden	11	2	1
Switzerland	2	0	0
Taiwan, China	1	0	0
Ukraine	0	1	N/A
United Kingdom	42	79	1
US	50	0	0
Total	213	213	

Notes: Firm-specific variables stem from the Amadeus and Zephyr databases from Bureau van Dijk. Tax variables (including the information on the CFC rules) are derived from the OECD, IBFD Tax Handbooks and the Worldwide Corporate Tax Guides by Ernst & Young. The cells on CFC rules of the table are always denoted as not available (N/A) if there are no GUOs from that country.

2.4 Empirical Approach

We analyze investment in targets after acquisitions using the following panel regression:

$$Y_{i,t} = \beta_0 + \beta_1 postMAyear_{i,t} + \beta_2 TarSTR_{i,t} + \beta_3 postMAyear_{i,t} * TarSTR_{i,t} + \beta_4 X_{i,t} + \alpha_i + \theta_t + \varepsilon_{i,t}, \quad (2.1)$$

where $Y_{i,t}$ is the dependent variable that measures either the natural logarithm of PPE ($lnTarPPE$), the natural logarithm of financial revenues ($lnTarFinRevenue$) or EBT per PPE ($TarEBTperPPE$) for target i in year t . $postMAyear_{i,t}$ takes the value one for years following the acquisition and $TarSTR_{i,t}$ measures the target's statutory profit tax rate.¹⁸

β_1 measures the effect of synergy gains achieved through the acquisition at target level. We have no expectation on the sign of the coefficient of β_1 because a priori the effect of synergy gains is ambiguous. On the one hand, the acquisition may lead to an increase in target investment, e.g., because the target avails of a certain technology that is new for the MNE and is expanded at target level (or the MNE avails of such a technology, which can now be used also within the target). On the other hand, the acquisition may lead to target divestment, e.g., because some target functions are already performed elsewhere within the MNE, i.e., rationalization takes place at target-level.¹⁹ Financial revenues are not expected to be affected by such synergy gains because those gains presumably rather affect real production or services in general. Profits may increase (if the MNE avails of a better technology or target functions are shifted to affiliates while output stays constant), decrease (if new functions are shifted from affiliates to the target while output stays constant) or stay constant (if none of this happens).

β_2 measures the basic effect of the target's statutory profit tax rate on the dependent variables (i.e., the effect that is independent on whether the observation is before or after the acquisition year). We expect a negative coefficient for β_2 for all dependent variables. In case of PPE, the tax rate has a positive effect on the cost of capital and, consequently, fewer investments are undertaken. Regarding the other dependent variables, they should be negatively affected by the tax rate because firms are expected to locate financial revenues and profits in low-tax countries.

¹⁸ One limitation is that whenever we consider financial revenues, we presumably only observe profit shifting via debt. Income from IP would rather fall under operational income since in many cases licensing of such IP is probably the main operation of the respective firm.

¹⁹ For a similar argumentation of the effects of acquisitions on target employment and output, see Conyon et al. (2002) and Gugler and Yurtoglu (2004).

After the acquisition, i.e., if $postMYear_{i,t}$ is equal to one, we have to distinguish whether the MNEs' headquarters reside in a country with CFC rules or not. This is carried out by running separate regressions (sample split) for the two cases.

β_3 measures the effect of the target's statutory profit tax rate on investment that additionally arises after acquisitions. We expect a positive sign of this coefficient in the regression with PPE as the dependent variable in case a target is acquired by a non-CFC rule MNE. This effect is due to profit shifting opportunities, which may decrease the cost of capital after the acquisition of high-tax targets in particular (hypothesis H-1). Low-tax targets may, however, become destinations of profit shifting themselves. In line with this reasoning, we expect a negative sign for β_3 in the regressions with financial revenues and EBT per PPE as dependent variables (hypotheses H-2 and H-3). Note, as a side remark, that the effect for EBT should not just be a consequence of the profit shifting to low-tax targets (and hence an increase for those observations), but also follow from the shifting of profits out of high-tax targets (and hence a decrease for those observations). On the contrary, financial revenues should only be affected in low-tax targets.

If a target is acquired by a CFC rule MNE, we generally expect no effect on PPE after the acquisition since the typical profit shifting strategies outlined in Section 2.2.1 are ineffective. Accordingly, β_3 is expected to be zero for these dependent variables (hypothesis H-4a). In case the CFC rule only includes passive income, we expect a negative sign for β_3 in the regression with PPE as dependent variable since we assume higher real investment in low-tax countries after the acquisition. We argue that decreasing the MNE's tax burden may only be achieved via real investment profit shifting (hypothesis H-4b). For financial revenues and EBT per PPE, β_3 is again expected to be zero (hypotheses H-5 and H-6).

It is important for understanding our estimation setting that for PPE it is irrelevant whether the target falls under CFC rules because we consider profit shifting opportunities to affiliates. We do not account for whether the CFC rules actually apply to the affiliates since it is difficult to observe the full group structure in the data set. However, since, as we will see later, we find that the suspected profit shifting effect can no longer be observed in case of CFC rules, we can assume that they are binding for the affiliates of at least some MNEs. For financial revenues and EBT per PPE, which are assumed to increase if the targets become destinations for profit shifting opportunities, it is however relevant whether the CFC rules apply. If we would observe potential profit shifting for CFC rule MNEs, it might be better to exclude those targets where

the CFC rules actually do not apply. For the remaining ones, i.e., those where the rules apply, we definitely should see no effect. However, since we presumably do not observe profit shifting for CFC rule MNEs, we abstain from this extended analysis in this paper. Further, one may also argue that it is relevant to consider also CFC rules of intermediate subsidiaries in third countries. However, we assume that if there are CFC rules in such subsidiaries, there should also be CFC rules in the headquarters' country since it is not likely that MNEs worsen their profit shifting opportunities by interposing an intermediate subsidiary with CFC rules if there are no such rules in the headquarters' country.

In addition to our variables of interest, we include a vector of target firm and country control variables $X_{i,t}$. Whereas some control variables are used only for some of the dependent variables, others are used for all. Our selection of control variables is largely oriented on previous literature measuring effects of taxes on investment (e.g., Overesch (2009), Ruf and Weichenrieder (2012)) and profits (Weichenrieder (2009)). At the target-level, we control for losses in the previous period, which could have a negative effect on investment decisions and profits in the following period. In case of PPE and EBT per PPE as dependent variables, we also control for the target's non-PPE assets, i.e., all balance sheet items other than PPE. We expect a positive effect of non-PPE assets because an increase in other assets, such as liquid assets may have a positive effect on investment in PPE. This may lead to more economic activity in the target, which should also increase EBT (in large firms, economies of scale may lead to a higher profitability). On the contrary, for financial revenues, we use PPE as another explanatory variable. For this variable, we expect a positive effect because financial revenues are obtained from liquid assets (bonds and financial portfolio investment), which larger firms presumably tend to hold in higher quantities (Ruf and Weichenrieder (2012)). At the country level, we control for macroeconomic conditions, including GDP, GDP per capita, GDP growth and a corruption index. In the regressions with financial revenues as the dependent variable, we also control for inflation as a measure for local lending conditions. If the lending conditions in the country are relatively good (i.e., the inflation is low), debt may be taken there and forwarded via internal lending to affiliates with adverse local lending conditions. This should increase the financial revenues of the subsidiary.

Further, we include target firm fixed effects α_i and year fixed effects θ_t . Firm fixed effects control for unobserved target-specific factors, which could have effects on the dependent variables, i.e., target-specific heterogeneity materializing in changes of the dependent variable. Year fixed effects control for unobserved time trends, such as business cycles, which may influence

the dependent variable. β_0 is the intercept and $\varepsilon_{i,t}$ is the residual. Table 2.2 provides variable definitions, data sources and summary statistics of all variables.

Table 2.2: Descriptive Statistics

Variable	Description	Mean	Standard Deviation
TarPPE*	PPE of target (in millions of USD).	11.101	56.772
TarFinRevenue*	Financial revenues of target (in millions of USD).	1.883	25.447
TarEBT_perPPE	EBT divided by PPE of target.	4.098	13.349
postMAyear	1 if year is after acquisition.	0.345	0.475
TarSTR	Statutory profit tax rate in target country.	0.286	0.052
AcqGUO_CFC	1 if CFC rules exist in acquirer GUO country.	0.587	0.493
TarAssets_noPPE*	Assets other than PPE of target (in millions of USD).	41.670	267.231
TarLoss_lag	1 if target has a loss in previous year.	0.079	0.270
TarEmployees*	Employees of target.	122.930	148.039
TarSales*	Sales of target (in millions of USD).	140.682	1,028.305
TarGDP*	GDP in target country (in trillions of USD).	1.857	1.132
TarGDP_growth	GDP growth in target country (in %).	1.473	3.053
TarGDP_percapita*	GDP per capita in target country (in thousands of USD).	39.268	14.240
TarCorruption	Corruption index in target country.	1.422	0.733
TarInflation	Inflation in target country (in %).	2.732	3.135

Notes: Firm-specific variables stem from the Amadeus and Zephyr databases from Bureau van Dijk. Tax variables (including the information on the CFC rules) are derived from the OECD, IBFD Tax Handbooks and the World-wide Corporate Tax Guides by Ernst & Young. All other country specific variables are obtained from the World Bank.

*In the regressions, logarithms are used.

It is possible that the observed targets within the different countries are not independently and identically distributed and so the standard errors are clustered. This could lead to biased standard errors, especially since our variable of interest (*TarSTR*) is a variable at the country level (Cameron and Trivedi (2009)). To account for this issue, we use cluster-robust standard errors on the target country level.²⁰ However, as mentioned in the previous section, our data set is restricted to only 26 target countries (21 countries in case of financial revenues and 23 countries in case of EBT per PPE). Since with few clusters (five to thirty) cluster-robust standard errors are downward biased and the H0-hypothesis of no effect is rejected too often, bootstrapping has

²⁰ For more details on cluster-robust standard errors, see Cameron and Miller (2015).

to be applied (Cameron et al. (2008)). We follow Greene (2012) and apply 1,000 bootstrap replications.²¹

There are two major limitations to our identification strategy:

First, we are careful in stating the exact mechanism behind the discussed effects. It could be that already the acquisition decision is determined by CFC rules. Regarding PPE for example, out of the group of MNEs that want to invest, it may only be the ones with no CFC rules that acquire targets in high-tax countries to invest there because only they can do profit shifting and hence conduct investment that is profitable after taxes. So we can think of two possible channels. In case of the first channel, targets are acquired independently of CFC rules and then, after the acquisition, CFC rules affect investment. In case of the second channel, profit shifting or CFC rules already affect the acquisition decision. In any of the two cases, we however end up with our hypotheses. Further analyses could apply further reductions of the sample based on other drivers of acquisitions. One driver could be the degree of synergies. If we would only consider those samples, where such drivers are particularly relevant, this may dominate tax considerations and allow to precisely measure the first channel. Besides making CFC rules exogenous, it would also have this effect on the incentive to conduct profit shifting. However, the limited number of observations makes such an approach difficult so far. As mentioned in Section 2.3, a relaxation of the ownership requirements may however increase the number of observations.

Second, as research has found out, the presence of CFC rules in a MNE's headquarters' country increases the probability that the headquarters are relocated to a non-CFC rule country (Voget (2011)). Hence, several of the MNEs that still have their headquarters in a country with CFC rules, might be less tax aggressive and, therefore, may not engage in profit shifting. Therefore, it would actually not be the CFC rules but the tax aggressiveness that affects investment. Here, future research could exploit short run effects of abrupt changes of CFC rules (like in Holzmann (2014)), which may be exogenous.

2.5 Results and Robustness Analysis

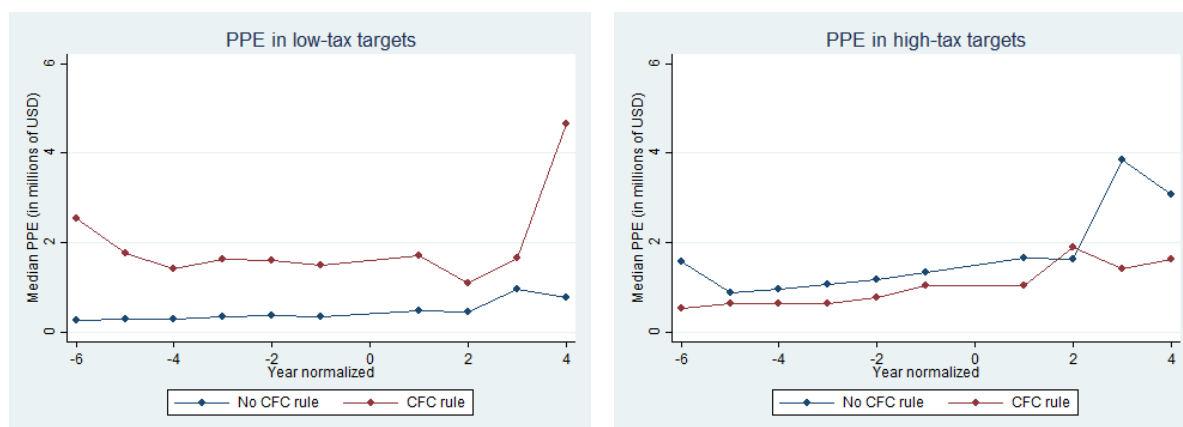
2.5.1 Property, Plant and Equipment

In this section, we present the results of our empirical analysis. As discussed in Section 2.2, we expect different effects of acquisitions on real investment (PPE) in the targets depending on

²¹ For more details on bootstrapping, see Cameron et al. (2008).

whether there are CFC rules or not in the acquirer's headquarters' country. We start our analysis with two graphs illustrating the development of low-tax and high-tax targets' PPE in Figure 2.1.

Figure 2.1: Development of target PPE before and after acquisition



Source: Amadeus database and Zephyr database (see Section 2.3).

Notes: This figure illustrates the development of target PPE (median value) over 10 years. Normalized year 0 is the acquisition year, which is excluded. PPE is on the y-axis and normalized years are on the x-axis. The observations are 1,412 (2,400) for low-tax (high-tax) targets. Low-tax targets (high-tax targets) are defined as targets with a statutory profit tax rate that is smaller (equal or higher) than the median target statutory profit tax rate in each year, i.e., the considered targets are classified as either low-tax or high-tax targets. In addition, for each data point in the graphs, we require at least 20 observations for the median value calculation.

In line with hypothesis H-1, PPE of high-tax targets acquired by non-CFC rule MNEs increases after the acquisition. We trace this finding back to the decline in cost of capital of formerly domestic high-tax targets due to arising profit shifting opportunities once they enter a non-CFC rule MNE. This may lead to the realization of more investment projects (see Section 2.2.2.1). PPE of high-tax targets acquired by CFC rule MNEs does not seem to be much affected by the acquisition.²² In low-tax targets, we see an increase of investment for targets acquired by CFC rule MNEs in the third year after the acquisition, which supports our assumption of profit shifting via real investment (hypothesis H-4b).

Table 2.3 shows the results for the regressions with PPE as the dependent variable. Column (1) includes our full sample of target firms, whereas the following two distinguish between targets acquired by non-CFC rule MNEs (column (2)) or CFC rule MNEs (column (3)). Different from

²² Since PPE for non-CFC rule MNEs is already slightly higher in years before the acquisition, we test in the Appendix (Table A 4 to Table A 9) whether there is a common trend before the acquisition for PPE (and also the other dependent variables). We distinguish between those targets that are acquired by CFC rule respectively non-CFC rule MNEs though only the results for non-CFC rule MNEs, which are of most interest to us, are shown. We conduct this test by looking at whether the observed post-acquisition effects may actually have started several years before or after the acquisition by variants of the regressions. We find, inter alia, an increase of PPE already in the year before the acquisition. We will explain that this is however presumably not problematic for our results.

the graphs, we now consider the tax rate as a continuous variable. Column (4) shows the results for CFC rules that only include passive income.

Table 2.3: Effect of acquisitions on target PPE

Sample	(1) All MNEs	(2) non-CFC rule MNEs	(3) CFC rule MNEs	(4) CFC rule MNEs (only passive in- come included)
postMAyear	-0.508 (0.398)	-1.104* (0.567)	0.037 (0.738)	0.559 (1.244)
TarSTR	-1.223 (1.594)	-3.846 (3.042)	1.821 (2.957)	0.032 (4.316)
postMAyear#TarSTR	1.402 (1.287)	3.569* (1.966)	-0.691 (2.526)	-0.989 (4.110)
lnTarAssets_noPPE	0.499*** (0.086)	0.421*** (0.117)	0.557*** (0.100)	0.388* (0.199)
TarLoss_lag	-0.071 (0.083)	0.066 (0.134)	-0.127 (0.129)	-0.027 (0.154)
lnTarGDP	7.035*** (2.598)	7.858 (5.462)	8.577** (4.322)	4.356 (7.113)
lnTarGDP_percapita	-5.881** (2.460)	-6.413 (5.197)	-7.576* (4.041)	-3.809 (6.640)
TarGDP_growth	-0.027** (0.012)	-0.020 (0.025)	-0.032 (0.021)	-0.009 (0.045)
TarCorruption	0.089 (0.317)	-0.326 (0.533)	0.479 (0.479)	0.613 (0.620)
Constant	-128.410*** (45.446)	-144.715 (97.381)	-154.725** (76.452)	-76.313 (127.448)
Observations	1,505	622	883	331
Deals	213	91	122	66
R-squared	0.214	0.199	0.242	0.201
Year fixed effects	YES	YES	YES	YES
Target firm fixed effects	YES	YES	YES	YES

Notes: Regressions with target PPE (natural logarithm) as dependent variable; see expression (1.1). For variable descriptions and data sources, see Section 2.3 and Table 2.2. All regressions include target firm and year fixed effects and are estimated using OLS panel regressions. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively. Standard errors are provided in parentheses and are clustered on the target country level.

In our results, the general effect of an acquisition (*postMAyear*) is negative and statistically significant in case of no CFC rules in the acquirer's headquarters' country (column (2)). As outlined in Section 2.4, the acquisition effect could be either positive or negative. Here we observe significant divestment in PPE after the acquisition, which may indicate that rationalization takes place at target level. We do not find this effect for the other specifications. Further, we find that *TarSTR* has no significant effect on real investment. It may be that, given that there

is relatively little variation over time, the effect of this variable is absorbed by the firm fixed effects.

Our variable of interest, the interaction term, is significantly positive in the second specification. Therefore, the results indicate that once a target is acquired by a non-CFC rule MNE, investment increases after the acquisition with an increasing tax rate. This is evidence in support of hypothesis H-1. To quantify the effect of the acquisition on PPE, we compare this effect for the lowest and highest target tax rates in our sample (12.5% respectively 38.9%).²³ For low-tax targets, we calculate the acquisition effect on PPE to be -0.658 $(-1.104 + 3.569 \cdot 0.125)$. Given that our dependent variable is given as the natural logarithm, this translates into a decrease of 48% $(=e^{(-0.658)} - 1)$ in PPE after acquisitions. For high-tax targets, we calculate the effect to be 0.284 $(-1.104 + 3.569 \cdot 0.389)$. In this case, the estimated effect is an increase of 33% $(=e^{(0.284)} - 1)$ in PPE after acquisitions. The F-Test for joint significance of *postMAYear* and its interaction with *TarSTR* holds (*p*-value of 0.072). As outlined in Section 2.2.2.1, the effect is supposed to be observed because profit shifting reduces the target's cost of capital to a higher degree in high-tax countries compared to low-tax countries. Therefore, relatively more investment is carried out in high-tax countries.²⁴

The aforementioned effect should not be observed if the target is acquired by a CFC rule MNE. Indeed, the interaction term is insignificant in column (3), which supports hypothesis H-4a. We would expect a negative effect of the interaction term in column (4), where we consider only CFC rules that include passive income, i.e., active income from real investment activity is excluded when applying CFC rules. In this case, we assume that those MNEs shift profits via real investment to low-tax targets (hypothesis H-4b). We find that the coefficient for the interaction term is insignificant. Hence, we do not find support for this hypothesis. However, note that, as a caveat, our sample for this case includes only a relatively small number of 66 deals with 331 observations in total.

Regarding control variables, we find a significantly positive effect for non-PPE assets in all specifications. This is as expected, because, as discussed in Section 2.4, other assets, such as liquid assets, may allow for more investment in PPE. The positive and significant effect of GDP but opposing effects for GDP per capita and GDP growth (at least in some specifications) may

²³ Referring to expression (2.1), we measure this effect by calculating the derivative $\delta Y / \delta \text{postMAYear}$.

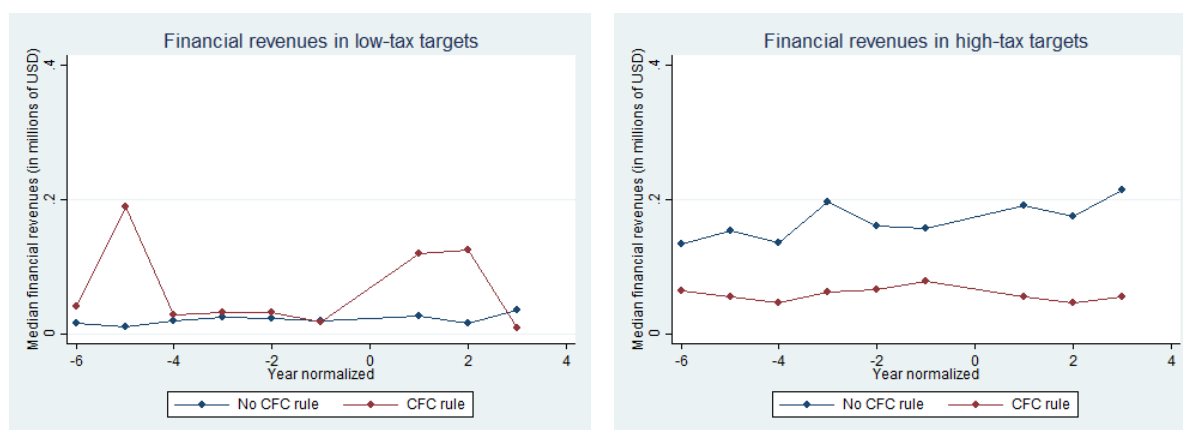
²⁴ However, our results indicate that acquisitions have an overall negative effect on real investment in targets with a relatively low tax rate. As outlined in Section 2.4, this may be due to rationalization at target-level, e.g., because some business functions may already be performed elsewhere within the MNE at lower cost.

be a slight indication that within our sample the size of the economy (GDP) but not its growth or wealth (GDP per capita) is favorable for higher investment.

2.5.2 Financial Revenues

Whereas the results in the previous section have shown that PPE increases in high-tax targets due to profit shifting opportunities, financial revenues are expected to increase in low-tax targets after the acquisition by non-CFC rule MNEs. This would be caused by profit shifting opportunities from high-tax affiliates within the MNE to those low-tax targets (hypothesis H-2). Similar to the graphical analysis in Section 2.5.1, we illustrate the development of financial revenues in Figure 2.2.

Figure 2.2: Development of target financial revenues before and after acquisition



Source: Amadeus database and Zephyr database (see Section 2.3).

Notes: This figure illustrates the development of target financial revenues (median value) over 9 years. Normalized year 0 is the acquisition year, which is excluded. Financial revenues are on the y-axis and normalized years are on the x-axis. The observations are 639 (1,585) for low-tax (high-tax) targets. Low-tax targets (high-tax targets) are defined as targets with a statutory profit tax rate that is smaller (equal or higher) than the median target statutory profit tax rate in each year, i.e., the considered targets are classified as either low-tax or high-tax targets. In addition, for each data point in the graphs, we require at least 20 observations for the median value calculation.

The graph on the left side surprisingly shows that financial revenues of low-tax targets acquired by CFC rule MNEs increase after the acquisition. We would expect this effect rather for non-CFC rule MNEs (see hypothesis H-2). However, this effect reverts in the third year after the acquisition. In addition, we do not find a clear pattern for the development of financial revenues in high-tax targets.

In line with our discussion from Section 2.2.2.1, column (1) in Table 2.4 shows that target financial revenues increase after the acquisition with a decreasing target statutory profit tax rate. We assume that this is the case, since low-tax targets become destinations of shifted profits. We expect this effect only for targets that are acquired by non-CFC rule MNEs. It may be possible that this effect also dominates in the overall sample. However, if we consider those MNEs in

particular (column (2)) the effect can no longer be observed, so we cannot confirm hypothesis H-2. In line with hypothesis H-5, we observe in column (3) that financial revenues are insensitive to the statutory profit tax rate of a formerly domestic target following an acquisition by a CFC rule MNE. However, given that we found no effect in case of no CFC rules, this is of limited interest.

Table 2.4: Effect of acquisitions on target financial revenues

Sample	(1) All MNEs	(2) non-CFC rule MNEs	(3) CFC rule MNEs
postMAyear	1.559 (1.132)	2.121 (1.634)	0.739 (1.371)
TarSTR	3.484 (5.207)	9.562 (10.458)	1.642 (6.054)
postMAyear#TarSTR	-7.052* (4.197)	-8.990 (6.272)	-4.672 (4.809)
lnTarPPE	0.250** (0.098)	0.035 (0.200)	0.349*** (0.131)
TarLoss_lag	-0.230 (0.263)	-0.609 (0.615)	0.005 (0.239)
lnTarGDP	-6.503 (7.680)	-13.545 (15.851)	-5.271 (8.870)
lnTarGDP_percapita	5.063 (7.826)	10.930 (15.968)	4.640 (9.362)
TarGDP_growth	0.040 (0.045)	0.097 (0.077)	-0.027 (0.072)
TarCorruption	0.501 (1.177)	-0.020 (1.690)	1.117 (1.396)
TarInflation	0.042 (0.070)	0.001 (0.102)	0.043 (0.076)
Constant	133.871 (136.367)	273.623 (277.409)	101.705 (152.673)
Observations	731	314	417
Deals	114	50	64
R-squared	0.0746	0.0872	0.114
Year fixed effects	YES	YES	YES
Target firm fixed effects	YES	YES	YES

Regressions with target financial revenues (natural logarithm) as dependent variable; see expression (1.1). For variable descriptions and data sources, see Section 2.3 and Table 2.2. All regressions include target firm and year fixed effects and are estimated using OLS panel regressions. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively. Standard errors are provided in parentheses and are clustered on the target country level.

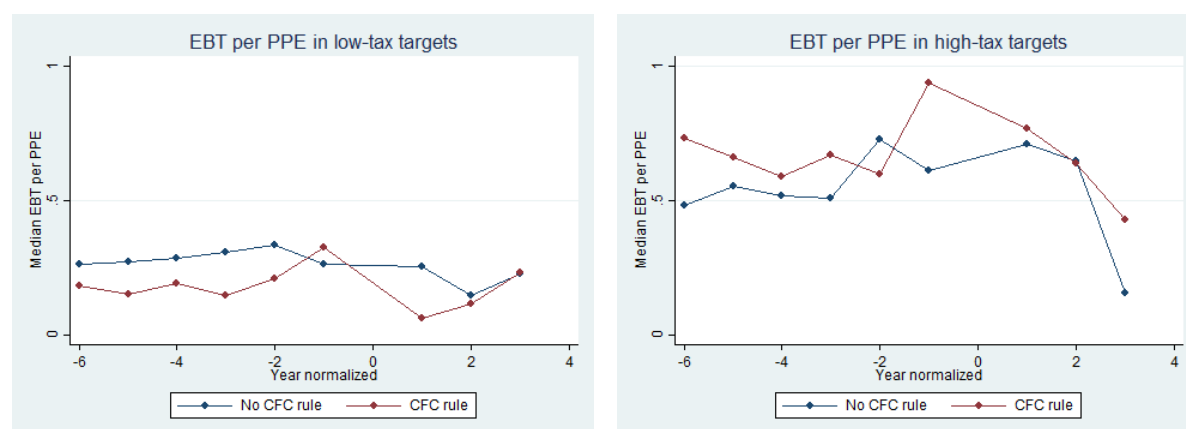
Regarding the other variables, as discussed above, we have no clear expectation about the coefficient for *postMAyear*, but again expect a negative effect of the tax rate. However, we find

no significant effect here. Regarding firm size (measured by PPE), financial revenues seem to increase with this variable, at least in the overall sample and for CFC rule MNEs. As discussed above, this may be explained by a tendency of larger firms to hold higher quantities of liquid assets. The other control variables are insignificant. Presumably, as discussed for the tax rate in Section 2.5.1, their effects are absorbed by the firm fixed effects.

2.5.3 EBT per PPE

In addition to financial revenues, which we considered in the previous subsection, we now investigate the effect of taxes, profit shifting opportunities and CFC rules on another measure of profit shifting, namely EBT per PPE. Again, we start our empirical analysis with descriptive statistics on the evolvement of this variable after the acquisition (Figure 2.3).

Figure 2.3: Development of EBT per PPE before and after acquisition



Source: Amadeus database and Zephyr database (see Section 2.3).

Notes: This figure illustrates the development of EBT per PPE (median value) over 9 years. Normalized year 0 is the acquisition year, which is excluded. EBT per PPE is on the y-axis and normalized years are on the x-axis. The observations are 1,328 (2,011) for low-tax (high-tax) targets. Low-tax targets (high-tax targets) are defined as targets with a statutory profit tax rate that is smaller (equal or higher) than the median target statutory profit tax rate in each year, i.e., the considered targets are classified as either low-tax or high-tax targets. In addition, for each data point in the graphs, we require at least 20 observations for the median value calculation.

Both, for low-tax targets as well as for high-tax targets we see a decrease of this measure after acquisitions (in case of CFC rule and non-CFC rule MNEs). Whereas the picture for low-tax targets, where the profits more or less return to the level before the acquisitions over time, is not clear, in high-tax targets there is a strong decline after acquisitions. The latter may indicate that, in line with our findings for PPE, profits are shifted away from high-tax targets once they enter a MNE. However, surprisingly, this development can be found for both, CFC rule and non-CFC rule MNEs.

Regarding the regression results, as for financial revenues, we do not find a significant effect for the interaction in column (2) (see Table 2.5). Hence, this dependent variable does not give

further evidence to the profit shifting effect, which presumably is found in the previous subsections, and we cannot add support to hypothesis H-3. Regarding control variables, another determinant of EBT per PPE should be economic activity. Indeed we show that non-PPE assets and sales have a positive and significant effect on this dependent variable, though only in column (2).

Table 2.5: Effect of acquisitions on target EBT per PPE

Sample	(1) All MNEs	(2) non-CFC rule MNEs	(3) CFC rule MNEs
postMAyear	4.096 (6.139)	-1.549 (8.848)	8.063 (10.691)
TarSTR	42.768 (35.253)	78.384 (68.075)	38.528 (81.736)
postMAyear#TarSTR	-11.991 (20.085)	12.851 (32.898)	-29.979 (33.951)
lnTarAssets_noPPE	1.459 (1.370)	1.853* (1.048)	1.609 (1.943)
lnTarEmployees	-1.862 (2.276)	-2.483 (2.286)	-1.885 (5.092)
lnTarSales	1.711 (1.451)	3.095* (1.764)	0.583 (3.058)
TarLoss_lag	-1.083 (1.188)	-0.081 (2.846)	-1.054 (2.763)
lnTarGDP	44.133 (41.360)	-14.391 (63.888)	85.162 (71.585)
lnTarGDP_percapita	-33.041 (35.347)	22.130 (61.512)	-72.377 (62.532)
TarGDP_growth	0.366 (0.231)	0.332 (0.234)	0.460 (0.452)
TarCorruption	-13.634 (9.384)	-22.594 (20.938)	-7.432 (8.425)
Constant	-915.521 (791.880)	100.116 (1,156.754)	-1,609.873 (1,339.324)
Observations	515	225	290
Deals	93	43	50
R-squared	0.0857	0.247	0.101
Year fixed effects	YES	YES	YES
Target firm fixed effects	YES	YES	YES

Regressions with target EBT per PPE as dependent variable; see expression (1.1). For variable descriptions and data sources, see Section 2.3 and Table 2.2. All regressions include target firm and year fixed effects and are estimated using OLS panel regressions. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively. Standard errors are provided in parentheses and are clustered on the target country level.

2.5.4 Extensions and Robustness Checks

In addition to the main analysis, we conduct two extensions and two robustness checks:

As our first extension, we augment our analysis by considering thin-capitalization or earnings-stripping rules and transfer pricing documentation rules at target level in Table A 1 to Table A 3 in the Appendix (Appendix to Section 2). Thin-capitalization rules or earnings-stripping rules may effectively hinder profit shifting activities at target-level by limiting or penalizing the deduction of interest payments. Whereas thin-capitalization rules limit or penalize interest deduction if the debt financing exceeds a certain debt to capital ratio, earnings-stripping rules apply in case of an excessive interest to earnings ratio. Transfer pricing documentation rules require detailed information on the height of intra-group transfer prices, which makes profit shifting obvious. We run separate regressions for the countries, where transfer pricing documentation rules exist (column (1) in Table A 1 to Table A 3), thin-capitalization or earnings-stripping rules exist (column (2)) or both kinds of rules exist (column (3)). Table A 1 shows that the interaction of *postMAyear* and *TarSTR* turns insignificant in the analysis of PPE in case of transfer pricing documentation rules or if both kinds of rules are applied by the respective country (columns (1) and (3)). This may indicate that they are, at least to a certain extent, effective in preventing profit shifting. However, for thin-capitalization or earnings-stripping rules alone (column (2)), the results slightly indicate that even in countries that have such rules, profit shifting may still be possible (PPE still increases with the tax rate after acquisitions). A possible explanation for this effect could be a limited effectiveness of those rules. Thin-capitalization rules, e.g., may be compensated by setting high interest rates (Schindler and Schjelderup (2016)). For the other two dependent variables, the effect stays insignificant (Table A 2 and Table A 3).

As our second extension, we also vary the acquisition date, i.e., we rerun the above regressions modelling the acquisition dummy as if the acquisition would have happened in the second to fifth year before respectively in the first to fourth year after the actual acquisition year. This investigation is a consequence of the graphs shown above, which raise concerns about whether there is a common trend of targets before the acquisition independent of whether they are then acquired by CFC rule or non-CFC rule MNEs. The results for targets acquired by non-CFC rule MNEs are shown in Table A 4 to Table A 9 in the Appendix. The results for CFC rule MNEs are not shown in this paper since the focus is on the effects for non-CFC rule MNEs. But also for them, relevant findings are discussed. For PPE, we also find the effect (increasing investment in high-tax targets bought by non-CFC rule MNEs) if we consider the second year before the acquisition as if it would be the year, where the acquisition took place (see column (4) in

Table A 4). One possible explanation could be an anticipation of the acquisition, which may lead to an increase of investment already before the acquisition, because future profit shifting opportunities are taken into account. This, however, would still be in line with our overall assumption about the effect of acquisitions and CFC rules. In addition, we also find a significant effect if we model the first year after the acquisition as the acquisition year (see column (1) in Table A 5). This additional effect, which implies a further increase of PPE starting from the second year after the acquisition, may indicate that the investment effect after acquisitions increases over time. For financial revenues, as for the year of the acquisition, we also find no effect if we vary the acquisition date, except, surprisingly, for the fourth year after the acquisition in case of CFC rule MNEs (as mentioned above, those results are however not shown in this paper). There, the coefficient of the interaction term is significantly negative. However, we are not too concerned about this result, since this is the only year for which we observe such an effect and it lies considerably far away from the acquisition year. The same applies for EBT per PPE, where we again find an effect for the fourth year after the acquisition, but now in case of non-CFC rule MNEs (see column (4) in Table A 9). Overall, those extensions with the varied acquisition date support our assumption that the effects that we observe are indeed driven by the acquisition. As mentioned above, there may be some potential further aspects in case of PPE (e.g., anticipation of the acquisition) that lead to the effect (investment increases with the tax rate) already before the acquisition. This could be accounted for in future research.

As mentioned above, we also run two robustness checks. This is also relevant, since so far we find no evidence for our hypotheses H-2, H-3 and H-4b (which however may be the case in those robustness checks).

First, instead of the tax rate, we use the tax rate differential to the GUO of the acquirer (Table A 10 to Table A 12). This differential accounts for the fact that a high tax rate does not necessarily mean that profits are shifted away from the respective firm (if it is assumed that profits would be shifted to the GUO). If the tax rate of the GUO is higher, it would not be beneficial from the MNEs perspective to shift profits to the latter. However, as a caveat, this measure is limited, since, besides the GUO, there may also be affiliates to which profits may be shifted.

Second, we exclude control variables that are other balance sheet items than the dependent variables and certain other firm characteristics. Those excluded variables are non-PPE assets in case of PPE as the dependent variable, PPE in case of financial revenues as the dependent variable and non-PPE assets, the number of employees and sales in case of EBT per PPE as the

dependent variable (Table A 13 to Table A 15). We do this check because there may be some reverse causality.

In both robustness checks, the effect of acquisitions on PPE in high-tax countries for non-CFC rule MNEs can no longer be observed (column (2) in Table A 10 and Table A 13). For financial revenues, the effect that we found in our basic regressions, i.e., the amount of financial revenues decreasing with an increasing tax rate after acquisitions (in the overall sample) can still be found in both robustness checks (column (1) in Table A 11 and Table A 14). Finally, it is noteworthy that in the second robustness check, where we exclude certain control variables, we find the expected negative effect of the tax rate on EBT per PPE (column (1) in Table A 15).

2.6 Concluding Remarks

We investigate the development of real investment, financial revenues and profits (EBT per PPE) in formerly domestic targets once they are acquired by foreign MNEs. In our analysis, we distinguish whether the headquarters of the acquiring MNEs reside in a country with or without CFC rules. This distinction is crucial because only in the absence of CFC rules, full profit shifting opportunities are potentially possible. Overall, we find that profit shifting opportunities and CFC rules affect target real investment (PPE). The development of financial revenues supports the assumption of profit shifting but not of counteracting effects of CFC rules. However, we do not find corresponding effects for EBT per PPE.

In particular, if a target is acquired by a MNE without CFC rules at the headquarters' level, we conclude the following: First, we show that the effect of acquisitions on target real investment depends on the tax rate. We find a negative effect in case of a low tax rate in the target country and a positive effect in high-tax targets. We discuss that this result may be explained by MNE-wide profit shifting opportunities, which decrease the cost of capital of high-tax targets, once they enter the MNE. Such a decrease leads to relatively more new profitable investment projects compared to low-tax targets, which had already relatively low cost of capital before the acquisition. We find that in low-tax targets rationalization effects may dominate and lead to divestment. Second, financial revenues increase in low-tax targets following acquisitions. This finding supports the assumption of profit shifting from high-tax to low-tax subsidiaries within MNEs. However, we do not find evidence that EBT per PPE increases in low-tax targets (respectively decreases in high-tax targets).

If a target is acquired by a MNE with CFC rules at the headquarters' level, we conclude the following: First, PPE does not change following the acquisition with regard to the target's statutory profit tax rate. Accordingly, CFC rules seem to prevent typical profit shifting, i.e., via interest or royalties, within these MNEs. This finding supports the assumption that CFC rules are effective measures against profit shifting from high-tax to low-tax subsidiaries within MNEs. In addition, we do not find evidence that, as a reaction to this limitation, these MNEs engage in profit shifting via real investment in low-tax targets. For financial revenues, however, we find the effect of profit shifting opportunities only for the overall sample and cannot make a clear distinction between CFC rule and non-CFC rule MNEs.

Our paper contributes to tax research by considering PPE, financial revenues and EBT per PPE as different dependent variables. Thereby we show the whole picture of profit shifting within one analysis. Since our estimates for two of those dependent variables at least partly confirm our hypotheses, we can be more certain that generally profit shifting is indeed conducted after such acquisitions.

Our results may also be of interest for tax policy makers, because, by analyzing the effect of CFC rules on profit shifting, we study an anti-avoidance measure that is addressed in the OECD BEPS project (OECD/G20 (2015)) and in an EU directive (European Council (2016)) that aims at CFC rule implementation to tackle profit shifting of MNEs. Further, we elaborate that such a measure may however distort real investment decisions in targets following acquisitions, which policy makers should be aware of when implementing such rules.

3. Tax Influence on Financial Structures of M&As²⁵

Abstract: A well-known strategy of tax avoidance by multinationals is to locate debt in subsidiaries resident in countries with a high tax rate. In case of M&As it is particularly advantageous to locate debt at the level of holdings. By using firm-level data provided by the Deutsche Bundesbank (German Central Bank), I show that consolidating the balance sheets of firms and their holdings leads to a stronger effect of taxes on the debt ratio in case of M&As. But, since this particular form of tax observations can be observed for only relatively few observations (which are however from a relatively large number of different MNEs) it seems to be a rather new phenomenon. Hence, also other aspects seem to be relevant in explaining why previous studies have found relatively low effects of taxes on debt financing. In case of greenfield investment, I find no effects of tax rates on the debt ratio. This denotes the importance of accounting for potentially heterogeneous tax avoidance behavior for both types of FDI.

Keywords: Corporate Taxation, Multinational Entities, Foreign Direct Investment, Capital Structure, Mergers and Acquisitions, Holdings, Empirical Analysis

JEL Classification: F23, G32, G34, H25, H26, H32

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3.1 Introduction

This paper focuses on tax avoidance in the context of M&As. M&As account for an increasing part of FDI (48% in 2015; UNCTAD (2016)) and are therefore potentially relevant for tax planning in MNEs. Indeed, it is, e.g., shown that effective tax rates of formerly domestic targets decline by around 3% after M&As (Belz et al. (2013)). Furthermore, Huizinga and Voget (2009) show that potential double taxation has an effect on the location of headquarters in MNEs after M&As.

Targets are often not acquired directly but via holdings (in this analysis I will use the term holding structures for such combinations of subsidiaries and their holdings). It is a question, whether the acquisition via holdings happens for tax reasons. Several papers have investigated, why operating firms are held via holdings. They can be separated into three main groups:

First, some show that so-called treaty shopping, i.e., the avoidance of withholding taxes, is a relevant determinant of holdings (see, e.g., Mintz and Weichenrieder (2010), Dyreng et al. (2015), Weyzig (2013) and Hong (2018)).

Second, the results of Dyreng et al. (2015) exemplarily indicate that holdings are sometimes used to compensate unfavorable conditions in the country of the investment. They find that holdings are rather located in countries, where less corruption and investment risk is present, than in the one of the investment.

Third, holding structures are also used to implement certain financial structures. From a tax perspective the interest tax shield should be allocated in a location with a high tax rate (debt push down; see Jacobs (2011)). Mintz (2004) shows that in this context so-called “double-dipping” can explain the use of holdings: Parent firms invest in operating firms via holdings in intermediary countries. While the parent finances this investment by taking a loan, the operating firm receives its funds also as a loan from the holding. Whereas the holdings are located in countries where the interests from the operating firm are not considered as income, the interests may be deducted from the taxable profit twice. In case of M&As, the debt may also particularly be loaded at the level of a holding in the same country. This is advantageous since it allows for debt financing up to the purchase price (and not just the amount of total assets) (Ruf (2011)). Indeed, for German inbound investment, Ruf (2010) shows that debt is particularly shifted to holding companies. In line with that, he shows that a higher tax rate of the parent firm (i.e., a relatively lower tax rate of the subsidiary) decreases the probability of the usage of a holding (Ruf (2011)). Another explanation could be that debt push down, by including the usage of

holdings, can particularly be used to circumvent thin-capitalization rules (Jacobs (2011)). Thin-capitalization rules are targeted against excessive debt financing, since they limit the deduction of interests from the tax base in case of excessive debt ratios.

I focus on the relevance of holding structures for financial structures in case of M&As. I consider German outbound FDI and thereby exploit more variation in the explanatory and control variables than previous studies that considered German inbound FDI. The dataset I am using is the Microdatabase Direct investment (MiDi) provided by the Deutsche Bundesbank (German Central Bank). Concerning outbound investment, this dataset allows to observe the complete chain of ownership including holding companies, since it is based on mandatory reporting for all outbound FDI from German MNEs. I will consider not just firms that became FDI through M&As (in the following referred to as “M&A firms”) but also greenfield investment (“non-M&A firms”). Based on that, I can show whether there are specific effects for the former.

Loading debt at the level of holdings may also explain why previous studies that do not account for this kind of debt financing, have found relatively small tax effects on debt financing (see, e.g., Jog and Tang (2001) and Desai et al. (2004), which were among the first studies). In a meta-study based on 46 primary studies, Feld et al. (2013) predict, as a consensus estimate, that the debt ratio (relative to total capital) increases by 3 percentage points if the tax rate increases by ten percentage points. However, if one considers the maximum tax rate differential of countries, the variation of the debt ratio due to the tax rate is rather small. In this analysis, I include EU and OECD countries. Here the rates range from 10% for Bulgaria to 38.93% for France in 2014 (see Table 1.1, where all tax variables are presented).

Several papers have made theoretical contributions or found empirical results that may explain the relatively small effects of the tax rate on the debt ratio. They can be distinguished into two main groups and several other papers:

The first group stresses the importance of accounting for tax differentials to affiliates or the parent company, which indicate the attractiveness of debt financing in the respective firm compared to the others. The results from Huizinga et al. (2008) put emphasis on the need to account for tax differentials to the parent and foreign affiliates instead of just the host country’s tax rate. Büttner and Wamser (2013) find for German MNEs that debt financing depends on the differential between the tax rate of the host country and the minimum tax rate in the group. Overesch and Wamser (2014) show the importance of accounting for tax differentials between the borrowing and lending affiliate.

The second relevant group are the papers that consider anti-avoidance measures. CFC rules (a common regulation of countries against tax avoidance), for example, by immediately taxing income in low-tax subsidiaries at the tax rate of the parent company, make the firms reducing the accumulation of internal debt financing in low-tax affiliates (see, e.g., Altshuler and Hubbard (2003), Ruf and Weichenrieder (2012), Büttner and Wamser (2013)). Ruf (2011) finds that transfer pricing regulations, which restrict the height of interest rates, may also have a negative effect on debt financing. Büttner et al. (2012) show that thin-capitalization rules reduce internal debt shifting. Another explanation could be that in case of thin-capitalization rules and no strict transfer pricing regulations, the height of interests rather than the debt ratios are adapted (Schindler and Schjelderup (2016)).

Several other papers investigate various aspects with respect to debt financing that may also explain the small effects. Excessive external debt financing may lead to bankruptcy risks (Kraus and Litzenberger (1973)) or debt overhang (too much debt may hinder attractive new investment projects; see Myers (1977)). Mintz and Weichenrieder (2005) differentiate firms by ownership shares and find no effect on debt financing for partially owned firms. Similarly, Krämer (2015) finds that the tax sensitivity of debt ratios increases with the concentration of ownership. Büttner et al. (2011) find that the effect of taxes on the debt ratio is rather strong for firms with less capabilities to reduce their tax base through non-debt tax shields and for firms with a smaller probability to experience losses. Egger et al. (2014a) find several reasons that may explain the relatively small tax sensitivity: First, previous studies have focused rather on large firms. This is misleading since the results of Egger et al. (2014a) show that small firms increase the results for the tax sensitivity of the internal debt ratio to some extent. Second, they show that the tax sensitivity also increases if an empirical model is chosen that accounts for the boundedness of the dependent variable between zero and one. Third, they find that relative advantages to locating debt at alternative affiliates (including non-tax related determinants of internal debt financing) reduce debt financing of a firm. The results of Weyzig (2014) show that debt financing is higher, if the firms are held via Dutch Special Purpose Entities, which render withholding taxes on interest payments ineffective. Heider and Ljungqvist (2015) find that the effect of the debt ratio on debt financing is higher for profitable firms and firms with better credit ratings. Schindler et al. (2015) provide evidence that in case of losses, transfer pricing can be adjusted more flexible than debt shifting. Another general issue may be that the effects are affected by omitted variable bias if variables that affect the external debt ratio but

are correlated with determinants of the internal debt ratio are excluded from regressions explaining the latter (and vice versa) (Møen et al. (2011)). However, this last issue does not lead to considerable differences in the effect of taxes on debt ratios.

I however expect that, as mentioned above, it is relevant to account for the use of holdings. Precisely, I show that it is necessary to consolidate financial structures of operating firms and holdings in order to measure the debt ratio more precisely.²⁶ Note that this analysis focuses on this innovation of consolidation. Therefore, many of the above mentioned findings of the previous literature are not comprised in the empirical part. Future research could combine this approach with adjustments based on those previous findings.

My paper is organized as follows: in the following section, I start by developing relevant hypotheses for my research. In Sections 3.3 and 3.4, I then describe the identification strategy and the used data. Afterwards, I present my results. The paper ends with some concluding remarks.

3.2 Development of Hypotheses

I analyze how taxes affect the financial structures of M&As. The analysis is separated in two steps. First, I investigate, whether financial considerations and associated tax benefits determine holding structures that emerge from M&As. As a second step, I investigate the effect of taxes on debt ratios and particularly account for debt push down including holdings. To be precise, I consolidate financial structures of operating firms and holdings located in the same host country before evaluating the tax influence on the debt ratio.

Note that in my empirical analysis I will always consider M&A and non-M&A firms separately. The hypotheses will however be formulated for M&As in particular. In most cases, the effect is expected to be given also for non-M&A firms, but to a weaker extent. The only exception is the investigation of withholding taxes on the probability of holdings. Here, the effect is assumed to be similar for M&A and non-M&A firms. After each hypothesis, it is mentioned if and why the effect differs for non-M&A firms.

3.2.1 Determinants of Holding Structures in the Case of M&As

I start by investigating the effect of several determinants of holding structures implemented in the course of M&As. Debt financing, which reduces the tax base, is especially relevant in case of a high corporate tax rate in the host country. In the introduction, it was already mentioned

²⁶ Note that whenever I refer to consolidation, I do not refer to the well-known meaning of consolidating financial statements of MNEs as a whole but of consolidating those balance sheet positions that enter the calculation of the joint debt ratio for all subsidiaries of a MNE in a given country.

that in case of M&As, debt financing at the level of holdings is particularly advantageous. This however requires group taxation, i.e., both firms have to be considered as de facto one firm for tax purposes. The reason is as follows: The subsidiary generates profits that should be reduced before taxation by interest payments (including those interest payments at the holding level). However, if both firms would be taxed separately, a high tax burden for the subsidiary would occur before the tax base could be reduced by additional interest payments of the holding (this reduction would only be possible after the distribution of the already taxed profits to the parent). Therefore, in order to offset the profits of the subsidiaries with the interest payments of the holding firms in the same country before taxes are raised, a group tax regime is necessary. Those considerations lead to my first hypothesis:

H-1: The tax rate of the host country has a positive effect on the probability that a firm is held indirectly by a holding in the same country, if there is a group tax regime in the host country.

According to the considerations in the introduction holding structures may also be used to circumvent thin-capitalization rules. Hence the effect may also be observed for non-M&A firms. But since the holdings' advantage of taking debt up to market value is only given for M&A firms, this effect of the tax rate on holding structures is assumed to be smaller for non-M&A firms.

As mentioned above, an alternative explanation of the usage of holdings is treaty shopping, i.e., the avoidance of withholding taxes. In that case they would be located in intermediary countries. I want to test that those taxes indeed only affect the usage of holdings in intermediary countries but do not drive the use of domestic holdings. In accordance to that, I test the following hypothesis:

H-2: The withholding tax rate on dividends of the host country has a positive effect on the probability that a firm is held indirectly by a holding in an intermediary country, but not on the probability of a holding in the same country.

This avoidance behavior should be similar for non-M&A firms.

Another driver of using a holding may be that there is a credit system in the headquarters home country (e.g., like in the US until the tax reform of 2018²⁷). If the home country taxes exceed the tax credit, setting up a holding in an exemption country would be beneficial (Weichenrieder and Mintz (2008)). However, this is not relevant in my case, where I only consider subsidiaries of German MNEs and observations after 2004. Starting from 2001, Germany generally exempted foreign dividends.

3.2.2 Debt-Push-Down Strategies and Capital Structure Choices

In the second part of my analysis, I focus on the financial structures and in particular on debt financing of holding and target firms. First, I refer to previous literature that has already analyzed the tax effect in capital structure choices. Therefore, I attempt to confirm previous findings about a positive relationship between the host-country tax rate and leverage.

H-3: The tax rate of the host country is assumed to have a positive effect on the debt ratio.

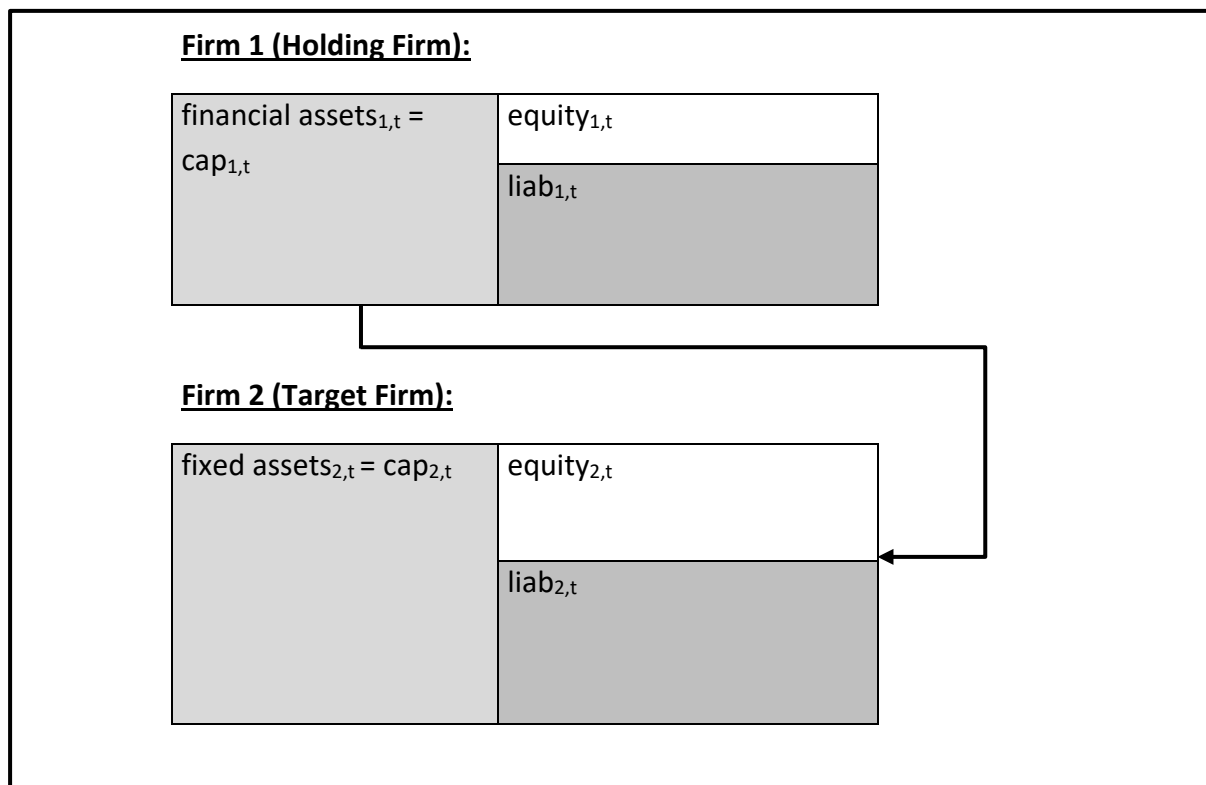
The effect for non-M&A firms may be weaker. The intuition is as follows. One reason why M&As are conducted is possibly that the new owners have possibilities to better avoid taxes (Belz et al. (2013)). Hence, since profit shifting may be particularly relevant in this kind of FDI, the effect of the tax rate on the debt ratio in other forms of FDI may be smaller. Therefore, it is presumably less likely that debt shifting is equally relevant in case of greenfield investment.

Unlike previous literature, my focus is on debt push down by means of holding firms. I expect that previous literature has underestimated the effect of host-country taxes on debt financing if the different entities of a holding structure are analyzed separately.

The following simple example may help to clarify this argument. I start by describing the example and then, based on that, I will argue why the consolidation is needed.

Figure 3.1 illustrates a simple holding structure where there is a target firm (Firm 2) that is owned by a holding in the same country (Firm 1). Let us suppose that the holding firm reports exclusively financial assets, i.e., the shares of the target firm, and that no intercompany loans are used here. The target firm however invests the capital in fixed assets. For the moment, no goodwill is assumed.

²⁷ Note that the US tax reform de facto may not lead to a full shift to an exemption system since it also includes the instrument Global Intangible Low-Taxed Income (GILTI) according to which low taxed foreign profits from intangibles are included in a higher US taxation (see, e.g., Becker and Englisch (2018), Fuest (2018), Schreiber et al. (2018) or Spengel et al. (2018b) for an explanation of this instrument).

Figure 3.1: Simple holding structure

Notes: The index of all balance sheet positions (i,t) includes the number of the firm before the comma (i) and the period after the comma (t). Liab_{i,t} denotes the liabilities of the respective firm.

Traditionally the total debt ratio (*TDR*) was calculated as the average of the ratios of debt to total capital ($cap_{i,t}$, i.e., *financial assets*_{1,t} respectively *fixed assets*_{2,t}):

$$TDR_t = \frac{\frac{liab_{1,t}}{cap_{1,t}} + \frac{liab_{2,t}}{cap_{2,t}}}{2} \quad (3.1)$$

The consolidated total debt ratio (*CTDR*) of the two entities can be computed as follows:

$$CTDR_t = \frac{(liab_{1,t} + liab_{2,t})}{(cap_{1,t} + cap_{2,t} - equity_{2,t})} \quad (3.2)$$

Note that I subtract $equity_{2,t}$ in the denominator because it is already included in $cap_{1,t}$ and hence it would be counted twice. In other words, if one considers the consolidation starting with the subsidiary, the debt ratio comprises in the denominator its capital ($cap_{1,t}$ and $equity_{2,t}$ net out in expression (3.2)) and in the numerator its debt financing ($liab_{2,t}$) plus the additional debt financing of the holding ($liab_{1,t}$). The latter is included in $equity_{2,t}$, which is equal to $cap_{1,t}$. If, instead, there is goodwill, the value of $cap_{1,t}$ may be larger than $equity_{2,t}$ and therefore the

market value of Firm 2 exceeds its book value by this difference. This difference allows, as mentioned above, for additional debt financing of the holding.

The consolidation is needed for the following reason: The measure of the debt ratio in the related empirical literature refers to firms that *ceteris paribus* have profits proportional to their capital. However, if one firm is a holding of another, the capital of the holding occurs twice while profits are only generated relatively to the capital of the subsidiary. Hence, the conventional relation between the debt ratio and profits does not hold any longer. Therefore, I state that the *CTDR* has to be used, where $equity_{2,t}$ is subtracted. It follows from this subtraction that the *CTDR* of both firms is presumably larger than the average *TDR*.

Note, that simple examples can show that the *CTDR* may also be lower than the *TDR* if there are multiple holding structures in one country. This would be the case if one holding structure is relatively large and has a low debt ratio. Hence, in the overall sample, the effect of a higher *CTDR* must not necessarily be observed. However, in case of debt push down the debt ratios should be similar across different aggregates. If debt is used to reduce profits (and there are no financing constraints), there is no reason why this should only be conducted for some subsidiaries of a MNE. As mentioned above, debt push down with holding structures should particularly be likely in case of M&As in high-tax countries. Hence, at least for this sample, I expect a larger *CTDR* relative to the *TDR*.

I conclude that I expect a higher level of the *CTDR* compared to debt ratios measured for each single entity. However, as for hypothesis H-1, this requires that there is a group tax regime in the host country of the firm.

H-4: Measures for the debt ratio show higher levels of debt-financing if I consolidate all liabilities assigned to subsidiaries of a MNE located in the same country and there is a group tax regime in that country.

Since holdings are particularly likely in case of M&A firms, the increase (stemming from the consolidation of subsidiaries and their holdings) should be smaller for non-M&A firms.

The consolidation, which allows to observe the debt ratio more precisely, will presumably lead to a higher measured effect of the tax rate on the debt ratio. This is assumed since holdings and accordingly higher levels of debt financing are more likely in countries with a high tax rate. I therefore expect that previous literature has underestimated the tax effect on capital structure choices.

H-5: *The effect of the tax rate on the debt ratio is larger compared to previous results if I consolidate all liabilities assigned to subsidiaries of a MNE located in the same country and there is a group tax regime in that country.*

For non-M&A firms, which are less likely to have holdings, the increase should be less pronounced.

If I consolidate financial information of all entities controlled by the same MNE in a certain host country, I can compute the ratio for total debt as well as similar measures for total inter-company debt and total bank loans. I therefore further look at internal and external debt financing in particular. As for total debt financing, I also expect a stronger effect of the tax rate on those two ratios once I consider the consolidated financial items.

H-6: *The effect of the tax rate on the internal debt ratio and the external debt ratio is larger if I consolidate all liabilities assigned to subsidiaries of a MNE located in the same country and there is a group tax regime in that country.*

As in case of H-5, the increase should be smaller for non-M&A firms.

3.3 Identification Strategy

3.3.1 Determinants of Holding Structures in the Case of M&As

In the following empirical part, I inter alia determine the probability that a firm is held by a holding. I estimate this probability with a logit model. For my first regression, I consider a dummy variable as my dependent variable that is equal to one if the firm is held indirectly by a holding in the same country (*Holding (same country)*) in the first year where it appears in the database. I only consider firms that are not holdings for firms in the same country themselves (though they may have subsidiaries in other countries). Expression (3.3) shows my empirical approach, where i denotes the respective firm:

$$\begin{aligned} \text{Holding (same country)}_i = & \beta_0 + \beta_1 STR_i + \beta_2 GT \text{ Regime}_i \\ & + \beta_3 STR_i * GT \text{ Regime}_i + \beta_4 WhT_i + X\gamma + \varepsilon \end{aligned} \quad (3.3)$$

My variables of interests are the statutory profit tax rate in the host country of the firm (STR) as well as the existence of a group tax regime ($GT \text{ Regime}$) in the host country. I expect a positive effect of the tax rate on the probability of a holding whenever there is a group tax regime. Hence I assume a positive value for β_3 (see hypothesis H-1). Since I expect this effect rather for M&A firms, I run separate regressions for those firm as well as those that have entered

the database through greenfield investment. Furthermore, I also include the withholding tax rate (WhT) in the host country as an explanatory variable but I only expect an effect in the second regression, which I will describe below and where I change the dependent variable. Including withholding taxes is also helpful for the reason that they may be correlated with the statutory profit tax rate. If WhT would be excluded, STR may capture its effect (actually no effect on holdings in the same country), which may drive down the effect of STR . X denotes a vector of country specific control variables.

For the second regression I now exchange the dependent variable by the variable *Holding (interm. country)* that is equal to one if there is a holding in an intermediary country.

$$\begin{aligned} Holding(intermed. country)_i = & \beta_0 + \beta_1 STR_i + \beta_2 GT Regime_i \\ & + \beta_3 STR_i * GT Regime_i + \beta_4 WhT_i + X\gamma + \varepsilon \end{aligned} \quad (3.4)$$

In this second regression, I now focus on WhT . I expect a positive effect for β_4 (see hypothesis H-2).

3.3.2 Debt-Push-Down Strategies and Capital Structure Choices

In this second step, I investigate the effect of taxes on financial structures. I refer to well-known strategies to identify a tax effect on the capital structure choice but I also consider consolidated debt ratios as a dependent variable.

For my basic set of regressions, I consider the total as well as the external and internal debt ratio as dependent variables. The total debt ratio (TDR) is now defined as $TDR_{it} = \frac{liab_{i,t}}{cap_{i,t} - profit_{i,t}}$ (see Section 3.2.2 for the definition of the variables in the ratio (except $profit_{i,t}$, which is defined in the footnote below)).²⁸ Different from that, the internal debt ratio (IDR) considers only liabilities to affiliates and the parent of the firm. For the external debt ratio (EDR), the difference between the total liabilities and those internal liabilities, i.e., the external liabilities, is divided by total capital. Again I use STR as the explanatory variable and conduct two separate regressions for M&A- and non-M&A firms. However, different than in Section 3.3.1, all subsidiaries of a MNE in a country are now considered as M&A firms, if any of them has such a mode of entry. On the contrary, firms are considered as non-M&A firms, if no firm within the same MNE and country has such a mode of entry. However, the mode of entry is only given for firms

²⁸ This definition of TDR is similar to the one in expression (3.1) except for two adjustments. First, in expression (3.1) I consider the average of those debt ratios for the special case of two firms. Second, now I also subtract current profits ($profit_{i,t}$) from total capital, since they may also be considered as equity.

that became FDI after 2004, so I consider only the time period 2005 to 2014.²⁹ Expression (3.5) shows the regression equation for the case of the *TDR*, where *i* denotes the respective firm and *t* the year:

$$TDR_{it} = \beta_0 + \beta_1 STR_{it} + X\gamma + \theta_i + \theta_t + \varepsilon_{it} \quad (3.5)$$

X is a vector of firm and country level characteristics. According to my hypothesis H-3 I expect a positive sign for β_1 . As mentioned above, the effect for non-M&A firms may be weaker.

Furthermore, I consider the consolidated debt ratios as dependent variables, i.e., the *CTDR*, the consolidated internal debt ratio (*CIDR*) and the consolidated external debt ratio (*CEDR*). They are basically constructed as in expression (3.2) but now generally as one debt ratio for all the firms in each holding structure (including also chains of subsidiaries). The firms of each holding structure are always completely located in one country and the equity of the firms that are no holdings is subtracted in the denominator. Different from the stylized case in expression (3.2), now also internal liabilities between the firms in the holding structure are subtracted in order to avoid double counts (they are generally subtracted from the numerator and the denominator of all three debt ratios, except from the numerator of the *CEDR*). Furthermore, as for the unconsolidated debt ratios, the debt ratios differ in so far from the example of the *CTDR* in Section 3.2.2 as now I also subtract current profits from total capital, since they may also be considered as equity. Finally, for simplifying the aggregation, this consolidation is conducted for all affiliates in the same MNE and country, i.e., a common debt ratio is, for example, also constructed if there are multiple such structures (arranged in a parallel way) of one MNE in a country.³⁰

Given that the consolidation requires a group tax regime, I conduct all regressions with the debt ratios as dependent variables only for firms in those countries that have such regimes (also for the unconsolidated case in order to make the results comparable).

²⁹ As mentioned above, I can observe the mode of entry only for new firms after 2004. Hence, it may be questioned whether non-M&A firms may not have affiliates in the same country that entered the database through a M&A before 2005. However, it can be assumed that the probability for this is similar for M&A firms and non-M&A firms or even higher for the former. In the first case (a similar probability), the estimation would measure the effect of additional M&As, given an equal likelihood of previous M&As. Since new M&As add to the previous average effect by increasing the likelihood/extent of debt push down via holdings, in essence, the interpretation of this paper should still hold. In the second case (a higher probability of M&A firms to have older affiliates that are also M&A firms), I would still measure the specific effect of M&As, which would then also be increased by past M&As. Again, in essence, the interpretation should hold.

³⁰ Note that in fact I not necessarily do the consolidation for all firms of a MNE in a country. I identify MNEs via their German parents. However, a German MNE may invest in a country via multiple German parents.

Expression (3.6) shows the example of the *CTDR*, which I again analogously consider for the internal and external debt ratio:

$$CTDR_{it} = \beta_0 + \beta_1 STR_{it} + X\gamma + \theta_i + \theta_t + \varepsilon_{it} \quad (3.6)$$

The variable *STR* is defined as for expression (3.5). I also expect a positive effect of the tax rate on this debt ratio, i.e., β_1 should be positive in expression (3.6). In addition, because of the consolidation, the effect should be stronger than in the unconsolidated case (see hypothesis H-5 respectively H-6 for *CIDR* and *CEDR*). Furthermore, as stated above, I assume a smaller increase for non-M&A firms (those are the cases where holding structures are less likely and hence the consolidation should be less relevant).

According the underlying reasoning, the effect should stem from firms belonging to a holding structure. Therefore, in additional regressions, I will only consider firms where there is such a holding structure in the respective host country, MNE and observation year.

Moreover, I will consider the potential influence of thin-capitalization rules and further reduce the sample to firms that are located in countries with such rules. As mentioned above, accounting for thin-capitalization rules is relevant since one purpose of using holdings may also be to circumvent those rules, which limit the deduction of interests in case of excessive debt ratios (Jacobs (2011)). Accordingly, I also expect a stronger effect in case there are thin-capitalization rules in the host country. However, this should rather be the case for the internal debt ratio, which, different then the external debt ratio, has been found to be particularly affected by those rules (Büttner et al. (2012)).

3.4 Data

I use firm data for multinationals from the MiDi database, which are collected by the Deutsche Bundesbank (German Central Bank). This database includes information on both FDI of German MNEs (outbound) as well as FDI of foreign MNEs in Germany (inbound). I consider German outbound FDI, which – as mentioned in Section 3.1 – allows me to exploit more variation.³¹ Due to mandatory reporting, this database provides balance-sheet information on all FDI

³¹ I exclude observations from mining, agriculture, non-profit and membership organizations because special tax regimes may be available there. Furthermore, I exclude firms from the financial services sector, for which special regulations for the balance sheet structure apply, which may lead to biased results. Finally, I also exclude observations whose German parent is not an incorporated and legally independent entity, as well as subsidiaries that are not legally independent. In all those cases, I drop all observations of the MNE (in all years) in one country, since otherwise I might drop some firms from a holding structure whereas others remain, which may bias the debt ratios.

positions (subsidiaries) of German MNEs abroad.³² Furthermore, I can observe chains of ownership including the holdings. MiDi provides panel data with information on the mode of entry (M&A project vs. greenfield project), so I can observe the group structures over time, including the emergence of new subsidiaries through M&As. As mentioned above, I am restricted to the time period 2005 to 2014. I consider only fully owned subsidiaries so that the MNE has sufficient influence to conduct the described tax avoidance.

I consider investment in countries belonging to the EU or the OECD (based on membership in 2014) excluding Germany, which is the country of the MNEs' headquarters. However, this does not mean that necessarily all those countries are in the final sample. My sample includes 1,842 observations for the regressions explaining the holding structures (this number is here also equal to the number of firms since I consider always only the first year per firm), 30,714 observations for the regressions explaining the unconsolidated debt ratios and 27,854 observations for the regressions explaining the consolidated debt ratios.³³

The descriptions, means and standard deviations of the variables used in the empirical analysis are listed in Table 3.1 to Table 3.3. I generally use the dependent variables and variables of interests as described in Section 3.3. The variables of my first set of regressions (i.e., for explaining holding structures) are listed in Table 3.1.

³² The mandatory collection is determined in the German Foreign Trade and Payments Regulation (Aussenwirtschaftsverordnung). The criteria, when an investment has to be reported varied over time. From 1999 until 2001, FDI had to be reported if the participation was 10% or more and the balance-sheet total of the respective foreign investment exceeded 5 million Euros or if the participation was 50% or more and the balance-sheet total exceeded 500.000 Euros. From 2002 until 2006, FDI had to be reported if the participation was 10% or more and the balance-sheet total exceeded 3 million Euros. Since 2007, the threshold of 10% applies only for direct shares, whereas for indirect shares or a mixture of direct and indirect shares the threshold has been raised to 50% (for details see Schild and Walter (2016)). I uniformly apply the threshold of 3 million Euros, in fact, by slightly diverging from this rule in order to receive the results efficiently, observations with total capital of less than 3 million Euros (instead of up to 3 million Euros) are not considered and full ownership is always required.

³³ The observations are always from a sample that comprises both, M&A and non-M&A firms. E.g., for the regressions explaining holding structures, the number of observations is 1,842. This is equal to the sum of columns (3) and (4) in Table 3.5, i.e. to the sum of the sample of M&A and non-M&A firms in the regressions with *Holding (interm. country)* as the dependent variable. The sum of columns (1) and (2) is slightly smaller. This is due to the fact that some observations are dropped since no entries as greenfield investment in 2008 had a holding in the same country. Hence the respective year dummy would perfectly predict that outcome.

Table 3.1: Descriptive statistics for regressions on determinants of holding structures

Variable	Description	Mean	Standard Deviation
Holding (same country)	Dummy variable that is equal to one if the firm is held indirectly by a holding in the same country in the first year where it appears in the database.	0.163	0.370
Holding (interm. country)	Dummy variable that is equal to one if the firm is held indirectly by a holding in an intermediary country in the first year where it appears in the database.	0.067	0.250
Statutory profit tax rate (STR)	Statutory profit tax rate in the firm's host country.	0.282	0.071
Group Tax Regime (GT Regime)	The firm is located in a country with a group tax regime.	0.745	0.436
Withholding Tax (WhT)	Withholding tax rate in the firm's host country.	0.014	0.043
GDP*	Gross Domestic Product in the firm's host country; measured in billion USD.	2,387.753	4,162.962
GDP per Capita*	Gross Domestic Product per home country national in the firm's host country; measured in USD.	39,307.708	19,805.559
Inflation	Inflation rate in the firm's host country.	2.228	2.145
Corruption	Value of World Bank's Control of Corruption Index in the firm's host country.	1.189	0.811

Notes: The number of observations is 1,842. Firm specific variables are obtained from the Microdatabase Direct investment (MiDi) 1999-2014 of the Deutsche Bundesbank's Research Data and Service Centre (RDSC) (DOI = 10.12757/Bbk.MiDi.9914.02.03). Tax variables are derived from IBFD Tax Handbooks and the Worldwide Corporate Tax Guides by Ernst & Young. *GDP*, *GDP per Capita*, *Inflation* and *Corruption* stem from the World Bank.

*In the regressions, logarithms are used.

Here, I consider the dependent variables and variables of interest as defined in section 3.3.1, namely *Holding (same country)*, *Holding (interm. country)*, *STR*, *GT Regime* and *WhT*.

Regarding control variables, certain country specific factors may also have an impact on whether subsidiaries are held directly or via holdings (see Dreßler (2012)). Therefore I include *GDP*, *GDP per capita*, *Inflation* and *Corruption* (measured by the World Bank's Control of Corruption index where higher values denote less corruption) in the regressions. Since *GDP* and *GDP per capita* indicate the market size and purchasing power and hence maybe profits, which could be offset by interest payments, they may increase the probability of holdings in the same country. Further, they may reduce the probability of holdings in an intermediary country, since high values of those variables may indicate favorable investment conditions where firms are presumably rather directly held by the headquarters (see the discussion related to Dyreng et al. (2015) in Section 3.1). Both, *Inflation* and *Corruption* may however be indicators of investment risks in the respective countries and are hence assumed to have opposite signs to the GDP

measures in regressions explaining the usage of holdings in intermediary countries (for domestic holdings, I have no clear expectations).

Table 3.2 shows the variables for my second set of regressions, precisely those with the unconsolidated debt ratios as dependent variables.

Table 3.2: Descriptive statistics for regressions on capital structures (unconsolidated debt ratios)

Variable	Description	Mean	Standard Deviation
TDR	Liabilities of a firm, divided by total capital (excluding profit).	0.494	0.252
IDR	Internal liabilities of a firm, divided by total capital (excluding profit).	0.214	0.225
EDR	External liabilities of a firm, divided by total capital (excluding profit).	0.280	0.220
Statutory profit tax rate (STR)	Statutory profit tax rate in the firm's host country.	0.299	0.067
LCF	The firm has a loss carryforward.	0.215	0.411
Sales*	Sales of the firm (in million Euro).	52.651	195.281
Tangibility	Fixed and intangible assets of the firm, divided by total capital (balance sheet total).	0.215	0.229
Inflation	Inflation rate in the firm's host country.	1.852	1.547
Corruption	Value of World Bank's Control of Corruption Index in the firm's host country.	1.318	0.720

Notes: The number of observations is 30,714. Firm specific variables are obtained from the Microdatabase Direct investment (MiDi) 1999-2014 of the Deutsche Bundesbank's Research Data and Service Centre (RDSC) (DOI = 10.12757/Bbk.MiDi.9914.02.03). Tax variables are obtained from IBFD Tax Handbooks and the annual World-wide Corporate Tax Guides by Ernst & Young. *Inflation* and *Corruption* stem from the World Bank. *In the regressions, logarithms are used.

Here, I keep the tax rate as an explanatory variable. In addition, I include several variables at the firm level that should affect the ability respectively willingness of firms to take loans, namely Loss Carryforward (*LCF*), *Sales* and *Tangibility*. Furthermore, I again include *Inflation* and *Corruption* as control variables at the country level. Agency conflicts may be another explanation for higher debt financing (Jensen (1986)). However, those should largely be covered by fixed effects (Overesch and Voeller (2010)).

In the following, I briefly discuss the expected effects for the control variables:

For *LCF*, the effect is not clear cut ex ante. If a firm carries forward losses, it has relatively low current profits and hence should have a lower incentive to reduce its tax base via a high debt

ratio (see, e.g., MacKie-Mason (1990)). However, losses may also lead to stronger indebtedness.

For the variable *Sales* different effects can be thought of. First, for large firms (i.e., firms with large sales) it is assumed to be easier to receive external debt financing (see, e.g., Graham and Harvey (2001)). Second, corresponding to that, the effect on the internal debt ratio may have the opposing sign, since internal debt financing may be used to compensate lower external debt financing, if the latter is not possible because of low *Sales*. Third, large firms may typically be more mature and hence might rather finance themselves with retained earnings (Ruf (2011)). It follows from those considerations that there may be a negative effect of *Sales* on the internal debt ratio. For the external debt ratio, the two relevant considerations however have opposing signs. Hence, I have no clear expectation concerning external debt but assume that the internal debt ratio declines with *Sales*. Because of those opposing signs, I also expect no specific effect on the total debt ratio.

Like *Sales*, also a high value of *Tangibility* (measured by fixed and intangible assets of the firm divided by total capital (balance sheet total)) should increase the willingness of external lenders to give a loan. Furthermore, as for *Sales*, I expect that limitations for external debt financing because of low *Tangibility* may be compensated by internal debt financing. Hence, I expect opposing signs for both debt ratios and have no expectations on the total debt ratio.

Inflation serves as a measure for lending conditions because high inflation often makes the central banks raising the interest rates. This should decrease external borrowing but again have an opposing effect on internal debt financing. In addition, the real value of the deducted interests and hence the incentive to have high debt ratios declines with the inflation rate. Therefore, I expect a negative effect of *Inflation* on external debt financing but no specific effect on internal debt financing.

Finally, as in the analysis explaining holding structures, I again include *Corruption*, which, as stated above, takes a high value in case of low corruption. It presumably has a positive effect on the debt ratios, since lenders may be eager to give loans rather to firms in more secure countries. As for *Tangibility* I expect again a negative effect on the internal debt ratio and a positive effect on the external debt ratio.

For the consolidated case, the tax rate and the country specific control variables are the same as in the unconsolidated case (see Table 3.3). Furthermore, the firm specific variables stay the

same for those firms that do not belong to a holding structure. If there are holding structures, they are however not considered for separate firms, but for all firms in the same MNE and country together. Besides the debt ratios, therefore also some explanatory variables (*LCF*, *Sales* and *Tangibility*) differ, since they are now not calculated for a single firm but as a minimum outcome (the variable *LCF* is defined as equal to one if any firm has a loss carryforward) respectively sum (*Sales* and *Tangibility*) for all firms in the same MNE and country.

Table 3.3: Descriptive statistics for regressions on capital structures (consolidated debt ratios)

Variable	Description	Mean	Standard Deviation
CTDR	Liabilities of the firm/consolidated liabilities of all firms belonging to the same MNE and country, divided by consolidated total capital (see Section 3.3.2 for a description of those consolidated items).	0.470	0.248
CIDR	Internal liabilities of the firm/consolidated internal liabilities of all firms belonging to the same MNE and country, divided by consolidated total capital (see Section 3.3.2 for a description of those consolidated items).	0.205	0.217
CEDR	External liabilities of the firm/consolidated external liabilities of all firms belonging to the same MNE and country, divided by consolidated total capital (balance sheet total).	0.265	0.210
Statutory profit tax rate (STR)	Statutory profit tax rate in the firm's/group of firms' (in same MNE and country) host country.	0.298	0.067
LCF (consolidated)	The firm/at least one firm in the group of firms (in same MNE and country) has a loss carryforward.	0.239	0.426
Sales*	Total sales of the firm/group of firms (in same MNE and country; in million Euro).	58.057	214.769
Tangibility (consolidated)	Total fixed and intangible assets of the firm/group of firms (in same MNE and country), divided by total capital (balance sheet total).	0.206	0.216
Inflation	Inflation rate in the firm's/group of firms (in same MNE and country) host country.	1.859	1.562
Corruption	Value of World Bank's Control of Corruption Index in the firm's/group of firms (in same MNE and country) host country.	1.329	0.716

Notes: The number of observations is 27,854. Firm specific variables are obtained from the Microdatabase Direct investment (MiDi) 1999-2014 of the Deutsche Bundesbank's Research Data and Service Centre (RDSC) (DOI = 10.12757/Bbk.MiDi.9914.02.03). Tax variables are obtained from IBFD Tax Handbooks and the annual Worldwide Corporate Tax Guides by Ernst & Young. *Inflation* and *Corruption* stem from the World Bank. *In the regressions, logarithms are used.

Table 3.4 shows the means of the total debt ratio for the consolidated and unconsolidated case, which I consider in order to test my hypothesis H-4. As in the regressions with the debt ratios as dependent variables, I only consider firms in countries with group tax regimes. I consider all firms (row (1)) and M&A firms in particular (rows (2) to (5)). In the case of all firms, the debt

ratio is surprisingly slightly smaller for the consolidated case compared to the unconsolidated case (0.459 compared to 0.476 in row (1)). However, as mentioned in Section 3.2.2, this may be the case if multiple holding structures of a MNE in one country are consolidated. But, as stated above, in case of debt push down I expect an increase in the debt ratio through the consolidation. In the following rows, I consider subsamples where debt push down with holding structures and therefore higher debt ratios should become more likely given my discussion in Section 3.2. First, debt push down should be more likely in case of M&As. Starting from row (2) I only consider such firms. Here, the debt ratio in the consolidated case is at first still smaller than in the unconsolidated case (row (2)). So I find no stronger effect for M&A firms in general. In a next step (row (3)), I further restrict my sample to firms in countries with a high tax rate (above the 75%-percentile of all countries). Here, the outcome of higher consolidated debt ratios is even more likely, given that in this case tax avoidance is more favorable and debt financing at the level of holdings is particularly advantageous. Furthermore, this should also hold in case of multiple holding structures, since in countries with a high tax rate the debt ratios should be similar across different holding structures. Indeed, the consolidated debt ratio in row (3) (0.497) is slightly higher than the unconsolidated debt ratio (0.485). Not surprisingly, this effect becomes stronger if I consider only firms belonging to holding structures, i.e., those firms from which the increase stems (a consolidated debt ratio of 0.577 compared to an unconsolidated debt ratio of 0.481 in row (4)). But the sample is now relatively small. Though, 86 MNEs in the sample have such structures, so the considered way of tax avoidance is not very seldom. Since, there are only about 3 observations per MNE, it may however be a rather new phenomenon. Finally, the effect should also be stronger if there are thin-capitalization rules (row (5)), because circumventing such rules is another purpose of holding structures. However, here the consolidated debt ratio slightly declines to 0.565 (compared to the value in row (4)). Hence, there may be other factors affecting the debt ratios for which the chosen descriptive statistics do not control for. This renders regression analyses particularly relevant, for which the results will be shown in the following section. For now, I can conclude that the results support my hypothesis H-4, according to which the consolidated debt ratios should be higher than the unconsolidated ones.

Table 3.4: Means of the total debt ratio

Row number	Only M&A firms	Country with a high tax rate (above 75%-percentile of all countries)	Belonging to holding structure	Thin-capitalization rule	Mean (un-consolidated)	Mean (consolidated)	Number of observations (un-consolidated)	Number of MNEs
(1)					0.476	0.459	34,180	2,964
(2)	x				0.480	0.479	5,181	668
(3)	x	x			0.485	0.497	1,638	264
(4)	x	x	x		0.481	0.577	708	86
(5)	x	x	x	x	0.473	0.565	660	83

Source: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank (German Central Bank), Micro-database Direct investment (MiDi) 1999-2014 (DOI = 10.12757/Bbk.MiDi.9914.02.03).

3.5 Results

3.5.1 Determinants of Holding Structures in the Case of M&As

In this section I present my results for the empirical analysis as specified in Section 3.3. The interaction term is significant in column (1) in Table 3.5. The finding indicates that for non-M&A firms, the tax rate has a positive effect on the probability of holdings in the same country if there is a group tax regime in the host country. However, according to the hypothesis H-1, I expect the effect in particular for M&A firms, because in case of M&As, debt financing at the level of holdings is especially attractive.

Table 3.5: Determinants of holding structures

Dependent variable	(1)	(2)	(3)	(4)
	Holding (same country)		Holding (interm. country)	
Sample	Non-M&A firms	M&A firms	Non-M&A firms	M&A firms
STR	-0.438 (4.398)	2.930 (3.150)	0.683 (3.771)	-4.376 (3.395)
GT Regime	-2.816** (1.371)	1.187 (1.075)	-1.220 (1.402)	-2.199*** (0.836)
STR # GT Regime	10.848** (4.936)	-3.066 (3.931)	1.113 (5.102)	6.314* (3.437)
WhT	-4.674** (2.254)	-4.111 (4.905)	-0.411 (4.282)	-0.117 (2.466)
ln(GDP)	-0.062 (0.077)	0.177* (0.101)	-0.082 (0.145)	0.059 (0.106)
ln(GDP per Capita)	0.227 (0.292)	0.275 (0.257)	-0.573 (0.607)	-0.004 (0.315)
Inflation	-0.098 (0.090)	-0.038 (0.057)	-0.173 (0.140)	0.076 (0.047)
Corruption	-0.236 (0.188)	0.135 (0.126)	0.636 (0.605)	0.053 (0.215)
Constant	-3.831 (2.676)	-6.435** (2.904)	3.515 (5.953)	-1.795 (3.020)
Number of observations	490	1,313	529	1,313
Pseudo R-squared	0.089	0.060	0.102	0.031
Wald chi-squared	88.87	250.34	66.76	52.26
Chi-squared-test ^Δ	0.000	0.000	0.000	0.000

Source: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank (German Central Bank), Micro-database Direct investment (MiDi) 1999-2014 (DOI = 10.12757/Bbk.MiDi.9914.02.03).

Notes: ^Δp-value reported. The dependent variable is one, if the firm was held by a holding in the same country (column (1) and (2)) or an intermediary country (column (3) and (4)) in the year when it was founded. The standard errors are shown in parentheses. They are robust and clustered at the country level. The regressions include year-specific effects. *, ** and *** show significance at the level of 10%, 5% and 1%.

There are possible explanations for those unexpected findings. Besides the advantage of debt financing up to the market value, holdings can also be used to circumvent thin-capitalization rules. This may explain the observed significant effect for non-M&A firms. Regarding M&A firms, it may be that, as expected, they have holdings in high-tax countries but that this effect is covered since M&A firms in low-tax countries also have holdings. Though not discussed in the literature so far, the latter could be relevant in order to avoid capital gains taxes. Acquirers may plan to resell the firm again at some point in time. Therefore, it is favorable to acquire the firm via a holding in the same country, if the capital gains taxes there are lower than in the country of the parent firm. Since low capital gains taxes may go hand in hand with low statutory profit taxes, this may explain the correlation between the usage of holdings and low tax rates in case of M&As. This reasoning is supported by the findings for the determinants of holdings in intermediary countries: high tax rates, and therefore maybe also a high capital gains taxes, are related with a higher probability of those intermediary holdings in case of M&As (column (4) in Table 3.5). Again, holdings may be used to avoid high capital gains taxes in the parent country. But if those taxes are high in the country of the operating firm, too, an intermediary country with lower rates may be chosen as the holding location. To conclude, H-1 may be valid, but it may not be observed, since it is maybe covered by other effects. Future research could therefore account for capital gains taxes.

Since withholding taxes exert no significant effect on the likelihood of holdings in an intermediary (columns (3) and (4)), I find no evidence for the hypothesis H-2.

Regarding control variables, only $\ln(GDP)$ is significant in one specification (column (2)), but this effect is however as expected: Countries with high GDP have presumably also a large market size and purchasing power, which may lead to higher profits. Here it is particularly relevant to have holdings in the same country, whose additional debt financing could help to reduce the large tax base.

As mentioned above, another way to investigate debt push down is by looking at the debt ratios. Those results are shown in the following section.

3.5.2 Debt-Push-Down Strategies and Capital Structure Choices

The results from the previous regressions do not clearly indicate that MNEs place debt in particular at the level of holdings. In the following I present my results from the analysis where I test, whether however the investigation of financial structures supports this finding. I start by investigating my hypothesis H-3. The respective results are shown in Table 3.6.

Table 3.6: Tax influence on capital structures (unconsolidated debt ratios)

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	TDR		IDR		EDR	
Sample	Non-M&A firms	M&A firms	Non-M&A firms	M&A firms	Non-M&A firms	M&A firms
STR	-0.018 (0.068)	0.344** (0.174)	0.028 (0.064)	0.196 (0.202)	-0.046 (0.064)	0.148 (0.198)
LCF	0.080*** (0.004)	0.078*** (0.009)	0.054*** (0.004)	0.049*** (0.010)	0.026*** (0.003)	0.029*** (0.010)
ln(Sales)	0.038*** (0.003)	0.046*** (0.008)	0.009*** (0.003)	0.016* (0.009)	0.029*** (0.003)	0.030*** (0.009)
Tangibility	0.061*** (0.016)	-0.071* (0.041)	0.043*** (0.013)	0.031 (0.038)	0.018 (0.014)	-0.102*** (0.038)
Inflation	0.002** (0.001)	-0.003 (0.002)	0.002* (0.001)	-0.002 (0.003)	0.001 (0.001)	-0.001 (0.002)
Corruption	-0.016** (0.008)	0.032 (0.025)	-0.014* (0.008)	-0.022 (0.025)	-0.002 (0.006)	0.055** (0.027)
Constant	0.327*** (0.023)	0.198*** (0.068)	0.156*** (0.024)	0.100 (0.079)	0.171*** (0.021)	0.098 (0.078)
Number of observations	26,362	4,352	26,362	4,352	26,362	4,352
Adjusted R-squared	0.769	0.783	0.702	0.687	0.707	0.712

Source: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank (German Central Bank), Micro-database Direct investment (MiDi) 1999-2014 (DOI = 10.12757/Bbk.MiDi.9914.02.03).

Notes: The regressions include year-specific and firm-specific effects. The standard errors are shown in parentheses. They are robust and clustered at the country-year level. *, ** and *** show significance at the level of 10%, 5% and 1%.

I find a significant positive effect of the tax rate on the total debt ratio for M&A firms (column (2)). According to this result, an increase of the tax rate by 10 percentage points increases the total debt ratio by about 3.4 percentage points. Hence, the effect is about 10% larger than the one that Feld et al. (2013) find as a consensus estimate in their meta-study. However, I do not find corresponding effects for the external and internal debt ratio. This may however be the case, since the two can and presumably are used alternatively and so high tax rates may lead to high levels of those debt ratios for only some cases, leaving the overall effects for those ratios insignificant. Internal debt may particularly be used, if firms find it difficult to receive external debt financing. For external debt financing, one could think of the advantage that it may be used to discipline managers.³⁴ For non-M&A firms, I also expect a positive, but weaker effect of the tax rate on the debt ratio (see Section 3.2.2). However, the effect is insignificant. It may be that also the growing awareness on profit shifting and respective anti-avoidance measures have led

³⁴ Note that also internal debt financing may be used in case of agency problems, since it allows to concentrate profits at the level of the parent. This concentration has been found to be a common strategy of firms (see Dischinger et al. (2014)).

to a decline of the effect over time and hence also compared to previous studies. This is in line with the findings of Heckemeyer and Overesch (2017), who derive from a meta-study that the reaction of firms to incentives for shifting has declined over the years.

Also several control variables are significant. *LCF* has a positive effect in each specification indicating presumably that the increase of debt due to losses outweighs the effect that losses reduce the incentives for tax avoidance (see again Section 3.4 for an explanation of both effects). Regarding the positive effect of *Sales* on external debt financing, the effect that for large firms debt financing is easier seems to outweigh the effect that large firms may also rather finance themselves with retained earnings (columns (5) and (6)). According to the discussion in Section 3.4, only the second effect should be existent for internal debt financing. The effect is in fact smaller, but still positive (columns (3) and (4)). Hence also for internal capital markets, the amount of *Sales* seems in fact to be relevant. The coefficient for *Tangibility*, which should also give a positive signal to external lenders, exerts a negative effect on the external debt ratio in case of M&A firms and a positive effect on the internal debt ratio in case of non-M&A firms. However, given that those effects, which are against the expectations, can always only be observed for a subsample, those findings should not be of too large concern. For *Inflation*, I expect a negative effect on the external debt ratio but no specific for the internal debt ratio. Hence the slightly positive effect for certain subsamples of the internal and total debt ratio is in line with the expectations. Finally, at least some subsamples indicate that there is more external debt financing in case of low corruption (high values of the variable *Corruption* indicate low corruption) and that high corruption is maybe compensated by more internal debt financing.

As a first conclusion, I can state that my results confirm my hypothesis H-3 since the local tax rate has a positive effect on debt financing. For non-M&A firms, no effect is found. The latter shows that it may be relevant to distinguish heterogeneous effects of tax avoidance for M&A and non-M&A firms.

As already seen in Section 3.4, in case the debt ratios of holding structures are consolidated, the debt ratios are higher at least in particularly relevant subsamples. According to my hypothesis H-5 I therefore expect a stronger effect of the tax rate on the debt ratio if I consolidate firms with their holdings in the same country. In addition, I assume this increase of the tax sensitivity also for internal and external debt financing separately (hypothesis H-6). As can be seen in Table 3.7, the effect of the tax rate on the total debt ratio increases (the coefficient is about 5 percentage points larger). Hence, I find support for my hypothesis H-5. Furthermore, I find no

evidence for hypothesis H-6. However, as mentioned above, there are plausible explanations for the latter. The effects of some control variables in some subsamples change their significance compared to Table 3.6 but the directions stay mainly the same.

Table 3.7: Tax influence on capital structures (consolidated debt ratios)

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	CTDR		CIDR		CEDR	
Sample	Non-M&A firms	M&A firms	Non-M&A firms	M&A firms	Non-M&A firms	M&A firms
STR	-0.047 (0.070)	0.390** (0.179)	0.008 (0.062)	0.145 (0.213)	-0.055 (0.063)	0.244 (0.204)
LCF	0.063*** (0.003)	0.053*** (0.011)	0.045*** (0.004)	0.036*** (0.010)	0.018*** (0.003)	0.017* (0.010)
ln(Sales)	0.024*** (0.003)	0.022*** (0.008)	0.008** (0.003)	0.011 (0.008)	0.016*** (0.003)	0.011 (0.007)
Tangibility	0.112*** (0.016)	-0.029 (0.041)	0.070*** (0.014)	0.021 (0.037)	0.042*** (0.014)	-0.050 (0.037)
Inflation	0.002* (0.001)	0.000 (0.002)	0.001 (0.001)	0.001 (0.002)	0.001 (0.001)	-0.001 (0.002)
Corruption	-0.009 (0.009)	0.047* (0.025)	-0.012 (0.009)	-0.028 (0.025)	0.002 (0.006)	0.075*** (0.025)
Constant	0.345*** (0.023)	0.213*** (0.069)	0.155*** (0.023)	0.127 (0.079)	0.190*** (0.021)	0.086 (0.069)
Number of observations	24,555	3,299	24,555	3,299	24,555	3,299
Adjusted R-squared	0.780	0.778	0.703	0.680	0.716	0.719

Source: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank (German Central Bank), Micro-database Direct investment (MiDi) 1999-2014 (DOI = 10.12757/Bbk.MiDi.9914.02.03).

Notes: The regressions include year-specific and firm-specific effects. The standard errors are shown in parentheses. They are robust and clustered at the country-year level. *, ** and *** show significance at the level of 10%, 5% and 1%.

For now I can conclude that my first results indicate that consolidating financial structures leads to higher debt ratios (see Section 3.4) respectively a higher measured effect of the tax rate on the debt ratio (Table 3.7).

I would expect that the increasing tax sensitivity is rather driven by those firms that are part of a holding structure. This subsample is considered in the regressions in Table 3.8. However, the effect of the tax rate on the total debt ratio for the sample of M&A firms (column (2)) now turns insignificant. Though, due to the smaller number of observations this may simply be the case because of limited statistical power.

Table 3.8: Tax influence on capital structures (consolidated debt ratios, only holding structures)

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	CTDR		CIDR		CEDR	
Sample	Non-M&A firms	M&A firms	Non-M&A firms	M&A firms	Non-M&A firms	M&A firms
STR	0.251 (0.244)	0.257 (0.465)	0.201 (0.299)	0.352 (0.620)	0.050 (0.189)	-0.095 (0.395)
LCF	0.032*** (0.009)	0.048** (0.020)	0.016 (0.011)	0.062*** (0.021)	0.016 (0.010)	-0.015 (0.011)
ln(Sales)	0.028*** (0.011)	0.018 (0.013)	0.000 (0.010)	-0.036** (0.016)	0.028** (0.011)	0.054*** (0.015)
Tangibility	0.255*** (0.070)	0.036 (0.126)	-0.055 (0.059)	-0.172 (0.156)	0.310*** (0.072)	0.208 (0.133)
Inflation	0.004 (0.003)	-0.007 (0.005)	-0.004 (0.004)	-0.005 (0.007)	0.007** (0.004)	-0.002 (0.004)
Corruption	-0.046 (0.028)	0.023 (0.069)	-0.023 (0.032)	0.027 (0.090)	-0.023 (0.030)	-0.004 (0.057)
Constant	0.259*** (0.086)	0.278 (0.186)	0.171 (0.106)	0.256 (0.246)	0.088 (0.086)	0.022 (0.159)
Number of observations	1,521	653	1,521	653	1,521	653
Adjusted R-squared	0.834	0.805	0.765	0.662	0.800	0.754

Source: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank (German Central Bank), Micro-database Direct investment (MiDi) 1999-2014 (DOI = 10.12757/Bbk.MiDi.9914.02.03).

Notes: The regressions include year-specific and firm-specific effects. The standard errors are shown in parentheses. They are robust and clustered at the country-year level. *, ** and *** show significance at the level of 10%, 5% and 1%.

Finally, in Table 3.9, I consider only such firms that again belong to a holding structure but are now also located in countries with thin-capitalization rules. As mentioned above, holding structures may inter alia be used to circumvent such rules. Again I expect a stronger effect of the tax rate on the debt ratio, but the effect stays insignificant.

Table 3.9: Tax influence on capital structures (consolidated debt ratios, only holding structures, thin-capitalization rules in host country)

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	CTDR		CIDR		CEDR	
Sample	Non-M&A firms	M&A firms	Non-M&A firms	M&A firms	Non-M&A firms	M&A firms
STR	0.259 (0.276)	0.697 (0.462)	0.277 (0.323)	0.562 (0.581)	-0.018 (0.219)	0.134 (0.537)
LCF	0.039*** (0.011)	0.028 (0.026)	0.009 (0.013)	0.051** (0.025)	0.030** (0.012)	-0.023 (0.020)
ln(Sales)	0.020 (0.014)	0.036** (0.015)	0.010 (0.013)	-0.043* (0.023)	0.010 (0.012)	0.079*** (0.021)
Tangibility	0.287*** (0.093)	-0.097 (0.196)	-0.130** (0.056)	-0.033 (0.194)	0.417*** (0.089)	-0.063 (0.215)
Inflation	0.007 (0.006)	-0.004 (0.006)	-0.004 (0.005)	0.002 (0.007)	0.011** (0.005)	-0.006 (0.005)
Corruption	-0.127*** (0.044)	0.138 (0.088)	-0.118*** (0.039)	0.295** (0.112)	-0.009 (0.041)	-0.157* (0.079)
Constant	0.404*** (0.129)	-0.081 (0.253)	0.254** (0.128)	-0.210 (0.327)	0.150 (0.107)	0.129 (0.262)
Number of observations	1,098	368	1,098	368	1,098	368
Adjusted R-squared	0.811	0.856	0.759	0.726	0.809	0.749

Source: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank (German Central Bank), Micro-database Direct investment (MiDi) 1999-2014 (DOI = 10.12757/Bbk.MiDi.9914.02.03).

Notes: The regressions include year-specific and firm-specific effects. The standard errors are shown in parentheses. They are robust and clustered at the country-year level. *, ** and *** show significance at the level of 10%, 5% and 1%.

3.6 Concluding remarks

In this paper, I investigate the influence of tax incentives on the financial structures of M&As. In case of M&As, purchase prices are often financed by high amounts of debt. From a tax perspective, it is beneficial to load the loans particularly on subsidiaries in countries with a high tax rate (so called debt push down). Furthermore, as I explain in this paper, it is often advantageous to place the debt at a holding in the country of the target firm since it allows for debt financing up to the purchase price (and not just the amount of total assets).

I investigate this potential tax influence on financial structures set up through M&As using a dataset of German MNEs. The analysis is separated into two steps. First, I investigate, whether financial considerations and associated tax benefits determine holding structures. I do not find evidence that the probability that a firm is held by a holding in the same country increases with the tax rate. However, I argue that this does not necessarily mean that firms in high-tax countries

are not often held via holdings, but that the insignificance of the tax rate effect may stem from firms in low-tax countries also being held by holdings, although for other reasons.

In addition, if debt push down involves holding structures, I show theoretically that it is necessary to consolidate financial structures of operating firms and those holdings, which leads to higher debt ratios. I again measure particular effects of M&A firms. Different than in the estimations explaining holding structures, firms are now defined as M&A firms if any firm in the same MNE, country and year had such a mode of entry after 2004. I find that in the overall sample of firms and also for M&A firms in particular the total debt ratio however slightly declines with this consolidation. But if I consider M&A firms that are located in countries with a high tax rate, i.e., where the usage of holdings is particularly advantageous, I see an increase from the unconsolidated debt ratio (48.5% of debt relative to total capital) to the consolidated debt ratio (49.7%). For holding structures in particular, I observe an increase from 48.1% to 57.7%. However, the composition of the observations indicates that this specific way of tax avoidance may rather be new. According to that, I also find that indeed the effect of the tax rate on the total debt ratio increases with such a consolidation. To be precise, my results for the unconsolidated case show that an increase of the tax rate by 10 percentage points increases the total debt ratio by 3.4 percentage points. For the consolidated case, this effect increases to 3.9 percentage points. However, I find an effect of the tax rate on the debt ratio only for M&A firms. Given that previous research has found this effect for both M&A and non-M&A firms, this study denotes the importance of considering potentially heterogeneous effects of those two forms of FDI.

4. The Impact of Tax Treaties and Repatriation Taxes on FDI Revisited³⁵; 36

Abstract: We revisit the effects of DTTs on FDI. Previous empirical studies provide somewhat counterintuitive results suggesting insignificant or even negative effects of tax treaties. Using a rich firm-level dataset provided by the Deutsche Bundesbank (German Central Bank) we analyze the investment impact of DTTs and repatriation taxes between more than 3,000 country pairs. Whereas we do not find a significant effect of tax treaties on overall investment, we show that repatriation taxes have an adverse effect on fixed assets and a positive effect on financial assets. The latter supports the assumption that firms defer profit distribution to avoid taxes. Correspondingly, we also find that revenue reserves increase in repatriation taxes.

Keywords: Corporate Taxation, Multinational Entities, Foreign Direct Investment, Double Tax Treaties, Repatriation Taxes, Empirical Analysis

JEL Classification: F23, H25, H26, H32

³⁵ This paper is joint work with Prof. Dr. Michael Overesch and Dr. Daniel Dreßler.

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4.1 Introduction

Multinational companies invest in their subsidiaries all over the world. There are several reasons for the increase of FDI over the last decades. Most of them come down to the argument of lower transaction costs. In this paper, we work out how the improved coordination concerning taxation affects FDI. In particular, we revisit the impact of DTTs and especially repatriation taxes on FDI. We model repatriation taxes as the sum of the nominal withholding tax effectively imposed on intercompany dividends by the country where the FDI takes place and the taxes imposed on those dividends in the home country of the receiving entity of the MNE.

Without a DTT, profits that are repatriated from a subsidiary to its parent or an intermediary firm may be taxed by both countries. In order to avoid double taxation, states enter into bilateral DTTs. Besides other aspects, a DTT allocates the claims to tax the same income, limits the tax rates imposed by source countries and defines a method to avoid double taxation. In particular, tax treaties define the percentage of distributed dividends the host country is allowed to keep as a withholding tax and how the dividends are taxed at the receiving entity.

During the last decades, hundreds of DTTs have been concluded or amended and many of them lowered the permissible tax imposed on dividends between the respective countries. We combine this extensive institutional variation with a rich micro-level data set of German multinationals active in more than 50 host countries. Especially, we have detailed information on the chains of ownership. Moreover, we can use the fact that Germany has one of the most extensive tax treaty networks all over the world and always stipulates the exemption of foreign dividends from home country taxes. This data allows us to identify DTTs, withholding tax rates and the effective taxes on repatriations between more than 3,000 country pairs over a period from 1996 to 2008. We provide evidence suggesting that repatriation taxes indeed significantly affect investments of multinational subsidiaries.

Previous research has found mixed results regarding the effects of DTTs on FDI and expected negative effects of repatriation taxes. In the following those results are presented, first for DTTs and then for repatriation taxes in general:

Whereas DTTs are expected to increase FDI, surprisingly, some papers also found insignificant or even negative effect. Davies (2003) considers US FDI data from the 1960s and 1970s and finds a negative response to tax treaties and mixed results for tax treaty amendments. Blonigen and Davies (2004) find mostly insignificant and also some negative effects of the existence of a DTT on US inward and outward FDI in aggregated data. Egger et al. (2006) consider outward

FDI of OECD countries. Yet, their results again suggest a significant negative impact of newly implemented tax treaties on FDI. Louie and Rousslang (2008) make another attempt and try to identify effects of US tax treaties on required returns, which should be lower with less taxation, but also fail to find statistically significant effects.

But there is also evidence that DTTs positively affect FDI. Here, one can differentiate between the extensive margin, i.e., whether firms invest at all, and the intensive margin, i.e., how much they invest. Di Giovanni (2005), Davies et al. (2009), Egger and Merlo (2011) and Marques and Pinho (2014) find that DTTs increase investment (primarily) at the extensive margin. Millimet and Kumas (2007) find both, positive and negative, results of DTTs on FDI. The results of an analysis by Behrendt and Wamser (2018) indicate that DTTs have a larger effect on the location decisions if the tax rate of the parent is relatively large compared to the one of the subsidiary. With respect to the intensive margin, Smart (2010) shows that a reduction of repatriation taxes caused by a change in the method to avoid double taxation (towards exemption) within DTTs increased FDI stocks of Canadian firms by about 80%. Egger and Wamser (2013) find an effect on that margin if the DTT is inaugurated together with other agreements fostering economic integration. Blonigen and Piger (2014) find that DTTs are rather relevant for investment into non-OECD countries. Those firms benefit from increased support in determining transfer prices through the DTTs. Petkova et al. (2018) find that DTTs only have effects on FDI stocks, if they reduce the tax burden at least to the minimum one within all the possible combinations of conduit countries through which the profits could be repatriated. Furthermore, they find a positive effect of the tax reduction on FDI only in a non-linear setting, indicating that only large reductions of the tax rate are effective. Blonigen et al. (2014) find effects on both, the extensive margin and the intensive margin, while for the latter, they actually consider sales. In addition, they find that the effects are stronger for firms with differentiated inputs.

Regarding repatriation taxes in general, we again consider the intensive and extensive margin separately. Concerning the extensive margin, Overesch and Wamser (2009) find negative effects of withholding taxes on location decisions of German multinationals, i.e., the number of subsidiaries in the respective country. Barrios et al. (2012) find that the sensitivity to double taxation depends on the return to assets, the amount of fixed assets and whether deferral is actually allowed in the parent-country tax legislation. In the particular context of M&As, Huizinga and Voget (2009) find striking effects of repatriation taxes on both, the direction of acquisitions and the number of acquired firms per country. As an acquisition always involves

two firms, they show that a high repatriation tax on dividends from one firm to the other decreases the probability that the latter becomes the acquirer (and not the target) and, in accordance to that, the number of M&As with the latter being the acquirer (the second approach accounts not just for the directions of the M&As but also the number of cases where certain countries are involved in M&As). With respect to the intensive margin, Hines Jr. (1996) finds that low-tax US states are particularly attractive to investors from home countries that exempt foreign income compared to investors from credit countries and hence repatriation taxes also affect the impact of host-country taxes on investment. A study by Egger et al. (2009) finds a significant negative effect of host-country withholding taxes on bilateral FDI stocks. Hong (2017) finds that FDI stocks are higher if the tax burden for direct repatriation is minimal compared to repatriation via intermediary countries.

We test whether the puzzling results found in the literature correspond with theoretical predictions respectively findings about the role of repatriation taxes on investment of subsidiaries. One assumption is that firms reinvest their profits in financial assets instead of repatriating them (Weichenrieder (1996)). This should particularly be the case if they expect a reduction in repatriation taxes. Desai et al. (2001) was one of the first of several papers that found that indeed repatriation taxes have a negative effect on repatriation. Accordingly, Hanlon et al. (2015) show that repatriation taxes increase acquisition activity. However, once there is a reduction in those taxes, profits may be distributed and hence financial assets may decline. If FDI data does not allow a differentiation between physical and financial investment, the effect of repatriation taxes on financial assets might compensate the one on fixed assets, which in turn may lead to the wrong conclusion that tax treaties generally exert no effect or a negative effect on FDI. Therefore, we disentangle different kinds of investment and financing and execute detailed tests of the predictions brought forward in the previous literature. First, we analyze whether new or renegotiated tax treaties exert significant effects on investment of subsidiaries, but the estimated results are not statistically significant. In addition, we find no effects of repatriation taxes on total assets. However, we find that repatriation taxes negatively affect investment in fixed assets. In addition, we find a positive effect of repatriation taxes on financial investments. Moreover, we find corresponding evidence regarding the structure of equity finance. Higher repatriation taxes are associated with a significantly higher share of revenue reserves. This finding supports the view that firms postpone repatriation because they have the general expectation that, owed to new tax treaties, high repatriation taxes will decrease in the future.

The remainder of the paper is organized as follows. In the next section we discuss effects of the institutional details of the international tax system and derive empirically testable hypotheses. Thereafter, the investigation approach is presented in Section 4.3. The data is presented in Section 4.4 and Section 4.5 presents empirical results. Finally, Section 4.6 concludes.

4.2 Development of Hypotheses

International business taxation significantly affects FDI. Several studies have come to the result that an increase of the host country's corporate tax negatively affects FDI (for an overview see De Mooij and Ederveen (2003), Feld and Heckemeyer (2011)). Moreover, intercompany transactions are subject to withholding taxes in the host country and are considered as foreign income at the level of the parent company. Consequently, the taxation of these transactions is also expected to influence FDI.

4.2.1 Double Tax Treaties and FDI

A DTT is an agreement between two countries on the taxation of dividends, which, without such an agreement, may be taxed by both treaty partners. A DTT limits the claims of those countries to tax the income. Moreover, DTTs coordinate the definition of terms and determine mutual agreement procedures.

Considering these functions, DTTs are expected to affect FDI of MNEs. It is, however, unclear if the introduction of a DTT increases or decreases FDI. On the one hand, DTTs are expected to be associated with additional FDI for the following reasons: elimination of double taxation, reduction of withholding taxes, standardization of terms and definitions, enhanced certainty about the tax environment and elimination of double taxation of expatriates. On the other hand, the previous literature has argued that tax treaties might also negatively influence FDI because treaties refer to the arm's length principle to assess transfer prices. This principle means that intrafirm transactions have to be priced at what third parties would agree upon. Therefore, DTTs would reduce profit shifting opportunities via those so called transfer prices. Further, DTTs eliminate loopholes by enhancing the information exchange between the treaty partners, provoke additional repatriations by reducing withholding taxes and prevent firms from setting up holding structures that aggressively exploit the international treaty network (see, e.g., Blonigen and Davies (2004)).

We argue that the rationales suggesting an adverse effect of tax treaties on FDI are not very convincing.³⁷ First, OECD countries as well as other countries already apply the arm's length principle to assess transfer prices on the basis of national tax legislation. Consequently, a tax treaty usually does not change the assessment of transfer prices.³⁸ Nevertheless, some tax treaties include specific rules on mutual agreement procedures in transfer pricing disputes. These rules, however, tend to avoid double taxation risk and might therefore be associated with more rather than less FDI. Second, information exchange does only contribute to closing loopholes if transactions are invisible to tax authorities. Yet, FDI is associated with significant control of investors by the administration. Parent companies and subsidiaries have to disclose many details in their financial accounts. Therefore, the effects of enhanced information exchange are expected to be rather limited in the particular case of FDI. Third, rules to prevent firms from what is called treaty shopping only eliminate incentives that just arise from the fact that a treaty has been concluded.³⁹ However, the adverse effects of DTTs on FDI may not be completely neglected since Behrendt and Wamser (2018) find that the elasticity to taxes increases after DTTs, i.e., profit shifting is more difficult. In addition, also Marques and Pinho (2014) find that besides repatriation taxes, also other aspects of DTTs affect the extensive margin of FDI.

Still, in a nutshell, it seems to be a very reasonable conclusion that positive effects of tax treaties on FDI outweigh negative treaty effects. A total positive effect is also expected after a renegotiation of a tax treaty, because renegotiations are often associated with significant cuts in repatriation taxes. This leads to our first testable hypothesis:

H-1: A new or a renegotiated tax treaty exerts a non-negative total effect on FDI.

4.2.2 Tax Treaties and the Effective Tax on Repatriation

A MNE has different means to repatriate profits, either by paying interests on previously provided intercompany loans, by paying royalties or by paying intercompany dividends. The latter can be considered the most important one in terms of volume and also in the potential sensitivity

³⁷ The explanation that tax treaties predominantly exert significant negative effects on FDI owing to transfer pricing rules and enhanced information exchange is also contradicted by evidence dealing with tax treaty effects on FDI in developing countries. Whereas national tax legislation of developing countries might often lack sophisticated transfer pricing rules and clear definitions of terms, a study by Neumayer (2007) finds significant positive treaty effects on FDI in developing countries.

³⁸ Details of arm's length transfer prices are defined by OECD transfer pricing guidelines (OECD (2010)). These guidelines came into force by national tax legislation and should not be mistaken as the OECD model convention.

³⁹ Anti-avoidance measures to prevent firms from treaty shopping might have an effect if these rules are introduced in the course of a renegotiation of an existing tax treaty. Then, FDI measures might be affected by some reorganizations of holding structures.

to tax treaty regulations. That is why we focus on repatriation via dividends in this paper. Cross-border intercompany dividends can be subject to tax in the host country of the subsidiary paying the dividends (source country) as well as in the residence country of the firm receiving the dividends (home country). Without an effective treaty, double taxation is very likely. Either way, the taxes imposed on intercompany dividends reduce funds available for distribution to the shareholders.

We have argued that the consequences of tax treaties for the taxation of FDI boil down to changes in repatriation taxes. In the following, let us consider the standard case of FDI in an incorporated subsidiary. Profits generated by a subsidiary are not taxed at the level of the parent firm as long as they are not distributed (deferral system). Sooner or later, however, a MNE will repatriate foreign profits and bring them to the sphere of disposability.

Among the various aspects associated with a tax treaty, two issues directly affect the effective tax on repatriation. First, tax treaties limit the withholding tax rate imposed on intercompany dividends (Article 10 OECD Model Tax Convention). However, the tax treaty only affects the treatment of intercompany dividends if national tax legislation already claims a fiscal position in intercompany dividends. In this case, withholding taxes are only changed by a tax treaty if the cap imposed by the treaty is below the withholding tax rate already effective in the source country. Suppose, for example, a tax treaty that limits the withholding tax at a rate of 10%. The tax treaty would change the effectively imposed tax rate if the ordinary withholding tax rate defined by the national tax code was 15%. In contrast, the withholding tax would remain completely unaffected by the tax treaty if the withholding tax rate determined by the national legislation was only 5%. Moreover, tax treaties between member states of the EU are very likely to have no material effect on withholding tax rates because the EU parent-subsidiary directive has already eliminated any withholding taxes imposed on intercompany dividends.

Second, tax treaties include an agreement on either the credit method or the exemption method to avoid double taxation of intercompany dividends at the level of the parent company (Article 23 OECD Model Tax Convention). However, national tax legislations also take into account that the repatriated profits have already been subject to withholding taxes and also to corporate taxes at the level of the subsidiary. If the exemption method is applied, repatriated intercompany dividends are tax exempt at the level of the firm that receives the dividends. Germany is one of

the countries exempting intercompany dividends from taxation. In the case of a credit system, intercompany dividends are subject to tax but taxes paid abroad reduce the tax liability.⁴⁰

We also have to consider the interplay between the tax treaty and the national tax legislation. A DTT changing the method to avoid double taxation can significantly cut the effectively imposed repatriation tax. Yet, there are many cases where the method introduced by a tax treaty effectively leaves the repatriation taxes unchanged. One case is an excess credit position. An excess credit arises if foreign taxes exceed the tax liability of the home country on foreign income. If the excess credit cannot be used, e.g., in subsequent periods, a credit system effectively equals the exemption system. In this case, introducing the exemption method does not effectively change repatriation taxes. Correspondingly, if the tax code of the home country already determines the exemption of intercompany dividends, the taxation of repatriated profits is effectively unchanged by a tax treaty referring to the indirect credit method. This is also true if the treaty refers to the same method that is already in force. Similarly, if the tax rate of the home country exceeds the tax credit, a reduction of the withholding tax, e.g., caused by a new tax treaty, has no material effect. The interplay of treaty effect and national tax legislation may also help to explain why the previous literature has often failed to find positive treaty effects.⁴¹

The discussion has shown that in conceivable cases tax treaties do not effectively change repatriation taxes. Please refer to the Appendix (Appendix to Section 4) for a detailed description how the effective repatriation tax is calculated. We set up the following hypothesis:

H-2: A new or renegotiated tax treaty exerts a positive effect on FDI if it has effectively decreased the repatriation tax imposed on intercompany dividends.

4.2.3 Repatriation Taxes and Retentions

Concerning the effect on FDI we consider a change in repatriation taxes the most important aspect of DTTs. Therefore, we derive testable hypotheses for additional empirical analyses about the impact of repatriation taxes on FDI.

The traditional view on dividend taxes is deduced from the fact that taxes on dividend payments are an excess burden on corporate investment. Since investors anticipate this additional tax,

⁴⁰ If a direct credit is applied, the foreign tax credit includes the withholding taxes imposed on intercompany dividends. An indirect credit also includes foreign corporate taxes paid by the subsidiary.

⁴¹ In additional robustness checks, the study by Blonigen and Davies (2004), for example, comes up with several positive treaty effects on US inbound FDI, whereas no robust effects are found in the case of US outbound FDI. The latter results may hint at an offsetting effect of the former US credit system and changes of withholding tax rates.

cost of equity capital rises with the dividend tax (Harberger (1962)). If marginal rates of return on capital are declining, the optimal investment size is negatively affected by dividend taxes. The repatriation taxes imposed on intercompany dividends are a particular type of dividend tax. Consequently, this “old” view on corporate taxation predicts negative effects of repatriation taxes on FDI.

Yet, another strand of literature, dealing with the so-called “new” view on corporate taxation, predicts insignificant effects of repatriation taxes and, therefore, of tax treaties. Starting with the seminal works by King and Auerbach (King (1974a), King (1974b), Auerbach (1979), Auerbach (1983)), this literature suggests that dividend taxes do not affect investment if a corporation can use retained earnings as its marginal source of finance. Unlike the Old View, these models consider the fact that dividend taxes can be deferred by retaining and reinvesting earnings within the corporation. As repatriation taxes, like withholding taxes or home country taxes on foreign income, are usually imposed on distributed income rather than on accruals, Hartman (1985) and Sinn (1984) apply these arguments to repatriation taxes on international intercompany dividends. In accordance with these models, repatriation taxes exert a negative effect only if new equity injection is the marginal source of finance, e.g., when a new subsidiary is founded (Sinn (1993)).

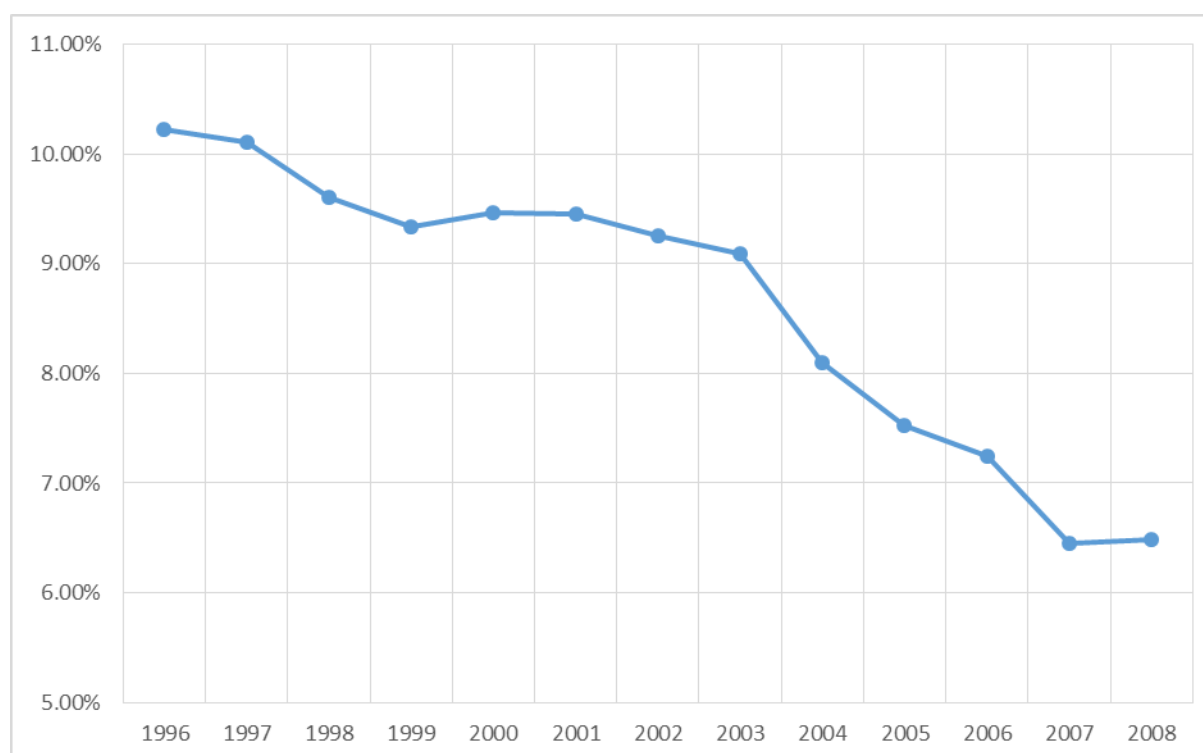
Applying the logic of the New View to repatriation strategies of MNEs suggests that repatriation taxes do not affect the timing of repatriations if current tax conditions are not expected to change over time. The rationale for this result is the following: Repatriation taxes do not affect the marginal investment decision because the subsidiary has to pay these taxes irrespective of whether it reinvests the profits or distributes them right away.

Empirical studies show that firms smooth their repatriation payments over time (Desai et al. (2007), Bellak and Leibrecht (2010)). Desai et al. (2007) argue that intercompany dividends can be quite well explained by agency conflicts between local managers and the central management of the firm, financial constraints of the multinational group and last but not least by the incentive that, in turn, the MNE has to pay smooth dividends to its external shareholders.

Previous results also suggest that repatriation taxes negatively affect repatriations (Desai et al. (2001), Desai et al. (2007), Bellak and Leibrecht (2010)). The most convincing explanation for an impact of repatriation taxes is the expectation that withholding taxes and home country taxes on foreign income in fact vary over time. Then, repatriation taxes are, of course, no longer irrelevant for the decision whether to retain or to repatriate foreign income. The expectation of

varying repatriation taxes was, for example, fulfilled for US multinationals in 2004 and 2005, when the US government offered a temporary reduction in US taxes on repatriated foreign income. Several empirical studies provide striking evidence that US firms jumped at the chance and repatriated billions of USD (Clemons and Kinney (2008), Redmiles (2008), Blouin and Krull (2009), Albring et al. (2011), Dharmapala et al. (2011)). Similarly, Egger et al. (2015) show that after a change in the method to avoid double taxation in the United Kingdom (from the credit to the exemption system) that meant a reduction of the repatriation tax, the repatriation of dividends increased.

It is very likely that multinationals all over the world expect some variation in repatriation taxes. More precisely, it is very likely that they expect falling repatriation taxes, since the extension of the EU parent-subsidiary directive, changes in national legislations, newly set up DTTs as well as treaty renegotiations show a clear overall trend of declining withholding taxes. We collected data on dividend taxation of a 57x56 country and 13 year matrix. Based on this data, there are 1,674 cases of declining withholding taxes. In 684 of these cases, it even shrunk to zero. By contrast, there are only 339 cases where the withholding tax increased, e.g., due to the expiration or cancellation of DTTs or changes in the national legislation. Figure 4.1 shows a striking negative trend in the average taxes withhold from cross-border intercompany dividends.

Figure 4.1: Average withholding tax on intercompany dividends

Notes: Average withholding tax rate on dividends in all combinations in a sample of 56 countries, in %. The values denoted above are the annual means of the added up 56 country-specific average withholding taxes.

If a firm expects a cut in repatriation taxes in subsequent years and internal funds are the marginal source of finance, the expected change in repatriation taxes indeed affects investment decisions. The higher the repatriation tax rate, the higher is the probability and the benefit of a tax cut in the future. In this case, it becomes rational to defer distributions and reinvest profits until the expected tax cut will come into force.

Moreover, tax treaties are often negotiated for years and often become effective one or two years after they were being finalized and published.⁴² Thus, multinationals can be expected to see the legal amendments in advance. This anticipation causes higher investment by the subsidiary right before the change. If repatriation taxes are significantly reduced or abolished, the incentive to retain profits and to invest in assets declines. Therefore, the growth path or even the stock of assets is expected to significantly decline just after a cut in repatriation taxes. Hence, in the short run, such cuts may have a negative effect on FDI but in the long run this

⁴² For example, the revision of the treaty between Germany and Switzerland has been signed on March 12, 2002, has come into force on March 24, 2003 and is effective from January 1, 2004. For the treaty between Italy and Russia, the corresponding dates are April 9, 1996, November 30, 1998 and January 1, 1999. The treaty between the United States and Luxembourg was signed on April 3, 1996, came into force on December 20, 2000 and was effective from January 1, 2001.

effect may switch to a positive sign. In line with that, Millimet and Kumas (2007) find positive effects of tax treaties on FDI measures particularly for observations succeeding the conclusion of a new DTT by many years.

Consequently, high repatriation taxes can be associated with additional investment due to retention. If marginal returns are decreasing, local investment opportunities, for example in fixed assets, are however limited. At some day repatriation of free cash flow becomes rational. However, as mentioned already in the introduction, Weichenrieder (1996) points at investment in the capital market as another opportunity to reduce the excess burden repatriation taxes exert on equity endowment. Investment in the capital market or in shares of other affiliated firms is independent from investment opportunities within the subsidiary. Consequently, the available interest rate in the world capital market is the lower boundary for the investment of retained earnings. Moreover, Altshuler and Grubert (2003) note that, in particular, buying shares is a means to funnel funds to other affiliates and at the same time, to avoid repatriation taxes. Put it differently, investing in shares of affiliated firms is an alternative means to funnel equity to other investment opportunities of the multinational group without paying repatriation taxes. Indeed, Foley et al. (2007) show that US multinationals hold extensive amounts of cash in foreign subsidiaries because repatriation will be taxed. Note, as a side remark, that this may change with the US tax reform from 2018, which included a change from the credit to the exemption system. Hanlon et al. (2015) show that the holdings of cash also increase acquisition activity. Therefore, excessive retention owed to high repatriation taxes is expected to cause financial investment, but not additional (local) investment in fixed assets.

In a nutshell, the effects of repatriation taxes on financial assets and on real investments are expected to have opposing signs. If FDI data does not allow disentangling physical investment from financial investment, the positive effect of high repatriation taxes on financial assets might dominate the opposing effect on real capital. Based on these considerations, we set up the following hypothesis:

H-3: Repatriation taxes positively affect financial investment in the capital market whereas repatriation taxes exert negative or even insignificant effects on real investments.

4.2.4 Repatriation Taxes and Financial Structures

In addition to the investment effects of repatriation taxes corresponding effects on capital structures have to be expected. Combining the arguments of the Old and New View on corporate taxation leads to the conclusion that a negative investment effect is expected if the source of finance is new equity. Sinn (1993) shows in a dynamic framework that repatriation taxes therefore initially lead to a nucleus of investment abroad. Then, however, the firm grows to maturity through retained earnings only. According to his model, the size of a mature subsidiary is unaffected by repatriation taxes. Nevertheless, the proportions of endowed equity capital (subscribed capital) and retained earnings (revenue reserves) are indeed affected by repatriation taxes because initial equity injection is negatively affected by repatriation taxes.

Moreover, the discussion in subsection 4.2.3 suggests additional retention if repatriation taxes are still high and are expected to decline someday. Then, the share of revenue reserves in total capital but also the share of nominal capital should be affected by repatriation taxes. Thus, we formulate the following hypothesis regarding the structure of equity finance:

H-4: *Repatriation taxes negatively affect the share of nominal capital in total capital whereas they positively affect the share of revenue reserves.*

4.3 Investigation Approach

In order to analyze how tax treaties and dividend taxes affect investments and financial structures of multinational subsidiaries, we use firm-level data taken from the Deutsche Bundesbank's Microdatabase Direct investment (MiDi), which comprises administrative data on FDI of German multinational enterprises. We start by taking total assets as the dependent variable of our analysis, which is in accordance with the previous literature dealing with effects of tax treaties. We run our regressions with the Arellano-Bond estimator (Arellano and Bond (1991)), a GMM dynamic panel-data estimator, which considers a first-differences model:

$$\Delta y_{i,t} = \gamma \Delta y_{i,t-1} + \Delta X'_{i,t} \beta + \Delta \varepsilon_{i,t} \quad (4.1)$$

The subscript i denotes the subsidiary where the investment takes place and t the respective year. The vector X includes tax variables but also a set of firm-level information and host-country characteristics. Concerning tax variables, we consider the host-country statutory profit tax rate, a variable indicating whether a new tax treaty is enforced and measures of withholding and repatriation taxes.

We include the lagged dependent variable since investment is assumed to be sticky over time (new investment would be associated with considerable adjustment costs). In addition, we assume unobserved subsidiary-specific effects. We cannot solve the later problem by using fixed effects because then the errors would affect the lagged dependent variable (Dischinger and Riedel (2011)). Instead we use first differences to remove unobserved subsidiary-specific effects. However, now $y_{i,t-1} - y_{i,t-2}$ is correlated with the error's first difference (which implies 1st order autocorrelation of the errors). Therefore, $y_{i,t-2}$ is included as an instrument for this estimator (in case of autocorrelation of higher order, higher lags are used). So far our approach is equivalent to the Anderson-Hsiao estimator (Anderson and Hsiao (1982)). However, we use the Arellano-Bond estimator, since it uses the explanatory and control variables (besides the lagged dependent variable) as additional instruments, which increases efficiency (Wooldridge (2002)).

Total assets include all types of investment. In order to test our hypotheses, we distinguish between different investment types in additional sets of regressions. Moreover, we also test our hypotheses on the impact of repatriation taxes on the financial structures.

Future research may also investigate how the US tax reform from 2018, which, as mentioned above, included a change from the credit to the exemption system and therefore presumably a decline in the repatriation taxes, affects investment. Therefore, however, considering US multinationals (and not Germans as in this analysis) would be necessary. Furthermore, as mentioned above, the GILTI instrument, which is also part of this reform, may counteract this switch of the systems (see footnote 27 on page 62).

4.4 Data

As mentioned above, the empirical analysis uses firm-level data taken from the MiDi database. The comprehensive micro database covers information on both, direct investment positions held in Germany by foreign companies and direct investment positions of German enterprises held abroad. In this study, we only analyze subsidiaries that are located outside Germany and are owned by a multinational enterprise having its headquarters in Germany.⁴³ The data allows us to trace groups and their affiliates as well as the detailed ownership chains over time from 1996 to 2008. The data collection is imposed by German law, which requires reporting for

⁴³ We exclude observations from mining, agriculture, non-profit and membership organizations because special tax regimes may be available there. Furthermore, we exclude observations whose German parent is not an incorporated and legally independent entity as well as subsidiaries that are not legally independent.

certain international transactions and positions.⁴⁴ This aspect of MiDi is worth emphasizing as we are thus able to observe virtually all major German outbound investments.

We consider a sample of subsidiaries located in 56 countries with Germany serving as the residence country of the parent company. Our sample consists of subsidiaries in the four BRIC countries, 29 countries that were members of the OECD in 2008 (excluding Germany) and the eight EU member states that were not OECD countries in 2008.⁴⁵ In order to complete the picture of major investment flows, we also include tax havens and those larger economies that show substantial investment stocks of German multinationals.⁴⁶ Whereas the headquarters of the multinational groups covered in our dataset are always located in Germany, we consider the investments in directly and indirectly held subsidiaries that are wholly-owned by a German firm. The total sample applied here consists of 84,625 observations of 18,229 subsidiaries.

As our dependent variable, we first consider the investment level in total assets of each subsidiary. Moreover, in the further estimations we focus on different investment types and consider fixed assets and internal financial assets (shares of affiliates) as dependent variables.⁴⁷ Concerning the financial structures, we also run additional regressions using the share of either revenue reserves or nominal capital in total capital (minus profit and loss for the financial year) as dependent variables.

As regards tax variables, we consider the statutory profit tax rate of the host-country corporate income tax. Concerning DTT reforms, we consider the dummy variable *New DTT* indicating

⁴⁴ The mandatory collection is determined in the German Foreign Trade and Payments Regulation (Aussenwirtschaftsverordnung). The criteria, when an investment has to be reported varied over time. From 1999 until 2001, FDI had to be reported if the participation was 10% or more and the balance-sheet total of the respective foreign investment exceeded 5 million Euros or if the participation was 50% or more and the balance-sheet total exceeded 500.000 Euros. From 2002 until 2006, FDI had to be reported if the participation was 10% or more and the balance-sheet total exceeded 3 million Euros. Since 2007, the threshold of 10% applies only for direct shares, whereas for indirect shares or a mixture of direct and indirect shares the threshold has been raised to 50% (for details see Schild and Walter (2016)). We uniformly apply the threshold of 3 million Euros, in fact, by slightly diverging from this rule in order to receive the results efficiently, observations with total capital of less than 3 million Euros (instead of up to 3 million Euros) are not considered, and full ownership is always required.

⁴⁵ The BRIC countries are Brazil, Russia, India and China. The covered OECD countries are Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Finland, France, Greece, Hungary, Iceland, Ireland, Italy, Japan, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, the Slovak Republic, South Korea, Spain, Sweden, Switzerland, Turkey, United Kingdom and the US. Moreover, we consider subsidiaries located in the EU countries Bulgaria, Cyprus, Estonia, Latvia, Lithuania, Malta, Slovenia and Romania.

⁴⁶ Included tax havens are the Bermuda Islands, the Cayman Islands, Hong Kong, Liechtenstein and Singapore. Moreover, we consider subsidiaries in Chile, Colombia, Croatia, Indonesia, Malaysia, Peru, Taiwan, Thailand, the United Arab Emirates and Uruguay.

⁴⁷ We take the natural logarithm of total, fixed and internal financial assets. To avoid the loss of observations for those variables we replace the levels with a 1 if they are listed as a 0 in the database. Logarithms are not taken from revenue reserves and nominal capital since scaling issues are already accounted for by the division through total capital.

whether an observation is from a year after a tax treaty reform is enforced. It turns to one if a new DTT for the respective home- and host-country pair has been introduced or if there has been a reform of the existing treaty. The dummy variable is zero for years before a reform has taken place. Table A 16 in the Appendix provides an overview of the tax treaty changes between 1996 and 2008 that have been used to set up this variable.

Our basic dataset covers the period from 1996 to 2008 and recognizes both directly and indirectly held subsidiaries. We only regard cases where holdings have full ownership of the subsidiaries. As indirectly held subsidiaries of German multinationals are included, we can monitor effects of changes in the withholding tax rates between each single pair of the 57 countries (including Germany). We combine our firm-level data with detailed data on taxation of cross-border inter-company dividends. Altogether, our matrix of withholding tax relationships shows 57 x 56 combinations each for 13 years resulting in 41,496 cells. Concerning the methods of how incoming dividends are dealt with by the parent company or the holding location, we gathered information for the same number of combinations. We browsed all tax treaties of the relevant country pairs and considered when they came into force or were terminated. We also considered that the tax treaty information may be overridden by a more favorable national rule or by multilateral legislation like the parent-subsidiary directive. Please refer to Table A 17 and Table A 18 in the Appendix for excerpts of these two matrices.

From all the 41,496 conceivable withholding tax combinations, we see 1,674 cases (4.0%) where the withholding tax is lower as compared to the previous year and 339 cases (0.8%) where it is higher as compared to the previous year. The rare cases where the withholding tax is higher than in the past mainly stem from situations where there is no DTT between two countries and in addition the subsidiary country starts levying a withholding tax for the first time. Some country combinations do not appear at all in the sample used for the regressions, whereas others are frequently observable. The comprehensive information on bilateral withholding taxes and methods to avoid double taxation is used to construct two additional variables. First, we consider the nominal withholding tax effectively imposed on intercompany dividends (*Withholding Tax*). Second, the variable *Repatriation Tax* also takes into account the treatment of intercompany dividends in the home country of the receiving entity of the MNE.

As additional control variables we consider host-country *GDP*, *GDP per Capita* and *Inflation Rate* taken from the World Bank's World Development Indicators. Moreover, a variable *Country Risk* scaling from 0 to 7 with higher values corresponding to higher risk is derived from the

OECD. Furthermore, we refer to the subsidiary-level profitability as a control variable. Table 4.1 provides an overview of the definitions, mean values and standard deviations of the variables employed in this study.

Table 4.1: Descriptive statistics

Variable	Description	Mean	Standard Deviation
Total Assets*	Total assets reported in the financial statements; measured in EUR '000.	223,307	2,850,654
Fixed Assets*	Fixed and intangible assets reported in the financial statements; measured in EUR '000.	20,118	283,219
Shares of Affiliates*	Financial assets in the form of shares of affiliated enterprises reported in the financial statements; measured in EUR '000.	25,631	566,096
Share of Nominal Capital	Subscribed or called-up capital, endowment capital and contributions by partners reported in the financial statements divided by total assets.	0.275	0.317
Share of Revenue Reserves	Revenue reserves plus profit/loss carried forward as reported in the financial statements divided by total assets.	0.148	0.308
Tax Rate	Statutory profit tax rate.	0.317	0.076
New DTT	A tax treaty has been newly introduced or changed.	0.185	0.389
Withholding Tax	Withholding tax on dividends for the respective country/country pair. It is the smaller of the domestic rate and the rate of an effective tax treaty.	0.016	0.041
Repatriation Tax	The additional tax that needs to be paid effectively on repatriation. Differs from <i>Withholding Tax</i> due to recognition of the credit system and the company tax. (cf. the first page of the Appendix for further details)	0.030	0.048
Profitability	Profit or loss for the previous financial year as reported by the balance sheet divided by total assets.	0.063	0.139
GDP*	Gross Domestic Product measured in billion USD.	2,226	3,621
GDP per Capita*	Gross Domestic Product per capita; measured in current USD.	29,397	15,371
Inflation Rate	Inflation rate.	.030	0.037
Country Risk	OECD Country Risk Classification Method measures the country credit risk. Risk categories span from a low credit risk (0) to a high credit risk (7).	.555	1.211

Notes: Firm-specific variables stem from the Microdatabase Direct investment (MiDi) 1996-2008 of the Deutsche Bundesbank's Research Data and Service Centre (RDSC) (no DOI is available for the used version, but for more recent ones, e.g., for 1999-2015: DOI = 10.12757/Bbk.MiDi.9915.03.04). Tax variables are derived from IBFD Tax Handbooks and the Worldwide Corporate Tax Guides by Ernst & Young. *GDP*, *GDP per Capita* and *Inflation Rate* stem from the World Bank's World Development Indicators, edition 2009. *Country Risk* is based on information from the OECD.

*In the regressions, logarithms are used.

4.5 Regression Results

4.5.1 Total Investment

In this section, we present our empirical results. We start by testing our hypotheses regarding the effects of tax treaty reforms and repatriation taxes on total investment. The respective results are presented in Table 4.2.

We start our analysis by considering a simple binary variable that indicates that a new tax treaty is enforced or that there has been a reform of a formerly existing DTT (*New DTT*). We do not find significant effects exerted by the introduction or modification of a DTT. Therefore, the results on the binary variable do not confirm hypothesis H-1 of a general non-negative tax treaty effect on FDI.

According to our second hypothesis, a DTT only affects FDI if it has effectively changed the taxation of the dividends. Therefore, in columns (2) and (3) we enrich our regressions by the variable *Withholding Tax*. In columns (4) and (5), we consider the variable *Repatriation Tax*. This variable stems from the withholding tax rates on dividends, but takes further aspects into consideration, such as whether the credit or exemption method is applied in the country of the parent company. Whereas we consider those new variables separately in columns (2) and (4), we combine them with the treaty dummy in columns (3) and (5). We expect that the more refined consideration of the variation in the effective repatriation taxes may improve identification. Nevertheless, in columns (2) to (5), Table 4.2 shows that withholding taxes or repatriation taxes also yield insignificant effects on total assets. Consequently, we are unable to find any significant effects of either tax treaty reforms or more detailed measures of repatriation taxes if total asset stocks are considered.

Concerning the control variables, the statutory profit tax rate in the host country, GDP per capita and inflation are significant. The tax rate has the expected negative effect. The positive impact of GDP per capita on assets can be explained by the tradeoff between labor intensive and capital intensive production: As GDP per capita can be seen as a proxy for labor costs, an increase of this variable should lead to a more capital intensive production and hence an increase in total assets. The coefficient of inflation can be explained by the fact that in a phase of monetary expansion, i.e., high inflation, investment is assumed to increase. On the other hand inflation is also an economic risk for investment. Hence, we are not surprised to find a negative effect of this variable on investment in financial assets (see Section 4.5.2).

Table 4.2: Effects of tax treaty changes and repatriation taxes on total assets

Dependent variable	(1) Total Assets	(2) Total Assets	(3) Total Assets	(4) Total Assets	(5) Total Assets
Dependent Variable t_{-1}	0.818*** (0.040)	0.819*** (0.041)	0.819*** (0.041)	0.817*** (0.041)	0.818*** (0.040)
New DTT	-0.004 (0.008)		-0.002 (0.008)		-0.004 (0.008)
Withholding Tax		0.108 (0.138)	0.101 (0.140)		
Repatriation Tax				-0.024 (0.109)	-0.030 (0.110)
Tax Rate	-0.162** (0.081)	-0.158* (0.081)	-0.158* (0.081)	-0.162** (0.081)	-0.163** (0.081)
Profitability	-0.003 (0.020)	-0.003 (0.020)	-0.003 (0.020)	-0.003 (0.020)	-0.003 (0.020)
ln(GDP)	0.012 (0.047)	0.011 (0.048)	0.011 (0.048)	0.012 (0.047)	0.012 (0.047)
ln(GDP per Capita)	0.195*** (0.054)	0.194*** (0.054)	0.194*** (0.054)	0.196*** (0.054)	0.196*** (0.053)
Inflation	0.046* (0.026)	0.046* (0.026)	0.046* (0.026)	0.046* (0.026)	0.046* (0.026)
Country Risk	0.011 (0.007)	0.011 (0.007)	0.011 (0.007)	0.011 (0.007)	0.011 (0.007)
Number of observations	84,625	84,625	84,625	84,625	84,625
Number of firms	18,229	18,229	18,229	18,229	18,229
Arellano-Bond-test (AR(2)) ^Δ	0.439	0.439	0.438	0.443	0.440
Number of instruments	29	29	30	29	30
Hansen-test ^Δ	0.000467	0.000481	0.000475	0.000476	0.000469

Source: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank (German Central Bank), Micro-database Direct investment (MiDi) 1996-2008 (no DOI is available for the used version, but for more recent ones, e.g., for 1999-2015: DOI = 10.12757/Bbk.MiDi.9915.03.04).

Notes: ^Δp-value reported. The dependent variables are in logs. The standard errors shown in parentheses are robust. Year dummies for 1998-2008 are included but not reported. We actually have data from 1996 to 2008. Due to the consideration of first differences as the dependent variable we have observations in the regression however only starting from 1997. In addition, one year dummy has to be dropped because otherwise each year dummy could be fully explained by the others. We apply the Arellano-Bond estimator, i.e., a GMM dynamic panel-data estimator where all variables enter in first differences (Arellano and Bond (1991)). In line with this estimator, we instrument the first differences of the lagged dependent variables with their second lags. *, ** and *** show significance at the level of 10%, 5% and 1%.

We also control for the lagged dependent variable. As can be seen from the coefficient of the lagged dependent variable, the assets stocks are quite sticky over time, i.e., they are strongly influenced by the situation of the previous period. As mentioned in Section 4.3, we have to instrument this variable with its second lag. This requires that there is no second-order autocorrelation, which we test and confirm with an Arellano-Bond-test (reported at the bottom of Table 4.2). Because of the p-values of the Hansen-tests of over-identifying restrictions we would have

to reject the assumption of valid instruments in the Arellano-Bond estimator, which we are using. They are below the acceptable threshold of 0.25 (Roodman (2009b)). However, this is not the case for the following regressions with fixed and internal financial assets as dependent variables. Following the reasoning of Acemoglu and Johnson (2007), those different test results across the different specifications may be explained by varying lags used as instruments. Indeed we use different lags for the different dependent variables (due to different autocorrelation of the errors). However, like Acemoglu and Johnson (2007) we are not too concerned about this issue because the size of the effect of the lagged dependent variable is not relevant for our empirical approach.

4.5.1 Real Investments

Taking into account the discussion in Section 4.2, opposing effects of repatriation taxes are expected if different investment types are considered. The insignificant effects of repatriation taxes on total assets might be a consequence of opposing responses to repatriation taxes of different investment types. If these elements are differently affected, their changes might net out leading to a total effect that is insignificant. Therefore, we decompose the overall effect of the repatriation tax on investment by separately considering different asset categories. In Table 4.3 we regress fixed assets on repatriation taxes, withholding taxes and the variable indicating whether a tax treaty amendment took place.

The results shown in Table 4.3 suggest that fixed assets are negatively affected by repatriation taxes as well as withholding taxes. The coefficient of -0.485 in column (4) of Table 4.3 indicates that a 1 percentage point increase in the repatriation tax results in a stock of fixed assets that is 0.485% smaller. The coefficient for withholding taxes in column (2) is slightly larger.

The effect of repatriation and withholding taxes supports our assumption that a closer look at those variables is advisable. Moreover, in columns (1), (3) and (5) we also consider the variable indicating whether a tax treaty amendment took place. The effect of a tax treaty reform proves to be insignificant. This finding supports the view that the effective changes of repatriation taxes and withholding taxes affect FDI whereas the various issues also concluded in a tax treaty do not really matter. At least, they do not seem to exert a negative impact on FDI in our sample.

Table 4.3: Effects of repatriation taxes on fixed assets

Dependent variable	(1) Fixed Assets	(2) Fixed Assets	(3) Fixed Assets	(4) Fixed Assets	(5) Fixed Assets
Dependent Variable t_{-1}	0.490*** (0.052)	0.490*** (0.052)	0.490*** (0.052)	0.490*** (0.052)	0.490*** (0.052)
New DTT	0.003 (0.022)		-0.004 (0.022)		-0.003 (0.022)
Withholding Tax		-0.506* (0.276)	-0.518* (0.274)		
Repatriation Tax				-0.485* (0.260)	-0.491* (0.262)
Tax Rate	-0.458** (0.205)	-0.472** (0.205)	-0.474** (0.205)	-0.477** (0.205)	-0.478** (0.205)
Profitability	0.228*** (0.050)	0.228*** (0.050)	0.229*** (0.050)	0.228*** (0.050)	0.228*** (0.050)
ln(GDP)	0.177** (0.077)	0.183** (0.077)	0.183** (0.077)	0.174** (0.079)	0.174** (0.079)
ln(GDP per Capita)	0.204** (0.092)	0.208** (0.092)	0.208** (0.092)	0.216** (0.094)	0.217** (0.094)
Inflation	0.175 (0.148)	0.173 (0.148)	0.173 (0.148)	0.173 (0.148)	0.173 (0.148)
Country Risk	0.006 (0.017)	0.008 (0.017)	0.008 (0.017)	0.008 (0.017)	0.008 (0.017)
Number of observations	84,625	84,625	84,625	84,625	84,625
Number of firms	18,229	18,229	18,229	18,229	18,229
Arellano-Bond-test (AR(2)) ^Δ	0.0160	0.0161	0.0161	0.0160	0.0160
Arellano-Bond-test (AR(3)) ^Δ	0.802	0.803	0.803	0.803	0.802
Arellano-Bond-test (AR(4)) ^Δ	0.593	0.595	0.595	0.596	0.595
Number of instruments	27	27	28	27	28
Hansen-test ^Δ	0.624	0.631	0.631	0.627	0.627

Source: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank (German Central Bank), Micro-database Direct investment (MiDi) 1996-2008 (no DOI is available for the used version, but for more recent ones, e.g., for 1999-2015: DOI = 10.12757/Bbk.MiDi.9915.03.04).

Notes: ^Δp-value reported. The dependent variables are in logs. The standard errors shown in parentheses are robust. Year dummies for 1998-2008 are included but not reported. We actually have data from 1996 to 2008. Due to the consideration of first differences as the dependent variable we have observations in the regression however only starting from 1997. In addition, one year dummy has to be dropped because otherwise each year dummy could be fully explained by the others. We apply the Arellano-Bond estimator, i.e., a GMM dynamic panel-data estimator where all variables enter in first differences (Arellano and Bond (1991)). Because of autocorrelation of the errors, we instrument the first differences of the lagged dependent variables with their fourth lags (Roodman (2009a)). *, ** and *** show significance at the level of 10%, 5% and 1%.

As regards control variables, now also the profitability and GDP are significant with an expected positive effect on investment, whereas inflation becomes insignificant.

4.5.2 Financial Investments

In Table 4.4 we show the effect of DTTs and repatriation taxes on financial assets. We suppose that high repatriation taxes cause firms to increase their financial asset stock in the host country if they expect a decline of such taxes in the future. Then, in the presence of high repatriation taxes, companies act rationally when they reinvest their profits instead of repatriating them. Investing in financial assets grants access to investment opportunities not limited to the host country of the respective subsidiary. Financial assets also include portfolio investments as well as investments within the MNE. Portfolio investments are however not very attractive if the firm has investment opportunities for the latter. We therefore focus on investments in shares of affiliated firms. Those are means to funnel equity to investment opportunities within the MNE – without paying repatriation taxes.

Indeed, the results in columns (4) and (5) show a positive and significant effect of repatriation taxes on shares in affiliated firms. The coefficient of 0.849 in column (5) means that a one percentage point increase in the repatriation tax results in a 0.849% increase in the subsidiary's financial asset stock. However, the withholding tax alone, which is part of the repatriation tax, and the treaty dummy alone do not prove to be significant (columns (1), (2), (3) and (5)).

Concerning the control variables, the tax rate, GDP and GDP per capita are insignificant. The negative effect of inflation may be explained by the fact that it is an economic risk for investment.

Table 4.4: Effects of repatriation taxes on financial assets

Dependent variable	(1) Internal Finan- cial Assets	(2) Internal Finan- cial Assets	(3) Internal Finan- cial Assets	(4) Internal Finan- cial Assets	(5) Internal Finan- cial Assets
Dependent Variable _{t-1}	0.802*** (0.037)	0.805*** (0.037)	0.803*** (0.037)	0.805*** (0.037)	0.804*** (0.037)
New DTT	-0.046 (0.041)		-0.040 (0.043)		-0.035 (0.042)
Withholding Tax		0.556 (0.624)	0.436 (0.655)		
Repatriation Tax				0.906* (0.484)	0.849* (0.496)
Tax Rate	-0.405 (0.382)	-0.375 (0.384)	-0.392 (0.384)	-0.355 (0.384)	-0.370 (0.384)
Profitability	0.176** (0.077)	0.176** (0.077)	0.176** (0.077)	0.176** (0.077)	0.176** (0.077)
ln(GDP)	-0.403 (0.381)	-0.408 (0.381)	-0.408 (0.382)	-0.395 (0.380)	-0.396 (0.380)
ln(GDP per Capita)	0.290 (0.358)	0.285 (0.356)	0.287 (0.357)	0.266 (0.355)	0.269 (0.356)
Inflation	-0.178* (0.092)	-0.178* (0.092)	-0.177* (0.092)	-0.176* (0.092)	-0.175* (0.092)
Country Risk	-0.016 (0.029)	-0.018 (0.029)	-0.018 (0.029)	-0.019 (0.029)	-0.019 (0.029)
Number of observations	84,625	84,625	84,625	84,625	84,625
Number of firms	18,229	18,229	18,229	18,229	18,229
Arellano-Bond-test (AR(2)) ^Δ	0.000	0.000	0.000	0.000	0.000
Arellano-Bond-test (AR(3)) ^Δ	0.954	0.947	0.951	0.947	0.951
Number of instruments	28	28	29	28	29
Hansen-test ^Δ	0.318	0.331	0.325	0.335	0.331

Source: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank (German Central Bank), Micro-database Direct investment (MiDi) 1996-2008 (no DOI is available for the used version, but for more recent ones, e.g., for 1999-2015: DOI = 10.12757/Bbk.MiDi.9915.03.04).

Notes: ^Δp-value reported. The dependent variables are in logs. The standard errors shown in parentheses are robust. Year dummies for 1998-2008 are included but not reported. We actually have data from 1996 to 2008. Due to the consideration of first differences as the dependent variable we have observations in the regression however only starting from 1997. In addition, one year dummy has to be dropped because otherwise each year dummy could be fully explained by the others. We apply the Arellano-Bond estimator, i.e., a GMM dynamic panel-data estimator where all variables enter in first differences (Arellano and Bond (1991)). Because of autocorrelation of the errors, we instrument the first differences of the lagged dependent variables with their third lags (Roodman (2009a)). *, ** and *** show significance at the level of 10%, 5% and 1%.

4.5.3 Capital Structures

In a final step we also analyze whether the structure of revenue reserves and nominal capital is affected by DTTs and repatriation taxes in particular. Since the impact of repatriation taxes on total capital, which corresponds to total assets, is insignificant, we consider the effects on its

elements revenue reserves and nominal capital. For the two we run separate estimations. Table 4.5 shows the effect of DTTs and repatriation taxes on the financial structures of multinational subsidiaries.

In line with the previous results, the dummies do not have an effect. In columns (2) and (3) we focus on the effect of the withholding as well as repatriation taxes on the revenue reserves of a subsidiary. The signs for the coefficients are positive, as expected (cf. H-4), and significant. The coefficient of 0.137 in column (3) means that a one percentage point higher repatriation tax leads to a 0.137% smaller share of revenue reserves. If firms expect a decline of withholding respectively repatriation taxes in the future, they act rationally when retaining profits and, in doing so, increasing their revenue reserves.

Columns (5) and (6) show, by contrast, that nominal capital is significantly negatively affected by withholding as well as repatriation taxes on dividends. This result was also expected and corresponds well to our findings regarding revenue reserves.

As in the case of total assets, the Hansen-test fails but again we assume that this is not affecting the validity of our empirical approach.

Table 4.5: Effects of repatriation taxes on shares of revenue reserves and nominal capital

Dependent variable	(1) Share of revenue re- serves	(2) Share of reve- nue reserves	(3) Share of reve- nue reserves	(4) Share of nominal capi- tal	(5) Share of nominal capi- tal	(6) Share of nominal capi- tal
Dependent Variable _{t-1}	0.789*** (0.035)	0.788*** (0.035)	0.788*** (0.035)	0.834*** (0.047)	0.834*** (0.047)	0.833*** (0.047)
New DTT	-0.001 (0.003)	0.001 (0.003)	0.000 (0.003)	-0.003 (0.003)	-0.004 (0.003)	-0.004 (0.003)
Withholding Tax		0.146*** (0.053)			-0.092* (0.051)	
Repatriation Tax			0.137*** (0.049)			-0.085** (0.038)
Tax Rate	-0.076** (0.033)	-0.072** (0.033)	-0.070** (0.033)	-0.059* (0.035)	-0.062* (0.035)	-0.062* (0.035)
Profitability	0.552*** (0.017)	0.551*** (0.017)	0.551*** (0.017)	-0.329*** (0.015)	-0.329*** (0.015)	-0.329*** (0.015)
ln(GDP)	0.024 (0.029)	0.022 (0.029)	0.025 (0.029)	-0.027 (0.019)	-0.026 (0.019)	-0.028 (0.018)
ln(GDP per Capita)	-0.010 (0.027)	-0.011 (0.028)	-0.013 (0.028)	0.019 (0.020)	0.020 (0.020)	0.021 (0.019)
Inflation	0.030 (0.024)	0.031 (0.024)	0.031 (0.024)	0.031 (0.040)	0.031 (0.040)	0.030 (0.040)
Country Risk	0.003 (0.003)	0.003 (0.003)	0.003 (0.003)	-0.002 (0.003)	-0.002 (0.003)	-0.002 (0.003)
Number of observations	84,625	84,625	84,625	84,625	84,625	84,625
Number of firms	18,229	18,229	18,229	18,229	18,229	18,229
Arellano-Bond-test (AR(2)) ^Δ	0.00323	0.00326	0.00331	0.0575	0.0575	0.0578
Arellano-Bond-test (AR(3)) ^Δ	0.804	0.810	0.812	0.744	0.740	0.739
Number of instruments	28	29	29	28	29	29
Hansen-test ^Δ	0.00333	0.00282	0.00268	0.0579	0.0542	0.0550

Source: Research Data and Service Centre (RDSC) of the Deutsche Bundesbank (German Central Bank), Micro-database Direct investment (MiDi) 1996-2008 (no DOI is available for the used version, but for more recent ones, e.g., for 1999-2015: DOI = 10.12757/Bbk.MiDi.9915.03.04).

Notes: ^Δp-value reported. The standard errors shown in parentheses are robust. Year dummies for 1998-2008 are included but not reported. We actually have data from 1996 to 2008. Due to the consideration of first differences as the dependent variable we have observations in the regression however only starting from 1997. In addition, one year dummy has to be dropped because otherwise each year dummy could be fully explained by the others. We apply the Arellano-Bond estimator, i.e., a GMM dynamic panel-data estimator where all variables enter in first differences (Arellano and Bond (1991)). Because of autocorrelation of the errors, we instrument the first differences of the lagged dependent variables with their third lags (Roodman (2009a)). *, ** and *** show significance at the level of 10%, 5% and 1%.

4.6 Concluding Remarks

We have analyzed how tax treaties and repatriation taxes affect investment and capital structures of multinational subsidiaries. If we follow the approach taken by previous studies and

consider a simple binary variable indicating the enforcement of a new tax treaty, we find insignificant effects on total assets. Then, we have particularly tested whether changes of repatriation taxes affect total investment of multinational subsidiaries. Yet, we do not find any statistically significant effects of repatriation taxes on total investment.

In additional analyses, however, we have taken into account that different types of investment might be adversely affected by changes of repatriation taxes. Our findings are in accordance with expectations on the effect of repatriation taxes. Investment in fixed assets is negatively affected by repatriation taxes leading to the conclusion that new equity is the marginal source of finance for such assets (at least for the initial equity injection). Moreover, our results suggest that firms postpone repatriation because they have the general expectation that, due to new tax treaties, high repatriation taxes will decrease in the future. Thereby they avoid the high taxes and pay lower taxes in future. In the absence of local investment opportunities, the respective funds are then invested in the capital market and especially in shares of affiliated firms. Accordingly, we find a positive effect of repatriation taxes on internal financial investments. Hence, repatriation taxes actually increase retained earnings but this only affects such investment.

The behavioral response to repatriation taxes is also confirmed by corresponding effects of repatriation taxes on financial structures of the subsidiaries. Our results suggest significant effects on the structure of equity finance. Higher repatriation taxes are associated with a significantly higher share of revenue reserves and at the same time with significantly smaller new equity injections.

The results suggest that the effect of repatriation taxes on dividends is worth analyzing. They seem to exert a significant impact on specific kinds of investments. The opposing effects, e.g., on investment in fixed and financial assets presumably lead to an overall insignificant effect on total investment. These opposing effects might explain previous findings of an insignificant effect of tax treaties on aggregated FDI. Our results suggest that changes of the repatriation taxes exert statistically significant effects on both investment and the structure of equity financing. Therefore, tax treaties seem to be strongly considered by multinational companies if the treaty effectively affects repatriation taxes. By contrast, our results indicate that the general case that a tax treaty exists or was rephrased does not exert a significant effect on investment. Since, however, parts of the previous research have found effects of such treaties (see Section 4.1), their findings (e.g., considering particularly relevant subsamples) could be combined with the

approach of this paper (particularly looking at different asset types) for future research. In addition, the effects of the 2018 US tax reform, which included a switch from the credit to the exemption method, may be of particular interest for future research on repatriation taxes.

5. Main concluding remarks

Tax avoidance of MNEs is of considerable interest since it affects not only tax returns of countries but also several other issues, e.g., investment incentives of firms or questions of tax incidence. This thesis contributes to the understanding of tax avoidance, first, by generally investigating profit shifting and investment effects in the first analysis, and, second, by addressing two puzzles on firm's tax avoidance behavior that previous research has left.

In my first analysis, I address a well-known way of tax avoidance, namely profit shifting within MNEs. This means that relationships between subsidiaries of MNEs are arranged in such a way that those in high-tax countries have to make payments to those in low-tax countries. Two common ways through which profit shifting is conducted are that low-tax subsidiaries give a credit respectively the right to use certain intellectual property, i.e., patents or trademarks, to high-tax subsidiaries. Then, with the interest payments respectively license fees, the profits are shifted to the low-tax subsidiaries. I investigate firms that previously had no affiliates in other countries but become part of a MNE through an acquisition and therefore at once have opportunities for such profit shifting. For acquired firms in high-tax countries, more investment projects should therefore be profitable after taxes. Indeed, I observe that after M&As real investment, i.e., investment in PPE, is larger for targets in high-tax countries. In addition, I observe the opposite sign for financial revenues, indicating that targets in low-tax countries become destinations for profit shifting themselves (though here I presumably observe only profit shifting via interests). Furthermore, the effect on real investment cannot be observed if the country of the acquirer's GUO applies a CFC rule, which is an anti-avoidance measures that is targeted against such profit shifting.

Future research could build on this approach particularly in three ways. First, currently, the relatively strict restriction is made that only those targets are considered where at once 100% of the shares are acquired. This assumption could be relaxed, which may increase the sample, thereby also the statistical power and hence maybe lead to additional support of the hypotheses (not all hypotheses could be confirmed yet). In addition, it may allow for further divisions of the sample, which could enable the precise modelling of the M&As as an exogenous effect with respect to tax planning. This would enhance the identification of the causal effects of both, profit shifting opportunities and CFC rules on profit shifting and investment. Second, one robustness check indicates that targets may anticipate the acquisitions and therefore already increase investment beforehand. This could also be addressed in future research. Third, previous

research has indicated that MNEs relocate their headquarters away from countries with CFC rules. Hence, the ones that remain in such countries may simply be less tax aggressive. Future research could investigate whether it is indeed less the constraint of CFC rules but rather the smaller tax aggressiveness that drives the finding that the investment effect can no longer be observed in case of such rules.

In the second analysis, I focus on measuring the exact extend of a specific way of tax avoidance, namely debt financing. I explain that in case the investment is conducted via a M&A, this debt financing is particularly advantageous at the level of holdings. In addition, I show theoretically that accounting for such debt financing requires the consolidation of the debt ratios of the operating firms and the holdings. I discuss theoretically and confirm empirically that this increases the measured debt ratios and, in accordance to that, the positive effect of the tax rate on the debt ratio. However, the results also indicate that the usage of holdings for debt financing may be a rather recent development.

The analysis could be enhanced by future research. First, not all hypotheses could be confirmed so far, which could be addressed by additional investigations. For example, given the reasoning from above, a high tax rate should also increase the probability of the usage of holdings in case of M&As. As mentioned in the analysis, it could be necessary to account for capital gains taxes in order to identify this effect. Second, while the focus of this study was to identify the changes in the effect of taxes on debt financing due to the consolidation, other innovations in current research dealing with tax-induced debt financing could be included. For example, the incentives for debt financing in the respective firm could be elaborated relative to the incentives in its affiliates in other countries. Here, tax rate differentials to affiliates may be particularly relevant (see, e.g., Huizinga et al. (2008), Büttner and Wamser (2013), Overesch and Wamser (2014)). Or one could use an estimator that accounts for the fact that the dependent variable is bounded between zero and one (see, e.g., Egger et al. (2014a)).

The third analysis differs from the two others, since it does not focus on the avoidance of profit taxes in the host country of firms, but on the avoidance of taxes that are raised on dividends flowing between affiliates (or to the parent), located in different countries (repatriation taxes). The analysis investigates the investment effects of DTTs, which reduce repatriation taxes, respectively of repatriation taxes in general. Whereas the results do not indicate an effect for DTTs in particular, repatriation taxes seem to affect investment: fixed assets decline in those

taxes while financial assets increase. The latter finding supports the assumption that firms expect coming declines in those taxes, delay the distribution of profits and therefore reinvest profits in financial assets as long as those taxes are high.

Given that the findings for DTTs in particular are insignificant, additional research could combine the approach of this analysis (especially looking at different asset types) with the ones of other papers that found effects for DTTs (foremost using relevant subsamples that they identified). In addition, the consequences of the US tax reform from 2018 could be investigated, which presumably led to a considerable decline of repatriation taxes due to the change in the method to avoid double taxation.

As regards policy implications, the findings support several reform options. The discussed tax avoidance highlights aspects of the current tax system that do not suit a world where firms pursue the maximization of their (after-tax) profits. Profit shifting, which is based on exploiting international tax differentials, clearly points at a lack of harmonization. Here, several reform options could be implemented, such as a common corporate tax base (European Commission, 2016) or a move towards levying taxes at the location of consumption (presumably the first paper making respective suggestions was by Bond and Devereux (2002)). Regarding debt financing, which includes besides profit shifting also external debt, the tax system favors such financing over equity financing, since interests reduce the tax base. Besides the above mentioned general reform options, there are several solutions that focus particularly on overcoming this bias towards debt financing, which also leads to bankruptcy risks (see Spengel et al. (2018a) for an overview of such approaches). The results for the third analysis show that firms react to double taxation until it is overcome through a reduction of the repatriation taxes. The negative effects of such taxes on real investment highlight the importance of limits to such taxes.

To conclude, this thesis investigates how MNEs avoid taxes. First, it confirms previous findings that profit shifting within MNEs has positive effects on investment, but is prevented by the anti-avoidance measure of CFC rules. Second, it shows that, in case of M&As, the effect of tax avoidance via debt financing is larger if one accounts for debt financing at the level of holdings. Third, it shows that the effect of repatriation taxes on cross-border dividend flows differs for fixed and financial assets, which may lead to an overall insignificant effect. This may contribute to the explanation of the findings of some previous studies, according to which DTTs, which often lead to a limitation of those taxes, may have no or even negative effects on investment. As mentioned above, those findings are also relevant for policy makers. Firms, when acting

rational as (after-tax) profit maximizers, are expected to use those legal opportunities for tax avoidance. Therefore, fundamental tax reforms such as a common corporate tax base or a move towards a rather consumption oriented taxation may be needed.

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Appendix

Appendix to Section 2

Table A 1: Effect of acquisitions on target PPE (Non-CFC rule MNEs; anti-avoidance measures at target-level)

Sample	(1) Transfer pricing documen- tation rules	(2) Thin-capitalization / earnings-stripping rules	(3) Transfer pricing documen- tation rules and thin-capital- ization / earnings-stripping rules
postMAyear	-1.275* (0.745)	-1.057** (0.491)	-1.168 (0.749)
TarSTR	-2.742 (2.711)	-2.246 (3.203)	-2.702 (3.258)
postMAyear#TarSTR	3.762 (2.585)	3.264** (1.645)	3.316 (2.627)
lnTarAssets_noPPE	0.492*** (0.162)	0.418*** (0.117)	0.479*** (0.154)
TarLoss_lag	0.086 (0.120)	0.052 (0.133)	0.074 (0.121)
lnTarGDP	8.513 (6.797)	6.197 (5.430)	7.121 (8.188)
lnTarGDP_percapita	-7.022 (6.430)	-4.727 (5.043)	-5.669 (7.441)
TarGDP_growth	-0.056* (0.033)	-0.011 (0.024)	-0.062* (0.035)
TarCorruption	-0.372 (0.407)	-0.754 (0.491)	-0.485 (0.425)
Constant	-158.959 (120.970)	-116.294 (100.153)	-134.494 (152.249)
Observations	512	577	481
Deals	74	84	69
R-squared	0.224	0.209	0.216
Year fixed effects	YES	YES	YES
Target firm fixed effects	YES	YES	YES

Notes: Regressions with target PPE (natural logarithm) as dependent variable; see expression (2.1). For variable descriptions and data sources, see Section 2.3 and Table 2.2. All regressions include target firm and year fixed effects and are estimated using OLS panel regressions. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively. Standard errors are provided in parentheses and are clustered on the target country level.

Table A 2: Effect of acquisitions on target financial revenues (Non-CFC rule MNEs; anti-avoidance measures at target-level)

Sample	(1) Transfer pricing documen- tation rules	(2) Thin-capitalization / earnings-stripping rules	(3) Transfer pricing documen- tation rules and thin-capital- ization / earnings-stripping rules
postMAyear	1.801 (3.636)	2.338 (1.709)	1.739 (5.662)
TarSTR	11.372 (12.197)	8.873 (12.773)	11.645 (16.844)
postMAyear#TarSTR	-7.389 (11.915)	-9.306 (6.519)	-7.082 (18.566)
lnTarPPE	0.237 (0.243)	0.157 (0.198)	0.358 (0.244)
TarLoss_lag	-0.901 (0.763)	-0.605 (0.642)	-0.845 (0.876)
lnTarGDP	-15.335 (35.917)	-19.801 (17.169)	-16.176 (78.318)
lnTarGDP_percapita	14.819 (36.781)	16.640 (16.258)	15.593 (76.147)
TarGDP_growth	0.065 (0.132)	0.068 (0.103)	0.064 (0.200)
TarCorruption	-0.158 (2.814)	0.398 (2.660)	0.111 (6.646)
TarInflation	-0.122 (0.153)	0.019 (0.158)	-0.255 (0.296)
Constant	282.437 (625.275)	390.185 (320.639)	299.268 (1,412.607)
Observations	248	286	227
Deals	38	46	35
R-squared	0.113	0.0914	0.109
Year fixed effects	YES	YES	YES
Target firm fixed effects	YES	YES	YES

Notes: Regressions with target financial revenues (natural logarithm) as dependent variable; see expression (2.1). For variable descriptions and data sources, see Section 2.3 and Table 2.2. All regressions include target firm and year fixed effects and are estimated using OLS panel regressions. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively. Standard errors are provided in parentheses and are clustered on the target country level.

Table A 3: Effect of acquisitions on target EBT per PPE (Non-CFC rule MNEs; anti-avoidance measures at target-level)

Sample	(1) Transfer pricing documen- tation rules	(2) Thin-capitalization / earnings-stripping rules	(3) Transfer pricing documen- tation rules and thin-capital- ization / earnings-stripping rules
postMAyear	-5.054 (12.028)	-1.708 (4.113)	-5.354 (37.436)
TarSTR	18.295 (285.128)	34.095* (18.229)	15.838 (51.026)
postMAyear#TarSTR	27.028 (38.774)	15.953 (15.544)	29.554 (120.818)
lnTarAssets_noPPE	1.495 (1.555)	1.931** (0.834)	1.178 (1.164)
lnTarEmployees	-0.729 (2.845)	-1.203 (1.827)	0.020 (3.190)
lnTarSales	2.445 (2.029)	2.295* (1.192)	2.308** (0.922)
TarLoss_lag	0.287 (4.568)	-0.118 (2.524)	0.048 (5.391)
lnTarGDP	-25.021 (912.821)	-22.873 (39.726)	-13.323 (561.708)
lnTarGDP_percapita	11.825 (1,255.897)	17.830 (38.951)	0.641 (531.278)
TarGDP_growth	0.110 (2.841)	0.092 (0.126)	0.090 (0.667)
TarCorruption	-0.199 (118.314)	-3.024 (4.777)	1.264 (31.128)
Constant	511.064 (12,352.062)	380.946 (712.575)	302.908 (10,154.877)
Observations	183	211	173
Deals	34	39	31
R-squared	0.218	0.212	0.210
Year fixed effects	YES	YES	YES
Target firm fixed effects	YES	YES	YES

Notes: Regressions with target EBT per PPE as dependent variable; see expression (2.1). For variable descriptions and data sources, see Section 2.3 and Table 2.2. All regressions include target firm and year fixed effects and are estimated using OLS panel regressions. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively. Standard errors are provided in parentheses and are clustered on the target country level.

Table A 4: Effect of acquisitions on target PPE (Non-CFC rule MNEs; variation of acquisition date (as if it had happened in an earlier year))

Change acquisition date to	(1) 5 years before acquisition	(2) 4 years before acquisition	(3) 3 years before acquisition	(4) 2 years before acquisition
postMAyear_m5	-0.351 (0.884)			
postMAyear_m4		-0.678 (0.879)		
postMAyear_m3			-0.697 (0.780)	
postMAyear_m2				-0.921 (0.571)
TarSTR	-4.367 (4.237)	-4.601 (3.503)	-4.888 (3.422)	-4.251 (3.055)
postMAyear_m5#TarSTR	1.453 (2.532)			
postMAyear_m4#TarSTR		2.411 (2.560)		
postMAyear_m3#TarSTR			3.182 (2.419)	
postMAyear_m2#TarSTR				3.356* (1.866)
lnTarAssets_noPPE	0.417*** (0.112)	0.424*** (0.114)	0.422*** (0.122)	0.424*** (0.114)
TarLoss_lag	0.060 (0.130)	0.049 (0.129)	0.031 (0.120)	0.054 (0.124)
lnTarGDP	7.504 (5.874)	7.791 (5.651)	8.289* (4.950)	7.977 (5.147)
lnTarGDP_percapita	-6.212 (5.604)	-6.421 (5.383)	-6.816 (4.686)	-6.520 (4.833)
TarGDP_growth	-0.022 (0.028)	-0.027 (0.026)	-0.031 (0.026)	-0.026 (0.026)
TarCorruption	-0.225 (0.552)	-0.252 (0.532)	-0.273 (0.576)	-0.295 (0.529)
Constant	-137.007 (103.949)	-142.792 (101.343)	-152.710* (88.208)	-147.050 (92.845)
Observations	622	622	622	622
Deals	91	91	91	91
R-squared	0.192	0.194	0.204	0.199
Year fixed effects	YES	YES	YES	YES
Target firm fixed effects	YES	YES	YES	YES

Notes: Regressions with target PPE (natural logarithm) as dependent variable; see expression (2.1). postMAyear_m[x] is a dummy variable that is 1 for all years following the year x before the acquisition. For all other variable descriptions and data sources, see Section 2.3 and Table 2.2. All regressions include target firm and year fixed effects and are estimated using OLS panel regressions. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively. Standard errors are provided in parentheses and are clustered on the target country level.

Table A 5: Effect of acquisitions on target PPE (Non-CFC rule MNEs; variation of acquisition date (as if it had happened in a later year))

Change acquisition date to	(1) 1 year after acquisition	(2) 2 years after acquisition	(3) 3 years after acquisition	(4) 4 years after acquisition
postMAyear_p1	-1.292 (0.851)			
postMAyear_p2		-1.641 (1.092)		
postMAyear_p3			-1.180 (1.856)	
postMAyear_p4				-0.140 (3.453)
TarSTR	-3.909 (2.986)	-3.901 (3.191)	-3.517 (3.346)	-3.350 (3.080)
postMAyear_p1#TarSTR	4.435* (2.592)			
postMAyear_p2#TarSTR		5.057 (3.656)		
postMAyear_p3#TarSTR			3.311 (6.978)	
postMAyear_p4#TarSTR				-2.197 (13.434)
lnTarAssets_noPPE	0.406*** (0.121)	0.399*** (0.124)	0.407*** (0.115)	0.418*** (0.111)
TarLoss_lag	0.047 (0.123)	0.036 (0.131)	0.059 (0.129)	0.065 (0.128)
lnTarGDP	8.118 (4.996)	8.600* (5.067)	7.746 (5.219)	7.771 (5.339)
lnTarGDP_percapita	-6.643 (4.649)	-7.118 (4.639)	-6.438 (4.807)	-6.515 (5.009)
TarGDP_growth	-0.017 (0.023)	-0.017 (0.022)	-0.017 (0.024)	-0.019 (0.023)
TarCorruption	-0.243 (0.568)	-0.240 (0.558)	-0.215 (0.572)	-0.236 (0.523)
Constant	-149.460* (90.358)	-157.732* (92.386)	-141.322 (94.750)	-141.381 (96.133)
Observations	622	622	622	622
Deals	91	91	91	91
R-squared	0.200	0.202	0.195	0.195
Year fixed effects	YES	YES	YES	YES
Target firm fixed effects	YES	YES	YES	YES

Notes: Regressions with target PPE (natural logarithm) as dependent variable; see expression (2.1). postMAyear_m[x] is a dummy variable that is 1 for all years following the year x before the acquisition. For all other variable descriptions and data sources, see Section 2.3 and Table 2.2. All regressions include target firm and year fixed effects and are estimated using OLS panel regressions. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively. Standard errors are provided in parentheses and are clustered on the target country level.

Table A 6: Effect of acquisitions on target financial revenues (Non-CFC rule MNEs; variation of acquisition date (as if it had happened in an earlier year))

Change acquisition date to	(1) 5 years before acquisition	(2) 4 years before acquisition	(3) 3 years before acquisition	(4) 2 years before acquisition
postMAyear_m5	-2.016 (4.114)			
postMAyear_m4		0.979 (2.516)		
postMAyear_m3			1.127 (1.806)	
postMAyear_m2				1.658 (1.634)
TarSTR	0.545 (11.366)	6.077 (9.666)	5.823 (9.805)	8.924 (9.693)
postMAyear_m5#TarSTR	6.753 (11.811)			
postMAyear_m4#TarSTR		-1.238 (7.048)		
postMAyear_m3#TarSTR			-1.838 (5.565)	
postMAyear_m2#TarSTR				-5.540 (5.227)
lnTarPPE	0.010 (0.209)	-0.017 (0.196)	-0.020 (0.188)	0.022 (0.203)
TarLoss_lag	-0.618 (0.636)	-0.605 (0.663)	-0.645 (0.659)	-0.576 (0.620)
lnTarGDP	-9.312 (17.566)	-11.614 (16.819)	-11.793 (15.696)	-14.321 (15.369)
lnTarGDP_percapita	7.825 (17.962)	9.684 (16.792)	9.779 (15.751)	11.852 (15.693)
TarGDP_growth	0.089 (0.092)	0.098 (0.088)	0.104 (0.090)	0.102 (0.087)
TarCorruption	-0.391 (2.095)	-0.126 (2.029)	-0.019 (1.883)	0.078 (1.914)
TarInflation	-0.017 (0.123)	-0.000 (0.121)	-0.005 (0.123)	-0.009 (0.117)
Constant	190.355 (304.111)	233.178 (299.437)	237.210 (277.790)	285.380 (268.598)
Observations	314	314	314	314
Deals	50	50	50	50
R-squared	0.0742	0.0775	0.0777	0.0764
Year fixed effects	YES	YES	YES	YES
Target firm fixed effects	YES	YES	YES	YES

Notes: Regressions with target financial revenues (natural logarithm) as dependent variable; see expression (2.1). postMAyear_m[x] is a dummy variable that is 1 for all years following the year x before the acquisition. For all other variable descriptions and data sources, see Section 2.3 and Table 2.2. All regressions include target firm and year fixed effects and are estimated using OLS panel regressions. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively. Standard errors are provided in parentheses and are clustered on the target country level.

Table A 7: Effect of acquisitions on target financial revenues (Non-CFC rule MNEs; variation of acquisition date (as if it had happened in a later year))

Change acquisition date to	(1) 1 year after acquisition	(2) 2 years after acquisition	(3) 3 years after acquisition	(4) 4 years after acquisition
postMAyear_p1	1.838 (1.840)			
postMAyear_p2		1.558 (3.156)		
postMAyear_p3			4.432 (5.088)	
postMAyear_p4				2.993 (10.533)
TarSTR	9.101 (10.204)	6.376 (9.800)	6.586 (8.977)	6.131 (9.621)
postMAyear_p1#TarSTR	-8.486 (6.323)			
postMAyear_p2#TarSTR		-6.358 (10.091)		
postMAyear_p3#TarSTR			-17.284 (18.913)	
postMAyear_p4#TarSTR				-10.483 (44.321)
lnTarPPE	0.032 (0.221)	0.008 (0.229)	0.009 (0.210)	0.004 (0.192)
TarLoss_lag	-0.596 (0.633)	-0.587 (0.628)	-0.557 (0.699)	-0.581 (0.635)
lnTarGDP	-12.854 (16.636)	-12.643 (15.859)	-13.257 (14.589)	-12.118 (16.212)
lnTarGDP_percapita	10.424 (16.771)	10.544 (15.956)	11.137 (14.788)	10.174 (16.503)
TarGDP_growth	0.104 (0.076)	0.093 (0.089)	0.081 (0.089)	0.095 (0.083)
TarCorruption	-0.342 (1.675)	-0.163 (1.890)	-0.218 (1.714)	-0.047 (1.687)
TarInflation	-0.006 (0.111)	-0.007 (0.113)	0.010 (0.120)	-0.001 (0.103)
Constant	260.106 (292.016)	253.371 (276.978)	264.349 (256.072)	242.334 (281.621)
Observations	314	314	314	314
Deals	50	50	50	50
R-squared	0.0840	0.0742	0.0805	0.0729
Year fixed effects	YES	YES	YES	YES
Target firm fixed effects	YES	YES	YES	YES

Notes: Regressions with target financial revenues (natural logarithm) as dependent variable; see expression (2.1). postMAyear_p[x] is a dummy variable that is 1 for all years following the year x after the acquisition. For all other variable descriptions and data sources, see Section 2.3 and Table 2.2. All regressions include target firm and year fixed effects and are estimated using OLS panel regressions. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively. Standard errors are provided in parentheses and are clustered on the target country level.

Table A 8: Effect of acquisitions on target EBT per PPE (Non-CFC rule MNEs; variation of acquisition date (as if it had happened in an earlier year))

Change acquisition date to	(1) 5 years before acquisition	(2) 4 years before acquisition	(3) 3 years before acquisition	(4) 2 years before acquisition
postMAyear_m5	-9.524 (26.310)			
postMAyear_m4		-10.582 (13.089)		
postMAyear_m3			-9.085 (10.933)	
postMAyear_m2				-5.876 (7.351)
TarSTR	47.250 (86.587)	56.735 (64.847)	74.503 (74.668)	79.643 (68.243)
postMAyear_m5#TarSTR	39.065 (83.571)			
postMAyear_m4#TarSTR		35.919 (42.702)		
postMAyear_m3#TarSTR			21.592 (30.125)	
postMAyear_m2#TarSTR				7.287 (22.618)
lnTarAssets_noPPE	1.945* (1.049)	1.876* (0.989)	1.848 (1.127)	1.762* (1.045)
lnTarEmployees	-2.832 (2.095)	-2.419 (2.269)	-2.408 (2.220)	-2.731 (2.372)
lnTarSales	3.206** (1.368)	3.034** (1.508)	3.160 (2.533)	3.179* (1.798)
TarLoss_lag	-0.087 (2.604)	-0.392 (3.111)	0.254 (3.618)	-0.354 (3.127)
lnTarGDP	-30.703 (74.879)	-26.786 (71.591)	-21.373 (65.016)	-16.810 (65.919)
lnTarGDP_percapita	38.876 (73.662)	35.709 (69.139)	30.036 (61.826)	24.931 (63.116)
TarGDP_growth	0.392 (0.279)	0.306 (0.267)	0.267 (0.275)	0.453* (0.256)
TarCorruption	-24.272 (21.554)	-23.422 (20.571)	-22.851 (20.865)	-22.825 (20.073)
Constant	390.096 (1,339.174)	314.527 (1,293.899)	217.480 (1,190.997)	145.134 (1,206.433)
Observations	225	225	225	225
Deals	43	43	43	43
R-squared	0.253	0.250	0.252	0.256
Year Fixed Effects	YES	YES	YES	YES
Target firm fixed effects	YES	YES	YES	YES

Notes: Regressions with target EBT per PPE as dependent variable; see expression (2.1). postMAyear_p[x] is a dummy variable that is 1 for all years following the year x after the acquisition. For all other variable descriptions and data sources, see Section 2.3 and Table 2.2. All regressions include target firm and year fixed effects and are estimated using OLS panel regressions. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively. Standard errors are provided in parentheses and are clustered on the target country level.

Table A 9: Effect of acquisitions on target EBT per PPE (Non-CFC rule MNEs; variation of acquisition date (as if it had happened in a later year))

Change acquisition date to	(1) 1 year after acquisition	(2) 2 years after acquisition	(3) 3 years after acquisition	(4) 4 years after acquisition
postMAyear_p1	-1.864 (11.105)			
postMAyear_p2		5.115 (83.421)		
postMAyear_p3			5.927 (76.526)	
postMAyear_p4				45.680*** (10.481)
TarSTR	77.192 (59.622)	80.658 (65.523)	81.287 (62.484)	86.690 (53.901)
postMAyear_p1#TarSTR	14.858 (33.904)			
postMAyear_p2#TarSTR		-21.383 (268.299)		
postMAyear_p3#TarSTR			-25.297 (251.653)	
postMAyear_p4#TarSTR				-183.273*** (42.776)
lnTarAssets_noPPE	1.940 (1.218)	1.895* (1.089)	1.958** (0.996)	2.060*** (0.611)
lnTarEmployees	-2.559 (2.143)	-2.552 (2.272)	-2.556 (2.127)	-2.455 (1.513)
lnTarSales	3.084** (1.461)	3.079* (1.741)	2.984** (1.302)	2.958*** (0.584)
TarLoss_lag	0.113 (2.533)	0.005 (3.280)	0.104 (2.437)	0.353 (1.171)
lnTarGDP	-18.673 (50.709)	-16.571 (76.293)	-16.996 (69.379)	-14.932 (50.520)
lnTarGDP_percapita	26.256 (48.265)	22.909 (73.539)	23.252 (66.820)	21.149 (45.349)
TarGDP_growth	0.373 (0.256)	0.391 (0.249)	0.391* (0.221)	0.384 (0.237)
TarCorruption	-22.473 (20.238)	-22.677 (20.692)	-22.801 (19.980)	-24.174 (16.085)
Constant	175.596 (942.812)	154.411 (1,367.920)	163.342 (1,262.178)	128.949 (961.954)
Observations	225	225	225	225
Deals	43	43	43	43
R-squared	0.249	0.245	0.244	0.261
Year Fixed Effects	YES	YES	YES	YES
Target firm fixed effects	YES	YES	YES	YES

Notes: Regressions with target EBT per PPE as dependent variable; see expression (2.1). postMAyear_p[x] is a dummy variable that is 1 for all years following the year x after the acquisition. For all other variable descriptions and data sources, see Section 2.3 and Table 2.2. All regressions include target firm and year fixed effects and are estimated using OLS panel regressions. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively. Standard errors are provided in parentheses and are clustered on the target country level.

Table A 10: Effect of acquisitions on target PPE (tax rate differential to GUO instead of tax rate)

Sample	(1) All MNEs	(2) non-CFC rule MNEs	(3) CFC rule MNEs	(4) CFC rule MNEs (only passive in- come included)
postMAyear	-0.119 (0.106)	-0.092 (0.120)	-0.169 (0.146)	0.248 (0.234)
STR_Diff	-0.348 (1.296)	-2.684 (2.605)	1.906 (2.654)	3.938 (2.517)
postMAyear#STR_Diff	-0.100 (0.570)	0.095 (0.721)	-1.041 (2.203)	-2.918 (3.761)
lnTarAssets_noPPE	0.494*** (0.085)	0.417*** (0.120)	0.557*** (0.102)	0.411** (0.171)
TarLoss_lag	-0.068 (0.088)	0.060 (0.121)	-0.132 (0.118)	-0.020 (0.143)
lnTarGDP	7.099*** (2.532)	6.641 (5.630)	8.539** (4.025)	3.428 (6.257)
lnTarGDP_percapita	-6.008** (2.405)	-5.320 (5.344)	-7.578** (3.784)	-3.160 (5.813)
TarGDP_growth	-0.024* (0.013)	-0.018 (0.025)	-0.033* (0.019)	-0.003 (0.043)
TarCorruption	0.128 (0.291)	-0.243 (0.543)	0.500 (0.494)	0.671 (0.629)
Constant	-129.189*** (43.947)	-123.286 (100.334)	-153.172** (71.255)	-57.544 (113.863)
Observations	1,505	622	883	331
Deals	213	91	122	66
R-squared	0.213	0.191	0.243	0.217
Year fixed effects	YES	YES	YES	YES
Target firm fixed effects	YES	YES	YES	YES

Notes: Regressions with target PPE (natural logarithm) as dependent variable. STR_Diff is the tax rate differential to the GUO. For all other variable descriptions and data sources, see Section 2.3 and Table 2.2. All regressions include target firm and year fixed effects and are estimated using OLS panel regressions. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively. Standard errors are provided in parentheses and are clustered on the target country level.

Table A 11: Effect of acquisitions on target financial revenues (tax rate differential to GUO instead of tax rate)

Sample	(1) All MNEs	(2) non-CFC rule MNEs	(3) CFC rule MNEs
postMAyear	-0.460* (0.263)	-0.472 (0.577)	-0.571* (0.300)
STR_Diff	-0.982 (3.631)	3.717 (7.705)	-2.898 (4.632)
postMAyear#STR_Diff	-3.564* (2.104)	-3.777 (3.318)	-1.863 (3.902)
lnTarPPE	0.238** (0.097)	-0.033 (0.198)	0.369*** (0.130)
TarLoss_lag	-0.219 (0.255)	-0.533 (0.615)	0.012 (0.226)
lnTarGDP	-7.193 (7.322)	-11.321 (15.218)	-7.121 (9.251)
lnTarGDP_percapita	6.140 (7.137)	9.519 (15.049)	6.611 (9.576)
TarGDP_growth	0.028 (0.041)	0.097 (0.082)	-0.040 (0.071)
TarCorruption	0.648 (1.366)	0.066 (1.958)	1.263 (1.443)
TarInflation	0.036 (0.072)	0.001 (0.122)	0.041 (0.078)
Constant	142.726 (132.986)	229.615 (269.360)	132.182 (160.722)
Observations	731	314	417
Deals	114	50	64
R-squared	0.072	0.078	0.112
Year fixed effects	YES	YES	YES
Target firm fixed effects	YES	YES	YES

Notes: Regressions with target financial revenues (natural logarithm) as dependent variable. STR_Diff is the tax rate differential to the GUO. For all other variable descriptions and data sources, see Section 2.3 and Table 2.2. All regressions include target firm and year fixed effects and are estimated using OLS panel regressions. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively. Standard errors are provided in parentheses and are clustered on the target country level.

Table A 12: Effect of acquisitions on target EBT per PPE (tax rate differential to GUO instead of tax rate)

Sample	(1) All MNEs	(2) non-CFC rule MNEs	(3) CFC rule MNEs
postMAyear	0.789 (1.915)	2.139 (2.012)	-0.452 (4.385)
STR_Diff	13.304 (33.544)	78.686 (63.100)	-43.558 (87.562)
postMAyear#STR_Diff	-1.795 (9.922)	12.284 (13.925)	-62.685 (43.148)
lnTarAssets_noPPE	1.440 (1.427)	2.021* (1.093)	1.158 (1.759)
lnTarEmployees	-1.868 (2.283)	-1.941 (2.188)	-3.040 (5.220)
lnTarSales	1.789 (1.389)	3.080 (1.935)	1.099 (2.908)
TarLoss_lag	-1.155 (1.313)	-0.625 (3.472)	-1.046 (2.493)
lnTarGDP	34.595 (31.616)	-0.111 (75.954)	66.962 (57.150)
lnTarGDP_percapita	-23.826 (24.829)	3.909 (71.734)	-57.423 (48.471)
TarGDP_growth	0.353 (0.240)	0.408 (0.270)	0.450 (0.530)
TarCorruption	-12.189 (9.089)	-21.807 (19.347)	-2.453 (8.538)
Constant	-738.928 (621.444)	-89.041 (1,370.538)	-1,257.655 (1,084.591)
Observations	515	225	290
Deals	93	43	50
R-squared	0.083	0.272	0.125
Year fixed effects	YES	YES	YES
Target firm fixed effects	YES	YES	YES

Notes: Regressions with target EBT per PPE as dependent variable. STR_Diff is the tax rate differential to the GUO. For all other variable descriptions and data sources, see Section 2.3 and Table 2.2. All regressions include target firm and year fixed effects and are estimated using OLS panel regressions. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively. Standard errors are provided in parentheses and are clustered on the target country level.

Table A 13: Effect of acquisitions on target PPE (excluding non-PPE assets from the control variables)

Sample	(1) All MNEs	(2) non-CFC rule MNEs	(3) CFC rule MNEs	(4) CFC rule MNEs (only passive in- come included)
postMAyear	-0.061 (0.416)	-1.045* (0.629)	0.819 (0.756)	1.025 (1.163)
TarSTR	-0.756 (1.634)	-2.976 (3.077)	2.516 (2.887)	0.800 (4.264)
postMAyear#TarSTR	-0.102 (1.456)	3.311 (2.217)	-3.289 (2.709)	-2.641 (4.061)
TarLoss_lag	-0.168** (0.074)	-0.051 (0.156)	-0.209* (0.124)	-0.160 (0.188)
lnTarGDP	8.600*** (2.926)	8.714 (6.258)	10.895*** (4.179)	7.327 (6.769)
lnTarGDP_percapita	-7.053*** (2.723)	-6.876 (6.077)	-9.476** (3.960)	-5.996 (6.501)
TarGDP_growth	-0.019 (0.013)	-0.017 (0.025)	-0.020 (0.025)	0.003 (0.045)
TarCorruption	-0.242 (0.301)	-0.523 (0.522)	0.013 (0.431)	0.026 (0.664)
Constant	-151.391*** (51.964)	-156.945 (110.008)	-189.816*** (73.422)	-129.867 (120.420)
Observations	1,505	622	883	331
Deals	213	91	122	66
R-squared	0.094	0.104	0.107	0.137
Year fixed effects	YES	YES	YES	YES
Target firm fixed effects	YES	YES	YES	YES

Notes: Regressions with target PPE (natural logarithm) as dependent variable; see expression (2.1). For variable descriptions and data sources, see Section 2.3 and Table 2.2. All regressions include target firm and year fixed effects and are estimated using OLS panel regressions. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively. Standard errors are provided in parentheses and are clustered on the target country level.

Table A 14: Effect of acquisitions on target financial revenues (excluding PPE from the control variables)

Sample	(1) All MNEs	(2) non-CFC rule MNEs	(3) CFC rule MNEs
postMAyear	1.646 (1.232)	2.126 (1.760)	1.360 (1.505)
TarSTR	2.811 (6.080)	6.365 (11.410)	4.977 (6.402)
postMAyear#TarSTR	-7.802* (4.513)	-8.952 (6.647)	-7.437 (5.479)
TarLoss_lag	-0.286 (0.265)	-0.521 (0.564)	-0.141 (0.252)
lnTarGDP	-3.228 (8.702)	-8.130 (17.595)	-0.168 (9.838)
lnTarGDP_percapita	2.222 (8.560)	6.259 (17.719)	-0.214 (9.871)
TarGDP_growth	0.037 (0.044)	0.063 (0.080)	-0.004 (0.069)
TarCorruption	0.229 (1.191)	-0.098 (1.848)	0.734 (1.315)
TarInflation	0.042 (0.068)	0.022 (0.099)	0.033 (0.076)
Constant	76.842 (156.055)	172.011 (308.644)	16.307 (172.912)
Observations	758	323	435
Deals	117	51	66
R-squared	0.071	0.090	0.090
Year fixed effects	YES	YES	YES
Target firm fixed effects	YES	YES	YES

Notes: Regressions with target financial revenues (natural logarithm) as dependent variable; see expression (2.1). For variable descriptions and data sources, see Section 2.3 and Table 2.2. All regressions include target firm and year fixed effects and are estimated using OLS panel regressions. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively. Standard errors are provided in parentheses and are clustered on the target country level.

Table A 15: Effect of acquisitions on target EBT per PPE (excluding non-PPE assets, employees and sales from the control variables)

Sample	(1) All MNEs	(2) non-CFC rule MNEs	(3) CFC rule MNEs
postMAyear	12.203 (8.868)	9.652 (12.813)	11.867 (11.671)
TarSTR	28.378 (40.174)	94.351 (105.867)	-0.247 (69.079)
postMAyear#TarSTR	-55.544* (31.867)	-55.349 (49.602)	-51.014 (42.719)
TarLoss_lag	-3.270** (1.477)	-5.056* (2.871)	-2.445 (1.584)
lnTarGDP	51.280 (61.836)	6.238 (80.795)	76.086 (91.758)
lnTarGDP_percapita	-52.292 (55.333)	-12.114 (73.758)	-72.672 (80.297)
TarGDP_growth	0.218 (0.376)	1.143 (0.762)	-0.273 (0.506)
TarCorruption	-14.386* (8.575)	-19.134 (19.010)	-13.815 (8.519)
Constant	-842.740 (1,145.174)	-33.242 (1,503.880)	-1,293.051 (1,703.292)
Observations	1,072	428	644
Deals	161	66	95
R-squared	0.047	0.062	0.071
Year fixed effects	YES	YES	YES
Target firm fixed effects	YES	YES	YES

Notes: Regressions with target EBT per PPE as dependent variable; see expression (2.1). For variable descriptions and data sources, see Section 2.3 and Table 2.2. All regressions include target firm and year fixed effects and are estimated using OLS panel regressions. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively. Standard errors are provided in parentheses and are clustered on the target country level.

Appendix to Section 4

Methods to Avoid Double Taxation and Repatriation Taxes

If the exemption method is applied, repatriated intercompany dividends are tax exempt at the level of the firm receiving the dividends. Yet, in a few countries like France, Germany or Belgium a share α is still subject to tax, whereas in most countries applying the exemption method, $\alpha = 0$. Then, the tax m imposed on one currency unit of intercompany dividends amounts to:

$$m = \alpha \tau^R + \omega^S \quad (\text{A } 1)$$

where τ^R is the corporate tax rate of the home country and ω^S is the withholding tax rate imposed on intercompany dividends by the source country.

In the case of a system applying the credit method, intercompany dividends are subject to tax but taxes paid abroad reduce the tax liability. If a direct credit is applied, the foreign tax credit includes the withholding taxes imposed on intercompany dividends. Then, the additional tax imposed on one currency unit of intercompany dividends amounts to:

$$m = \tau^R - \min\{\tau^R; \omega^S\} + \omega^S \quad (\text{A } 2)$$

An indirect credit also includes foreign corporate taxes τ^S paid by the subsidiary. The additional tax imposed on intercompany dividends is computed in accordance with the following expression:

$$m = \frac{\tau^R}{(1 - \tau^S)} - \min\left\{\frac{\tau^R}{(1 - \tau^S)}; \frac{\tau^S}{(1 - \tau^S)} + \omega^S\right\} + \omega^S \quad (\text{A } 3)$$

Expressions (A 2) and (A 3) show that the repatriation tax is determined by the tax rate of the home country. It can be deducted from the formulas that there is a conceivable situation where a decrease in the withholding tax ω^S is just subsidized by a proportional increase in τ^R . This is the case if the tax rate of the home country exceeds the tax credit. Then, a reduction of the withholding tax, e.g., caused by a new tax treaty, has no material effect.

Table A 16: Selected tax treaty changes between 1996 and 2008

Parent	Subsidiary	1 st Tax Treaty	Treaty Revision	WHT before	WHT after	Parent	Subsidiary	1 st Tax Treaty	Treaty Revision	WHT before	WHT after
Australia	Austria		2002	.15	.15	Belgium	United States	2000		0	0
Australia	Canada	1998		.2	.1	Brazil	Belgium		1997	.05	.05
Australia	Czech Republic	2001		.1	.1	Brazil	Chile		2004	0	0
Australia	Finland		2002	0	0	Brazil	Finland		2007	.1	.05
Australia	Malaysia		2006	0	0	Brazil	Germany		2006	.15	.211
Australia	Mexico	2008		0	0	Brazil	Mexico	1998		.25	.05
Australia	Norway		1997	.25	.05	Brazil	Norway	2004		.35	.05
Australia	Romania		2007	.15	0	Brazil	Portugal	2002		.25	.1
Australia	Russia	1998		0	0	Bulgaria	Canada	2002		.1	.1
Australia	Slovak Republic	2001		.05	0	Bulgaria	Croatia	1999		.15	.05
Australia	Taiwan	2001		.15	.1	Bulgaria	Cyprus	2000		.25	.1
Australia	United Kingdom		1998	0	0	Bulgaria	Czech Republic		2000	.15	.1
Australia	United States		1997	.05	.05	Bulgaria	Greece	2006		0	0
Austria	Australia		2002	.15	.15	Bulgaria	Ireland		2002	0	0
Austria	Canada		2003	.15	.15	Bulgaria	Latvia	2007		0	0
Austria	Croatia	2002		.25	0	Bulgaria	Lithuania	2000		.2	.05
Austria	Czech Republic		2008	0	0	Bulgaria	Portugal	2001		0	0
Austria	Estonia		2004	.25	0	Bulgaria	Singapore		2003	.05	.05
Austria	Finland		1998	0	0	Bulgaria	Slovak Republic	2002		.2	.1
Austria	Germany		1997	.15	.1	Bulgaria	Slovenia		2008	0	0
Austria	India		2001	.25	.1	Bulgaria	Thailand		2008	.15	.1
Austria	Korea		1996	.07	.05	Bulgaria	Turkey	2001		.2	.1
Austria	Latvia	1996		.2	.05	Canada	Australia		2003	.15	.05
Austria	Lithuania	2006		0	0	Canada	Belgium		2008	0	0
Austria	Mexico	2004		.3	0	Canada	Bulgaria		2000	.15	.1
Austria	Netherlands		2003	0	0	Canada	Chile	2003		0	0
Austria	New Zealand		1997	.15	.15	Canada	Croatia	2000		.25	.05
Austria	Norway		2003	.15	.05	Canada	Czech Republic		2003	.1	.05
Austria	Poland	2004		.35	.05	Canada	Denmark	2005		.35	.05
Austria	Romania		1999	.1	.05	Canada	Finland		1999	0	0
Austria	Russia	2000		0	0	Canada	France	2001		0	0
Austria	Singapore	2001		0	0	Canada	Germany	1998		.1	.05
Austria	Slovenia	2007		0	0	Canada	Hungary	2005		0	0
Austria	Sweden		1998	0	0	Canada	Iceland	2002		.25	.05
Austria	Switzerland		2006	0	0	Canada	India		1999	.15	.1
Austria	United Arab Emirates	1996		.25	0	Canada	Indonesia		1997	.1	.1
Austria	United States		2000	0	0	Canada	Ireland	1996		0	0
Belgium	Brazil		2008	.15	.1	Canada	Japan		2007	0	0
Belgium	Canada		2005	.15	.05	Canada	Korea		2003	.15	.05
Belgium	China	2005		0	0	Canada	Latvia	2001		0	0
Belgium	Croatia	2005		.1	.05	Canada	Lithuania	1999		0	0
Belgium	Cyprus	2001		.17	.1	Canada	Luxembourg	2005		0	0
Belgium	Czech Republic		2001	.15	.05	Canada	Mexico	2007		0	0
Belgium	Denmark		1999	.15	.05	Canada	Netherlands	2002		.15	0
Belgium	Estonia		1996	.25	.05	Canada	Norway		2006	.05	0
Belgium	Germany		2003	.1	.05	Canada	Peru		2006	0	0
Belgium	Greece	1999		.25	.05	Canada	Portugal		1998	.25	.1
Belgium	Hong Kong		2005	0	0	Canada	Romania	1997		0	0
Belgium	Iceland	2000		0	0	Canada	Russia		1998	.25	.15
Belgium	Indonesia	1997		0	0	Canada	Slovak Republic	2000		0	0
Belgium	Latvia	1999		0	0	Canada	Slovenia	2007		0	0
Belgium	Lithuania	2005		0	0	Canada	Spain	2003		0	0
Belgium	Luxembourg	2007		0	0	Canada	Sweden		2006	0	0
Belgium	Mexico	2006		.25	.05	Canada	Switzerland		1998	0	0
Belgium	Netherlands		1998	.05	.05	Canada	United Arab Emirates	2008		0	0
Belgium	Poland	1997		0	0	Canada	United Kingdom		1998	0	0
Belgium	Portugal	1997		.15	.1						
Belgium	Romania	2005		.15	0.5						
Belgium	Russia		1997	.25	.1						
Belgium	Singapore	2008		0	0						
Belgium	Slovak Republic	2004		.15	.05						
Belgium	Slovenia	2005		0	0						
Belgium	Spain		1997	0	0						
Belgium	Taiwan	1998		.3	.15						

etc.

[illegible][illegible]

The figures shown in Table A 17 are those of the dividend flowing from a company located in the country of the owner company located in the country of the line. For example, a dividend paid from a company in the Cayman Islands to its owner company in the United States is taxed at 0%, whereas a dividend flowing from the United States to the Cayman Islands is subject to 30% withholding tax in the United States.

Table A 18: Methods of dealing with incoming dividends in 2008

[illegible]

The abbreviations used in Table A 18 are the following: EX=exemption, 95 = exemption by 95%, IC = indirect credit, DC = direct credit, DE = deduction, DO = double taxation. The methods refer to a dividend flowing from a company located in the country of the column to its owner company located in the country of the row. For example, France exempts a dividend from a Japanese company by 95% whereas Japan uses the indirect credit method for dividends flowing in from French companies.

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