Charles University

Faculty of Social Sciences
Institute of Economic Studies

MASTER'S THESIS

International taxation and cross-border mergers and acquisition

Author: **Bc. Josef Pokorný**

Supervisor: **doc. Petr Janský, Ph.D.**

Academic Year: **2018/2019**

Declaration of Authorship

The author hereby declares that he compiled this thesis independently, using only the listed resources and literature, and the thesis has not been used to obtain a different or the same degree.

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Prague, July 31, 2019

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Acknowledgments

Abstract

This thesis studies the effects of differences in the international tax system on the location of target companies and potential tax savings leading from international transactions. Using a large sample of M&A transaction data, we develop a target location choice model and estimate it by a multinomial logistic regression. The results show that differences in taxation of target and acquirer country provide opportunities for tax optimization practices that increase the probability of choosing a target location with higher tax difference. We further evaluate these effect using regression on takeover premium which shows that 1 percentage point increase in difference of effective average tax rate may cause up to 0.5 percentage point increase in takeover premium. The found effects are heterogenous for individual companies and correspond to characteristics of tax-inversions and profit shifting practices.

JEL Classification	F23, G34, H25, C25
Keywords	mergers and acqusitions, international taxation, foreign direct investments, profit shifting
Author's e-mail	pokorny.jo@gmail.com
Supervisor's e-mail	petr.jansky@fsv.cuni.cz

Abstrakt

Tato práce zkoumá rozdíly v mezinárodním daňovém systému a jejich efeky na výběr cílové lokace kupované společnosti a na možné daňové úspory plynoucí z mezinárodních transakcí. Za použití velkého vzorku dat o fúzích a akvizicích byl odhadnut mnohorozměrný logistický regresní model zkoumající volbu cílové země. Výsledky ukazují, že rozdíly ve výši zdanění v zemích kupující a kupované společnosti poskytují příležitosti k agresivní daňové optimalizaci, čímž zvyšují pravděpodobnost výběru cílové země s větším rozdílem zdanění. Tento efekt je dále vyhodnocován pomocí regrese vysvětlující transakční prémii, která ukazuje, že nárůst rozdílu ve zdanění o 1 procentní bod může způsobit zvýšení transakční prémie až o 0.5 procentního bodu. Nalezené efekty nejsou stejné pro všechny společnosti, přičemž odpovídají charakteristikám přesouvání zdanitelných příjmů a změnám daňové residence.

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Acronyms

AIC   Akaike information criterion

ATF   Americans for Tax Fairness

BvD   Bureau van Dijk

CEPII Centre d'Etudes Prospectives et d'Informations Internationale

EATR Effective average tax rate

EMTR Effective marginal tax rate

EV   Enterprise value

EBITDA Earnings before interest, taxes, depreciation and amortization

FDI   Foreign direct investment

GDP   Gross domestic product

IPO   Initial public offering

M&A Mergers and acquisitions

MNE Multinational enterprise

OFDI Outward Foreign Direct Investment

OECD Organisation for Economic Co-operation and Development

OLS   Ordinary Least Squares

PEG ratio Price/Earnings-to-Growth

Master's Thesis Proposal

Author	Bc. Josef Pokorný
Supervisor	doc. Petr Janský, Ph.D.
Proposed topic	International taxation and cross-border mergers and acquisition

Motivation In November 2015, US pharmaceutical giant Pfizer announced a merger with Ireland pharma company Allergan. The main and maybe also the only reason for this merger was a tax inversion of Pfizer from US tax regime to the Ireland regime. Tax savings from repatriating retained offshore income were estimated up to 35 billion of USD (ATF 2015), if the deal would proceed. Additional tax benefits would certainly come from operating under new Ireland tax regime. Such huge tax benefits can also justify relatively high takeover premium that was 60% of unaffected Allergan value. This takeover finally collapse on the new US regulation that puts certain obstacle for Pfizer to do so. Nevertheless, this was not the first attempt of Pfizer to do tax inversion (attempt with Astra Zeneca in past) and arguably neither the last one.

This motivates me to use data of cross-border M&As activity to study the effect of different tax regimes on market for corporate control. There are several studies suggesting that tax issues really matter in decisions about M&As. The common intuition is that companies shift their residence using M&As to the locations that provides some tax benefits compared to origin location. Scholes and Wolfson (1989) studied the effect of tax reforms in USA during 1980's on market for corporate control and they found significant shift in demand for M&A. More recently, Huizinga and Voget (2009) studied how the double taxation regimes across European countries, USA and Japan determine the parent-subsidiary relation in multinational companies. Using M&A data they found that international double tax liability would increase by 1.5 p.p. of worldwide income if the parent-subsidiary structure would be inverted. Moreover, they found tax reasons to be significant driver in decision about parent location. Other studies showed that increase in local tax rate reduces the FDI (Hines and Rice 1994, Newlon 2001), nevertheless the M&A data as subset of FDI provides

much more detailed information that can be studied to greater detail. Therefore, not only the magnitude and direction of M&As (as a substantial part of FDI) can be studied, but also the questions such as, whether, how much and under which condition are tax inversions profitable for companies, can be answered. The answers for latter questions can be substantial insight to issues of tax havens that become more and more discussed in past years.

Hypotheses

Hypothesis #1: Difference in target's and acquirer's local corporate tax rates (double tax rates) positively affects the probability of being overtaken (direction).

Hypothesis #2: Difference in target's and acquirer's local corporate tax rates (double tax rates) positively affects the number of takeovers or total value of takeovers (volume).

Hypothesis #3: Difference in target's and acquirer's local corporate tax rates (double tax rates) positively affects the takeover premium and post-takeover performance of acquirer (profitability).

Methodology Detailed M&A data can be accessed from Thomson Reuters SDC database. Only the cross-border deals are in the merit of interest, nevertheless the non-cross-border takeovers can serve as control group for verifying the results. As the taxation is changing, the time span of cross-border deals should be limited (i.e. since 1990's). Also the sample of countries has to be preselected depending on two constraints: a) availability of detailed data about tax regime, b) having sufficient number of takeovers within the sample for each country enabling to control for country-pairs fixed effect.

The corporate tax rates for each country can be set either in statutory way or as an average effective rates calculated in previous researches. Moreover, we can compute also directly from annual reports the effective tax rates of given company (target as well as acquirer), which is also the benefit of having micro data and not the aggregates of FDI. The starting point for detailed data about double taxation can be the paper of Huizinga and Voget (2009) that provides methodology of calculation and also the data for 28 European countries, USA and Japan, which are valid as of 2004. (This set could be actualized and extended by countries, which are traditionally seen as tax havens.) Also Feld et al. (2013) summarized data about double taxation for quite different sample of countries.

Hypothesis #1 (direction of flow) can be tested using binary choice model (logit or probit) developed in line with previous application of Huizinga and Voget (2009).

This model is based on assumption that newly merged company will choose country, which provides more benefits, to be the residential (parental).

Testing of hypothesis #2 (volume) can be based on gravity models, which are very common in international trade research and it was used also by Di Giovanni (2005) or by Huizinga and Voget (2009) on field of cross-country M&A.

Finally, the question, how much the companies benefits from tax inversion (Hypothesis #3: profitability), can be answered by the final takeover premium or by ex post performance of newly merged company. Both approaches have their limits. Unaffected takeover premium can be seen as total gross benefit of takeover under assumption that all the benefits from takeover are captured by target's shareholders and acquirer does not benefit nor lose in the takeover at all. Even though this assumption seems very strong and even unrealistic, some theories (e.g. free-rider model of Grossman and Hart 1980) suggest this outcome and also some empirically studies conclude that while the acquirer ends up on average with zero (meaning that they pay for target as much as it worth to), the only beneficiary is the target. The alternative approach of modelling profitability of takeover can be conducted using post-takeover performance. The drawbacks of this approach are a) what is the appropriate measure of performance (commonly used are post-takeover market value or net income in following period), and mainly b) how the counterfactual is modelled (in other words, it is necessary to predict, what would have happened if the takeover had not occurred. In case of evaluation of post-takeover market value the common approach is modelling the counterfactual using abnormal return analysis based on CAPM model. The counterfactual for net income often is the last net income adjusted by average growth rate. Detailed overview of corporate takeover literature and especially of determinants of takeover premium and evaluation of post-takeover premium is provided by Betton et al. (2008).

Therefore, I would expect that higher potential tax savings lead also to higher takeover premium and better post-takeover performance. Rossi and Volpin (2004) built and estimated a model explaining the takeover premium in cross-country takeovers, but they did not control for tax differences between the countries. Nevertheless, according to the best of my knowledge, there is no study evaluating the post-takeover performance of cross-border M&As. Finally, there is large space for potential extensions that can be part of this thesis and built up on same models. For example, the issue of base erosion and profit shifting can be considered because connecting the stand-alone company to the multinational firm can lead to potential tax benefits from profit shifting (see Dharmapala 2014 for overview). Next, the issue of "Tax treaty shopping?" (Weyzig 2012) can be considered, because the reduction in double taxation is not only issue of tax treaties and avoidance of withholding taxes can be next motivation for cross-border M&As. Moreover, the recently developed Financial

Secrecy Index (Cobham et al. 2015) calls for application in various financial cross-country researches and it could be hypothesize that higher scored countries (providing more secrecy) attract and provide consequent benefits to overtaken companies from lower scored countries.

Expected Contribution This way of studying market for corporate control is not so common, hence just the verification of previous findings (Huizinga and Voget 2009, De Giovanni 2005) is meaningful contribution to the existing research. Moreover, according to my knowledge there is only limited research of how the tax inversion affects post-takeover performance (Desai and Hines 2002). My thesis will contribute to this topic substantially and provides uniquely complete picture of direction, volume and profitability of cross-border M&As in context of taxation. Also I believe that better understanding of how much the companies benefit from tax inversions in terms of market value can help to set reasonable regulation in international tax competition. Finally, there is a debate about how the tax havens can be recognized and the cross-border M&A data can definitely help to resolve this debate and indicate countries that are abnormally attractive for tax inversion deals.

Outline

1. Introduction and motivation: I will motivate research question by brief explanation of concrete case, explain what is the advantage of M&A data over the aggregate view of FDI and define some terminology used in M&A field, because the thesis should overlap to different fields.

2. Literature review and development of hypotheses: I will mainly summarize the literature needed for development of hypotheses and summarize the previous results.

3. Data: I will describe the data from SDC database, explain the data the calculation of double tax rates (Huizinga and Voget 2009), define other variables and provide summary statistics.

4. Empirical analysis: The methodology and results for each hypothesis will be presented separately one by one, because each of them requires quite different model.

5. Extension: Financial Secrecy Index: The models can be re-estimated using Financial Secrecy Index (alternatively, this part is included in chapter 4.)

6. Discussion and conclusion: I will summarize the results, compare them with previous research, show their potential usage in practise and suggest topics for further research according to limitations in my own analysis.

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Author   Supervisor

Chapter 1

Introduction

In November 2015, US pharmaceutical giant Pfizer announced a merger with Irish pharma company Allergan. The main and maybe also the only reason for this merger was a tax inversion of Pfizer from US tax regime to the Ireland regime. Tax savings from repatriating retained offshore income were estimated up to $35 billion if the deal would proceed (Rice & Clemente 2015). Additional tax benefits would certainly come from operating under new Irish tax regime. Such enormous tax benefits can also justify a relatively high takeover premium that was negotiated to 60% of unaffected Allergan value. This takeover finally collapsed on a newly introduced US regulation that put certain obstacles for Pfizer to do so. Nevertheless, this was not the first attempt of Pfizer to do tax inversion (attempt with Astra Zeneca in past) and likely neither the last one, even though the US administration decreased the corporate income tax rate substantially in 2018. In fact, there are some very recent rumours about a possible merger between Pfizer and Dutch pharmaceutical company Mylan (Kuchler & Fontanella-Khan 2019), which could also be tax-motivated as the Netherlands is known for not being very strict in applying their taxes on corporate profit and dividends (Weyzig 2013).

The above-mentioned transaction would have created the world's largest pharmaceutical company, had it gone through, and the public could follow its development in nearly a live stream. It, therefore, illustrates, how important position do multinational companies have in the present globalized world. Through their subsidiaries in one or more foreign countries they can create new jobs or generate positive technology spillovers and thus affect the host country welfare. Countries are aware of multinational companies' importance and aim to attract foreign investment of these companies or in other cases, keep them

from shifting their presence to some other country.

Therefore, it is important to study how multinational companies make their decisions about foreign investments and what affects these decisions. There is certainly a broad range of aspects that companies consider when investing abroad and one of them are taxes, because they may mean additional costs as well as potential space for group-wise tax optimization in the complex and complicated international taxation framework. Previous empirical research supports this intuition, moreover, it shows that there are several steps in deciding about foreign investments and each of them may be affected by taxes.[1]

More recent research, however, turns its attention to only a part of foreign direct investments, which is cross-border mergers and acquisitions (M&A) that constitute as much as 80% of FDI (Herger *et al.* 2016). The main reason to study M&A is that there are now extensive databases covering millions of transactions across the globe, part of which are cross-border. These datasets then contain various details about the transaction specifics and also about all of the involved parties - the acquirer, target and vendor companies. These granular and detailed data are thus very convenient to study all sorts of M&A aspects and determinants, most typically the transaction premium determinants and overall value creation and re-allocation. Nevertheless, they can be also particularly useful for examining the effect of taxes on these foreign investments, furthermore, the details allow for identifying specific tax avoidance practices such as profit shifting or inversions and evaluating their effects.

In this thesis, we focus on taxation in countries involved in M&A deals and hypothesize that differences in taxation in target's and acquirer's countries can create possible tax savings that might be seen as additional transaction synergies. Therefore, we estimate the influence of taxation on the location choice of target company expressed by probability of being overtaken and also on the profitability expressed by takeover premium.

Building on Arulampalam *et al.* (2018), we employ a multinomial logit model and indeed show that the difference between involved parties' tax rates positively affects the probability of being overtaken. Building on Huizinga *et al.* (2012), in the second regression model estimated by fixed effect model, we document profit shifting motivation in cross-border M&A by estimating a positive influence of difference in taxation on the takeover premium.

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[1]See for example Hines & Rice (1994), Devereux & Griffith (1998), Harris *et al.* (1993) or Desai *et al.* (2004).

However, the main contribution of this thesis is that it takes advantage of the big data on M&A obtained from the Zephyr database combined with another extensive database, Amadeus, covering details of companies' ownership structure. The produced dataset thus provides unique information on the whole company or group structure before and after a merger or acquisition. Using these details, we are able to show that the group structure matters for the effect of taxes. For instance, our results suggest that even though there may be a large difference between the target and acquirer country tax rates, it has much lower effect on the choice of location and takeover premium, if the acquiring group already has a presence in the same country or different country with low taxation.

Finally, we suggest innovative theoretical framework to quantify the possible profit or loss on countries' corporate tax collection leading from cross-border M&A followed by profit shifting. The within sample calculations indicates that both profit or losses may be quite substantial both in absolute and relative numbers. For instance, the Ireland's profits are estimated to be on average around 24 % of its yearly corporate tax revenue, on the other hand the USA lose roughly -6 % on tax revenue every year. This thesis thus not only supports the evidence that there is a tax motivation in cross-border takeovers, but also that the impact of taxation on countries' corporate tax revenues may be considerable.

The remainder of this thesis is structured as follows. Chapter 2 elaborates on the motivation for studying international capital flows and how are they influenced by taxes. In Chapter 3 we describe the complexities of international taxation as well as certain tax optimization practices. We include also a case study of the Pfizer-Allergan merger deal to illustrate these practices and further motivate the research question. Chapter 4 systematizes the previous empirical literature describing taxation effects on M&A activities and develops specific hypotheses to be tested. Chapter 5 and Chapter 6 describes the dataset and methodology used in the empirical analysis. Results of this analysis are then presented and discussed in Chapter 7 and the Chapter 8 concludes.

Chapter 2

International flows of capital

Multinational firms are one of the key features of the modern globalized world and gained considerable importance in the past decades. They are specific in several ways, for instance, they have to have some superiority to the domestic companies because there are numerous costs connected to expanding abroad, therefore companies that are able to compete with local companies, that do not face these costs, have to also have some advantages. Such superiorities may lie in lower production costs through economies of scale, better research, and development leading to higher quality products, more sophisticated branding and marketing or more effective management organization.[1]

Through their subsidiaries in foreign countries they may also affect welfare in the host economy in various ways. They can generate spillovers to domestic companies while these spillovers may be either positive but also negative. For example, the domestic firms may be able to improve their efficiency and productivity by copying or adopting modern technology, which includes innovations to production as well as to management, marketing or distribution. Increased competition may benefit the local consumers through a wider variety of products or lower prices, but on the other hand, it can harm the local producers.

Nevertheless, most countries aim to attract investments from multinational companies, generally called foreign direct investment (FDI), because it can increase development, employment or improve competition. Substantial theoretical and empirical literature has thus grown up to study various features of multinationals. Given their importance in all economies, a wide stream of the

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[1]Several empirical studies provide evidence that multinational firms are indeed more profitable, more productive or have other advantages, the reader may refer to Haddad & Harrison (1993), Harrison & Aitken (1999) or Blomstrom & Sjöholm (1999).

literature is focused on what affects and determines the decisions of multinational corporations, particularly decisions concerning foreign investments.

Obviously, numerous factors are influencing foreign direct investment, some of which are somehow firm and product specific, such as market size, availability and cost of resources and labor, transportation costs or infrastructure. Other factors are more general such as macro-economic or political stability. Nevertheless, one factor that affects every company's investment in a foreign country is taxation, which may differ tremendously across countries. The international taxation system is rather complicated and may entail significant additional costs for the multinational companies, but in some cases also benefits.[2] Devereux (2007) argues that there is a four step investment decision process of multinational companies, where each step may be influenced by taxation.

Supposing that a company wants to expand abroad, the first decision is whether to produce at home and export or produce abroad. In the case of exporting, they may be tariffs imposed on the exported goods, in case of producing abroad the income generated abroad will be taxed in the host country. Conditional on expanding abroad the company needs to choose the location. Here the differences in various countries' tax systems play an important role in decision making. In the next step, the company needs to decide on the scale of investment it makes in the particular location. Here again the size of taxation matters. Finally, the company may be able to decide on the location where the profit is declared. This decision is again influenced by taxation and the possibility of shifting the profit.

2.1   Review of literature

Considering that there are numerous ways how taxation can affect foreign direct investment, there is also large amount of literature studying these effects. The literature differs in some more nuanced aspects of FDI that it focuses on, but also in the data that it uses, more specifically the aggregation of capital flows and also the measure of taxation.

The first stream of this literature uses aggregate data on FDI flows. Citing just a few of such studies, each one of Buettner (2002), Benassy-Quere *et al.* (2005), Gorter & Parikh (2003) and Bellak & Leibrecht (2009) use a different measure of taxation while all of them find a significant effect of this measure on

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[2]In this section part of the study the international taxation is treated in a general sense, nevertheless, it is described further below in this thesis in Chapter 3.

bilateral FDI flows between several important developed countries. Moving to relatively more specific data, two other studies by Grubert & Mutti (1991) and Hines & Rice (1994) use data on the aggregate capital stock of foreign affiliates of US companies and find that these are also significantly negatively affected by average tax rate measures. Furthermore, both of the studies also provide evidence on tax rates' large negative effect on the location profit.

Nevertheless, more granular data on individual firms provide much-needed nuance to examine the decisions of multinational companies and the way how taxes affect them. Kemsley (1998) focuses on how taxes influence companies' decision whether to export or produce abroad and finds that US companies are more likely to export to high tax countries compared to low tax countries. Devereux & Griffith (1998) study the effect of taxes on the second decision step mentioned above which is where to locate the foreign production. They find a strong negative impact of taxation on the probability of choosing a particular country. Similar effects find also Buettner & Ruf (2007) and Stöwhase (2006). Relating to the third decision step, empirical analysis of Cummins & Hubbard (1995) provides evidence that taxes matter also for the scale of foreign investment.

Several other papers than use firm-level data to assess tax effects on the location of profit. Klassen *et al.* (1993) find a significantly lower rate of profit of US multinational companies after a tax reform in 1986, which lowered the tax rate, suggesting that the lower tax rate caused the companies to shift profit to the USA. Harris (1993) makes a similar comparison and finds that multinational companies reported lower foreign profit while paying higher taxes in the US after 1986. On the other hand, empirical analysis of Harris *et al.* (1993) shows that companies with foreign affiliates in low-tax jurisdictions reported relatively lower tax payments in the US, which is again consistent with profit shifting. Desai *et al.* (2004) find evidence that US affiliates located in higher tax countries have significantly higher affiliate debt, which suggests that companies shift profit to lower tax jurisdictions through intra-group lending.

Finally, there is also literature examining the effect of taxes on repatriation policies, showing that companies use various strategies depending on its tax treatment (Grubert 1998) and also that foreign subsidiaries with a parent in high tax jurisdiction tend to pay lower dividends (James R. Hines & Hubbard 1990).

2.2   Tax competition

The mentioned literature is by no means exhaustive but still, it provides considerable evidence of tax effects on foreign direct investments. Nevertheless, it is not useful only to better understand the decisions of multinational companies, but also for the policy makers in individual countries to be able to set effective taxation policy. Even thought there is clearly an incentive for companies to seek low tax environment for their investments, some may be willing to invest in higher tax countries if the government, for instance, invests more in to infrastructure and also "transparency, simplicity, stability and certainty in the application of the tax law and in tax administration" (Clark *et al.* 2007) can be important factors.

Policymakers may also want to know if the tax burden is actually borne by the companies themselves or if they transfer the costs into the pricing of their products such that the burden is effectively borne by the local consumers. Setting the tax rates may also be seen as an optimization problem such that foreign investment is not discouraged but also the country is able to maximize the tax revenues.

Since the 1980s we can observe a notable decline in corporate tax rates in most of the developed world. This can be largely attributed to the opening markets and the formation of common markets such as the European Union and technology innovations decreasing all kinds of costs associated with expanding abroad. This development made it significantly easier for companies to set up a presence in a foreign country and forced countries to compete for foreign investment by creating a more favorable tax environment.

This effect is called tax competition, according to Leibrecht & Hochgatterer (2012) it can be defined as any uncooperative setting of tax rates by governments, aimed at influencing the allocation of the mobile tax bases. Countries compete this way for attracting new companies, for new investment of companies already set up in the country, but also for profits shifted from another country. In this competition, countries mostly cut tax rates as it is the most visible practice, but can also adopt weaker transfer pricing regulation which provides an opportunity for shifting part of the profits to low-tax jurisdictions. This way the country can keep a higher tax rate while attracting more foreign investment.

As any non-cooperative game, tax competition thus may be beneficial for countries that are flexible to adjust the tax rules enough to attract companies.

Contrarily it may be harmful to other states that invest in infrastructure, legal and institutional background and other public goods and in turn obtain very little tax revenues from companies who take advantage of these public goods while taxing their profits elsewhere. Developing countries would be for instance those who would suffer from this course of action (Janský & Prats 2015).

On the other hand, research shows that size matters in tax competition and that it is smaller countries who especially decrease tax rates and benefit the most.[3] Some of these countries are perhaps doing this because they are so small that they have very few other options on how to gain revenue. These are often very small island states such as Bermuda, Cayman Islands or the British Virgin Islands, some of which even decide not to impose taxes at all, and they are usually called "tax havens."

To prevent harmful tax competitions, countries and multinational organizations adopt anti-tax-avoidance policies or agree on some sort of harmonization of their tax rates. Some countries also create blacklists of non-cooperative jurisdictions in terms of taxation (essentially tax havens) and then impose tougher rules for companies who would want to shift profit to the blacklisted countries.[4]

Covering the bases of international flows of capital and the literature showing that they are affected by taxation, this thesis aims to focus more elaborately on one specific part of FDI, which is mergers and acquisitions M&A. Chapter 4 shows the motivations for choosing this particular part of FDI, why taxes matter for M&A and how their effect should be studied. Nevertheless, first, we need to provide an overview of the international taxation systems and their specifics. This overview is therefore provided in the following chapter.

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[3]Refer for instance to Kanbur & Keen (1993) who find a positive correlation between corporate tax rate and country size.

[4]For instance the European Union compiles a list of non-cooperative jurisdictions for tax purposes (European Union 2019)

Chapter 3

Introduction to international taxation

This chapter describes a rather complex and complicated field of international taxation. Every multinational M&A transaction leads to several possible implications from the perspective of income taxation that are described below. Even though this work is mainly focused on corporate income-related taxation, Desai *et al.* (2004) or Herger *et al.* (2016) point out that other non-profit taxes such as Value-added tax or wage taxes are also important factors in capital flows and generally in tax competition, but those are neglected in this chapter as well as in empirical analysis.

This chapter is further structured as follows. Section 3.1 describes the basic statutory framework of international corporate income taxation and summarizes its consequences. Section 3.2 discusses some further peculiarities of the international tax system influencing effective taxation as well as some tax optimization practices that can influence effective taxation and potentially motivate M&A transactions. Section 3.3 elaborates on differences of different tax measures and summarizes, which measure is suitable for various research questions. Most of the discussed tax specifics are further illustrated in the case study (Section 3.4) of US pharmaceutical company Pfizer attempting to merge with Ireland company Allergan.

3.1 Statutory taxation of income and profit repatriation taxes

Even the tax system of a single country is usually very complex and complicated. Therefore it would not be suitable for this thesis to describe and work with all possible details and nuances of international taxation across all possible country pairs. Instead, this section should set the basic framework of international taxation of profit and provides a basic understanding of international taxation.

For this purpose let's assume that subsidiary incorporated in country s is owned by a company with residence in country r. The profit of the subsidiary can be taxed in the subsidiary country as well as in the country of parent residence. This thesis distinguishes three tax payments. The corporate tax paid by subsidiary and then two taxes connected with the repatriation of income to the parent company. Those are withholding tax and tax from foreign income.

We can further formalize the corporate income tax rate of country s as τ_{st}. The withholding tax is applied in case of repatriation of income through dividend payments. It is also paid in the subsidiary country and is given by country-pair specific rate ω_{rst}, which is often subject to treaties between the country pairs. Finally, the repatriated income in the country of parent residence is subject to corporate tax from foreign income in rate τ_{rt}. Hence, the theoretical overall income tax rate of the subsidiary is given by

$$\tau_{rst} = \tau_{st} + \underbrace{(1 - \tau_{st})\,\omega_{rst} + \tau_{rt}}_{\text{Double taxation}} \tag{3.1}$$

Compared to a situation when the subsidiary would operate individually in country s, additional taxation $(1 - \tau_{st})\,\omega_{rst} + \tau_{rt}$ emerges in multinational structures. This effect is called double taxation[1] and decreases the net income of subsidiary and therefore also its value on the market for corporate control as shown by Huizinga & Voget (2009) also empirically.

Most countries limit this unfavorable effect of double taxation of multinational firms by bilateral tax treaties. These treaties can regulate the withholding tax rates, as well as the way how repatriated foreign income is taxed in

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[1]It is not unusual that also dividend payments paid out within the same country are under some conditions subject to withholding tax. Nevertheless, this work abstracts from these cases and stays only on company level.

the parent country. The withholding tax rates are usually precisely specified for each specific country pair, both ω_{rst} and ω_{srt}, and those are summarized in Table C.1 as of 2018.

The applied withholding tax rate can be further subjected to additional conditions specified by a given tax treaty, while the most common is the condition of minimal ownership share to reach the lower withholding tax rate.[2] Those conditions again can vary across country-pairs as those are given by tax treaty. Moreover, they do not need to be reciprocal in the sense that country A provides the same conditions to country B as country B provides to A. Besides of bilateral tax treaties, there are also some multilateral pacts such as EU Parent-Subsidiary directive (Council of European Union 2011) that exempts profits distributed by a subsidiary in one EU member state to its parent company in another member state from withholding tax if the parent company holds at least 10 % of the subsidiary.

The taxation of income from foreign subsidiaries in the parent country is somewhat different because every country has only one corporate income tax rate and it either exempts the foreign income from this taxation or not. These two approaches are usually called "territorial" and "worldwide". The country is said to apply the territorial tax system if it exempts income from foreign subsidiaries from taxation and hence the applied $\tau_{rt} = 0$. Some countries may exempt only income from countries with which they have a tax treaty, or they exclude some blacklisted countries, other countries may exempt it regardless of its origin. Also, additional requirements may apply, such as minimum ownership stake or minimum holding period of the foreign subsidiary. The details of individual tax regimes are summarized by Table 5.1.

If a country applies the worldwide system, it taxes the foreign income but usually allows to deduct tax credit from corporate income tax paid in country of residence. There are two credit tax systems: an indirect system that allows to credit both withholding and corporate tax paid on level of subsidiary and direct system that allows to credit only withholding tax. Nevertheless, the tax credit can not exceed the original tax duty. Hence the credit in indirect system is $c_{rst}^i = \min\left[\tau_{rt}; \tau_{st} + (1 - \tau_{st})\,\omega_{rst}\right]$ and $c_{rst}^d = \min\left[\tau_{rt}; \omega_{rst}\right]$ in direct system. Finally, some countries only allow to deduct foreign taxes from taxable income.

In principle, even the system of foreign income taxation can vary between individual country pairs depending on the specification of the tax treaty. The

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[2]To illustrate: a Czech subsidiary of another US company pays 5 % withholding tax from repatriated income if the ownership share is higher than 10 %. Otherwise, it pays 15 %.

Table 5.1 summarizes the systems used by each of the studied countries. The territorial system is prevailing and also some countries switched from the world-wide system to territorial showing a clear trend towards the territorial system.

Finally, in either the territorial or worldwide tax system, the resulting multi-national tax burden can be summarized as follows (Huizinga & Voget 2009):

- No relief

$$\tau_{rst} = \tau_{st} + (1 - \tau_{st})\,\omega_{rst} + \tau_{rt} \tag{3.2}$$

- Territorial system with exemption for foreign income:

$$\tau^e_{rst} = \tau_{st} + (1 - \tau_{st})\,\omega_{rst} \tag{3.3}$$

- Worldwide system with indirect tax credit

$$\tau^i_{rst} = \begin{cases} \tau_{st} + (1 - \tau_{st})\,\omega_{rst} & \text{if } \tau_{rt} < \tau_{st} + (1 - \tau_{st})\,\omega_{rst} \quad (3.4) \\ \tau_{rt} & \text{otherwise} \quad (3.5) \end{cases}$$

- Worldwide system with direct tax credit

$$\tau^d_{rst} = \begin{cases} \tau_{st} + (1 - \tau_{st})\,\omega_{rst} & \text{if } \tau_{rt} < \omega_{rst} \quad (3.6) \\ \tau_{rt} + (1 - \omega_{rst})\,\tau_{st} & \text{otherwise} \quad (3.7) \end{cases}$$

- Deduction system

$$\tau^{de}_{rst} = \tau_{st} + (1 - \tau_{st})\,\omega_{rst} + (1 - \tau_{st} - (1 - \tau_{st})\,\omega_{rst})\,\tau_{rt} \tag{3.8}$$

$$= 1 - (1 - \tau_{st})\,(1 - \tau_{rt})\,(1 - \omega_{rst}) \tag{3.9}$$

From the perspective of multinational companies, we can make two simple conclusions. Residing in a country with the territorial system leads to lower or the same total tax liability τ_{rst} compared to the worldwide system (ceteris paribus). However, it holds for all circumstances that $\tau_{rst} \geq \tau_{st}$. It is therefore fairly obvious that going multinational can lead to non-negative additional taxation from a statutory point of view and consequently, the factor of double taxation should decrease the value of target company (Huizinga & Voget 2009).

3.2 Effective taxation

The previous subsection describes the basic framework of international income taxation. Nevertheless, in reality, there are considerably more tax consequences that influence the effective tax rate. This diversity in tax system emerges from legal tax incentives as well as from some more or less legal tax optimization practices. Unfortunately, it is difficult to generalize or quantify these factors and essentially each factor needs to be evaluated on a case by case basis. This subsection should list and describe some of these factors that affect the effective tax rate and summarize implications between statutory and effective tax rates.

First of all, it is important to remind that the tax liability depends not only on the tax rate but as well on the tax base, which can be also a source of tax system diversity and certainly a main vehicle for tax optimization practices such as base erosion (profit shifting).

Tax incentives and other legal practices

Klemm (2010) defines the tax incentives very broadly as "all measures that provide for a more favorable tax treatment of certain activities or sectors compared to what is granted to general industry" and argues "that tax competition is a particularly important force behind many of them." Empirical research shows that indeed some of them are successful in attracting FDI (Leibrecht & Hochgatterer 2012), nevertheless their overall effect on economy is debatable.[3] Tax incentives are not at the most interest of this thesis, therefore only a brief summary of the most common tax incentives follows, in order to provide a complete picture of international taxation framework.

- **Tax Holidays** can be temporary as well as long-term tax exemption of certain tax. Quite common is in countries with the worldwide system that allows the parent companies to repatriate their foreign income without additional taxation. An example of such tax holidays is The American Jobs Creation Act in 2004 that allowed to repatriate hundreds of billions of dollars to US parent companies (Clemons & Kinney 2008).

- **Investment allowances and Tax credits** provide a reduction of tax base or direct deduction from payable tax, respectively, of specified expenditures or investment. It is often defined for some specific industry or

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[3]See Klemm (2010) for discussion of individual tax incentives and their overall effect.

type of investment. Most often are arguably incentives to Research and Development or to strategic field investments.

- **Rate reduction** or even exemption is commonly provided to specific industries or even specific companies in a similar principle as investment allowances and tax credits. For example, Ireland applies generally 12.5 % corporate income tax rate while the tax rate is reduced to 6.25 % for income from intellectual property.

- **Timing differences** aim to postpone taxable income which improves the cash-flow of the company and more generally reduces the present value of tax payments. This can be reached either by postponing taxable income or accelerating cost deduction (e.g. aggressive depreciation) (Holland & Vann 1998).

Profit shifting

By the term "profit shifting" is generally meant the tendency to shift taxable income to jurisdictions with a more favorable tax regime. This can be done by many different practices with the same ultimate aim - to reduce tax duty. The most simple and common practices involve using internal debt or capital market and pricing of intra-group trading activities. For example subsidiary in low-tax jurisdiction can provide its owner with a debt with a high interest rate, which effectively results in shifting the taxable income to the subsidiary with favorable tax regime. Pricing can be used in similar logic, a subsidiary in low-tax jurisdiction provides services or goods to its owner for overpriced prices or vice versa, owner in high-tax jurisdiction provides undervalued consideration. Such practice can again effectively increase the profit of the subsidiary on the cost of the owner. Both of these practices of profit shifting can be combined with postponing of income repatriation to overcome additional double taxation as described in Section 3.1.[4]

There are many studies focusing on this field that aim to prove and quantify the effect of profit shifting. However, most of them are trying to indirectly prove the existence of such practices by either focusing on one of these practices or by looking at differences in profitability.

Hines & Rice (1994) use aggregated data of foreign affiliates of US companies to compare rates of profit across countries and they find that a difference of one

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[4]Postponing of repatriation can be nicely followed in the illustrative case of Pfizer in section 3.4.

percentage point in statutory tax rate is associated with 6% change in profit, which can be interpreted as evidence of profit shifting. A similar approach on company-level data was used by Collins *et al.* (1998), who estimate the effective tax rates on accounting data and find that foreign affiliates with larger effective tax rate than the US statutory rate tend to have lower profit with an increase in this differences.

Other studies tend to look at debt or capital structure. Desai *et al.* (2004) use a rich dataset of US parent companies and their foreign affiliates with detailed information about external and internal debt. The results confirm that higher tax rates are associated with a larger debt of affiliates in this regime, suggesting that affiliates with higher tax regime shift their profits to the parent through the interest expenses mechanism. Moreover, results show that the sensitivity of internal debt on the tax regime is almost twice as big as in the case of external debt. Desai *et al.* (2007) study the repatriation of income through dividend payments and they find that dividends are positively related to the tax rate in the host country. This can be interpreted in the light of double taxation with tax credit system where the higher tax rate in the host country leads to lower double tax rate. Hence this study indirectly shows that subsidiaries in countries with larger double tax rate pay fewer dividends to its parent, which could be a pattern of postponed repatriation of taxable income.

A more direct approach to investigate profit shifting can be used for pricing channel. Clausing (2003) uses monthly data of prices for different items over 3 years. These data enable her to differentiate between intra-group transfers and arm-length deals. She shows that intra-group import from (export to) low-tax countries is significantly associated with higher (lower) prices. Recently, Cobham *et al.* (2015) show a similar pattern on the quite specific case of Switzerland parent companies. They show that these companies re-export commodities from developing countries while the prices of the export from developing countries are significantly lower than in other jurisdictions than Switzerland.

The existing literature thus shows that there is enough evidence proving the existence of profit shifting, however, evidence of the scope or other quantification of such behavior is considerably thinner. Only Bartelsman & Beetsma (2003) estimate that potential additional profit coming from the increase of tax rate in one country would be from 65% shifted out. Therefore, this work aims to evaluate the profitability of such practices especially from the view of multinational companies.

Tax inversion

Tax inversion or corporate expatriation is the situation when a company merges with another company in a different jurisdiction, so the emerged new entity can change the country of incorporation mostly for tax reasons. It is also not unusual that small firm overtakes much larger corporation for this purpose.

Corporate expatriation is a heated topic especially in the USA, which has one of the highest statutory corporate income tax rates, and it receives a lot of attention since billions of dollars are inversed annually. American firms are rapidly expanding their inversion practices since an inversion on foreign income is commonly accompanied by reduced tax liabilities.

Desai & Hines (2002) suggest in their research that there is an incentive from the host governments to allow big corporations to inverse their incomes into their countries. Likewise, share prices of these companies rise as expatriation is announced. Companies not only enjoy the benefits of saving on taxes when they decide to inverse their revenue, but they also receive support and further benefits from governments and shareholders. Desai & Hines (2002) conclude that managers of these firms are able to increase shareholder wealth and reduce the firm's global liabilities through the announcement of expatriation. Furthermore, expatriation does damage to the home economy through fewer tax receipts, but this translates into greater benefits experienced by the inverted firms and the host country. In general, there will be higher wages and more domestic jobs.

Along the same discussion, Sheppard (2003) identifies how US multinationals flee when confronted with threats of higher taxes. He also argues that contrary to popular debate, corporate inversion does not destroy shareholder value. However, the research does state that the home country's overall tax base is destroyed as well as encouraging other companies to act in a similar manner to keep up with the competition.

Relation of statutory and effective tax

All these practices can decrease the effective tax rate as compared to the statutory one and therefore the statutory tax rate τ_{rst} can be seen as the upper limit of the effective tax rate. All these factors are also related to the taxation of multinational firms, so these practices can be seen as potential synergies arising from the international takeover and consequently increase the incentive for takeover as well as raise the transaction value.

The following case study describes one of the largest and most discussed tax inversion that almost happened.

3.3   Alternative tax measures

Devereux (2007) points out that several concerns need to be taken into account when choosing the correct measure of the tax rate for a given research issue or hypothesis. These can be divided into the following pairs:

- Statutory versus Effective rates

- Average versus Marginal rates

- Forward versus Backward looking measures

The basic differences between statutory and effective rates are described in Section 3.2. Nevertheless, the answer to a question, which of these is better to use, is not so obvious. In general, the ultimate question is, what kind of measure companies use to answer the given question. The intuition tells us that companies should base their decision according to effective tax rates because these are the tax costs that are paid. However, this does not need to be true in all cases. For example, a detailed specifics of a given jurisdiction can be unknown or hard to analyze for foreign investors and in such cases, it can be easier to make decisions based on statutory rates. Moreover, profit shifting practices aiming to reduce the effective tax rate are probably connected to considerable transaction costs. In such a case, the effective rate is also not an ideal measure of the tax burden, because the ideal measure should take into account these connected costs and the statutory rate. Therefore, the optimal measure of the real tax burden probably lies somewhere between these two measures. Statutory, as well as effective rates, are often non-linear for several reasons. It could be the legislation that sets progressive taxation of corporate income, or the effective rate can be influenced by the fact that companies have lower incentive to somehow optimize their tax duty if the taxable income is low. If described non-linearity exists then the difference between marginal[5] and the average tax rate can be substantial. The appropriateness of usage of these measures again depends on the nature of the research question. In general, if the decision depends on marginal cost[6] then the marginal tax rate

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[5]Marginal tax rate is the rate by which an additional income would be taxed.
[6]For example how much to invest?

is more appropriate. On the other hand, if it is discrete choice question[7] than the average tax rate representing the overall cost can be more appropriate.

Another very important nuance is between forward and backward looking estimation of tax rates. Forward-looking estimates of tax rates should be generally based on expected taxation of future income flows. This is also the measure that is preferable if the value of any investment is based on future capital gains and therefore also decisions about any investment should be done on a forward-looking estimate of tax rates. Nevertheless, the backward-looking estimate is more usual because of the availability of data. The difference between these measures can be substantial especially for effective tax rates because the final tax duty at any given point of time is influenced by the history of a given company, which includes the history of investments, deferred tax liabilities, past losses or the history of the given tax system. This can be also a source of potential endogeneity of such backward-looking measures of effective tax rates because these are essentially based on profit and tax duty and hence they could be directly dependent on investments. Such endogeneity should be treated in the empirical analysis. The difference between forward and backward estimate of tax rates is also illustrated in the next section.

3.4   Case study: Pfizer & Allergan merger

A planned merger deal between two of the biggest pharmaceutical companies, Pfizer and Allergan, was a great inspiration for studying the topic of the relationship between cross-border mergers and taxation. The deal was structured as an inverse acquisition in which the US giant Pfizer would have taken over smaller Irish Allergan and shift its residence to Ireland. However, this transaction that would have produced the largest pharmaceutical company in the world never happened due to a change in US regulation. Nevertheless, the deal attracted intense media attention and the public could have observed its development, from the initial discussions, through the changes in stock prices until the cancellation of the contract and its aftermath. This was mostly due to a widely shared opinion that the ultimate aim of the merger was to shift Pfizer's headquarters to Ireland and enjoy the benefits of the lower corporate tax. This certainly arouses a lot of controversies and expert analyses and also inspired the topic of this thesis. We summarize this remarkable deal and particularly its

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[7]For example whether to establish a subsidiary in a given country.

taxation aspects in this motivational section. Therefore this case demonstrates that taxation can be a serious motivation for even very large M&A deals and also illustrates some of the practices described above.

The background

Where newspapers already reported that Pfizer and Allergan were talking about a merger at the end of October 2015, it was not before November 23, 2015, when Pfizer and Allergan officially announced that Pfizer planned to acquire Allergan in a friendly takeover. Allergan shareholders would receive 11.3 shares for every share of Allergan they own, this corresponded to roughly $160 billion of Allergan value according to unaffected market prices at the end of October 2015.[8] Both companies expected to close the deal in the second half of 2016, making it the largest deal in the pharmaceutical industry and the third-largest deal ever. The addition of Allergan's market capitalization of about $113 billion would have made Pfizer the largest pharmaceutical company in sales worldwide (Hemmond *et al.* 2015).

Besides the revenue enhancement and the expected cost savings of $2 billion in the next three years, Pfizer could have benefited from the lower corporate tax rate in Ireland, where Allergan's headquarters are based (according to the official press release). The corporate tax on profits in Ireland is only 12.5%, significantly lower than the 35% in the USA. The lower tax rate would have allowed Pfizer to keep up with its competitors, where the US tax rate would have led to a worsening position of Pfizer compared to its competitors, according to Pfizer CEO Ian Read.

Pfizer already hoped to avoid the high tax rate in 2013 by acquiring the British-Swedish AstraZeneca, however, this deal was not successful. The company then tried the same with the British GSK a year later, with the same result. Nevertheless, the idiom "third time's the charm" for Pfizer was not fulfilled as the US Treasury Department announced on April 4, 2016 that they have proposed new rules for inversion which limit the company's ability to participate in inversion transactions if they have already done them within the past 36 months (McCracken 2016). Allergan was involved in such transactions in the marked time frame, therefore the inversion deal would not be approved. Days

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[8]According to a joint press release, available from Pfizer official website `https://www.pfizer.com/news/press-release/press-release-detail/pfizer_and_allergan_to_combine`.

after this announcement Pfizer's board voted to cancel the deal the company issued a press release that the takeover agreement has been terminated.

The deal was dead, however, not because the companies decided that it would not be favorable for them, but because the regulation changed, and thus it would not be approved. We further shortly examine the negotiated takeover price and whether the premium was indeed motivated by saving on taxation.

Analysis of the takeover premium

The price of the transaction was structured such that Pfizer offered 11.3 of its shares for one share of Allergan. Initial calculation using the unaffected prices from the end of October 2015 shows the premium to be higher than 30% with a corresponding bid value of $160 billion. Actually, if the unaffected prices from April 7, 2016 are used to recalculate the bid premium of 53% is obtained, which represents the value of $51 billion.

To understand such a substantial premium, one should take into account the valuation of Allergan and possible synergies arising from the merger. The first one is rather troublesome to perform, as Allergan had engaged in a great number of mergers and acquisitions in the past and consequently, acquired a high portion of debt. In most of its past, the company also did not generate any profit and did not pay any dividends, which makes it very difficult to make any predictions about its future performance. A simple method of indicative valuation was performed by calculating various multiples and comparing them to the pharmaceuticals industry averages. These are summarized in table 3.1. Even though the calculated ratios indicate wide spread of possible values, on average they are not suggesting that Allergan market price would be undervalued by so much.

Table 3.1: Valuation of Allergan

	EV/Sales	EV/EBITDA	Price/Sales	PEG ratio
Pharmaceuticals Industry Average				
Total	4.76	13.63	4.37	1.13
Fast Growing Companies	7.38	20.12	6.98	1.64
Difference	55%	48%	60%	46%
Allergan				
Multiples	6.37	33.58	4.43	1.81
Premium to Fast Growing	-14%	67%	-36%	10%

Another possible explanation of the premium thus are the tax-inversion benefits for Pfizer of shifting its residence to Ireland. If we compare both the

Irish and the US tax systems, we see that the corporate tax rate of the first is 12.5%, while the one for the Unites States is 35%. In this sense, the deal is not that important as taxes are paid wherever the profits are generated. The issue arises when those profits are repatriated because the USA applies worldwide tax system and any foreign source is income is thus taxed by the US corporate tax rate, crediting for taxes already paid. Ireland also uses the worldwide system, but their low rate makes the payment of extra taxes very unlikely when profits are repatriated. Pfizer would than save on repatriating already retained earnings, but also on any potential future earnings.

The coalition Americans for Tax Fairness (ATF) (Rice & Clemente 2015), calculated what Pfizer would save on US taxes on their accumulated foreign profits trapped offshore (until 2014), if they moved the company to Ireland, assuming that the decision of the company was to repatriate all of its profits. They estimate the benefit to be $35 billion.[9] The sum calculated by ATF can be seen as an upper bound of what could have Pfizer saved on hypothetical repatriation of past accumulated profits.

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[9]The amount of $35 billion leads from repatriation of accumulated profit offshore ($74 billion leads to saving of almost $14 billion of tax saving) and from $21 billion of deferred tax liabilities on offshore profit reported by Pfizer.

Table 3.2: Tax rate of Pfizer by region

	Revenues ($ bn)			Revenue Share				Tax rate	Rate*	
	2015	2014	2013	2015	2014	2013	Average		(U)	(L)
United States	21.7	19.1	20.3	44%	38%	39%	40.7%	35%	0%	0%
Developed Europe (a)	9.7	11.7	11.7	20%	24%	23%	22.1%	21%	14%	6.0%
Developed Rest of World (b)	6.3	7.3	8.3	13%	15%	16%	14.6%	27%	8%	0.0%
Emerging Markets (c)	11.1	11.5	11.2	23%	23%	22%	22.6%	24%	11%	3.0%
Total revenues:	48.9	49.6	51.6	Weighted average:				28.3%	6.7%	2.0%

* Tax-inversion benefit rate as a percentage of pre-tax income.

(U) Under assumption that US tax rate remain same(35%).

(L) Under assumption that the US tax rate decreases to Developed Rest of World countries average (27%).

(a) Western Europe, Finland and the Scandinavian countries.

(b) Australia, Canada, Japan, New Zealand and South Korea.

(c) Asia (excl. Japan and South,Korea), Latin America, Africa, Central and Eastern Europe, Middle East and Turkey.

This estimate is just the immediate benefit based on repatriation of income, however, there are also the future tax benefits that need to be evaluated. For this purpose, it is important to base the estimate of the tax-inversion benefit rate on the forward-looking expectations of the development of tax regimes of the Pfizer group. For example, the US corporate tax rate is one of the highest in the world, hence it is quite probable that USA government will be pushed by the tax competition to decrease corporate tax rate in the future.[10] For the illustrative purpose of this case study, we try to estimate future tax benefits from this inversion. First, the income of Pfizer is estimated in a rather naive and simple way on consolidated accounting data. Then, we calculate a forward-looking estimate of tax-inversion benefit rate, which is in principle defined as a weighted average difference of US tax rate and average tax rates in different regions, because this is essentially the additional taxation needs to be paid from repatriated taxable income.[11] This calculation is summarized in Table 3.2. The same calculation is repeated for two scenarios, in the first one US corporate tax rate remains unchanged, in the second, it will drop to developed countries average.[12] Finally, the estimate of future tax benefits from studied tax inversion is \$7.5 billion using the weighted average of these scenarios.[13]

Concluding remarks to the case study

Using the case of Pfizer the complexity and difficulties of gathering information about the tax issues of companies or at least completely accurate ones can be further illustrated. There is, for example, possible evidence of profit shifting, for instance, Pfizer declared a \$16 billion loss in the USA in years 2010-2014 and 74 billion profit offshore. This seems rather suspicious taking into account that 38% of the company's sales and 48% of its assets in 2014 were in the USA (Rice & Clemente 2015), suggesting further tax evasion through profit shifting to Pfizer's subsidiaries in tax havens.

Comparing the possible tax benefits of the merger with the premium, it can

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[10]Another possible issue about the future of US tax rates is the fact that there were several tax holidays in the past allowing to repatriate income from foreign subsidiaries without additional taxation.

[11]Here, it is assumed that there is no additional taxation in Ireland because of the very low statutory corporate rate.

[12]We now know that the US corporate tax rate was decreased to 21% effective from 2018. However, this calculation should illustrate the decisions justifying the tax premium at the point where it could not be sure whether and how much the tax rate would be cut. The average developed countries tax rate is thus a reasonable forward-looking measure for this purpose.

[13]Detail of calculation of the future tax benefits are available upon request.

be assessed that they are substantial and most likely an essential motive for the deal.[14] The US Treasury Department had probably seen it similarly and adopted a change in legislation aimed at "serial inverters," for which was the Pfizer-Allergan deal obviously a great inspiration. The fact that the takeover was canceled by Pfizer only two days after adoption of the new legislation can be seen as sort of a confirmation of what was its pivotal incentive and its importance.

Even though, the transaction was terminated there has been some interesting development in recent years. At the end of 2017, US Federal court invalidated the anti-inversion regulation, because it didn't comply with the notice and comment procedures (Chorvat 2017). This could have potentially revived the deal, however, in November 2017 the USA decided to decrease their corporate income tax from 35% to 21%, effective from January 1, 2018.[15] This way the potential tax inversion benefit from the Pfizer Allergan merger would be significantly smaller, similar to our approximate alternative scenario of tax cut in the last column of Table 3.2. Therefore it is rather unlikely that the deal will be put back on the table, as the tax benefits might not be so worth the costs connected to the transaction and inversion.

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[14]In total the tax benefits were identified up to $42.5 bn (35 + 7.5).

[15]The corporate tax rate change was introduced under the "Tax Cuts and Jobs Act", formally Public Law 115-97, available from: `https://www.congress.gov/115/plaws/publ97/PLAW-115publ97.htm`.

Chapter 4

Development of hypotheses

The reader may notice that a considerable portion of the literature on tax effect on international flows of capital cited in Section 2.1 dates back before 2000 and uses aggregate data on FDI flows which is not ideal and lacks needed details. There are also several studies using firm-level data (Devereux & Griffith 1998; Stöwhase 2006; Grubert & Mutti 2000; Harris *et al.* 1993), however, these datasets mostly comprise of small samples of companies, in an overwhelming majority of US incorporation. Moreover, the source of the data is confidential US government tax returns which are only available to US Treasury researchers. The recent trend is, therefore, to turn the attention to a more specific part of FDI which is Mergers and Acquisitions (M&A). Cross border M&A constitute a large part of FDI, according to Herger *et al.* (2016) as much as 80%, and there are now extensive databases covering ample details about every transaction and each of the involved parties. These aspects make M&A data very convenient for studying relationships between international flows of capital and other phenomenons, in case of our interest, taxation.

Section 4.1 describes a simple theoretical framework for analysis of M&A transaction which is useful for a deeper understanding of the developed hypothesis. The most related current literature is summarized in Section 4.2. Finally, the testable hypotheses for empirical analysis are summarized in Section 4.3.

4.1 Theoretical framework to study M&A transactions

There are various theoretical frameworks developed to study M&A market and realized transactions. Some of them are developed on biding auction principles

(Head & Ries 2008). Another famous theoretical approach, known as free-rider model (Grossman & Hart 1980), is built on the behavior of target's shareholders, which might tend to free-ride on their decision to sell their stake, which tends to increase the final price of the transaction. Finally, some concepts even release the concept of rationality and argue that corporate takeovers are driven by motivations of managers, their ambitions and hubris (Roll 1986; Hayward *et al.* 2006).

Nevertheless, the common base for most of the theoretical frameworks is the proposition that the takeover of the target company occurs only if the pre-takeover value of the target company V_{t0} is lower than the post-takeover value V_{ta}. In other words, the deal can happen only if there is some benefit (total synergy) from transaction S_{ta}, which might be expressed in relative terms of the pre-transaction value as $s(x)$.

$$S_{ta} = V_{ta} - V_{t0} \qquad\qquad \geq 0$$
$$s(x) = \frac{S_{ta}}{V_{t0}} = \frac{V_{ta}}{V_{t0}} - 1 \qquad\qquad \geq 0$$

The second basic proposition is that the realized price on M&A market should be between those two values $V_{t,0} \leq P \leq V_{t,a}$. Therefore common modeling approach for studies examining the price of transactions can be described by the following equation:

$$P = V_{t0} + \delta * S_{ta} \tag{4.1}$$

$$\pi(\delta, x) := \frac{P - V_{t0}}{V_{t0}} = \delta * s(x) \tag{4.2}$$

where $\pi(\delta, x)$ is the transaction premium expressed as a percentage, *delta* is the share of total synergy paid to the target, which can be interpreted as the relative bargaining power of the target and the acquirer company, and x are the determinants of total synergies.

There is extensive literature studying all sorts of possible synergies as well as the determinants of relative bargaining power. Nevertheless, it is not the purpose of this thesis to summarize them and the reader can refer to a comprehensive meta-analysis by Betton *et al.* (2008) or Eckbo (2009). Instead, the following literature review focuses more closely on emerging literature that uses

M&A data to study international taxation and its impact on capital flow.

4.2 Current literature

The literature studying international M&A while closely focusing on international taxation is rather scarce. Di Giovanni (2005) is probably the first to study direction and volume of FDI on the international M&A market. The author estimates a gravity model, which is common in the trade literature, to examine the determinants of size and direction of international M&A flows. The main implication of such a model is that the flow of trade between two countries should inversely depend on the distance between the countries and proportionally depend on their economic size. He uses M&A data from the Thomson Financial SDC database and several other sources for the explanatory variables over the period of 1990–1999. His work is mostly focused on the effect of financial deepening to capital flow, however, he also finds a significant effect of the target's tax rate as well as of the presence of tax treaties between the two countries.

Huizinga & Voget (2009) focus their work more on taxation and especially on withholding tax and double tax rates as they are described in section 3.1. The authors show that the parent-subsidiary structure, created by the cross-border M&A deals is affected by the outlook of international double taxation. They identify the parent-subsidiary structure for each M&A transaction according to the incorporation of the new entity, while finding that double tax rate influences the choice of where the parent company will be incorporated. This can be also illustrated by a summary statistic that the average double tax rate is 0.62% in their sample, while it would be 2.11% if the pairs had been switched. Their work is particularly outstanding by collecting extensive information on tax systems and pairwise tax treaties among a set of European countries Japan and the USA over a quite a long period of 1985–2004. Similar to di Giovanni (2005), the authors source the data on M&A deals from the Thomson Financial SDC database. The main model to estimate the impact of international taxation on the parent-subsidiary structure decision is a binary choice logistic model, which allows for inclusion of a range of control variables.

Furthermore, the authors use the results of their model to simulate a hypothetical change in the international tax system and its impact on parent-subsidiary decisions. An interesting example, suggesting itself, is the possibility that the USA would abolish their worldwide taxation system in which

case their multinational companies would not be subject to double-taxation on their foreign-source income. According to Huizinga & Voget (2009), this would increase the proportion of M&As resulting in parent company incorporation in the USA by notable 4.5 percentage points, from 53.1% to 57.6%. They also estimate a gravity model, which shows that the double tax rate has also a negative effect on the volume of transactions.

Later Huizinga *et al.* (2012), again using the same data, measures the burden of international taxation by the extent to which it is transmitted into the takeover premium and acquiring firm excess stock returns around the takeover announcement. The authors conduct a simple OLS estimation that relates the bid premium to the net double tax rate and several other control variables and find that the double taxation arising from the cross-border takeover is fully capitalized by the target shareholders, as the pass-through is not statistically different from one. On the other hand, analogous estimation finds no significant impact of double taxation on the acquiring company's excess returns. The authors thus conclude that their analysis provides evidence that the burden of international double taxation is fully born by the target company shareholders.[1]

Recently, Arulampalam *et al.* (2018) study the location choice of the target in much greater detail. They formalize the conceptual framework with a heterogeneous response to the tax regime, depending on the characteristics of the acquirer, target and reason for the acquisition. They estimate a form of the random parameters mixed logit model, which allows for this heterogeneous effect of taxes and avoids the assumption of independence of irrelevant alternatives that is inherent to a standard logit model. In general, they find a negative correlation of host country tax rates and the probability of location choice, nevertheless, the magnitude of elasticity depends on several factors including the territorial or worldwide tax system. In their analysis they combine M&A data from the Zephyr database with individual company data from Orbis database (both databases are maintained by Bureau van Dijk), obtaining more than 2000 M&A deals, both cross-border and domestic, in years 2005–2008.

Feld *et al.* (2013) show that dividend taxation system (territorial/exemption versus worldwide/tax credit) of acquirer influences the M&A market. Especially they argue that acquirers with the credit system are discriminated on the M&A market and have a lower chance to win in a tender process because the credit system leads to higher taxation than exemption from tax. They

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[1]This finding is in accordance with findings that almost all the net benefit from the M&A transactions are captured by targets (Betton *et al.* 2008).

study this issue on the tax reform in the UK and Japan, when these countries have changed their tax system from tax credit to exemption in 2009. The authors use data on more than 12000 deals from the Zephyr database and conduct a multinomial choice regression and also a mixed logit estimation explaining the acquirer choice of origin. Finally, they conclude that the number of acquisitions by Japanese and British companies has increased by 32% and 4%, respectively, as a result of this reform. They also simulate a similar policy change in the US tax system and estimate an increase in the number of US cross-border acquisitions by 17.1%.

Todtenhaupt & Voget (2017) argue that international differences in corporate taxation can distort the efficient allocation of productive factors resulting from M&A activity. This may be possible because companies primarily maximize profit and therefore they calculate both the productivity as well as tax implications of location decisions. There may arise a trade-off between productivity and tax burden. The authors study the impact of these differences in taxation on the realization of productivity gains. Similar to other authors, they combine data M&A data from the Zephyr database with firm information from Amadeus and Orbis databases and their final sample covers more than 800 M&A deals over the period 2000–2013. The analysis relates the change in total factor productivity resulting from a M&A deal to an absolute tax difference between the target and the acquirer. Simple fixed effects estimation shows a significantly negative effect of the tax differential on the total factor productivity, such that a 1 percentage point increase in the tax differential between acquirer and target location reduces the merger-induced productivity gain by 4.5%. Further analysis shows that this effect is mainly driven by transactions where the target country's taxation level is lower than the acquirer country taxation level.

A quite more specific study was conducted by Herger *et al.* (2016) on the topic of horizontal and vertical investments. Moreover, they cover also indirect taxes concluding that elasticity to location choice is negative. Nevertheless, the elasticities vary for different taxes and different kinds of investments.

4.3 International taxation in cross-border transactions

First of all, it is useful to classify following empirical analysis within decision framework suggested by Devereux (2007), which proposes that multinational companies determine their capital flows in a four-stage decision mechanism where each of those steps may be influenced by taxation:

- Produce abroad or export

- If produce abroad, then where (location)

- How much to produce, conditionally on location (volume)

- How to reallocate profit given the volume and the location (profitability)

In principle, the first step requires also data about brownfield investments and hence M&A data cannot be used. On the other hand, the third step can be well studied on aggregated data, therefore M&A data do not bring a significant contribution to this matter. Therefore, the presented analysis focuses on the second (location) and the fourth (profitability) step,[2] where the granular data from M&A market can be the most useful. Hence, the main questions of the empirical analysis are the following: How international taxation influence the location choice of the target company? And how international taxation influences the overall profitability of MNE by reallocation of profit?

Building on the above-mentioned literature, we can observe that most of the studies focus mainly on taxation from the statutory point of view. Nevertheless, Section 3.2 suggests that the topic of multinational taxation is much more complex and some nuances of the complicated tax system can be crucial for an understanding of the companies decision process. For example, hypothesizing perfect profit shifting would mean that all profits are shifted to the location with the lowest effective tax rate, which is not possible in reality, because there exist some limits of such practice. This example as well as the case study of Pfizer attempting to merge with Allergan motivates the main hypothesis that differences in tax regimes, rather than the absolute level of taxation, influence the decisions of MNEs.

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[2]To the best of our knowledge, there is no attempt to model this whole framework step by step in backward induction as it would require very complex model combining many different data sources.

Based on corporate finance theory, it is rational for the acquirer to invests in a company where the highest transaction surplus[3] is gained. This surplus naturally depends on numerous company characteristics as well as on transaction specifics, including the legal and general economic conditions and by our main hypothesis also on taxation in the following way:

Hypothesis #1: Absolute difference in target's and acquirer's rate of taxation positively affects:

(a) the probability of being overtaken (location),

(b) the takeover premium expressing the relative value of the transaction (profitability[4]).

Both these sub-hypotheses stand on the common principle that differences in tax systems of acquirer and target country can create potential "tax synergies" in the new entity compared to the stand-alone state. By assumption, tax synergies are the part of the total surplus, which is divided between target's shareholders and acquirer based on their relative bargaining power. If the bargaining power is independent to tax synergies, then higher tax synergies are associated with higher surplus and the consequently higher probability of takeover, the higher total volume of capital flow and also higher takeover premium under the assumption that at least some part of total surplus is captured by the target.[5]

Such tax synergies can possibly follow from various legal or illegal reasons and tax optimization practices. Section 3.2 summarizes just a few of them concerning the taxation of income that is also closely followed in the empirical analysis. Those are especially tax inversions that optimize total taxation including repatriation of income by switching the tax domicile country. Alternatively, shifting the profit to the country with a lower tax rate can be another source of tax synergies. Other forms of taxation can have a similar effect to M&A market as studied by Herger *et al.* (2016), however, those are outside of the scope of this thesis.

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[3]Transaction surplus can be generalized as the net present value of all future cash streams minus the purchasing price.

[4]Term "profitability" is used through the thesis as the reference to this effect on takeover premium. It needs to be clarified that the term profitability does not correspond to the traditional financial accounting definition of profit margin, but rather it relates to the value of the target company and consequently to the profit of target company shareholders.

[5]In academic discourse it is often concluded that in reality almost whole surplus is captured by the target company. (Betton *et al.* 2008))

Both practices are described in principles in Section 3.2 and illustrated in the case study in Section 3.4. Nevertheless, it is important to realize that there is a potential for the tax synergies either in a case when the acquirer faces lower taxation then the target (e.g. tax inversions or profit shifting from target to acquirer) as well as in opposite case (e.g. profit shifting from the acquirer to target). Therefore positive and negative differences can have asymmetric effects as different situations of the acquirer company can have different tax incentives.

> Hypothesis #2: The effects of tax differences described in Hypothesis 1 are asymmetric when the acquirer faces lower taxation than the target compared to the opposite difference.

Furthermore, it is likely that the effect of taxation differences is not the same for all transactions as some transactions could be highly tax-motivated and others could have minimal or no tax motivation at all. Therefore different sorts of non-linearities are expected.

In the first place, tax regimes in the acquiring and target companies are not the only merit taxation characteristics as the acquirer as well as the target can be further part of a larger multinational enterprise (MNE). Such a broader multinational structure likely has its own strategy for dealing with taxes and can be the main vehicle for profit shifting and other tax optimization practices. Therefore, simple country differences are not only an important factor but tax synergies can lead from much more complex pre-takeover and post-takeover MNE structures. For example, even large tax differences between target an acquirer may have no effect, if the transaction is within one MNE or between two MNEs with similar structures. On the other hand, even domestic transaction with literally no tax differences between acquirer and target can have significant tax synergies, if the target was independent stand-alone company and the acquirer is part of MNE with profit shifting opportunities.

> Hypothesis #3: The effects of tax differences described in Hypothesis 1 further depend on pre-takeover and post-takeover ownership structure of target and acquirer, such as:
>
> (a) the effect is stronger when the acquirer is part of MNE or the target was an independent stand-alone company or when the target operates in the worldwide tax system while the acquirer in territorial,

(b) the effect depends rather on MNE group-wise tax differences than on company-wise differences.

Finally, the potential tax synergies are certainly higher when there are lower costs associated with tax optimization practices. For example, a lower cost of profit shifting can be associated with weaker legal framework or lower cost of profit repatriation. More specifically also shifting profit to a not fully owned subsidiary can imply significant cost when the profit is divided between all shareholders. This could be generalized to the following hypothesis:

Hypothesis #4: The effects of tax differences described in Hypothesis 1 is stronger when the cost of profit shifting is lower.

The list of more and more specific hypotheses concerning international taxation can continue. Nevertheless, the presented hypotheses can be summarized such that the differences in tax regimes provide the opportunity for MNEs to reduce their tax due, while the effect can be largely heterogeneous as different companies can have different tax opportunities and incentives.

Chapter 5

Data

There are essentially two types of data that are necessary for the empirical analysis: data on M&A transactions and ownership structure of involved companies, and data on taxation systems of all countries from which these companies reside. This chapter describes first the taxation data in Section 5.1 and secondly the dataset containing M&A details. Finally, we describe also several other variables and their data sources which enter the empirical analysis as control variables.

5.1   International taxation data

Chapter 3 illustrates that the topic of international taxation is very complicated and many issues need to be carefully evaluated to choose the correct type of tax rate measure. Moreover, the needed data are often difficult to estimate or collect.

As described in Section 3.1, international taxation comprises of multiple taxation concepts, some on the side of the country, where the income is sourced, some in the country to which it is repatriated. Several types of taxes thus need to be covered.

First, the income of a corporation is taxed in the country of its origin by a corporate income tax. This tax is the same for all companies operating in the country, regardless if the company is owned by a non-resident. The data on statutory corporate income tax rates are quite simple to obtain as they are often used in scientific studies, although they change in time. Data for the empirical analysis were sourced from the Oxford University Centre for Business Taxation (Devereux & Bilicka 2018), who compiled an extensive dataset of statutory

corporate tax rates as well as effective average and marginal tax rates for a large number of countries over a significant time span.

The second column of Table 5.1 provides an overview of the corporate income tax rates in all the countries in the analyzed sample as of the year 2017. The tax rates range from 0 percent rate in the so-called tax heavens, such as the Cayman Islands or Bermuda, to as much as over 40 percent rate in the USA.[1]

If the company then wants to pay a dividend from this after-tax income to the parent company, this dividend is again taxed in the country of the income origin by a dividend withholding tax. Typically, each country has a domestic withholding tax rate which is applied to a resident dividend income and then country-pair specific tax rates applied to non-resident dividends, depending on the country of the parent company to which the income is being repatriated. These rates are subject to bilateral tax treaties and can change for each country pair. The majority of countries actually specify two rates for most of the bilateral relations, the lower one being conditional on a certain minimal ownership share that the dividend receiver must hold. This ownership limit is typically 10 or 25 percent. In the absence of a tax treaty with the parent company country, the domestic withholding tax rate is applied.

These data are rather demanding to collect from the original treaty sources, therefore they have been obtained from Deloitte International Tax Source (Deloitte 2018). Tables C.1 and C.2 provide a comprehensive overview of the bilateral withholding tax rates as of 2018 for all the possible country pairs used in the analysis. In order to maintain these already large tables readable, only the lower rates are reported because this analysis uses direct ownership links that in most cases satisfy the ownership thresholds. The tables show that most of the withholding tax rates range between 5 and 20 percent, however, we can also observe a lot of 0 rates, not only in case of the so-called tax havens but also other countries such as Estonia or Hungary.

In the last step, the dividend may be taxed once more in the parent company country by its corporate income tax. Countries usually prevent this double income taxation by applying either a credit for the tax already paid in the subsidiary country or even exempt the foreign source income from income taxation. These regimes are called worldwide taxation and territorial taxation, respectively, and were described in more detail in Section 3.1.

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[1]The US corporate tax rate comprises of federal rate and individual state rates, therefore it can differ among states. The rate in Table 5.1 is an average statutory tax rate.

Table 5.1: Corporate tax regimes

Country	System	Tax rate	Countries exempted	exemption percent-age	Additional requirements		
					min. tax rate	min. own-ership (%)	min. holding per. (yrs)
Australia	T	30.0	All	100	0	10	0
Austria	T	25.0	All	100	0	10	1
Belgium	T	34.0	Treaty	95	0	10	1
Bermuda	T	0.0	All	100	0	0	0
Bulgaria	T	10.0	EU	100	0	0	0
Cayman Isl.	T	0.0	All	100	0	0	0
Canada	T	26.8	Treaty	100	0	10	0
Cyprus	T	12.5	All	100	0	0	0
Czech Rep.	T	19.0	Treaty	100	12	10	1
Denmark	T	22.0	All	100	0	10	0
Estonia	T	20.0	Treaty	100	7	10	0
Finland	T	20.0	Treaty	100	0	10	0
France	T	38.0	All	95	0	5	2
Germany	T	30.9	All	95	0	0	0
Greece	T	29.0	EU	100	0	10	2
Hungary	T	11.0	All	100	0	0	0
India	T	34.6	All	50	0	26	0
Indonesia	T	25.0	All	100	0	25	0
Italy	T	26.5	All	95	0	0	0
Japan	T	30.9	All	95	0	0	0.5
Latvia	T	20.0	All	100	0	0	0
Luxembourg	T	29.2	All	100	10.5	0	1
Malaysia	T	24.0	All	100	0	0	0
Netherlands	T	25.0	All	100	0	5	0
New Zealand	T	28.0	All	100	0	0	0
Norway	T	24.0	All	97	0	10	2
Poland	T	19.0	Treaty	100	0	10	2
Portugal	T	29.5	EU	100	0	10	1
Romania	T	16.0	Treaty	100	0	10	1
Russia	T	20.0	All	100	0	15	1
Singapore	T	17.0	All	100	0	0	0
Slovakia	T	22.0	All	100	0	0	0
South Africa	T	28.0	All	100	0	10	1.5
Spain	T	29.4	Treaty	100	0	5	1
Sweden	T	22.0	EU	100	0	10	1
Switzerland	T	21.2	All	95	0	10	0
Turkey	T	20.0	All	100	15	10	1
UK	T	20.0	All	100	0	0	0
Virgin Isl.	T	0.0	All	100	0	0	0
Argentina	W	35.0	None				
Brazil	W	34.0	None				
Croatia	W	18.0	None				
Chile	W	24.0	None				
China	W	25.0	None				
Ireland	W	12.5	None				
Israel	W	25.0	None				
Korea	W	22.0	None				
Mexico	W	30.0	None				
Ukraine	W	18.0	None				
USA	W	40.5	None				

Table 5.1 presents the foreign source income taxation regimes of countries in our sample as of 2018. These data are obtained from Deloitte's International Tax Guides and Highlights (Deloitte 2019). The second column of this table states whether each country applies territorial (T) or worldwide (W) taxation system. It shows that most countries allow for exempting the foreign source income from taxation, nevertheless, some of them allow this only for tax treaty partner countries or fellow EU countries. Some countries also allow only for a portion of the income being exempted, most commonly 95 percent. Additional requirements may be also further specified, such as the minimum tax rate in the subsidiary country, minimum ownership share of the subsidiary or minimum holding period. These additional requirements are used and accounted for in the empirical analysis but are not included in the table to maintain legibility.

Nevertheless, 11 countries in the sample tax worldwide income and only provide credit for tax already paid. Two notable examples are Ireland and the USA. Whereas US-based parent companies have to tax all their repatriated foreign income by the high US corporate tax rate, the low 12.5% corporate tax of Ireland de facto means that most of the foreign income is exempted because of the tax paid in the subsidiary country exceeds the domestic tax duty. Ireland is thus much more convenient residence for parent companies than the USA, even though both countries use the worldwide taxation system.

5.2   M&A data

Most of the M&A research is based on Thomson Reuters database SDC. Nevertheless, SDC provides only a little information on ownership structures. Therefore, this analysis is based on M&A deals recorded in the Zephyr database collected by Bureau van Dijk (BvD), which can be easily combined with the Amadeus database containing detailed ownership data collected also by BvD. Zephyr collects data about various corporate takeovers, IPOs and other transactions connected to changes in ownership structure, which helps to keep Amadeus ownership database up to date.

The used dataset is restricted for transactions after 1st January 2009 as the archived accounting data are available only for 10 years back and also the period of 2009 - 2018 could be assigned to the last M&A wave[2] and therefore

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[2]Waves in M&A activity are well documented and researched phenomenons. Most of the researchers agree that there have been seven M&A waves up until today. See for instance Bruner (2005), Harford (2005) or Maksimovic *et al.* (2013).

could be seen as a representative sample across all phases of M&A wave. We further restrict the sample to completed deals witch results in more than 200 000 transactions in the sample, involving 49 countries as summarized in Table 5.2.

The main variable obtained from the Zephyr is the pre-announcement premium defined as the acquisition price divided by pre-announcement market capitalization minus 1. There are also several other measures concerning the transaction as well as the specifics of the target and the acquiring company. See Appendix A for summary and definition of used variables.

Ownership data

Amadeus ownership database collects ownership links for a wide range of companies. Each link is defined by owning and owned subject (alternatively by shareholder and subsidiary) and contains certain information about direct or total ownership, date of validity (in form of month and year) and source of the information.

Nevertheless, the ownership database has also some severe limitations caused by the nature of ownership data. Mainly, every ownership link is truly valid only at the date of information, because BvD cannot guarantee that they do not miss any change of ownership. Nevertheless, BvD treats the link as "active" as long as they do not register some update of the existing link or some new link contradicts the previous links. In such cases, BvD archives old link and creates a new active link. Moreover, some links are not specific and include just relative or approximate value. Consequently, it is rather rare to have a complete picture of ownership structure, which may cause that some important ownership links in multinational companies could be omitted.

The empirical analysis requires the data of ownership structure prior and especially after the takeover so that we can reconstruct the whole group of the acquirer up to his global ultimate owner and all related subsidiaries. Knowledge of the MNE structure is supposed to bring insight to which transactions are or can be tax-motivated and which of them have rather different motivations. For example, MNE having several subsidiaries in different jurisdictions is not likely tax-motivated to overtake another subsidiary in one of the same jurisdictions. On the other hand, a company based in a single country with a high tax regime might be motivated to overtake the company in a low-tax regime in order to shift profit.

Unfortunately, it is not possible to recall a large number of archived links

from BvD. Therefore, we proceed similarly to Arulampalam *et al.* (2018) such that we retrieve the actual ownership links of subsidiaries (direct and indirect up to level 5) for all companies that are identified as a target, acquirer, vendor, global ultimate owner of the acquirer or global ultimate owner of vendor in any of the transactions since January 2009. In the second step, we recursively update these ownership links based on those transactions going back in time. This is not a straightforward task and it requires several simplification assumptions that deal with the nature of data. Consequently, some of the resulting pre-transaction MNE structures might be incomplete or not entirely correct.

We identify several variables describing the group of companies defined as the companies having a common ultimate owner (ultimate owner is the independent company owning directly or indirectly at least 50 % of the company). These are especially variables concerning the location of subsidiaries, the size of the group and minimal tax rates across the group. The exact definition of all variables is in described Appendix A.

5.3 Additional control variables

To account for other factors that could affect the location choice of the target company we include several control variables. First, GDP in the target country is used as an important indicator of the economic development of the given country which is certainly important for the location choice. The data are obtained from the OECD National Accounts Statistics database (OECD 2014). Second, country-pair specific variables are included, because they capture that given that the acquirer comes from a particular country, certain other countries have a similar socio-economic environment and thus it is easier to set up a presence there. For each country-pair, we have five dummy variables indicating common border, common language, common religion, whether the countries used to be one state and whether they have or ever had a colonial link. Finally, we include also variable containing distance between the two countries, because there are transportation costs connected to a greater distance between the two involved countries. All of these country-pair specific variables are obtained from the GeoDist dataset compiled by Mayer & Zignago (2011) from CEPII - French center for research and expertise on the world economy.

Both target and acquirer country GDP are involved also in the estimation of premium to control for economic situations specific to the two involved countries.

5.4   Data summary

The following Table 5.2 summarizes M&A activities by each country in the used sample. Unsurprisingly, the most active M&A markets are in countries of G8 (all in top 15), furthermore, there are also the Netherlands, Spain, and China in the top 10. Quite similar statistics apply for cross-border takeovers as well, here we can see also countries that are commonly seen as a tax havens such as Singapore, British Virgin Islands, the Cayman Islands in the top 15.

The second column provides a relative proportion of cross-border transactions and we can observe that the tax havens have the highest proportions of foreign M&A deals. Besides the countries mentioned above, we can see some other island countries such as Bermuda (1.) with a staggering 95% of cross-border transactions, or Cyprus (4.). In the top 10, there are also some European countries that might be seen favorable in terms of taxation such as Luxembourg (2.), Ireland (5.) or Switzerland (10.). Smaller open economies such as Slovakia, Austria or Israel have also a quite high proportion of cross-borders. Moreover, we can observe that countries often labeled as tax havens are rather acquiring countries than targeting countries, which again corresponds to potential tax motivation, for instance for tax inversions.

The second rightmost column reports the difference in the value of transactions (measured in billions of euros) as a target minus as an acquirer, showing the net inflow of incoming foreign investment through M&A. Here we can observe that while the USA have by roughly 45% more transactions as acquirer than as target, the net inflow of M&A investment is positive and the largest in the studied sample. This means that US target companies are larger or simply more expensive than foreign targets acquired by US parents. An opposite effect can be observed for instance for Germany or China. The last column relates the yearly average of net inflow of foreign M&A investment to GDP, meaning that it shows the value of net inflow of M&A investment relative to the size of the economy. Here we can observe that by far the largest relative inflow is to Bermuda, followed by Cyprus, Belgium, and Luxembourg.

Even such simple statistics can reveal certain patterns of tax-motivated cross-border M&As. However, it needs to born in mind that the presented sample is indeed only a sample of deals documented by the BvD. The sample might be subject to a selection bias as the BvD does not need to be well established in all countries and therefore, arguably, some domestic transactions in Caribbean islands could be more likely omitted in the database.

Table 5.2: M&A transactions by countries

	All		Crossborder transactions				
		% of	number of transactions			value of transactions	
Country	total	total	acquirer	target	balance	balance	to GDP
Argentina	487	54%	34	229	195	12.24	0.20%
Australia	8380	35%	1268	1630	362	85.91	0.56%
Austria	1805	64%	668	496	-172	9.11	0.17%
Belgium	2829	59%	773	890	117	-213.94	-3.69%
Bermuda	924	95%	639	236	-403	-90.33	-128.41%
Brazil	2897	43%	136	1113	977	67.08	0.25%
Virgin Isl.	3824	64%	1265	1180	-85	34.33	0.00%
Bulgaria	4489	18%	51	764	713	4.37	0.65%
Canada	11396	47%	2867	2470	-397	-157.64	-0.79%
Cayman Isl.	1845	93%	1102	621	-481	19.12	0.00%
Cyprus	1505	91%	1100	272	-828	-32.36	-11.40%
Czech Rep.	2923	29%	207	632	425	18.65	0.69%
Denmark	3198	49%	732	834	102	8.27	0.20%
Estonia	1647	16%	111	148	37	0.18	0.09%
Finland	5378	26%	715	660	-55	-17.50	-0.59%
France	9651	45%	2666	1719	-947	-128.37	-0.39%
Germany	12428	51%	2887	3435	548	-123.36	-0.27%
Greece	376	51%	67	123	56	15.84	0.52%
Hungary	724	39%	71	209	138	2.95	0.17%
Chile	651	50%	64	261	197	31.25	0.97%
China	24668	9%	913	1398	485	-87.57	-0.07%
India	5254	28%	544	933	389	40.32	0.14%
Indonesia	1428	33%	66	406	340	9.13	0.09%
Ireland	1656	81%	768	572	-196	-43.84	-1.17%
Israel	1191	66%	333	448	115	-21.25	-0.61%
Italy	5630	39%	807	1395	588	63.03	0.26%
Japan	13409	13%	1431	351	-1080	-248.61	-0.39%
Korea	2837	17%	285	210	-75	-2.50	-0.03%
Latvia	652	30%	47	149	102	0.91	0.25%
Luxembourg	1197	94%	849	278	-571	-27.27	-3.12%
Malaysia	6294	16%	447	572	125	-8.33	-0.24%
Mexico	853	63%	158	379	221	5.63	0.04%
Netherlands	9843	41%	2170	1833	-337	-224.04	-2.31%
New Zealand	1286	50%	177	460	283	-0.57	-0.09%
Norway	4101	39%	727	887	160	20.35	0.39%
Poland	6402	19%	315	870	555	13.74	0.22%
Portugal	811	48%	100	288	188	30.61	1.08%
Romania	1131	36%	47	355	308	6.98	0.29%
Russia	9220	15%	419	935	516	10.09	0.11%
Singapore	3977	55%	1314	869	-445	-73.13	-1.86%
Slovakia	416	66%	122	154	32	1.88	0.16%
South Africa	2335	27%	142	490	348	8.90	0.25%
Spain	11861	18%	733	1358	625	130.77	0.79%
Sweden	8063	43%	2167	1290	-877	17.15	0.26%
Switzerland	4072	63%	1646	929	-717	-22.77	-0.39%
Turkey	1074	46%	115	374	259	10.11	0.10%
Ukraine	1991	34%	56	622	566	7.69	0.45%
UK	26984	37%	4654	5274	620	354.46	1.03%
USA	59372	28%	9738	6712	-3026	482.35	0.21%

Chapter 6

Methodology

The Section 4.3 describing our hypotheses suggests that the difference in taxation influences the location choice of targeted country and takeover premium. In order to test these hypotheses empirically, we can build on Equation (4.2) which tells us that the takeover premium depends on relative bargaining power δ and synergies $s(x)$, that we can model as follows:

$$\pi_{at} = \alpha_1 Z_a + \alpha_2 Z_t + \beta T_{at} + \gamma X_{at} + \epsilon_{at} \tag{6.1}$$

Where the π_{at} is the realized takeover premium. Z_a and Z_t are acquirer and target company characteristics, including their location, and country characteristics such as tax rates. X_{at} are the pairwise characteristics of acquirer and target including the interactions of Z_a and Z_t. T_{at} are the tax variables of interest, including the difference in target and acquirer effective average tax rate, $|\Delta EATR|$. The coefficients to estimate are α_1 , α_2, β γ and the ϵ_{at} represents the error term.

Further, the Section 6.1 and 6.2 describes the methodology for estimation of location choice model and regression on takeover premium, respectively. The Section 6.3 develops the methodology that attempts to interpret regression results by estimating the impact of profit shifting on national corporate tax collections.

6.1   Location choice of target company

The research question for Hypothesis 1 a) is the effect of tax differences on location choice for the expansion. In other words, how does taxation influence

the probability of selecting a target in a given country? This approach can be addressed empirically using the cross-border transaction data. Each transaction is one realization of location choice selection, where we can assume that the acquiring company selects the target company in a country, which offers the greatest profit to the acquirer. We can link total profit $\Pi_{a,t}^A$ of acquirer to the (4.2) as

$$\Pi_{at}^A = V_{ta} - P_{ta} = V_{ta} - V_{t0} - \delta * S_{ta} = (1 - \delta)S_{ta} \approx \beta X \qquad (6.2)$$

which depends on the same factors as takeover premium in (6.1) and therefore can be estimated also in a similar way.

The acquisition of target company in country k therefore means that $\Pi_{at_k}^A > \Pi_{at_h}^A$ for all h different from k. Feld *et al.* (2013), Herger *et al.* (2016) or Arulampalam *et al.* (2018) further suggest that the $Prob\left(\Pi_{at_k}^A > \Pi_{at_h}^A | \beta X\right)$ can be estimated using the multinomial logit form model. Hence,

$$Prob\left(\Pi_{at_k}^A > \Pi_{at_h}^A | \beta X\right) = \frac{exp\left(\beta X\right)}{\sum exp\left(\beta X\right)} \qquad (6.3)$$

Herger *et al.* (2016) focus on the location choice of targets similarly to our analysis. They decide to use Poisson regression to estimate the probabilities, which makes the estimation less computational intense compared to multinomial logit regression.[1] Nevertheless, this model does not allow to control for deal-specific variables as well as company-specific variables such as acquired share, prior stake in the target (toehold) or acquirer MNE structure, which might be crucial to proxy for profit shifting or tax inversion incentives. Feld *et al.* (2013), studying the switch from worldwide to the territorial tax system in the UK and Japan, estimate the conditional multinomial logit model. Most recently, Arulampalam *et al.* (2018) study the effect of the target country corporate tax rate on the probability of acquisition. Their study brings two methodological inventions compared to the previous ones. First, they include also the domestic takeovers and not only cross-boarders to the analysis. Second, they release the assumption of independence of irrelevant alternatives

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[1]Figueiredo *et al.* (2003) develops the way how to convert the conditional logit model to Poisson regression, which is not such computationally intense, while it leads to the same estimated coefficients and also asymptotically the same standard errors.

(IIA),[2] which would be violated given the hypothesized heterogeneous effects
of taxes on location choices. More specifically, they claim that the target coun-
try statutory corporate tax rate can have either a positive or negative effect
on location choice given the acquirer specifics. Therefore they use random
parameters mixed logit model that is well suitable also for our analysis.

We estimate the mixed effect model with random effects of tax difference
variables. The developed multinomial logit consists of 49 logit equations where
in each of the equations is estimated log odds of selecting given country as
opposed to all other alternatives. Consequently, there are two types of coef-
ficients. Choice specific coefficients that can vary for each country and choice
invariant coefficients that are restricted to have the same value for each country
and therefore can be easily interpreted. Details on estimation procedure can
be obtained in Arulampalam *et al.* (2018) or the practical usage using software
R is described by Zeileis & Croissant (2009) and Hasan *et al.* (2014).

The multinomial logit model requires a huge amount of data to be processed,
especially if there are many choice alternatives. Basically, each observation of
the transaction needs to be factorized to a set of alternative choices, therefore
every transaction is recorded on 49 rows as we study 49 target countries, i.e.
the total dataset has $i * j$ rows for i transactions and choice between j countries.
The usage of rather a large sample of transactions (204 903) as in our case re-
quires to process table of more than 10 million rows, which requires substantial
computational power, especially for random parameter model estimation.

6.2 Profitability: Impact of taxation to takeover premium

Moving to the Hypothesis 1 b) and effect on profitability, it is useful to briefly
remind the concept of company valuation, where the basic valuation perspec-
tive is through the net present value of discounted cash flows. Consequently,
the takeover premium can be also interpreted as a percentage increase in div-
idend payments caused by a transaction that is captured by original target
shareholders. Hence, it is a part (*delta*) of the additional profitability created
by the transaction. There are several theoretical (Grossman & Hart 1980) as
well as empirical studies (Betton *et al.* 2008) suggesting that all the additional

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[2]IIA is one of the assumptions of standard multinomial or conditional logit model when
the alternative choices are assumed to be independent.

value is in reality captured by the original target shareholders and hence the $\delta = 100\%$. This becomes an important assumption for the interpretation of results in the following section.

The effect of taxation on takeover premium can be directly estimated by equation (6.1) using OLS, where the realization of takeover premium pi_{at} is measured by the pre-announcement premium. A similar approach was used also by Huizinga *et al.* (2012) who study the impact of the double tax rate on takeover premium in cross-border takeovers. They build their methodological framework on the discounted dividend approach of target valuation. Their main hypothesis states that double-taxation additionally reduces the net of tax dividend flow to the foreign acquirer company and consequently also reduces the value of the target company, which might be materialized in lower takeover premium. They conclude that there is a negative association between country-pair double-tax rate and takeover premium and that the additional taxation is almost fully transmitted to the lower takeover premium, which means that this additional tax burden is borne by target-firm shareholders. Such outcome is in line with common perception (underlined by empirical studies such as Betton *et al.* (2008)) that all the transaction synergies are fully captured by target-firm shareholders and hence included in takeover premium, therefore also additional taxation should reduce 1:1 the takeover premium.

Huizinga & Voget (2009) estimate the model also using IV regressions as they argue that double tax rate can be endogenous because the activity on M&A market might influence the bilateral negotiations of tax treaties. Nevertheless, in the case of statutory tax rates we see such endogeneity pattern less likely as the national policies are unlikely to be influenced by any private bilateral transactions.

Nevertheless, the main methodological issue concerns the explained variable. Takeover premium should correspond to the percentage differences of takeover price with respect to the unaffected value of the target company. The unaffected value of the target company is hard to observe even for listed companies, where common proxy measure is the market capitalization prior to the announcement of the transaction. This relies on the effective market, but at the same time, it assumes that no rumors affected the share price prior to the announcement. There is no usable source of unaffected value of non-listed companies. Even the measure of the transaction price is not known in all cases and in the case of a share deal, it could be further influenced by share value fluctuation. Overall, the measure of takeover premium does not need to be consistent

across all transactions and can be subject to measurement error. In order to deal with some outlier observations that might emerge by this measurement error, the data are winsorized by the 1st and 99th percentile.

Other methodological concerns might relate to the random sampling of data because the takeover premium is by definition available just for the listed companies, which do not represent a random sample of companies and therefore the generalization of results for all companies can be misleading.

6.3 Estimation of country profit/loss from cross-border takeovers

It would be very useful from the perspective of tax policy implication to evaluate the impact of tax differences on individual national budgets and namely in our analysis of collections of corporate income tax. Such an impact is in general very difficult to evaluate and there has been no attempt to do so on the transaction-level data, to the best of our knowledge. Nevertheless, this chapter presents an innovative approach how to approximate the impact of profit shifting of post-takeover MNE on national corporate tax collections. This approach might be over-simplified and built on too strong assumptions, so the results need to be interpreted with caution. Still, it can provide useful intuition and stepping stone for further research.

Let us assume that buyer company from country a taxes each unit of additional income[3] by effective average tax rate t_a and the target company from country t is taxed by rate t_t. When the buyer takes over the target with a premium π, then the premium caused by taxation could be estimated according to equation 6.1 as follows:

$$\widehat{\Pi_i^{tax}} = \widehat{\beta} * |\Delta_{t-a}EATR| * V_{t,0} \tag{6.4}$$

If we further assume that all transaction synergies/benefits are captured by the target[4] and consequently, that the premium is a reasonable estimate of total synergies/benefits, then our estimate $\widehat{\Pi_i^{tax}}$ is also the estimate of total corporate tax benefit leading from the transaction.

This $\widehat{\Pi_i^{tax}}$ can be interpreted as an expected present value of all future tax savings. And if the whole tax benefit is caused by post-takeover profit shifting,

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[3] Here, the assumption of proportional tax burden applies.
[4] See the first paragraph of the previous section.

then the present value of future shifted pre-tax income from buyer to target needs to correspond to $\widehat{\beta}V_s$ for tax-motivated takeovers as formalized by the following equation.

$$shifted\_income_i = \frac{\widehat{\Pi_i^{tax}}}{|\Delta_{t-a}EATR|} = \widehat{\beta}V_{t,0} \qquad \text{for } |\Delta_{t-a}EATR| \neq 0 \quad (6.5)$$

Finally, if the profit is shifted to the target the tax loss of country a and the tax benefit of country t from the cross-border takeover i could be estimated as follows:

$$\widehat{T_i^t} = \widehat{\beta}t_tV_{t,0} \qquad\qquad\qquad\qquad\qquad (6.6)$$

$$\widehat{T_i^a} = \widehat{\beta}t_aV_{t,0} \qquad\qquad\qquad\qquad\qquad (6.7)$$

which holds just for tax-motivated transactions $\Delta t_{rs} \neq 0$ and also it clearly depends only on the fixed estimate of *beta* and the absolute effective tax rate and not the difference, which is not entirely realistic. Nevertheless, it is straight forward to generalize this approach for more tax measures including the interaction terms or non-linear transformation such as polynomial.

Once we have an estimate for an individual transaction, we can either try to generalize the effect on total FDI flows or evaluate the effects on the sample of observed transactions, which is also the way used in the presented analysis. The aggregated in-sample estimate of impact of M&A transaction on national corporate tax collection of country k is:

$$\Delta NPV(tax\_collection_k) = \sum_{i,k=t}^{I} \widehat{T_i^t} + \sum_{i,k=a}^{I} \widehat{T_i^a} \qquad (6.8)$$

The notation $\Delta NPV(tax\_collection_k)$ suggests the interpretation of this estimate as it corresponds to the change of corporate income tax collection and it is the net present value of all future tax losses and gains connected with possible profit shifting and not the yearly impact to the budget. Trying to transform estimates to yearly tax revenues/losses, we can assume perpetuity with the cost of equity 7 % and growth rate 2 %.[5] Using the Gordon formula, the yearly estimate of tax profit/loss can be obtained by multiplying the total

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[5]The parameters are selected with no special treatment, but they should correspond to the acquirer company, even though the value for the government can be different.

value by (0.1 - 0.02). The impact within the analyzed sample is summarized in Section 7.3.

It is necessary to keep in mind all the strong assumptions and simplifications when interpreting these estimates. Firstly, the estimate does not take into consideration all possible benefits and costs of transaction for a given country as described in Chapter 2 (i.e. positive spillovers to the domestic economy, other paid taxes), but rather focuses just on tax revenues/losses from possible profit shifting. Secondly, assuming that premium is equal to total synergies implies that our estimate should be rather underestimated, on the other hand not all the post-takeover MNEs necessarily shift profit, which would cause our calculation to be rather overestimated. When aggregating across all takeovers, there could be some sample bias, because the estimation of the premium is done only on listed companies. Lastly, the estimates are calculated just for in sample transactions and not generalized for the whole economy and its development.

Chapter 7

Results

This chapter presents the regression results of a multinomial logit model of target location choice (7.1) and model on takeover premium (7.2). The economic effect of described findings is demonstrated in Section 7.3, where we estimate the impact of profit shifting on national budgets.

7.1 Effects on targets location

The regression results of multinomial logit specified in Section 6.1 are summarized in Table 7.1 and Table 7.2. Each column summarizes one of the model specifications and the explained variable is the log odds of the choice of the target country for all model specifications. Each model specification of the multinomial logit model consists of 48 equations as we have 49 alternative choice target countries.

Even though this seems like a huge model that could be hard to identify, it allows us to include even several choice specific parameters given the more than 200 000 studied transactions, that further split into 49 * 200 000 binary decisions.[1] The model includes choice specific coefficients for target country intercepts α_k and difference in GDP of target and acquiring country, which control for substantial part of variation, especially target country intercepts control for target country specifics. Nevertheless, these coefficients are not presented in the results table for the sake of clarity.[2]

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[1] Each transaction is a set of 49 binary decisions as the target selects one target country (1) and reject rest 48 countries (0).

[2] Given the large number of observations, the model can estimate even more choice specific coefficients with sufficient computational capacity. Unfortunately, it is difficult to collect complete data for a wide range of 49 countries including some small countries (e.g. the Cayman Islands)

Table 7.1: Location of targets: multinomial logit regressions, part 1

	(L1)	(L2)	(L3)
$\|\Delta_{t-a}EATR\|$	1.15***		
	(0.09)		
$\|\Delta EATR\|^+_{t>a}$		1.71***	
		(0.32)	
$\|\Delta EATR\|^-_{t<a}$		0.60*	
		(0.31)	
$\min\|\Delta EATR\|^+_{t>acq.group}$			0.38
			(0.31)
$\min\|\Delta EATR\|^-_{t<acq.group}$			−0.45
			(0.32)
$EATR_t$	−0.02	−0.06	0.03
	(0.12)	(0.12)	(0.12)
isCrossboarder	−2.08***	−2.09***	−2.02***
	(0.05)	(0.05)	(0.05)
isCrossboarder & DTR	−4.30***	−4.30***	−3.92***
	(0.10)	(0.10)	(0.10)
new location	−2.33***	−2.32***	−2.33***
	(0.03)	(0.03)	(0.03)
new location & $isMNE_a$	0.97***	0.97***	0.97***
	(0.02)	(0.02)	(0.02)
log(dist)	−0.34***	−0.34***	−0.33***
	(0.01)	(0.01)	(0.01)
neighbours	0.56***	0.56***	0.57***
	(0.02)	(0.02)	(0.02)
neighbours & $isMNE_a$	−0.28***	−0.28***	−0.28***
	(0.03)	(0.03)	(0.03)
language	1.34***	1.34***	1.36***
	(0.01)	(0.01)	(0.01)
colony	0.22***	0.22***	0.20***
	(0.02)	(0.02)	(0.02)
use to same country	0.20***	0.20***	0.21***
	(0.04)	(0.04)	(0.04)
AIC	445886.47	445885.11	446036.62
Log Likelihood	-222883.24	-222881.56	-222957.31
Num. obs.	204903	204903	204903
K	49	49	49

Note: Location choice of the target country is the dependent variable in all reported models. The standard errors are reported in the parentheses, stars denote significance on 10% (*), 5% (**) and 1% (***) significance level.

Table 7.2: Location of targets: multinomial logit regressions, part 2

	(L4)	(L5)	(L6)	(L7)
$|\Delta EATR|^+_{t>a}$	1.96***	1.69***	0.38	
	(0.32)	(0.32)	(0.43)	
$|\Delta EATR|^-_{t<a}$	−5.16***	0.60*	0.57*	
	(0.34)	(0.31)	(0.31)	
$|\Delta EATR|^-_{t<a}$ & zero Double Tax Rate	7.71***			
	(0.17)			
$|\Delta EATR|^-_{t<a}$ & target in new location		0.21		
		(0.27)		
$|\Delta EATR|^+_{t>a}$ & tax inversion flag			1.45***	2.00***
			(0.31)	(0.16)
$|\Delta EATR|^-_{t<a}$ & zero DTR & new location				4.49***
				(0.29)
$EATR_t$	−0.47***	−0.06	−0.07	0.03
	(0.12)	(0.12)	(0.12)	(0.12)
new location	−2.29***	−2.32***	−2.32***	−2.29***
	(0.03)	(0.03)	(0.03)	(0.03)
isCrossboarder	−2.13***	−2.09***	−2.09***	−2.09***
	(0.05)	(0.05)	(0.05)	(0.05)
isCrossboarder & DTR	−3.40***	−4.30***	−4.27***	−4.13***
	(0.10)	(0.10)	(0.10)	(0.10)
new location & $isMNE_a$	0.95***	0.97***	0.97***	0.90***
	(0.02)	(0.02)	(0.02)	(0.02)
log(dist)	−0.38***	−0.34***	−0.34***	−0.34***
	(0.01)	(0.01)	(0.01)	(0.01)
neighbours	0.59***	0.56***	0.56***	0.56***
	(0.02)	(0.02)	(0.02)	(0.02)
neighbours & $isMNE_a$	−0.26***	−0.28***	−0.28***	−0.25***
	(0.03)	(0.03)	(0.03)	(0.03)
language	1.29***	1.34***	1.34***	1.35***
	(0.01)	(0.01)	(0.01)	(0.01)
colony	0.18***	0.22***	0.22***	0.21***
	(0.02)	(0.02)	(0.02)	(0.02)
use to same country	0.23***	0.20***	0.20***	0.20***
	(0.04)	(0.04)	(0.04)	(0.04)
AIC	443752.32	445887.11	445864.54	445657.54
Log Likelihood	-221814.16	-222881.56	-222870.27	-222767.77
Num. obs.	204903	204903	204903	204903
K	49	49	49	49

Note: Location choice of the target country is the dependent variable in all reported models. The standard errors are reported in the parentheses, stars denote significance on 10% (*), 5% (**) and 1% (***) significance level.

The explanatory variables of interest are differences in effective average tax rate (EATR) of target and acquiring country and corresponding interaction terms that are further discussed in detail. The EATR is selected as the appropriate measure as reasoned by Devereux (2007), nevertheless, we replicate the estimation also for statutory tax rate (presented in Appendix D) and EMTR (unrepresented) and the estimated coefficients remain qualitatively unchanged for all three alternatives.[3]

Starting with the test of Hypothesis 1 a), we examine the estimated coefficient of a variable of difference between target and acquirer country EATR in absolute value $|\Delta_{t-a}EATR|$ in the first column of Table 7.1 (L1). This variable has a positive and significant effect as expected, which means that a higher difference in taxation, ceteris paribus, increases the probability of selecting the target with this larger taxation difference. Interpretation of marginal effect depends on the magnitude of tax difference, but in case of average difference in cross-border transaction of 8 percentage points (p.p.), decreasing this difference to 0 (such that the tax rates would be unified) would mean a decrease in odds by 9.2 %.[4]

In the second column of Table 7.1 (L2) the asymmetric effect is tested by splitting the differences in EATR between target and acquirer to a case when the target has a higher tax rate ($|\Delta EATR|_{t>a}^{+}$) and to the opposite case when the target has a lower tax rate ($|\Delta EATR|_{t<a}^{-}$). Both of these tax differences are again recorded in their absolute values. We can observe that in the case when the target has a higher tax rate, the difference is almost three times larger than for the other case of tax difference. Still, for both of them, the coefficients are positive and statistically significant. This finding shows that the effect of difference in taxation on the choice of location is indeed asymmetric as suggested by Hypothesis 2 and that the positive difference $EATR_t > EATR_a$ has a larger impact on the selection of target country than negative differences.

The stronger effect of positive differences ($|\Delta EATR|_{t>a}^{+}$) might be associated with tax inversions, where by definition the acquirer merges with target in a higher tax jurisdiction. Moreover, the tax inversions are usually from the worldwide system to the territorial tax system (Feld *et al.* 2013). Dummy indicating territorial system in the target country is therefore added as an interaction term in the model specification (L6) depicted in Table 7.2, where we

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[3]Note that it is not possible to include more kinds of measures to one regression due to their high correlations.

[4]$\frac{\Delta odds}{odds} = \beta * \Delta\{|\Delta_{t-a}EATR|\} = 1.15 * 0.08 = 9.2\%$

can observe that the positive effect of tax differences is stronger and therefore mainly associated with this kind of transactions.

Focusing on MNE structure, we replace the company wise tax rate differences by the absolute value differences of minimal tax rate across jurisdictions of acquirer MNE group and target country tax rate. In column (L3) of Table 7.1, we can see that such measures have no significant effect on target location choice, which is against our Hypothesis 3 b). The model specification (L5) also shows no significant increase in tax difference effect in the case when the target is domiciled in a new location as supposed by Hypothesis 3 a). These results mean that tax differences are important for target choice decision mostly on the company level and whole group structure does not play a role for tax differences effect.

In order to test Hypothesis 4, whether the cost of profit shifting influences the tax differences effect, the model specification (L4) in Table 7.2 includes interaction term of negative tax differences $\min |\Delta EATR|^+_{t>acq.group}$ with dummy specifying whether the double tax rate on repatriation of income is equal to zero. The effect of this interaction term is very high[5], but confirms that if there is no additional taxation of profit repatriation, there is also no additional tax cost associated with profit shifting to target country with lower tax regime.

Finally, (L7) attempts to combine all found heterogeneity effects into one simple model specification. We can easily compare that the magnitude of tax differences effects for those specified transactions is substantially higher than in the (L2) column. This leads to the conclusion that there are many heterogeneous effects of taxation which should be carefully treated in every tax-related study and especially under the international framework. And consequently, all studies that try to control for taxes linearly omit this heterogeneity.

Except for these tax difference variables, each model includes also the same set of control variables that are estimated as a choice invariant (i.e. they are assumed to have the same effect for all targeted countries). First of all, cross-border transactions are less likely than domestic takeovers. The estimated coefficients around -2 can be interpreted as a change in the log of odds and hence exponential of the coefficient can be interpreted as the effect on odds, hence the cross-border transaction, ceteris paribus, is as much as 7 times less likely than a domestic transaction. A similar negative effect is also estimated for expansions to a new location, where the acquirer has not operated prior

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[5]Likely due to partially over-fitting with the base level that has rather large negative effect.

to the transaction, but this effect is lower for acquirers identified as a part of MNE prior to the transaction.

Further, there are two additional tax measures included as control variables. First, the level of target country EATR is supposed to have a negative effect on location choice according to Arulampalam *et al.* (2018). Nonetheless, it turns to be rather insignificant in our estimates, where we control for tax differences. This might be interpreted in the way that differences in taxation are indeed more important than levels, even though they are inherently correlated. Second, the double tax rate that measures additional taxation connected with the repatriation of profit has a large negative effect confirming the findings of Huizinga & Voget (2009) and Feld *et al.* (2013) that additional taxation on repatriation of profit hinders the incentives to invest in a given jurisdiction.

Finally, there is a set of variables measuring the proximity and similarity of countries such as common border, similar language or past colonial and federation relation, all of which have a positive effect on the probability of takeover as expected. Also, the geographical distance of countries has expected negative correlation as it is a reverse measure of countries' proximity. Overall, the more proximate the countries are the more likely they are chosen for M&A transaction. The interaction terms show, that these effects are weaker for MNEs as they are able to adapt more easily.

7.2   Effects on profitability

This section elaborates on the regression results for the analysis on takeover premium summarized in Table 7.3 and Table 7.4. Before the detailed effects will be described, it is useful to remind the connection of previous analysis on the selection of target location to this one. We moved from the second step of the decision process of MNE to the fourth step (refer to Section 4.3 and Devereux (2007)), therefore given the choice of the target location, MNE decides on the allocation of profit based on the value of this allocation.

The data sample for the analysis of tax differences effect on profitability is unfortunately rather restricted by the need for enumeration of transaction premium, which is in principle derived as a percentage difference of deal value per share and unaffected market share price on the stock market. Hence the following analysis is restricted only to transactions, in which the target company is publicly traded and the value of the transaction is known, which shrinks our sample to the 5515 takeovers including 1750 cross-border transactions. Even

though this is just a fraction (less than 3 %) of the whole sample, we can still run a decent regression analysis, while keeping in mind the findings from the previous section.

The explained variable is the pre-announcement takeover premium expressed as a percentage for all model specifications. Devereux (2007) suggests the marginal tax rate to be the most appropriate measure for this decision step of profit allocation, as it should be the closest measure of tax applied to additional shifted profit. Nevertheless, we present the results for EATR for consistency with the previous section as it is the most universal measure. Similar model specifications are also estimated for the statutory tax rates (presented in Appendix D) and EMTR (unrepresented) and the estimated coefficients remain qualitatively unchanged for all three alternatives.

To test Hypothesis 1 b), we use again the difference between target and acquirer country EATR in absolute value $|\Delta_{t-a}EATR|$ as the main explanatory variable of interest. The results of the base estimation model are presented in column (P1) of Table 7.3 and the $|\Delta_{t-a}EATR|$ has a positive and significant effect as hypothesized. This means that higher difference in taxation, ceteris paribus, increases the takeover premium and hence represents additional value in the transaction. The interpretation of the effect is quite straight forward, 1 p.p. increase in tax difference causes 0.3 p.p. increase in takeover premium. This means that for the case when target and acquirer have the same tax rates, the percentage premium is 2.4 p.p. lower compared to a case when the difference in tax rates is 8 p.p., which is the average difference for cross-border transactions in our sample. We of course control for the effect of cross-border transactions as such by including a dummy variable, therefore the above-mentioned effect can be truly attributable to the difference in taxation.

In column (P2) the asymmetric effect is tested by splitting the differences in EATR between target and acquirer to a case when the target has higher tax rate ($|\Delta EATR|_{t>a}^{+}$) and to the opposite case when the target has a lower tax rate ($|\Delta EATR|_{t<a}^{-}$), similarly to the location model. We can observe that both coefficients have almost the same magnitude, but still the reasoning tax optimization mechanism needs to be different for each of them.

Looking at the MNE structure, we replaced the company wise tax rate differences by the absolute value difference of minimal tax rate across jurisdictions of acquirer MNE group target MNE group. In column (P3), we can see that for positive tax differences $\min |\Delta EATR|_{tar.group>acq.group}^{+}$ is the effect literally the same as in column (P2) for company-level differences, while in case

Table 7.3: Profitability: regressions on takeover premium, part 1

	(P1)	(P2)	(P3)	(P4)	(P5)
(Intercept)	−3.93	−3.14	0.49	0.10	−2.17
	(12.96)	(13.22)	(13.07)	(13.26)	(13.12)
$\lvert\Delta_{t-a}EATR\rvert$	0.30**				
	(0.12)				
$\lvert\Delta EATR\rvert^{+}_{t>a}$		0.27*		0.26	
		(0.16)		(0.17)	
$\lvert\Delta EATR\rvert^{-}_{t<a}$		0.35*		0.26	
		(0.18)		(0.19)	
$\min\lvert\Delta EATR\rvert^{+}_{tar.group>acq.group}$			0.27*	0.22	
			(0.16)	(0.16)	
$\min\lvert\Delta EATR\rvert^{-}_{tar.group<acq.group}$			0.13***	0.12***	
			(0.04)	(0.04)	
$\lvert\Delta EATR\rvert^{+}_{t>a}$ & same direction for group					0.42**
					(0.18)
$\lvert\Delta EATR\rvert^{-}_{t<a}$ & same direction for group					0.29*
					(0.17)
$EATR_t$	−0.07	−0.06	−0.10	−0.09	−0.05
	(0.09)	(0.10)	(0.09)	(0.10)	(0.10)
DTR	−0.00	−0.00	0.07	−0.00	0.01
	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)
isCrossboarder	3.08**	3.07**	4.72***	2.93**	3.94***
	(1.35)	(1.35)	(1.03)	(1.35)	(1.14)
isToehold	−2.28*	−2.28*	−2.24*	−2.24*	−2.25*
	(1.24)	(1.24)	(1.24)	(1.24)	(1.24)
acq_stake	14.58***	14.59***	14.70***	14.57***	14.68***
	(1.89)	(1.89)	(1.88)	(1.88)	(1.88)
cash	3.46***	3.46***	3.37***	3.39***	3.48***
	(0.73)	(0.73)	(0.73)	(0.73)	(0.73)
isRumor	−13.83***	−13.83***	−13.79***	−13.79***	−13.86***
	(0.70)	(0.70)	(0.70)	(0.70)	(0.70)
$isMNE_a$	2.48***	2.48***	3.67***	3.56***	2.83***
	(0.87)	(0.87)	(0.95)	(0.95)	(0.87)
$isMNE_t$	4.19***	4.18***	2.64***	2.63***	4.41***
	(0.80)	(0.80)	(1.00)	(1.01)	(0.81)
log(t_GDP)	1.54***	1.63***	1.70***	1.59***	1.71***
	(0.51)	(0.60)	(0.51)	(0.60)	(0.53)
log(a_GDP)	0.78**	0.65	0.54	0.66	0.53
	(0.37)	(0.57)	(0.38)	(0.57)	(0.43)
log(equity_value)	−2.92***	−2.92***	−2.98***	−2.99***	−2.92***
	(0.16)	(0.16)	(0.16)	(0.16)	(0.16)
territorial system	−1.80*	−1.80*	−2.15**	−1.99**	−1.94*
	(0.99)	(0.99)	(0.99)	(1.00)	(0.99)
R^2	0.22	0.22	0.22	0.22	0.22
Num. obs.	5515	5515	5515	5515	5515

Note: M&A transaction premium is the dependent variable in all reported models. The standard errors are reported in the parentheses, stars denote significance on 10% (*), 5% (**) and 1% (***) significance level.

of negative differences $\min |\Delta EATR|^-_{tar.group<acq.group}$, we can observe lower magnitude, but a highly significant coefficient. The statistically strong effect is also confirmed by regression specification in column (P4) where the company level differences, as well as group-wise differences, are included. In this model, most of the tax differences coefficients turn to be insignificant on a 90% confidence level due to the high correlation of group-wise and company level tax differences. In order to avoid multicollinearity but keep this additional information of group-wise tax differences, model specification (P5) introduces the interaction term of a dummy variable saying that group-wise differences have the same direction as the company level differences, which improves the estimate for positive differences, but the coefficient for negative tax differences remains unchanged compared to model specification (P2).[6] Overall columns (P2) - (P3) supports Hypothesis 3 b), that group structure tax rates influence the takeover premium.

Moving to Table 7.4, we try to capture the cost of shifting from the acquirer company to the target company by adding an interaction term of final post-takeover ownership share in target company with the negative tax differences. The logic is that minority shareholders in the target company may prevent from profit shifting to the target company as the shifted profit should be then divided also between minority shareholders and therefore represents substantial additional "cost" for shifted profit. The interpretation of coefficients in the model (P6) for a fully owned target is therefore unchanged while the effect of one unit change in tax difference proportionally decreases post-takeover ownership share. We can see a slight increase in coefficients as well as in significance level in accordance with Hypothesis 4, nevertheless, the Table 6 applies.

Focusing further on the case, when the target has lower tax rates than the acquirer, model (P7) includes also an interaction term, of a dummy variable indicating whether the acquirer overtakes the target domiciled in a new location. Those are potentially the transactions when the acquirer group reaches a new country with a lower tax regime, and it can potentially shift the profit. The coefficient is higher in magnitude and more significant, supporting this hypothesis.

Moving to positive tax differences, $|\Delta EATR|^+_{t>a}$, model (P8) includes a dummy variable indicating that target is not part of MNE because such tar-

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[6]Note that comparing coefficients in the two separate models is not valid statistical inference. Unfortunately, a lower number of observations and consequently a low number of edge cases do not allow for regular statistical inference. Therefore, this analysis relies on the findings of previous analysis and on the iterative approach.

Table 7.4: Profitability: regressions on takeover premium, part 2

	(P6)	(P7)	(P8)	(P9)	(P10)
(Intercept)	1.66	1.76	4.47	3.80	2.20
	(13.26)	(13.23)	(13.11)	(13.11)	(13.15)
$|\Delta EATR|^+_{t>a}$	0.32**	0.31*			
	(0.16)	(0.16)			
$|\Delta EATR|^-_{t<a}$ * stake	0.29				
	(0.19)				
$|\Delta EATR|^-_{t<a}$ * stake & new location		0.35**	0.37**	0.35**	0.36**
		(0.17)	(0.17)	(0.17)	(0.17)
$|\Delta EATR|^+_{t>a}$ & target is not MNE			0.32**		
			(0.16)		
$|\Delta EATR|^+_{t>a}$ & tax inversion flag				0.42***	
				(0.16)	
$|\Delta EATR|^+_{t>a}$ * weighted conditions					0.53***
					(0.20)
$\min |\Delta EATR|^-_{tar.group<acq.group}$ * stake	0.15***	0.15***	0.14***	0.14***	0.14***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
$EATR_t$	−0.09	−0.08	−0.06	−0.09	−0.10
	(0.10)	(0.10)	(0.10)	(0.10)	(0.10)
DTR	−0.01	−0.01	0.01	−0.02	−0.03
	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)
isCrossboarder	2.86**	2.97**	3.53***	2.80**	2.62**
	(1.34)	(1.26)	(1.14)	(1.21)	(1.24)
isToehold	−2.36*	−2.36*	−2.35*	−2.31*	−2.33*
	(1.24)	(1.24)	(1.24)	(1.24)	(1.24)
acq_stake	14.28***	14.25***	14.26***	14.33***	14.22***
	(1.89)	(1.89)	(1.89)	(1.88)	(1.88)
cash	3.40***	3.40***	3.39***	3.43***	3.42***
	(0.73)	(0.73)	(0.73)	(0.73)	(0.73)
isRumor	−13.75***	−13.76***	−13.75***	−13.78***	−13.77***
	(0.70)	(0.70)	(0.70)	(0.70)	(0.70)
$isMNE_a$	3.78***	3.94***	4.03***	3.95***	3.98***
	(0.94)	(0.94)	(0.94)	(0.94)	(0.94)
$isMNE_t$	2.13**	2.23**	2.47**	2.25**	2.31**
	(0.99)	(0.99)	(0.99)	(0.99)	(0.99)
log(t_GDP)	1.60***	1.58***	1.88***	1.52***	1.47***
	(0.60)	(0.58)	(0.53)	(0.56)	(0.57)
log(a_GDP)	0.61	0.62	0.21	0.62	0.73
	(0.57)	(0.54)	(0.43)	(0.48)	(0.51)
log(equity_value)	−3.01***	−3.01***	−3.01***	−3.02***	−3.02***
	(0.16)	(0.16)	(0.16)	(0.16)	(0.16)
territorial system	−1.97**	−2.01**	−2.13**	−2.47**	−2.21**
	(0.99)	(0.99)	(0.99)	(1.00)	(0.99)
R^2	0.22	0.22	0.22	0.22	0.22
Num. obs.	5515	5515	5515	5515	5515

Note: M&A transaction premium is the dependent variable in all reported models. The "weighted conditions" is the average of "tax inversion flag" and "target is not MNE". The The standard errors are reported in the parentheses, stars denote significance on 10% (*), 5% (**) and 1% (***) significance level.

get company could have already accessed to benefits of international taxation structures. We also include the tax inversion dummy to the model (P9) showing a higher and more statistically significant coefficient, in line with Hypothesis 3 a).

Finally, similarly to the previous section, the last model specification (P10) attempts to combine all found heterogeneity effects into one simple model specification. We can easily compare that the magnitude of tax differences effects for those specified transactions is substantially higher than in the (P2) column. Upon these regression results, we can conclude that an additional 1 p.p. difference in taxation between target and acquirer leads on average to the 0.5 p.p. increase in takeover premium, when the interaction conditions are met.

Except for these tax difference variables, each model includes also the same set of control variables as well as the year dummy variables to capture different phases of M&A waves. Furthermore, the model is estimated on target country de-meaned data to capture the fixed effects of the individual countries.

Starting with taxation related controls, the effective average tax rate of target country has a small negative and rather insignificant effect, which in principle again contradicts the framework of Arulampalam *et al.* (2018) and suggests that differences in taxation are likely more important than levels. Similarly, the double tax rate turns out to be rather insignificant in the regressions, which does not support the analysis of Huizinga *et al.* (2012), who found almost 1:1 substitution to takeover premium. This discrepancy might be quite puzzling, but one of the most likely explanation can be a different time span of the sample as Huizinga *et al.* (2012) uses data for transactions in period 1985 to 2004 and this analysis uses much newer transactions from 2011 to 2018. The importance of repatriation taxes likely decreased in time given the trends of a) decreasing the overall rate of taxation, in combination with b) markets globalization including the capital markets, c) capital market integration (EU and a growing number of tax treaties) and d) trend to switch from worldwide to the territorial system.

Briefly commenting on other commonly used controls, cross-border transactions have on average larger premium. Prior rumors decrease the announcement premium as the market can already partly adjust to anticipate the change of value. Transactions paid in cash tend to have higher takeover premiums. Larger acquisition stake is associated with a larger takeover premium, which might be explained by controlling premium, on the other hand, having an ownership stake prior to the transaction decreases the price that the acquirer has to pay.

The takeover premium is higher when target or acquirer are multinational companies. The larger is the target company, the lower is the takeover premium. Finally, investing in a new country is associated with a lower premium as such expansion might be connected with additional cost connected with adaption to the new market.

These controls are selected in accordance with previous literature, nevertheless, there is extensive literature studying the determinants of the takeover premium, which argues also other parameters to be important.[7] Hence our analysis could be subject to some omitted variable bias.

7.3 Impact on national tax collections

The results for location choice model as well as results of regression on profitability suggest that differences in tax regimes open the potential for companies to exploit these differences in order to reduce their total group tax due, by shifting the profit or searching for favorable tax condition in other countries.[8] Nevertheless, the tax collections are always a zero-sum game, therefore the gain of companies has to be compensated by a reduction of tax collection of countries, while each country can experience a different impact to their budget.

We develop the methodology in Section 6.3 that aims to approximate the impact of transactions in the studied sample on national tax collections from corporate income tax. Figure 7.1 summarizes this impacts in percentages relative to yearly tax collections from corporate tax in 2017. There are four statistics in the figure. The column on the left contains the estimate of the absolute net present value of all future tax collection impacts in millions of EUR, while the black dots show the estimated relative impact to the yearly corporate tax collection. The yellow and blue (striped) bars further distinguish between the effects of transactions where domestic companies figure as acquirer and target, respectively. The figure contains only the countries with a non-zero corporate tax rate as those have by definition zero tax impact.[9] Also, countries for which the data on revenue from corporate tax collection was not available are excluded.

The sum of effects across all countries is -278 243 millions of EUR, which

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[7]See for instance Betton *et al.* (2008) for comprehensive meta-analysis of this literature.

[8]This results are likely to be robust as these very similar results are obtained by two very different methods.

[9]Bermuda, the British Virgin Islands an Cayman Islands have zero corporate tax rate in the used sample of countries.

Figure 7.1: Impact of tax difference to national tax collections
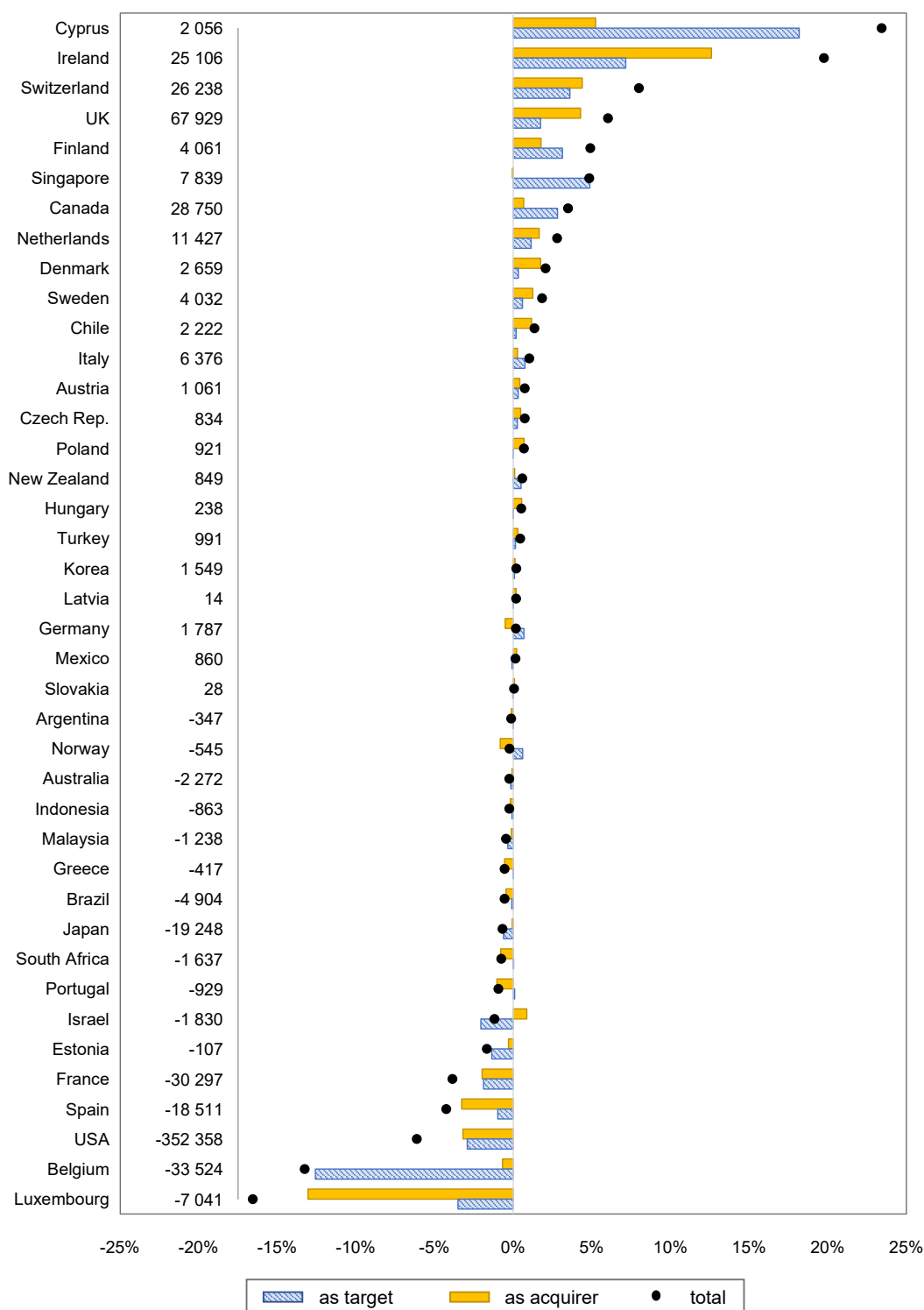
Note: The figure shows an impact of transactions in studied sample on national tax collections from corporate income tax. On the x-axis, there is a relative impact on yearly tax collections. Left column contains the estimate of absolute net present value of all future tax collection impacts in millions of EUR. *Source*: Author's own calculations based on methodology in Section 6.3.

should correspond to the total additional tax savings of companies as a consequence of the more than 200 000 transactions in our sample. The UK has the best net impact in absolute value. Interestingly, the UK switched from the worldwide system in 2009. On the other hand, the USA has the worst balance of -352 358 millions of EUR, which is caused by the worldwide tax system and high corporate tax rate until 2018. In relative terms, the winners are Cyprus, Ireland or Switzerland, which might correspond to their reputation of countries with favorable tax systems. On the other side of the spectrum are Luxembourg and Belgium, which is quite puzzling especially in the case of Luxembourg. Nevertheless, it is probably caused by the rather high corporate tax rate and in the case of Luxembourg, the lost corporate tax collection might be well offset by other benefits of MNE.

Nevertheless, this methodology relies on several strong assumptions (refer to the Section 6.3) and, hence, it needs to be interpreted as a supplementary view on the market of cross-border M&A, rather than a comprehensive analysis of the impact to national welfare.

Chapter 8

Conclusion

Large merger or acquisition deals often make headlines and draw the attention of the broad public. It may be partially because people are attracted by the exorbitant price tags on those deals, but there is also a rational reason. Large M&A deals translate to a large flow of capital, which becomes even more interesting when they flow internationally. Multinational companies affect the welfare of countries in which they have subsidiaries or affiliates by increasing domestic competition, generate new jobs or technology spillovers. Broad stream of research, therefore, studies, how multinational companies make their decisions and what affects M&A activity.

This thesis contributes to this course of research by examining the effect of corporate taxation on the target location choice in cross-border M&A and on the profitability of the resulting enterprise. We build on previous papers by Huizinga *et al.* (2012) and Arulampalam *et al.* (2018), however, we employ a considerably broader dataset with more than 200 000 M&A transactions, domestic and cross-border involving companies from 49 different countries. This big and granular data provide an opportunity to study the effects of taxation on M&A in greater detail. They document M&A decisions on the company and transaction level, which allows us to dig deeper into what affects companies' decisions. At the same time, the extensive dataset enables estimating large and complex models.

Our results are mostly in line with the conclusions of the previous research and support the findings that the international taxation framework indeed influences M&A activity. Nevertheless, this thesis brings also several new conclusions as we argue that these tax differences increase the profit of MNEs because they provide opportunities for tax optimization practices. Therefore,

the tax differences are even more important for cross-border transactions then the level of taxation as opposed to Arulampalam *et al.* (2018). Our results also show that the importance of taxation on profit repatriation is decreasing as we do not find as strong negative effect of takeover premium as Huizinga *et al.* (2012) for their sample of transactions from 1985 to 2004. One explanation may be that the tax systems are changing and corporate taxes have decreased substantially over the past few decades (arguably due to tax competition) and therefore this effect just nearly disappeared.

Moreover, we identified substantial heterogeneity of tax effects depending on the MNE structure of acquirer as well as the target. The interesting finding is that positive, as well as negative differences in tax rates between target and acquirer, has a positive effect on location selection of target as well as on takeover premium. We also find a stronger effect of tax difference for certain transactions, particularly those that in their nature give rise to tax inversions or profit shifting. This may also indicate that these tax optimization practices have a substantial effect on the decisions of MNE.

Finally, we aim to develop a methodology that may be useful to evaluate the impact of tax differences on tax revenues of individual countries. These calculations suggest that some countries, such as Ireland or Cyprus, profit on the differences in taxation and resulting tax competition, and the cross-border M&A activity notably increases their corporate tax revenue. On the other hand, countries with a higher tax rate may be losing substantial amounts on tax revenue. Nevertheless, this method is rather simplified and there is a lot of space for improvement, but still, it may have interesting potential for aggregation of the tax effects to country-level impact.

In conclusion, this thesis contributes by confirming taxation effects on decisions concerning the allocation of FDI in the form of M&A. Our empirical analysis connects the international taxation framework with the area of M&A activity and shows the macroeconomic impacts of tax competition and flows of capital.

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Appendix A

Description of variables

The following Table A.1 describes all variables used in the empirical analysis and also lists data sources for these variables.

Table A.1: Variable Definitions and Data Sources

Variable	Description and Data Source
$EATR_t$	Effective average corporate tax rate in the target country. *Source*: Oxford University Centre for Business Taxation
$EATR_a$	Effective average corporate tax rate in the acquirer country. *Source*: Oxford University Centre for Business Taxation
DTR	Double taxation as an additional tax burden arising from repatriating profit generated in the target country. *Source*: Own calculation using Oxford University Centre for Business Taxation, Deloitte International Tax *Source*
$\|\Delta_{t-a}EATR\|$	Absolute value of a difference between acuirerer and target country effective average corporate tax rates. *Source*: Own calculation based on $EATR_t$ and $EATR_a$ and company information from Amadeus and Zephyr database by BvD
$\|\Delta EATR\|_{t>a}^{+}$	Absolute value of a difference between acuirerer and target country effective average corporate tax rates, when this difference is positive. *Source*: Own calculation based on $EATR_t$ and $EATR_a$ and company information from Amadeus and Zephyr database by BvD
$\|\Delta EATR\|_{t<a}^{-}$	Absolute value of a difference between acuirerer and target country effective average corporate tax rates, when this difference is negative. *Source*: Own calculation based on $EATR_t$ and $EATR_a$ and company information from Amadeus and Zephyr database by BvD

Table A.1 - *continued*

Variable	Description and Data Source
$\min|\Delta EATR|^{+}_{t>acq.group}$	Absolute value of difference of minimal average effective corporate tax rate across jurisdictions of acquirer MNE group and target country average effective corporate tax rate, when this difference is positive. *Source*: Own calculation based on $EATR_t$ and $EATR_a$ and company information from Amadeus and Zephyr database by BvD
$\min|\Delta EATR|^{-}_{t<acq.group}$	Absolute value of difference of minimal average effective corporate tax rate across jurisdictions of acquirer MNE group and target country average effective corporate tax rate, when this difference is negative. *Source*: Own calculation based on $EATR_t$ and $EATR_a$ and company information from Amadeus and Zephyr database by BvD
Territorial system	Dummy variable: 1 if acquirer country applies territorial taxation system. *Source*: Deloitte's International Tax Guides and Highlights, Zephyr database by BvD
tax inversion flag	Dummy variable: 1 if target country applies worldwide taxation system and acquirer country applies territorial system. *Source*: Deloitte's International Tax Guides and Highlights, Zephyr database by BvD
$isMNE_a$	Dummy variable: 1 if the acquiring company group is a multinational, defined as it has affiliates in at least 2 foreign countries prior the transaction. *Source*: Zephyr and Amadeus database by BvD
$isMNE_t$	Dummy variable: 1 if the target company group is a multinational, defined as it has affiliates in at least 2 foreign countries prior the transaction. *Source*: Zephyr and Amadeus database by BvD

Table A.1 - *continued*

Variable	Description and Data Source
isCrossboarder	Dummy variable: 1 if the target company comes from different country than the acquiring company. *Source*: Zephyr and Amadeus database by BvD
new location	Dummy variable: 1 if the acquiring company did not have any affiliate in the country of the target company prior the transaction. *Source*: Zephyr and Amadeus database by BvD
log(dist)	Distance between the target and acquirer countries calculated following the great circle formula, which uses latitudes and longitudes of the most important cities/agglomerations (in terms of population) *Source*: GeoDist dataset by CEPII
neighbours	Dummy variable: 1 if the target and acquirer countries share a common border. *Source*: GeoDist dataset by CEPII
language	Dummy variable: 1 if a language is spoken by at least 9% of the population in both countries. *Source*: GeoDist dataset by CEPII
colony	Dummy variable: 1 if the target and acquirer countries have ever had a colonial link. *Source*: GeoDist dataset by CEPII
use to same country	Dummy variable: 1 if the target and acquirer countries have ever had been or are the same state. *Source*: GeoDist dataset by CEPII
GDP_t	Target country GDP measured in current US dollars. *Source*: OECD National Accounts Statistics database
GDP_a	Acquirer country GDP measured in current US dollars. *Source*: OECD National Accounts Statistics database

Table A.1 - *continued*

Variable	Description and Data Source
equity_value	Market capitaliztion of the target company on announcement date of the transaction. *Source*: Zephyr and Amadeus database by BvD
acq_stake	Ownership stake in the target company aquired by acquirer in the transaction. *Source*: Zephyr and Amadeus database by BvD
cash	Dummy variable: 1 if the consideration contains at least an element of cash. Cash does not refer to actual money but to payment by cheque or transfer of funds. *Source*: Zephyr and Amadeus database by BvD
isToehold	Dummy variable: 1 if the acquirer had an owernship stake in the target company prior to the transaction. *Source*: Zephyr and Amadeus database by BvD
isRumor	Dummy variable: 1 if th announcement date of the transaction is the same as the rumour date. *Source*: Zephyr and Amadeus database by BvD

Appendix B

Interactive map

The interactive map visualizing the cross-border transactions is available upon the request to author. Following figure illustrate the map for transactions in and out of the Czech Republic.

Figure B.1: Map of cross-border transactions
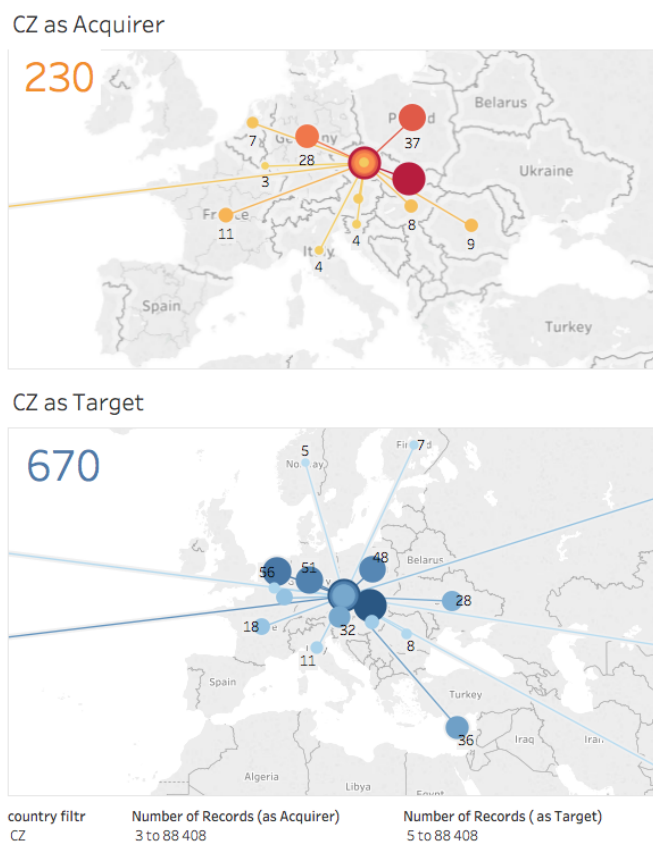
Appendix C

Witholding tax data

These following Table C.1 and Table C.2 contain data on wiholding taxes on dividends and have been obtained from Deloitte International Tax Source (Deloitte 2018). These tables provide a comprehensive overview of the bilateral withholding tax rates as of 2018 for all the possible country pairs used in the analysis. Majority of countries actually specify two rates for most of the bilateral relations, the lower one being conditional on a certain minimal ownership share that the dividend receiver must hold. This ownership limit is typically 10 or 25 percent. In order to maintain these already large tables readable, only the lower rates are reported because this analysis uses direct ownership links that in most cases satisfy the ownership thresholds. The first column of Table C.1 contains the domestic withholding tax rate which is applied to a resident dividend income and also to non-resident dividend income in case of an absence of a tax treaty with the parent company country.

Table C.1: Witholding tax rates

	WHT	ARG	AUS	AUT	BEL	BMU	BRA	VGB	BUL	CAN	CMY	CHL	CHN	CYP	CZE	DEN	EST	FIN	FRA	GER	GRC	HUN	IND	INS	IRL
Argentina	21	-	10	21	10	21	10	21	21	10	21	10	21	21	21	10	21	10	15	15	21	21	21	21	21
Australia	15	10	-	15	15	15	15	15	15	5	15	5	15	15	5	15	15	0	0	0	15	15	15	15	15
Austria	28	28	15	-	15	28	15	28	0	15	28	15	7	10	0	0	5	0	0	5	5	10	10	10	10
Belgium	16	10	15	15	-	16	10	16	10	5	16	0	5	10	5	15	5	5	10	15	5	10	15	10	15
Bermuda	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brazil	0	10	0	15	10	0	-	0	0	15	0	10	15	0	15	25	0	10	15	0	0	15	15	0	0
British Virgin Islands	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulgaria	3	3	3	0	10	3	3	3	-	10	3	3	10	5	10	5	0	10	5	5	10	10	15	15	5
Canada	25	10	5	5	5	25	15	25	10	-	25	10	10	15	5	5	5	5	5	5	5	5	15	10	5
Cayman Islands	0	0	0	0	0	0	0	0	0	0	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chile	35	10	5	15	0	35	10	35	35	10	35	-	10	35	15	5	35	35	15	35	35	35	35	35	5
China	10	10	15	7	5	10	15	10	10	10	10	10	-	10	5	5	5	5	5	5	5	10	10	10	5
Cyprus	0	0	0	0	10	0	0	0	5	0	0	0	0	-	0	0	0	5	10	5	25	5	10	0	0
Czech Republic	15	15	5	0	5	15	15	15	10	5	15	15	5	0	-	0	5	5	0	5	15	5	10	10	5
Denmark	12	10	15	0	0	12	25	12	5	5	12	5	5	0	0	-	5	0	12	5	18	0	15	10	0
Estonia	0	0	0	5	5	0	0	0	0	5	0	0	5	0	5	5	-	5	5	5	5	5	10	0	5
Finland	20	10	0	0	5	20	0	20	10	5	20	20	5	5	0	5	5	-	0	5	13	5	10	10	0
France	30	15	0	0	10	30	15	30	5	5	30	15	5	10	0	30	5	0	-	0	30	5	15	10	10
Germany	25	15	0	5	15	25	25	25	5	5	25	25	5	5	5	5	5	5	5	-	25	5	10	10	5
Greece	10	10	10	5	5	10	10	10	10	5	10	10	5	25	10	38	5	47	10	25	-	45	10	10	5
Hungary	0	0	15	10	10	0	15	0	10	5	0	0	10	5	5	0	5	5	5	5	10	-	10	15	5
India	0	0	15	10	15	0	15	0	15	15	0	10	10	10	15	10	10	15	10	0	10	10	-	10	10
Indonesia	20	20	15	10	10	20	20	20	15	10	20	20	10	20	10	10	20	10	10	10	20	15	10	-	20
Ireland	10	10	15	10	15	10	10	10	5	5	10	5	5	0	5	0	5	0	0	5	5	5	10	10	-
Israel	20	20	20	0	15	20	10	20	10	0	20	20	10	20	5	0	5	5	5	0	5	10	20	10	10
Italy	14	15	15	15	15	14	15	14	10	5	14	14	10	15	15	0	5	10	5	10	15	10	15	10	15
Japan	18	18	0	0	10	18	13	18	10	5	18	0	10	18	10	0	0	10	0	0	18	10	10	10	10
S. Korea	20	20	15	5	15	20	10	20	5	5	20	5	5	20	5	15	5	10	10	5	5	5	15	10	10
Latvia	0	0	0	5	5	0	0	0	5	5	0	0	5	0	5	5	5	5	5	5	5	5	10	0	5
Luxembourg	8	8	8	5	10	8	0	8	5	0	8	8	5	0	0	5	0	5	5	5	8	0	10	10	5
Malaysia	0	0	0	0	15	0	0	0	0	0	0	5	0	0	0	0	0	0	5	0	0	0	5	0	10
Mexico	10	10	0	5	0	10	10	10	10	5	10	5	10	10	0	0	0	0	5	5	10	5	10	10	5
Netherlands	8	10	15	5	5	8	15	8	5	5	8	8	5	8	0	0	5	0	5	5	5	5	5	5	0
New Zealand	15	15	0	15	15	15	15	15	15	5	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
Norway	13	10	0	5	0	13	15	13	5	5	13	5	15	0	0	0	5	0	0	0	20	10	10	15	5
Poland	19	19	15	5	0	19	19	19	10	5	19	5	10	0	5	0	5	5	5	5	19	10	10	10	0
Portugal	20	20	20	15	15	20	10	20	10	10	20	10	10	10	10	10	10	20	15	15	15	10	10	10	15
Romania	5	5	5	0	5	5	5	5	5	5	5	5	3	10	10	10	10	5	10	5	20	5	10	13	3
Russia	15	10	5	5	10	15	10	15	15	10	15	5	5	5	10	10	15	5	5	5	5	10	10	15	10
Singapore	0	0	15	0	0	0	0	0	5	15	0	0	5	0	5	0	5	5	5	5	0	5	10	10	0
Slovakia	18	18	15	10	5	18	15	18	10	5	18	18	10	10	5	15	10	5	10	5	18	5	15	10	0
South Africa	20	20	5	5	5	20	10	20	5	5	20	5	5	5	5	5	20	5	5	8	5	5	10	10	5
Spain	19	10	15	10	0	19	15	19	5	0	19	5	10	0	5	19	5	0	0	5	5	5	15	10	15
Sweden	15	10	15	5	5	15	15	15	10	5	15	5	5	0	0	5	0	0	0	0	0	5	10	10	5
Switzerland	35	10	0	0	0	35	35	35	0	0	35	15	5	0	0	0	0	0	0	0	0	0	10	10	0
Turkey	15	15	5	5	10	15	10	15	10	15	15	15	10	15	10	15	10	5	15	5	15	10	15	10	5
Ukraine	15	15	15	5	5	15	10	15	5	5	15	15	5	5	5	5	5	0	0	5	5	5	10	10	5
UK	0	10	0	0	0	0	0	0	0	0	0	5	5	0	5	0	5	0	0	5	0	0	10	0	5
USA	30	30	0	5	0	30	30	30	5	5	30	30	10	5	5	0	5	0	0	0	30	5	15	10	5

Table C.2: Witholding tax rates continued

	ISR	ITA	JAP	KOR	LVA	LUX	MAL	MEX	NET	NZL	NOR	POL	PRT	ROM	RUS	SIN	SLO	ZAF	SPA	SWE	SWI	TUR	UKR	GBR	USA
Argentina	21	15	21	21	21	21	21	10	10	21	10	21	21	21	10	21	21	21	10	10	10	21	21	10	21
Australia	15	15	0	15	15	15	0	0	15	0	0	15	15	5	5	15	15	5	15	15	0	5	15	0	0
Austria	0	15	0	5	5	5	5	5	5	15	0	5	15	0	5	0	10	5	10	5	0	5	5	5	5
Belgium	15	15	5	15	5	10	15	0	5	15	0	0	15	5	10	5	5	5	0	5	0	15	5	0	0
Bermuda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brazil	10	15	13	15	0	15	0	10	15	0	15	0	10	0	10	0	15	10	15	15	0	10	10	0	0
British Virgin Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulgaria	10	10	10	5	5	5	3	3	5	3	5	10	15	5	15	5	10	5	5	10	0	10	5	0	5
Canada	0	5	5	5	5	5	15	5	5	5	5	5	10	5	10	15	5	5	0	5	0	15	5	0	5
Cayman Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chile	35	5	0	5	35	35	5	5	35	35	5	5	10	35	5	35	35	5	5	5	15	35	35	5	35
China	10	10	10	5	5	5	10	5	5	15	15	10	10	3	5	5	10	5	10	5	5	10	5	5	10
Cyprus	0	0	0	0	0	0	0	0	0	0	0	0	10	10	5	0	0	5	0	0	0	0	5	0	0
Czech Republic	5	15	10	5	5	0	10	10	0	15	0	5	10	10	10	5	5	5	5	0	0	10	5	5	5
Denmark	0	0	0	15	5	5	0	0	0	15	0	0	10	10	10	0	15	5	12	0	0	15	5	0	0
Estonia	0	5	0	5	5	0	0	0	5	0	5	5	10	10	0	5	10	0	5	5	0	10	5	5	5
Finland	0	10	10	10	5	5	5	0	0	15	0	5	20	0	5	0	5	5	0	0	0	5	5	0	0
France	5	5	0	10	5	5	5	0	5	15	0	5	15	5	5	5	10	5	0	0	0	15	0	0	0
Germany	5	15	0	5	5	5	5	5	5	15	0	5	15	5	5	5	5	8	5	5	0	5	5	5	0
Greece	10	15	10	5	5	38	10	10	35	10	40	10	15	45	5	10	10	5	5	10	0	15	5	10	10
Hungary	5	10	10	5	5	0	10	5	5	0	10	10	15	5	10	5	5	5	5	5	0	10	5	0	5
India	10	15	15	15	10	10	5	10	15	15	10	10	10	10	10	15	10	15	10	10	10	10	10	15	15
Indonesia	20	10	10	10	20	10	10	10	5	15	15	10	10	13	15	10	10	10	10	10	10	10	10	10	10
Ireland	10	15	0	0	5	0	10	5	15	0	5	15	15	3	10	0	0	5	15	0	0	10	5	5	5
Israel	-	10	5	5	5	5	20	5	5	20	25	5	5	15	10	5	5	25	10	0	5	10	5	15	13
Italy	10	-	10	10	5	15	10	15	5	15	15	10	15	0	5	15	15	5	15	10	15	5	5	0	0
Japan	5	10	-	5	0	5	5	0	0	0	5	10	5	10	0	5	10	5	10	0	0	10	15	0	0
S. Korea	5	10	5	-	5	10	10	0	10	15	15	5	10	7	5	10	5	5	10	10	5	15	5	5	10
Latvia	5	5	0	5	-	5	0	5	5	0	5	5	5	5	5	0	5	0	5	5	5	10	5	5	5
Luxembourg	5	15	5	10	5	-	0	5	3	8	5	0	15	5	5	5	5	5	0	5	5	5	5	5	5
Malaysia	0	10	5	0	0	5	-	0	0	15	0	0	0	10	0	5	0	5	0	0	5	10	0	5	0
Mexico	5	15	0	0	5	8	10	-	0	0	0	5	10	10	10	0	0	5	0	0	0	5	5	0	0
Netherlands	5	5	0	10	5	3	0	5	-	15	0	5	10	0	5	0	0	0	5	0	0	5	0	0	0
New Zealand	15	15	0	15	15	15	0	15	15	-	15	15	15	15	15	15	15	15	15	15	15	15	15	15	0
Norway	5	15	5	15	5	5	0	0	15	15	-	0	5	5	10	5	5	5	10	0	0	5	5	0	15
Poland	5	10	10	5	5	0	0	5	5	15	0	-	10	5	10	5	0	5	5	5	0	10	5	0	5
Portugal	5	15	5	10	10	15	20	10	10	20	5	10	-	10	10	10	10	10	10	10	0	5	10	10	5
Romania	15	0	10	7	10	5	10	10	0	5	5	5	10	-	15	5	10	15	10	10	0	15	10	10	10
Russia	10	5	0	5	5	5	15	10	5	15	10	10	10	15	-	5	10	10	5	5	0	10	5	10	5
Singapore	5	10	5	10	0	0	5	0	0	5	5	5	10	5	5	-	5	5	0	10	5	10	5	0	0
Slovakia	5	15	10	5	10	5	0	0	0	18	5	0	10	10	10	5	-	5	5	0	0	5	10	5	5
South Africa	25	5	5	5	20	5	5	5	5	5	5	5	10	15	10	5	5	-	5	5	5	10	5	5	5
Spain	10	15	10	10	5	10	0	0	10	15	10	5	10	10	5	0	5	5	-	10	0	5	18	0	10
Sweden	5	10	0	10	5	0	0	0	0	15	0	5	10	10	5	10	0	0	10	-	0	15	0	0	0
Switzerland	5	15	0	5	5	0	5	0	0	15	0	0	0	0	0	5	5	0	0	0	-	5	5	0	0
Turkey	10	15	10	10	10	10	10	5	10	5	5	10	5	15	10	10	5	10	5	15	5	-	10	15	15
Ukraine	5	5	15	5	5	5	15	5	5	15	5	5	10	10	5	5	10	5	18	0	5	10	-	5	5
UK	15	0	0	5	5	0	5	0	0	15	0	0	10	0	10	0	5	5	0	0	0	15	5	-	0
USA	13	5	0	10	5	5	30	0	0	0	15	5	5	10	5	30	5	5	10	0	0	15	5	0	-

Appendix D

Additional estimation results

This appendix provides addition estimation results, where the structures of the model are almost the same to the model presented in Chapter 7 with the only change that all measures of EATR are here replaced by statutory tax rate (STR). Reader can refer to the 7 for help with interpretation.

Table D.1: Location of targets: statutory tax rates, part 1

	(AL1)	(AL2)	(AL3)	
$\|\Delta_{t-a}STR\|$	1.38***			
	(0.08)			
$\|\Delta STR\|^{+}_{t>a}$		1.25***		
		(0.17)		
$\|\Delta STR\|^{-}_{t<a}$		1.50***		
		(0.18)		
$\min\|\Delta STR\|^{+}_{t>acq.group}$			0.16	
			(0.16)	
$\min\|\Delta STR\|^{-}_{t<acq.group}$			0.45**	
			(0.18)	
STR_t	0.01	0.01	0.04	
	(0.12)	(0.12)	(0.12)	
isCrossboarder	−2.09***	−2.08***	−2.00***	
	(0.05)	(0.05)	(0.05)	
isCrossboarder & DTR	−4.51***	−4.53***	−4.04***	
	(0.10)	(0.10)	(0.10)	
new location	−2.32***	−2.32***	−2.36***	
	(0.03)	(0.03)	(0.03)	
new location & $isMNE_a$	0.97***	0.97***	0.99***	*Note:*
	(0.02)	(0.02)	(0.02)	
log(dist)	−0.35***	−0.35***	−0.34***	
	(0.01)	(0.01)	(0.01)	
neighbours	0.56***	0.56***	0.57***	
	(0.02)	(0.02)	(0.02)	
neighbours & $isMNE_a$	−0.28***	−0.28***	−0.28***	
	(0.03)	(0.03)	(0.03)	
language	1.34***	1.34***	1.35***	
	(0.01)	(0.01)	(0.01)	
colony	0.22***	0.22***	0.21***	
	(0.02)	(0.02)	(0.02)	
use to same country	0.21***	0.21***	0.21***	
	(0.04)	(0.04)	(0.04)	
AIC	445770.82	445772.17	446021.69	
Log Likelihood	-222825.41	-222825.08	-222949.84	
Num. obs.	204903	204903	204903	
K	49	49	49	
Intercept	1	1	1	

***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

Location choice of the target country is the dependent variable in all reported models. The standard errors are reported in the parentheses, stars denote significance on 10% (*), 5% (**) and 1% (***) significance level.

Table D.2: Location of targets: statutory tax rates, part 2

	(AL4)	(AL5)	(AL6)	(AL7)
$\|\Delta STR\|_{t>a}^{+}$	0.88***	1.23***	1.12***	
	(0.17)	(0.17)	(0.27)	
$\|\Delta STR\|_{t<a}^{-}$	−2.84***	1.56***	1.48***	
	(0.21)	(0.18)	(0.18)	
$\|\Delta STR\|_{t<a}^{-}$ & zero Double Tax Rate	6.19***			
	(0.15)			
$\|\Delta STR\|_{t<a}^{-}$ & zero DTR & new location		−0.61**		
		(0.24)		
$\|\Delta STR\|_{t>a}^{+}$ & tax inversion flag			0.16	1.75***
			(0.26)	(0.14)
$\|\Delta EATR\|_{t<a}^{-}$ & zero DTR & new location				3.53***
				(0.26)
STR_t	−0.38***	−0.01	0.01	0.04
	(0.12)	(0.12)	(0.12)	(0.12)
new location	−2.29***	−2.33***	−2.32***	−2.30***
	(0.03)	(0.03)	(0.03)	(0.03)
isCrossboarder	−2.12***	−2.08***	−2.08***	−2.08***
	(0.05)	(0.05)	(0.05)	(0.05)
isCrossboarder & DTR	−3.65***	−4.52***	−4.52***	−4.17***
	(0.10)	(0.10)	(0.10)	(0.10)
new location & $isMNE_a$	0.95***	0.98***	0.97***	0.91***
	(0.02)	(0.02)	(0.02)	(0.02)
log(dist)	−0.38***	−0.35***	−0.35***	−0.34***
	(0.01)	(0.01)	(0.01)	(0.01)
neighbours	0.59***	0.56***	0.56***	0.56***
	(0.02)	(0.02)	(0.02)	(0.02)
neighbours & $isMNE_a$	−0.26***	−0.28***	−0.28***	−0.26***
	(0.03)	(0.03)	(0.03)	(0.03)
language	1.29***	1.34***	1.34***	1.35***
	(0.01)	(0.01)	(0.01)	(0.01)
colony	0.20***	0.22***	0.22***	0.21***
	(0.02)	(0.02)	(0.02)	(0.02)
use to same country	0.22***	0.21***	0.21***	0.21***
	(0.04)	(0.04)	(0.04)	(0.04)
AIC	444013.06	445767.55	445773.76	445703.29
Log Likelihood	-221944.53	-222821.77	-222824.88	-222790.65
Num. obs.	204903	204903	204903	204903
K	49	49	49	49

Note: Location choice of the target country is the dependent variable in all reported models. The standard errors are reported in the parentheses, stars denote significance on 10% (*), 5% (**) and 1% (***) significance level.

Table D.3: Profitability: statutory tax rates, part 1

	(1)	(2)	(3)	(4)	(5)
(Intercept)	−1.88	−1.04	2.07	1.84	0.03
	(12.22)	(12.47)	(12.32)	(12.50)	(12.36)
$\lvert\Delta_{t-a}STR\rvert$	0.26**				
	(0.11)				
$\lvert\Delta STR\rvert_{t>a}^{+}$		0.23*		0.20	
		(0.14)		(0.15)	
$\lvert\Delta STR\rvert_{t<a}^{-}$		0.30*		0.21	
		(0.15)		(0.16)	
$\min\lvert\Delta STR\rvert_{t>acq.group}^{+}$			0.29**	0.25*	
			(0.13)	(0.14)	
$\min\lvert\Delta STR\rvert_{t<acq.group}^{-}$			0.12***	0.11***	
			(0.04)	(0.04)	
$\lvert\Delta STR\rvert_{t>a}^{+}$ & same direction for group					0.43***
					(0.16)
$\lvert\Delta STR\rvert_{t<a}^{-}$ & same direction for group					0.30**
					(0.15)
STR_t	−0.04	−0.04	−0.08	−0.07	−0.03
	(0.07)	(0.08)	(0.07)	(0.08)	(0.07)
DTR	−0.02	−0.03	0.06	−0.02	−0.01
	(0.12)	(0.12)	(0.11)	(0.12)	(0.11)
isCrossboarder	3.25**	3.25**	4.64***	3.10**	3.72***
	(1.33)	(1.33)	(1.03)	(1.33)	(1.13)
isToehold	−2.27*	−2.26*	−2.26*	−2.24*	−2.24*
	(1.24)	(1.24)	(1.24)	(1.24)	(1.24)
acq_stake	14.60***	14.61***	14.70***	14.58***	14.67***
	(1.89)	(1.89)	(1.88)	(1.88)	(1.88)
cash	3.45***	3.44***	3.37***	3.38***	3.47***
	(0.73)	(0.73)	(0.73)	(0.73)	(0.73)
isRumor	−13.86***	−13.85***	−13.82***	−13.81***	−13.88***
	(0.70)	(0.70)	(0.70)	(0.70)	(0.70)
$isMNE_a$	2.49***	2.50***	3.70***	3.61***	2.89***
	(0.87)	(0.87)	(0.95)	(0.95)	(0.87)
$isMNE_t$	4.17***	4.17***	2.62***	2.62***	4.44***
	(0.80)	(0.80)	(1.00)	(1.01)	(0.81)
log(t_GDP)	1.43***	1.52***	1.59***	1.49***	1.61***
	(0.47)	(0.53)	(0.47)	(0.53)	(0.49)
log(a_GDP)	0.80**	0.67	0.58	0.69	0.53
	(0.37)	(0.52)	(0.38)	(0.52)	(0.43)
log(equity_value)	−2.92***	−2.92***	−2.98***	−2.99***	−2.92***
	(0.16)	(0.16)	(0.16)	(0.16)	(0.16)
territorial system	−1.88*	−1.90*	−2.15**	−2.08**	−1.98**
	(0.99)	(1.00)	(1.00)	(1.00)	(0.99)
R^2	0.22	0.22	0.22	0.22	0.22
Num. obs.	5515	5515	5515	5515	5515

Note: M&A transaction premium is the dependent variable in all reported models. The standard errors are reported in the parentheses, stars denote significance on 10% (*), 5% (**) and 1% (***) significance level.

Table D.4: Profitability: statutory tax rates, part 2

	(6)	(7)	(8)	(9)	(10)
(Intercept)	3.23	3.15	5.83	5.48	3.74
	(12.50)	(12.47)	(12.36)	(12.36)	(12.39)
$\lvert\Delta STR\rvert^+_{t>a}$	0.29**	0.28**			
	(0.14)	(0.14)			
$\lvert\Delta STR\rvert^-_{t<a}$ * stake	0.24				
	(0.16)				
$\lvert\Delta STR\rvert^-_{t<a}$ * stake & new location		0.28*	0.28*	0.28*	0.29*
		(0.15)	(0.15)	(0.15)	(0.15)
$\lvert\Delta STR\rvert^+_{t>a}$ & target is not MNE			0.28**		
			(0.14)		
$\lvert\Delta STR\rvert^+_{t>a}$ & tax inversion flag				0.38***	
				(0.14)	
$\lvert\Delta STR\rvert^+_{t>a}$ * weighted conditions					0.48***
					(0.17)
$\min \lvert\Delta STR\rvert^-_{tar.group<acq.group}$ * stake	0.14***	0.14***	0.13***	0.13***	0.14***
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
STR_t	−0.07	−0.07	−0.05	−0.07	−0.08
	(0.08)	(0.08)	(0.07)	(0.07)	(0.08)
DTR	−0.03	−0.03	−0.00	−0.05	−0.05
	(0.12)	(0.11)	(0.11)	(0.11)	(0.11)
isCrossboarder	3.02**	3.13**	3.74***	3.04**	2.72**
	(1.32)	(1.25)	(1.12)	(1.19)	(1.23)
isToehold	−2.34*	−2.34*	−2.32*	−2.27*	−2.31*
	(1.24)	(1.24)	(1.24)	(1.24)	(1.24)
acq_stake	14.28***	14.26***	14.28***	14.36***	14.23***
	(1.89)	(1.89)	(1.88)	(1.88)	(1.88)
cash	3.39***	3.39***	3.38***	3.42***	3.41***
	(0.73)	(0.73)	(0.73)	(0.73)	(0.73)
isRumor	−13.77***	−13.77***	−13.76***	−13.79***	−13.78***
	(0.70)	(0.70)	(0.70)	(0.70)	(0.70)
$isMNE_a$	3.85***	3.99***	4.06***	4.00***	4.04***
	(0.94)	(0.94)	(0.94)	(0.94)	(0.94)
$isMNE_t$	2.03**	2.11**	2.38**	2.12**	2.19**
	(0.99)	(0.99)	(0.99)	(0.99)	(0.99)
log(t_GDP)	1.49***	1.49***	1.75***	1.39***	1.34**
	(0.53)	(0.53)	(0.49)	(0.52)	(0.52)
log(a_GDP)	0.65	0.66	0.28	0.69	0.81*
	(0.52)	(0.51)	(0.42)	(0.47)	(0.49)
log(equity_value)	−3.01***	−3.01***	−3.01***	−3.02***	−3.02***
	(0.16)	(0.16)	(0.16)	(0.16)	(0.16)
territorial system	−2.09**	−2.11**	−2.26**	−2.61***	−2.33**
	(1.00)	(1.00)	(0.99)	(1.00)	(0.99)
R^2	0.22	0.22	0.22	0.22	0.22
Num. obs.	5515	5515	5515	5515	5515

Note: M&A transaction premium is the dependent variable in all reported models. The "weighted conditions" is the average of "tax inversion flag" and "target is not MNE". The The standard errors are reported in the parentheses, stars denote significance on 10% (*), 5% (**) and 1% (***) significance level.