Discussion Paper No. 17-040

International Taxation and M&A Prices

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Abstract: We show that corporate taxation systems regarding foreign dividends and capital gains across 49 countries differ in many aspects, contradicting the requirements for capital ownership neutrality and indicating that ownership patterns are distorted. Consequently, a national tax policy maker may ask which taxation system improves the position of its multinational entreprises in bidding for foreign targets. To address this question, we develop a theoretical model on the impact of foreign dividends and capital gains taxation on cross-border M&A prices from the acquirer's perspective and theoretically compare different taxation systems. In a next step, we empirically validate our model in a regression analysis on a large cross-border M&A data set. Based on this analysis, we find that foreign dividends taxation rather than capital gains taxation impacts M&A prices. Finally, we provide tax policy suggestions.

Keywords: International taxation • Repatriation taxes • Capital gains taxes • Lock-in effect • Multinational entities • Cross-border M&As

JEL Classification: F23 • G34 • H25 • H26 • H32 • H73

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1. Introduction

Cross-border mergers and acquisitions (M&As) are a prominent form of foreign direct investment (FDI)[1] and an important tool for multinational entities (MNEs) in their portfolio management, i.e., investing in and restructuring their group. When MNEs from various countries bid for a certain foreign target, each country's corporate taxation system regarding foreign dividends and capital gains impacts on reservation prices and thus may have a decisive impact ownership allocation.

The question of how to neutrally tax M&A transactions has been widely discussed in capital ownership neutrality (CON) literature (e.g., Desai and Hines (2003), Becker and Fuest (2010), Becker and Fuest (2011), Ruf (2012), Devereux et al. (2015)). To achieve CON, one crucial requirement is that all countries apply the same taxation system, i.e., variation among taxation systems leads to inefficient ownership structures and a violation of CON. However, we find substantial variation among taxation systems across 49 countries over the 2002-2015 period, which suggests that the requirements for CON are not fulfilled in reality.

Given that CON is not reached in the taxation environment faced by MNEs, the question arises as to how a national tax policy maker can strengthen the position of its MNEs in acquiring foreign targets. Such a strong position is in the interest of a national tax policy maker due to positive spillovers of cross-border M&A activity to the MNE's residence country (e.g., Manne (1965), Scharfstein (1988), Bresman et al. (1999), Devos et al. (2009), Wang and Xie (2009), Bena and Li (2014), Sapra et al. (2014), Stiebale (2016)). In addition, it is in a country's interest to strengthen the position of its MNEs as buyers in cross-border M&A because the range of suitable targets is limited for operational reasons (e.g., specific intellectual property that can be acquired).

To give detailed guidance to national tax policy makers on how to strengthen the position of their respective MNEs in bidding for foreign targets, i.e., increase the MNEs' reservation price, we model the joint impact of foreign dividends and capital gains taxation at the corporate level on the acquiring MNE's reservation price for a specific target in a multi-period design. For dividends taxation, we analyze whether (non-)taxation of repatriated profits affects the reservation price. In determining profit taxation, we take into account statutory tax rates, withholding tax rates and profit shifting opportunities. For capital gains taxation, we analyze whether the reservation price is affected by a potential tax treatment of participation losses arising from liquidating the target in the future.

In an empirical application on a large cross-border M&A data set, we show that our model holds in reality. In particular, we conclude that foreign dividends taxation plays a decisive role in determining the reservation price, whereas the capital gains taxation effect is irrelevant. These results have important implications for tax policy. We propose that it is in a country's interest to exempt foreign dividends to improve the position of its MNEs when bidding for foreign targets. Additionally, countries should refrain from imposing CFC rules at acquirer level that hinder profit shifting and, consequently, increase the tax burden.

Our paper contributes to *theoretical* M&A tax research by deriving a model that implements the joint effect of foreign dividends and capital gains taxation on M&A prices from the acquirer perspective. While these effects have already been discussed in literature, our model differs in that it discusses these effects without taking into account taxation at the personal level. Additionally, different from Devereux et al. (2015), we allow for profit shifting between subsidiaries rather than only between parent and subsidiary. Finally, we additionally model the impact of selling the target in future periods instead of liquidating it and of indefinite profit retention with debt-financed payouts to shareholders. These two aspects have not been discussed in the ownership literature so far.

Our paper contributes to *empirical* M&A tax research by jointly considering the effect of foreign dividends and capital gains taxation on cross-border M&A activity. While a few studies investigate the effect of acquirers' taxation systems on M&A activity, they focus only on foreign dividends taxation. Further, the M&A studies by Hebous et al. (2011), Herger et al. (2016) and Arulampalam et al. (2017) find that the corporate tax rate of a potential target has a negative effect on its actual acquisition; however, these studies focus only on the target corporate tax rate and, consequently, do not allow policy implications to be drawn on how to design the taxation system of the acquirer's residence country. Additionally, to our knowledge, our study is the first to analyze the impact of capital gains taxation at the acquirer level on M&A prices. Finally, we show that tax planning plays a role in cross-border M&A activity; thereby, we contribute to a growing body of empirical literature on tax planning

[1] In 2016, cross-border M&As accounted for 869 billion USD. The other prominent form of FDI is foreign greenfield investment, which accounted for 828 billion USD in 2016 (UNCTAD (2017)).

and M&As (e.g., Belz et al. (2016)).

The remainder of this paper is structured as follows. In Section 2, we provide a short review of relevant theoretical literature on optimal M&A taxation systems, and in Section 3, we survey the taxation systems of the OECD, G20 and EU member countries over the 2002-2015 period. We develop our theoretical model in Section 4, and in Section 5, we provide an empirical application of our model and tax policy suggestions. Finally, Section 6 concludes our paper.

2. Optimal M&A taxation systems: Review of theoretical literature

The question how M&As should be taxed best from an economic point of view has been extensively discussed in literature. In the following, we give a brief overview of the most relevant CON literature[2].

Desai and Hines (2003) were the first to define CON. They claim that "[t]ax systems satisfy [CON] if they do not distort ownership patterns." Based on the transaction cost theory, the authors expect that there are productivity differences among several potential owners of an asset. Consequently, CON requires "the most productive ownership of assets within the set of feasible investors." The paper does not give a formal approach to CON, but from their work, Desai and Hines (2003) postulate that CON is achievable under the exemption or the credit method. However, to achieve CON, it is crucial that all countries apply an identical taxation system, i.e., all countries either exempt or tax foreign income.

A first formal approach to CON is taken by Becker and Fuest (2010). They analyze M&A and greenfield investment under two different assumptions. Their first assumption is that ownership advantage is a private (i.e., scarce) good within the firm. In this case, domestic and foreign investment are substitutes and the authors argue that CON cannot be achieved. Their second assumption is that ownership advantage is a public good within the firm. In this case, domestic and foreign investment are complements and the authors argue that CON can be achieved by either the exemption method or the cross-border cash flow taxation system. Becker and Fuest (2010) derive these results in a setting without taxation of capital gains and interest.

Becker and Fuest (2011) advance the model by Becker and Fuest (2010) by adding interest taxation in the residence country of the owner.[3] However, capital gains taxation is still not implemented, and their paper does not look at CON referring to MNEs but at CON referring to the direct (and ultimate) shareholder being an individual. Therefore, corporate taxation only matters at target level. If dividends are taxed at the individual shareholder's level, CON is only achievable if interest and dividends tax rates of the domestic and the foreign country have equal ratios to each other. Again, the models by Becker and Fuest (2010) and Becker and Fuest (2011) show that CON is only achievable if all countries apply an identical taxation system.

A different approach to CON is taken by Ruf (2012). He implements CON in a setting with a classic taxation system, where interest income is subject to taxation $(1 + r(1 - \tau))$. However, his model deviates from taxation systems applied in reality in assuming economic depreciation instead of historical cost depreciation because interest taxation otherwise distorts the intertemporal allocation of resources. In such a taxation system, CON can be achieved by using the credit method. The assumption of historical cost accounting introduces distortions and CON can no longer be achieved using the credit method. Under the exemption method, the MNE refrains from selling foreign subsidiaries even though an acquirer has higher ownership advantage. Consequently, CON cannot be achieved by the exemption method either.

Devereux et al. (2015) set up a model allowing for either greenfield or M&A investment. Additionally, they implement management capacity as a restriction for greenfield or M&As investment. Contrary to Ruf (2012), the MNE maximizes its value by discounting the after-tax cash flows with the gross interest rate. This finding implies that the MNE does not take into account taxation at the individual shareholder level. Capital gains taxation is not modelled explicitly, but the final tax payment of the MNE depends on the taxation method of domestic and foreign profits as well as on an allowance granted to the MNE in the first period. This allowance can be interpreted as a discounted value of depreciation of the participation in future periods and, therefore, could principally be the same

[2] CON has been first mentioned by Devereux (1990).

[3] Interest taxation is modelled differently to that in a classic taxation system. While, usually, the interest rate alone is taxed $(1 + r \cdot (1 - \tau))$, Becker and Fuest (2011) model a cash flow tax $(1 + r) \cdot (1 - \tau)$.

as modelling capital gains taxation. For M&A investment, CON can be achieved by applying a cross-border cash flow taxation system on foreign investment. If unlimited management capacity is given, the exemption method also ensures CON. Further, the authors show that their results hold in the presence of profit shifting. In addition, as no country has so far implemented a cross-border cash flow taxation system on foreign investment, the authors discuss how the results change with historical cost accounting. Depending on the height of costs and the relation of the tax rates in both countries to each other, the exemption method can dominate the credit method (or vice versa) in welfare terms, but neither of these taxation systems leads to CON.

As this review shows, CON can only be achieved under specific circumstances. The most important requirement is that all countries apply an identical taxation system and most papers argue that CON is achievable in a cross-border cash flow taxation system if investment at home and abroad are not perfect complements. Further, capital gains taxation plays an important part but usually results in CON being distorted if the tax base for capital gains is historical cost accounting. In the following section, these requirements undergo a reality check.

3. Extensive survey on taxation systems and anti profit shifting measures in 49 countries

3.1. Variation in taxation systems

To check whether the requirements of the theoretical CON literature outlined in Section 2 hold in reality, we undertake an extensive survey on the actual corporate taxation systems in place across the OECD, G20 and EU member countries (49 countries) over the 2002-2015 period. For this purpose, we collect data on the unilateral method, whereby the national tax law of the respective country stipulates how double taxation of foreign dividends and capital gains can be avoided.

As Figure 1 shows, the applied taxation systems are diverse, with 11 different taxation systems. The most common are the exemption method (in place in 20 countries in 2015) and the credit method (13 countries) for both foreign dividends and capital gains. While the exemption method has gained in popularity over the last years, the credit method has lost. The split taxation system of exempting foreign dividends and crediting foreign capital gains is also common (9 countries) and remains stable over time. We observe 18 countries that change their taxation system over time.

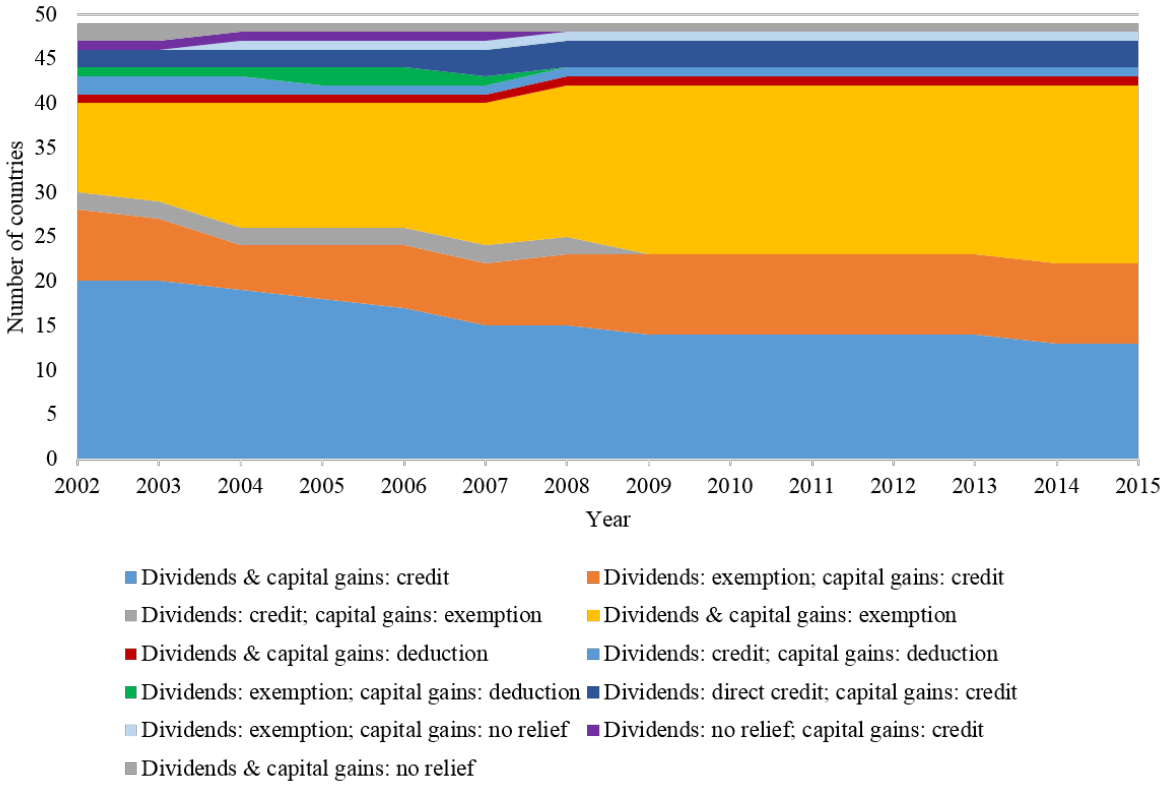
21 countries apply a different taxation method on foreign dividends to that on foreign capital gains. More specifically, in 205 from a total of 686 country-year observations, foreign dividends and capital gains are taxed differently. Further, four countries that apply the credit method on foreign dividends and capital gains apply different tax rates on the respective income (see Figures 9, 10, 11 and 12 in the Appendix). In addition, some EU member countries differentiate in their taxation system depending on the location of the foreign subsidiary. For example, since 2008, the Czech Republic has applied the exemption method on EU subsidiaries and the deduction method on non-EU subsidiaries.

Finally, as Figure 2 shows, the countries under consideration concluded a substantial number of double taxation conventions (DTCs) with each other. The median number of DTCs is 44, and only very few countries have a relatively low number of DTCs. Favorable taxation methods on foreign dividends and capital gains in a DTC overrule the unilateral taxation method. Hence, an additional dimension of variation in taxation systems is present.

Taken together, we observe substantial variation of taxation systems in reality. This observation is in sharp contrast to the identical taxation system across countries required to achieve CON, as outlined in Section 2. Thus, CON cannot be achieved in reality and the question arises how the different taxation systems distort cross-border M&A activity in general and M&A prices in particular. However, empirical research on the effect of taxation systems on cross-border M&A activity is scarce as the following short review shows, and we aim to extend this strand of literature.

To our knowledge, there are three empirical studies on the effect of *foreign dividends* taxation on M&A activity. Feld, Ruf, Scheuering, Schreiber and Voget (2016) start from an ownership neutrality point of view. They argue that ownership neutrality is violated if the system to avoid double taxation of dividends of potential foreign targets varies across countries. This effect is due to second-best ownership structures that may evolve because after-tax dividends of foreign targets differ across countries, depending on their taxation system. Indeed, the authors

Figure 1: Changes in taxation systems over time for 49 countries (OECD, G20 and EU member countries).



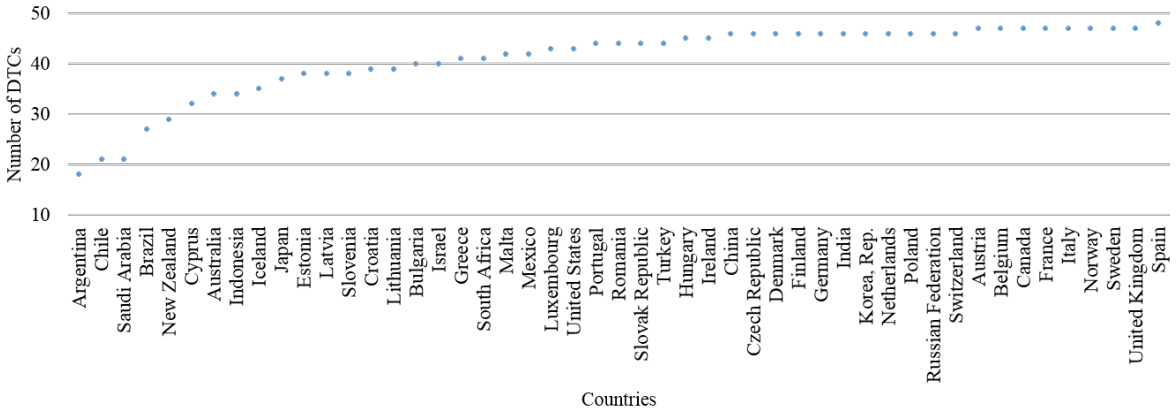
find evidence that the credit method impedes cross-border M&A activity. Huizinga and Voget (2009) investigate the direction and volume of cross-border M&A activity by analyzing whether the prospect of international double taxation of foreign dividends in the acquiring country affects the parent-subsidiary-structure following cross-border M&As. They show that countries with a higher rate of international double taxation are less likely to attract parent firms in a newly created MNE after cross-border M&As. Finally, Voget (2011) finds that, upon repatriation of foreign dividends, additional taxation in the residence country increases the probability of headquarters relocations away from that country.

To our knowledge, there are two empirical studies on the effect of *corporate capital gains* taxation on M&A activity. These studies base their argumentation on the fact that selling a subsidiary may trigger capital gains taxation. This tax burden could be seen as additional transaction costs that increase the reservation price of sellers. Ayers et al. (2007) consider this so-called lock-in effect and argue that capital gains taxation reduces the number and trading volume of M&As. Indeed, in a US M&A data set, they find a negative association between acquisitions and capital gains tax rate. Feld, Ruf, Schreiber, Todtenhaupt and Voget (2016) investigate this lock-in effect in a global M&A data set, where a vendor sells one of its domestic subsidiaries. They find that a decrease in capital gains tax rate increases M&A activity. Additionally, to our knowledge, two studies focus on the impact of *individual shareholder capital gains* taxation on takeover premiums. Ayers et al. (2003) show a positive relation between the takeover premium and capital gains taxation at the level of the selling individual shareholder. Huizinga et al. (2017) show that future capital gains taxation at the acquirer individual shareholder level negatively affects the takeover premium with an increasing tax rate differential between acquirer and seller capital gains taxation.

3.2. Variation in anti profit shifting measures

In addition to observed variation in taxation systems, profit shifting opportunities might impact reservation prices. MNE-wide profit shifting has been in the focus of the public, politicians, practitioners and researchers over the

Figure 2: Number of double taxation conventions between OECD, G20 and EU member countries.



last years.[4] However, the impact of profit shifting on M&A prices has rarely been discussed. Devereux et al. (2015) argue that profit shifting does not distort CON under the assumption of a worldwide cross-border cash flow taxation system incorporating the credit method. However, as our model developed in Section 4.2 shows, profit shifting has an impact on M&A prices and, thereby, distorts CON in a non-cash flow taxation world with various taxation systems. In the following survey, we show that MNEs' profit shifting opportunities vary substantially among countries.

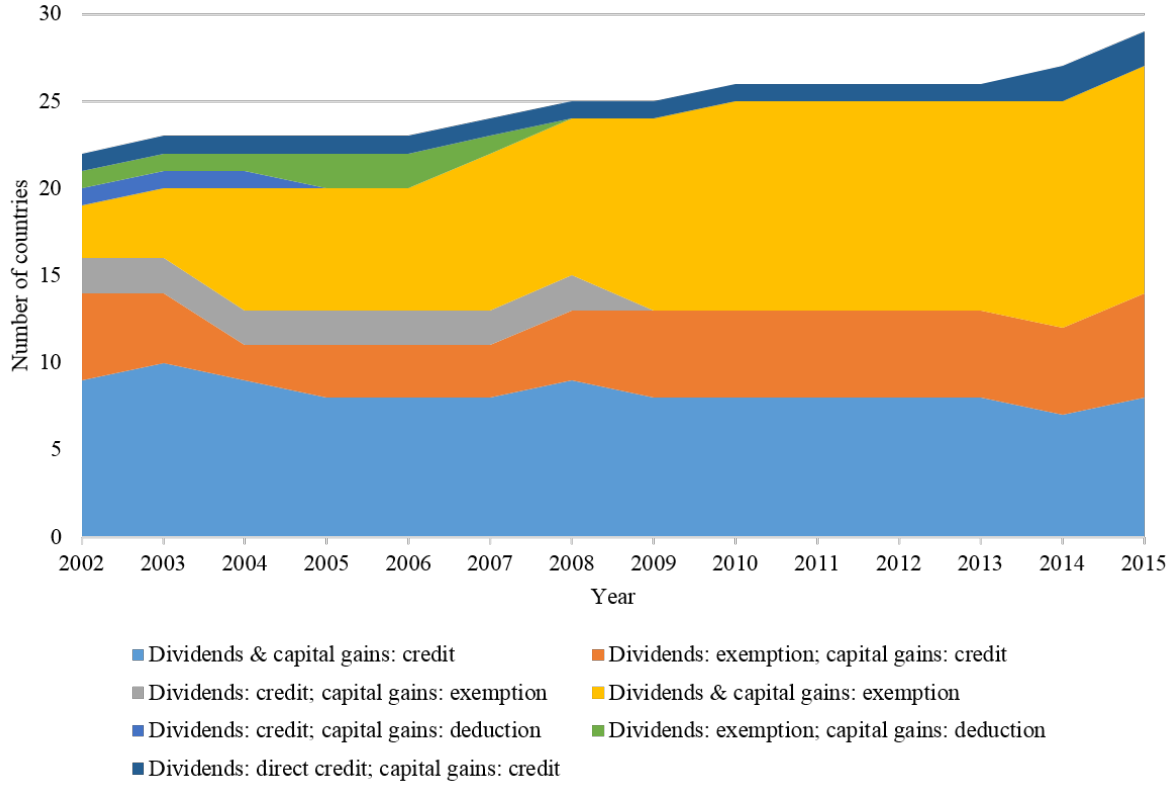
One important anti profit shifting measure is controlled foreign corporation (CFC) rules. These rules aim at MNE-wide book profit shifting strategies, i.e., shifting profits generated in high-tax subsidiaries to low-tax subsidiaries via internal debt-financing or IP-licensing. If CFC rules are applicable, they lead to immediate taxation of low-tax subsidiaries' profits in the MNE's headquarters' country. Consequently, these profit shifting strategies are ineffective. Indeed, empirical research has shown that the presence of CFC rules in the headquarters' country severely mitigates profit shifting opportunities within the MNE (e.g., Altshuler and Hubbard (2003) and Ruf and Weichenrieder (2012)). As shown in Figure 3, CFC rules are present in 29 of the 49 countries in 2015, compared to 22 countries in 2002. Among the two major taxation systems, 52% (65%) of countries that apply the credit (exemption) method on foreign dividends and capital gains have CFC rules. Consequently, there is substantial variation in the presence and non-presence of CFC rules and also countries with the same taxation system may or may not apply CFC rules.

Figures 4 and 5 summarize the findings on taxation systems and MNE-wide profit shifting opportunities by calculating the tax burden of immediate foreign dividends repatriation and capital gains realization as well as profit retention in a tax haven. We consider the year 2015 and those countries that apply the exemption or credit method on foreign dividends and capital gains. The tax burden of foreign dividends and capital gains taxation reflects the statutory tax rate on the respective income. The tax burden of profit retention in a tax haven is calculated in the following way: Generally, we assume full profit shifting within the MNE and set the profit retention tax burden equal 0% as this is the logical lower bound for profit taxation. If the residence country of the MNE applies CFC rules, the tax burden is set to the tax rate threshold that triggers the application of CFC rules in the residence country.[5] Consequently, the tax burden on profit retention is the minimum tax burden an MNE can achieve using

[4]For empirical evidence on tax-motivated profit shifting see, for example, Huizinga and Laeven (2008), Weichenrieder (2009), Dischinger and Riedel (2011), Grubert (2012), Buettner and Wamser (2013) and Dharmapala and Riedel (2013). For anecdotal evidence see, for example, Sullivan (2012). In addition, profit shifting has a high priority on the agenda of current tax policy debates, as the OECD "Base Erosion and Profit Shifting" (BEPS) Project (OECD (2015*c*)) or the anti tax avoidance directive (European Council (2016)) show.

[5]Some countries use a blacklist (whitelist) that triggers (does not trigger) the application of CFC rules. In this case, the tax burden is derived based on the countries mentioned in these lists. For EU member countries in the years after the decision of the European Court of Justice (ECJ) in the case "Cadbury-Schweppes" (C-194/04) in 2006, we assume that countries with CFC rules apply a clause allowing firms to escape CFC rule application if they prove sufficient economic activity in the respective low-tax EU member country. Therefore, we set the tax burden equal to the lowest statutory corporate tax rate within the EU. This is consistent with empirical evidence provided by Ruf and Weichenrieder (2013), who show that European MNEs preferably shift profits to EU subsidiaries after the ECJ decision. For the US, we set the tax burden equal to 0% as the so-called "check-the-box" regulations allow US MNEs to escape fairly easily from CFC rules (see, e.g., Altshuler and Grubert (2006) and Mutti and Grubert (2009)).

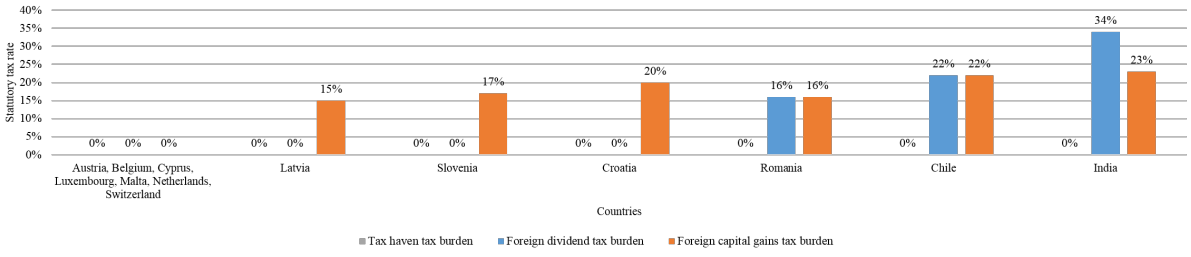
Figure 3: Changes in CFC rules and taxation systems over time for 49 countries (OECD, G20 and EU member countries).



MNE-wide profit shifting.

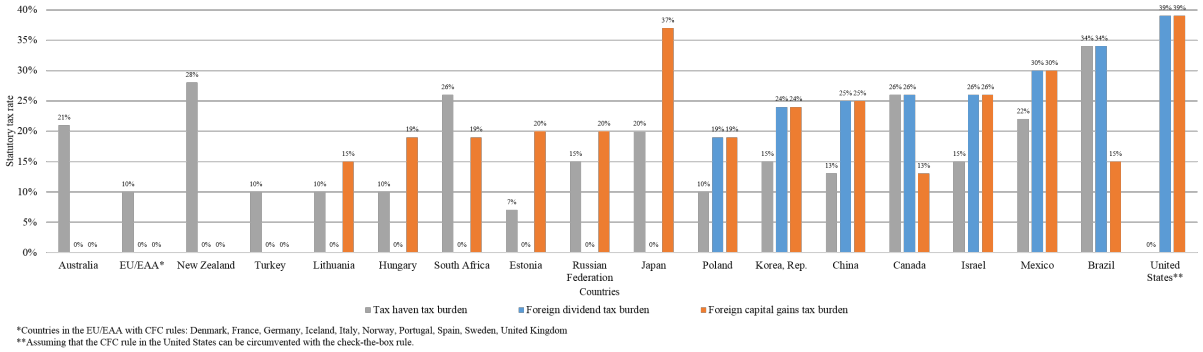
Both figures start with countries that apply the exemption method for both foreign dividends and capital gains, followed by countries that apply the exemption method for foreign dividends and apply the credit method for capital gains, followed by countries that apply the credit method for both foreign dividends and capital gains. Figure 4 shows countries without CFC rules and Figure 5 shows countries with CFC rules. Both figures show a diverse picture. Countries such as the Netherlands or Switzerland have no CFC rules and exempt foreign dividends and capital gains, whereas countries such as Mexico and Brazil have relatively high tax rate thresholds for the application of CFC rules and a relatively high tax rate on foreign dividends and capital gains. Several countries exempt foreign dividends and apply the credit method on capital gains in both CFC rule countries (e.g., Japan) and non-CFC rule countries (e.g., Russian Federation).

Figure 4: Non-CFC rule countries: Tax burden of foreign dividends, capital gains and profit retention.



Two further anti profit shifting measures may partly impede profit shifting strategies; however, they are applicable at the *subsidiary* level and, consequently, have no link to the taxation systems analyzed above. Thin capitalization or interest stripping rules may restrict the deduction of excessive interest expenses; transfer pricing rules require

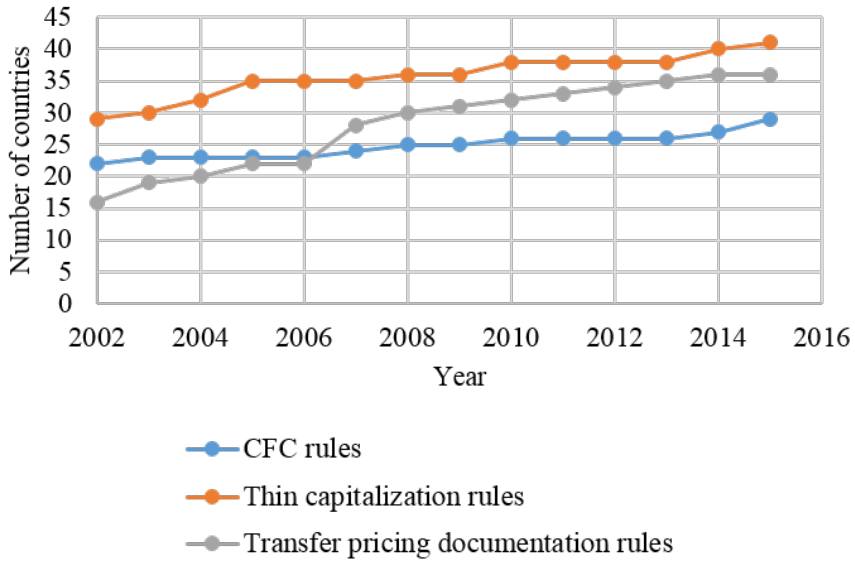
Figure 5: CFC rule countries: Tax burden of foreign dividends, capital gains and profit retention.



*Countries in the EU/EAA with CFC rules: Denmark, France, Germany, Iceland, Italy, Norway, Portugal, Spain, Sweden, United Kingdom
**Assuming that the CFC rule in the United States can be circumvented with the check-the-box rule.

the application of the arm's length principle on intra-group transfer prices and may restrict the deduction of unjustifiably high interest or royalty expenses. Figure 6 shows that mandatory transfer pricing documentation rules[6] more than doubled over the 2002-2015 period and thin capitalization or interest stripping rules increased by around 50%. Still, not all countries apply those anti profit shifting measures and profit shifting strategies are still (partly) implementable within an MNE depending on the location of subsidiaries.

Figure 6: Changes in anti profit shifting measures over time for 49 countries (OECD, G20 and EU member countries).



4. Theoretical model on the impact of taxation systems on acquirer reservation prices

4.1. Motivation of model

Section 3 illustrates that countries apply various corporate taxation systems regarding foreign dividends and capital gains taxation; in addition, there is a wide spectrum of profit shifting opportunities and tax rates. These findings are in sharp contrast to the theoretical results of CON literature presented in Section 2 that claim that CON can only be achieved if all countries apply an identical taxation system, in particular, a cross-border cash flow taxation system using the credit method (Devereux et al. (2015)). Combining the findings of Section 2 and 3 and taking into account the empirical evidence showing that taxing foreign dividends or capital gains impedes the M&A activity

[6]We define mandatory transfer pricing documentation rules to be present in a country if the country's tax law requires the application of the arm's length principle on intra-group transfer prices and requires documentation or disclosure of those transfer prices.

of that country's MNEs, it is clear that CON cannot be reached in the current taxation environment. Moreover, a country that implements a taxation system satisfying CON may put its own MNEs at a disadvantage relative to other MNEs in bidding for foreign targets if the taxation system those MNEs are subject to enhances M&A activity.

It is not easy to answer the question as to which taxation system enhances or hinders cross-border M&A activity. As outlined in Section 3.1, empirical results suggest that taxing foreign dividends leads to fewer *acquisitions*, while taxing capital gains leads to fewer *sellings*. Further, the focus of those studies lies on the effects of *either* dividends *or* capital gains taxation, i.e., those effects are not considered jointly. While this isolated consideration does not imply that the results of those studies are biased in answering their research questions, a joint consideration may help to comprehensively understand the effect of the taxation system on the acquirer's reservation price. Especially, differences in tax rates for foreign dividends or capital gains cannot be covered by looking at only one of the two aspects. Further, taking profit shifting opportunities into account seems to be relevant in determining tax impacts on reservation prices. Besides a huge body of empirical literature showing that profit shifting takes place in general (see Section 3.2), a growing body of empirical literature specifically investigates M&As in light of profit shifting. For example, Belz et al. (2016) find that domestic targets experience a decrease in their effective tax rates by up to 8% following acquisition by a tax aggressive MNE. Additionally, the well-known phenomenon of tax induced inversions, i.e., a tax motivated relocation of headquarters by a merger with a foreign firm located in a tax haven country, has been researched in several studies (e.g., Desai and Hines (2002), Cloyd et al. (2003), Babkin et al. (2017)).

Based on theoretical CON literature as outlined in Section 2, we argue that when an acquirer determines the reservation price for a foreign target, he considers tax consequences of future dividends repatriation *as well as* tax consequences of future capital gains or losses[7] once the target is eventually sold or liquidated. Further, based on empirical tax literature mentioned above, we argue that he may consider profit shifting opportunities available to him, tax strategies such as delaying repatriation and additional taxes such as withholding taxes. Therefore, a joint consideration of all these effects is necessary to provide detailed guidance for the national tax policy maker on a taxation system that enhances cross-border M&A activity.

Based on this argumentation, we derive a simple model of how a potential acquirer determines the taxation impact on his reservation price. This model encompasses all of the aforementioned aspects of taxation systems and is based on the models developed by Ruf (2012) and Devereux et al. (2015). However, we do not allow for economic depreciation (Ruf (2012)) or an immediate deduction of the acquisition price from the tax base (Devereux et al. (2015)) but rather restrict our model to the more realistic case of depreciation of the book value of a participation in the target to account for capital gains taxation at the acquirer level. In addition, we explicitly allow for profit shifting. Finally, by considering capital gains taxation at the acquirer side, we add another dimension to empirical tax literature that so far focuses on the seller side in investigating the effect of capital gains taxation.

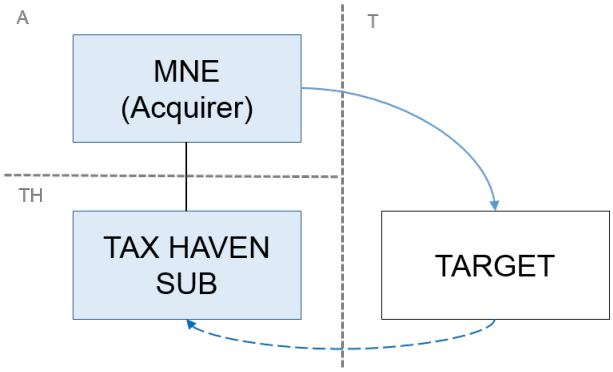
4.2. Development of model

Figure 7 shows the basic setup of our model: A multinational enterprise (MNE) located in Country A wants to acquire a certain target firm (TARGET) located in Country T.[8] MNE is the global ultimate owner of the group and acquires TARGET directly. Subsequent to the acquisition, profits generated by TARGET may be shifted to a tax haven subsidiary (TAX HAVEN SUB) located in Country TH.

[7] In this paper, the term "capital gains" refers to capital gains and losses.

[8] To finance the acquisition, MNE raises equity from multiple individual shareholders located in different countries. As these shareholders are assumed to be relatively small, their individual tax rules do not impact the gross market interest rate they demand from MNE. Consequently, MNE does not take into account the specific tax rules of its shareholders and discounts with the gross market interest rate. Further, we assume MNE to have access to shareholders globally. Therefore, the gross market interest rate is not country-specific, but a worldwide uniform interest rate. This would also be the result if arbitrage on investment opportunities amongst savers "leads to an outcome in which all projects offer the same rate of return to savers before personal tax"(King and Fullerton, 1984, p. 12). This assumption is reasonable, as the presence of untaxed investors (e.g., pension funds) should otherwise result in an equilibrium with zero personal taxes for all investors. The same result will also follow if MNE finances the acquisition by using (untaxed) profit reserves from a tax haven subsidiary. Given that many US MNEs have retained large amounts of (almost untaxed) profits in tax havens (see, e.g., Cox (2016)), this scenario is also a plausible explanation for assuming that personal taxes do not matter.

Figure 7: Theoretical model overview.



The acquirer's reservation price (P_{Acq}) is then determined as follows:

$$P_{Acq} = DIV_{Acq} \cdot PVF_t \cdot (1 - \tau_{Acq}) + \frac{\tau^{A,CG} \cdot P_{Acq}}{(1+r)^t}. \tag{1}$$

DIV_{Acq} stands for dividend payments that MNE receives from TARGET. τ_{Acq} represents the potential tax burden that dividend payments face upon repatriation to MNE and PVF_t is the present value factor for dividend payments. $\tau^{A,CG}$ is the tax rate applied on capital gains in MNE's country. The reservation price is driven by two tax effects outlined in the following.

The first term represents the effect of the present value of the after-tax cash flow (i.e., dividend payments) that MNE receives from TARGET. The acquirer's reservation price decreases if τ_{Acq} increases, and this effect is strictly time invariant (although the absolute value changes with the number of periods taken into account).

The second term represents the effect of the present value of the potential tax refund that the acquirer receives upon liquidation or sale of TARGET in period t. The tax refund emerges as the acquirer can potentially either depreciate the book value of the participation in TARGET upon liquidation or reduce the gains from selling TARGET by the book value in his accounts.[9] The higher the capital gains tax rate $\tau^{A,CG}$, the higher the tax refund. However, unlike dividends taxation, the capital gains taxation effect is strictly time dependent—it occurs only once—and decreases with an increasing number of periods taken into account. As a result, the acquirer's reservation price decreases if τ_{Acq} decreases or the number of periods increases; the acquirer's reservation price increases if $\tau^{A,CG}$ increases.

TARGET's dividends are assumed to be the full profits of TARGET and equal TARGET's cash flows.[10] They consist of two components: The profit generated by TARGET's business activities (denoted by ε) and an additional profit created solely because MNE becomes the parent of TARGET, i.e., a synergy (denoted by Δ_{Acq}). Consequently, DIV_{Acq} could be written as $DIV_{Acq} = \varepsilon + \Delta_{Acq}$.

It is assumed that TARGET has neither paid-in capital nor profit reserves at the beginning of the first period. As a result, there are no assets left in TARGET after the repatriation of profits at the end of the last period. Consequently, TARGET is liquidated.[11] A modification of this assumption is discussed in Section 8.1.1 in the Appendix. There we allow for subsequent acquisitions instead of liquidation. As the liquidation occurs in the books of the acquirer,

[9] It is assumed that MNE generates sufficient profits from other sources to make use of the capital loss. Further, it is important to note that our model design assumes that the capital loss is used at the acquirer level only. However, the capital losses may also be considered in Country T if MNE is subject to limited tax liability in T. Therefore, the method to avoid double taxation for capital gains in Country A might also impact the reservation price if a tax refund in Country T occurs. However, Art. 13 (5) of the OECD Model Tax Convention 2014 prohibits the country in which the shares are alienated (T in this case) to tax such proceeds. See footnote 22 for how we deal with the rare case in our empirical application, where limited tax liability in T may be problematic if no DTC between A and T exists.

[10] Accordingly, we use the terms *profit* and *cash flow* synonymously throughout this paper.

[11] If TARGET has paid-in capital at the beginning of the first period, this paid-in capital is accounted for in the reservation price and can be repatriated tax free to MNE, resulting in a tax neutral reduction of the book value of TARGET. Consequently, each unit of paid-in capital will increase the reservation price by one unit. If TARGET has profit reserves at the beginning of the first period, these profit reserves are also paid for in the reservation price; however, their repatriation to MNE may lead to dividends taxation in A. The calculation looks similar to the one below except that the profit reserves are already taxed at rate τ^T and, therefore, cannot be shifted to TH.

the depreciation yields tax refunds in the acquirer residence country.[12]

From a tax perspective, τ_{Acq} depends on multiple characteristics. If no profits are shifted, no withholding taxes exist and foreign dividends are exempted from taxation in the acquirer's residence country, then τ_{Acq} simply equals the tax rate in the target residence country, i.e., $\tau_{Acq}^{Exemption} = \tau^T$. If, however, withholding taxes are levied, $\tau_{Acq}^{Exemption,WHT} = \tau^T + \tau_{WHT}^T - \tau^T \cdot \tau_{WHT}^T$. If, on the contrary, no profits are shifted and foreign dividends are taxed in the acquirer's residence country with a credit granted for underlying foreign taxes paid, then τ_{Acq} equals the tax rate in the acquirer residence country, i.e., $\tau_{Acq}^{Credit} = \tau^A$. Further, we analyze the setting in which all profits are shifted to a tax haven without costs, resulting in $\tau_{Acq}^{Exemption,PS} = \tau^{TH}$ with τ^{TH} being the tax rate in the tax haven. For MNEs from residence countries applying the credit method, profit shifting does not impact the dividends tax burden if $\tau^T \leq \tau^A$ and works as a means to avoid excess foreign tax credits if $\tau^T > \tau^A$.[13]

$\tau^{A,CG}$ is also dependent on the taxation system that the acquirer residence country applies. If foreign capital gains are exempted from taxation, the capital gains tax rate is zero, i.e., $\tau^{A,CG} = 0$. If foreign capital gains are taxed, the capital gains tax rate is positive and—in most cases—equals the corporate statutory tax rate, i.e., $\tau^{A,CG} = \tau^A$.

PVF_t is the present value of the terminal value factor TVF_t, i.e., $PVF_t = \frac{TVF_t}{(1+r)^t}$. TVF_t takes the value $\frac{\left[1+\frac{r}{1-\tau^A}\cdot(1-\tau^T)\right]^t-1}{\frac{r}{1-\tau^A}\cdot(1-\tau^T)}$ if no profits are shifted and $\frac{\left[1+\frac{r}{1-\tau^A}\cdot(1-\tau^{TH})\right]^t-1}{\frac{r}{1-\tau^A}\cdot(1-\tau^{TH})}$ if profits are shifted. The underlying assumption is that profits are reinvested at the cost of capital of the firm. As the acquirer is assumed to be financed with equity only, the cost of capital depend on the rate of return that the investors demand (r) and the tax rate the MNE faces. As the effective tax rate of the MNE depends on all its investments and not only on the acquisition whose price is determined, we approximate this tax rate by τ^A. Consequently, the cost of capital is calculated as $\frac{r}{1-\tau^A}$. TVF_t is thus country specific.[14]

Section 3.1 has shown that the most relevant methods to avoid double taxation are the credit method and the exemption method. Consequently, we focus on these two methods when analyzing the impact of dividends taxation on M&A deal values. Additionally, countries may choose between taxing or not taxing foreign capital gains.[15] Thus, the following four different taxation systems are analyzed:

- DIV0CG0:
  Foreign dividends are taxed and underlying foreign taxes as well as withholding taxes are credited (DIV0); foreign capital gains are taxed (CG0).
- DIV0CG1:
  Foreign dividends are taxed and underlying foreign taxes as well as withholding taxes are credited (DIV0); foreign capital gains are exempted (CG1).
- DIV1CG0:
  Foreign dividends are exempted (DIV1); foreign capital gains are taxed (CG0).
- DIV1CG1:
  Foreign dividends and foreign capital gains are exempted (DIV1 & CG1).

Table 1 shows the calculation of TAX in detail. Based on the values of TAX, we can draw conclusions with respect

[12] In principle, the target residence country could also tax capital losses upon the liquidation of TARGET and thus also grant a tax refund. This case, however, is highly unlikely. First, Article 13 (5) of the OECD Model Tax Convention prohibits the TARGET residence country from taxing such proceeds and, second, the tax refund would only materialize if the acquirer has other income in the TARGET residence country. Therefore, we abstain from this further complexity.

[13] As Section 8.1.2 in the Appendix shows, the complexity of the model increases once costs of profit shifting are taken into account. However, costs of profit shifting are covered by several variables in the empirical application (e.g., CFC rules, transfer pricing regulations or thin capitalization rules). Therefore, we limit our model to the case without costs of profit shifting to increase model readability.

[14] If the MNE's effective tax rate regarding this investment $\left[\frac{\Pi_{Acq}}{\varepsilon+\Delta_{Acq}}\cdot\tau^{TH}+\left(1-\frac{\Pi_{Acq}}{\varepsilon+\Delta_{Acq}}\right)\cdot\tau^T\right]$ is higher than τ^A, the rate of return upon reinvestment falls below the required rate of return of the investors (r). Consequently, it is assumed that the MNE does not reinvest but repatriates the earnings and TVF_t takes the value $\frac{(1+r)^t-1}{r}$.

[15] Double taxation of capital gains does not play a role in our analysis, as our sample consists of almost only M&A deals between countries that have concluded DTCs with each other. For additional information, see footnote 9.

to differences in TAX between countries and analyze which taxation system yields the highest reservation prices for M&A bidders.

Table 1: Calculation of TAX among the four taxation systems.

DIV0CG0	DIV0CG1	DIV1CG0	DIV1CG1
Full profit shifting (fullPS)			
$TVF_t \cdot \frac{(1-\tau^A)}{(1+r)^t-\tau^{A,CG}}$	$TVF_t \cdot \frac{(1-\tau^A)}{(1+r)^t}$	$TVF_t \cdot \frac{(1-\tau^{TH})}{(1+r)^t-\tau^{A,CG}}$	$TVF_t \cdot \frac{(1-\tau^{TH})}{(1+r)^t}$
No profit shifting (noPS)			
$1-(1-\tau^T)\cdot(1-\tau^T_{WHT}) < \tau^A$			
$TVF_t \cdot \frac{(1-\tau^A)}{(1+r)^t-\tau^{A,CG}}$	$TVF_t \cdot \frac{(1-\tau^A)}{(1+r)^t}$	$TVF_t \cdot \frac{(1-\tau^T)\cdot(1-\tau^T_{WHT})}{(1+r)^t-\tau^{A,CG}}$	$TVF_t \cdot \frac{(1-\tau^T)\cdot(1-\tau^T_{WHT})}{(1+r)^t}$
$1-(1-\tau^T)\cdot(1-\tau^T_{WHT}) > \tau^A$			
$TVF_t \cdot \frac{(1-\tau^T)\cdot(1-\tau^T_{WHT})}{(1+r)^t-\tau^{A,CG}}$	$TVF_t \cdot \frac{(1-\tau^T)\cdot(1-\tau^T_{WHT})}{(1+r)^t}$	$TVF_t \cdot \frac{(1-\tau^T)\cdot(1-\tau^T_{WHT})}{(1+r)^t-\tau^{A,CG}}$	$TVF_t \cdot \frac{(1-\tau^T)\cdot(1-\tau^T_{WHT})}{(1+r)^t}$

Table illustrates calculation of tax component (TAX) based on our model among the four taxation systems. TAX^{fullPS} considers the assumption that all profits are shifted from TARGET to TAX HAVEN SUB. TAX^{noPS} considers the assumption of no profit shifting.

Based on the calculation of TAX, the following analysis can be undertaken for a country applying the DIV1CG1 system. This country's MNEs have a higher reservation price for a certain target than MNEs from a country applying the DIV0CG1 system (i.e., $TAX^{fullPS}_{DIV1CG1} > TAX^{fullPS}_{DIV0CG1}$) as dividends are taxed only at the target or the tax haven tax rate.[16] On the contrary, a higher capital gains tax rate increases the reservation price of MNEs for a certain target as the tax refund they get in the last period becomes more valuable to them (i.e., $TAX^{fullPS}_{DIV1CG1} < TAX^{fullPS}_{DIV1CG0}$).[17]

The same analysis can be undertaken for a country applying the DIV0CG0 system. That country's MNEs have a lower (higher) reservation price for a certain target than MNEs from a country applying the DIV1CG0 (DIV0CG1) system. Consequently, we expect $TAX^{fullPS}_{DIV0CG0} < TAX^{fullPS}_{DIV1CG0}$ and $TAX^{fullPS}_{DIV0CG0} > TAX^{fullPS}_{DIV0CG1}$.

Finally, it is unclear whether MNEs from a country applying the DIV0CG0 system derive lower or higher reservation prices than MNEs from countries applying the DIV1CG1 system. The reason is that it is unclear which of the two effects—the value increasing effect of lower dividends taxation or the value decreasing effect of no capital gains taxation—dominates.

4.3. Model extension: Indefinite profit retention

So far, we have assumed that an acquirer calculates the reservation price for a certain target over a predefined period. However, tax literature (e.g., Foley et al. (2007)) argues that several US firms claim a large portion of their foreign earnings as permanently reinvested abroad, i.e., these firms do not plan on repatriating these foreign earnings. The cumulative amount of these indefinitely reinvested earnings is currently estimated at more than 2.4 trillion USD (McKeon (2016)). Applying this idea to our model results in the following problem: If a firm never repatriates foreign earnings, no payout to its shareholders can be made. Consequently, the value of the foreign profits for the MNE and its shareholders drops to zero. To circumvent this problem, MNEs may choose to pay their shareholders dividends financed by taking up loans, a structure known from Apple Inc. (see, e.g., Apple Inc. (2015) and Thielman (2016)).

The economic effects of Apple Inc.'s structure are as follows: As foreign earnings are reinvested abroad, repatriation taxes are saved. The interest expenses generated by this structure are tax deductible in the US, i.e., each Dollar paid in interest saves US taxes of about 0.39 Dollar. Consequently, there is a liquidity disadvantage of about 61% of the interest payments made. As it is not reasonable to assume that Apple Inc. can cover these (increasing) interest expenses with US earnings forever, the liquidity disadvantage should be covered by the foreign operations.

[16] Given that the target or the tax haven has a lower tax rate than the residence country of an MNE, i.e., $\tau^{TH} < \tau^T < \tau^A$.

[17] Given that the potential difference in tax haven tax rates (τ^{TH}) between two acquirer countries does not overcompensate the capital gains effect.

Consequently, Apple Inc. should repatriate just enough money from foreign operations to cover for this liquidity disadvantage.[18]

To implement this strategy in our model, we adjust the model under the full profit shifting assumption as follows: The individual shareholders do not value foreign cash flow directly (as this is almost completely retained abroad), but rather the cash flow that the acquirer pays out to its shareholders (i.e., the debt the acquirer takes up). In the first period, the MNE takes up a loan of D_{Acq}. This loan bears interest at the gross market interest rate r. It is assumed that all loans have a maturity of one year. Consequently, the loan taken up in the first period has to be paid back at the end of the second period. To fund this payback, another loan is taken up in period two amounting to the amount of debt paid back plus the constant payout to the shareholders, i.e., $n \cdot D_{Acq}$ in period n. The foreign earnings are assumed to be reinvested at the capital market rate r[19] and are then repatriated to fund interest payments on the loan. Dividend payments from the tax haven subsidiary to the MNE consequently amount to $(n-1) \cdot (\varepsilon + \Delta_{Acq}) \cdot (1-\tau^{TH})^2 \cdot r$ in period n. Given that the residence country applies the credit method and no additional profits exist at MNE level to make use of potential excess foreign tax credits, the profit maximizing constant payout to the individual shareholders of the MNE amounts to $D^*_{Acq} = (\varepsilon + \Delta_{Acq}) \cdot (1-\tau^{TH})^2$.[20] For this amount of annual (additional) debt, the liquidity effect (dividends received ./. interest paid ./. taxes) at the level of the MNE equals zero, as interest payments equal dividends payments. As a result, the tax basis is zero and no tax payments are due at MNE level.

The acquirer's reservation price can then be expressed as follows:

$$P_{Acq}^{Credit+IndefiniteRetention}(\Delta_{Acq}) = (\varepsilon + \Delta_{Acq}) \cdot \frac{(1-\tau^{TH})^2}{r} \tag{2}$$

If the acquirer had not used this structure, his reservation price would be derived as follows:

$$P_{Acq}^{Credit+Repatriation}(\Delta_{Acq}) = (\varepsilon + \Delta_{Acq}) \cdot \frac{1-\tau^{A}}{r} \tag{3}$$

Therefore, for acquirers from credit countries, using the structure is beneficial as long as $\tau^A > \tau^{TH} \cdot (2-\tau^{TH})$.

Acquirers from exemption countries do not use this structure. As they do not have any taxable income (due to dividends exemption), no tax effect of taking up loans emerges because potential loss carry-forwards can never be used. As a result, the highest possible debt-financed payout equals the amount derived above for credit countries. However, this will always be lower than the reservation price when the structure is not used:

$$P_{Acq}^{Exemption+Repatriation}(\Delta_{Acq}) = (\varepsilon + \Delta_{Acq}) \cdot \frac{(1-\tau^{TH})}{r} \tag{4}$$

We account for this model adjustment in a further analysis in the empirical application. In calculating $TAX_{div}^{fullPS,indefinite}$, we assume that acquirers from exemption countries will always repatriate foreign earnings. Acquirers from credit countries will use the proposed structure as long as $\tau^A > \tau^{TH} \cdot (2-\tau^{TH})$ and repatriate foreign earnings otherwise.

[18] In the year 2016, about 50% of all foreign cash of subsidiaries of Apple Inc. were accounted for as permanently reinvested earnings. Consequently, Apple Inc. plans on repatriating the other half of foreign cash in the forseeable future, indicating that this money could be used to fund interest payments on debt taken up in the US (see Apple Inc., 2016, p.55).

[19] In the long run, it is not reasonable to assume that the firm will always be able to find investment projects that yield a higher return than the capital market rate.

[20] See Table 9 in the Appendix for an overview on all liquidity and tax effects.

5. Empirical application

5.1. M&A data and calculation of TAX

5.1.1. M&A data

In this section, we apply our theoretical model derived in the previous section to real world M&A data. This data is taken from the Thomson Financial SDC database, which contains worldwide M&A transactions and provides information on the countries of the acquirer ultimate parent, direct acquirer and target. We investigate the period 2002 to 2014. In line with our theoretical model assumptions outlined in Section 4.2, we have selected all completed M&As through which 100% of target shares are acquired and restrict our sample to cross-border M&As defined as an acquirer buying the shares of a foreign target. To eliminate the possibility that a subsidiary in a third country is involved in the M&A, we require that the acquirer ultimate parent *directly* acquires the target. Further, we exclude acquirer ultimate parents from the financial sector. Finally, as our model and empirical application focus on the credit method and the exemption method as the most common methods to avoid double taxation, we do not consider country-years in which no relief or the deduction method is implemented.

Table 2 shows that 9,108 cross-border M&As and 40 countries remain. In line with Di Giovanni (2005), we observe that countries with the largest financial markets have most observations in our sample. Our sample decreases by 92% to 709 observations from 29 countries once we take into account firm level control variables, which are needed for our regression analysis in Section 5.2. As Table 2 shows, the decrease is very close to 92% in most countries and, hence, is not driven by specific countries. Further, it is not a single variable that causes the reduction in observations but the combination of financial data needed for the empirical application. Hence, we assume that the smaller sub-sample is a representative subset of the larger one and that focusing on this subset does not bias our subsequent empirical work.[21] Table 2 also gives an overview of the M&A deal numbers and M&A deal values per acquirer ultimate parent country. Further, the table shows that almost half of the considered countries changed their taxation system in the period 2002 to 2014. More details on the respective taxation systems of the considered countries are shown in Table 8 in the Appendix.

5.1.2. Calculation of TAX

To avoid double taxation on foreign dividends and capital gains as described in Section 3.1, the calculation of TAX according to Table 1 is based on the unilateral method. However, relying only on this unilateral method in analyzing observed cross-border M&A transactions would lead to spurious results as most countries in our sample have a large DTC network, as Figure 2 shows. These bilateral tax treaties overrule national tax law when there is a beneficial outcome for the tax payer. Therefore, we consider all DTC country-year pairs and replace the unilateral method by the DTC method for the case of a beneficial outcome. Further, based on our findings in Section 3.1, we check for each EU member country whether it has any beneficial method to avoid double taxation for subsidiaries residing in another EU member country. If that is the case, we replace the unilateral or bilateral method to avoid double taxation with this EU method.

The necessary tax rates to calculate TAX are statutory corporate tax rates of the acquirer ultimate parent and target country (τ^A, τ^T) and capital gains tax rates of the acquirer ultimate parent country ($\tau^{A,CG}$).[22] For calculating TAX^{fullPS}, we include the lowest possible tax haven tax rate (τ^{TH}) for each acquirer ultimate parent country, as derived in Section 3.2. If τ^{TH} is higher than τ^T, we set τ^{TH} equal to τ^T as it would not make sense to shift profits

[21] This argumentation follows Huizinga and Voget (2009), p. 1228, who face the same problem using firm level data in an SDC data set and who observe a similar decrease in sample size. To expand our sub-sample, we follow Huizinga and Voget (2009) and use Compustat North America and Compustat Global databases that are together global in coverage to fill-up firm level control variables. We use CUSIP and SEDOL firm identification codes to link the Compustat databases with the SDC database.

[22] We assume that no capital gains taxation in the target country occurs. However, as outlined in footnote 9, this assumption is critical if no DTC between the acquirer ultimate parent and target exists. Therefore, we drop very few observations if no DTC between those countries exists and (1) where the acquirer ultimate parent country exempts capital gains and the target country may tax those capital gains due to limited tax liability, or (2) where the acquirer ultimate parent country taxes capital gains applying the credit method and the target country may tax those capital gains due limited tax liability at a higher capital gains tax rate than the acquirer ultimate parent country, i.e., no excess foreign tax credits should occur. Additionally, we ensure that each of the countries that is identified as taxing capital gains also permits the deduction of capital losses.

Table 2: Cross-border M&As with acquirer ultimate parents resident in the 40 countries under consideration (2002-2014).

Country	Number of deals	Number of deals for which firm control variables are given	Sample decrease (column (2) to column (3))	Total deal value in small sample (in million USD)	Mean of TAX in small sample	Standard dev. of TAX in small sample	Minimum of TAX in small sample	Maximum of TAX in small sample	Change in taxation system?
Australia	513	22	.96	9,342	11.7	.87	10.0	12.7	YES
Austria	53	2	.96	210	12.1	.10	12.0	12.2	NO
Belgium	97	12	.88	3,668	11.5	.73	10.0	12.8	NO
Brazil	23		1						NO
Canada	1,418	60	.96	53,470	12.1	2.35	10.0	20.0	NO
Chile	12	1	.92	3,425	15.5		15.5	15.5	NO
China	90	2	.98	44	10.7	.54	10.4	11.1	NO
Croatia	3		1						NO
Cyprus	9		1						NO
Denmark	76	8	.89	4,360	11.5	1.06	9.4	12.5	NO
Estonia	1		1						YES
Finland	139	10	.93	10,172	12.4	2.10	10.0	17.6	NO
France	217	23	.89	63,580	12.3	1.71	10.3	16.3	YES
Germany	248	20	.92	56,932	12.5	1.42	10.3	15.0	NO
Hungary	5		1						NO
Iceland	25	6	.76	1,336	11.5	.65	11.0	12.8	YES
India	192	16	.92	1,396	11.6	1.43	9.3	14.2	NO
Israel	125	12	.90	26,917	11.4	2.37	9.4	16.9	NO
Italy	117	9	.92	7,096	12.2	1.40	9.7	14.3	YES
Japan	257	21	.92	15,555	13.5	2.50	11.2	20.9	YES
Korea, Rep.	88	2	.98	177	12.0	2.33	10.4	13.7	NO
Latvia	1		1						NO
Lithuania	1		1						NO
Luxembourg	29	2	.93	563	9.9	.26	9.7	10.1	NO
Malta	3		1						YES
Mexico	37	2	.95	15,912	14.8	2.11	13.3	16.3	NO
Netherlands	217	33	.85	43,007	11.7	1.43	10.2	16.8	NO
New Zealand	65	2	.97	92	10.9	.97	10.2	11.6	YES
Norway	159	8	.95	3,206	12.2	1.26	9.2	12.9	YES
Portugal	18	2	.89	12	12.2	.14	12.1	12.3	YES
Romania	3		1						NO
Russian Fed.	18	2	.89	1,130	10.4	0.00	10.4	10.4	YES
Slovenia	4		1						YES
South Africa	39	5	.87	2,118	12.9	.81	12.2	14.3	YES
Spain	154	12	.92	64,875	11.2	1.58	9.0	13.6	NO
Sweden	384	34	.91	27,353	12.1	1.40	10.0	16.0	YES
Switzerland	200	21	.89	39,165	11.2	1.16	9.7	13.9	NO
Turkey	11		1						YES
United Kingdom	1,633	80	.95	78,087	11.4	1.19	9.7	17.4	YES
United States	2,424	280	.88	174,536	13.2	1.19	10.3	16.6	NO
Total	9,108	709	.92	707,738	12.4	1.64	9.02	20.9	

Table shows number of acquirer ultimate parents per country in our cross-border M&A sample where the acquirer ultimate parent is resident in one of the 40 considered countries (OECD, G20 and EU member countries) that apply the exemption or credit method on foreign dividends and capital gains. Argentina and Indonesia, which apply the credit method on foreign dividends and capital gains, do not have observations. The target is resident in a member country of the OECD, G20 or EU. The sample decrease shows the relative decrease in observed M&As from the base sample (9,108 observations) to the sample including firm level control variables (lnTarEBITDA, lnTarEquity, lnTarTotAss, TarLeverage, lnAcqUltParTotAss, AcqUltParROA). Cross-border M&As are defined as acquirer ultimate parent and target being in different countries. TAX refers to TAX^{noPS} for a period of 30 years.

to the higher taxed tax haven subsidiary.[23] Finally, under the assumption of no profit shifting (TAX^{noPS}), we include the withholding tax rate on dividends of the target country (τ^T_{WHT}). τ^T_{WHT} equals the unilateral withholding tax rate and is replaced by the potentially lower withholding tax rate of the DTC, if a DTC is present between the acquirer ultimate parent and target country. Under the assumption of full profit shifting from the target to a tax haven subsidiary, we set the withholding tax rate to zero since we assume that tax haven countries do not apply withholding taxes on dividends. Finally, as the measure of r in TAX, we use average long-term interest rate for government bonds of selected countries where the capital repayment is guaranteed by governments. These government bonds represent the alternative financial investment that is used as the benchmark investment in our theoretical model.

Based on Table 1 and our detailed tax data set, we can now calculate the values of TAX for each deal in our cross-border M&A sample. Table 2 shows the summary statistics of TAX^{noPS} for each country for a period of 30 years and Table 3 shows summary statistics of TAX^{noPS} among each of the four taxation systems. Overall, we observe substantial variation in TAX^{noPS} between and within the different taxation systems. However, it is still an empirical question whether this variation explains the differences in observed M&A deal values in our M&A data set. Therefore, we apply a multivariate regression analysis to our data set in the following.

[23] CFC rules are not applicable to the income of this low-tax target since we assume that the target generates active income, which does not fall under the scope of CFC rules applicable in our data set.

Table 3: Overview on TAX^{noPS} among the four taxation systems.

	DIV0CG0	DIV0CG1	DIV1CG0	DIV1CG1
Obs.	325	56	90	238
Share	45.8%	7.9%	12.7%	33.6%
Mean	13.02	11.09	12.41	11.89
Median	12.98	11.20	12.13	11.83
Std. dev.	1.37	0.83	2.38	1.42
Min.	9.27	9.74	9.98	9.02
Max.	16.95	12.58	20.91	17.64

Table shows summary statistics of TAX^{noPS} for a period of 30 years.

5.2. Regression analysis

5.2.1. Main analysis and robustness checks

In this section, we investigate whether the tax component TAX as summarized in Table 1 explains variation in M&A deal values[24] in our sample of cross-border M&A transactions. Equation 1 of our theoretical model gives rise to the following regression equation to investigate the effect of taxation systems on cross-border M&A prices:

$$M\&A\_DealValue_{ijt} = \alpha + \beta TAX_{ijt} + \gamma_1 EBITDA_{jt} + \gamma_2 Assets_{it} + \gamma_3 ROA_{it} + \Phi FIRMCONTROLS + \phi_{AcqUltParCtry} + \phi_{TarCtry} + \phi_{Year} + \phi_{TarInd} + \varepsilon_{ijt},$$

where α is the intercept, β is the coefficient of interest, γ_1, γ_2, γ_3 are coefficients corresponding to model-specific firm variables, Φ is a vector of coefficients corresponding to further firm level control variables, and ε_{ijt} is the residual. To account for any unobserved effects, we include fixed effects for acquirer ultimate parent country, target country, year and target industry. All variables are defined and summarized in Table 10 in the Appendix.

We estimate the regression using ordinary least squares (OLS) regression. The dependent variable ($M\&A\_DealValue_{ijt}$) is the natural logarithm of the M&A deal value where acquirer ultimate parent i acquirers target j in year t. Our variable of interest (TAX_{ijt}) represents our measure of the taxation system that jointly considers foreign dividends and capital gains taxation if acquirer ultimate parent i acquires target j in year t, see Table 1.

As prior literature has shown, the target country tax rate has a significant impact on target acquisition (see, e.g., Hebous et al. (2011), Herger et al. (2016), Arulampalam et al. (2017)). Therefore, we start our analysis with TAX^{noPS}, i.e., with the assumption of no profit shifting, where profits are taxed in the target country and not shifted to a tax haven subsidiary.

If an acquirer considers foreign dividends and capital gains taxation in determining the reservation price in the way our theoretical model predicts, we expect the coefficient of TAX^{noPS} to take a value slightly above 1 in the one period model. That is because the value of TAX^{noPS} varies around 0.8 in the one period model.[25] As TAX^{noPS} increases over time due to an increasing TVF_t, the coefficient should decrease over time following a convex function. Based on our theoretical model, we hypothesize the following, in alternative form:

Hypothesis 1: TAX^{noPS} has a positive effect on M&A deal value.

To investigate the individual importance of foreign dividends and capital gains taxation, we disentangle TAX^{noPS} into TAX^{noPS}_{div} and TAX_{cg}, i.e., we consider the two effects of foreign dividends and capital gains taxation separately. TAX^{noPS}_{div} incorporates dividends taxation upon repatriation, i.e., $DIV_{Acq} \cdot (1 - \tau_{Acq})$, and the PVF_t. As PVF_t reflects profit taxation of retained or redistributed earnings, TAX^{noPS}_{div} covers all aspects of profit taxation and increases with an increasing time period. Based on our theoretical model, we hypothesize the following, in alternative form:

Hypothesis 2: TAX^{noPS}_{div} has a positive effect on M&A deal value and the coefficient decreases following a convex function with an increasing time period.

[24] We do not observe the reservation price of the acquirer ultimate parent. However, the acquirer's reservation price should impact the acquisition price as long as bargaining power is not fully on the side of the acquirer. Consequently, we assume that deal value is a reasonable proxy for the reservation price.

[25] TAX^{noPS} has a mean of 0.78 with minimum (maximum) values of 0.50 (1.14).

TAX_{cg} takes the value of one if capital gains are exempt and a value larger than one if capital gains are taxed. It decreases with an increasing time period. Based on our theoretical model, we hypothesize the following, in alternative form:

Hypothesis 3: TAX_{cg} has a positive effect on M&A deal value and the coefficient increases following a concave function with an increasing time period.

As empirical literature provides evidence of profit shifting within MNEs (see Section 3.2), we also analyze the dividend component of TAX under the assumption of full profit shifting, i.e., TAX_{div}^{fullPS}. However, profit shifting opportunities crucially depend on anti profit shifting measures in the target country. In particular, thin capitalization or interest stripping rules and mandatory transfer pricing documentation may hinder profit shifting from the target to a tax haven subsidiary.[26] We, therefore, hypothesize the following, in alternative form:

Hypothesis 4: TAX_{div}^{fullPS} has a positive effect (no effect) on M&A deal value when targets with (without) profit shifting opportunities are acquired.

On the firm level, we use three variables from firms' consolidated financial statements to control for firm-specific characteristics that are also considered in our theoretical model. $EBITDA_{jt}$ is used to control for target cash flow and refers to ε in our theoretical model.[27] As highlighted in Section 4.2, cash flow and profit are assumed to be equal in our theoretical model. Consequently, one could take pre-tax income for the reservation price calculation. However, in the real world, an important difference between cash flow and profit is depreciation and amortization. Therefore, we take EBITDA as our proxy for cash flow as it corrects for depreciation and amortization. The acquirer's size ($Assets_{it}$) and profitability (ROA_{it}) are used to control for synergies generated at the target level due to joining the MNE and refer to Δ_{Acq} in our theoretical model. We do not observe the real synergies; however, empirical studies argue that synergies generated through M&As are positively related to the acquirer's size and profitability. For example, Huyghebaert and Luypaert (2013) point out that economies of scale and economies of scope can lead to cost-based synergies after M&As. The larger the acquirer, the higher the degree of labor specialization and the higher the potential to allocate fixed costs of target operations over a large number of units within the acquirer.

The vector $FIRMCONTROLS$ captures further target control variables. Equity controls for the presence of paid-in capital and/or profit reserves of the target, which are assumed to have a positive effect on M&A deal values. Leverage considers the debt level of the target and controls for two target characteristics. First, high leverage can be considered as a measure of a high borrowing capacity, e.g., due to the presence of valuable fixed assets at target level (Huizinga and Voget (2009)). Second, high leverage may prevent the target from additional borrowing to finance worthwhile investments (Huizinga et al. (2012)). Both arguments suggest a positive effect of leverage on M&A deal values.

We expect that country- or industry-specific shocks (such as the financial crisis in 2008) are controlled for by including country, year and industry fixed effects. Further, following the argumentation by Feld, Ruf, Scheuering, Schreiber and Voget (2016), we expect that these shocks do not distort our empirical results since our variable of interest (TAX) also varies due to changes at a bilateral level (e.g., DTC between acquirer ultimate parent and target country). It is reasonable to assume that these shocks are not correlated with our bilateral-specific variable of interest and, consequently, these shocks should not bias our empirical results.

Table 4 presents our main OLS regression results with *M&A_DealValue* as the dependent variable under the assumption of no profit shifting.

[26] Several empirical studies provide evidence that these provisions are effective in reducing profit shifting opportunities; see, for example, Buettner et al. (2012) or Lohse and Riedel (2013).

[27] We exclude targets with a negative EBITDA as estimating prices based on a negative EBITDA may result in negative prices. Thereby, we additionally ensure that there is no selection bias amongst acquirers as acquirers from countries that tax capital gains could tend to invest more in riskier targets because these acquirers can make use of capital losses as opposed to acquirers from countries who exempt capital gains.

Table 4: OLS regression results under no profit shifting assumption.

	Joint TAX^{noPS}			Disentangled TAX^{noPS}		
Explanatory variables	(1)	(2)	(3)	(4)	(5)	(6)
$TAX^{noPS,1period}$	1.221					
	(0.938)					
$TAX^{noPS,10periods}$		0.294*				
		(0.147)				
$TAX^{noPS,30periods}$			0.123			
			(0.073)			
$TAX_{div}^{noPS,1period}$				3.428***		
				(1.192)		
$TAX_{cg}^{1period}$				-0.840		
				(0.921)		
$TAX_{div}^{noPS,10periods}$					0.377**	
					(0.147)	
$TAX_{cg}^{10periods}$					0.248	
					(1.677)	
$TAX_{div}^{noPS,30periods}$						0.159**
						(0.074)
$TAX_{cg}^{30periods}$						-1.701
						(2.678)
lnTarEBITDA	0.347***	0.346***	0.343***	0.345***	0.346***	0.342***
	(0.041)	(0.040)	(0.038)	(0.040)	(0.040)	(0.039)
lnTarEquity	0.331***	0.333***	0.335***	0.331***	0.332***	0.336***
	(0.050)	(0.049)	(0.047)	(0.049)	(0.049)	(0.048)
TarLeverage	0.003	0.003	0.003*	0.003	0.003	0.003*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
lnAcqUltParTotAss	0.237***	0.239***	0.237***	0.237***	0.238***	0.236***
	(0.033)	(0.033)	(0.033)	(0.032)	(0.032)	(0.032)
AcqUltParROA	0.016**	0.016**	0.016**	0.017**	0.017**	0.016**
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Constant	1.536**	0.808	1.169	1.046	0.127	2.487
	(0.682)	(0.706)	(0.740)	(1.148)	(1.752)	(2.862)
Observations	709	709	709	709	709	709
Acquirer Ultimate Parent Country Fixed Effects	YES	YES	YES	YES	YES	YES
Target Country Fixed Effects	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES
Target Industry Fixed Effects	YES	YES	YES	YES	YES	YES
Number of clusters	29	29	29	29	29	29

Regression of natural logarithm of M&A deal value on TAX. For variable definitions and data sources, see Table 10 in the Appendix. Results for country, year and industry fixed effects are not displayed but are available upon request. All regressions are estimated using OLS regression. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively. Standard errors are provided in parentheses and are clustered on acquirer ultimate parent country level to control for heteroscedasticity and autocorrelation.

In columns (1) to (3), we investigate Hypothesis 1 and consider the joint effect of the taxation system of foreign dividends and capital gains. We observe a non-significant positive estimate for the one and thirty period consideration; for the ten period consideration, we observe significance at the 10% level. Hence, we find only weak evidence in support of Hypothesis 1. To investigate the individual importance of foreign dividends and capital gains taxation as hypothesized under Hypothesis 2 and Hypothesis 3, we disentangle TAX in columns (4) to (6) into a dividends taxation component (TAX_{div}^{noPS}) and a capital gains taxation component (TAX_{cg}). We observe that TAX_{div}^{noPS} is significantly positive at the 1% or 5% level, which supports Hypothesis 2. However, we do not find evidence in support of Hypothesis 3, as TAX_{cg} is insignificant throughout all specifications. Rejecting Hypothesis 3 implies that acquirers do not consider capital gains taxation in determining their reservation price. This irrelevance of capital gains taxation could be explained in three ways. First, valuation literature typically does not include the capital gains effect on the acquirer side as the firm is typically valued under the going concern assumption (see, e.g., Penman (2013)). Second, even if valuation is undertaken with regard to a limited time horizon, the capital gains effect could be neglectable as it becomes rather small with long time horizons. Third, time horizons taken into account in firm valuation could differ among acquirers and, therefore, the height of the capital gains effect could differ drastically between observations in our data set.

Further, we find that the coefficient of TAX_{div}^{noPS} decreases following a convex function the more years are taken into account. This also supports Hypothesis 2 and is consistent with our model expectation because TAX_{div}^{noPS} increases the more periods are considered. The interpretation of the TAX_{div}^{noPS} coefficient in column (6) is as follows: If TAX_{div}^{noPS} changes by 1 unit in a certain country and year, the price an MNE in this country and year is willing to pay for a target increases by 15.9%. For example, if the US decreases its corporate statutory tax rate from 35% to 20% as proposed by the United States Department of the Treasury (2017), the value of TAX_{div}^{noPS} will increase from 14.04 to 16.57, which translates into an M&A price increase of around 40.3%.[28]

The coefficients for target cash flow ($lnTarEBITDA$) and equity ($lnTarEquity$) are significantly positive as expected and suggest that a 1%-increase in target cash flow (equity) leads to a 0.35% (0.33%) increase in M&A deal value. Target leverage has a positive though mostly insignificant coefficient. The synergy control variables at acquirer ultimate parent level are significantly positive as expected: If the acquirer's size (profitability) increases by 1% (1%-point), M&A prices are higher by 0.24% (1.6%).

In Table 5, we check the explanatory power of our model under the assumption of full profit shifting. Under this assumption, we still observe substantial variation in TAX^{fullPS} as the presence of CFC rules with different tax haven tax rate thresholds creates variation for MNEs from exemption countries and MNEs from credit countries vary along their statutory corporate tax rate. We observe in column (1) that the coefficient of TAX^{fullPS} is significantly positive at the 10% level, suggesting that our model weakly explains variation in observed M&A deal values under this assumption. However, TAX^{fullPS} only incorporates possible application of CFC rules in the acquirer ultimate parent country and, thereby, only reflects anti profit shifting provisions at *acquirer level*. Yet, also at *target level*, profit shifting opportunities may be severely reduced by thin capitalization or interest stripping rules and mandatory transfer pricing documentation. Therefore, we split our sample into targets that reside in countries with maximally one of those two anti profit shifting measures, i.e., countries where profit shifting is still possible (column (2)) and into targets that reside in countries with both of those anti profit shifting measures, i.e., countries where profit shifting is very limited or even impossible (column (3)). We observe that the coefficient of TAX_{div}^{fullPS} is significantly positive at the 1% level in the sample of targets with profit shifting opportunities, while it is insignificant in the sample of targets with very limited profit shifting opportunities. This finding supports Hypothesis 4 and suggests that acquirers take into account anti profit shifting provisions in the target country in determining their reservation price. A deeper investigation of the target country taxation system on M&A prices would go beyond the scope of this paper and would be an interesting area for future research. Column (4) addresses the same sample as column (2) based on the definition of TAX^{fullPS} for the case of indefinite profit retention as modelled in Section 4.3. The coefficient remains significantly positive.

In Table 6, we apply a variety of robustness checks to confirm our findings, taking column (6) of Table 4 as a starting point. In column (1), we use the corporate effective average tax rate of the target country provided by ZEW, instead of the corporate statutory tax rate. We observe that the coefficient's level of significance decreases, which may indicate that acquirers use statutory instead of effective tax rates in target valuation. In columns (2) and (3), we consider cross-border M&As, where the acquirer ultimate parent and target are in the same industry.

[28] $(TAX_{div,2017,20\%}^{noPS,US} - TAX_{div,2017,35\%}^{noPS,US}) \cdot coefficient = (16.57 - 14.04) \cdot 0.159 = 0.403$.

Table 5: OLS regression results under full profit shifting assumption.

Explanatory variables	(1) Full sample	(2) Sample of targets with profit shifting opportunities	(3) Sample of targets with very limited profit shifting opportunities	(4) Indefinite profit retention in the sample of targets with profit shifting opportunities
$TAX_{div}^{fullPS,30periods}$	0.050*	0.532***	0.007	
	(0.026)	(0.150)	(0.040)	
$TAX_{cg}^{30periods}$	-0.505	26.975	-0.562	
	(2.549)	(15.983)	(2.661)	
$TAX_{div}^{fullPS,indefinite}$				0.855***
				(0.160)
lnTarEBITDA	0.350***	0.480**	0.360***	0.421**
	(0.039)	(0.224)	(0.040)	(0.196)
lnTarEquity	0.331***	-0.070	0.355***	-0.040
	(0.048)	(0.229)	(0.041)	(0.196)
TarLeverage	0.003	0.004	0.004**	0.009
	(0.002)	(0.010)	(0.002)	(0.008)
lnAcqUltParTotAss	0.240***	0.414***	0.211***	0.401***
	(0.032)	(0.069)	(0.031)	(0.052)
AcqUltParROA	0.016**	-0.000	0.014**	0.004
	(0.006)	(0.029)	(0.006)	(0.028)
TarTC_presence	-0.605			
	(0.459)			
TarTP_docu	-0.006			
	(0.249)			
Constant	2.842	-28.257*	2.568	-7.256*
	(2.740)	(15.118)	(2.989)	(3.564)
Observations	709	106	603	106
Acquirer Ultimate Parent Country Fixed Effects	YES	YES	YES	YES
Target Country Fixed Effects	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES
Target Industry Fixed Effects	YES	YES	YES	YES
Number of clusters	29	18	29	18

Regression of natural logarithm of M&A deal value on TAX. For variable definitions and data sources, see Table 10 in the Appendix. Results for country, year and industry fixed effects are not displayed but are available upon request. All regressions are estimated using OLS regression. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively. Standard errors are provided in parentheses and are clustered on acquirer ultimate parent country level to control for heteroscedasticity and autocorrelation.

It may be argued that taxes play a more important role in such horizontal M&As rather than in vertical M&As. The results remain robust using a dummy variable (column (2)) or a sample reduced to horizontal M&As (column (3)). In column (4), we include the GDP of the target and acquirer ultimate parent country and observe no change in our main regression results. Target equity is substituted by target total assets in column (5) and our results prove to be robust. In column (6), we exclude year fixed effects and observe a decrease of the coefficient; yet, it remains significantly positive. An exclusion of target industry fixed effects (column (7)) does not change our main regression results. To check whether outliers may bias our results, we exclude M&As where the deal value is in the 1st and 99th percentile and observe quantitatively and qualitatively robust results (column (8)). Finally, in columns (9) and (10), we vary the calculation of standard errors. The levels of significance remain stable regarding no clustering (heteroscedastic standard errors, column (9)) and clustering at target country level (column (10)). Overall, our results prove to be quantitatively and qualitatively robust to a variety of robustness checks.

Table 6: Robustness checks for OLS regression results.

Explanatory variables	(1) Target effective average tax rate	(2) Same industry (dummy)	(3) Same industry (sample reduction)	(4) With country control variables	(5) With target total assets	(6) Excl. year fixed effects	(7) Excl. target industry fixed effects	(8) Trimmed deal value	(9) Robust standard errors	(10) Standard errors clustered on target country
$TAX^{noPS,30periods}_{div,effectivetaxrate}$	0.073*									
	(0.043)									
$TAX^{noPS,30periods}_{div}$		0.159**	0.216**	0.163**	0.135*	0.093**	0.151*	0.168*	0.159**	0.159**
		(0.075)	(0.085)	(0.074)	(0.072)	(0.043)	(0.076)	(0.086)	(0.075)	(0.063)
$TAX^{30periods}_{cg}$	-0.167	-1.804	-2.549	-1.474	-1.665	-2.086	-0.925	-3.211	-1.701	-1.701
	(2.071)	(2.689)	(3.164)	(2.630)	(2.433)	(1.953)	(2.498)	(2.779)	(2.936)	(3.090)
lnTarEBITDA	0.347***	0.341***	0.309***	0.343***	0.278***	0.344***	0.347***	0.335***	0.342***	0.342***
	(0.047)	(0.038)	(0.041)	(0.038)	(0.041)	(0.040)	(0.040)	(0.041)	(0.048)	(0.021)
lnTarEquity	0.321***	0.335***	0.330***	0.335***		0.331***	0.338***	0.315***	0.336***	0.336***
	(0.054)	(0.047)	(0.066)	(0.048)		(0.049)	(0.049)	(0.041)	(0.058)	(0.053)
lnTarTotAss					0.418***					
					(0.051)					
TarLeverage	0.004*	0.003	0.003	0.003*	-0.007***	0.003	0.003*	0.003*	0.003	0.003*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
lnAcqUltParTotAss	0.250***	0.238***	0.264***	0.236***	0.228***	0.238***	0.235***	0.230***	0.236***	0.236***
	(0.032)	(0.032)	(0.040)	(0.032)	(0.031)	(0.033)	(0.033)	(0.033)	(0.035)	(0.040)
AcqUltParROA	0.016***	0.016**	0.022**	0.017**	0.016**	0.017**	0.016**	0.015**	0.016***	0.016***
	(0.006)	(0.006)	(0.009)	(0.006)	(0.006)	(0.007)	(0.007)	(0.006)	(0.004)	(0.005)
lnTarGDP				0.055						
				(0.300)						
lnAcqUltParGDP				0.189						
				(0.494)						
sameIndustry		0.055								
		(0.068)								
Constant	1.750	2.545	3.042	-4.317	2.474	3.759*	2.038	4.480	2.487	2.487
	(2.212)	(2.875)	(3.231)	(17.536)	(2.603)	(1.944)	(2.603)	(3.242)	(3.062)	(2.989)
Observations	613	709	514	709	709	709	709	663	709	709
Acquirer Ultimate Parent Country Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Target Country Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	NO	YES	YES	YES	YES
Target Industry Fixed Effects	YES	YES	YES	YES	YES	YES	NO	YES	YES	YES
Number of clusters	28	29	27	29	29	29	29	29	n/a	31

Regression of natural logarithm of M&A deal value on *TAX*. For variable definitions and data sources, see Table 10 in the Appendix. Results for country, year and industry fixed effects are not displayed but are available upon request. All regressions are estimated using OLS regression. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively. Standard errors are provided in parentheses and are clustered on acquirer ultimate parent country level to control for heteroscedasticity and autocorrelation (except for columns (9) and (10) with heteroscedastic standard errors and standard errors clustered on target country level).

5.2.2. Further analysis

In our main regression analysis, we analyze the influence of the acquirer country's taxation system on cross-border M&A prices using firm level data. In the following, we take a macroeconomic perspective on our theoretical model. In particular, we investigate whether taxation systems affect the probability of being the acquiring country of a given foreign target. This analysis and empirical approach follow Feld, Ruf, Scheuering, Schreiber and Voget (2016), who find that foreign dividends taxation applying the credit method impedes cross-border M&A activity compared to exempting foreign dividends from taxation. We extend Feld, Ruf, Scheuering, Schreiber and Voget (2016) in two ways: First, we additionally implement capital gains taxation. Second, we use a different measure—TAX based on our theoretical model—to investigate the effect of taxation systems on cross-border M&A activity.

Equation 1 of our theoretical model gives rise to the following regression equation to investigate the effect of a country's taxation system on the probability (P) of being the actual acquiring country of a foreign target:

$$P(V_{ijk} \geq V_{hjk}|X) = \frac{exp(\alpha TAX_{ij} + \beta X_{ijk})}{\sum_{l=1}^{I} exp(\alpha TAX_{lj} + \beta X_{ljk})} \quad \forall\ h\ \epsilon\ (1, ..., I), \tag{5}$$

where i is the actual acquirer ultimate parent country from a total of I candidate acquirer ultimate parent countries and j is the country of target k.[29] Given that the observed M&As reflect synergies from combining two firms and that acquirers value the individual firms and the M&A correctly at their fair value, Equation 5 can be considered a choice model. Using conditional logit and mixed logit regression models, we analyze whether a country's taxation system, i.e., TAX from our theoretical model, affects $P(V_{ijk} \geq V_{hjk})$.

We consider various control variables in vector X_{ijk} to capture owner-country-specific synergies realized through a potential M&A. In particular, we control for GDP, GDP per capita and GDP growth of the candidate acquirer ultimate parent country. These controls capture productivity levels in the acquirer country, and we expect positive coefficients of these variables. We further control for bilateral factors such as distance, common language, colonial relationships and common origins of the legal systems between the potential acquirer ultimate parent and target country. These controls capture bilateral transaction costs, and we expect a significant influence of these variables. Further, we include acquirer ultimate parent fixed affects. Note that the target is the same for every (potential) deal; therefore, we automatically account for target, target country, year and target industry fixed effects. All variables are defined and summarized in Table 11 in the Appendix. Section 5.1.1 provides information on the considered data set with 9,103 cross-border M&As.

Table 7 presents the results of our logit regressions. The results regarding TAX^{noPS} are similar to the results presented in the previous section: A higher value of TAX^{noPS} significantly increases the probability of acquisitions from the respective country. Disentangling TAX^{noPS} into a dividends and capital gains component confirms the finding that dividends taxation drives this significant influence. This finding is in line with Feld, Ruf, Scheuering, Schreiber and Voget (2016). Regarding significant control variables, GDP growth in the acquirer ultimate parent country strongly affects M&A activity; GDP and GDP per capita show positive coefficients. Further, M&A activity is strongly affected by a shorter distance between the acquirer ultimate parent country and target country, a common language, former colonial relationships and a similar legal system.

Taken together, this further analysis shows that our theoretical model, which is primarily set up to explain cross-border reservation prices on a firm level, also explains M&A activity on a macroeconomic level.

5.3. Tax policy implications

Our regression analysis shows that our theoretical model holds in reality and in a final step, we aim to derive implications for national tax policy makers. Generally, our model suggests a two-fold impact of an acquirer's taxation systems on his reservation price for a foreign target. On the one hand, the price should decrease with increasing dividends taxation; on the other hand, the price should increase with increasing capital gains taxation.

As our empirical analysis has shown, higher dividends taxation at the acquirer level negatively affects M&A prices,

[29] We suppress a time subscript t in the interest of readability of the model.

Table 7: Logit regression results.

Explanatory variables	(1) Conditional logit regression (I)	(2) Conditional logit regression (II)	(3) Mixed logit regression (I)	(4) Mixed logit regression (II)
$TAX^{noPS,30periods}$	0.118***		0.079***	
	(0.019)		(0.021)	
$TAX_{div}^{noPS,30periods}$		0.127***		0.088***
		(0.020)		(0.022)
$TAX_{cg}^{30periods}$		-0.858		-1.333
		(0.870)		(0.961)
lnAcqUltParGDP	0.292	0.363	0.239	0.308
	(0.234)	(0.236)	(0.251)	(0.254)
lnAcqUltParGDP_percapita	0.450*	0.291	0.489*	0.327
	(0.238)	(0.243)	(0.257)	(0.263)
AcqUltParGDP_growth	0.045***	0.044***	0.045***	0.043***
	(0.012)	(0.012)	(0.013)	(0.013)
lnDistance	-0.464***	-0.462***	-0.505***	-0.503***
	(0.015)	(0.015)	(0.021)	(0.021)
CommonLanguage	0.658***	0.666***	0.370***	0.376***
	(0.125)	(0.125)	(0.141)	(0.141)
ColonialRelationship	0.323***	0.320***	0.332***	0.330***
	(0.048)	(0.048)	(0.052)	(0.052)
CommonLegalSystem	0.434***	0.433***	0.491***	0.490***
	(0.040)	(0.040)	(0.045)	(0.045)
Observations	314,626	314,626	165,218	165,218
Acquirer Ultimate Parent Country Fixed Effects	YES	YES	YES	YES
Log-likelihood	-19,259	-19,257	-17,597	-17,595

Regressions of probability of being the acquirer ultimate parent country on TAX. For each deal, the dependent variable equals one if the respective country is the actual acquirer's country of origin, and zero if the respective country is a counterfactual acquirer country. All regressions control for acquirer ultimate parent country fixed effects, which follow a random distribution in the mixed logit regressions; results for acquirer ultimate parent country fixed effects are not displayed but are available upon request. To keep the mixed logit regressions computationally feasible, the set of 40 acquiring countries considered in the conditional logit regression is restricted to the 20 most frequent acquirer countries. For variable definitions and data sources, see Table 11 in the Appendix. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively. Robust standard errors are provided in parentheses.

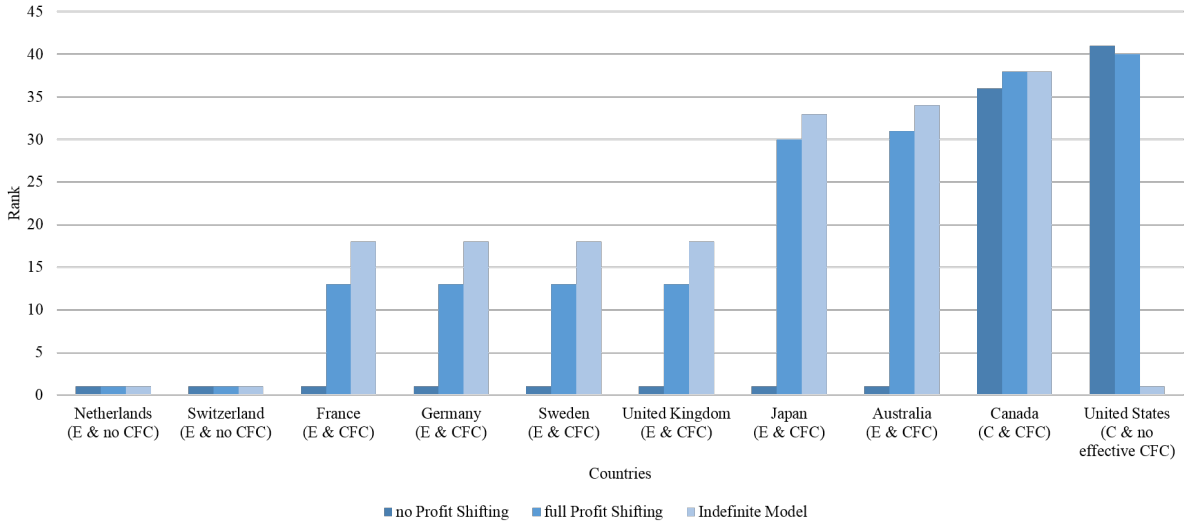
while capital gains taxation at the acquirer level does not have an effect. This finding indicates that acquirers do not take capital gains taxation into account when determining their reservation price. If national tax policy makers aim at improving the position of their MNEs in bidding for foreign targets, they should therefore focus on reducing dividends taxation rather than trying to impact reservation prices by applying capital gains taxation. Reducing dividends taxation can be undertaken in two ways. First, the tax burden can be *directly* reduced by switching from the credit method to the exemption method, by lowering the corporate statutory tax rate, or by allowing for unlimited tax credits (i.e., refunding foreign taxes paid). Second, the tax burden can be *indirectly* reduced by allowing for profit shifting. As column (2) of Table 5 shows, TAX_{div}^{fullPS} proves to be significant if outbound profit shifting is possible from the target country. As the tax haven tax rate is determined based on CFC rules of the acquirer residence country, MNEs from countries without CFC rules (or low CFC tax rate thresholds) are able to engage in more profit shifting. Consequently, acquirer residence countries should refrain from applying CFC rules.

Figure 8 provides an overview of the ranks in 2015 of those 10 countries with most observations in our M&A data set with regard to the impact of acquirer countries' taxation systems on reservation prices. A higher rank indicates a lower value of TAX and, consequently, MNEs residing in that country can only pay a lower price.

We observe that countries that exempt foreign dividends offer their firms the best environment under the no profit shifting assumption. Under the full profit shifting assumption and no CFC rules (e.g., Netherlands), this position can be retained. Countries that exempt foreign dividends but have CFC rules (e.g., France) weaken their position by applying CFC rules. This is true for both, the full profit shifting and the indefinite retention assumptions. France, Germany, Sweden and the UK have identical ranks as their respective tax haven tax rate is assumed to be identical (see Section 3.2). Japan and Australia have higher tax haven tax rates and, thus, worse ranks.

Contrary to our proposal to refrain from applying CFC rules, the OECD BEPS project calls on countries to im-

Figure 8: Selected countries ranked by their value of TAX for 2015.



The bars show the rank for the respective country in 2015 under the assumption of no profit shifting (dark blue), full profit shifting (mid-blue) and the indefinite retention model (light blue). All ranks are derived based on TAX calculated by the model shown in Section 4 for a period of 30 years. The target tax rate is set to 25.5%, which is the mean target tax rate across our M&A observations. Ranks for full and no profit shifting are calculated under the assumption of identical costs of capital to simplify depiction. Lower ranks indicate higher values of TAX. The shown countries are the 10 countries with most observations in our M&A data set.

plement effective CFC rules (OECD (2015*a*)). The EU requires all member countries to implement CFC rules by 2019 (European Council (2016)). The argument above that CFC rules reduce acquisition prices and thus worsen the position of domestic MNEs in bidding for foreign targets refers to a case where some countries apply CFC rules while others do not. Consequently, a uniform application of CFC rules by all (or in the case of the BEPS project at least by the OECD + G20 countries) could therefore be one way to secure tax basis, while not putting domestic MNEs at a disadvantage. However, the OECD and EU proposal lacks a uniform definition of the CFC tax rate threshold and, consequently, countries can still compete via the CFC tax rate threshold.

Countries applying the credit method have generally higher ranks than exemption countries. However, this is mainly due to high tax rates in these credit countries. Under the no profit shifting assumption, credit countries with low tax rates would have no disadvantage to exemption countries, even if excess foreign tax credits result. Under the full profit shifting assumption, credit countries generally have higher ranks as the tax haven tax rate is typically lower than the acquirer country tax rate. CFC rules worsen the ranks for credit countries (e.g., Canada), while no CFC rules (or ineffective CFC rules) improve the rank (e.g., United States). However, this effect is relatively low due to the low interest rate in 2015. In the indefinite model with the full profit shifting assumption and debt financing of distributions, residence country tax rates are irrelevant for determining the final price for credit countries.[30] The price is then only determined by the tax haven tax rate. Consequently, a credit country without or with ineffective CFC rules (e.g., United States) has an identical rank as an exemption country without CFC rules (e.g., Netherlands) and a better rank than an exemption country with CFC rules (e.g., Germany). Taken together, in the indefinite retention model, in which capital gains no longer occur, an improvement in the relative position of a country can mainly be achieved by not applying CFC rules or lowering CFC tax rate thresholds.

Independent of the question how a country reduces profit taxation, it will most likely suffer a tax revenue loss. Therefore, the size of positive spillovers from cross-border M&A activity is highly relevant to national tax policy makers. Even though the absolute height remains unclear, positive spillovers have been shown empirically. For example, Bresman et al. (1999) and Bena and Li (2014) show that home investment benefits from knowledge spillovers from cross-border M&A activity. Further, M&As are found to increase productivity (e.g., Devos et al. (2009)), management efficiency (e.g., Manne (1965), Wang and Xie (2009)), discipline (e.g., Scharfstein (1988), Sapra et al. (2014)) and innovation (e.g., Stiebale (2016)). Thus, in a mid- or long-term calculation, tax revenue losses should (at least partially) be compensated by additional tax revenue gains through increasing inbound in-

[30] This is only true if retaining profits abroad makes sense, as described in Section 4.3. Credit countries with very high CFC tax rate thresholds (e.g., Canada) and all exemption countries would choose immediate repatriation.

vestment and increasing earnings in the residence country. Nevertheless, national tax policy makers might want to compensate tax revenue losses in the short-term. This could be undertaken by broadening the tax base through hindering outbound profit shifting of resident target firms via interest stripping rules or tightening transfer pricing regulations.[31] Such a reduction in outbound profit shifting is also on the political agenda in many countries. While the OECD only recommends that countries introduce an interest stripping rule (OECD (2015*c*)), the EU came forward with a mandatory interest stripping rule for all EU member countries as of 2019 (European Council (2016)). As a result, profit shifting opportunities via internal debt financing will be limited for EU targets. Additionally, the OECD has implemented new OECD Transfer Pricing Guidelines (OECD (2017)) that redefine the arm's length price especially for license payments to locate profits to where value creation measured by functions and risks takes place. Consequently, profit shifting via internal licensing should get harder.

Finally, the irrelevance of capital gains taxation for acquirer reservation price determination has a significant impact on results in the CON literature and the question of whether to tax capital gains or not. We find that capital gains taxation is irrelevant in acquirer reservation price determination; consequently, the question whether to tax capital gains or not should be answered by looking solely at the seller. On the seller-side, the lock-in effect of capital gains taxation is an empirically validated obstacle to selling firms. Consequently, capital gains should not be taxed at all. As a result, optimal M&A taxation would only be determined by profit taxation.

6. Conclusion

CON is the concept of neutral taxation of M&As. One crucial assumption is that all countries apply the same taxation system on foreign dividends and capital gains. However, in analyzing the actual taxation systems of the 49 EU, OECD and G20 member countries over the 2002-2015 period, we show that countries apply different taxation systems and that these taxation systems differ in many aspects. Hence, CON is globally not achievable. Given this tax distortion and positive spillovers of cross-border M&A activity that have been extensively documented in empirical literature, we argue that a national tax policy maker should focus on how to improve the position of its MNEs in bidding for foreign targets instead of setting up a taxation system that is neutral regarding M&As but might put its MNEs at a disadvantage in bidding for foreign targets.

To address this tax policy issue, we develop a multi-period theoretical model that considers the joint effect of foreign dividends and capital gains taxation on the acquiring MNE's reservation price for a specific target. Our model also implements profit shifting opportunities and tax deferral of dividends taxation. We derive a tax factor (TAX) for different taxation systems that allows us to theoretically compare these taxation systems. Thereby, guidance can be given to national tax policy makers on how to improve the position of their MNEs in bidding for foreign targets regarding tax base, tax rates and profit shifting restrictions.

In the empirical application of our theoretical model, we apply TAX to a large sample of cross-border M&A transactions. In our regression analysis, we find that dividends taxation has a significant effect on M&A prices, whereas capital gains taxation seems to be irrelevant. Further, we provide evidence that profit shifting positively affects M&A prices if the target country allows for a certain degree of profit shifting. Moreover, we provide evidence that acquirer country's CFC rules negatively impact prices paid for targets. In addition, it follows from the irrelevance of capital gains taxation for acquirers that capital gains taxation should be avoided as empirical literature documents that taxing capital gains impedes M&A activity with regard to selling firms.

Our policy suggestion is that countries that want to enhance the position of their MNEs in acquiring foreign targets should best apply the exemption method and not hinder profit shifting by imposing CFC rules. Not imposing CFC rules and taxing foreign dividends is also a suitable strategy, as long as the acquirer country's tax rate is low and an unlimited tax credit is granted. Hence, countries with high tax rates should primarily reduce their tax rate, if they do not want to change to the exemption method.

The irrelevance of capital gains taxation on the acquirer side should also impact the way CON is currently discussed in literature. If capital gains are irrelevant in determining the acquirer's price for a certain target, then the acquirer can never be taxed neutrally unless the tax rate is zero. In the presence of positive tax rates, the only way of determining identical prices for the acquirer and the seller, and thus neutrally taxing the acquisition, is to exempt foreign dividends and capital gains while preventing profit shifting at the source.

[31] Of course, there are also other ways to compensate tax revenue loss, e.g., by increasing non-profit taxes such as value added tax.

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8. Appendix

8.1. Further model adjustments

8.1.1. Creating capital gains instead of capital losses: Subsequent acquisitions

In reality, one can observe that some investors, such as private equity investors, buy targets to restructure them and sell them (possibly at a profit) a few years later. Obviously, these investors know already at the planning stage of an acquisition that they do not want to keep the target until it ceases to exist. As these investors likely realize capital gains and not capital losses upon the sale, capital gains taxation imposes a tax payment instead of a tax repayment to them. Therefore, for this special group of acquirers, it is reasonable to question the assumption of creating a capital loss.

This question is theoretically addressed in the following paragraphs. In short, adjusting our model to a two period model with subsequent acquisitions, we demonstrate that assuming capital losses is still reasonable—even if the first acquirer sells the target after one period. In particular, we show that capital gains only occur under one of the following rather unlikely circumstances: a) The first acquirer has a very high power in negotiations, resulting in paying a very low M&A price to the original seller and receiving a very high M&A price from the second acquirer, or b) the target creates an (overall) loss during the holding period of the first acquirer and profits afterwards. However, within the scope of our model, higher synergies and/or preferential tax treatment of the second acquirer are not an explanation as the second acquirer would have acquired the target in the first place.

The model will be adjusted as follows: Acquirer A from Country A wants to acquire the target at the beginning of the first period and plans to sell this firm to acquirer B from Country B at the end of the first period. Acquirer B then plans to liquidate the target at the end of the second period. This transforms the model into a two period model with two acquisitions taking place. The reservation price of the first acquirer (A) therefore looks as follows under the full profit shifting assumption:

$$\begin{aligned} P^{PS}_{Acq,A} = (\varepsilon + \Delta_{Acq,A}) \cdot \frac{(1-\tau^{THA}) \cdot \alpha^{A,THA} \cdot (1-\tau^{A})}{1+r} \\ + \frac{P^{PS}_{Acq,B} - (P^{PS}_{Acq,B} - P^{PS}_{Acq,A}) \cdot \tau^{A,CG} \cdot \beta^{A}}{1+r} \end{aligned} \tag{6}$$

Rearranging equation 6 yields:

$$P^{PS}_{Acq,A} = (\varepsilon + \Delta_{Acq,A}) \cdot \frac{(1-\tau^{THA}) \cdot \alpha^{A,THA} \cdot (1-\tau^{A})}{1+r-\tau^{A,CG} \cdot \beta^{A}} + \frac{P^{PS}_{Acq,B} \cdot (1-\tau^{A,CG} \cdot \beta^{A})}{1+r-\tau^{A,CG} \cdot \beta^{A}} \tag{7}$$

Equation 7 shows that the value increasing effect of the book value depreciation still remains. Additionally, a second effect is now introduced, which results in an additional value increase associated with the M&A price acquirer A receives for selling the target to acquirer B. This second value increasing effect is reduced by the tax imposed on the capital gains. As long as the reservation price of acquirer B is positive ($P^{PS}_{Acq,B} > 0$), this value increasing effect is present.

In the considered two period model, acquirer A's alternative to selling the firm to acquirer B is to hold the participation in the target until the end of the second period and then liquidate the target. Consequently, acquirer A's alternative reservation price calculation under the assumption of immediate repatriation is:

$$P^{PS}_{Acq,A} = (\varepsilon + \Delta_{Acq,A}) \cdot \frac{(1+r)^2 - 1}{r} \cdot \frac{(1-\tau^{THA}) \cdot \alpha^{A,THA} \cdot (1-\tau^{A})}{(1+r)^2 - \tau^{A,CG}\beta^{A}} \tag{8}$$

Setting equations 7 and 8 equal results in the following minimum M&A price that acquirer B must pay so that the proposed deal structure is beneficial for acquirer A:

$$P^{PS}_{Acq,B} \geq (\varepsilon + \Delta_{Acq,A}) \cdot (1-\tau^{THA}) \cdot \alpha^{A,THA} \cdot (1-\tau^{A}) \cdot \frac{1+r}{(1+r)^2 - \tau^{A,CG} \cdot \beta^{A}} \tag{9}$$

Acquirer B's reservation price at the end of the first period can be drawn from equation 1 plugging in t=1. It then looks as follows:

$$P^{PS}_{Acq,B} = (\varepsilon + \Delta_{Acq,B}) \cdot \frac{(1-\tau^{THB}) \cdot \alpha^{B,THB} \cdot (1-\tau^{B})}{1 + r - \tau^{B,CG} \cdot \beta^{B}} \tag{10}$$

Setting equations 9 and 10 equal yields the following condition:

$$\begin{aligned} &(\varepsilon + \Delta_{Acq,B}) \cdot (1-\tau^{THB}) \cdot \alpha^{B,THB} \cdot (1-\tau^{B}) \cdot \frac{1}{1 + r - \tau^{B,CG} \cdot \beta^{B}} \\ &\geq (\varepsilon + \Delta_{Acq,A}) \cdot (1-\tau^{THA}) \cdot \alpha^{A,THA} \cdot (1-\tau^{A}) \cdot \frac{1+r}{(1+r)^2 - \tau^{A,CG} \cdot \beta^{A}} \end{aligned} \tag{11}$$

There could be two reasons why acquirer B's reservation price (left side of equation 11) exceeds the minimum reservation price that acquirer A needs (right side of equation 11). It could be that acquirer B's taxation system is more favorable[32] or that acquirer B creates a higher synergy.[33] However, both of these assumptions are rather unlikely as acquirer B would be the preferred bidder at the beginning of the first period and acquirer A would never be successful in acquiring the target. Therefore, it is reasonable to assume that the synergies of acquirer A and B as well as their taxation systems are identical. Consequently, equation 11 collapses to:

$$\frac{1}{1 + r - \tau^{A,CG} \cdot \beta^{A}} \geq \frac{1+r}{(1+r)^2 - \tau^{A,CG} \cdot \beta^{A}} \tag{12}$$

As a result, acquirer B's reservation price equals the required price by acquirer A only if either interest rates are zero ($r = 0$) or if capital gains are exempted $\left(\beta^{A} = 0\right)$. Under these assumptions, acquirer B's reservation price cannot exceed the minimum reservation price demanded by acquirer A and, therefore, acquirer A will always create capital losses upon disposal at the end of the first period. However, capital losses are lower than the ones A would face upon liquidation at the end of the second period. The reasoning behind this result is that capital gains taxation occurs either twice after one period (acquirer A realizes a capital loss at the end of the first period and acquirer B realizes a capital loss at the end of the second period) or only once after two periods (acquirer A keeps the target). Consequently, either the time value of money must be identical (interest rate is zero) or capital gains taxation has no value (capital gains are untaxed).

Given that interest rates are positive and capital gains are taxed, acquirer B's reservation price will always be lower than acquirer A's reservation price if he intends to sell. The value increasing effect of the sale remains present, but acquirer A still realizes a capital loss upon the sale. The only difference between the setting with and without subsequent acquisitions is that the overall capital loss is split up between acquirer A and acquirer B in the setting with subsequent acquisitions.

Given this analysis, it seems as if there could never be capital gains upon a sale. This of course is not true. First, assume that the target generates an overall loss until sold and profits thereafter. In this case, capital gains could occur as the price acquirer A is willing to pay at the beginning of the first period is lower than the price acquirer B is willing to pay at the end of the first period. Second, assume that acquirer A pays a lower M&A price for the target than his reservation price due to high negotiation power. Consequently, acquirer A's reservation price decreases (and subsequently his tax payment upon disposal increases), while acquirer B's reservation price must not be affected at all. Modelling this implies that acquirer A already knows the final M&A price paid for the target while determining his reservation price. However, this assumption contradicts the idea of determining a reservation price.

To sum up, capital gains should not occur within the scope of our model if the target is profitable and acquirer A pays his reservation price. Consequently, subsequent acquisitions can maximally lead to an indifference between selling and keeping the target and this indifference occurs only if either interest rates are zero or capital gains are exempted.

[32] $\frac{(1-\tau^{THB}) \cdot \alpha^{B,THB} \cdot (1-\tau^{B})}{1+r-\tau^{B,CG} \cdot \beta^{B}} \geq \frac{(1-\tau^{THA}) \cdot \alpha^{A,THA} \cdot (1-\tau^{A}) \cdot (1+r)}{(1+r)^2 - \tau^{A,CG} \cdot \beta^{A}}$

[33] $\Delta_{Acq,B} \geq \Delta_{Acq,A}$

8.1.2. Costs of profit shifting

So far, we have assumed that profits can be shifted without costs from the target to the tax haven subsidiary. However, several empirical (e.g., Swenson (2001), Huizinga and Laeven (2008), Maffini (2012), Markle (2016)) and theoretical papers assume that profit shifting imposes costs. Therefore, full profit shifting might be an assumption that is too far reaching. Following a well-known strand of literature that focuses on the costs of profit shifting via transfer pricing adjustments (e.g., Haufler and Schjelderup (2000), Johannesen (2010), Becker and Fuest (2012), Devereux et al. (2015)), we include an increasing convex cost function for profit shifting denoted by $C(\Pi)$. Thereby, costs for tax advisors to declare such price adjustments or possible fines to be paid should be covered by our cost function. The cost function is zero for no profit shifting ($C(\Pi) = 0; \Pi = 0$) and positive for any positive values of profit shifting ($C(\Pi) > 0;\ \Pi > 0$). Further, it is important to know in which countries costs arise and what their tax treatment looks like. Obviously, declaration costs should arise between the countries involved in profit shifting. In our model, this includes the target country (T) and the tax haven country of the MNE (TH). Additionally, costs might arise in the country where the MNE is located (A). All costs should, in principle, be deductible for tax purposes. However, some costs (e.g., fines) are often non-deductible. Consequently, a portion of the costs can also be assumed to be non-deductible. As a result, the cost function looks as follows:

$$C(\Pi_{Acq}) = \chi^{T}_{Acq}(\Pi_{Acq}) + \chi^{TH}_{Acq}(\Pi_{Acq}) + \chi^{A}_{Acq}(\Pi_{Acq}) + \phi_{Acq}(\Pi_{Acq}) \tag{13}$$

χ^{j}_{Acq} indicates the costs deductible for tax purposes in country j. ϕ_{Acq} denotes the costs of profit shifting that are non-deductible and is simply the difference between all costs and the costs deductible for tax purposes in the other countries.[34]

Taking into account this cost function, the acquirer's reservation price looks as follows:

$$\begin{aligned} P_{Acq} = & \frac{\left[(\varepsilon + \Delta_{Acq} - \Pi_{Acq} - \chi^{T}_{Acq})\right] \cdot (1-\tau^{T}) \cdot (1-\tau^{T}_{WHT}) \cdot \alpha^{A,T} \cdot (1-\tau^{A})}{(1+r)^{t} - \tau^{A,CG}\beta^{A}} \cdot TVF_{t} \\ & + \frac{(\Pi_{Acq} - \chi^{TH}_{Acq}) \cdot (1-\tau^{TH}) \cdot \alpha^{A,TH} \cdot (1-\tau^{A})}{(1+r)^{t} - \tau^{A,CG}\beta^{A}} \cdot TVF_{t} \\ & - \frac{\chi^{A}_{Acq} \cdot (1-\tau^{A}) - \phi_{Acq}}{(1+r)^{t} - \tau^{A,CG}\beta^{A}} \cdot TVF_{t} \end{aligned} \tag{14}$$

Without specifying the cost function in more detail, it is now impossible to calculate the indifference price of the acquirer. We assume that the height of profit shifting costs depend on specific provisions in the respective country's law. Consequently, the cost function will be potentially different for each combination of acquirer, target and tax haven countries, depending on provisions for example for interest deductibility, transfer pricing regulations or CFC rules. For the full profit assumption in our empirical analysis, we argue that costs for profit shifting arising in the target country are captured by dummy variables controlling for limitations on debt financing and transfer pricing manipulations. Additionally, we argue that no or just very low costs should be created in the tax haven, as high profit shifting costs in the tax haven would contradict its attractiveness. Costs in the residence country of the acquirer—if at all related directly to the shifting—should be captured by implementing tax haven specific tax rates taken from the CFC rules of that country. Therefore, only non-deductible costs are left. As good tax planning involves not paying fines—and these are the most likely type of tax planning costs that are non-deductible—we expect non-deductible costs to be rather small. Consequently, we are able to take costs of profit shifting into account in the empirical application without specifying the cost function in more detail.

[34] These costs occur per definition in Country A. This simplification has the effect that there is no difference between tax base and profit that can be paid out as dividends.

8.2. *Tables*

Table 8: Overview on countries applying the four taxation systems.

CAPITAL GAINS \ DIVIDENDS	Credit method	Exemption method
Credit method	Argentina, Brazil, Canada, Chile, China, India, Indonesia, Israel, *Japan (until 2008)*, Korea, Rep., *Malta (until 2006)*, Mexico, *Norway (until 2003)*, Poland, *Portugal (until 2013)*, Romania, *South Africa (until 2004)*, *Turkey (until 2005)*, United States	*Australia (until 2003)*, Croatia, *Estonia (from 2008)**, Hungary, *Iceland (until 2007)*, *Italy (until 2003)*, *Japan (from 2009)*, Latvia, Lithuania, *Russian Federation (from 2008)***, *Slovenia (from 2006)*, *South Africa (from 2005)*, *Sweden (until 2002)*
Exemption method	*New Zealand (until 2008)*, *United Kingdom (until 2008)*	*Australia (from 2004)*, Austria, Belgium, Cyprus, Denmark, *France (from 2007)****, Germany, *Iceland (from 2008)*, *Italy (from 2004)*, Luxembourg, *Malta (from 2007)*, Netherlands, *New Zealand (from 2009)*, *Norway (from 2004)*, *Portugal (from 2014)*, *Slovenia (until 2005)*, Spain, *Sweden (from 2003)*, Switzerland, *Turkey (from 2006)*, *United Kingdom (from 2009)*

*Estonia deducted foreign capital gains taxes until 2007 and is therefore not included before 2008.
**Russian Federation operated a no relief system with regards to dividends until 2007 and is therefore not included before 2008.
***France deducted foreign capital gains taxes until 2006 and is therefore not included before 2007.

Figure 9: Canada: Changes in tax rates on foreign dividends and capital gains over time.

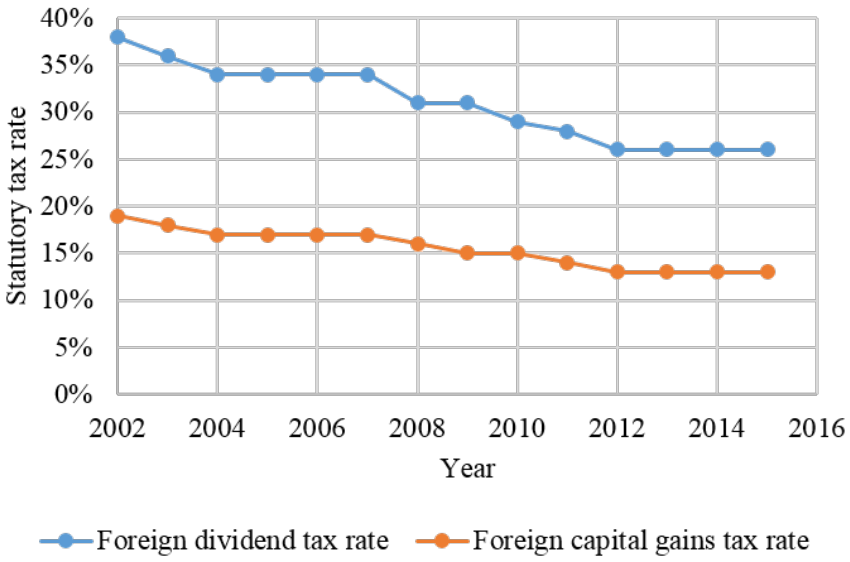


Figure 10: India: Changes in tax rates on foreign dividends and capital gains over time.

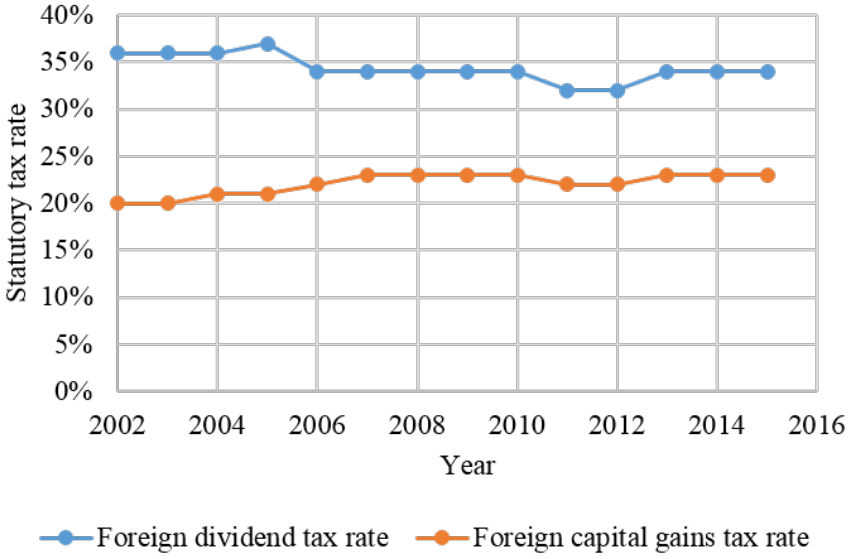


Figure 11: Israel: Changes in tax rates on foreign dividends and capital gains over time.

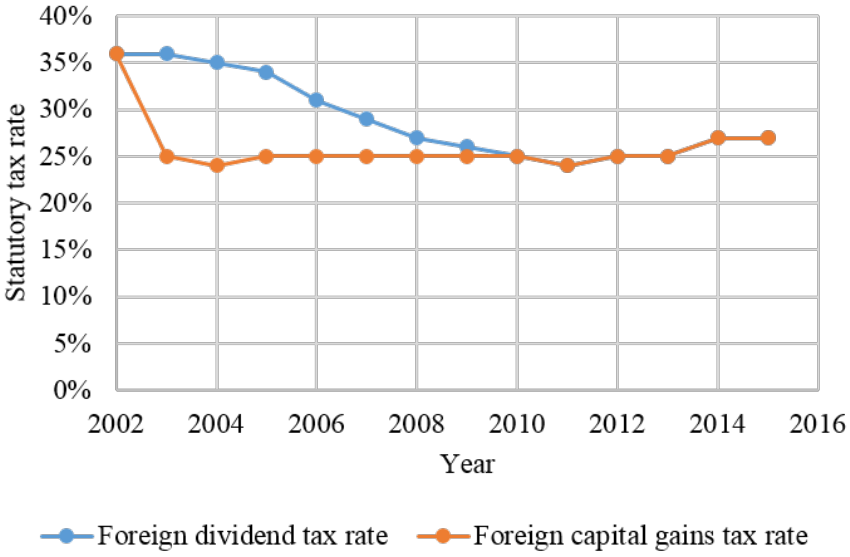
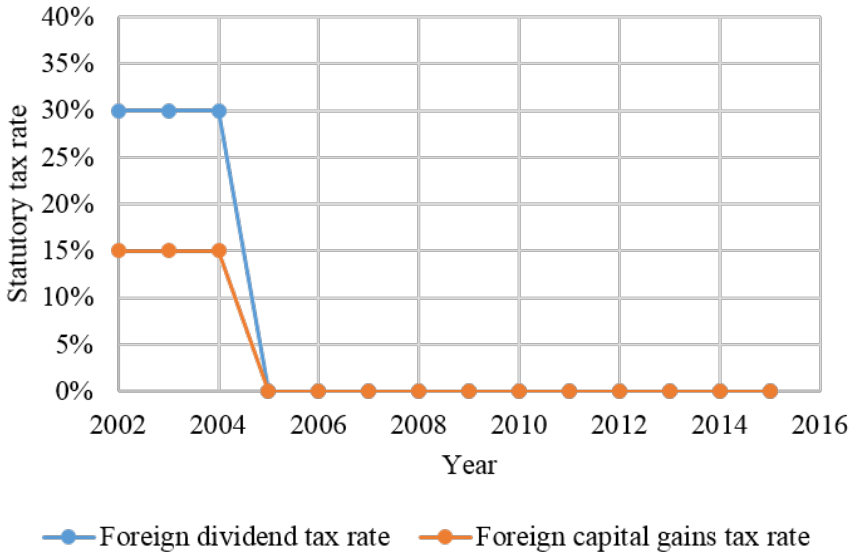


Figure 12: South Africa: Changes in tax rates on foreign dividends and capital gains over time.



South Africa changed its unilateral system from the credit method to the exemption method in 2005.

Table 9: Liquidity effects with indefinite retention, maximum profit shifting and credit in the residence country.

		t=1	t=2 ... t=n
Tax Haven	Profit after taxes	$(\varepsilon + \Delta_{Acq}) \cdot (1 - \tau^{TH})$	$(\varepsilon + \Delta_{Acq}) \cdot (1 - \tau^{TH})$
	+ Interest income after taxes		$(n-1) \cdot (\varepsilon + \Delta_{Acq}) \cdot (1 - \tau^{TH})^2 \cdot r$
	./. Dividends paid out		$(n-1) \cdot (\varepsilon + \Delta_{Acq}) \cdot (1 - \tau^{TH})^2 \cdot r$
	= CF (increase in value)	$(\varepsilon + \Delta_{Acq}) \cdot (1 - \tau^{TH})$	$(\varepsilon + \Delta_{Acq}) \cdot (1 - \tau^{TH})$
MNE	New loan	D_{Acq}	$n \cdot D_{Acq}$
	./. Repayment of old loan		$(n-1) \cdot D_{Acq}$
	./. Interest expense		$(n-1) \cdot D_{Acq} \cdot r$
	+ Dividends received		$(n-1) \cdot (\varepsilon + \Delta_{Acq}) \cdot (1 - \tau^{TH})^2 \cdot r$
	./. Taxes		$\left[\left((\varepsilon + \Delta_{Acq}) \cdot (1 - \tau^{TH}) - D_{Acq}\right) \cdot (n-1) \cdot r\right] \cdot \tau^{A}$ $-min[(\varepsilon + \Delta_{Acq}) \cdot (1 - \tau^{TH}) \cdot (n-1) \cdot r \cdot \tau^{TH};$ $\left[\left((\varepsilon + \Delta_{Acq}) \cdot (1 - \tau^{TH}) - D_{Acq}\right) \cdot (n-1) \cdot r\right] \cdot \tau^{A}]$
	= CF (Distribution)	D_{Acq}	$D_{Acq} + \left((\varepsilon + \Delta_{Acq}) \cdot (1 - \tau^{TH})^2 - D_{Acq}\right) \cdot (n-1) \cdot r$ $-\{\left[\left((\varepsilon + \Delta_{Acq}) \cdot (1 - \tau^{TH}) - D_{Acq}\right) \cdot (n-1) \cdot r\right] \cdot \tau^{A}$ $-min[(\varepsilon + \Delta_{Acq}) \cdot (1 - \tau^{TH}) \cdot (n-1) \cdot r \cdot \tau^{TH};$ $\left[\left((\varepsilon + \Delta_{Acq}) \cdot (1 - \tau^{TH}) - D_{Acq}\right) \cdot (n-1) \cdot r\right] \cdot \tau^{A}]\}$

Table 10: Definition, data sources and summary statistics of variables for OLS regression.

Variable	Description	Source	Obs.	Mean	Std. dev.	Min.	Max.
lnValueUSD	M&A deal value (natural logarithm)	SDC	709	18.87	2.07	12.10	24.18
$TAX^{noPS,1period}$	Tax component for no profit shifting for 1 periods	Tax Guides & OECD	709	0.78	0.14	0.50	1.14
$TAX^{noPS,10periods}$	Tax component for no profit shifting for 10 periods	Tax Guides & OECD	709	6.26	0.86	4.34	9.46
$TAX^{noPS,30periods}$	Tax component for no profit shifting for 30 periods	Tax Guides & OECD	709	12.41	1.64	9.02	20.91
$TAX_{div}^{noPS,1period}$	Tax component for profits only for no profit shifting for 1 periods	Tax Guides & OECD	709	0.61	0.05	0.48	0.86
$TAX_{div}^{noPS,10periods}$	Tax component for profits only for no profit shifting for 10 periods	Tax Guides & OECD	709	5.32	0.48	4.19	7.65
$TAX_{div}^{noPS,30periods}$	Tax component for profits only for no profit shifting for 30 periods	Tax Guides & OECD	709	11.61	1.35	8.52	18.87
$TAX_{cg}^{1period}$	Tax component for capital gains only for 1 periods	Tax Guides & OECD	709	1.29	0.27	1.00	1.64
$TAX_{cg}^{10periods}$	Tax component for capital gains only for 10 periods	Tax Guides & OECD	709	1.18	0.17	1.00	1.40
$TAX_{cg}^{30periods}$	Tax component for capital gains only for 30 periods	Tax Guides & OECD	709	1.07	0.06	1.00	1.20
$TAX_{div}^{fullPS,30periods}$	Tax component for profits only for full profit shifting for 30 periods	Tax Guides & OECD	709	16.53	2.93	10.65	25.48
$TAX_{div}^{fullPS,indefinite}$	Tax component for indefinite profit retention and full profit shifting	Tax Guides & OECD	709	22.54	3.92	13.55	34.18
$TAX_{div,effectivetaxrate}^{noPS,30periods}$	Tax component for profits only for no profit shifting for 30 periods using corporate average effective tax rate	Tax Guides, OECD & ZEW	613	11.08	1.09	7.04	16.92
lnTarEBITDA	EBITDA of target (natural logarithm)	SDC & Compustat	709	16.34	2.11	9.85	24.27
lnTarTotAss	Total assets of target (natural logarithm)	SDC & Compustat	709	18.41	2.11	12.90	26.20
lnTarEquity	Equity of target (natural logarithm)	SDC & Compustat	709	17.47	2.25	11.75	25.35
TarLeverage	Leverage of target (in %)	SDC & Compustat	709	52.90	23.50	0.58	99.58
lnAcqUltParTotAss	Total assets of acquirer ultimate parent (natural logarithm)	SDC & Compustat	709	21.32	2.10	14.22	27.25
AcqUltParROA	Return on assets of acquirer ultimate parent (in %)	SDC & Compustat	709	6.21	10.32	-72.74	78.31
AcqUltParCSTR	Corporate statutory tax rate, including typical local taxes, in acquirer ultimate parent country (in %)	Tax Guides	709	33.55	5.87	17.00	40.00
AcqUltParCGTR	Capital gains tax rate in acquirer ultimate parent country (in %)	Tax Guides	709	31.80	7.97	13.00	40.00
AcqUltParTHCSTR	Lowest possible tax haven tax rate for acquirer ultimate parent (in %)	Tax Guides	709	8.90	11.01	0.00	36.00
TarCSTR	Corporate statutory tax rate, including typical local taxes, in target country (in %)	Tax Guides	709	31.53	5.52	10.00	41.00
TarCATR	Corporate effective average tax rate in target country (in %)	ZEW	613	0.37	0.04	0.14	0.56
TarWHTR	Withholding tax rate in target country on dividend payments to acquirer ultimate parent country	Tax Guides	709	1.92	3.49	0.00	22.00
TarTC_presence	Binary dummy variable coded 1 if thin capitalization or interest stripping rules exist in target country, and 0 otherwise	Tax Guides	709	0.95	0.23	0.00	1.00
TarTP_docu	Binary dummy variable coded 1 if mandatory transfer pricing documentation rules exist in target country, and 0 otherwise	Tax Guides	709	0.88	0.32	0.00	1.00
Interest_rate_1	Mean interest rate for government bonds of DE, ES, FR, IT, JP, UK and US maturing in 1 year (in %)	www.investing.com	709	5.11	1.84	2.57	8.18
Interest_rate_10	Mean interest rate for government bonds of DE, ES, FR, IT, JP, UK and US maturing in 10 years (in %)	www.investing.com	709	3.75	0.33	3.24	4.61
Interest_rate_30	Mean interest rate for government bonds of DE, ES, FR, IT, JP, UK and US maturing in 30 years (in %)	www.investing.com	709	4.03	0.37	2.93	4.67
sameIndustry	Acquirer ultimate parent and target have the same SIC code	SDC & Compustat	709	0.72	0.45	0.00	1.00
lnTarGDP	Gross domestic product in target country (natural logarithm)	World Bank	709	28.41	1.21	24.72	30.48
lnAcqUltParGDP	Gross domestic product in acquirer ultimate parent country (natural logarithm)	World Bank	709	28.71	1.51	23.34	30.48

Data on acquirer ultimate parent country, target country, year and target industry fixed effects are not reported but are available upon request. Data sources for the tax variables are IBFD, European Tax Handbooks (2004-2014), various corporate tax guides (Ernst & Young, Worldwide Corporate Tax Guides (2004-2014); Ernst & Young, Worldwide Transfer Pricing Reference Guides (2004-2014); Deloitte, Global Transfer Pricing Country Guide (2011-2014); KPMG, Global Transfer Pricing Review (2012-2014); KPMG, Corporate tax rates table (2016); Price Waterhouse Coopers, International Transfer Pricing (2008-2014)) and Zinn et al. (2014).

Table 11: Definition, data sources and summary statistics of variables for logit regression.

Variable	Description	Source	Obs.	Mean	Std. dev.	Min.	Max.
$TAX^{noPS,30periods}$	Tax component for no profit shifting for 30 periods (retention)	Tax Guides & OECD	314,626	11.67	2.04	7.05	25.35
$TAX^{noPS,30periods}_{div}$	Tax component for profits only for no profit shifting for 30 periods (retention)	Tax Guides & OECD	314,626	11.20	1.93	6.78	22.15
$TAX^{30periods}_{cg}$	Tax component for capital gains only for 30 periods	Tax Guides & OECD	314,626	1.04	0.04	1.00	1.20
lnAcqUltParGDP	Gross domestic product in candidate acquirer ultimate parent country (natural logarithm)	World Bank	314,626	26.58	1.82	22.18	30.48
lnAcqUltParGDP_percapita	Gross domestic product per capita in candidate acquirer ultimate parent country (natural logarithm)	World Bank	314,626	9.87	0.99	6.13	11.54
AcqUltParGDP_growth	Growth of gross domestic product in candidate acquirer ultimate parent country (in %)	World Bank	314,626	2.77	3.53	-14.81	14.23
lnDistance	Simple distance in km between most populated cities of candidate acquirer ultimate parent and target country (natural logarithm)	Mayer and Zignago (2011)	314,626	8.44	1.04	4.09	9.88
CommonLanguage	Common language index (0 (low similarity) to 1 (high similarity))	Melitz and Toubal (2014)	314,626	0.23	0.19	0.00	0.99
ColonialRelationship	Binary dummy variable coded one if candidate acquirer ultimate parent and target country were ever in a colonial relationship, and 0 otherwise	Mayer and Zignago (2011)	314,626	0.07	0.26	0.00	1.00
CommonLegalSystem	Binary dummy variable coded one if legal system of candidate acquirer ultimate parent and target country have common legal origins, and 0 otherwise	Head et al. (2010)	314,626	0.24	0.43	0.00	1.00

Data on acquirer ultimate parent country fixed effects are not reported but are available upon request. Data sources for the tax variables are IBFD, European Tax Handbooks (2004-2014) and various corporate tax guides (Ernst & Young, Worldwide Corporate Tax Guides (2004-2014); KPMG, Corporate tax rates table (2016)).