Profit shifting within multinationals

An analysis of its tax-minimization potential and of anti-avoidance measures that extend taxation of interest and royalties at source

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Abbreviations

ACE	Allowance for corporate equity
BEA	Bureau of Economic Analysis
BEPS	Base erosion and profit shifting
CFC	Controlled foreign company
CIT	Corporate income tax
CoC	Cost of capital
DTT	Double taxation treaty
D/E ratio	Debt-to-equity ratio
EATR	Effective average tax rate
EBIT(DA)	Earnings before interest, taxes, (depreciation, and amortization)
EFTA	European Free Trade Association
EMTR	Effective marginal tax rate
EU	European Union
FE	Fixed effects
GAAR	General anti-avoidance rule
GDP	Gross domestic product
IAE	Impuesto sobre actividades económicas
IBFD	International Bureau of Fiscal Documentation
IP	Intellectual property
IRAP	Imposta regionale sulle attività produttive
MNE	Multinational enterprise
MNPC	Multinational parent company
NE	New equity
OECD	Organisation for Economic Co-Operation and Development
RE	Retained earnings
R&D	Research and development
TC	Thin capitalization strictness indicator
TP	Transfer pricing strictness indicator
TP Doc	Transfer pricing documentation requirements
UK	United Kingdom
US	United States
USD	United States dollar
WHT	Withholding tax
ZEW	Centre for European Economic Research

1 Introduction

While the modern global economy is highly integrated and interconnected, international taxation remains characterized by different coexisting national tax systems.[1] For multinational enterprises (MNE), this entails both risks of double taxation and opportunities for tax avoidance.[2] International policy has long been focused on tackling double taxation resulting from a lack of harmonization of the tax systems. However, media reports[3] of very low effective tax burdens of prominent multinationals have pushed the issue of tax avoidance to the top of the international policy agenda.[4] Since 2012, the Organisation for Economic Co-operation and Development (OECD) and the G20, as well as the European Commission have been working on measures to combat base erosion and profit shifting (BEPS) by multinationals.[5] Both the scope of this development and the fast speed at which international consensus on relevant issues has been achieved are remarkable.

In its BEPS action plan, the OECD identified 15 actions that comprehensively target common tax-planning strategies.[6] The final BEPS reports on these actions include recommendations ranging from common approaches and best practices for domestic law, through reinforced international standards, to agreed minimum standards.[7] The latter comprise a new approach to defining substantial activity for the evaluation of harmful tax practices, compulsory spontaneous exchange of information on certain tax rulings,[8] new regulations against treaty abuse,[9] the introduction of mandatory country-by-country reporting,[10] and changes to dispute resolution mechanisms.[11] In addition, the OECD transfer pricing guidelines and the OECD model treaty have been substantially revised.[12] As part of its Anti-Tax Avoidance Package, the European Commission adopted an Anti-Tax Avoidance Directive on 12 July, 2016. This required all European Union (EU) member states to introduce specific controlled foreign company

[1] See also Deffaa (2011), p. 287; Devereux/Fuest (2010), p. 23.
[2] See Deffaa (2011), p. 289; Lang (2003).
[3] See e.g. Duhigg/Kocieniewski (2012); Griffith (2012); Jungbluth (2013); Meck (2013).
[4] The first time G20 leaders declared the fight against tax base erosion and profit shifting by multinational corporations to be an important aim was during the G20-summit in Los Cabos in June 2012. See G20 Leaders (2012), p. 9.
[5] For an overview of the final reports of the OECD BEPS project, see OECD (2015a). For an overview of the Anti-Tax Avoidance Package of the European Commission, see European Commission (2016a).
[6] See OECD (2013).
[7] See OECD (2015b), p. 6. For an overview of the intermediate reports on the 15 BEPS action points, see Spengel/Nusser (2015a).
[8] For details, see OECD (2015e).
[9] For details, see OECD (2015f).
[10] For details, see OECD (2015i).
[11] For details, see OECD (2015j).
[12] For details, see OECD (2015h); OECD (2015g).

(CFC) regulations, an earnings stripping rule, measures against hybrid mismatch arrangements, regulations for exit taxation, and a general anti-abuse rule.[13] These reforms may promote the harmonization and coordination of international taxation. To what extent they will be effective in reducing so-called "aggressive tax planning"[14] and how both countries and multinational corporations will respond to those new circumstances remains to be seen.

This dissertation contributes to the ongoing discussion of BEPS in two ways. In the first part, it summarizes existing knowledge of and provides new insights into the tax-minimization potential of profit shifting within multinationals. It gives an overview of anecdotal and empirical evidence related to BEPS and identifies key elements of the international tax system that make aggressive tax planning possible. Based on these findings, it identifies representative tax planning arrangements and analyses their impact on the cost of capital (CoC) and effective average tax rates (EATRs) of cross-border investments between EU member states and the United States (US) using the Devereux/Griffith model. The results complement anecdotal evidence on BEPS by illustrating the extent to which the effective tax burden can be reduced by typical tax-planning strategies, depending on the location of the parent and subsidiary and the existence of certain anti-avoidance measures.

The aim of the second part of this dissertation is to provide arguments for and analyse the effects of different methods for extending the taxation of interest and royalties at source. Firstly, general approaches for combating BEPS are discussed, and the advantages of extending source taxation of interest and royalties are emphasized. Secondly, an overview of the prevalence and forms of anti-avoidance regulations extending taxation of interest and royalties at source is provided, and the empirical evidence of the effectiveness of these rules is summarized. In addition, this dissertation itself empirically investigates whether companies substitute between different profit-shifting channels, as well as how this affects the effectiveness of existing regulations for source-based taxation of intragroup payments. Finally, the dissertation presents alternative measures for extending taxation of interest and royalties at source that prevent the double taxation of profits and are not being considered by either the OECD or the European Commission. The dissertation highlights the different objectives and effects of these measures.

[13] See Council Directive (EU) 2016/1164.

[14] There is no clear definition of "aggressive tax planning", see Vella (2015), p. 4. On the meaning and definition of "aggressive tax planning" see also Dourado (2015a) and Steiner (2007), pp. 308-309. In the following, the term will be used for tax-planning strategies such as those explained in Chapter 2.1. These achieve low effective tax burdens using BEPS.

It also provides rough estimates of the tax revenue gains and losses resulting from two of these reform options in selected countries.

The dissertation is structured as follows. Chapter 2 summarizes anecdotal and empirical evidence related to BEPS and identifies the key elements of the international tax system that enable aggressive tax planning.[15] In Chapter 3, the impact of representative tax-planning strategies on forward-looking effective tax rates is studied.[16] The first section of Chapter 4 discusses problems of BEPS and potential reform options.[17] In the second section of Chapter 4, current country practices concerning anti-avoidance measures that extend source taxation of interest and royalties are summarized. In addition, empirical evidence about their effectiveness is provided.[18] Alternative methods to strengthen the taxation of interest and royalties at source and their potential tax-revenue consequences are discussed in the third section of Chapter 4.[19] Chapter 5 concludes the dissertation.

This dissertation is based on several papers originally written as submissions for publications in taxation journals and includes a report commissioned by the European Commission. Table 1 lists these papers, referring to the co-authors, the publication status and the contribution of the author of this dissertation.

[15] Chapter 2.1.1, providing anecdotal evidence on BEPS, is based on a paper published in the World Tax Journal and co-authored by Clemens Fuest, Christoph Spengel, Katharina Nicolay, and Jost H. Heckemeyer, see Fuest et al. (2013) pp. 309-312.

[16] The chapter is based on a study conducted on behalf of the European Commission, published as European Commission Taxation Paper No 64-2016. It is a joint work with Christoph Spengel, Jost H. Heckemeyer, Oliver Klar, and Frank Streif, see Spengel et al. (2016b).

[17] This chapter is based loosely on arguments presented in two papers co-authored by Clemens Fuest, Christoph Spengel, Katharina Nicolay, and Jost H. Heckemeyer published in Steuer und Wirtschaft and the World Tax Journal, see Fuest et al. (2015) and Fuest et al. (2013).

[18] Chapters 4.2.1 and 4.2.2 are extracts of a paper co-authored by Katharina Nicolay (née Finke), Clemens Fuest, and Christoph Spengel which has been published as ZEW Discussion Paper 14-073, see Finke et al. (2014). The content has been slightly modified. Chapter 4.2.3 is a joint work with Katharina Nicolay and Olena Pfeiffer, published in a modified version as ZEW Discussion Paper 17-066, see Nicolay et al. (2017).

[19] This chapter is based on Sections 5 and 6 of a paper co-authored by Katharina Nicolay (née Finke), Clemens Fuest, and Christoph Spengel which has been published as ZEW Discussion Paper 14-073, see Finke et al. (2014).

Table 1: Co-authors, publication status, and contribution of the author

	Paper	Co-Authors	Publication Status	Own Key Contribution
1	Profit Shifting and "Aggressive" Tax Planning by Multinational Firms: Issues and Options for Reform	Clemens Fuest Jost H. Heckemeyer Katharina Nicolay Christoph Spengel	*Published in* World Tax Journal	- Description of tax-planning strategies of prominent multinational corporations - Elaboration and description of policies to address profit shifting and "aggressive" tax planning
2	Eindämmung internationaler Gewinnverlagerung: Wo steht die OECD und was sind die Alternativen?	Clemens Fuest Jost H. Heckemeyer Katharina Nicolay Christoph Spengel	*Published in* Steuer und Wirtschaft	- Description of the OECD-BEPS actions and of general options for reform - Discussion of the German position on BEPS
3	The impact of tax planning on forward-looking effective tax rates	Jost H. Heckemeyer Oliver Klar Christoph Spengel Frank Streif	*Published as* European Commission Taxation Paper No. 64-2016	- Introduction and positioning of the study - Development and description of the tax-planning strategies and collection and description of relevant tax parameters - Adaption of the basic formulas of the Devereux/Griffith model and implementation into the java code underlying the software TaxKit used to calculate effective tax rates - Evaluation and description of the baseline results - Evaluation and description of the CoC and EATR results for all tax planning alternatives - Collection and description of information on CFC rules in EU member states and the US and modelling and description of examples for the effect of anti-avoidance rules - Summary of results

4	Extending Taxation of Interest and Royalty Income at Source – an Option to Limit Base Erosion and Profit Shifting?	Clemens Fuest Katharina Nicolay Christoph Spengel	*Published as* ZEW Discussion Paper No. 14-073	- Introduction and positioning of the study - Collection and description of information on interest deduction limitation rules and WHTs on interest and royalties in EU, European Free Trade Association (EFTA) and G20 member states - Qualitative literature survey - Description and analysis of reform options - Data collection - Data evaluation and description of stylized facts on cross-border royalties and license fee flows - Tax revenue estimation including development of study design, calculation of revenue effects and description of results
5	On the interdependency of profit-shifting channels and the effectiveness of anti-avoidance legislation	Katharina Nicolay Olena Pfeiffer	*Published as* ZEW Discussion Paper No. 17-066	- Introduction and positioning of the study - Development of data collection concept - Collection of data on interest deduction limitation rules and transfer pricing regulations and elaboration of strictness indicators - Development of the model and hypothesis - Description of the data, estimation approaches, and institutional background - Panel analysis - Difference-in-Difference analysis - Description of results

2 Anecdotal and empirical evidence on BEPS

The lack of harmonization of international taxation and the substantial tax-rate differences between countries create numerous possibilities for multinational corporations to engage in tax planning. How high the resulting tax savings may be in individual cases has been revealed by media reports[20] and academic publications[21] about the tax planning arrangements of Google, Apple, and several other prominent multinational corporations. According to numbers published in Tax Notes International, Google and Apple have been able to reduce their effective tax rate on non-US income to 3% and 1%, respectively in 2010 by shifting profits from high-tax to zero-tax countries and stateless companies.[22] In Chapter 2.1, some of the tax planning structures of well-known multinational corporations are outlined to identify the distinct elements of taxation that render such arrangements possible. In Chapter 2.2, an overview of empirical studies on the extent and forms of multinational profit shifting is provided to illustrate the general significance of the issue beyond anecdotal evidence. Chapter 2.3 summarizes the findings of the previous two sections and defines three key elements of the international tax system that make aggressive tax planning possible.

2.1 Tax-planning strategies of prominent multinational corporations

The disclosed tax planning structures of prominent multinational corporations all feature similar and distinctive elements. Chapter 2.1.1 describes these elements in detail, based on the tax-planning strategy that Google has been using. In Chapter 2.1.2, a short overview of alternative structures applied by several other multinational corporations is provided.

2.1.1 "Double Irish Dutch sandwich"[23]

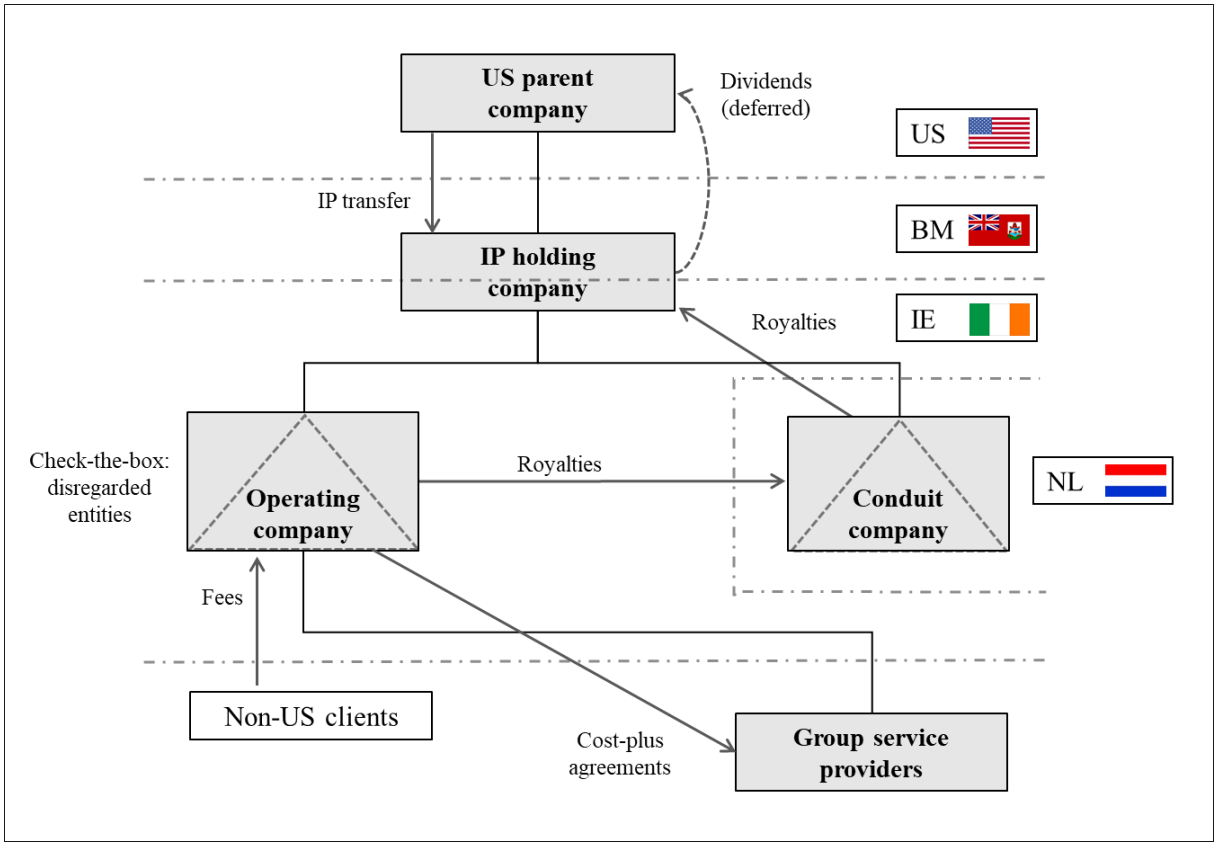
The tax-planning technique that Google and others have been using to reduce tax liability on non-US income has become known as the "Double Irish Dutch sandwich".[24] As its name implies, this technique involves two companies incorporated in Ireland (one intellectual property (IP)[25]-holding company and one operating company), and one conduit company incorporated

[20] See e.g. Duhigg/Kocieniewski (2012); Meck (2013); Jungbluth (2013).
[21] See e.g. Kleinbard (2011a), pp. 707-714; Sandell (2012).
[22] See Sullivan (2012).
[23] This chapter is a slightly modified extract from Fuest et al. (2013), pp. 309-312.
[24] Google now seems to use a different structure. However, the "Double Irish Dutch sandwich" or single elements of it are also used by other multinationals, and the structure serves as a good example to illustrate important features of aggressive tax planning. For the statement on Google's new strategy, see House of Commons - Committee of Public Accounts (2012).
[25] In line with the OECD definition, the term IP in the following denotes the rights to use industrial assets, such as patents, trademarks, trade names, designs, models and so on. Such commercial IP can be classified into trade IP

in the Netherlands.[26] The IP holding company is a direct subsidiary of the U.S. parent company and the single owner of the Irish operating company and the Dutch conduit company. The IP holding company is managed and controlled in Bermuda and is therefore considered resident in this country for Irish tax purposes.[27] The US, in contrast, treats the company as an Irish corporation because, according to US tax law, tax residency is based on jurisdiction of incorporation.

Figure 1 summarizes the structure. In the following, the single steps and elements of the "Double Irish Dutch sandwich" are explained in detail.

Figure 1: „Double Irish Dutch sandwich"



and marketing IP. While trade IP (e.g. patents) is often created through costly and risky research and development (R&D) activities, marketing IP (e.g. trademarks) serves the commercial exploitation of a product or service, etc. See OECD (2010).

[26] For a detailed description of the structure, see Berrong (2010); Kleinbard (2011a); Sandell (2012); Pinkernell (2012); Brothers (2014).

[27] With the Finance Act 2014, Ireland changed its company residence rules. Since 2015, companies that are either incorporated in Ireland or managed from Ireland are considered to be subject to unlimited tax liability in Ireland. However, a transition period until 2020 applies for companies incorporated in Ireland before 2015. See Irish Tax and Customs (2017).

(1) Payment of low tax on the initial IP transfer

To set up the structure, the U.S. parent company first transferred the rights to use its IP outside of the US to the IP holding company. According to the U.S. super-royalty rule, transferring the full-fledged intangible would have triggered taxation of the hidden reserves and future income generated by the intangible.[28] Therefore, the IP holding company has likely made a buy-in payment and concluded a cost-sharing agreement on the future modification and enhancement of the IP with the U.S. parent company. Under a cost-sharing agreement, the IP holding company bears a certain share of the research and development (R&D) costs for the future development of the IP, and it is thus entitled to a respective share of worldwide profits.[29] The R&D activities usually largely remain in the US.[30] As the IP holding company owns the non-U.S. IP rights developed under the cost-sharing agreement no periodic license payments must be made to the U.S. parent company. Determining the arm's length price for the buy-in payment is often very difficult as the intangible is only partially developed at the time of transfer and risk is associated with future earnings. Hence, multinationals have considerable leeway in determining the price and are usually able to avoid high exit taxes.[31]

(2) Almost no taxation in the country of final consumption

The Irish operating company exploits the IP and earns revenues. In Google's case, the operating company provides advertising services and acts as the contractual partner of non-U.S. customers. No substantial physical presence is created in the country of final consumption and the profits cannot be taxed there. Functions in the customers' residence states (such as marketing activities) are usually assigned to low-risk group companies. These group service providers work on a cost-plus basis, which keeps the tax base in the country of final consumption low.

[28] According to this rule, transfer prices determined at the time of transfer that are not commensurate with the income attributable to the intangible may be adjusted later on. For details on the rule, see Lessambo (2016), pp. 315-316.

[29] For an overview of the U.S. rules for cost-sharing agreements, see Simone/Sansing (2016), pp. 6-11; Heriford et al. (2013).

[30] See Ting (2014), p. 42; Sapirie (2013), p. 1037.

[31] According to the U.S. cost-sharing regulations, buy-in payments can also be adjusted if the profit of a participant in the cost-sharing agreement turns out to be too high relative to payments. See also Keates et al. (2009). However, there are exceptions to this, and similar adjustment rules and their application seem to be avoidable. See Pinkernell (2013), p. 182 footnote 18.

(3) Setting high royalty payments reduces taxation at the level of the operating company

The profits from customer sales earned by the operating company are subject to tax in Ireland. However, the tax base of the operating company is close to zero because it pays high tax-deductible royalties for the use of the IP that is held by the IP holding company. As Ireland has only recently introduced transfer pricing rules and these rules do not apply to contracts and terms agreed before July 2010,[32] most companies using the "Double Irish Dutch sandwich" are able to erode the tax base in Ireland by paying very high royalty payments.

(4) Interposition of Dutch conduit company to avoid withholding taxes

The royalties are not paid directly to the IP holding company but are passed through a conduit company in the Netherlands, which sublicenses the IP. The Dutch conduit company does not perform any economic activity. It is interposed because the IP holding company is a Bermuda resident for Irish tax purposes, and Ireland levies withholding tax (WHT) on royalty payments to Bermuda. By channeling the royalties through the Dutch conduit company, WHTs can be completely circumvented, as royalties paid from Ireland to the Netherlands are tax-free under the EU Interest and Royalties Directive.[33] Moreover, the Netherlands does not impose WHT on any royalty payments, irrespective of the residence state of the receiving company.

(5) IP holding company untaxed in Ireland and Bermuda

The IP holding company is subject to tax in neither Ireland nor Bermuda, since Ireland considers the company a non-resident and Bermuda does not impose income tax on corporations. Hence, the profits earned in the EU leave it virtually untaxed.

(6) U.S. CFC rules are circumvented

The US also does not tax non-U.S. income as long as it is not redistributed as dividends or qualified as Subpart F income under U.S. CFC rules.[34] To avoid the latter, the Irish operating company and the Dutch conduit company file a check-the-box election with the consequence that both Irish subsidiaries and the Dutch Conduit Company are treated as one single Irish corporation and their incomes are combined for U.S. tax purposes. The royalty payments between the companies are thus disregarded. This also means that only revenues from transactions with

[32] See Hogan/Galvin (2010), p. 222.
[33] Council Directive 2003/49/EC.
[34] For an overview of U.S. CFC rules, see Brauner/Herzfeld (2013) and Demleitner (2012).

customers (which typically do not constitute Subpart F income due to exceptions included in the Subpart F provisions) are considered from a U.S. perspective.

2.1.2 Overview of other MNE tax planning arrangements

The "Double Irish Dutch sandwich" is only one example of how multinational companies use profit shifting to minimize tax payments. In the following, an overview of comparable strategies applied by other multinational corporations is provided.

Until recently,[35] Apple, one of the world's most valuable corporations, used a structure that was fairly similar to Google's. The company also took advantage of the conflicting definition of tax residence according to Irish and U.S. tax law and transferred economic ownership of its IP rights for sales and manufacturing in Europe and Asia from the US to two companies resident in Ireland using cost-sharing agreements.[36] The Irish tax authorities considered the two Irish affiliates (named AOE and ASI) that were conducting intragroup sales to in-country distribution companies in Europe and Asia[37] to be managed from a head office in the US. However, this head office did not have employees or any physical presence in the US.[38] Consequently, the two companies were not subject to unlimited tax liability in either the US or Ireland. Only their income attributable to the branches in Ireland and thus sourced in Ireland was taxable there. Two tax rulings granted by the Irish tax authorities[39] ensured that the fraction of profits of AOE and ASI that were allocated to the Irish branches was vanishingly small, resulting in an overall effective tax rate for Apple's European sales of less than 1%.[40]

This demonstrates that Apple was able to yield comparable tax savings to those of Google using profit shifting via intragroup sales and royalty payments. They did this with an even simpler strategy that did not involve a conduit company in the Netherlands. Moreover, this example suggests that substantial tax avoidance is not only achievable for companies selling services via the internet but also for companies selling tangible goods to consumers via on-the-ground businesses.

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[35] Since 2015, Apple seems to use a new corporate structure. See European Commission (2016c), p. 42. Details on the new structure have not yet been published.
[36] For details on the cost-sharing agreements, see European Commission (2016c), pp. 36-40.
[37] AOE is responsible for manufacturing a certain series of computer products and sells them to related parties. ASI buys finished products from third-party contract manufacturers and sells them to related and unrelated parties. See Ting (2014), pp. 42-44; European Commission (2016c), pp. 10-12.
[38] See European Commission (2016c), pp. 10.
[39] On 30 August, 2016, the European Commission announced that these tax rulings constitute illegal state aid. For the Commission Decision and detailed information on the rulings, see European Commission (2016c). For an overview of state-aid investigations on this and other tax rulings, see Linn, A. (2015).
[40] See European Commission (2016d).

The latter becomes particularly obvious when considering the tax-planning strategy of Starbucks. Starbucks features a retail business model that relies heavily on significant presence at the location of the final customer.[41] In 2012, it was revealed that Starbucks in the United Kingdom (UK) reported losses and consequently paid almost no tax for most of the years present in the UK.[42] The losses seem to have been derived from substantial intragroup payments. Starbucks UK paid royalties to a Dutch company for using the brand and trademark, as well as for related IP rights. The Dutch company in turn payed royalties to a UK-based partnership liable to tax in neither the Netherlands nor the UK. It seems that this company is owned via two other Dutch partnerships that are themselves ultimately owned by a U.S. holding company.[43] The U.S. tax status of the partnerships is unclear. The UK partnership is possibly part of a hybrid structure not considered to be liable to unlimited taxation in the US or any other country.[44] In addition to the royalty payment, Starbucks UK also paid high mark-ups on the coffee purchased from another Dutch company. This Dutch company roasts coffee and sells roasted coffee beans to related and unrelated operators of Starbucks shops in Europe, the Middle East, and Africa.[45] It in turn pays inflated prices for green coffee beans traded by a Swiss Starbucks affiliate. This Swiss company is likely to benefit from a special tax regime in Switzerland, implying low taxation of the income from the sale of the coffee beans.[46] In addition, the Dutch roasting company also pays royalties for the roasting technology to the UK-based presumably tax-exempt partnership. In a tax ruling, the Dutch tax authorities approved the high royalty rate and mark-up for coffee beans paid by the Dutch roasting company.[47]

The tax-planning strategy applied by Starbucks illustrates that extensive tax-induced profit shifting using royalty payments and transfer pricing is not restricted to companies that offer high-technology products. Instead, it seems to be generally available to all companies with a well-established brand name and business model. Moreover, the cases of Starbucks and Apple

[41] See Kleinbard (2013), p. 1516.
[42] See Bergin (2012).
[43] See also Herzfeld (2014), p. 860.
[44] See Kleinbard (2013), p. 1522 and p. 1525; Tavares/Bogenschneider/Pankiv (2016). On this kind of Dutch CV-BV structures in general, see Vleggeert (2016a).
[45] See European Commission (2015a), pp. 8-9.
[46] Starbucks reported that it faced an effective tax rate of 12% over its history in Switzerland. This number might, however, refer to the aggregate tax payments for all Starbucks operations in Switzerland, while commodity traders as the Swiss coffee-trading company are often subject to even lower taxation in Switzerland. See Kleinbard (2013), p. 1527.
[47] On 21 October, 2015, the European Commission announced that those tax rulings constitute illegal state aid. For the Commission Decision and detailed information on the rulings, see European Commission (2015a). For the reaction of the Netherlands and Starbucks to this decision, see Finet (2015).

suggest that favorable tax rulings are a crucial element of tax avoidance strategies of multinationals.[48]

Certain European countries (Ireland, the Netherlands, and Switzerland) play a central role in the previous examples. Besides these, Luxembourg has also become known as a very favorable location for multinational corporations engaging in aggressive tax planning. Amazon, for example, conducts its sales to customers in Europe via a company resident in Luxembourg. This company in turn pays a high royalty and presumably a high level of interest[49] to a limited liability partnership that is also established in Luxembourg, thus reducing the taxable profit of the operating company to a very low level. [50] A ruling from the Luxembourg tax authorities has confirmed the adequacy of the royalty rate.[51] The IP holding company is classified differently by Luxembourg and the US. This difference results in neither the company in Luxembourg nor its U.S. partners being subject to tax on the royalty income as long as the profits are not distributed.[52]

Another example of a multinational corporation using a hybrid mismatch arrangement and a tax ruling from Luxembourg is McDonalds. The franchisors and related-party operators of McDonalds restaurants pay franchise fees and royalties to a Swiss branch of a Luxembourg-based company. This Swiss branch forwards the royalties to a U.S. branch of the Luxembourg company and receives a small service fee on a cost-plus basis.[53] Luxembourg has testified in a tax ruling that the royalty income is attributable to the two foreign branches and that these are, as permanent establishments, not subject to taxation in Luxembourg. In a revised version of the tax ruling requested a few months later, it was also confirmed that the non-existence of a permanent establishment in the US for U.S. tax purposes (and thus the U.S. tax-exemption of the profits) did not engender taxation in Luxembourg either.[54] Consequently, the royalties received by the U.S. branch of the Luxembourg IP holding are tax-exempt in both the US and Luxembourg. The "LuxLeaks" scandal illustrated that it is common practice in Luxembourg to issue favorable tax rulings to multinational corporations.[55]

[48] Google may also have received a tax ruling by the Irish tax authorities, but no information about this is available.
[49] For indices for those interest payments, see Sheppard (2015), p. 292.
[50] European Commission (2014), p. 5-6; Sheppard (2015), p. 291-292.
[51] The European Commission has launched a formal state-aid investigation concerning this ruling. See European Commission (2014).
[52] See European Commission (2014), p. 8.
[53] See European Commission (2015b), p. 7.
[54] The European Commission has launched a formal state-aid investigation concerning this ruling. See European Commission (2015b).
[55] For the process through which Luxembourg issued tax rulings, see Marian (2016).

All prior examples refer to multinational corporations headquartered in the US that can avoid paying taxes in Europe while also escaping taxation under U.S. CFC rules using these rules' available exceptions. However, the use of aggressive tax planning structures is not limited to U.S. multinational corporations. Anecdotal evidence for extensive profit-shifting activities also exists for several companies headquartered in other countries.[56] Ikea, for example, requires all country subsidiaries to pay a royalty of 3% of total sales to a Dutch company.[57] A study commissioned by the Greens/EFA Group in the European Parliament suggests that the royalty income is further channeled to a financing company in Luxembourg potentially via interest payments on a hybrid loan.[58] Under a hybrid loan arrangement, the interest is deductible in the residence country of the payer and tax-exempt at the level of the recipient, since the residence country of the recipient considers it to be dividend income.[59] The Luxembourg financing company featured an effective tax rate of only 0.06% during the years 2012-2014 and paid dividends to a tax-exempt foundation in Liechtenstein.[60]

Another report provides hints that the German-headquartered company BASF engages in a broad range of different profit-shifting strategies.[61] For example, there are indicators that BASF channels profits from the US to Belgium via interest payments and further via a hybrid loan to the Netherlands.[62] This would allow for almost complete avoidance of any tax payment on these profits. In addition, there is evidence that BASF makes use of the Dutch innovation box, which applies a tax rate of 5% to income from intangible property.[63] Moreover, BASF seems to hold some intangible assets in a Swiss branch of a Dutch company. The effective tax rate of this company is reported to have been 6.2% over the years 2010-2014.[64] The report further suggests that profits of BASF's operating companies are shifted to a Belgium company via transfer pricing of services. These profits seem to remain largely tax-exempt at the level of the Belgium company due to the use of the notional-interest-deduction-regime in Belgium. This regime allows for the deduction of a certain percentage of new equity (NE) from the tax base.[65]

[56] In addition to the following examples, there is a report on the aggressive tax-planning strategies of Inditex, which owns Zara and other fashion brands, see Tataret (2016).
[57] See Auerbach (2016a), p 15. Previously, a slightly different structure applied.
[58] The report commissioned by the Greens/EFA in the European Parliament suggests that Luxembourg has granted a favourable tax ruling for the taxation of the interest income.
[59] An overview of the taxation of financial instruments is given in Bärsch (2012).
[60] See Auerbach (2016a), p. 18.
[61] See Auerbach (2016b). In the following, only some of these strategies are covered.
[62] See Auerbach (2016b).
[63] See Auerbach (2016b). For details on the Dutch innovation box, see Nijhof/Kloes (2010) and Chapter 3.2.3.3.
[64] See Auerbach (2016b).
[65] For details on this regime, see Bombeke/v. Frenckell (2006).

2.2 Empirical evidence of BEPS

As well as anecdotal evidence, there is also broad empirical evidence for tax-induced profit shifting within multinational corporations.[66]

The main conceptual framework used to identify the existence of profit shifting in the empirical literature has been established by Grubert and Mutti[67] and Hines and Rice[68]. The underlying assumption of this strand of literature is that the reported profit of companies consists of true profit and shifted profit. To control for the value of true profit, most studies include measures of production factors in their analysis, including capital and employees.[69] The tax incentive, measured by either the tax rate or different forms of the tax rate differential,[70] defines the level of shifted profit. While early studies using this approach have relied on aggregate country-level data, more recent papers have used firm level panel data, which allows scholars to control for confounding factors and yields more reliable estimates.[71] The studies have generally shown that a firm's pre-tax profitability decreases as the tax rate or tax rate differential increases. Heckemeyer and Overesch have conducted a comprehensive literature survey by qualitatively and quantitatively analyzing 25 empirical studies that regress a tax-rate incentive on companies profit or EBIT.[72] The authors concluded that an increase of one percentage point in the tax differential between a given firm and its affiliates reduces its reported profits by 0.8%.

While most studies of profit shifting use corporate tax rates as a source of identification, a study of Dharmapala and Riedel has examined exogenous earnings shocks at the parent firm and investigated their impact on low-tax and high-tax subsidiaries.[73] The authors have found evidence for a tax-motivated increase in reported profits of low-tax (but not high-tax) affiliates. The results suggest that 2% of the additional profit is shifted to low-tax affiliates. Another approach to estimate the loss in taxes due to profit shifting compares the tax payments of multinational and domestic companies that are highly similar in relevant firm characteristics. This approach has been proposed by Egger et al.[74] and Finke[75]. The former have reported a 30%

[66] For an overview of these studies, see Dharmapala (2014a); Riedel (2014); Schjelderup (2016).
[67] See Grubert/Mutti (1991).
[68] See Hines/Rice (1994).
[69] See also Dharmapala (2014a), p. 424.
[70] A tax differential was first used by Huizinga/Laeven (2008).
[71] See Dharmapala (2014a), p. 4.
[72] See Heckemeyer/Overesch (2017).
[73] See Dharmapala/Riedel (2013).
[74] See Egger/Eggert/Winner (2010).
[75] See Finke (2013).

lower tax burden for multinational corporations in European high-tax countries, while Finke has highlighted a 27% lower tax burden for German-headquartered multinationals.[76]

Furthermore, numerous empirical studies have focused on analyzing single profit-shifting channels. These studies provide evidence that multinationals use both debt financing and non-financial transactions, such as the intragroup transfer of goods and services or licensing of IP, to shift income earned in high-tax countries to lower taxed group entities. With respect to debt financing, Desai et al. have used data of the U.S. Bureau of Economic Analysis (BEA) to provide empirical evidence that multinationals use intra-company loans to mitigate tax payments of subsidiaries in high-tax locations.[77] They reported that higher tax rates are associated with higher affiliate debt-to-asset ratios, and they stated that internal debt levels are particularly sensitive to tax rates. Huizinga et al. have also found an effect of the international tax system on leverage for a sample of European firms,[78] while Buettner and Wamser have confirmed these results for affiliates of German multinationals.[79] A study of Egger et al. has shown that the debt-to-asset ratio of multinational firms is significantly higher than the debt-to-asset ratio of domestic firms.[80] In a meta-study, Feld et al. have surveyed 48 empirical studies of the relationship between taxation and capital structure choices.[81] Across all studies, the authors found a significant relationship between tax incentives and firms' capital structures. Accounting for different study characteristics, they predicted a marginal tax effect on the debt ratio of approximately 0.27. Hence, an increase of the tax rate differential by one percentage point results in an increase of the debt ratio by 0.27.

Regarding the use of intrafirm trade as a channel of profit shifting, two different studies of Clausing have shown that taxation significantly influences the intragroup trade flows between U.S. firms and foreign affiliates.[82] In one study, Clausing has argued that an increase of the statutory tax rate by one percentage point in one country is associated with a 1.9% drop in intrafirm trade between affiliates in this country and their parents.[83] In another study, Clausing has found that not only the magnitude of intragroup transactions, but also the prices used in intrafirm trade respond to tax rate changes.[84] Bartelsman and Beetsma have confirmed these

[76] See also Riedel (2014), p. 5.
[77] See Desai et al. (2004).
[78] See Huizinga et al. (2008).
[79] See Buettner/Wamser (2013).
[80] See Egger/Eggert/Keuschnigg/Winner (2010).
[81] See Feld et al. (2013).
[82] See Clausing (2001) and Clausing (2006).
[83] See Clausing (2006).
[84] See Clausing (2003).

findings using data on intra sectoral trade between OECD countries,[85] while Overesch and Schreiber have found similar results for a sample of German multinationals.[86] Furthermore, there is robust evidence that the strategic location of intangibles is sensitive to the tax rate. A study of Karkinsky and Riedel reports that a 1% increase in the corporate income tax (CIT) rate decreases the holding of patents by approximately 3.5%.[87] In addition, Desai et al. have provided evidence that large multinationals engaging in extensive intrafirm trade and featuring a high R&D-intensity are the most likely to have affiliates in tax havens.[88]

Empirical evidence relating to the relative importance of the profit-shifting channels is not unified. Heckemeyer and Overesch have found that the volumes of shifted tax bases are driven to one third by the channel of internal debt financing and to two thirds by tax-motivated adjustments of related-party transactions.[89] The results of Dharmapala and Riedel,[90] on the other hand, suggest a larger effect of debt financing, whereas the findings of Grubert point to equal shares.[91]

To conclude, empirical evidence related to corporate tax avoidance is robust and significant. Moreover, it has been clearly demonstrated that both licensing and transfer pricing, as well as group financing strategies, are used to reallocate profits within the group. However, it is less clear which strategy of tax avoidance is most relevant. Finally, very little is known about the actual revenue consequences of these strategies.[92]

2.3 Summarized findings

The tax planning structures described in Chapter 2.1 and the empirical evidence summarized in Chapter 2.2 reveal that opportunities for aggressive tax planning are not restricted to companies active in a particular industry or headquartered in a specific country. Basically, most multinational companies seem to have certain opportunities to take advantage of existing flaws and incentives in the international CIT systems, thus making BEPS possible.

The presented tax planning arrangements are fostered by the following three key elements of the international tax system:

[85] See Bartelsman/Beetsma (2003).
[86] See Overesch/Schreiber (2010).
[87] See Karkinsky/Riedel (2012).
[88] See Desai et al. (2006).
[89] See Heckemeyer/Overesch (2017).
[90] See Dharmapala/Riedel (2013).
[91] See Grubert (2003).
[92] The last paragraph is taken from Fuest et al. (2013), p.316.

(1) a lack of concurrent taxation of worldwide income at the level of the ultimate parent company;

(2) the existence of tax havens, preferential tax regimes, tax rulings, and hybrid mismatch arrangements offering non- or low-taxation of interest, royalty, and transfer pricing income;

(3) a lack of taxation of interest and royalty payments or other transfer prices in the residence country of the payer.

Obtaining an advantage from base erosion and profit-shifting strategies firstly requires sheltering income of foreign subsidiaries from taxation at the level of the parent company. This is generally the case for all companies headquartered in countries applying the exemption method to dividend income, and it may also be achieved for companies resident in a country with a credit system by deferring the distribution of profits.[93] CFC rules are often either inexistent or ineffective. For example, the latter is true for the US and EU member states. In the US, the check-the-box regulations and several exceptions make it easy to circumvent the application of CFC rules.[94] Following the jurisdiction of the European Court of Justice, EU member states must exempt subsidiaries resident in EU or EEA member states from the application of CFC rules if the structure does not constitute a wholly artificial arrangement.[95]

Non- or low-taxation of interest and royalty income and income from other transfer prices can be achieved by locating the affiliates receiving interest, royalties, and transfer prices in zero- or low-tax countries or countries that offer preferential tax regimes. An alternative is to make use of hybrid mismatch arrangements under which the income is not subjected to tax by the involved countries (thanks to a conflicting qualification of either the company or the income). This strategy is fostered by favorable tax rulings and the ability to enter into cost-sharing agreements that allow for the transfer of IP to low-tax locations without triggering exit taxation.

The opportunity to erode the tax base via interest and royalty payments as well as other transfer prices is a basic element of most international tax systems. This is because factor remunerations are usually deductible at the level of the payer and taxed in the residence country of the recipient.[96] Countries may generally levy a WHT on outgoing payments. Within the EU, however,

[93] Most countries currently apply the exemption method to dividends, see Kofler (2012).
[94] See Ting (2015), p. 411-413.
[95] See European Court of Justice (2006). See also Fontana (2006); Smit (2014). An empirical study confirms that this exemption strongly weakens the effectiveness of CFC rules in a European context, see Ruf/Weichenrieder (2013).
[96] See also Dharmapala (2014b).

the Interest and Royalties Directive[97] (which was introduced in 2003 with the aim of reducing tax obstacles between member states) forbids the levying of WHTs in cases of transactions between at least 25%-associated companies. Many countries also do not levy WHT with respect to payments to third countries.[98] Difficulties in the valuation of royalty payments, as well as other transfer prices, facilitate the shifting of large parts of profit via intragroup payments. This is especially true if transfer pricing regulations are weak.[99]

[97] Directive 2003/49/EC.
[98] For an overview, see Chapter 4.2.1.
[99] For the effectiveness of transfer pricing regulations, see Chapters 4.2.2 and 4.2.3.

3 The impact of tax planning on forward-looking effective tax rates[100]

As illustrated in Chapter 2, both anecdotal and empirical evidence for extensive tax-induced profit shifting within multinational corporations exists. The purpose of this chapter is to provide a more general insight into the impact of representative tax-planning strategies on forward-looking effective tax rates considering cross-border investments between the EU member states and the US. The Devereux/Griffith model is used to calculate CoC and EATRs for cross-border investments using typical tax-planning strategies. This allows for comparison of the results for different tax planning structures to the results for direct cross-border investments. The latter are provided by the annually updated report on effective tax rates conducted by the Centre for European Economic Research (ZEW) and commissioned by the European Commission.[101]

The chapter is structured as follows. In Chapter 3.1, the Devereux/Griffith model used to compute CoC and EATR is briefly described. This section also lists the underlying economic assumptions of the model. Chapter 3.2 provides an overview of the different tax-planning strategies and countries considered, before summarizing relevant tax parameters. Chapter 3.3 explains which adaptions to the basic cross-border formula of the Devereux/Griffith model have been made to generate the results for CoC and EATR for the different tax-planning strategies. Chapter 3.4 summarizes the baseline results that present the most tax-efficient way for a multinational parent company to directly finance an investment in a wholly owned foreign subsidiary. Chapter 3.5 discusses the effective tax levels computed for all considered tax-planning strategies and compares them to the baseline results. Chapter 3.6 examines the potential effects of anti-avoidance measures on the results. Finally, Chapter 3.7 concludes.

3.1 Methodology: The Devereux/Griffith model

To quantify the impact of tax planning on forward-looking effective tax rates the Devereux/Griffith model, developed by Devereux and Griffith, [102] is used. The model has already been applied in several studies on behalf of the European Commission, such as the annual report on effective tax levels in the EU prepared by ZEW.[103]

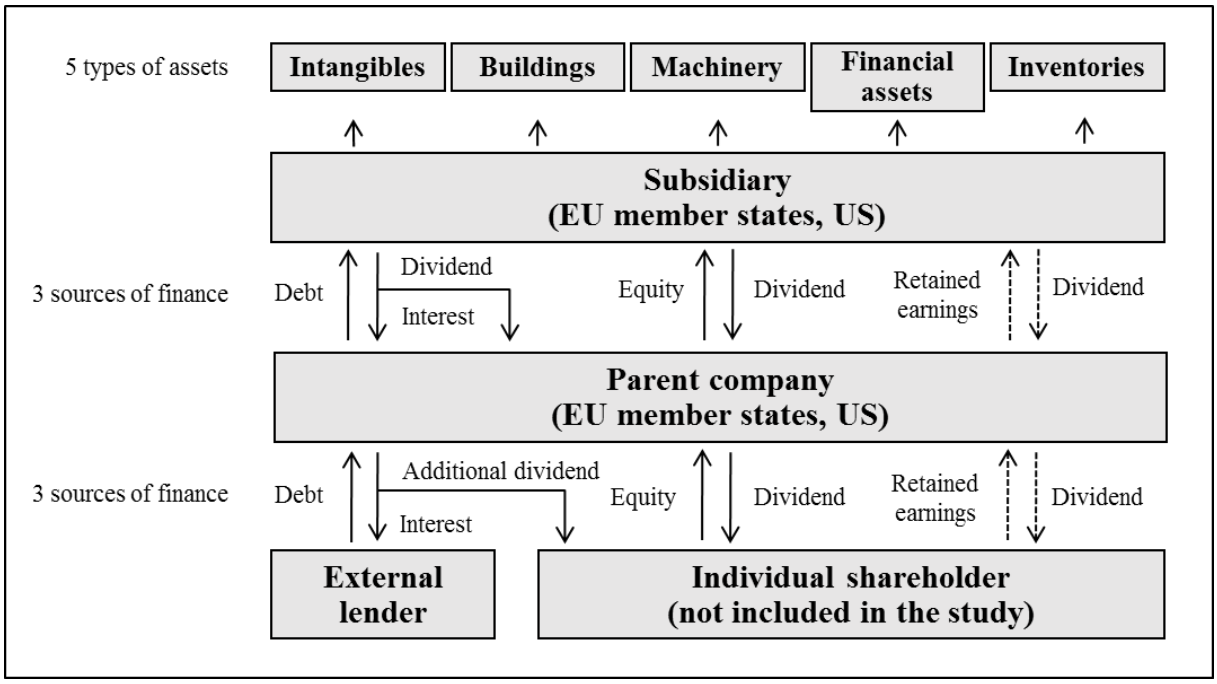
[100] This chapter is a slightly modified version of a study co-authored by Christoph Spengel, Jost H. Heckemeyer, Oliver Klar, and Frank Streif (2016). It was commissioned by the European Commission and published as European Commission Taxation Paper No 64-2016, see Spengel et al. (2016b).
[101] For 2015, see Spengel et al. (2016a).
[102] See Devereux/Griffith (1999).
[103] For the annual report 2015, see e.g. Spengel et al. (2016a). Other reports include European Commission (2001); Devereux et al. (2008).

The basic approach proposed by Devereux and Griffith considers a hypothetical incremental investment located in a specific country. This investment is undertaken by a company that may reside in either the same or in a different country. The hypothetical investment takes place in one period and generates a return in the following period.

Given a post-tax real rate of return required by the company's shareholder, it is possible to use the tax code to compute the implied required pre-tax real rate of return, known as the CoC. The proportionate difference between the CoC and the required post-tax real rate of return is known as the effective marginal tax rate (EMTR). This approach assumes that firms undertake all investment projects that earn at least the required rate of return. A complementary approach would be to consider discrete investment choices and, in particular, discrete location choices. Devereux and Griffith have proposed using an EATR as a measure to identify the effect of taxation on such discrete location choices.

The investment and financial structure of the model is illustrated in Figure 2.

Figure 2: Structure of the supposed investment



For the hypothetical investment project and its underlying economic conditions, the following assumptions from the annual reports on effective tax levels in the EU (prepared by ZEW) apply:[104]

[104] For 2015, see Spengel et al. (2016a).

- the pre-tax rate of return on profitable investment projects is assumed to amount to 20%;
- the real interest rate of an alternative investment is assumed to be 5%;
- the inflation rate is assumed to be 2% in all countries;
- investments in five different assets – intangibles (purchase of a patent), industrial buildings, machinery, financial assets and inventories – are considered;
- the depreciation rates are 15.35% for intangibles, 3.1% for industrial buildings, and 17.5% for machinery (financial assets and inventories are not depreciated);
- there are three possible ways of financing the investment – retained earnings (RE), NE, and debt;
- to represent averages over different forms of investment, equal weights for each asset type (20%) apply;
- for the refinancing of the parent company, the financing weights are 55% RE, 10% NE, and 35% debt.

3.2 Study design

The aim of this study is to show the impact of typical tax-planning strategies on the CoC for marginal investments and the EATR for profitable investments. It considers cross-border investments of multinational (parent) corporations located in any of the EU member states and the US. Due to a lack of detailed information about relevant shareholders and the high mobility of the international capital market, personal taxes are of little importance for decision making in MNEs.[105] Thus, the analysis is limited to the corporate level (i.e. excluding shareholder taxation). As BEPS focuses on large multinational corporations, the case of incorporated SMEs and partnerships is ignored.

As a consequence of the complexity and diversity of international tax rules, multinationals enjoy manifold tax planning opportunities. Below, this dissertation focuses on basic strategies that play a central role in international tax planning and are generally available to all multinational corporations.[106] The cases considered represent simplified forms of the tax-planning strategies discussed in Chapter 2.1 and the study on structures of aggressive tax planning conducted by Ramboll Management Consulting and Corit Advisory.[107] All tax-planning strategies studied are

[105] See Spengel (2003), p. 81-85.
[106] For anecdotal and empirical evidence on the use of these strategies, see Chapter 2.
[107] See Meldgaard et al. (2015).

variations of the fundamental tax planning tool of profit shifting from high-tax to low-tax countries.[108] Profits can be shifted via either interest payments, royalty payments, or transfer pricing of goods and services. These payments are usually deductible from the tax base at the level of the payer and are included in the tax base of the recipient.[109] Of these three profit-shifting channels, the study of Ramboll Management Consulting and Corit Advisory[110] focuses on the use of intragroup interest and royalty payments. While the following quantification is restricted to the same two channels, some of the results for profit shifting via royalty payments, excluding those for tax planning via IP-box regimes, are transferable to other transfer pricing strategies.

Chapter 3.2.1 provides details of the tax-planning strategies considered. In Chapter 3.2.2, the tax parameters of the fictitious financing and IP holding locations involved in the tax planning arrangements are summarized. Chapter 3.2.3 provides an overview of relevant country-level tax information used in the calculations that is not provided by the annually updated report on effective tax rates conducted by ZEW.[111]

3.2.1 Tax-planning strategies

Multinationals can reduce their global tax payments by shifting profits via intragroup interest payments from affiliates resident in high-tax countries to other affiliates resident in low-tax countries. The study considers the following four tax-planning strategies, which allow for profit shifting by means of debt financing.

(1) "Financing via Offshore": loan structure via a tax-exempt country

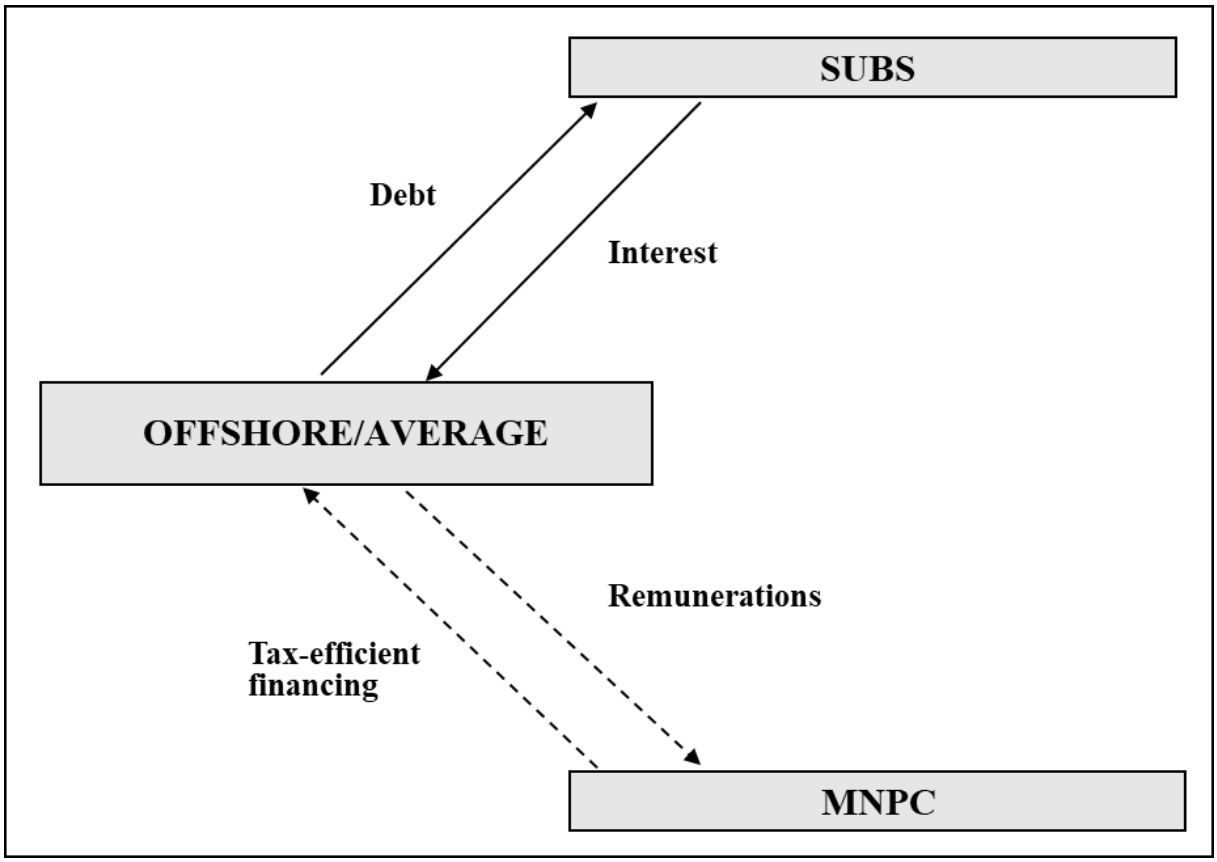
The multinational parent company (MNPC) located in an EU member state or the US indirectly owns a subsidiary (SUBS) located in another EU member state or the US, via an intermediate company (OFFSHORE). The intermediate company is located in a tax-exempt country (referred to as Offshore). The tax parameters for Offshore are specified in Chapter 3.2.2. MNPC provides funds via the most tax-efficient financing channel to OFFSHORE. OFFSHORE grants an interest-bearing loan to SUBS.

[108] The terms high-tax countries and low-tax countries are used in relative terms and always refer to the tax level of a country relative to the tax level of other countries considered.
[109] See also Dharmapala (2014b).
[110] See Meldgaard et al. (2015).
[111] For 2015, see Spengel et al. (2016a).

(2) "Financing via Average": loan structure via an average EU country

This case replicates the tax planning structure of "Financing via Offshore" but models an intermediate financing company (AVERAGE) located in a fictitious average EU member state (referred to as Average). The tax parameters for the average EU member state are specified in Chapter 3.2.2.

Figure 3: Tax-Planning Strategies 1 and 2



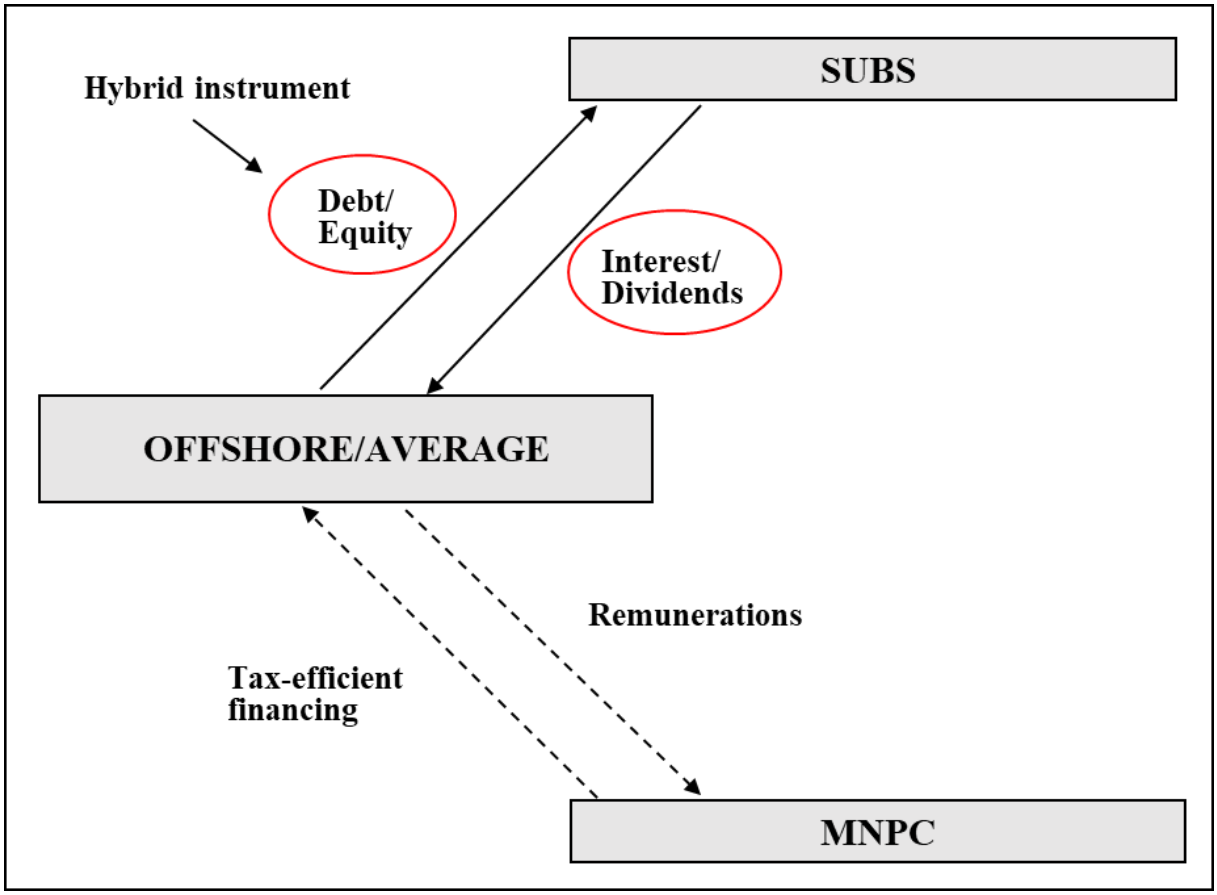
(3) "Hybrid financing via Offshore": hybrid loan structure via a tax-exempt country

This case also replicates "Financing via Offshore", with the difference that OFFSHORE grants a hybrid interest-bearing loan to SUBS, a subsidiary of OFFSHORE located in an EU member state or the US. The hybrid loan is considered as equity by the country of residence of OFFSHORE and as debt by the country of residence of SUBS.

(4) "Hybrid financing via Average": hybrid loan structure via an average EU country

The last case of debt shifting replicates the tax planning structure of "Hybrid financing via Offshore" but models an intermediate company (AVERAGE) located in a fictitious average EU member state.[112]

Figure 4: Tax-Planning Strategies 3 and 4



Another profit-shifting channel takes advantage of the intragroup licensing of IP. If IP is licensed from an affiliate resident in a low-tax country to an affiliate resident in a high-tax country, the corresponding royalty payments reduce the tax base in the high-tax country and shift the profits to the low-tax country. The study considers the following three tax-planning strategies that employ profit shifting via royalty payments:

[112] Following an amendment of the EU Parent Subsidiary Directive (Council Directive 2014/86/EU of 8 July 2014), EU member states had to implement an anti-avoidance rule against hybrid financing arrangements in their regulations for the taxation of dividends by the end of 2015. Hence, the tax-planning strategy "Hybrid Financing via Average" should be more difficult to obtain in practice in the future.

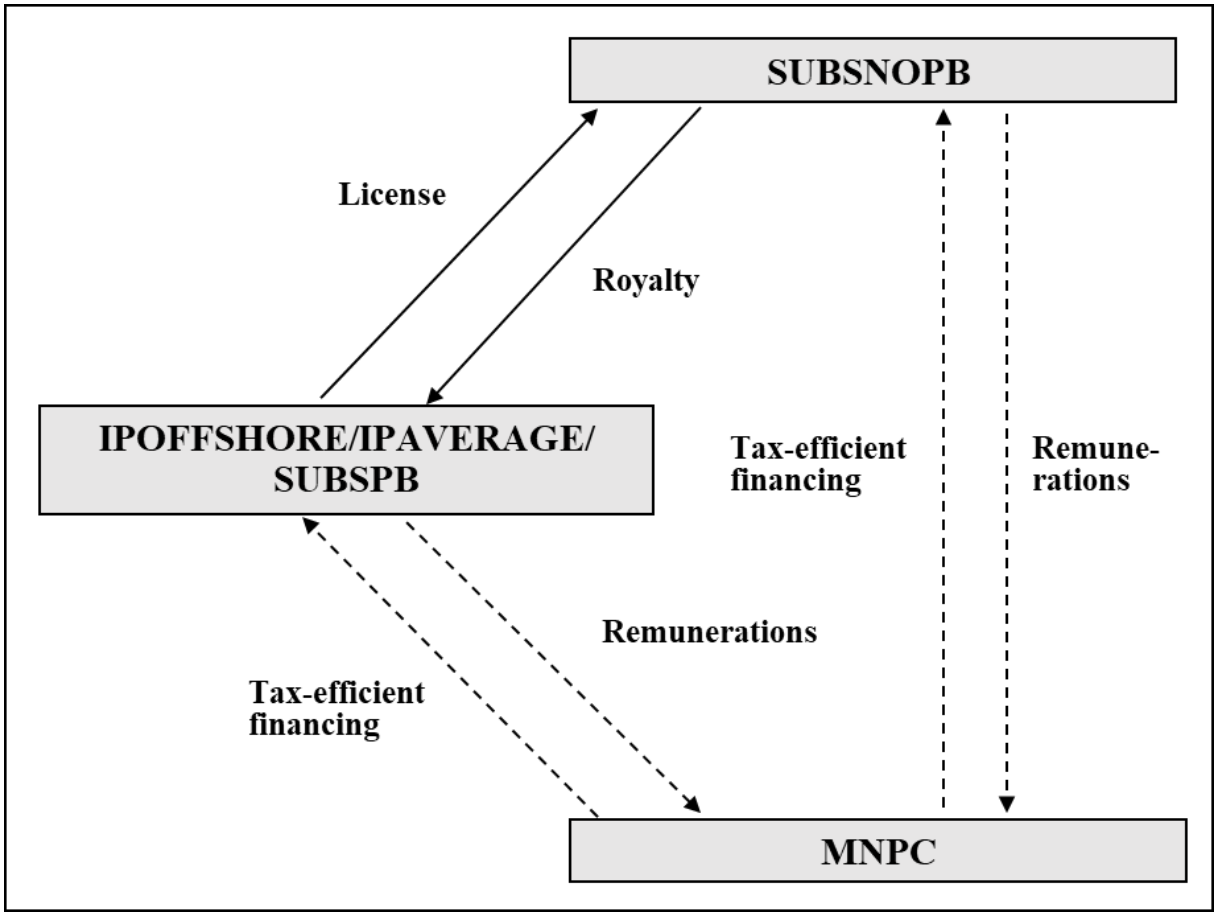
(5) “IP tax planning via Offshore”: IP is owned in a tax-exempt country

The multinational parent company located in an EU member state or the US provides funds to its subsidiary (IPOFFSHORE), which is located in a tax-exempt country, via the most tax-efficient financing channel. IPOFFSHORE uses these funds to invest in an intangible. IPOFFSHORE then licenses the IP to SUBS, which in turn pays royalties. SUBS, which is owned by MNPC, invests in the remaining four assets considered in the Devereux/Griffith model and yields the same return as it would have done had it also invested in an intangible directly.

(6) “IP tax planning via Average”: IP is owned in an average EU country

This case replicates the tax planning structure of “IP tax planning via Offshore” but models an IP holding company (IPAVERAGE) located in an average EU member state.

Figure 5: Tax-Planning Strategies 5-7



(7) "IP tax planning via IP-box countries": IP is owned in an EU member state offering an IP-box regime

This case replicates "IP tax planning via Offshore" but considers an IP holding company SUBSPB located in one of the 11 EU member states that offered an IP-box regime in 2015 (Belgium, Cyprus, France, Hungary, Italy, Luxembourg, Malta, the Netherlands, Portugal, Spain, UK).

To analyze the tax-minimization potential of the different tax-planning strategies described above, the CoC and EATR resulting from those strategies are compared to those from direct cross-border investments involving only MNPC and SUBS. In this comparison the most tax-efficient way of financing (RE, NE and debt) of the respective financing company (financing structures), the IP holding company and SUBS (IP structures) as well as the most tax-efficient way of directly financing SUBS by MNPC (direct cross-border investment) are considered.

3.2.2 Tax parameters for the "tax-exempt country" and the "average EU country"

Tax-Planning Strategies 1, 3 and 5 (defined in Chapter 3.2.1) consider a fictitious "tax-exempt country". Two different assumptions for this country are made, which are explained below.

(1) "Offshore treaty" is defined as a non-EU country that effectively does not levy profit or non-profit taxes on dividends, interest, and royalties. Offshore treaty has concluded a tax treaty with all EU member states and the US, reducing all WHT to zero.

Several EU member states generally exempt dividends from taxation but will tax dividends if certain preconditions are not met (for an overview see Chapter 3.2.3.2). Examples for such preconditions are either a minimum level of taxation of the distributed income or economic substance of the distributing company. Upon assumption, these switch-over rules do not apply to dividends received from Offshore treaty in the 29 parent countries considered. Dependent on the specific requirements of the switch-over clause, circumventing these rules will be possible if either the general CIT in Offshore treaty is above the required minimum tax level, other active business income is generated in Offshore treaty, or the dividends are channeled via a high-tax country that fully exempts dividends from taxation. For countries that generally apply the credit method to dividends from non-EU member states without exception, this method is also assumed to apply to dividends received from Offshore treaty.

Some countries deny the deduction of interest or royalties from taxable income if the corresponding income is subject to low taxation. These rules are only considered for tax planning via Offshore treaty if they apply regardless of the residence country of the company receiving the interest or royalty income, as these rules are difficult to circumvent. Amongst EU member states and the US, such a regulation only exists in Austria.[113]

Overall, arrangements using Offshore treaty reflect tax-planning strategies that achieve the non-taxation of interest and royalty income by shifting profits to a zero-tax country and successfully circumventing the application of anti-avoidance rules that target aggressive tax-planning strategies. The financing and IP holding company resident in Offshore treaty is termed OFFSHORE treaty in the following.

(2) "Offshore no treaty" is defined as a tax-exempt country outside of the EU that does not levy any kind of profit or non-profit taxes and has not concluded any tax treaties with EU member states or the US. Tables 3, 4, and 5 and the explanations in Chapter 3.2.3.1 provide an overview of WHTs on dividends, interest and royalties flowing into the tax-exempt country.

Switch-over clauses for dividend taxation are assumed to apply to dividends received from Offshore no treaty (see Chapter 3.2.3.2). Anti-avoidance rules that deny the deduction of interest and royalty expenses from the tax base in the case of low taxation of the corresponding income will be considered if they apply to payments to non-treaty countries and cannot be easily avoided by proving the economic substance of the transaction. For interest payments, comparable rules exist in Austria, Slovenia, and Sweden. The deduction of royalty expenses is restricted only in Austria. [114]

Consequently, arrangements using Offshore treaty reflect tax-planning strategies that are targeted at the non-taxation of interest and royalty income and that are effectively tackled by anti-avoidance rules existing in the residence country of SUBS and MNPC.[115] In the following, the financing and IP holding companies resident in Offshore no treaty are denoted as OFFSHORE no treaty.

[113] For details, see Peyerl (2014). The royalty deduction restriction is only taken into account for IP tax planning via Offshore treaty, as in the case of payments to Offshore no treaty WHT on royalties in Austria ensures a minimum taxation of 10%.
[114] For Austria, see Peyerl (2014); for Slovenia, see Republic of Slovenia Ministry of Finance (2016); for Sweden, see KPMG (2014a).
[115] However, thin capitalization rules and earnings stripping rules as well as CFC rules are considered for neither tax planning via Offshore treaty nor tax planning via Offshore no treaty. For a general discussion of the effect of these rules, see Chapter 3.6.

Table 2: Tax parameters for "Average"

	CIT rate (%)	capital allowances for intangibles	
		kind of allowance	allowance rate (%)
Austria	25	SL	10
Belgium	33.99	SL	20
Bulgaria	10	SL	15
Croatia	20	SL	50
Cyprus	12.5	SL	20
Czech Republic	19	SL	16.66
Denmark	23.5	SL	100
Estonia	20		n.a.
Finland	20	SL	10
France	38.93	SL	20
Germany	30.95	SL	20
Greece	29	SL	10
Hungary	20.86	SL	50
Ireland	12.5	SL	10
Italy	31.3	SL	33.33
Latvia	15	SL	20
Lithuania	15	DB	66.66
Luxembourg	29.22	SL	20
Malta	35	SL	10
Netherlands	25	SL	20
Poland	19	SL	20
Portugal	29.5	SL	10
Romania	16	SL	5.55
Slovak Republic	22	SL	20
Slovenia	17	SL	10
Spain	33.4	SL	5
Sweden	21.48	DB	30
UK	20	SL	10
"Average"	23	SL	21

Abbreviations:
SL = straight line; DB = declining balance

Tax-Planning Strategies 2, 4, and 6 (specified in Chapter 3.2.1) consider a fictitious "average EU country" denoted as "Average". The relevant tax parameters for this country are the arithmetic means of the respective tax parameters across all 28 EU member states.[116] The CIT rates and the capital allowances for intangibles in the EU member states are listed in Table 2. The respective rounded averages determine the relevant tax parameters of Average. Dividends are tax-exempt in Average. Alternative nominal statutory income tax rates that currently apply to

[116] The information on those tax parameters is taken from Spengel et al. (2016a).

certain types of income in four EU member states (Cyprus, France, Ireland, and Italy) are not considered. Interest is considered to be fully deductible in Average, which is in line with the rules in 23 of the 28 EU member states. Capital allowances for assets other than intangibles are irrelevant, as the intermediate company either does not invest in any assets (Tax-Planning Strategies 1-4) or only invests in intangibles (Tax-Planning Strategies 5-7). Tables 3, 4, and 5 in Chapter 3.2.3.1 display WHT on inbound and outbound dividends, as well as interest and royalties from and to Average.

Regarding tax planning via Offshore treaty, switch-over clauses for dividends in the parent country are assumed to not apply to tax planning via Average. A restriction of the deduction of interest and royalties paid to an EU member state only exists in Austria. The required minimum tax rate is 10%. Hence, this rule is assumed to apply to the tax-planning strategy "Hybrid financing via Average" as well as to IP tax planning using IP-box regimes that offer an effective tax rate below 10%. The IP-box regimes are discussed in detail in Chapter 3.2.3.3.

3.2.3 Additional relevant tax data

Most tax law information necessary for the calculation of CoC and EATR is taken from the tax database at ZEW, which is also used in the annual report on effective tax rates that is conducted for the EU Commission.[117] For all calculations, the tax law provisions of 1 July, 2015 are considered. In the following, tax data that are not included in the annual report on effective tax rates are summarized.

3.2.3.1 WHT on dividends, interest, and royalties

WHTs play an important role in international tax planning as they prevent the tax-free shifting of profits and reduce the tax advantage resulting from profit-shifting activities. An overview of the relevant WHT rates on dividends, interest and royalties is provided in Tables 3, 4, and 5.

The WHT rates on intragroup dividend, interest, and royalty flows between EU member states are reduced to zero due to the EU Parent Subsidiary Directive and the EU Interest and Royalties Directive. For payments between EU and US companies, the lower of the domestic and tax treaty rates applies.[118] For dividends, interest and royalties received by a company resident in

[117] For an overview on the tax parameters, see Spengel et al. (2016a).

[118] The domestic and treaty WHT rates are obtained from the International Bureau of Fiscal Documentation (IBFD) tax research platform. Please note that some domestic WHT rates assumed in this study differ from the WHT rates reported by the study of Ramboll Management Consulting and Corit Advisory (see Meldgaard et al. (2015)). Differences result from specific assumptions underlying the tax planning structures considered in this study. For Cyprus, this study considers a 10% domestic WHT on royalties as the IP rights are used within Cyprus and not abroad.

Offshore no treaty, it is assumed that the general domestic WHT rates for corporations apply in the country of residence of the paying company. However, if existent, the higher WHT rates on intragroup payments to low-tax countries or listed tax havens in the 29 countries are considered. The WHT rates for payments from and to Average are calculated by taking the respective arithmetic means across all 28 EU member states.

Dividends distributed to US parent companies are subject to WHT in 11 EU member states at rates between 5% and 12%. The average WHT rate of 3% for dividends paid from EU member state companies to US companies is defined to apply to dividend payments from Average to the US. The US levy WHTs on dividend payments to parent companies in most EU member states. The respective tax rates vary between 5% and 30%. The average value of 6% is assumed to apply for dividends distributed from a U.S. company to its parent company resident in Average.

Table 4 shows that most (20) EU member states do not levy any WHTs on interest payments to 100% US-affiliated companies. In the remaining eight EU countries, the WHT rates range from 5% to 15% and are always lower than the countries' respective CIT rates. On average, the WHT rate for interest payments from EU member states to the US amounts to 3%. This rate is assumed to apply to interest payments from the US to Average. Intragroup interest payments from the US to 16 EU member states are free of WHT. For intragroup payments to companies that are resident in the remaining 12 EU member states, the WHT rates range between 5% and 30%. The 30% U.S. CIT rate only applies for payments to Croatian related companies. This is due to the lack of a tax treaty between the US and Croatia. On average, the WHT rate for intragroup interest payments made from U.S. companies to those resident in EU member states is 5%. In the calculations, this value is considered for interest payments from Average to the US.

The US exempt royalty payments made by U.S. companies to recipients in 14 EU member states from WHT. For the remaining EU countries, the rates range between 5% and 30%. In total, the EU average value for intragroup royalty payments received from U.S. companies is 5%. This rate is assumed to apply to royalty payments from the US to Average. WHTs on royalties paid from Average to the US are not relevant for the tax-planning strategies considered in this study.

For Ireland, a 0% WHT on dividend payments to Offshore no treaty applies since the tax-planning strategies assume that the intermediate company is always controlled by persons who are resident in another EU member state or in a tax treaty state. For Malta, the study considers a 0% WHT rate on interest and royalties because the recipient of the respective payments is not controlled by individuals that are resident in Malta. For Luxembourg, a 0% WHT rate on interest is considered since higher WHT rates in this country only apply to special types of interest.

Most of the 29 countries apply high WHTs on dividends, interest, and royalties paid to specified low-tax countries or listed tax havens with which no tax treaty has been concluded. The rates for dividends range between 10% and 35% while the rates for interest and royalty payments range between 10% and 75%. Only Hungary, Luxembourg, Malta, and the Netherlands do not levy WHTs on royalties irrespective of the recipient country. These countries also generally exempt interest. Additionally, Austria, Cyprus, Germany, Estonia, Finland, and Sweden exempt interest from WHTs irrespective of the recipient country. Dividends distributed to countries with which no tax treaty has been concluded remain tax-exempt only in Cyprus, Estonia, Hungary, Ireland, Malta, the Slovak Republic, and the UK. It follows that only Hungary and Malta apply no WHTs to either type of the three different intragroup payments.

Table 3: WHT on dividends 2015 (in %)

From/to	AT	BE	BG	CY	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	UK	US	Average	Offshore treaty	Offshore no treaty
AT		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	25
BE	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25
BG	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	5
CY	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CZ	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	35
DE	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	26.38
DK	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	27
EE	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EL	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	10
ES	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	19.5
FI	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
FR	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	30
HR	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	12
HU	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IE	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	5	0	0	26
LT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	15
LU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	15
LV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	15
MT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0
NL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	15
PL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	5	0	0	19
PT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	5	0	0	35
RO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	10	0	0	16
SE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	30
SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	5	0	0	15
SK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0
UK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0
US	5	0	5	5	5	0	0	5	30	10	0	0	30	5	5	5	5	5	5	5	0	5	5	10	0	5	5	0		6	0	30
Average	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3				
Offshore	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				

Abbreviations:
AT = Austria; BE = Belgium; BG = Bulgaria; CY = Cyprus; CZ = Czech Republic; DE = Germany; DK = Denmark; EE = Estonia; EL = Greece; ES = Spain; FI = Finland; FR = France; HR = Croatia; HU = Hungary; IE = Ireland; IT = Italy; LT = Lithuania; LU = Luxembourg; LV = Latvia; MT = Malta; NL = Netherlands; PL = Poland; PT = Portugal; RO = Romania; SE = Sweden; SI = Slovenia; SK = Slovak Republic; UK = United Kingdom; US = United States

Table 4: WHT on interest 2015 (in %)

From/to	AT	BE	BG	CY	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	UK	US	Average	Offshore treaty	Offshore no treaty
AT		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
BE	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25
BG	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	10
CY	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CZ	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	35
DE	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DK	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25
EE	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EL	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	15
ES	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	19.5
FI	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FR	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75
HR	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	20
HU	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IE	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
IT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	26
LT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
LU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0
LV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	15
MT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0
NL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0
PL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	20
PT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	10	0	0	35
RO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	10	0	0	50
SE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0
SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	5	0	0	15
SK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	35
UK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	20
US	0	0	5	10	0	0	0	10	0	10	0	0	30	0	0	10	10	0	10	10	0	0	10	10	0	5	0	0		5	0	30
Average	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3			
Offshore	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			

Abbreviations:

AT = Austria; BE = Belgium; BG = Bulgaria; CY = Cyprus; CZ = Czech Republic; DE = Germany; DK = Denmark; EE = Estonia; EL = Greece; ES = Spain; FI = Finland; FR = France; HR = Croatia; HU = Hungary; IE = Ireland; IT = Italy; LT = Lithuania; LU = Luxembourg; LV = Latvia; MT = Malta; NL = Netherlands; PL = Poland; PT = Portugal; RO = Romania; SE = Sweden; SI = Slovenia; SK = Slovak Republic; UK = United Kingdom; US = United States

Table 5: WHT on royalties 2015 (in %)

From/to	AT	BE	BG	CY	CZ	DE	DK	EE	EL	ES	FI	FR	HR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	UK	US	Average	Offshore treaty	Offshore no treaty
AT		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
BE	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25
BG	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	10
CY	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
CZ	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	35
DE	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15.825
DK	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25
EE	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	10
EL	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
ES	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	24
FI	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
FR	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75
HR	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	20
HU	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IE	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20
IT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	8	0	0	22.5
LT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	10	0	0	10
LU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0
LV	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	15
MT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0
NL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0
PL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	10	0	0	20
PT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	10	0	0	35
RO	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	15	0	0	50
SE	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	0	0	21.48
SI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	5	0	0	15
SK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	10	0	0	35
UK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	20
US	0	0	5	0	10	0	0	10	0	10	0	0	30	0	0	8	10	0	10	10	0	10	10	15	0	5	10	0		5	0	30
Average	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4			
Offshore	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			

Abbreviations:

AT = Austria; BE = Belgium; BG = Bulgaria; CY = Cyprus; CZ = Czech Republic; DE = Germany; DK = Denmark; EE = Estonia; EL = Greece; ES = Spain; FI = Finland; FR = France; HR = Croatia; HU = Hungary; IE = Ireland; IT = Italy; LT = Lithuania; LU = Luxembourg; LV = Latvia; MT = Malta; NL = Netherlands; PL = Poland; PT = Portugal; RO = Romania; SE = Sweden; SI = Slovenia; SK = Slovak Republic; UK = United Kingdom; US = United States

3.2.3.2 Taxation of intercompany dividends

Table 6 provides an overview of the tax treatment of intercompany dividends in the EU member states and the US. Most countries considered in this study apply the exemption method to intercompany dividends. Only Ireland and the US generally apply the credit method to all foreign intercompany dividends. Bulgaria, Greece, and Poland restrict the application of the exemption method to dividends received from other EU member states and apply the credit method in all other cases. Finland and Romania only exempt dividends distributed by companies that are resident in EU member states and countries with which a tax treaty has been concluded. Moreover, most EU member states have implemented switch-over clauses that apply the credit method instead of the exemption method to dividends in certain cases of low taxation.[119]

Table 6: Taxation of dividends in the EU member states and the US 2015

	Credit method	Exemption method	Switch-over clause	Credit of underlying CIT
Austria		x	x	x
Belgium		x	x	
Bulgaria	x (non-EU)	x (EU)		
Croatia		x		
Cyprus		x	x	
Czech Republic		x	x	
Denmark		x		
Estonia		x	x	
Finland	x (non-treaty)	x (EU + treaty)	x	
France		x	x	
Germany		x		
Greece	x (non-EU)	x (EU)		
Hungary		x	x	
Ireland	x		x (higher tax rate)	x
Italy		x	x	
Latvia		x	x	
Lithuania		x	x	
Luxembourg		x	x	
Malta		x		
Netherlands		x	x	
Poland	x (non-EU)	x (EU)		x (treaty)
Portugal		x	x	x
Romania	x (non-treaty)	x (EU + treaty)	x	
Slovak Republic		x		
Slovenia		x	x	
Spain		x	x	x
Sweden		x	x	
UK		x		
US	x			

[119] For a detailed overview of these rules, see Maisto (2012).

In Ireland and the US, underlying CIT paid by direct and lower tier subsidiaries can be credited. Poland credits underlying CIT in the case of dividends received from treaty countries. The remaining countries that apply the credit method to dividends received from companies that are not resident in EU member states or treaty countries do not credit underlying CIT. Of the countries applying a switch-over clause, only Austria, Spain, and Portugal credit underlying CIT paid abroad against domestic income tax.

3.2.3.3 IP-box regimes in the EU member states

In 2015, 11 EU member states offered a preferential tax treatment of income accruing from certain intangibles. The key element of these IP-box regimes is an effective tax rate for specific types of IP income that is significantly lower than the general CIT rate in the respective countries. In the EU, the effective IP-box tax rates range from 0% in Malta to 21.9% in Italy.[120]

Besides the IP-box tax rates, the IP-box regimes differ with respect to their types of qualifying IP, their types of qualifying IP income, and their treatment of current and past IP-related expenses.

The Devereux/Griffith model considers intangibles in the form of patents acquired from third parties. Following the basic assumptions of the model, SUBSPB is assumed to acquire a patent that qualifies for beneficial treatment under all 11 EU IP-box regimes. In 9 of the 11 IP-box countries, acquired IP does in fact benefit from low-taxation under the IP-box regimes (subject to certain conditions). Considering that self-developed IP would yield identical or even lower CoC and EATRs and taking into account that possibilities to work around the self-development criterion usually exist, the assumption of a qualifying acquired patent in Portugal and Italy should not bias the results.

In all considered EU member states listed in Table 7, royalties qualify for the reduced effective tax rates of the IP-box regimes. Only five countries additionally include income from the sale of patented products or notional royalties. As SUBSPB receives royalty income, all IP-box regimes in EU member states are applicable to its income.

[120] The overview of IP-box regimes is based on Evers (2014); Evers et al. (2014), and the country information available on the IBFD tax research platform. With respect to France, the IP-box tax rate of 18.34% is a result of cumulatively considering the 15% IP-box tax rate, the exceptional tax surcharge, the social surcharge, and local taxes. For Italy, the IP-box tax rate amounts to 70% of the CIT and the local tax imposta regionale sulle attività produttive (IRAP). With respect to Portugal, the IP-box tax rate equals 50% of the CIT increased by the state surtax and the municipal surtax. For Spain, the IP-box tax rate is a result of 40% of the CIT rate and the added effective tax rate for the local business tax impuesto sobre actividades económicas (IAE).

Table 7: IP-box regimes in the EU member states 2015

	IP-box tax rate (%)	Acquired IP	Royalties	Notional royalties	Gross approach interest	Gross approach depreciation
Belgium	6.8	x[a]	x	x	x	
Cyprus	2.5	x	x			
France	18.34	x[c]	x			
Hungary	9.5	x	x		x	x
Italy	21.9		x	x		
Luxembourg	5.84	x[c]	x	x		
Malta	0	x[c]	x			
Netherlands	5	x[a]	x	x		
Portugal	14.75		x		x	x
Spain	17.86	x[b]	x			
UK	10	x[a]	x	x	x	

Notes:
a = under the condition of further development/improvement by the taxpayer; b = 25% of the costs must have been borne by the taxpayer; c = acquired from a third party

Concerning the treatment of current and past expenses, the IP-box countries apply two different approaches; the net approach and the gross approach. In most countries, current expenses can only be deducted at the IP-box tax rate; it follows that the net income is taxed at the favorable IP-box tax rate. In contrast, some countries apply the IP-box tax rate to the gross IP income, allowing for the deduction of current expenses at the general CIT rate. In the Devereux/Griffith model, the only current expenses considered are interest payments. Four EU IP-box countries apply the gross approach to interest payments related to IP income. Concerning past expenses, all 11 countries require the capitalization of acquired IP. However, they differ with respect to the treatment of the related depreciation expenses. While depreciation expenses are deductible from IP-box income in most countries (net approach), some countries allow the deduction of these expenses from other income taxed at the higher general CIT rate (gross approach). Among the 11 EU IP-box countries, only Hungary and Portugal apply the gross approach for the depreciation of the intangible asset. An asymmetric treatment of income and current and past expenses that applies under the gross approach further increases the attractiveness of IP-box regimes.

3.3 Adaption of the formulas of the Devereux/Griffith model

The starting point of the Devereux/Griffith model is the change in firm value in period t due to an increase in the capital stock of one unit in this period that is reversed in the next period (t+1). The basic formulas underlying the Devereux/Griffith model for cross-border settings involving a parent company and its subsidiary located in different countries have been established and explained in prior studies.[121] The starting point is the post-tax rent attributable to an investment of the subsidiary that is financed with RE (R^{RE}). As the tax consequences differ with respect to different forms of company financing, the baseline formula must be modified in the case of equity or debt financing of the subsidiary. This can be done by adding the present value of equity or debt financing, respectively ($R^{RE} + F$). In the following, first the basic formulas for the post-tax rent of an investment financed with RE (R^{RE}) and the present value of debt financing (R^{DE}) are presented. In a second step, the necessary modifications of these formulas to implement Tax Planning Strategies 1-4 and Tax Planning Strategies 5-7 are explained.

3.3.1 Basic formulas

In a cross-border setting in the basic Devereux/Griffith model (MNPC and SUBS are located in different countries), the formula for RE financing is defined as follows:

$$R^{RE} = -(1-\sigma_{SP})(1-A_S) + \frac{(1-\sigma_{SP})(p+\delta)(1-\tau_S)(1+\pi)}{(1+\rho)} + \frac{(1-\sigma_{SP})(1-\delta)(1-A_S)(1+\pi)}{(1+\rho)} \quad \textbf{(1)}$$

Term 1 of Equation (1) depicts the waiver of dividends in period t at the level of MNPC due to the earlier investment. The funds required to finance the investment are equal to 1 minus the present value of tax savings from depreciation of the acquired asset (A_S). σ_{SP} represents the tax burden on dividends paid by SUBS to MNPC.

Term 2 models the additional dividends in period t+1 at the level of MNPC, arising from the post-tax cash flow of the investment. p depicts the real return of the investment, δ denotes the economic depreciation, and τ_S stands for the CIT rate in the subsidiary country. ρ denotes the discount factor.

Term 3 of Equation (1) measures the additional dividend in t+1 at the level of MNPC that results from saving a substitute investment because the investment was brought forward by one period.

[121] See Devereux/Griffith (1999); Schreiber et al. (2002); Devereux/Griffith (2003); Lammersen (2005).

The formula used in the Devereux/Griffith model for the present value of debt financing of the subsidiary R^{DE} reflects the tax savings from debt financing or alternative scenarios. In a cross-border setting (MNPC and SUBS are located in different countries), the present value of the debt financing of the subsidiary as currently implemented in the baseline scenario of the Devereux/Griffith model results in

$$R^{DE} = -\sigma_{SP}(1-\tau_S \varnothing_{S0}) + \frac{\sigma_{SP}(1-\tau_S \varnothing_{S0})}{1+\rho} + \frac{i(1-\omega_{SP})(1-\tau_S \varnothing_{S0})}{1+\rho} \\ - \frac{(1-\sigma_{SP})i(1-\tau_S)(1-\tau_S \varnothing_{S0})}{1+\rho} \qquad (2)$$

The funds required to finance the investment are equal to 1 minus the immediate depreciation of the acquired asset $(1-\tau_S \varnothing_{S0})$. These are provided by a loan from MNPC to SUBS. In comparison to the case in which the investment is financed with RE of the subsidiary, the parent in period t pays an additional amount of $(1-\tau_S \varnothing_{S0})$ and receives an additional dividend of $(1-\tau_S \varnothing_{S0})(1-\sigma_{SP})$. This causes net extra cost of $-\sigma_{SP}(1-\tau_S \varnothing_{S0})$ (Term 1 of Equation (2)). The repayment of the loan by the subsidiary in period t+1 results in a corresponding correction term of $\sigma_{SP}(1-\tau_S \varnothing_{S0})$ at the level of the parent company (Term 2 of Equation (2)). In addition, the parent company receives interest income from the loan (Term 3 of Equation (2)). ω_{SP} denotes the tax burden on interest income at the level of the parent company. However, the interest payments reduce the dividend payment received from the subsidiary by $(1-\sigma_{SP})i(1-\tau_S)(1-\tau_S \varnothing_{S0})$ (Term 4 of Equation (2)). τ_S accounts for the deductibility of interest payments from the subsidiary's tax base.

3.3.2 Necessary modifications to implement Tax-Planning Strategies 1-4

Tax-Planning Strategies 1-4 involve profit shifting via interest payments. Accordingly, the investment of SUBS is financed with debt received from OFFSHORE/AVERAGE. Therefore, to obtain the total post-tax rent, the formula for the present value of debt financing must be added to the basic formula for the post-tax rent attributable to an investment of the subsidiary that is financed with RE ($R = R^{RE} + R^{DE}$).

In scenarios 1-4, SUBS is assumed to have no RE because all former marginal profits have been channeled to OFFSHORE/AVERAGE. As SUBS itself has no RE and the funds for the investment, the interest payments, and the profits are channeled via a third company (OFFSHORE/AVERAGE), the basic formulas for both R^{RE} and R^{DE} must be combined and modified.

3.3.2.1 RE financing of OFFSHORE/AVERAGE

In Tax-Planning Strategies 1-4, SUBS receives debt financing from OFFSHORE/AVERAGE instead of MNPC. The funds provided as loans from OFFSHORE/AVERAGE to SUBS may either be taken out of the RE of OFFSHORE/AVERAGE or result from NE or debt contribution from MNPC. For the case of RE financing of OFFSHORE/AVERAGE, combining and modifying Equations (1) and (2) yields

$$
\begin{aligned}
R^{REoff/avg} = & -(1-\sigma_{OP})(1-\tau_S \varnothing_{S0}) + (1-\sigma_{SO})(1-\sigma_{OP})(A_S - \tau_S \varnothing_{S0}) \\
& + \frac{(1-\sigma_{SO})(1-\sigma_{OP})(p+\delta)(1-\tau_S)(1+\pi)}{(1+\rho)} + \frac{(1-\sigma_{SO})(1-\sigma_{OP})(1-\delta)(1-A_s)(1+\pi)}{(1+\rho)} \\
& + \frac{(1-\sigma_{OP})(1-\tau_S \varnothing_{S0})}{(1+\rho)} - \frac{(1-\sigma_{SO})(1-\sigma_{OP})(1-\tau_S \varnothing_{S0})}{(1+\rho)} \\
& + \frac{i(1-\tau_S \varnothing_{S0})(1-\omega_{SO})(1-\sigma_{OP})}{(1+\rho)} - \frac{i(1-\tau_S \varnothing_{S0})(1-\tau_S)(1-\sigma_{SO})(1-\sigma_{OP})}{(1+\rho)}
\end{aligned}
\qquad \textbf{(3)}
$$

When comparing this to the basic formula for R^{RE}, a few differences arise. Firstly, Term 1 of Equation (1) is now split up into two parts. Under Tax-Planning Strategies 1-4, as opposed to the baseline scenario, OFFSHORE/AVERAGE instead of SUBS holds RE that are used to finance the investment and are forwarded to SUBS as debt. The result is a reduction in dividends paid from OFFSHORE/AVERAGE to MNPC in period t. The financial demand of SUBS for the investment equals 1 minus the tax savings from immediate depreciation $(1-\tau_S \varnothing_{S0})$. This amount is granted to SUBS as a loan and reduces the dividend payments from OFFSHORE/AVERAGE to MNPC (term 1 of equation (3)).

The tax burden on dividends paid from OFFSHORE/AVERAGE to MNPC is denoted by σ_{OP}.[122] The present value of tax savings from depreciation reduced by the tax savings from immediate depreciation, that are used for the investment, increases the firm value of SUBS and results in an additional dividend paid from SUBS to OFFSHORE/AVERAGE (Term 2 of Equation (3)). All values of SUBS are first distributed to OFFSHORE/AVERAGE and then forwarded to MNPC. Hence, differently to the base case scenario, those values are multiplied by $(1-\sigma_{SO})(1-\sigma_{OP})$, where σ_{SO} denotes the tax burden on dividends paid from SUBS to OFFSHORE/AVERAGE. Except for this different distribution factor, Terms 2 and 3 of Equation (1) remain unchanged (see Terms 3 and 4 of Equation (3)).

In addition, similarly to Equation (2), the effects of the loan at the level of both SUBS and OFFSHORE/AVERAGE must be considered. In period t+1, the loan payback to OFFSHORE reduces the firm value of SUBS measured at the level of MNPC by $(1-\sigma_{SO})(1-\sigma_{OP})(1-\tau_S \varnothing_{S0})$ (Term 6 of Equation (3)). It also increases the firm value of OFFSHORE, measured at the level of MNPC by $(1-\sigma_{OP})(1-\tau_S \varnothing_{S0})$ (Term 5 of Equation (3)). The effect of the interest payments on the loan is modelled by Terms 7 and 8 of Equation (3). Term 7 considers the after-tax interest income of OFFSHORE/AVERAGE. ω_{SO} denotes the tax burden on interest in OFFSHORE/AVERAGE while Term 8 refers to the decrease in dividends paid from SUBS via OFFSHORE/AVERAGE to MNPC resulting from the interest payments. In this scenario, the tax shield generated by the deductibility of interest payments from the tax base of SUBS is also considered.

Equation (3) equally applies to Tax-Planning Strategies 1-4 for RE financing of OFFSHORE/AVERAGE. If OFFSHORE/AVERAGE was financed with NE or debt, $R^{NEoff/avg}$ and $R^{DEoff/avg}$ would have to be added to $R^{REoff/avg}$.

3.3.2.2 NE financing of OFFSHORE/AVERAGE

If OFFSHORE/AVERAGE was financed with NE from MNPC, $R^{NEoff/avg}$ would have to be added to Equation (3). $R^{NEoff/avg}$ is given by:

[122] For credit countries, σ_{OP} depends on the taxation of distributed profits in OFFSHORE/AVERAGE. As distributed profits stem from both interest and dividends received by OFFSHORE/AVERAGE and these two types of income may be taxed differently, the assumption is made that 90% of the distributed income of OFFSHORE/AVERAGE is attributable to interest, while 10% is attributable to dividends received in cases of marginal investments. For profitable investments, it is assumed that 35% of the distributed profit stems from interest and that 65% stems from dividends.

$$R^{NEoff/avg} = -\sigma_{OP}(1-\tau_S \varnothing_{S0}) + \frac{\sigma_{OP}(1-\tau_S \varnothing_{S0})}{1+\rho} \quad \textbf{(4)}$$

The first term takes into account that, differently to the scenario in which the investment is financed with RE of the subsidiary, a dividend is distributed in period t. However, the equity financing reduces the income of the parent company compared to the case of RE financing by $(1-\tau_S \varnothing_{S0})$. Term 2 of Equation (4) considers that MNPC foregoes a dividend in period t+1 compared to the case of RE financing, as the NE is paid back to MNPC in t+1. The only change compared to the basic formula for R^{NE} is MNPC contributing capital to OFFSHORE/ AVERAGE instead of SUBS and receiving or missing out on dividends from OFFSHORE/ AVERAGE. Hence, σ_{OP} applies instead of σ_{SP}.

3.3.2.3 Debt financing of OFFSHORE/AVERAGE

If OFFSHORE/AVERAGE was financed with debt from MNPC and forwarded this debt as a loan to SUBS, $R^{DEoff/avg}$ would have to be added to $R^{REoff/avg}$. $R^{DEoff/avg}$ is given by:

$$R^{DEoff/avg} = -\sigma_{OP}(1-\tau_S \varnothing_{S0}) + \frac{\sigma_{OP}(1-\tau_S \varnothing_{S0})}{1+\rho} - \frac{(1-\sigma_{OP})i(1-\tau_O)(1-\tau_S \varnothing_{S0})}{1+\rho} + \frac{i(1-\omega_{OP})(1-\tau_S \varnothing_{S0})}{1+\rho} \quad \textbf{(5)}$$

With respect to Terms 1-2, please see the explanations for equity financing in Chapter 3.3.2.2. In addition, two more terms must be added. Term 3 refers to the reduction of dividend payments due to interest payments made from OFFSHORE/AVERAGE to MNPC. τ_O represents the deductibility of interest payments from the tax base of OFFSHORE/AVERAGE. Term 4 adds the interest income of MNPC received from OFFSHORE/AVERAGE to the formula. The taxes on interest (represented by ω_{OP}) reduce interest income.

3.3.2.4 Additional modifications for Tax-Planning Strategies 3 and 4

For Tax-Planning Strategies 3 and 4 that consider a hybrid loan, the main difference to Tax-Planning Strategies 1 and 2 lies in Term 7 of Equation (3). ω_{SO} is replaced by σ_{SOhyb}, which denotes the combined tax burden on the interest payment from SUBS to OFFSHORE/ AVERAGE, considering WHTs on interest in the country of SUBS and the taxation of dividend income in the country of OFFSHORE/AVERAGE.

3.3.3 Necessary modifications to implement Tax-Planning Strategies 5-7

Under Tax-Planning Strategies 5-7, profits are shifted via royalty payments instead of loans. While SUBS continues to invest in four of the five assets considered in the Devereux/Griffith model, IPOFFSHORE/IPAVERAGE/SUBSPB invests in the intangible asset instead of SUBS. Hence, only the formulas for the investment in the intangible asset must be modified.

For the investment in the intangible asset, primarily the baseline net present value formula for R^{RE} (see Equation (1)) has to be adapted as follows:

$$R^{RE_{IP}} = -(1-\sigma_{OP})(1-A_O) + \frac{(1-\sigma_{OP})(p+\delta)(1-\tau_O)(1-\pi)x}{1+\rho} + \frac{(1-\sigma_{SP})(p+\delta)(1-\tau_S)(1+\pi)(1-x)}{1+\rho} + \frac{(1-\sigma_{OP})(1-\delta)(1-A_O)(1+\pi)}{1+\rho} \quad \textbf{(6)}$$

While IPOFFSHORE/IPAVERAGE/SUBSPB invests in the intangible asset, SUBS generates profits using the asset. A fraction of x of this profit is shifted to IPOFFSHORE/ IPAVERAGE/SUBSPB via royalty payments for the use of the intangible asset. In the following it is assumed that all profits arising from the use of the IP are paid out as royalties ($x = 1$). Thus, the profit earned at the level of SUBS is split up into post-royalty profits of SUBS and royalty income of IPOFFSHORE/IPAVERAGE/SUBSPB. Both post-tax profits are distributed to MNPC. To model this, Terms 1 and 3 of the baseline formula (Equation (1)) remain basically unchanged (see Terms 1 and 4 in Equation (6)). Term 2 is split into two terms. Term 2 in equation (6) refers to the share of profit x that is shifted from SUBS to IPOFFSHORE/ IPAVERAGE/SUBSPB via royalty payments. Term 3 in Equation (6) refers to the after-royalty profit that is distributed directly to MNPC.

If IPOFFSHORE/IPAVERAGE/SUBSPB is financed with NE or debt, the financing formulas for either NE or debt have to be added to this modified $R^{RE_{IP}}$ to calculate the total post-tax rent. The baseline formulas for NE and debt financing remain unchanged. However, differently to the baseline scenario, the applicable parameters for dividend and interest payments are between IPOFFSHORE/IPAVERAGE/SUBSPB and MNPC instead of SUBS and MNPC.

3.4 Baseline results: Tax-efficient direct financing

To illustrate the effects of the tax-planning strategies covered in this study, the CoC and EATR calculated for those strategies are compared to the cross-border results calculated in the 2015

effective tax rates report prepared for the European Commission.[123] The minimum values of the RE, NE and debt financing of the subsidiary serve as baseline results. In both the baseline calculations and the tax planning calculations, the parent company is refinanced by a weighted average (i.e. 55% RE, 10% NE and 35% debt, see Chapter 3.1) across all three financing alternatives.

The tables summarizing the financing-specific and most tax-efficient CoC and EATRs for direct cross-border inbound and outbound investments for the 29 countries (baseline results without tax planning) are listed in Chapter A of the Annex available from http://ec.europa.eu/taxation_customs/publications/taxation-services-papers/taxation-papers_de (referred to as Annex in the following).[124]

From a theoretical perspective, the CoC of cross-border investment reflects the differences in the optimal investment volume, conditional on location choice. In other words, the lower the CoC, the higher the investment volume of the respective subsidiary compared to other subsidiaries of the parent company. Moreover, CoC is an indicator for the competitiveness of companies producing in the host economy, as they codetermine lower price limits of supplied goods and services.[125] EATRs, on the other hand, are relevant if companies must make a discrete choice of where to allocate profitable investment. From a theoretical perspective, other factors held constant, a parent company will invest in the subsidiary located in the host country that offers the lowest EATR.[126]

As a basic principle, the most tax-efficient source of financing of the subsidiary is determined by the relation between the tax rates in the parent and the subsidiary countries. If the CIT rate in the country of the subsidiary is higher than in the parent country, debt financing is the most favorable financing alternative. For marginal investments financed by debt, the tax level in the parent country is decisive, since profits are shifted from the subsidiary country to the parent country. For profitable investments, the effect is less pronounced because the positive net present value is not shifted via interest but is instead taxed at the level of the subsidiary and distributed to the parent as a dividend. Nevertheless, the advantage stemming from shifting part of the profit to the low-tax parent country means that the debt financing of high-tax country subsidiaries usually remains favored.

[123] See Spengel et al. (2016a).
[124] Differences compared to the Annex concerning outbound investments from Estonia result from a finer modulation of the distribution tax in the Devereux/Griffith model. The detailed tables are available from the author.
[125] See Lammersen/Schwager (2005), p. 14.
[126] See Schreiber et al. (2002), pp. 21-22; Lammersen (2002), p. 28.

If the CIT rate in the country of the subsidiary is lower than in the parent country, financing the investment with RE is usually the most tax-efficient alternative. In the case of marginal investments financed by RE, the tax burden is primarily determined by the CIT rate in the subsidiary country. For profitable investments financed by RE, taxes on dividends (which potentially reduce the profit shifting advantage) also play a role. Differences between RE- and NE financing of the subsidiary will arise if dividends are only partially tax-exempt in the parent country or if the parent country applies the indirect tax credit method to dividend income and if simultaneously the tax level of the parent country is higher than that of the subsidiary country. In these cases, the CoC and the EATR of NE financing of the subsidiary are higher than those of RE financing of the subsidiary. In the other cases, RE- and NE financing of the subsidiary result in the same CoC and EATR. If RE- and NE financing of the subsidiary result in the same CoC and EATR, RE financing is classified as the most tax-efficient way of financing.

Table 8 lists the mean CoC and EATR for each country, averaged over all partner countries for inbound and outbound investments using the most tax-efficient way of financing the subsidiary.

The averages of the inbound investment values across all parent countries (given in Table 8) demonstrate the following: in general, low-tax countries are the most attractive cross-border investment locations, while high-tax countries (such as France or the US) are less attractive. For profitable inbound investments, the ranking of the countries is very similar to the ranking according to the countries' effective statutory profit tax rates (i.e. the statutory profit tax rate increased by surcharges and local profit taxes, denoted as CIT in Table 8). This is because taxation in the country of residence of the subsidiary plays the decisive role for profitable investments. In contrast, the country ranking with regard to the CoC for marginal inbound investments differs more noticeably from the respective ranking with regard to the CIT. In that case, some high-tax countries like Italy and Belgium are among the jurisdictions with the lowest CoC for inbound investments. This is because in the case of marginal investments, the total profit (not simply fractions of it) can be allocated to the country with the lower tax rate. This is achieved by means of either RE- or debt financing, which reduces the relevance of the level of taxation in the subsidiary's country of residence. In addition, tax base effects in the subsidiary country have a strong effect on the CoC. This in turn makes marginal investments in high-tax countries with favorable depreciation rules particularly attractive, since they yield high tax savings when they are financed with debt. However, a total mitigation of taxes in high-tax subsidiary countries by means of debt financing often remains impossible. This is due to restrictions on the deductibility of interest payments or the existence of non-profit taxes in the

subsidiary country. It follows that low-tax countries are generally also the most attractive in the context of marginal investments. With respect to Italy, the low average CoC results from the availability of an allowance for corporate equity (ACE), which allows to deduct a certain percentage of equity from the tax base. Such a regime only exists in Italy and Belgium.[127] Despite the country's high CIT rate, its ACE regime makes RE financing the most favorable source of finance for investments into Italy.

Table 8: Mean CoC and EATR – Direct cross-border investment (in %)

Outbound						**Inbound**					
	CoC	**CIT**		**EATR**	**CIT**		**CoC**	**CIT**		**EATR**	**CIT**
US	5.3	37.9	**BG**	19.3	10.0	**EE**	4.4	20.0	**BG**	8.8	10.0
IT	5.3	31.3	**IT**	19.5	31.3	**IT**	4.9	31.3	**EE**	13.2	20.0
BG	5.3	10.0	**MT**	19.6	35.0	**BG**	5.0	10.0	**LT**	13.6	15.0
FR	5.5	38.9	**LV**	20.1	15.0	**HR**	5.2	20.0	**IE**	14.1	12.5
LV	5.5	15.0	**LT**	20.1	15.0	**BE**	5.3	34.0	**LV**	14.3	15.0
LT	5.5	15.0	**PT**	20.3	29.5	**LT**	5.4	15.0	**RO**	14.8	16.0
BE	5.6	34.0	**LU**	20.3	29.2	**CZ**	5.4	19.0	**CY**	15.3	12.5
MT	5.6	35.0	**UK**	20.4	20.0	**SI**	5.5	17.0	**SI**	15.5	17.0
SI	5.6	17.0	**ES**	20.4	33.4	**RO**	5.5	16.0	**HR**	16.4	20.0
RO	5.6	16.0	**BE**	20.5	34.0	**IE**	5.5	12.5	**CZ**	16.6	19.0
UK	5.7	20.0	**NL**	20.5	25.0	**LV**	5.5	15.0	**PL**	17.5	19.0
PL	5.7	19.0	**FI**	20.5	20.0	**LU**	5.5	29.2	**FI**	18.5	20.0
HU	5.7	20.9	**HU**	20.5	20.9	**SK**	5.6	22.0	**SE**	19.2	21.5
FI	5.7	20.0	**DK**	20.5	23.5	**PL**	5.6	19.0	**HU**	19.3	20.9
CY	5.7	12.5	**PL**	20.5	19.0	**SE**	5.6	21.5	**SK**	19.3	22.0
PT	5.7	29.5	**SE**	20.5	21.5	**CY**	5.6	12.5	**DK**	20.9	23.5
SE	5.7	21.5	**AT**	20.5	25.0	**NL**	5.7	25.0	**UK**	21.4	20.0
LU	5.7	29.2	**RO**	20.6	16.0	**DK**	5.7	23.5	**NL**	21.9	25.0
DK	5.8	23.5	**CY**	20.8	12.5	**FI**	5.7	20.0	**AT**	22.3	25.0
AT	5.8	25.0	**SI**	20.8	17.0	**PT**	5.8	29.5	**IT**	23.0	31.3
NL	5.8	25.0	**CZ**	21.0	19.0	**HU**	5.8	20.9	**LU**	24.2	29.2
HR	5.8	20.0	**HR**	21.1	20.0	**AT**	5.8	25.0	**PT**	25.2	29.5
ES	5.8	33.4	**DE**	21.3	31.0	**MT**	6.0	35.0	**EL**	25.8	29.0
DE	5.8	31.0	**EE**	21.4	20.0	**EL**	6.0	29.0	**BE**	26.7	34.0
CZ	5.8	19.0	**SK**	21.6	22.0	**DE**	6.0	31.0	**DE**	27.1	31.0
EE	5.9	20.0	**IE**	22.2	12.5	**FR**	6.3	38.9	**MT**	29.7	35.0
SK	6.0	22.0	**FR**	22.7	38.9	**UK**	6.4	20.0	**ES**	31.7	33.4
IE	6.1	12.5	**EL**	22.9	29.0	**US**	6.7	37.9	**FR**	35.2	38.9
EL	6.3	29.0	**US**	27.3	37.9	**ES**	7.6	33.4	**US**	36.2	37.9
Ø	**5.7**	**23.6**	**Ø**	**20.9**	**23.6**	**Ø**	**5.7**	**23.6**	**Ø**	**20.9**	**23.6**

Abbreviations:
AT = Austria; BE = Belgium; BG = Bulgaria; CY = Cyprus; CZ = Czech Republic; DE = Germany; DK = Denmark; EE = Estonia; EL = Greece; ES = Spain; FI = Finland; FR = France; HR = Croatia; HU = Hungary; IE = Ireland; IT = Italy; LT = Lithuania; LU = Luxembourg; LV = Latvia; MT = Malta; NL = Netherlands; PL = Poland; PT = Portugal; RO = Romania; SE = Sweden; SI = Slovenia; SK = Slovak Republic; UK = United Kingdom; US = United States

[127] See Zangari (2014) for a comparison of the two regimes.

Overall, Estonia features the lowest CoC for inbound investments. This implies that subsidiaries resident in Estonia usually benefit from a competitive advantage over those resident in all remaining countries. Financing the Estonian subsidiary with RE avoids profit taxes for a marginal investment, since the country does not levy taxes on RE. Distributed dividends are only subject to the 20% CIT rate if they do not stem from dividends received from qualifying subsidiaries. Dividend taxation also plays a role in the RE financing of profitable investments. Therefore, regarding profitable investments, Bulgaria is on average the most attractive investment location, as it offers the lowest nominal CIT rate on distributed profits within the EU (10%).

However, the detailed tables demonstrate that Estonia and Bulgaria are not always the most attractive subsidiary location for marginal and profitable investments, respectively.[128] For U.S. parent companies, investing in an Estonian subsidiary financed by RE remains the most favorable investment opportunity in the cases of both marginal and profitable investments. The reason for this lies in the application of the indirect tax credit method to foreign dividends in the US. This method prescribes that dividends are taxed at the U.S. CIT rate and that underlying foreign income taxes of the subsidiary can be credited. Because of the high U.S. CIT rate, the income taxes levied in Bulgaria and Estonia are fully creditable. Hence, the advantage of the 0% tax rate being levied on retained profits in Estonia is not relativized by a lower tax burden on distributed profits in the case of an investment in a Bulgarian subsidiary.

For low-tax countries like Bulgaria, the most attractive subsidiary location for marginal investments is Belgium using debt financing of the subsidiary. Debt financing of a Belgian subsidiary shifts profits to the low-tax country, while benefits from a tax base reduction arise under the high Belgian tax rate. Non-profit taxes, which cannot be reduced by debt financing are comparatively low in Belgium and, differently to other high-tax countries, do not have a significant effect on the CoC. In addition, Belgium offers very favorable depreciation rates. In the case of profitable investments, Lithuania is the most attractive subsidiary location for Bulgarian parent companies that finance the subsidiary through loans. Lithuania applies a low CIT rate and offers attractive depreciation rules. In the case of profitable investments, since only parts of the profits are shifted from the subsidiary to the parent via interest payments, investing in high-tax countries like Belgium is less attractive for Bulgarian parent companies.

For outbound investments, both low- and high-tax countries rank among the most attractive parent company locations. Considering investments in high-tax countries, the most favorable

[128] See Annex.

parent location for both marginal and profitable investments is usually Bulgaria. If the Bulgarian parent company finances the high-tax subsidiary with debt, the entire profit will be shifted to Bulgaria which offers the lowest tax rate on interest income among all considered countries.

Focusing on marginal investments in low-tax countries, the most attractive parent location is the US. Under RE financing, profits are only taxable in the respective low-tax countries. In addition, the advantage of interest deductibility regarding debt refinancing of the parent company is largest in the US, which applies the second highest CIT rate among all 29 countries whilst allowing the full deduction of interest for tax purposes. In the case of a profitable investment, Malta is usually the most attractive parent location for investments in low-tax subsidiaries that are financed with RE. Malta fully exempts dividends from taxation, triggering profit taxes exclusively in the low-tax countries. Moreover, Malta applies one of the highest CIT rates among the 29 countries considered, which results in a significant advantage in the debt refinancing of the parent company.

Overall, the baseline results show that under tax-efficient financing of the subsidiary, the tax burden of a cross-border investment is influenced by both the taxation at the level of the subsidiary and the taxes that accrue at the level of the parent company. For marginal investments, the CoC will be particularly low if the parent company is subject to very high taxation and the subsidiary is subject to very low taxation. Using RE financing of the subsidiary causes the taxation of profits in the low-tax country and enables the deduction of refinancing costs of the parent at the high tax rate in the parent company's country of residence. A low CoC will also occur if the parent company is subject to very low taxation while the subsidiary company is subject to very high taxation and benefits from favorable depreciation rules. In such a case, profits can be shifted to the low-tax parent country via debt financing, while depreciation is deductible in the subsidiary country at the high CIT rate. In summary, there are both countries with very high-tax rates and very low tax rates among the countries with the lowest mean CoC for inbound and outbound investments. For profitable investments, the tax level in the subsidiary country is the decisive factor. It follows that the attractiveness of countries as investment locations generally decreases with an increasing CIT rate.

3.5 CoC and EATR for the considered tax-planning strategies

3.5.1 Profit shifting via interest payments

The first two tax-planning strategies consider investments in SUBS that are financed via a loan granted by an intermediate holding company. The intermediate holding company can either be

OFFSHORE treaty, OFFSHORE no treaty, or AVERAGE. Tax-Planning Strategies 3 and 4 additionally assume that the loan granted to SUBS has a hybrid element that results in its classification as equity at the level of the intermediate company.

3.5.1.1 "Financing via Offshore treaty": Loan from OFFSHORE treaty

The first tax-planning strategy involves an intermediate company (OFFSHORE treaty) resident in Offshore treaty. The fictitious country Offshore treaty does not levy taxes on dividends, interest, and royalties. Moreover, it has concluded tax treaties with all 28 EU member states and the US reducing WHTs on these payments to zero. No switch-over clauses apply to dividends received from Offshore treaty. The scenario assumes that it is only in Austria that interest payments are non-deductible if paid to Offshore treaty (see Chapter 3.2.2).

In the case of a marginal investment, the investment return of SUBS is shifted to OFFSHORE treaty via interest payments. Since the country Offshore treaty does not levy taxes on interest, the marginal return remains untaxed at the level of OFFSHORE treaty. Taxation of dividends or interest at the level of MNPC will only be relevant if OFFSHORE treaty is financed with NE or debt. Thus, the advantage from the non-taxation of the marginal investment return is largest in the context of RE financing of OFFSHORE treaty. Table 9 lists the CoC and EATR for each country, averaged over all parent countries for inbound and outbound investments under RE financing of OFFSHORE treaty in comparison to the baseline results summarized in Chapter 3.4.[129]

Table 9 shows that all mean CoC for outbound investments are below 5%. This implies that taxes under the considered tax-planning strategy generally have a subsidizing effect. The reason for this is that the marginal return of the investment is effectively not taxed anywhere, while tax depreciation of the acquired assets that usually exceeds economic depreciation reduces other profits earned by SUBS. Refinancing costs at the level of MNPC result in additional tax savings.

[129] The detailed results for all country combinations are included in Chapter B1 of the Annex.

Table 9: Mean CoC and EATR – "Financing via Offshore treaty" (in %)

Outbound						Inbound					
CoC			EATR			CoC			EATR		
	TP	BL		TP	BL		TP	BL		TP	BL
US	3.0	5.3	**MT**	12.5	19.6	**BE**	3.1	5.3	**BG**	6.4	8.8
EL	3.5	6.3	**ES**	13.3	20.4	**LU**	3.4	5.5	**LT**	9.8	13.6
FR	3.6	5.5	**PT**	13.3	20.3	**HR**	3.6	5.2	**IE**	10.3	14.1
MT	3.7	5.6	**LU**	13.4	20.3	**MT**	3.6	6.0	**LV**	10.5	14.3
BE	3.7	5.6	**AT**	13.6	20.5	**FR**	3.6	6.3	**RO**	10.7	14.8
ES	3.8	5.8	**BE**	13.7	20.5	**PT**	3.6	5.8	**SI**	11.1	15.5
PT	3.8	5.7	**NL**	14.0	20.5	**NL**	3.8	5.7	**CY**	11.2	15.3
LU	3.9	5.7	**DK**	14.2	20.5	**IT**	3.8	4.9	**HR**	11.4	16.4
DE	3.9	5.8	**IT**	14.3	19.5	**SK**	3.8	5.6	**CZ**	11.7	16.6
AT	3.9	5.8	**DE**	14.4	21.3	**CZ**	3.9	5.4	**PL**	12.5	17.5
IT	3.9	5.3	**SE**	14.5	20.5	**DK**	3.9	5.7	**FI**	13.6	18.5
NL	4.0	5.8	**UK**	14.6	20.4	**DE**	3.9	6.0	**SK**	13.8	19.3
DK	4.0	5.8	**FI**	14.7	20.5	**SE**	3.9	5.6	**SE**	13.9	19.2
PL	4.0	5.7	**HR**	14.8	21.1	**EL**	3.9	6.0	**EE**	14.3	13.2
SE	4.1	5.7	**HU**	14.8	20.5	**US**	4.0	6.7	**HU**	14.4	19.3
UK	4.1	5.7	**CY**	15.3	20.8	**PL**	4.1	5.6	**DK**	15.3	20.9
FI	4.1	5.7	**LV**	15.4	20.1	**SI**	4.1	5.5	**NL**	16.1	21.9
HR	4.2	5.8	**LT**	15.4	20.1	**LT**	4.1	5.4	**UK**	16.3	21.4
HU	4.2	5.7	**SI**	15.6	20.8	**FI**	4.1	5.7	**LU**	18.0	24.2
SI	4.2	5.6	**FR**	16.1	22.7	**RO**	4.2	5.5	**PT**	19.1	25.2
IE	4.2	6.1	**EE**	17.1	21.4	**BG**	4.2	5.0	**EL**	19.1	25.8
CY	4.3	5.7	**SK**	17.1	21.6	**HU**	4.2	5.8	**IT**	20.4	23.0
LV	4.3	5.5	**CZ**	17.2	21.0	**IE**	4.2	5.5	**BE**	20.8	26.7
LT	4.3	5.5	**RO**	17.2	20.6	**CY**	4.3	5.6	**DE**	21.1	27.1
BG	4.4	5.3	**IE**	18.0	22.2	**LV**	4.3	5.5	**MT**	23.2	29.7
EE	4.8	5.9	**PL**	19.2	20.5	**EE**	4.3	4.4	**AT**	25.0	22.3
RO	4.8	5.6	**BG**	21.9	19.3	**UK**	4.8	6.4	**ES**	25.4	31.7
CZ	4.8	5.8	**US**	25.0	27.3	**ES**	5.2	7.6	**US**	26.6	36.2
SK	4.8	6.0	**EL**	30.2	22.9	**AT**	6.2	5.8	**FR**	28.6	35.2
Ø	**4.1**	**5.7**	**Ø**	**16.2**	**20.9**	**Ø**	**4.1**	**5.7**	**Ø**	**16.2**	**20.9**

Abbreviations:
TP = Tax-planning strategy; BL = Baseline scenario
AT = Austria; BE = Belgium; BG = Bulgaria; CY = Cyprus; CZ = Czech Republic; DE = Germany; DK = Denmark; EE = Estonia; EL = Greece; ES = Spain; FI = Finland; FR = France; HR = Croatia; HU = Hungary; IE = Ireland; IT = Italy; LT = Lithuania; LU = Luxembourg; LV = Latvia; MT = Malta; NL = Netherlands; PL = Poland; PT = Portugal; RO = Romania; SE = Sweden; SI = Slovenia; SK = Slovak Republic; UK = United Kingdom; US = United States

In comparison to direct cross-border outbound investments (baseline scenario), the mean CoC for outbound investments using the tax-planning strategy "Financing via Offshore treaty" is lower for all countries. This is because taxation of the marginal return cannot be completely avoided in the case of direct investments. As outlined in Chapter 3.4, both low- and high-tax countries are among the most attractive locations for parent companies with regard to direct outbound investments. For the respective high-tax countries, the most tax-efficient method of subsidiary financing is to make use of RE; for the respective low-tax countries, it is the use of

debt financing. Opposed to the baseline scenario, the most attractive MNPC locations with regard to the financing of SUBS via OFFSHORE treaty are all high-tax countries. Additionally, the CoC for outbound investments via Offshore treaty increases with a decreasing CIT rate of MNPC. The reason for this difference to the baseline results is as follows: RE financing of OFFSHORE treaty is always most attractive irrespective of MNPC's country of residence; therefore, the differences in CoC for outbound investments only depend on the tax effects of refinancing costs at the level of MNPC. The higher the CIT rate and the fewer restricted interest deductibility in the parent country is, the higher the tax advantage stemming from the deductibility of debt refinancing costs of MNPC is.

This finding can best be illustrated for MNPCs resident in countries where interest payments related to tax-exempt dividends are not deductible from the tax base (Romania, the Czech Republic, and the Slovak Republic). These countries feature the highest CoC for outbound investments under the "Financing via Offshore treaty" tax-planning strategy, as refinancing costs for debt financing of MNPC do not result in a tax advantage.

The mean CoC for inbound investments into all countries except for Austria and Spain also remain below 5%. In addition, except in the Austrian case, they remain lower than the corresponding inbound CoC for direct financing from MNPC to SUBS. Differences in the CoC for inbound investments via Offshore treaty arise because the tax effects of depreciation differ across source countries. In addition, a restricted deductibility of interest payments at the level of SUBS causes differences in the values of inbound CoC across countries. The high mean CoC for investments in Austria, which exceeds the mean CoC under optimal direct financing, stems from the application of an anti-avoidance rule. This rule denies the deduction of interest expenses from the tax base if the corresponding interest income was not subject to an effective taxation of at least 10%.

The ranking of countries according to their inbound CoC when financing the subsidiary via Offshore treaty once again differs from the ranking according to the baseline results. If the "Financing via Offshore treaty" tax-planning strategy is applied, the rank of a country according to inbound CoC values mainly indicates how beneficial the tax base regulations in this country are. Particularly high-tax countries with favorable depreciation rules and no interest deduction restrictions, such as Belgium, exhibit the lowest CoC for inbound investments. Consequently, for marginal investments, these countries are the most attractive if tax planning via Offshore treaty was used. Low-tax countries, which display the on average lowest CoC for direct inbound investments (baseline scenario), are comparatively less attractive in the case of financing the

subsidiary via Offshore treaty. Thus, if companies decided to use this tax-planning strategy, this would particularly increase the investment volume in high-tax countries with favorable depreciation rules and no interest deduction restrictions. In addition, the subsidiaries resident in countries applying comparatively high tax rates are likely to become more competitive than those located in low-tax countries.

However, differences in the CoC only arise due to different effects of tax base reductions for other profits. If there were no other profits or only other marginal profits for which the same tax planning structure is applied, and if the interest was fully deductible in the country of residence of SUBS, the CoC for marginal investments would be the same across different MNPC and SUBS locations.

The EATR results show that RE financing of OFFSHORE treaty is also the optimal strategy in the case of profitable investments. Under RE financing, dividend taxes in the country of the parent (MNPC) only apply to the return in excess of the marginal return. In contrast, CIT in the MNPC location is due on the total profit in the case of NE- and debt financing of OFFSHORE treaty.

For profitable investments, the tax reducing effect of the "Financing via Offshore treaty" tax-planning strategy is less pronounced, since only a part of the profit escapes profit taxation at the level of SUBS. Nevertheless, the EATR for outbound investments remains lower for most countries in the case of tax planning than for direct financing from MNPC to SUBS. Differently to the baseline scenario, the marginal return is tax-exempt, while the rest of the profit is taxed identically under the considered tax-planning strategy and direct financing. Only outbound investments from countries that apply the credit method to dividends received from OFFSHORE treaty but do not credit underlying CITs of lower tier group companies yield higher mean EATRs than in the baseline results. For MNPCs resident in such credit countries (here Bulgaria and Greece), the advantage of low taxation of the marginal return is overcompensated by the additional tax payments on the excess return. Unlike the case of a direct holding of SUBS by MNPC, taxes paid at the level of SUBS could not be credited in the country of MNPC if dividends were received via OFFSHORE treaty. Hence, for MNPCs resident in these two countries, shifting all profits via OFFSHORE treaty is not an attractive alternative to direct financing. However, using a financing company resident in Offshore treaty while directly holding the participation in SUBS could also reduce the EATR for investments from these countries to a level below the EATR under direct financing. This particular case is not modelled in this study.

Compared to the case of direct financing, major differences in terms of the attractiveness of countries as parent locations for profitable outbound investments result for low-tax countries that apply the credit method to dividends received from Offshore treaty but not to dividends from EU countries (such as Bulgaria, Greece, and Poland). Differences between the outbound EATRs in the case of "Financing via Offshore treaty" for countries that generally exempt dividends from taxation arise from the potential inclusion of 5% of the dividends. In addition, low-tax countries usually face slightly higher mean outbound EATRs, as more investments in countries with a high tax rate are considered when calculating the average across all subsidiary countries.

The mean EATRs for inbound investments imply that, with the exceptions of Austria and Estonia, the attractiveness of countries for profitable inbound investments of foreign investors generally increases if the "Financing via Offshore treaty" tax-planning strategy is used instead of direct financing of the investment. The lower mean EATRs are driven by the results for investments from MNPCs residing in countries that exempt foreign dividends, as well as countries that credit underlying CITs of lower tier subsidiaries. The ranking of the countries according to the mean EATR values for inbound investments (and thus the location attractiveness of countries for profitable investments) is similar to the baseline scenario. As opposed to marginal investments, the attractiveness of high-tax countries as investment locations decreases, since the negative effect of high profit taxation cancels out the advantage from high tax depreciation.

Overall, tax planning via Offshore treaty reduces the mean CoC by 1.6 percentage points (from 5.7% to 4.1%) and the mean EATR by 4.7 percentage points (from 20.9% to 16.2%). Therefore, cross-border investments are on average taxed less when financed via Offshore treaty. For marginal investments, if the "Financing via Offshore treaty" strategy is applied, high-tax countries become more attractive as a location for both parent and subsidiary companies of multinational firms. In the case of profitable investments, similarly to the baseline scenario, low-tax countries remain the on average more attractive investment locations. For MNPCs resident in countries that apply the credit method to dividends but do not credit CITs of lower tier subsidiaries, holding SUBS via OFFSHORE treaty generally incurs a higher tax burden on profitable investments than MNPC directly investing in SUBS. For Austria, the strategy is also made unattractive by the non-deductibility of the interest payments due to the low effective taxation of the interest income in Offshore treaty. Overall, this leads to the conclusion that whether this strategy results in a tax advantage (and is thus beneficial) depends on the profitability of an investment, the

taxation of dividends in the country of residence of the parent company, and the deductibility of interest in the subsidiary country.

3.5.1.2 "Financing via Offshore no treaty": Loan from OFFSHORE no treaty

In the following, the effects within the context of the "Financing via Offshore" tax-planning strategy of WHTs (on interest and dividends) and switch-over clauses for dividends on the CoC and EATR are discussed. In this variation of the tax-planning strategy, the intermediate company is resident in Offshore no treaty. Offshore no treaty does not levy any taxes on income and has not concluded tax treaties with the 28 EU member states and the US. Hence, WHTs on interest and dividends levied according to the domestic tax law in the country of residence of SUBS apply (see Chapter 3.2.3.1). In addition, switch-over clauses that trigger the inclusion of dividends in the taxable income are assumed to apply in the case of tax planning via Offshore no treaty (see Chapter 3.2.3.2). Moreover, rules that deny the deduction of interest expenses from the tax base if the interest income is tax-exempt, and which cannot be circumvented by proving economic substance of the payments, are considered under this tax-planning strategy. Such rules apply in Austria, Slovenia, and Sweden.

The first difference from the results described in Chapter 3.5.1.1 is that, if the intermediate company is resident in Offshore no treaty, tax-free shifting of the marginal return to the tax-exempt country is usually not possible. This can be attributed to the WHTs that most considered countries of residence of SUBS levy on interest payments to non-treaty countries. Moreover, the non-deductibility of interest payments in Slovenia and Sweden, which is assumed to apply only under "Financing via Offshore no treaty", further increases the tax burden of the marginal return for investments in these countries. In addition, WHTs on dividends paid from SUBS to OFFSHORE no treaty as well as the switch-over from the exemption to the credit method for dividends received by MNPC increase the tax burden of the excess return. Such rules currently apply in various EU member states.[130]

[130] Chapter B2 of the Annex contains detailed results for the tax-planning strategy "Financing via Offshore no treaty" for all parent-subsidiary-combinations.

Table 10: Mean CoC and EATR – "Financing via Offshore no treaty" (in %)

Outbound						Inbound					
CoC			EATR			CoC			EATR		
	TP	BL		TP	BL		TP	BL		TP	BL
FR	4.3	5.5	**MT**	28.4	19.6	**LU**	3.1	5.5	**CY**	19.9	15.3
BE	5.0	5.6	**DK**	29.3	20.5	**DE**	3.4	6.0	**BG**	21.5	8.8
US	5.1	5.3	**DE**	29.6	21.3	**MT**	3.4	6.0	**EE**	22.2	13.2
EL	5.5	6.3	**HR**	30.2	21.1	**NL**	3.5	5.7	**HU**	22.4	19.3
LU	5.5	5.7	**UK**	30.3	20.4	**FI**	3.8	5.7	**IE**	24.5	14.1
ES	5.5	5.8	**AT**	32.0	20.5	**HU**	4.1	5.8	**LT**	28.7	13.6
IT	5.5	5.3	**PT**	32.3	20.3	**CY**	4.1	5.6	**UK**	29.6	21.4
PT	5.6	5.7	**SK**	32.6	21.6	**IE**	4.1	5.5	**MT**	29.9	29.7
MT	5.8	5.6	**US**	33.1	27.3	**LT**	4.8	5.4	**NL**	30.5	21.9
NL	5.8	5.8	**IE**	33.9	22.2	**BG**	4.9	5.0	**LV**	30.5	14.3
AT	6.0	5.8	**ES**	34.1	20.4	**HR**	5.3	5.2	**FI**	31.2	18.5
SE	6.0	5.7	**BG**	36.1	19.3	**SE**	5.3	5.6	**HR**	31.2	16.4
DE	6.1	5.8	**CZ**	36.1	21.0	**EL**	5.3	6.0	**SK**	31.4	19.3
CZ	6.1	5.8	**LV**	37.2	20.1	**LV**	5.5	5.5	**LU**	31.9	24.2
DK	6.1	5.8	**LT**	37.3	20.1	**IE**	5.8	5.5	**EL**	34.8	25.8
PL	6.1	5.7	**SI**	37.6	20.8	**AT**	5.8	5.8	**SI**	35.3	15.5
FI	6.1	5.7	**PL**	38.2	20.5	**PL**	5.9	5.6	**PL**	35.4	17.5
HU	6.2	5.7	**CY**	38.3	20.8	**BE**	6.2	5.3	**DE**	39.7	27.1
SI	6.2	5.6	**FI**	38.7	20.5	**UK**	6.4	6.4	**SE**	41.0	19.2
UK	6.2	5.7	**HU**	38.7	20.5	**DK**	6.6	5.7	**RO**	41.2	14.8
HR	6.3	5.8	**SE**	38.8	20.5	**SI**	6.7	5.5	**AT**	41.4	22.3
CY	6.4	5.7	**RO**	39.0	20.6	**SK**	6.8	5.6	**DK**	43.1	20.9
LV	6.4	5.5	**NL**	40.2	20.5	**IT**	6.9	4.9	**ES**	45.0	31.7
IE	6.4	6.1	**IT**	40.5	19.5	**ES**	7.6	7.6	**BE**	45.5	26.7
LT	6.4	5.5	**EL**	41.3	22.9	**CZ**	8.0	5.4	**IT**	46.0	23.0
BG	6.7	5.3	**LU**	41.4	20.3	**US**	8.3	6.7	**CZ**	47.7	16.6
RO	7.0	5.6	**EE**	42.1	21.4	**PT**	8.4	5.8	**PT**	52.2	25.2
SK	7.0	6.0	**BE**	42.5	20.5	**RO**	8.9	5.5	**US**	53.2	36.2
EE	7.4	5.9	**FR**	44.8	22.7	**FR**	16.0	6.3	**FR**	67.9	35.2
Ø	**6.0**	**5.7**	**Ø**	**36.4**	**20.9**	**Ø**	**6.0**	**5.7**	**Ø**	**36.4**	**20.9**

Abbreviations:
TP = Tax-planning strategy; BL = Baseline scenario
AT = Austria; BE = Belgium; BG = Bulgaria; CY = Cyprus; CZ = Czech Republic; DE = Germany; DK = Denmark; EE = Estonia; EL = Greece; ES = Spain; FI = Finland; FR = France; HR = Croatia; HU = Hungary; IE = Ireland; IT = Italy; LT = Lithuania; LU = Luxembourg; LV = Latvia; MT = Malta; NL = Netherlands; PL = Poland; PT = Portugal; RO = Romania; SE = Sweden; SI = Slovenia; SK = Slovak Republic; UK = United Kingdom; US = United States

Table 10 shows that, for inbound investments to 9 of the 10 countries that do not levy WHTs on interest irrespective of the recipient country, the mean CoC is lower than for the "Financing via Offshore treaty" tax-planning strategy. The higher CoC for Sweden is attributable to the non-deductibility of interest payments to Offshore no treaty. Lower CoC result if any dividend taxes on distributions from SUBS to OFFSHORE no treaty and/or on distributions from OFFSHORE no treaty to MNPC are levied. This is because, in the Devereux/Griffith model,

the value of refinancing costs at the level of MNPC increases with the tax burden on the distributed return of the investment. This can be explained by tax savings from tax-deductible refinancing costs of MNPC associated with the incremental investment, which increase the company's net present value compared to the case of RE financing of MNPC. Due to this additional net present value resulting from the refinancing tax shield at the level of MNPC (which can effectively be attributed to the investment), the investor's required pre-tax rate of return decreases relative to that in the case of RE financing of MNPC. As the tax burden on returns of SUBS at the level of MNPC increases, the required pre-tax rate of return that corresponds to the additional firm value generated from tax savings associated with the deduction of refinancing costs decreases. WHTs on interest increase the CoC above the CoC under "Financing via Offshore treaty".

The EATRs for inbound investments into the countries that levy WHTs on neither interest nor on dividends (Cyprus, Estonia, Hungary, Malta) are equal to the respective EATRs for the "Financing via Offshore treaty" strategy for all parent countries that treat dividends from Offshore treaty and Offshore no treaty in the same way (Croatia, Denmark, Germany, Malta, Slovak Republic, UK, US). For profitable investments into and from all other countries, the following applies: WHTs on interest and/or dividends, as well as the higher taxation of the dividends at the level of MNPC due to the application of switch-over clauses, increase the EATR above the level of "Financing via Offshore treaty".

Marginal investments from seven high-tax countries would on average require lower CoC if tax planning via Offshore no treaty was used instead of directly investing in SUBS. As explained above, the lower mean CoC for investments from those parent countries mainly results from the relatively higher value of refinancing costs, which increases with the tax burden on dividends.

For the investment constellations where the CoC and EATR are higher than they are in the case of "Financing via Offshore treaty", whether "Financing via Offshore no treaty" yields a lower CoC and EATR than direct financing depends on the level of the WHTs on interest and dividends, as well as the level of taxation of the dividends in the parent country. On average, the CoC and especially the EATR for this strategy are higher than with optimal direct financing. The WHTs on dividends in many countries and the application of switch-over clauses for dividend taxation make tax planning for profitable outbound investments via Offshore no treaty rather unattractive. Overall, the "Financing via Offshore no treaty" tax-planning strategy is particularly advantageous for investments from countries that exempt dividends received from

Offshore no treaty into countries without WHTs on interest and dividends. On average, however, the strategy is not recommendable, as it increases the mean CoC by 0.3 percentage points (from 5.7% to 6%) and the mean EATR by 15.5 percentage points (from 20.9% to 36.4%) in comparison to the baseline results.

The "Financing via Offshore no treaty" strategy illustrates that WHTs on interest and dividends, as well as switch-over clauses for intragroup dividends, are in principle an effective tool to curb the profit-shifting activities of multinationals.[131] However, as long as intragroup payments between corporations resident in EU member states are exempt from WHTs while not all EU member states levy WHTs on payments to third countries, domestic WHTs can easily be avoided by channeling the respective payments to tax havens via other EU member states without triggering further taxation. Additionally, this strategy often allows for the avoidance of the application of switch-over clauses. To conclude, multinationals are usually able to effectively achieve the outcome of tax planning via Offshore treaty, even if their country has not established treaties with tax havens and levies high WHTs on interest payments. Therefore, the "Financing via Offshore treaty" tax-planning strategy is likely to be more relevant than the "Financing via Offshore no treaty" strategy in practice.

3.5.1.3 "Financing via Average": Loan from AVERAGE

The second tax-planning strategy involving profit shifting via interest payments considers an intermediate company resident in Average: an EU member state that applies a CIT rate of 23%.

This tax-planning strategy is only attractive for investments between countries that both have a higher tax rate than Average. If the profits at either the level of MNPC or the level of SUBS are subject to a lower income tax rate than 23%, using RE financing of SUBS or direct debt financing from MNPC results in a lower taxation of the returns. This is evidenced by the overview of mean CoC and EATRs for inbound investments in Table 11, where only high-tax countries exhibit lower mean values than in the case of direct financing.

The ranking of countries according to the results for inbound and outbound CoC and EATR for the "Financing via Average" strategy is very similar to the ranking according to the results for the case of direct financing. Tax planning via AVERAGE is only favorable for a few country combinations. Consequently, the mean CoC across all country combinations compared to the

[131] For WHTs, see also Fuest et al. (2013).

baseline scenario increases by 0.1 percentage points (from 5.7% to 5.8%) and the EATR increases by 0.7 percentage points (from 20.9% to 21.6%).[132]

Table 11: Mean CoC and EATR – "Financing via Average" (in %)

Outbound						Inbound					
CoC			EATR			CoC			EATR		
	TP	BL		TP	BL		TP	BL		TP	BL
BG	5.3	5.3	**BG**	19.4	19.3	**BE**	5.2	5.3	**BG**	11.9	8.8
IT	5.4	5.3	**IT**	19.8	19.5	**HR**	5.3	5.2	**LT**	15.2	13.6
US	5.4	5.3	**MT**	20.3	19.6	**LU**	5.4	5.5	**IE**	15.6	14.1
FR	5.6	5.5	**LV**	20.4	20.1	**CZ**	5.6	5.4	**LV**	15.9	14.3
LV	5.6	5.5	**LT**	20.4	20.1	**PT**	5.6	5.8	**RO**	16.2	14.8
LT	5.6	5.5	**RO**	20.6	20.6	**SK**	5.6	5.6	**SI**	16.6	15.5
RO	5.7	5.6	**ES**	21.1	20.4	**NL**	5.6	5.7	**CY**	16.6	15.3
MT	5.7	5.6	**PT**	21.1	20.3	**SE**	5.7	5.6	**HR**	16.8	16.4
BE	5.7	5.6	**LU**	21.2	20.3	**DK**	5.7	5.7	**CZ**	17.3	16.6
SI	5.7	5.6	**HU**	21.2	20.5	**MT**	5.7	6.0	**PL**	18.1	17.5
PL	5.9	5.7	**PL**	21.2	20.5	**AT**	5.8	5.8	**FI**	18.9	18.5
HU	5.9	5.7	**CZ**	21.3	21.0	**SI**	5.8	5.5	**SE**	19.4	19.2
CZ	5.9	5.8	**UK**	21.3	20.4	**LT**	5.8	5.4	**SK**	19.4	19.3
CY	5.9	5.7	**SI**	21.3	20.8	**PL**	5.8	5.6	**EE**	19.9	13.2
ES	5.9	5.8	**CY**	21.3	20.8	**BG**	5.8	5.0	**HU**	19.9	19.3
UK	5.9	5.7	**BE**	21.3	20.5	**IT**	5.8	4.9	**DK**	20.8	20.9
PT	5.9	5.7	**EE**	21.4	21.4	**FI**	5.8	5.7	**NL**	21.6	21.9
EE	5.9	5.9	**FI**	21.4	20.5	**RO**	5.8	5.5	**UK**	21.8	21.4
LU	5.9	5.7	**HR**	21.5	21.1	**EL**	5.8	6.0	**AT**	22.1	22.3
FI	5.9	5.7	**SE**	21.7	20.5	**IE**	5.9	5.5	**LU**	23.6	24.2
HR	5.9	5.8	**AT**	21.7	20.5	**DE**	5.9	6.0	**PT**	24.6	25.2
DE	5.9	5.8	**NL**	21.8	20.5	**LV**	5.9	5.5	**EL**	25.2	25.8
SE	6.0	5.7	**SK**	21.9	21.6	**CY**	5.9	5.6	**IT**	26.1	23.0
AT	6.0	5.8	**DK**	22.0	20.5	**HU**	6.0	5.8	**BE**	26.5	26.7
NL	6.0	5.8	**DE**	22.1	21.3	**FR**	6.0	6.3	**DE**	26.7	27.1
SK	6.0	6.0	**EL**	23.2	22.9	**EE**	6.1	4.4	**MT**	29.0	29.7
DK	6.1	5.8	**IE**	23.2	22.2	**US**	6.3	6.7	**ES**	31.1	31.7
IE	6.4	6.1	**FR**	23.4	22.7	**UK**	6.6	6.4	**FR**	34.5	35.2
EL	6.5	6.3	**US**	27.7	27.3	**ES**	7.5	7.6	**US**	35.3	36.2
Ø	**5.8**	**5.7**	**Ø**	**21.6**	**20.9**	**Ø**	**5.8**	**5.7**	**Ø**	**21.6**	**20.9**

Abbreviations:
TP = Tax-planning strategy; BL = Baseline scenario
AT = Austria; BE = Belgium; BG = Bulgaria; CY = Cyprus; CZ = Czech Republic; DE = Germany; DK = Denmark; EE = Estonia; EL = Greece; ES = Spain; FI = Finland; FR = France; HR = Croatia; HU = Hungary; IE = Ireland; IT = Italy; LT = Lithuania; LU = Luxembourg; LV = Latvia; MT = Malta; NL = Netherlands; PL = Poland; PT = Portugal; RO = Romania; SE = Sweden; SI = Slovenia; SK = Slovak Republic; UK = United Kingdom; US = United States

[132] The detailed results for the "Financing via Average" strategy for all country combinations are included in Chapter B3 of the Annex.

3.5.1.4 Tax-Planning Strategies 3 and 4: Hybrid loan

For Tax-Planning Strategies 3 and 4, it is assumed that the loan given to SUBS by OFFSHORE treaty, OFFSHORE no treaty, and AVERAGE is categorized as equity capital in the respective countries. Meanwhile the countries of residence of SUBS consider the loan to be debt capital.

This hybrid classification of the loan does not change the CoC and EATR results calculated for the "Financing via Offshore treaty" or "Financing via Offshore no treaty" strategies, under which the intermediate company is resident in a country that taxes neither dividends nor interest. Since Offshore treaty and Offshore no treaty do not levy CITs on either type of income, it is irrelevant whether the remunerations resulting from the loan are treated as dividends or interest.

However, differences arise if tax planning via the intermediate company AVERAGE is considered. The mean values across all parent-subsidiary combinations for this tax-planning strategy are summarized in Table 12.[133]

If AVERAGE granted a hybrid loan to SUBS, the interest would be deductible from the tax base of SUBS while it would be taxed as dividends at the level of AVERAGE. In the average country, intragroup dividends are assumed to be tax-exempt. Therefore, using the "Hybrid financing via Average" strategy, non-taxation of the marginal return is achieved. The results are thus very similar to Tax-Planning Strategy 1: "Financing via Offshore treaty". However, since AVERAGE is an EU country that levies taxes at a rate of 23% on other income, several advantages arise compared to Tax-Planning Strategy 1. Firstly, Bulgaria, Greece, and Poland apply the credit method for dividends received by non-EU countries such as Offshore treaty, while they exempt dividends received from related companies that are resident in the EU. Therefore, for these countries, the mean EATRs for outbound investments are significantly lower using the "Hybrid financing via Average" strategy than using Tax-Planning Strategy 1. Moreover, debt financing of AVERAGE offers additional tax-saving potential for MNPCs resident in countries with a lower tax rate than that of Average. While the interest payments made to MNPC reduce other taxable profits of AVERAGE, the corresponding interest income is taxed at a lower rate at the level of MNPC. Consequently, the CoC and EATRs for outbound investments are either lower than or virtually equal to the CoC and EATRs in the case of "Financing via Offshore treaty". Slightly higher mean CoC and EATRs are driven by the higher WHTs on

[133] Chapter B4 of the Annex includes the detailed results for the "Hybrid financing via Average" tax-planning strategy.

interest and dividend payments from the US to Average and from Average to the US. In the case of outbound investments from Greece, the higher CoC for the "Hybrid financing via Average" strategy than the "Financing via Offshore treaty" strategy is caused both by a different treatment of dividends and, in particular, by a different treatment of related refinancing costs at the level of the parent company in the two scenarios. Regarding inbound investments, the mean CoC and EATRs are almost all below those for Tax-Planning Strategy 1. The only exception is inbound investments to the US due to the higher WHTs on interest and dividends in the case of "Hybrid financing via Average".

Table 12: Mean CoC and EATR – "Hybrid financing via Average" (in %)

Outbound						**Inbound**					
CoC			**EATR**			**CoC**			**EATR**		
	TP	**BL**		**TP**	**BL**		**TP**	**BL**		**TP**	**BL**
US	3.0	5.3	**BG**	11.8	19.3	**BE**	2.8	5.3	**BG**	4.3	8.8
BG	3.3	5.3	**IT**	12.3	19.5	**LU**	3.1	5.5	**LT**	7.6	13.6
IT	3.3	5.3	**MT**	12.6	19.6	**FR**	3.2	6.3	**IE**	7.9	14.1
LV	3.6	5.5	**LV**	12.8	20.1	**MT**	3.2	6.0	**LV**	8.2	14.3
LT	3.6	5.5	**LT**	12.8	20.1	**HR**	3.3	5.2	**RO**	8.5	14.8
FR	3.6	5.5	**RO**	13.0	20.6	**PT**	3.3	5.8	**SI**	8.9	15.5
RO	3.6	5.6	**ES**	13.4	20.4	**NL**	3.5	5.7	**CY**	8.9	15.3
MT	3.7	5.6	**PT**	13.5	20.3	**IT**	3.5	4.9	**HR**	9.2	16.4
SI	3.7	5.6	**LU**	13.5	20.3	**SK**	3.5	5.6	**CZ**	9.6	16.6
BE	3.7	5.6	**HU**	13.6	20.5	**DE**	3.6	6.0	**PL**	10.4	17.5
PL	3.8	5.7	**PL**	13.6	20.5	**EL**	3.6	6.0	**FI**	11.4	18.5
HU	3.8	5.7	**CZ**	13.6	21.0	**DK**	3.6	5.7	**SE**	11.7	19.2
CY	3.8	5.7	**UK**	13.7	20.4	**CZ**	3.6	5.4	**SK**	11.7	19.3
CZ	3.8	5.8	**CY**	13.7	20.8	**SE**	3.6	5.6	**EE**	12.2	13.2
UK	3.9	5.7	**SI**	13.8	20.8	**PL**	3.8	5.6	**HU**	12.2	19.3
ES	3.9	5.8	**EE**	13.8	21.4	**SI**	3.8	5.5	**DK**	13.1	20.9
PT	3.9	5.7	**FI**	13.8	20.5	**FI**	3.9	5.7	**NL**	13.9	21.9
EE	3.9	5.9	**AT**	13.8	20.5	**LT**	3.9	5.4	**UK**	14.1	21.4
FI	3.9	5.7	**BE**	13.8	20.5	**RO**	3.9	5.5	**LU**	15.9	24.2
LU	3.9	5.7	**HR**	13.9	21.1	**HU**	4.0	5.8	**PT**	16.9	25.2
HR	3.9	5.8	**SE**	14.1	20.5	**IE**	4.0	5.5	**EL**	17.4	25.8
DE	3.9	5.8	**NL**	14.1	20.5	**CY**	4.0	5.6	**IT**	18.4	23.0
AT	3.9	5.8	**SK**	14.2	21.6	**BG**	4.0	5.0	**BE**	18.7	26.7
SE	4.0	5.7	**DK**	14.3	20.5	**LV**	4.0	5.5	**DE**	18.9	27.1
NL	4.0	5.8	**DE**	14.6	21.3	**EE**	4.0	4.4	**MT**	21.2	29.7
SK	4.0	6.0	**EL**	15.6	22.9	**US**	4.2	6.7	**AT**	23.0	22.3
DK	4.1	5.8	**FR**	16.3	22.7	**UK**	4.5	6.4	**ES**	23.4	31.7
IE	4.3	6.1	**IE**	18.1	22.2	**ES**	4.8	7.6	**FR**	26.6	35.2
EL	4.4	6.3	**US**	25.1	27.3	**AT**	5.9	5.8	**US**	29.0	36.2
Ø	**3.8**	**5.7**	**Ø**	**14.3**	**20.9**	**Ø**	**3.8**	**5.7**	**Ø**	**14.3**	**20.9**

Abbreviations:
TP = Tax-planning strategy; BL = Baseline scenario
AT = Austria; BE = Belgium; BG = Bulgaria; CY = Cyprus; CZ = Czech Republic; DE = Germany; DK = Denmark; EE = Estonia; EL = Greece; ES = Spain; FI = Finland; FR = France; HR = Croatia; HU = Hungary; IE = Ireland; IT = Italy; LT = Lithuania; LU = Luxembourg; LV = Latvia; MT = Malta; NL = Netherlands; PL = Poland; PT = Portugal; RO = Romania; SE = Sweden; SI = Slovenia; SK = Slovak Republic; UK = United Kingdom; US = United States

In conclusion, of the different strategies using profit shifting via interest payments, tax planning through a financing company resident in Average granting a hybrid loan to SUBS is on average the most attractive strategy for investments from and to the 29 countries considered. In comparison to direct financing, it reduces the mean CoC by 1.9 percentage points (from 5.7% to 3.8%) and the EATR by 6.6 percentage points (from 20.9% to 14.3%). Using both this tax-planning strategy and tax planning via Offshore treaty results in very low CoC and EATRs and increases the attractiveness of cross-border investments in general. Comparing the ranking of countries with regard to CoC under both tax-planning strategies to the country ranking in the baseline scenario, high-tax countries become relatively more attractive as both parent and subsidiary locations, while the relative attractiveness of low-tax countries decreases for marginal investments. The inbound EATRs for the two most favorable tax-planning strategies indicate that the relative attractiveness of different investment locations remains largely unaffected for profitable investments (compared to direct investments from MNPC to SUBS).

3.5.2 Profit shifting via royalty payments

As well as profit shifting via interest payments, profit shifting via royalty payments plays an important role in international tax planning. Tax-Planning Strategies 5-7 deal with this opportunity. All three IP tax-planning strategies share the characteristics that an IP company invests in an intangible asset while SUBS invests in the remaining four assets considered in the Devereux/Griffith model (buildings, machinery, inventories, and financial assets). SUBS licenses the intangible asset from the IP company and generates income from its use. For the licensing arrangement, royalties are paid from SUBS to the IP company. The IP company can either be resident in Offshore treaty, Offshore no treaty, Average, or any of the 11 EU member states that had an IP-box regime in place in 2015.

The tax-planning strategies based on intercompany financing only allow for shifting the marginal return via interest payments to the financing company. For IP tax planning, this study assumes that the total profits earned from the use of the intangible can be shifted to the IP company via royalty payments. The returns generated from the use of the other four assets are not reduced by the royalty payments. This assumption is made to simulate the highest theoretically acceptable arm's length price of the royalty payment. It takes account of the fact that most countries apply the arm's length principle, which requires royalty payments between related persons to be priced at a level comparable to similar royalty payments made between

unrelated parties.[134] Concerning licensing arrangements between unrelated parties, it seems reasonable to assume that the maximum price a company is willing to pay for an intangible is the share of profit that this intangible contributes to the company's total profit. However, finding comparable transactions between unrelated companies is particularly difficult for intangible property that is often unique in its features, which results in considerable leeway when defining the arm's length price.[135] Moreover, the tax-planning strategies of multinational corporations presented in Chapter 2.1 indicate that companies with valuable intangibles are especially able to shift large parts of their profits to low-tax entities. To account for this, in addition to the results for an investment in all five assets, CoC and EATRs are also provided for the case where IP is the only productive asset the multinational invests in and total profits of SUBS can thus be shifted via royalty payments.[136]

3.5.2.1 "IP tax planning via Offshore treaty"

Similarly to the "Financing via Offshore treaty" strategy, the first IP tax planning case assumes the IP company (IPOFFSHORE treaty) to be resident in Offshore treaty.

In the case the multinational only invests in an intangible asset, the results for marginal investments will be comparable to those under Tax-Planning Strategy 1 ("Financing via Offshore treaty"), since, in both cases, the marginal return is shifted to the country Offshore treaty, where it remains untaxed. Hence, in line with the findings for Tax-Planning Strategy 1, it is always most tax-efficient to finance IPOFFSHORE treaty with RE. Table 13 lists mean CoC and EATRs for all countries averaged over all possible parent-subsidiary combinations for an investment in the intangible asset by IPOFFSHORE treaty.[137]

Consistent with the results for Tax-Planning Strategy 1, the mean CoC usually amount to 5% or less for cross-border investments. The only exception is investments to Austria, where royalty payments are not deductible from the tax base if the corresponding royalty income is subject to an effective taxation of less than 10%. Deviations from the results for Tax-Planning Strategy 1 are due to the missing tax advantage from depreciation of the intangible asset, as the asset is owned by OFFSHORE treaty, which is not subject to income taxation. Since there is no

[134] For an overview of the application of the arm's length principle, see Zinn et al. (2014).
[135] See also Owens (2013), p. 443.
[136] In Chapter C of the Annex, the CoC and EATRs are reported separately for the investment in the four assets at the level of SUBS (Chapter C2 of the Annex) and the investment in the intangible asset at the level of the IP company (Chapter C1 of the Annex). In the following subchapters, separate tables summarize the combined mean values for cross-border investments in all five assets.
[137] The detailed results for an investment in an intangible conducted via OFFSHORE treaty are included in Chapter C1-1 of the Annex.

tax base reducing effect, the inbound CoC are the same (i.e. 4.5%) for all countries except Austria. This implies that in the case of "IP tax planning via Offshore treaty", taxes do not influence the investor's decision as to the location where the intangible is used to generate profits, if royalty payments are deductible in the residence country of SUBS. The same also holds true for purely domestic investments, where SUBS and MNPC are located in the same country but IP is licensed from IPOFFSHORE treaty. Hence, capital export neutrality[138] will apply with respect to the location of the use of intangibles in the production process if the "IP tax planning via Offshore treaty" strategy is used.

Table 13: Mean CoC and EATR – "IP tax planning via Offshore treaty" – Intangible (in %)

Outbound				Inbound			
CoC		EATR		CoC		EATR	
US	3.8	**AT**	-3.0	**CZ**	4.5	**US**	-0.2
EL	4.2	**MT**	-2.7	**EE**	4.5	**EL**	-0.1
FR	4.3	**PT**	-2.0	**RO**	4.5	**PL**	0.2
MT	4.4	**LU**	-2.0	**SK**	4.5	**IE**	0.3
BE	4.4	**ES**	-1.8	**BG**	4.5	**BG**	0.4
AT	4.4	**NL**	-1.5	**CY**	4.5	**FR**	0.6
PT	4.5	**BE**	-1.3	**IE**	4.5	**CZ**	0.6
LU	4.5	**DK**	-1.3	**LT**	4.5	**EE**	0.6
IT	4.5	**SE**	-1.0	**LV**	4.5	**RO**	0.6
ES	4.6	**FI**	-0.9	**SI**	4.5	**SK**	0.6
DE	4.6	**HR**	-0.9	**HU**	4.5	**SI**	0.6
NL	4.6	**UK**	-0.9	**FI**	4.5	**CY**	0.6
DK	4.7	**IT**	-0.8	**HR**	4.5	**LT**	0.7
PL	4.7	**HU**	-0.7	**UK**	4.5	**LV**	0.7
SE	4.7	**DE**	-0.6	**SE**	4.5	**DE**	0.7
FI	4.7	**LT**	-0.2	**PL**	4.5	**HU**	0.7
HR	4.7	**LV**	-0.2	**DK**	4.5	**IT**	0.7
UK	4.7	**CY**	0.1	**NL**	4.5	**UK**	0.7
HU	4.8	**SI**	0.1	**DE**	4.5	**FI**	0.7
SI	4.8	**CZ**	1.6	**ES**	4.5	**HR**	0.7
LT	4.9	**EE**	1.6	**IT**	4.5	**SE**	0.7
LV	4.9	**RO**	1.6	**LU**	4.5	**DK**	0.7
IE	4.9	**SK**	1.6	**PT**	4.5	**BE**	0.7
CY	4.9	**FR**	2.1	**BE**	4.5	**NL**	0.7
BG	5.0	**BG**	7.7	**MT**	4.5	**ES**	0.7
CZ	5.2	**IE**	9.2	**FR**	4.5	**LU**	0.7
EE	5.2	**PL**	13.2	**EL**	4.5	**PT**	0.7
RO	5.2	**EL**	19.3	**US**	4.5	**MT**	0.7
SK	5.2	**US**	22.7	**AT**	11.1	**AT**	43.0
Ø	**4.7**	**Ø**	**2.0**	**Ø**	**4.7**	**Ø**	**2.0**

Abbreviations:
AT = Austria; BE = Belgium; BG = Bulgaria; CY = Cyprus; CZ = Czech Republic; DE = Germany; DK = Denmark; EE = Estonia; EL = Greece; ES = Spain; FI = Finland; FR = France; HR = Croatia; HU = Hungary; IE = Ireland; IT = Italy; LT = Lithuania; LU = Luxembourg; LV = Latvia; MT = Malta; NL = Netherlands; PL = Poland; PT = Portugal; RO = Romania; SE = Sweden; SI = Slovenia; SK = Slovak Republic; UK = United Kingdom; US = United States

[138] The principle of capital export neutrality requires domestic and foreign investments to be taxed equally. For this and alternative economic neutrality concepts, see Endres/Spengel (2015), pp. 19-36; Spengel (2013); Schön (2009), pp. 78-84.

Different CoC for outbound investments across countries result from different tax consequences of refinancing MNPC. The higher the value of the tax savings from interest deduction at the level of MNPC is, the lower the outbound CoC is. Due to a lack of tax advantages from depreciation, the CoC for inbound and outbound investments are slightly higher than that of Tax-Planning Strategy 1.

As opposed to cross-border tax-planning strategies using debt financing, the model assumes that total profits (i.e. IP profits including economic rents that are attributed to the usage of the intangible) can be shifted under tax planning with IP. Thus, considering only the investment in the intangible, the resulting EATRs lie notably below their counterparts resulting from debt financing of the subsidiary via Offshore treaty (Tax-Planning Strategy 1).

Outbound investments from countries that fully exempt dividends from taxation whilst applying high CIT rates that result in high tax savings from deductible refinancing costs of MNPC yield the lowest EATR. The advantages stemming from the deductibility of refinancing costs even lead to negative outbound EATRs for investments from most countries. This implies that the investments do not trigger any tax payments but are instead subsidized by tax savings. Outbound investments to all countries except Austria and from jurisdictions that forbid the deduction of refinancing costs related to tax-exempt dividends (e.g. the Slovak Republic, Romania) feature an EATR of 0%. For MNPCs resident in credit countries that fully tax received dividends, outbound investments yield the highest EATR. It follows that those countries become the least attractive parent company locations in the case of "IP tax planning via Offshore treaty".

For profitable investments, the decision on the location of SUBS that uses the intangible to generate profits is also generally unaffected by taxation. Differences in the mean EATR for inbound investments in intangibles only arise due to a different composition of included parent countries in the calculation of the mean values. For Austria, the inbound EATRs are far higher than for the remaining subsidiary locations, which is a result of the non-deductibility of royalty payments from the tax base.

Overall, the comparison shows that, for profitable investments in intangibles, using an IP company in Offshore treaty and shifting profits via royalty payments to the tax-exempt country may result in tax burdens close to zero. This is the case when profits are not subject to high dividend taxation in the parent country and royalty payments are deductible in the residence country of SUBS. Therefore, for companies with valuable intangibles that are of outstanding importance

to profit generation, tax planning via royalties offers far higher tax savings than tax planning via interest payments.

For companies that do not solely rely on intangibles but instead derive profits from a combination of several assets, the CoC and EATR calculated for the combined investment in all five assets (as in the case of tax planning with interest payments and in the baseline scenario) are more relevant. As SUBS invests in the remaining four assets, the tax-efficient financing strategy for the investment in these assets depends on the relative tax rate difference between the country of residence of MNPC and the country of residence of SUBS. To illustrate the combined effect of the tax-planning strategy in the case of an investment in an asset mix, the results for optimally financing SUBS and optimally financing IPOFFSHORE treaty are weighted by 0.8 and 0.2. This is in line with the basic assumptions of the model defined in Chapter 3.1. Table 14 provides the resulting mean values for all investment combinations between the 29 countries considered.

As the marginal returns of the remaining four assets are subject to tax either at the level of SUBS (RE- or NE financing of SUBS) or the level of MNPC (debt financing of SUBS) and hence do not remain completely untaxed, the overall mean values for inbound and outbound CoC are higher than for the "Financing via Offshore treaty" strategy. Nevertheless, the effect of the low taxation of profits from IP still reduces the mean CoC by 0.1 percentage points (from 5.7% to 5.6%) compared to an investment of SUBS in all assets directly financed by MNPC (baseline results).

For profitable outbound investments in an asset mix, using "IP tax planning via Offshore treaty" as opposed to "Financing via Offshore treaty" either increases or decreases the EATR. Independently, the mean EATRs for outbound investments always remain below those for direct investments. For countries that apply the exemption method to foreign dividends, the EATRs will be lower if the "Financing via Offshore treaty" strategy is used, since this involves a larger share of total profits (the marginal return of all five assets) being shifted to the tax-exempt country. For credit countries that do not permit the crediting of underlying CITs of lower tier subsidiaries, the EATRs will be lower if "IP tax planning via Offshore treaty" is applied. This is due to the lack of double taxation avoidance in Tax-Planning Strategy 1, where profits above the marginal return are fully taxed at the level of both SUBS and MNPC. This negative effect overcompensates the advantage of a larger share of total profits that is tax-exempt at the level of OFFSHORE treaty under the "Financing via Offshore treaty" strategy.

Table 14: Mean CoC and EATR – "IP tax planning via Offshore treaty" – All assets (in %)

Outbound						Inbound					
CoC			EATR			CoC			EATR		
	TP	BL		TP	BL		TP	BL		TP	BL
US	5.0	5.3	**MT**	15.4	19.6	**EE**	4.4	4.4	**BG**	7.2	8.8
IT	5.2	5.3	**IT**	15.7	19.5	**BG**	4.9	5.0	**EE**	10.7	13.2
BG	5.3	5.3	**PT**	16.1	20.3	**IT**	5.1	4.9	**LT**	11.6	13.6
FR	5.3	5.5	**AT**	16.1	20.5	**HR**	5.1	5.2	**IE**	11.9	14.1
BE	5.4	5.6	**LU**	16.2	20.3	**SI**	5.3	5.5	**LV**	11.9	14.3
MT	5.4	5.6	**LV**	16.3	20.1	**CZ**	5.3	5.4	**RO**	12.3	14.8
LV	5.5	5.5	**LT**	16.3	20.1	**LT**	5.3	5.4	**SI**	12.4	15.5
LT	5.5	5.5	**ES**	16.3	20.4	**IE**	5.3	5.5	**CY**	13.3	15.3
SI	5.5	5.6	**BE**	16.4	20.5	**RO**	5.4	5.5	**CZ**	13.6	16.6
PL	5.6	5.7	**NL**	16.4	20.5	**LV**	5.4	5.5	**HR**	13.6	16.4
AT	5.6	5.8	**UK**	16.4	20.4	**LU**	5.4	5.5	**PL**	14.4	17.5
PT	5.6	5.7	**DK**	16.4	20.5	**SK**	5.4	5.6	**FI**	14.9	18.5
UK	5.6	5.7	**SE**	16.5	20.5	**FI**	5.5	5.7	**SE**	15.8	19.2
LU	5.6	5.7	**FI**	16.5	20.5	**PT**	5.5	5.8	**SK**	15.9	19.3
HU	5.6	5.7	**HU**	16.6	20.5	**SE**	5.5	5.6	**HU**	16.0	19.3
FI	5.6	5.7	**CY**	16.9	20.8	**PL**	5.5	5.6	**UK**	17.8	21.4
DK	5.6	5.8	**SI**	17.0	20.8	**BE**	5.5	5.3	**DK**	17.8	20.9
SE	5.6	5.7	**HR**	17.0	21.1	**CY**	5.5	5.6	**NL**	18.1	21.9
NL	5.6	5.8	**RO**	17.1	20.6	**NL**	5.6	5.7	**IT**	19.3	23.0
DE	5.6	5.8	**DE**	17.2	21.3	**MT**	5.7	6.0	**LU**	19.8	24.2
ES	5.6	5.8	**BG**	17.3	19.3	**HU**	5.7	5.8	**PT**	20.1	25.2
CY	5.6	5.7	**CZ**	17.4	21.0	**DK**	5.7	5.7	**EL**	20.6	25.8
RO	5.6	5.6	**EE**	17.7	21.4	**EL**	5.7	6.0	**DE**	22.3	27.1
HR	5.7	5.8	**SK**	17.9	21.6	**DE**	5.9	6.0	**BE**	22.8	26.7
CZ	5.8	5.8	**FR**	18.8	22.7	**US**	6.1	6.7	**MT**	23.8	29.7
EE	5.9	5.9	**PL**	19.4	20.5	**UK**	6.2	6.4	**ES**	24.5	31.7
SK	5.9	6.0	**IE**	19.8	22.2	**FR**	6.3	6.3	**AT**	26.4	22.3
IE	5.9	6.1	**EL**	22.5	22.9	**ES**	6.6	7.6	**US**	28.4	36.2
EL	6.0	6.3	**US**	26.6	27.3	**AT**	6.9	5.8	**FR**	29.1	35.2
Ø	**5.6**	**5.7**	**Ø**	**17.5**	**20.9**	**Ø**	**5.6**	**5.7**	**Ø**	**17.5**	**20.9**

Abbreviations:
TP = Tax-planning strategy; BL = Baseline scenario
AT = Austria; BE = Belgium; BG = Bulgaria; CY = Cyprus; CZ = Czech Republic; DE = Germany; DK = Denmark; EE = Estonia; EL = Greece; ES = Spain; FI = Finland; FR = France; HR = Croatia; HU = Hungary; IE = Ireland; IT = Italy; LT = Lithuania; LU = Luxembourg; LV = Latvia; MT = Malta; NL = Netherlands; PL = Poland; PT = Portugal; RO = Romania; SE = Sweden; SI = Slovenia; SK = Slovak Republic; UK = United Kingdom; US = United States

Overall, the outbound EATRs considering all five assets for "IP tax planning via Offshore treaty" vary less between different parent countries than those calculated for the "Financing via Offshore treaty" strategy. The ranking of the attractiveness of different countries as investment locations for profitable investments changes only slightly compared to the baseline scenario and Tax-Planning Strategy 1. In all three cases, the level of taxation in the source country remains decisive for profitable investments. Nevertheless, the mean EATR decreases by 3.4 percentage points (from 20.9% to 17.5%) compared to the baseline scenario, making investments

into 28 of the 29 countries more attractive when IP tax planning via Offshore treaty is used. Even lower CoC and EATRs could be achieved if the "IP tax planning via Offshore treaty" and "Financing via Offshore treaty" strategies were combined.

3.5.2.2 "IP tax planning via Offshore no treaty"

While profits can be shifted to Offshore treaty via royalty payments without triggering tax consequences, most countries levy WHTs on royalty payments to Offshore no treaty. Consequently, "IP tax planning via Offshore no treaty" is most beneficial for inbound investments into the four countries that do not levy WHTs on royalties, i.e. Hungary, Malta, Luxembourg, and the Netherlands. Table 15 illustrates this result. The latter countries are particularly attractive for IP-intensive multinational corporations, as royalty payments remain untaxed irrespective of the recipient country. The higher the WHT on royalties is, the higher the CoC and EATR, and consequently the less attractive "IP tax planning via Offshore no treaty" for an investment into the respective country, become.

In addition, the full taxation of dividends received from Offshore no treaty in many EU member states due to switch-over clauses reduces the advantage of profit shifting via royalties for profitable investments. Thus, the most attractive parent locations for profitable investments under the "IP tax planning via Offshore no treaty" strategy are countries that generally exempt dividends and do not apply a switch-over clause to dividends from passive or low-taxed income.

For an investment in the intangible only, the CoC and EATRs are exceptionally high for some countries (see Table 16). These high CoC and EATRs result from the combination of WHTs levied on the total incoming cash flow (including the remuneration for economic depreciation) and the missing tax saving from depreciation of the intangible, which is held in the tax-exempt country Offshore treaty. For profitable inbound investments into the two countries levying the highest WHT rates on royalties (France and Romania), this interaction reduces the post-tax net present value of the investment in the intangible to below zero. In the case of France, taxation reduces the cash inflows resulting from the investments in the intangible to less than the value required for reinvestment due to economic depreciation, which yields a mean EATR for inbound investments into France of above 100%.[139]

[139] For the detailed results for an investment in an intangible using IP tax planning via Offshore no treaty, see Chapter C1-2 of the Annex.

Table 15: Mean CoC and EATR – "IP tax planning via Offshore no treaty" – All assets (in %)

Outbound						Inbound					
CoC			EATR			CoC			EATR		
	TP	BL		TP	BL		TP	BL		TP	BL
FR	6.2	5.5	**MT**	22.7	19.6	**EE**	4.8	4.4	**BG**	12.1	8.8
US	6.4	5.3	**DK**	23.4	20.5	**BG**	5.4	5.0	**EE**	15.5	13.2
IT	6.5	5.3	**UK**	23.5	20.4	**LU**	5.4	5.5	**LT**	16.5	13.6
BE	6.6	5.6	**BG**	23.7	19.3	**NL**	5.5	5.7	**HU**	18.1	19.3
BG	6.7	5.3	**HR**	24.1	21.1	**MT**	5.6	6.0	**LV**	18.2	14.3
MT	6.8	5.6	**DE**	24.2	21.3	**HU**	5.6	5.8	**CY**	18.2	15.3
LV	6.9	5.5	**PT**	24.5	20.3	**LT**	5.7	5.4	**SI**	18.7	15.5
PT	6.9	5.7	**LV**	24.6	20.1	**SI**	5.9	5.5	**IE**	19.6	14.1
LT	6.9	5.5	**AT**	24.6	20.5	**CY**	5.9	5.6	**NL**	20.2	21.9
LU	6.9	5.7	**LT**	24.6	20.1	**LV**	6.1	5.5	**HR**	21.3	16.4
SI	6.9	5.6	**IT**	24.6	19.5	**HR**	6.1	5.2	**LU**	21.9	24.2
PL	6.9	5.7	**SK**	24.7	21.6	**IT**	6.2	4.9	**PL**	22.2	17.5
ES	6.9	5.8	**RO**	25.0	20.6	**IE**	6.3	5.5	**FI**	22.6	18.5
RO	6.9	5.6	**CZ**	25.0	21.0	**FI**	6.4	5.7	**SE**	23.9	19.2
SE	6.9	5.7	**PL**	25.1	20.5	**PL**	6.5	5.6	**UK**	25.5	21.4
FI	6.9	5.7	**FI**	25.1	20.5	**AT**	6.5	5.8	**AT**	25.6	22.3
UK	6.9	5.7	**ES**	25.2	20.4	**SE**	6.5	5.6	**CZ**	25.7	16.6
NL	7.0	5.8	**SE**	25.2	20.5	**DE**	6.6	6.0	**MT**	26.0	29.7
DK	7.0	5.8	**HU**	25.3	20.5	**EL**	6.7	6.0	**DK**	26.9	20.9
AT	7.0	5.8	**SI**	25.3	20.8	**BE**	6.8	5.3	**IT**	27.6	23.0
HU	7.0	5.7	**CY**	25.3	20.8	**DK**	7.0	5.7	**SK**	28.0	19.3
CZ	7.0	5.8	**NL**	25.5	20.5	**UK**	7.2	6.4	**EL**	28.4	25.8
DE	7.0	5.8	**LU**	25.6	20.3	**CZ**	7.4	5.4	**DE**	28.8	27.1
CY	7.0	5.7	**BE**	25.7	20.5	**SK**	7.5	5.6	**RO**	29.0	14.8
HR	7.0	5.8	**IE**	26.1	22.2	**PT**	7.6	5.8	**BE**	31.8	26.7
SK	7.3	6.0	**EE**	26.6	21.4	**US**	7.8	6.7	**PT**	32.2	25.2
EL	7.3	6.3	**EL**	27.5	22.9	**ES**	7.9	7.6	**ES**	33.3	31.7
IE	7.3	6.1	**FR**	27.6	22.7	**RO**	9.3	5.5	**US**	39.2	36.2
EE	7.3	5.9	**US**	30.4	27.3	**FR**	18.1	6.3	**FR**	53.6	35.2
Ø	**6.9**	**5.7**	**Ø**	**25.2**	**20.9**	**Ø**	**6.9**	**5.7**	**Ø**	**25.2**	**20.9**

Abbreviations:
TP = Tax-planning strategy; BL = Baseline scenario
AT = Austria; BE = Belgium; BG = Bulgaria; CY = Cyprus; CZ = Czech Republic; DE = Germany; DK = Denmark; EE = Estonia; EL = Greece; ES = Spain; FI = Finland; FR = France; HR = Croatia; HU = Hungary; IE = Ireland; IT = Italy; LT = Lithuania; LU = Luxembourg; LV = Latvia; MT = Malta; NL = Netherlands; PL = Poland; PT = Portugal; RO = Romania; SE = Sweden; SI = Slovenia; SK = Slovak Republic; UK = United Kingdom; US = United States

A comparison of the results for "IP tax planning via Offshore no treaty" with the baseline scenario shows that investing in intangibles in a tax-exempt country and licensing them to a foreign subsidiary is only an attractive tax-planning strategy if no or low WHTs are levied in the subsidiary country.

Table 16: Mean CoC and EATR – "IP tax planning via Offshore no treaty" – Intangible (in %)

Outbound				Inbound			
CoC		EATR		CoC		EATR	
FR	8.6	**DK**	33.7	**HU**	4.3	**LU**	11.2
BE	10.6	**MT**	33.9	**NL**	4.3	**NL**	11.3
US	10.7	**DE**	34.4	**MT**	4.3	**HU**	11.4
EL	11.0	**HR**	34.4	**LU**	4.4	**MT**	12.0
PT	11.0	**UK**	34.4	**EE**	6.5	**EE**	24.9
IT	11.0	**SK**	35.9	**BG**	6.5	**CY**	25.0
ES	11.1	**AT**	39.1	**CY**	6.5	**LT**	25.1
LU	11.1	**CZ**	39.5	**LT**	6.5	**BG**	25.1
MT	11.3	**PT**	39.8	**LV**	7.8	**SI**	31.9
CZ	11.4	**BG**	40.0	**SI**	7.8	**LV**	32.0
NL	11.4	**IE**	40.6	**DE**	8.1	**DE**	33.4
SE	11.4	**LV**	41.0	**IE**	9.3	**EL**	38.8
AT	11.4	**LT**	41.3	**HR**	9.3	**FI**	38.9
DE	11.5	**RO**	41.4	**UK**	9.3	**PL**	38.9
DK	11.5	**SI**	41.5	**PL**	9.3	**IE**	39.1
FI	11.5	**US**	41.6	**FI**	9.3	**AT**	39.1
PL	11.5	**PL**	41.8	**AT**	9.3	**HR**	39.2
HR	11.7	**FI**	42.0	**EL**	9.3	**UK**	39.2
UK	11.7	**ES**	42.3	**SE**	9.8	**SE**	41.0
SI	11.7	**CY**	42.3	**IT**	10.1	**IT**	42.4
HU	11.7	**SE**	42.4	**ES**	10.6	**ES**	44.8
RO	11.8	**HU**	42.8	**DK**	11.0	**BE**	46.0
LV	11.8	**IT**	43.8	**BE**	11.0	**DK**	46.3
LT	11.8	**NL**	44.3	**US**	12.9	**US**	53.7
IE	11.9	**EL**	44.4	**SK**	15.0	**SK**	61.1
CY	11.9	**LU**	45.3	**CZ**	15.0	**CZ**	61.1
BG	12.1	**BE**	45.5	**PT**	15.0	**PT**	61.2
SK	12.1	**EE**	45.7	**RO**	24.1	**RO**	84.0
EE	12.6	**FR**	46.1	**FR**	63.7	**FR**	122.9
Ø	**11.4**	**Ø**	**40.7**	**Ø**	**11.4**	**Ø**	**40.7**

Abbreviations:
AT = Austria; BE = Belgium; BG = Bulgaria; CY = Cyprus; CZ = Czech Republic; DE = Germany; DK = Denmark; EE = Estonia; EL = Greece; ES = Spain; FI = Finland; FR = France; HR = Croatia; HU = Hungary; IE = Ireland; IT = Italy; LT = Lithuania; LU = Luxembourg; LV = Latvia; MT = Malta; NL = Netherlands; PL = Poland; PT = Portugal; RO = Romania; SE = Sweden; SI = Slovenia; SK = Slovak Republic; UK = United Kingdom; US = United States

3.5.2.3 "IP tax planning via Average"

Another variation of IP tax planning considers a situation where a company resident in Average (IPAVERAGE) invests in the intangible. Consistent with Tax-Planning Strategy 3, Average is assumed to have a CIT rate of 23%. Intangibles are depreciated at an annual rate of 21%.

Whether this tax-planning strategy is attractive or not depends on the CIT rate and tax depreciation schedule for intangibles in the country of residence of SUBS relative to the country of residence of IPAVERAGE. If the CIT rate is higher and the depreciation rules are less attractive in the country of SUBS, tax planning via IPAVERAGE reduces the CoC and EATR. Considering an investment in a country with a lower tax rate than Average and faster tax depreciation

of intangibles, investing in IP in Average and licensing out the IP to SUBS is not recommendable.

Table 17: Mean CoC and EATR – "IP tax planning via Average" – all assets (in %)

Outbound						Inbound					
CoC			EATR			CoC			EATR		
	TP	BL		TP	BL		TP	BL		TP	BL
IT	5.2	5.3	**BG**	18.9	19.3	**EE**	4.5	4.4	**BG**	10.8	8.8
BG	5.2	5.3	**IT**	19.2	19.5	**BG**	5.1	5.0	**EE**	14.2	13.2
US	5.2	5.3	**MT**	19.4	19.6	**IT**	5.2	4.9	**LT**	15.1	13.6
FR	5.4	5.5	**LV**	19.7	20.1	**HR**	5.3	5.2	**IE**	15.4	14.1
LV	5.5	5.5	**LT**	19.7	20.1	**SI**	5.4	5.5	**LV**	15.5	14.3
LT	5.5	5.5	**PT**	20.1	20.3	**CZ**	5.4	5.4	**RO**	15.8	14.8
BE	5.5	5.6	**LU**	20.1	20.3	**LT**	5.4	5.4	**SI**	15.9	15.5
MT	5.5	5.6	**RO**	20.1	20.6	**IE**	5.5	5.5	**CY**	16.9	15.3
RO	5.6	5.6	**UK**	20.2	20.4	**RO**	5.5	5.5	**CZ**	17.1	16.6
SI	5.6	5.6	**HU**	20.2	20.5	**LV**	5.5	5.5	**HR**	17.1	16.4
PL	5.6	5.7	**PL**	20.3	20.5	**LU**	5.5	5.5	**PL**	18.0	17.5
HU	5.6	5.7	**BE**	20.3	20.5	**SK**	5.6	5.6	**FI**	18.4	18.5
UK	5.6	5.7	**FI**	20.3	20.5	**FI**	5.6	5.7	**SE**	19.3	19.2
CY	5.7	5.7	**ES**	20.3	20.4	**PT**	5.6	5.8	**SK**	19.4	19.3
FI	5.7	5.7	**NL**	20.3	20.5	**SE**	5.6	5.6	**HU**	19.5	19.3
PT	5.7	5.7	**SE**	20.4	20.5	**PL**	5.6	5.6	**UK**	21.3	21.4
LU	5.7	5.7	**DK**	20.4	20.5	**BE**	5.7	5.3	**DK**	21.3	20.9
SE	5.7	5.7	**CY**	20.4	20.8	**AT**	5.7	5.8	**AT**	21.4	22.3
DK	5.7	5.8	**AT**	20.4	20.5	**CY**	5.7	5.6	**NL**	21.6	21.9
HR	5.7	5.8	**SI**	20.5	20.8	**NL**	5.7	5.7	**IT**	22.8	23.0
NL	5.7	5.8	**CZ**	20.7	21.0	**MT**	5.8	6.0	**LU**	23.3	24.2
AT	5.7	5.8	**HR**	20.8	21.1	**HU**	5.8	5.8	**PT**	23.6	25.2
CZ	5.7	5.8	**EE**	21.0	21.4	**EL**	5.8	6.0	**EL**	24.3	25.8
DE	5.8	5.8	**DE**	21.1	21.3	**DK**	5.8	5.7	**DE**	25.8	27.1
ES	5.8	5.8	**SK**	21.2	21.6	**DE**	6.0	6.0	**BE**	26.3	26.7
EE	5.8	5.9	**IE**	22.0	22.2	**US**	6.2	6.7	**MT**	27.3	29.7
SK	5.9	6.0	**FR**	22.5	22.7	**UK**	6.3	6.4	**ES**	28.0	31.7
IE	6.1	6.1	**EL**	22.6	22.9	**FR**	6.4	6.3	**US**	32.0	36.2
EL	6.3	6.3	**US**	27.1	27.3	**ES**	6.7	7.6	**FR**	32.6	35.2
Ø	**5.7**	**5.7**	**Ø**	**20.7**	**20.9**	**Ø**	**5.7**	**5.7**	**Ø**	**20.7**	**20.9**

Abbreviations:
TP = Tax-planning strategy; BL = Baseline scenario
AT = Austria; BE = Belgium; BG = Bulgaria; CY = Cyprus; CZ = Czech Republic; DE = Germany; DK = Denmark; EE = Estonia; EL = Greece; ES = Spain; FI = Finland; FR = France; HR = Croatia; HU = Hungary; IE = Ireland; IT = Italy; LT = Lithuania; LU = Luxembourg; LV = Latvia; MT = Malta; NL = Netherlands; PL = Poland; PT = Portugal; RO = Romania; SE = Sweden; SI = Slovenia; SK = Slovak Republic; UK = United Kingdom; US = United States

Table 17 summarizes mean CoC and EATRs for the investment in all five assets for "IP tax planning via Average". It illustrates that, for marginal investments, it is mainly the relationship between depreciation rates in Average and those in the residence country of the subsidiary that

is relevant. In contrast, the tax rate difference proves to be the decisive factor for profitable investments.[140]

3.5.2.4 "IP tax planning via IP-box countries"

The last tax-planning strategy assumes that the intangible is acquired by SUBSPB: a company resident in one of the 11 EU member states that offer an IP-box regime. SUBSPB licenses the intangible to SUBS.

Tables 18-25 compare mean values for inbound and outbound CoC and EATRs for all countries, averaged over all partner countries, for IP tax planning via the 11 EU IP-box countries. In Tables 18-21, only the investment in the intangible is considered. In Tables 22-25, the combined investment in all five assets is considered. The columns are ranked according to the attractiveness of the IP-box regimes (measured by taking the mean of the average values for optimal financing across all possible investment combinations). The rows are ranked according to the attractiveness of MNPC (outbound) and SUBS (inbound) locations, respectively, for when IP tax planning is conducted via the (on average) most attractive IP-box regime.[141]

Tables 18 and 20 illustrate that, for marginal investments, IP tax planning using the IP-box regimes in Portugal and Hungary is the most attractive option. While these two countries do not offer the lowest IP-box tax rates among the 11 IP-box countries, they permit the deduction of interest payments related to the IP-box income, as well as depreciation of the intangible asset at the higher ordinary CIT rate (gross approach). For marginal investments via these two IP-box countries, the tax saving from deductible depreciation at the higher general income tax rate combined with the taxation of returns at the lower IP-box tax rate yields a CoC, that is far below 5% (only considering the investment in intangibles).

IP tax planning using the IP-box regime in Portugal is most attractive for marginal outbound investments from low-tax countries applying debt financing of SUBSPB. According to the gross approach, the tax reduction due to deduction of the interest under debt financing of SUBSPB exceeds the taxation of the profits in Portugal. For investments from parent companies that are resident in low-tax countries, this tax saving in Portugal combined with the taxation in the parent country is lower than the tax burden on IP income in Hungary. Hence, for MNPCs

[140] The detailed results for an investment in intangibles using IP tax planning via Average are listed in Chapter C1-3 of the Annex.
[141] Chapter C1-4 of the Annex includes the detailed results for an investment in an intangible for IP tax planning via all EU member states that offer an IP-box regime.

resident in these countries, using the IP-box regime in Portugal for marginal outbound investments is more attractive than using the IP-box regime in Hungary. For marginal outbound investments from high-tax countries, IP tax planning taking advantage of the Hungarian IP-box regime usually proves most attractive. This is because in Hungary, a lower IP-box tax rate applies.

For IP tax planning using the IP-box regime in Belgium, the deductibility of interest and the ACE at the high CIT rate are the main reasons for the very low mean CoC. The tax saving from this interest and ACE deductibility is especially significant due to the large difference between the general CIT rate and the IP-box rate, resulting in excess tax savings (i.e. the tax savings are higher than the tax payments) concerning all MNPC locations. In addition, the annual tax depreciation rate in Belgium is comparably high. This further increases the tax advantage and reduces CoC. However, investing in IP in Belgium is less attractive than using the IP-box regimes in Portugal and Hungary, as depreciation does not reduce other income at the general CIT rate in the case of acquired IP that benefits from the IP-box regime in Belgium.

Although neither interest nor depreciation are deductible at the higher CIT rate, Italy also ranks among the most attractive IP-box locations for marginal investments. This is due to the comparably fast depreciation schedule and the resulting high tax savings from depreciation, combined with the additional tax savings from the application of the ACE regime.[142] The least attractive IP-box countries for marginal investments are France and Spain. The reasons for this lie in the relatively high tax rates on IP-box income in both countries combined with comparably low annual depreciation rates and the application of the net principle for both interest deductibility and tax depreciation. In the UK, the annual depreciation rate is also low, and a comparably high IP-box tax rate applies. However, as interest is deductible at the ordinary income tax rate in the UK, this IP-box regime is more attractive than the IP-box regimes of France and Spain.

[142] Please note that both Italy and Belgium have implemented specific anti-avoidance provisions to tackle abuses of the ACE regime. However, these regulations do not apply to the tax-planning strategies considered in this study. For a comparison of the anti-avoidance provisions in Italy and Belgium, see Zangari (2014).

Table 18: Mean CoC – Outbound – "IP tax planning via IP-box countries" – Intangible (in %)

CoC - Outbound - Intangible											
	IP-box country										
	Portugal	**Hungary**	**Belgium**	**Italy**	**Malta**	**Cyprus**	**Netherlands**	**Luxembourg**	**UK**	**France**	**Spain**
BG	1.7	2.6	3.3	4.4	5.1	5.1	5.2	5.2	4.6	4.9	7.1
IT	1.7	2.6	3.3	3.8	4.6	4.6	4.7	4.8	4.7	4.9	7.1
LT	2.0	2.8	3.5	4.2	5.0	5.0	5.1	5.1	4.9	5.2	7.4
LV	2.0	2.8	3.5	4.2	5.0	5.0	5.1	5.1	4.9	5.2	7.4
RO	2.0	2.9	3.6	4.7	5.3	5.3	5.5	5.5	4.9	5.2	7.5
SI	2.1	2.9	3.6	4.2	4.9	4.9	5.0	5.0	5.0	5.3	7.5
US	2.2	2.1	3.1	3.1	3.8	3.9	4.0	4.1	4.3	4.4	6.7
CZ	2.2	3.0	3.7	4.7	5.3	5.3	5.5	5.5	5.1	5.4	7.6
PL	2.2	3.0	3.7	4.1	4.9	4.9	5.0	5.0	5.1	5.2	7.5
HU	2.2	3.0	3.7	4.1	4.9	4.9	5.0	5.0	5.1	5.2	7.5
CY	2.2	3.0	3.7	4.3	5.0	5.0	5.1	5.2	5.1	5.4	7.7
EE	2.3	3.1	3.8	4.7	5.3	5.3	5.5	5.5	5.1	5.5	7.7
FI	2.3	3.0	3.8	4.1	4.8	4.8	4.9	5.0	5.1	5.2	7.5
HR	2.3	3.0	3.8	4.1	4.8	4.8	4.9	5.0	5.1	5.2	7.5
UK	2.3	3.0	3.8	4.1	4.8	4.8	4.9	5.0	5.1	5.2	7.5
SE	2.3	2.9	3.8	4.0	4.8	4.8	4.9	4.9	5.1	5.2	7.4
SK	2.4	3.2	3.9	4.7	5.3	5.3	5.5	5.5	5.2	5.6	7.8
DK	2.4	2.9	3.9	4.0	4.7	4.8	4.8	4.9	5.0	5.1	7.4
AT	2.5	2.6	3.8	3.9	4.5	4.5	4.6	4.6	5.0	5.1	7.3
NL	2.5	2.9	4.0	3.9	4.7	4.7	4.8	4.8	5.0	5.1	7.3
FR	2.6	2.5	3.8	3.6	4.4	4.4	4.5	4.5	4.7	4.7	7.0
MT	2.6	2.6	3.8	3.6	4.5	4.5	4.5	4.6	4.7	4.7	7.0
BE	2.6	2.6	3.8	3.6	4.5	4.5	4.6	4.6	4.7	4.8	7.0
EL	2.7	3.5	4.2	4.7	5.3	5.3	5.5	5.5	5.6	5.8	8.1
LU	2.7	2.7	4.0	3.8	4.6	4.6	4.7	4.7	4.9	4.9	7.2
PT	2.8	2.7	4.0	3.8	4.6	4.6	4.7	4.7	4.9	4.9	7.2
ES	2.8	2.8	4.0	3.8	4.6	4.6	4.7	4.8	4.9	5.0	7.2
DE	2.8	2.8	4.0	3.8	4.6	4.6	4.7	4.8	4.9	5.0	7.2
IE	2.9	3.2	4.4	4.3	5.0	5.0	5.1	5.1	5.3	5.4	7.7
Ø	**2.4**	**2.8**	**3.8**	**4.1**	**4.8**	**4.8**	**4.9**	**5.0**	**5.0**	**5.1**	**7.4**

Abbreviations:

AT = Austria; BE = Belgium; BG = Bulgaria; CY = Cyprus; CZ = Czech Republic; DE = Germany; DK = Denmark; EE = Estonia; EL = Greece; ES = Spain; FI = Finland; FR = France; HR = Croatia; HU = Hungary; IE = Ireland; IT = Italy; LT = Lithuania; LU = Luxembourg; LV = Latvia; MT = Malta; NL = Netherlands; PL = Poland; PT = Portugal; RO = Romania; SE = Sweden; SI = Slovenia; SK = Slovak Republic; UK = United Kingdom; US = United States

Table 19: Mean EATR – Outbound – "IP tax planning via IP-box countries" – Intangible (in %)

EATR - Outbound - Intangible											
	IP-box country										
	Hungary	**Portugal**	**Belgium**	**Malta**	**Cyprus**	**Netherlands**	**Luxembourg**	**UK**	**Italy**	**France**	**Spain**
AT	-3.7	0.5	-0.7	-2.4	-0.7	1.6	2.4	7.5	12.2	16.2	19.0
BG	-3.4	-2.9	-2.5	1.0	2.7	5.0	5.8	5.9	14.1	15.5	19.1
MT	-3.3	0.8	0.1	-2.1	-0.3	2.0	2.8	6.3	11.0	15.0	17.8
PT	-2.7	1.5	0.8	-1.4	0.3	2.7	3.4	7.0	11.7	15.7	18.4
LU	-2.6	1.4	0.8	-1.4	0.4	2.7	3.5	7.0	11.7	15.7	18.5
ES	-2.5	1.7	0.9	-1.2	0.5	2.8	3.6	7.2	11.9	15.9	18.6
LT	-2.3	-1.8	-1.4	0.4	2.1	4.4	5.2	7.0	13.5	16.7	20.2
LV	-2.3	-1.8	-1.4	0.4	2.1	4.4	5.2	7.0	13.5	16.7	20.2
IT	-2.3	-1.8	-1.4	-0.2	1.5	3.8	4.6	6.9	12.7	16.4	19.4
NL	-2.1	0.5	0.9	-0.8	0.9	3.2	4.0	7.5	12.2	16.2	19.0
RO	-2.1	-1.6	-1.1	2.2	3.9	6.3	7.0	7.2	15.3	16.9	20.4
BE	-2.0	2.1	1.4	-0.7	1.0	3.3	4.1	7.5	12.1	16.1	18.8
DK	-1.9	0.1	0.6	-0.7	1.1	3.4	4.2	7.7	12.4	16.4	19.2
SE	-1.7	-0.3	0.1	-0.4	1.3	3.6	4.4	7.9	12.7	16.7	19.4
FI	-1.5	-0.7	-0.2	-0.2	1.5	3.8	4.6	8.1	12.8	16.8	19.6
HR	-1.5	-0.7	-0.2	-0.2	1.5	3.8	4.6	8.1	12.8	16.8	19.6
UK	-1.5	-0.7	-0.2	-0.2	1.5	3.8	4.6	8.1	12.8	16.8	19.6
PL	-1.4	-0.9	-0.5	-0.1	1.6	3.9	4.7	7.9	13.0	17.0	19.7
HU	-1.4	-0.9	-0.5	-0.1	1.6	3.9	4.7	7.9	13.0	17.0	19.7
CZ	-1.4	-0.9	-0.5	2.2	3.9	6.3	7.0	7.9	15.3	17.6	21.1
CY	-1.3	-0.8	-0.4	0.7	2.4	4.7	5.5	8.0	13.8	17.6	20.5
DE	-1.2	2.9	2.1	0.0	1.7	4.0	4.8	8.2	12.8	16.8	19.5
EE	-1.2	-0.7	-0.2	2.2	3.9	6.3	7.0	8.1	15.3	17.8	21.3
SI	-1.2	-0.7	-0.2	0.8	2.4	4.8	5.5	8.1	13.7	17.6	20.4
SK	-0.7	-0.2	0.2	2.2	3.9	6.3	7.0	8.6	15.3	18.3	21.8
EL	0.9	1.4	1.8	2.2	3.9	6.3	7.0	10.2	15.3	19.3	22.0
FR	1.5	5.4	4.7	2.7	4.3	6.5	7.2	10.5	14.8	18.6	21.2
IE	1.8	2.0	7.0	9.6	9.7	10.2	10.3	10.8	13.8	17.8	20.5
US	17.2	17.1	20.3	22.7	23.0	23.4	23.5	23.8	20.0	24.3	28.5
Ø	**-1.0**	**0.7**	**1.0**	**1.3**	**2.9**	**5.1**	**5.8**	**8.4**	**13.5**	**17.1**	**20.1**

Abbreviations:

AT = Austria; BE = Belgium; BG = Bulgaria; CY = Cyprus; CZ = Czech Republic; DE = Germany; DK = Denmark; EE = Estonia; EL = Greece; ES = Spain; FI = Finland; FR = France; HR = Croatia; HU = Hungary; IE = Ireland; IT = Italy; LT = Lithuania; LU = Luxembourg; LV = Latvia; MT = Malta; NL = Netherlands; PL = Poland; PT = Portugal; RO = Romania; SE = Sweden; SI = Slovenia; SK = Slovak Republic; UK = United Kingdom; US = United States

Table 20: Mean CoC – Inbound – "IP tax planning via IP-box countries" – Intangible (in %)

CoC - Inbound - Intangible											
	IP-box country										
	Portugal	**Hungary**	**Belgium**	**Italy**	**Malta**	**Cyprus**	**Netherlands**	**Luxembourg**	**UK**	**France**	**Spain**
IE	2.3	2.6	3.5	4.1	4.5	4.6	4.7	4.7	5.0	5.1	7.4
DE	2.3	2.6	3.5	4.1	4.5	4.6	4.7	4.7	5.0	5.1	7.4
ES	2.3	2.6	3.5	4.1	4.5	4.6	4.7	4.7	5.0	5.1	7.4
PT	2.3	2.6	3.5	4.1	4.5	4.6	4.7	4.7	5.0	5.1	7.4
LU	2.3	2.6	3.5	4.1	4.5	4.6	4.7	4.7	5.0	5.1	7.4
EL	2.3	2.6	3.5	4.1	4.5	4.6	4.7	4.7	5.0	5.1	7.4
BE	2.3	2.6	3.5	4.1	4.5	4.6	4.7	4.7	5.0	5.1	7.4
MT	2.3	2.6	3.5	4.1	4.5	4.6	4.7	4.7	5.0	5.1	7.4
FR	2.3	2.6	3.5	4.1	4.5	4.6	4.7	4.7	5.0	5.1	7.4
AT	2.3	9.5	10.4	4.1	11.1	11.5	11.8	12.0	5.0	5.1	7.4
NL	2.3	2.6	3.5	4.1	4.5	4.6	4.7	4.7	5.0	5.1	7.4
DK	2.3	2.6	3.5	4.1	4.5	4.6	4.7	4.7	5.0	5.1	7.4
SK	2.4	2.6	3.5	4.1	4.5	4.6	4.7	4.7	5.0	5.1	7.4
SE	2.4	2.6	3.5	4.1	4.5	4.6	4.7	4.7	5.0	5.1	7.4
EE	2.4	2.6	3.5	4.1	4.5	4.6	4.7	4.7	5.0	5.1	7.4
FI	2.4	2.6	3.5	4.1	4.5	4.6	4.7	4.7	5.0	5.1	7.4
HR	2.4	2.6	3.5	4.1	4.5	4.6	4.7	4.7	5.0	5.1	7.4
UK	2.4	2.6	3.5	4.1	4.5	4.6	4.7	4.7	5.0	5.1	7.4
CY	2.4	2.6	3.5	4.1	4.5	4.6	4.7	4.7	5.0	5.1	7.4
HU	2.4	2.6	3.5	4.1	4.5	4.6	4.7	4.7	5.0	5.1	7.4
CZ	2.4	2.6	3.5	4.1	4.5	4.6	4.7	4.7	5.0	5.1	7.4
PL	2.4	2.6	3.5	4.1	4.5	4.6	4.7	4.7	5.0	5.1	7.4
US	2.4	2.6	3.6	4.1	6.8	4.6	4.7	4.7	5.0	5.2	7.4
SI	2.4	2.6	3.5	4.1	4.5	4.6	4.7	4.7	5.0	5.1	7.4
RO	2.4	2.6	3.5	4.1	4.5	4.6	4.7	4.7	5.0	5.1	7.4
LT	2.4	2.6	3.5	4.1	4.5	4.6	4.7	4.7	5.0	5.1	7.4
LV	2.4	2.6	3.5	4.1	4.5	4.6	4.7	4.7	5.0	5.1	7.4
IT	2.4	2.6	3.5	4.1	4.5	4.6	4.7	4.7	5.0	5.1	7.4
BG	2.4	2.6	3.5	4.1	4.5	4.6	4.7	4.7	5.0	5.1	7.4
Ø	**2.4**	**2.8**	**3.8**	**4.1**	**4.8**	**4.8**	**4.9**	**5.0**	**5.0**	**5.1**	**7.4**

Abbreviations:

AT = Austria; BE = Belgium; BG = Bulgaria; CY = Cyprus; CZ = Czech Republic; DE = Germany; DK = Denmark; EE = Estonia; EL = Greece; ES = Spain; FI = Finland; FR = France; HR = Croatia; HU = Hungary; IE = Ireland; IT = Italy; LT = Lithuania; LU = Luxembourg; LV = Latvia; MT = Malta; NL = Netherlands; PL = Poland; PT = Portugal; RO = Romania; SE = Sweden; SI = Slovenia; SK = Slovak Republic; UK = United Kingdom; US = United States

Table 21: Mean EATR – Inbound – "IP tax planning via IP-box countries" – Intangible (in %)

EATR - Inbound - Intangible											
	IP-box country										
	Hungary	**Portugal**	**Belgium**	**Malta**	**Cyprus**	**Netherlands**	**Luxembourg**	**UK**	**Italy**	**France**	**Spain**
US	-3.1	0.1	-1.2	15.7	0.7	2.9	3.7	7.9	13.3	16.9	19.8
IE	-2.6	0.6	-0.7	-1.1	1.1	3.4	4.2	8.3	13.5	17.1	20.1
FR	-2.6	0.5	-0.6	-0.9	1.3	3.5	4.3	8.3	13.4	17.1	20.1
EL	-2.5	0.7	-0.5	-0.8	1.4	3.5	4.3	8.3	13.4	17.0	20.0
SK	-2.5	0.7	-0.4	-0.8	1.4	3.5	4.3	8.4	13.4	17.1	20.0
SI	-2.5	0.7	-0.4	-0.8	1.4	3.6	4.3	8.4	13.5	17.1	20.1
EE	-2.5	0.7	-0.4	-0.8	1.4	3.5	4.3	8.4	13.4	17.1	20.0
DE	-2.5	0.6	-0.5	-0.8	1.4	3.6	4.4	8.4	13.5	17.1	20.1
CY	-2.4	0.8	-0.4	-0.8	1.4	3.6	4.3	8.4	13.5	17.1	20.1
CZ	-2.4	0.8	-0.4	-0.8	1.4	3.5	4.3	8.4	13.4	17.1	20.1
HU	-2.4	0.8	-0.4	-0.8	1.4	3.6	4.4	8.4	13.5	17.1	20.1
PL	-2.4	0.8	-0.4	-0.8	1.4	3.6	4.4	8.4	13.5	17.1	20.1
FI	-2.4	0.7	-0.4	-0.7	1.4	3.6	4.4	8.4	13.5	17.1	20.1
HR	-2.4	0.7	-0.4	-0.7	1.4	3.6	4.4	8.4	13.5	17.1	20.1
UK	-2.4	0.7	-0.4	-0.7	1.4	3.6	4.4	8.4	13.5	17.1	20.1
SE	-2.4	0.7	-0.4	-0.7	1.4	3.6	4.4	8.4	13.5	17.1	20.1
BE	-2.4	0.6	-0.5	-0.7	1.5	3.6	4.4	8.4	13.5	17.2	20.1
DK	-2.4	0.7	-0.4	-0.7	1.5	3.6	4.4	8.4	13.5	17.1	20.1
RO	-2.4	0.8	-0.4	-0.8	1.4	3.5	4.3	8.5	13.4	17.1	20.1
NL	-2.4	0.7	-0.5	-0.7	1.5	3.6	4.4	8.4	13.5	17.1	20.1
IT	-2.4	0.8	-0.4	-0.8	1.4	3.6	4.4	8.5	13.5	17.1	20.1
LT	-2.4	0.8	-0.4	-0.8	1.4	3.6	4.3	8.5	13.5	17.1	20.1
LV	-2.4	0.8	-0.4	-0.8	1.4	3.6	4.3	8.5	13.5	17.1	20.1
ES	-2.4	0.7	-0.5	-0.7	1.5	3.7	4.4	8.5	13.6	17.2	20.1
LU	-2.4	0.7	-0.4	-0.7	1.5	3.7	4.4	8.5	13.6	17.2	20.2
PT	-2.4	0.7	-0.4	-0.7	1.5	3.7	4.4	8.5	13.6	17.2	20.2
MT	-2.4	0.7	-0.4	-0.7	1.5	3.7	4.4	8.5	13.6	17.2	20.2
BG	-2.4	0.8	-0.3	-0.8	1.4	3.6	4.3	8.5	13.5	17.2	20.1
AT	41.1	0.7	43.0	42.5	44.8	47.0	47.8	8.4	13.5	17.1	20.1
Ø	**-1.0**	**0.7**	**1.0**	**1.3**	**2.9**	**5.1**	**5.8**	**8.4**	**13.5**	**17.1**	**20.1**

Abbreviations:

AT = Austria; BE = Belgium; BG = Bulgaria; CY = Cyprus; CZ = Czech Republic; DE = Germany; DK = Denmark; EE = Estonia; EL = Greece; ES = Spain; FI = Finland; FR = France; HR = Croatia; HU = Hungary; IE = Ireland; IT = Italy; LT = Lithuania; LU = Luxembourg; LV = Latvia; MT = Malta; NL = Netherlands; PL = Poland; PT = Portugal; RO = Romania; SE = Sweden; SI = Slovenia; SK = Slovak Republic; UK = United Kingdom; US = United States

According to Tables 19 and 21, for profitable investments, the attractiveness of the Hungarian IP-box regime is greater than that of the IP-box regime in Portugal. For the EATR, tax base effects are less relevant, and the IP-box tax rate in Hungary is lower than in Portugal. For the same reason, tax planning via Belgium becomes more attractive than IP tax planning via Portugal. Investments in Austria pose an exception, as royalty expenses are deductible from the tax base when paid to Portugal but not when paid to Hungary or Belgium, due to the lower IP-box tax rates in these countries. In addition to a lower IP-box tax rate, Belgium offers more favorable depreciation rules for intangibles than Portugal and additionally offers an ACE regime. The advantage of deducting depreciation at the higher general CIT rate in Portugal is overcompensated by the lower IP-box tax rate in Belgium for profitable investments. Despite the reduced relevance of tax base rules for profitable investments, the three countries applying the gross income approach to IP income (Hungary, Portugal, and - with respect to interest payments and the ACE – Belgium) remain among the four most attractive IP-box locations considering profitable investments. The only country that is similarly attractive while applying the net approach with respect to both interest and depreciation expenses is Malta. Malta features the lowest IP-box tax rate among the 11 countries considered, which is decisive for profitable investments. The ranking of the other IP-box regimes applying the net approach generally corresponds to the level of their IP-box tax rates. However, Italy poses an exception, since its ACE regime results in an additional tax advantage. This makes Italy more attractive for IP tax planning than France and Spain, despite their lower IP-box tax rates. While the IP-box tax rates in France and Spain are similar, the restriction of interest deductibility in Spain results in higher EATRs for tax planning using the Spanish IP-box regime.

As with tax planning via IPOFFSHORE, the inbound CoC and EATRs for the investment in the intangible are identical across investment locations. This is because irrespective of the country where profits are generated from IP, only the tax base and tax rate effects of the country in which the intangible is owned are relevant if royalty payments are fully deductible from the tax base of SUBS.

Comparing the “IP tax planning via IP-box regimes” and “IP tax planning via Offshore treaty” strategies, it becomes clear that for marginal investments, tax planning using the IP-box regimes in Portugal, Hungary, Belgium, and Italy is the most attractive alternative. This is due to favorable tax base effects and, in particular, the application of the gross approach under the respective IP-box regimes. Since Malta does not levy taxes on IP income eligible for the IP–box regime, the CoC and EATR for using Malta as an IP holding location are, for most parent-subsidiary

combinations, identical to those for IP tax planning via Offshore treaty. Differences arise for inbound investments into the US, as the US levies WHTs on royalties paid to Malta, while royalties paid to Offshore treaty are by assumption tax-exempt. Moreover, some countries apply the credit method to dividends received from OFFSHORE treaty, while they exempt dividends distributed by a company resident in Malta. Due to the low IP-box tax rate of only 2.5%, the resulting rates for IP tax planning via Cyprus are similar to the results for the "IP tax planning via Offshore treaty" strategy. Other IP-box regimes provide on average lower tax saving potential for marginal investments than the "IP tax planning via Offshore treaty" strategy. This is because the higher taxes on IP income in the IP-box countries overcompensate any potential tax advantages from depreciation and interest deductibility that are available under the IP-box regimes. For profitable investments, taking advantage of the IP-box regimes in Hungary, Portugal, Belgium, and Malta is generally preferable to conducting IP tax planning via Offshore treaty.

Tables 22-25 list the combined inbound and outbound CoC and EATRs for investments in all five assets. The tables illustrate that the country ranking according to the CoC for both inbound and outbound investments is very similar to the respective country ranking in the baseline scenario. The attractiveness of countries for marginal inbound investments relative to other investment locations decreases especially for countries with very favorable depreciation rules and high tax rates, such as Belgium. On the other hand, the attractiveness increases for countries with comparably less favorable depreciation rules. Nevertheless, the CoC and EATRs for all inbound investments decrease compared to the baseline scenario if SUBSPB is located in one of the most attractive IP-box countries. For tax planning via Hungary, the mean CoC decreases by 0.5 percentage points (from 5.7% to 5.2%), and the mean EATR decreases by 4 percentage points (from 20.9% to 16.9%). On the other hand, the CoC and EATR could increase compared to the base case if SUBSPB was located in one of the countries with a less favorable IP-box regime. If SUBSPB was located in Spain, the mean CoC would always be higher for inbound investments than for direct investments (the mean value increases to 6.1%). The only exception is Spain itself. When the IP-box regime in Spain is used for inbound investments into the country, the CoC is reduced compared to the baseline scenario, where IP-box regimes are not considered.

Table 22: Mean CoC – Outbound – "IP tax planning via IP-box countries" – all assets (in %)

CoC - Outbound - All assets												
	IP-box country											
	Portugal	**Hungary**	**Belgium**	**Italy**	**Malta**	**Cyprus**	**Netherlands**	**Luxembourg**	**UK**	**France**	**Spain**	**BL**
IT	4.6	4.8	4.9	5.0	5.2	5.2	5.2	5.2	5.2	5.3	5.7	5.3
BG	4.6	4.8	4.9	5.2	5.3	5.3	5.3	5.3	5.2	5.3	5.7	5.3
US	4.7	4.7	4.9	4.9	5.0	5.1	5.1	5.1	5.1	5.2	5.6	5.3
LV	4.9	5.1	5.2	5.3	5.5	5.5	5.5	5.5	5.5	5.5	6.0	5.5
LT	4.9	5.1	5.2	5.3	5.5	5.5	5.5	5.5	5.5	5.5	6.0	5.5
FR	5.0	5.0	5.2	5.2	5.3	5.3	5.4	5.4	5.4	5.4	5.8	5.5
RO	5.0	5.2	5.3	5.5	5.6	5.7	5.7	5.7	5.6	5.6	6.1	5.6
SI	5.0	5.2	5.3	5.4	5.6	5.6	5.6	5.6	5.6	5.6	6.1	5.6
BE	5.0	5.0	5.3	5.2	5.4	5.4	5.4	5.4	5.5	5.5	5.9	5.6
PL	5.1	5.2	5.4	5.4	5.6	5.6	5.6	5.6	5.6	5.7	6.1	5.7
UK	5.1	5.2	5.4	5.4	5.6	5.6	5.6	5.6	5.6	5.7	6.1	5.7
HU	5.1	5.2	5.4	5.4	5.6	5.6	5.6	5.6	5.6	5.7	6.1	5.7
MT	5.1	5.1	5.3	5.3	5.4	5.4	5.5	5.5	5.5	5.5	5.9	5.6
CY	5.1	5.2	5.4	5.5	5.6	5.6	5.7	5.7	5.7	5.7	6.2	5.7
FI	5.1	5.2	5.4	5.5	5.6	5.6	5.6	5.6	5.7	5.7	6.1	5.7
SE	5.1	5.2	5.4	5.5	5.6	5.6	5.6	5.6	5.7	5.7	6.1	5.7
HR	5.2	5.3	5.5	5.5	5.7	5.7	5.7	5.7	5.7	5.7	6.2	5.8
DK	5.2	5.2	5.5	5.5	5.6	5.6	5.6	5.6	5.7	5.7	6.1	5.8
CZ	5.2	5.3	5.5	5.7	5.8	5.8	5.8	5.8	5.7	5.8	6.2	5.8
NL	5.2	5.3	5.5	5.5	5.6	5.6	5.6	5.6	5.7	5.7	6.1	5.8
AT	5.2	5.2	5.4	5.5	5.6	5.6	5.6	5.6	5.7	5.7	6.1	5.8
PT	5.2	5.2	5.5	5.4	5.6	5.6	5.6	5.6	5.6	5.6	6.1	5.7
LU	5.2	5.2	5.5	5.4	5.6	5.6	5.6	5.6	5.6	5.7	6.1	5.7
EE	5.3	5.4	5.6	5.8	5.9	5.9	5.9	5.9	5.8	5.9	6.4	5.9
DE	5.3	5.3	5.5	5.5	5.6	5.6	5.7	5.7	5.7	5.7	6.2	5.8
ES	5.3	5.3	5.5	5.5	5.6	5.6	5.7	5.7	5.7	5.7	6.2	5.8
SK	5.3	5.5	5.6	5.8	5.9	5.9	5.9	5.9	5.9	6.0	6.4	6.0
IE	5.5	5.6	5.8	5.8	5.9	5.9	6.0	6.0	6.0	6.0	6.5	6.1
EL	5.7	5.8	6.0	6.1	6.2	6.2	6.2	6.2	6.2	6.3	6.7	6.3
Ø	**5.1**	**5.2**	**5.4**	**5.4**	**5.6**	**5.6**	**5.6**	**5.6**	**5.6**	**5.7**	**6.1**	**5.7**

Abbreviations:

BL = Baseline scenario

AT = Austria; BE = Belgium; BG = Bulgaria; CY = Cyprus; CZ = Czech Republic; DE = Germany; DK = Denmark; EE = Estonia; EL = Greece; ES = Spain; FI = Finland; FR = France; HR = Croatia; HU = Hungary; IE = Ireland; IT = Italy; LT = Lithuania; LU = Luxembourg; LV = Latvia; MT = Malta; NL = Netherlands; PL = Poland; PT = Portugal; RO = Romania; SE = Sweden; SI = Slovenia; SK = Slovak Republic; UK = United Kingdom; US = United States

Table 23: Mean EATR – Outbound – "IP tax planning via IP-box countries" – all assets (in %)

EATR - Outbound - All assets												
	IP-box country											
	Hungary	**Portugal**	**Belgium**	**Malta**	**Cyprus**	**Netherlands**	**Luxembourg**	**UK**	**Italy**	**France**	**Spain**	**BL**
BG	15.0	15.1	15.2	15.9	16.3	16.7	16.9	16.9	18.5	18.8	19.5	19.3
MT	15.3	16.1	16.0	15.6	15.9	16.4	16.5	17.2	18.2	19.0	19.5	19.6
IT	15.4	15.5	15.6	15.8	16.2	16.6	16.8	17.2	18.4	19.2	19.7	19.5
LV	15.9	16.0	16.1	16.4	16.8	17.2	17.4	17.8	19.1	19.7	20.4	20.1
LT	15.9	16.0	16.1	16.4	16.8	17.3	17.4	17.8	19.1	19.7	20.4	20.1
PT	16.0	16.8	16.7	16.2	16.6	17.1	17.2	17.9	18.9	19.7	20.2	20.3
AT	16.0	16.8	16.6	16.3	16.6	17.1	17.2	18.3	19.2	20.0	20.5	20.5
LU	16.0	16.8	16.7	16.3	16.6	17.1	17.3	18.0	18.9	19.7	20.2	20.3
ES	16.2	17.0	16.9	16.5	16.8	17.3	17.4	18.1	19.1	19.9	20.4	20.4
BE	16.2	17.1	16.9	16.5	16.8	17.3	17.4	18.1	19.0	19.8	20.4	20.5
NL	16.3	16.8	16.9	16.5	16.9	17.3	17.5	18.2	19.1	19.9	20.5	20.5
UK	16.3	16.5	16.5	16.5	16.9	17.4	17.5	18.2	19.2	20.0	20.5	20.4
DK	16.3	16.7	16.8	16.6	16.9	17.4	17.5	18.2	19.2	20.0	20.5	20.5
RO	16.3	16.4	16.5	17.2	17.5	18.0	18.1	18.2	19.8	20.1	20.8	20.6
SE	16.4	16.7	16.7	16.6	17.0	17.4	17.6	18.3	19.3	20.1	20.6	20.5
FI	16.4	16.6	16.7	16.7	17.0	17.5	17.6	18.3	19.3	20.1	20.6	20.5
HU	16.4	16.5	16.6	16.7	17.0	17.5	17.6	18.3	19.3	20.1	20.6	20.5
PL	16.4	16.5	16.6	16.7	17.0	17.5	17.7	18.3	19.3	20.1	20.7	20.5
CY	16.6	16.7	16.8	17.0	17.3	17.8	18.0	18.4	19.6	20.4	21.0	20.8
SI	16.7	16.8	16.9	17.1	17.5	17.9	18.1	18.6	19.7	20.5	21.1	20.8
CZ	16.9	17.0	17.0	17.6	17.9	18.4	18.5	18.7	20.2	20.6	21.4	21.0
HR	16.9	17.1	17.2	17.2	17.5	18.0	18.1	18.8	19.8	20.6	21.1	21.1
DE	17.1	17.9	17.7	17.3	17.6	18.1	18.3	19.0	19.9	20.7	21.2	21.3
EE	17.2	17.3	17.4	17.9	18.2	18.7	18.8	19.1	20.5	21.0	21.7	21.4
SK	17.4	17.5	17.6	18.0	18.3	18.8	19.0	19.3	20.6	21.2	21.9	21.6
IE	18.4	18.4	19.4	19.9	19.9	20.0	20.1	20.2	20.7	21.5	22.1	22.2
FR	18.7	19.5	19.3	18.9	19.3	19.7	19.8	20.5	21.4	22.1	22.6	22.7
EL	18.8	18.9	19.0	19.1	19.4	19.9	20.1	20.7	21.7	22.5	23.1	22.9
US	25.5	25.5	26.2	26.6	26.7	26.8	26.8	26.9	26.1	27.0	27.8	27.3
Ø	**16.9**	**17.2**	**17.3**	**17.3**	**17.6**	**18.1**	**18.2**	**18.7**	**19.8**	**20.5**	**21.1**	**20.9**

Abbreviations:
BL = Baseline scenario
AT = Austria; BE = Belgium; BG = Bulgaria; CY = Cyprus; CZ = Czech Republic; DE = Germany; DK = Denmark; EE = Estonia; EL = Greece; ES = Spain; FI = Finland; FR = France; HR = Croatia; HU = Hungary; IE = Ireland; IT = Italy; LT = Lithuania; LU = Luxembourg; LV = Latvia; MT = Malta; NL = Netherlands; PL = Poland; PT = Portugal; RO = Romania; SE = Sweden; SI = Slovenia; SK = Slovak Republic; UK = United Kingdom; US = United States

Table 24: Mean CoC – Inbound – "IP tax planning via IP-box countries" – all assets (in %)

CoC - Inbound - All assets												
	IP-box country											
	Portugal	**Hungary**	**Belgium**	**Italy**	**Malta**	**Cyprus**	**Netherlands**	**Luxembourg**	**UK**	**France**	**Spain**	**BL**
EE	4.0	4.0	4.2	4.3	4.4	4.4	4.4	4.4	4.5	4.5	5.0	4.4
BG	4.5	4.6	4.8	4.9	5.0	5.0	5.0	5.0	5.1	5.1	5.5	5.0
IT	4.7	4.7	4.9	5.0	5.1	5.1	5.1	5.1	5.2	5.2	5.7	4.9
HR	4.7	4.8	4.9	5.1	5.1	5.2	5.2	5.2	5.2	5.3	5.7	5.2
SI	4.8	4.9	5.1	5.2	5.3	5.3	5.3	5.3	5.4	5.4	5.8	5.5
CZ	4.8	4.9	5.1	5.2	5.3	5.3	5.3	5.3	5.4	5.4	5.8	5.4
LT	4.9	4.9	5.1	5.2	5.3	5.3	5.4	5.4	5.4	5.4	5.9	5.4
IE	4.9	5.0	5.1	5.3	5.3	5.4	5.4	5.4	5.4	5.5	5.9	5.5
RO	4.9	5.0	5.2	5.3	5.4	5.4	5.4	5.4	5.5	5.5	5.9	5.5
LV	5.0	5.0	5.2	5.3	5.4	5.4	5.4	5.5	5.5	5.5	6.0	5.5
LU	5.0	5.0	5.2	5.3	5.4	5.4	5.5	5.5	5.5	5.6	6.0	5.5
SK	5.0	5.1	5.2	5.3	5.4	5.4	5.5	5.5	5.5	5.6	6.0	5.6
FI	5.0	5.1	5.3	5.4	5.5	5.5	5.5	5.5	5.6	5.6	6.0	5.7
PT	5.0	5.1	5.3	5.4	5.5	5.5	5.5	5.5	5.6	5.6	6.1	5.8
SE	5.1	5.1	5.3	5.4	5.5	5.5	5.5	5.5	5.6	5.6	6.1	5.6
PL	5.1	5.1	5.3	5.4	5.5	5.5	5.5	5.5	5.6	5.6	6.1	5.6
BE	5.1	5.2	5.3	5.5	5.5	5.6	5.6	5.6	5.6	5.7	6.1	5.3
AT	5.1	6.5	6.7	5.5	6.9	6.9	7.0	7.0	5.6	5.7	6.1	5.8
CY	5.1	5.2	5.3	5.5	5.5	5.6	5.6	5.6	5.6	5.7	6.1	5.6
NL	5.1	5.2	5.4	5.5	5.6	5.6	5.6	5.6	5.7	5.7	6.2	5.7
MT	5.2	5.3	5.5	5.6	5.7	5.7	5.7	5.7	5.8	5.8	6.3	6.0
HU	5.3	5.3	5.5	5.6	5.7	5.7	5.7	5.7	5.8	5.8	6.3	5.8
EL	5.3	5.3	5.5	5.6	5.7	5.7	5.8	5.8	5.8	5.8	6.3	6.0
DK	5.3	5.3	5.5	5.6	5.7	5.7	5.8	5.8	5.8	5.9	6.3	5.7
DE	5.4	5.5	5.7	5.8	5.9	5.9	5.9	5.9	6.0	6.0	6.5	6.0
US	5.7	5.7	5.9	6.0	6.5	6.1	6.1	6.1	6.2	6.2	6.7	6.7
UK	5.8	5.8	6.0	6.1	6.2	6.2	6.2	6.2	6.3	6.3	6.8	6.4
FR	5.8	5.9	6.1	6.2	6.3	6.3	6.3	6.3	6.4	6.4	6.8	6.3
ES	6.2	6.3	6.4	6.5	6.6	6.6	6.7	6.7	6.7	6.8	7.2	7.6
Ø	**5.1**	**5.2**	**5.4**	**5.4**	**5.6**	**5.6**	**5.6**	**5.6**	**5.6**	**5.7**	**6.1**	**5.7**

Abbreviations:

BL = Baseline scenario

AT = Austria; BE = Belgium; BG = Bulgaria; CY = Cyprus; CZ = Czech Republic; DE = Germany; DK = Denmark; EE = Estonia; EL = Greece; ES = Spain; FI = Finland; FR = France; HR = Croatia; HU = Hungary; IE = Ireland; IT = Italy; LT = Lithuania; LU = Luxembourg; LV = Latvia; MT = Malta; NL = Netherlands; PL = Poland; PT = Portugal; RO = Romania; SE = Sweden; SI = Slovenia; SK = Slovak Republic; UK = United Kingdom; US = United States

Table 25: Mean EATR – Inbound – "IP tax planning via IP-box countries" – all assets (in %)

EATR - Inbound - All assets												
	IP-box country											
	Hungary	**Portugal**	**Belgium**	**Malta**	**Cyprus**	**Netherlands**	**Luxembourg**	**UK**	**Italy**	**France**	**Spain**	**BL**
BG	6.6	7.3	7.0	7.0	7.4	7.8	8.0	8.8	9.8	10.5	11.1	8.8
EE	10.1	10.7	10.5	10.4	10.8	11.3	11.4	12.2	13.2	14.0	14.6	13.2
LT	11.0	11.6	11.4	11.3	11.7	12.2	12.3	13.1	14.1	14.9	15.5	13.6
IE	11.3	11.9	11.7	11.6	12.0	12.5	12.6	13.5	14.5	15.2	15.8	14.1
LV	11.3	12.0	11.7	11.7	12.1	12.5	12.7	13.5	14.5	15.2	15.8	14.3
RO	11.7	12.3	12.1	12.0	12.5	12.9	13.0	13.9	14.9	15.6	16.2	14.8
SI	11.8	12.4	12.2	12.1	12.6	13.0	13.2	14.0	15.0	15.7	16.3	15.5
CY	12.7	13.4	13.1	13.1	13.5	13.9	14.1	14.9	15.9	16.6	17.2	15.3
CZ	13.0	13.6	13.4	13.3	13.7	14.2	14.3	15.1	16.1	16.9	17.5	16.6
HR	13.0	13.6	13.4	13.4	13.8	14.2	14.4	15.2	16.2	16.9	17.5	16.4
PL	13.9	14.5	14.3	14.2	14.7	15.1	15.2	16.1	17.1	17.8	18.4	17.5
FI	14.3	14.9	14.7	14.6	15.1	15.5	15.6	16.5	17.5	18.2	18.8	18.5
SE	15.2	15.8	15.6	15.5	16.0	16.4	16.6	17.4	18.4	19.1	19.7	19.2
SK	15.3	15.9	15.7	15.6	16.0	16.5	16.6	17.4	18.4	19.2	19.8	19.3
HU	15.4	16.0	15.8	15.7	16.1	16.6	16.7	17.5	18.5	19.3	19.9	19.3
UK	17.2	17.8	17.6	17.5	18.0	18.4	18.5	19.4	20.4	21.1	21.7	21.4
DK	17.2	17.8	17.6	17.5	18.0	18.4	18.6	19.4	20.4	21.1	21.7	20.9
NL	17.5	18.1	17.8	17.8	18.2	18.7	18.8	19.6	20.6	21.4	22.0	21.9
IT	18.7	19.3	19.1	19.0	19.4	19.9	20.0	20.8	21.8	22.6	23.2	23.0
LU	19.2	19.8	19.6	19.5	20.0	20.4	20.6	21.4	22.4	23.1	23.7	24.2
PT	19.5	20.1	19.9	19.9	20.3	20.7	20.9	21.7	22.7	23.4	24.0	25.2
EL	20.1	20.8	20.5	20.5	20.9	21.3	21.5	22.3	23.3	24.0	24.6	25.8
DE	21.7	22.3	22.1	22.0	22.5	22.9	23.0	23.8	24.9	25.6	26.2	27.1
BE	22.2	22.8	22.5	22.5	22.9	23.4	23.5	24.3	25.3	26.1	26.7	26.7
MT	23.2	23.8	23.6	23.5	24.0	24.4	24.5	25.3	26.4	27.1	27.7	29.7
ES	23.9	24.5	24.3	24.2	24.7	25.1	25.2	26.1	27.1	27.8	28.4	31.7
AT	26.0	17.9	26.4	26.3	26.7	27.2	27.3	19.5	20.5	21.2	21.8	22.3
US	27.8	28.5	28.2	31.6	28.6	29.0	29.2	30.0	31.1	31.8	32.4	36.2
FR	28.5	29.1	28.9	28.8	29.3	29.7	29.9	30.7	31.7	32.4	33.0	35.2
Ø	**16.9**	**17.2**	**17.3**	**17.3**	**17.6**	**18.1**	**18.2**	**18.7**	**19.8**	**20.5**	**21.1**	**20.9**

Abbreviations:
BL = Baseline scenario
AT = Austria; BE = Belgium; BG = Bulgaria; CY = Cyprus; CZ = Czech Republic; DE = Germany; DK = Denmark; EE = Estonia; EL = Greece; ES = Spain; FI = Finland; FR = France; HR = Croatia; HU = Hungary; IE = Ireland; IT = Italy; LT = Lithuania; LU = Luxembourg; LV = Latvia; MT = Malta; NL = Netherlands; PL = Poland; PT = Portugal; RO = Romania; SE = Sweden; SI = Slovenia; SK = Slovak Republic; UK = United Kingdom; US = United States

3.6 Effect of anti-avoidance regulations

Countries have implemented a broad range of anti-avoidance measures restricting tax-planning strategies such as those discussed in this study. Switch-over clauses for certain foreign inter-company dividends, WHTs, and rules that fully deny the deduction of interest and royalty payments if the corresponding income is taxed at a low rate have already been considered in this dissertation's calculations (for details see Chapters 3.2.2 and 3.2.3). Other important and prevalent anti-avoidance measures include CFC legislation, interest deduction limitation rules, and transfer pricing regulations. The calculations presented so far assume that the loan and interest volume remain below the respective threshold values of interest deduction limitation rules that the countries may apply.[143] In addition, the level of the royalty payments in Tax-Planning Strategies 5-7 is assumed to be in line with transfer pricing rules requiring arm's length pricing of intra-company transactions. While CFC rules are disregarded in the calculations, the following paragraph discusses in detail the features of CFC rules in the EU member states and the US, as well as their potential application in the case of the considered tax-planning strategies. In addition, Chapter 3.6.2 illustrates the effect of binding interest deduction restriction rules and CFC rules on the presented CoC and EATR in a worked example.

3.6.1 CFC rules in the EU member states and the US

Many countries use CFC legislation to fight BEPS. In principal, CFC rules are designed to tax certain (usually low-taxed) foreign base company income irrespective of its actual distribution at the level of the parent company. As a result, advantages stemming from shifting profits to low-tax jurisdictions are neutralized. The overall tax burden may even turn out to be higher than it would have been had the profits never been shifted.

Table 26 provides an overview of CFC rules in the different EU member states and the US.[144] It shows that among the 28 EU member states, 14 countries have implemented CFC rules. These rules are also in place in the US.

Most countries considered in Table 26 apply CFC rules only to foreign income that is taxed below a certain threshold. This threshold may be defined as a percentage of the domestic income tax rate or in terms of an absolute value. Usually, countries refer to the actual tax paid in the foreign country when testing whether CFC rules apply. The threshold value for most countries

[143] For an overview on interest deduction limitation rules, see Chapter 4.2.1 and Spengel et al. (2016c).
[144] The overview is based on Bräutigam et al. (2017), Deloitte (2014), and the country information available on the IBFD tax research platform.

varies between 50% and 75% of the domestic tax rate. In Germany and the US, the threshold value amounts to approximately 85% and 90%, respectively. In the US, the applicable high threshold rate is relativized by a broad range of exemptions from the application of the CFC rules.[145]

Eight EU member states apply a mixed approach by referring to a low-tax threshold while also listing specific countries that are covered (black list) or not covered (white list) by the CFC rules. Following the decision of the European Court of Justice in the case of Cadbury-Schweppes[146], almost all EU member states have implemented special EU-/EEA-clauses exempting subsidiaries resident in EU or EEA member states from the application of the CFC rules if the subsidiaries do not constitute wholly artificial arrangements. An exception is Denmark, where authorities decided to extend the existing CFC rules to domestic cases after the Cadbury-Schweppes ruling. In Denmark, it is not the level of taxation but only the type of income that is decisive for the application of CFC rules.[147] Lithuania applies no EU/EEA-clause but includes all EU member states in a white list. However, companies that are resident in white list countries may also be subject to CFC rules if they benefit from preferential tax regimes. Similarly to the case of Lithuania, the UK CFC rules do not include a general EU-/EEA-clause.[148]

The Netherlands do not employ CFC rules in the narrower sense but require the annual revaluation of shareholdings in subsidiaries at market value in certain cases. If the revaluation is required, the revaluation amount is included in the taxable income of the Dutch parent company, which effectively results in the same outcome as that achieved by CFC rules. A revaluation is required if the subsidiary is taxed at a rate below 10% and at least 90% of the assets are low-taxed and passive. In addition, the subsidiary needs to be held for the primary purpose of providing a return that is comparable to the return of portfolio investments.

[145] See e.g. Ting (2014) and Ting (2015).
[146] See European Court of Justice (2006).
[147] The rules might be in conflict with the freedom of establishment, see Schmidt (2014).
[148] For details on the UK rules, see Smith (2013).

Table 26: CFC rules in the EU member states and the US 2015

	Approach	Definition of low taxation				Tax credit availability	Special EU-/ EEA-clause
		Threshold		Subsidiary location	Parent location		
		relative	absolute				
Denmark	General	-	-	-	-	yes	no
Finland	low taxation/ jurisdictional	60%	12%	actual tax paid	CIT rate	yes	yes
France	low taxation	50%	16%	actual tax paid	hypothetical tax paid	yes	yes
Germany	low taxation		25%	actual tax paid		yes	yes
Greece	low taxation/ jurisdictional	50%	13%	CIT rate	CIT rate	yes	yes
Hungary	low taxation/ jurisdictional		10%	actual tax paid		yes	yes
Italy	low taxation/ jurisdictional	50%	13.75%	actual tax paid	hypothetical tax paid	yes	yes
Lithuania	low taxation/ jurisdictional	75%	11.25%	CIT rate	CIT rate	yes	no
Netherlands	low taxation		10%	CIT rate		yes	no
Poland	low taxation/ jurisdictional	75%	14.25%	actual tax paid	CIT rate	yes	yes
Portugal	low taxation	60%	12.60%	actual tax paid	hypothetical tax paid	yes	yes
Spain	low taxation	75%	15.75%	actual tax paid	CIT rate	yes (except tax haven)	yes
Sweden	low taxation/ jurisdictional	55%	12.10%	actual tax paid	CIT rate	yes	yes
UK	low taxation/ jurisdictional	75%	15%	actual tax paid	CIT rate	yes	no
US	low taxation	90%	29.97%	actual tax paid	CIT rate	yes	no

In all included countries, the relevant types of income of the different tax-planning strategies considered in this study (royalty and interest income) qualify as CFC income. In most countries, foreign taxes can be credited against the taxes levied on CFC income in the parent country. In countries where no tax credits are granted, the application of CFC rules is likely to lead to a higher overall tax burden than in a scenario without tax planning. In Hungary, CFC rules will only apply if the Hungarian parent company is controlled by Hungarian individual investors. In all other countries listed in Table 26, CFC rules apply at the level of the parent company.

For the seven tax planning structures considered in this study, the above summary of CFC rules allows for the following conclusions.

(1) If the intermediate company was located in Offshore no treaty, CFC rules could apply in all countries listed in Table 26.

(2) If the intermediate company was located in Offshore treaty, CFC rules could apply in most countries listed in Table 26. No CFC rules should apply in Hungary, as Hungary generally excludes treaty countries from its CFC legislation if the tax payer has a real economic presence in the subsidiary country. If Offshore treaty only exempted dividends, interest, and royalties from taxation but generally levied a CIT rate above the CFC threshold levels, CFC rules could be avoided in those countries that define low taxation based on the nominal foreign tax rate in the subsidiary country.

(3) If the intermediate company was located in Average, CFC rules should not apply in any of the EU member states, except for Denmark, as the tax level in Average (i.e. 23%) is higher than the low-tax threshold in all of these countries, except for Germany. All EU member states that refer to the actual tax paid at the level of the subsidiary in their CFC rules (e.g. Germany) have special EU-/EEA-clauses or comparable rules in place. Hence, also in the case of "Hybrid Financing via Average", CFC rules in these countries should not apply if the intermediate company had sufficient substance. The U.S. CFC rules may apply to the income of AVERAGE. However, there are several exemptions to the U.S. CFC rules that allow for the avoidance of the application of the rules.[149]

(4) For Tax-Planning Strategy 7, in which the intermediate company (SUBSPB) is resident in an EU member state offering an IP-box, the EU-/EEA-clauses should apply if SUBSPB had sufficient substance. In Lithuania, no special EU/EEA-clause exists. Companies benefiting from a favourable tax regime in a white list country (including all EU and EEA

[149] See e.g. Finley (2015), p. 294; Avi-Yonah (2016), p. 69.

countries) are subject to Lithuanian CFC legislation. Thus, the CFC rules in Lithuania may apply if the "IP tax planning via IP-box countries" strategy is used. Although the CFC rules in the UK do not include a special EU-/EEA-clause either, these CFC rules presumably would not apply to income of SUBSPB if the latter had sufficient substance. This is because the UK CFC legislation gateway provisions are intended to target only profits that have been artificially diverted from the UK. Hence, Denmark and Lithuania are likely to be the only EU member states for which CFC rules could apply under Tax-Planning Strategy 7. In addition, the CFC rules in the US are generally applicable to royalty income of SUBSPB. However, several possible methods to avoid the application of U.S. CFC rules exist.

To conclude, for most parent companies that are resident in countries that apply CFC rules, using the "Hybrid financing via Average" strategy or holding IP in a country that offers an IP-box regime proves to be more beneficial than other tax-planning strategies. This is because conducting tax planning via EU member states facilitates avoidance of the application of CFC rules.

3.6.2 Examples of the effect of CFC and interest deduction limitation rules on the CoC for "Financing via Offshore treaty"

Neither CFC rules nor interest deduction limitation rules are considered in the CoC and EATR calculations for the tax-planning strategies, as the underlying framework cannot adequately model such rules. However, the following simplified example illustrates the effect of binding CFC and thin capitalization rules in the case of an outbound investment from France to Belgium using the "Financing via Offshore treaty" tax-planning strategy. The example assumes RE financing of both OFFSHORE treaty and MNPC, and it considers an investment only in an intangible asset.

To calculate the CoC for a marginal cross-border investment using the "Financing via Offshore treaty" strategy, the following formula applies:

$$p = \frac{(1-\tau_S \varnothing_{S0})(1+\rho)}{(1-\sigma_{SO})(1-\tau_S)(1+\pi)} - \frac{(A_S - \tau_S \varnothing_{S0})(1+\rho)}{(1-\tau_S)(1+\pi)} - \frac{(1-\delta)(1-A_S)}{(1-\tau_S)}$$
$$- \frac{(1-\tau_S \varnothing_{S0})}{(1-\sigma_{SO})(1-\tau_S)(1+\pi)} + \frac{(1-\tau_S \varnothing_{S0})}{(1-\tau_S)(1+\pi)} - \frac{i(1-\tau_S \varnothing_{S0})(1-\omega_{SO})}{(1-\sigma_{SO})(1-\tau_S)(1+\pi)} \quad (7)$$
$$+ \frac{i(1-\tau_S \varnothing_{S0})}{(1+\pi)} - \delta$$

This formula is derived by setting Equation (3) (see Chapter 3.3.2.1) equal to zero and solving it for p. Inserting the respective parameters for the countries of France, Belgium, and Offshore treaty, the following equation yields CoC of the investment of about 2%.

$$p = \frac{(1-0)(1+0.071)}{(1-0)(1-0.3399)(1+0.02)} - \frac{((0.9439*0.3399)-0)(1+0.071)}{(1-0.3399)(1+0.02)}$$
$$- \frac{(1-0.1535)(1-(0.9439*0.3399))}{(1-0.3399)} - \frac{(1-0)}{(1-0)(1-0.3399)(1+0.02)} + \frac{(1-0)}{(1-0.3399)(1+0.02)} \quad (8)$$
$$- \frac{0.071(1-0)(1-0)}{(1-0)(1-0.3399)(1+0.02)} + \frac{0.071(1-0)}{(1+0.02)} - 0.1535$$
$$= 0.02$$

This very low CoC results from a full exemption of the return of investment from profit taxes and the high present value of savings from tax depreciation in Belgium.

If CFC rules applied in France, the interest income earned in period t+1 by Offshore treaty would immediately be taxed as ordinary income in France. As a result, the interest income would be subject to the French CIT rate of 38.93%. This is modelled by multiplying Term 7 of Equation (3) and correspondingly Term 6 of Equation (7) by $(1-\tau_P)$, which determines the additional tax burden on the interest in the parent country. This change results in a CoC of 6.1%. Direct debt financing from MNPC to SUBS in the baseline scenario renders the same CoC. The CoC under this direct financing strategy is higher than under RE financing of SUBS, which is the optimal financing strategy for direct investments from France to Belgium. For intangibles, this financing strategy results in a CoC of only 4.7%.

An application of interest deduction limitation rules in Belgium increases the CoC to 5.6%. To calculate this value, the factor τ_S in Term 8 of Equation (3), which represents tax savings from

interest deductibility, is set to zero. Although the full interest payment is taxed in Belgium and there are no further tax consequences at the level of OFFSHORE treaty, the resulting CoC is again higher than it is for tax-efficient direct financing (RE financing) of the Belgium subsidiary. The reason for this lies in the combination of non-deductible interest payments and the lack of an opportunity to benefit from the ACE regime under the "Financing via Offshore treaty" strategy due to debt financing of the subsidiary.

These two examples illustrate that anti-avoidance measures, such as CFC rules and interest deduction limitation rules, have the potential to fully eliminate tax advantages derived from the use of tax-planning strategies. In addition, compared to investing directly in the subsidiary using optimal financing from the parent company, anti-avoidance measures are likely to increase the tax burden of an investment further if certain tax-planning strategies are applied.

3.7 Summary

The ongoing debate on aggressive tax planning of multinationals suggests that companies use profit shifting via interest and royalty payments to significantly reduce the effective tax burden on their global profits. To provide a more general insight into tax burden effects of international tax planning, the Devereux/Griffith model is used to calculate CoC and EATRs for cross-border investments between all EU member states and the US, applying representative profit-shifting strategies. The results of these calculations are compared to the CoC and EATRs for tax-efficient direct cross-border investments not involving representative profit shifting strategies.

For tax planning via an intermediate financing company resident in a tax-exempt country that grants a loan to its subsidiary and receives the marginal return of the investment as interest, the mean CoC across all investment combinations decreases by 1.6 percentage points (from 5.7% to 4.1%) and the mean EATR decreases by 4.7 percentage points (from 20.9% to 16.2%).

If marginal profits were instead shifted via interest payments to an average EU country with a CIT rate of 23%, the CoC and EATR would only decrease for investments between high-tax countries. On average, if this tax-planning strategy was used instead of an investment directly financed by the parent company, the CoC for cross-border investments would increase by 0.1 percentage points (from 5.7% to 5.8%), and the EATR would increase by 0.7 percentage points (from 20.9% to 21.6%).

If the financing company resident in the average country granted a hybrid loan to the subsidiary and the average country treated the returns as tax-exempt dividends, the mean CoC across all investment combinations would decrease by 1.9 percentage points (from 5.7% to 3.8%), and

the mean EATR would decrease by 6.6 percentage points (from 20.9% to 14.3%), compared to direct financing. Hence, this tax-planning strategy is generally superior to using a financing company in a tax-exempt country. This result is driven by investments from parent companies residing in low-tax countries for which debt financing of the financing company is optimal. However, parent companies that are resident in high-tax countries may also benefit from this strategy, since it often proves advantageous compared to using a financing company resident in a non-EU tax-exempt country. This is because CFC rules are less relevant in a European context.

For IP tax planning using an IP holding company resident in a tax-exempt country that licenses IP to the subsidiary abroad, the mean CoC decreases by 0.1 percentage points (from 5.7% to 5.6%) and the mean EATR decreases by 3.4 percentage points (from 20.9% to 17.5%). These results assume that IP tax planning only allows for the shifting of returns derived from the intangible but not from the other four assets considered in the model. As anecdotal evidence of the tax-planning strategies of multinationals like Google and Ikea suggests,[150] companies may in reality be able to shift larger shares of profits via royalties. Assuming that a company generated its income solely through the use of intangibles, the mean CoC would decrease to 4.7%, and the mean EATR would decrease to only 2%. This shows that IP tax planning results in effective tax rates of close to zero for profitable companies with a business model that mainly relies on intangible assets.

Owning IP in an EU member state that offers an IP-box regime and then licensing that IP to a subsidiary reduces the mean CoC and EATR for many cross-border investments below the mean CoC and EATR in the baseline scenario. However, depending on the residence country of the parent and the subsidiary company, as well as the attractiveness of the IP-box regime, the CoC and EATR may also exceed the respective results in the case of direct investments. According to the results of this study, Portugal offers the most attractive IP-box regime for marginal investments. It allows for the deduction of interest and depreciation expenses at the high statutory CIT rate, while it taxes IP income at the low IP-box tax rate. Conducting IP tax planning using the IP-box in Portugal reduces the mean CoC by 0.6 percentage points (from 5.7% to 5.1%) for marginal cross-border investments in all five assets. For profitable investments, Hungary offers the most attractive IP-box regime, reducing the mean EATR to 16.9%, which is lower than for both IP tax planning via a tax-exempt country and intra-company financing via a tax-exempt country. When considering only the investment in the intangible asset,

[150] See Chapter 2.1 for details.

if the Hungarian IP-box regime was used, the mean CoC and the mean EATR would decrease to 2.8% and to -1.0%, respectively. These calculations indicate that in particular IP-box regimes that permit an asymmetric treatment of income and expenses offer the highest tax-saving potential of all tax-planning strategies considered.

Anti-avoidance measures, such as WHTs, switch-over clauses for intercompany dividends, thin capitalization rules, and CFC regulations, reduce the tax savings from tax-planning strategies. Not only this, but they often even increase CoC and EATR above what would result in the case of a direct investment in the subsidiary using the most tax-efficient form of direct financing.

4 Anti-avoidance measures that extend taxation of interest and royalties at source

In Chapters 2 and 3, it has been demonstrated that some multinational companies engage in extensive profit shifting using different tax-planning strategies. This allows those companies to substantially reduce their effective tax burden on cross-border investments. In this chapter, arguments for extending taxation of interest and royalties at source to tackle BEPS are provided. In addition, different aspects of existing and alternative regulations that extent the taxation of interest and royalties at source are investigated.

The chapter is structured as follows: Chapter 4.1 refers to the problems of BEPS and analyses general options for reform. In Chapter 4.2, an overview of current country practice regarding measures that extend the taxation of interest and royalties at source is given. In addition, empirical evidence of the effectiveness of these measures is summarized. An own empirical study investigates the interdependency of profit shifting channels and its consequences for the effectiveness of anti-avoidance legislation. Chapter 4.3 presents alternative measures for extending taxation of interest and royalties at source. These measures all avoid double taxation but are considered by neither the OECD nor the European Commission. Moreover, Chapter 4.3 provides rough estimates of the tax revenue gains and losses resulting from two of the reform options in selected countries.

4.1 Problems of BEPS and general options for reform[151]

While the presented tax-planning strategies make use of existing international tax law and are not illegal,[152] they are perceived as unfair, since they are only available for certain multinational corporations.[153] Purely domestic companies, small companies, and individuals cannot avoid taxation to such an extent. This harms the ability-to-pay principle: a fundamental legal concept that requires all taxpayers with the same ability-to-pay to carry the same tax burden, thus ensuring tax equity.[154] A violation of this principle results in an unequal distribution of the tax burden and harms the integrity of the tax system. Moreover, a different taxation of tax-payers with the same ability-to-pay is inefficient from an economic perspective.[155] The economic principle of capital export neutrality requires domestic and foreign investments to be taxed equally.

[151] This chapter builds on Fuest et al. (2013); Fuest et al. (2015), and Spengel/Nusser (2015b), and includes extracts of these works.
[152] For the distinction between tax fraud, tax evasion, tax avoidance, and (aggressive) tax planning, see Essers (2014), p. 58.
[153] See also Saint-Amans/Russo (2016), p. 236; van de Vijver (2015), p. 240.
[154] See Schön (2009), pp. 71-75; Fleming et al. (2001), p. 309.
[155] See also Wilde (2015), p. 439.

An unequal treatment of these types of investment distorts production efficiency because it distorts competition between firms with different opportunities to avoid taxes.[156]

Both taxation according to the ability-to-pay principle and the principle of capital export neutrality can be achieved by full taxation of worldwide profits in the residence country of the shareholder.[157] In practice, this is difficult to achieve. Profits are therefore taxed at the corporate level. At this level, a taxation in line with the two aforementioned principles would require the multinational parent company to be liable to tax on its accrued worldwide income.[158] This requires that no permanent deferral of taxation in the parent country is possible.

Generally, an immediate taxation of income arising under the considered tax-planning strategies at the level of the parent company can be achieved using CFC rules. Many countries already apply such legislation.[159] However, the tax planning arrangements summarized in Chapter 2.1 illustrate that, for example, the CFC rules in the US may easily be circumvented due to a broad range of exceptions. Action 3 of the OECD BEPS action plan therefore provides recommendations for the design of CFC rules to ensure an effective prevention of BEPS.[160] For EU member states, CFC rules will be obligatory by the end of 2018.[161] The EU Anti-Tax Avoidance Directive requires that all member states introduce CFC rules that tax certain undistributed passive income of subsidiaries (including interest and royalty income) in the residence country of the parent. Instead of applying a catalogue of passive income, the member states may also use an alternative approach by referring more generally to all income derived under an artificial arrangement. The directive determines that CFC rules only need to apply to income taxed below 50% of the tax rate in the residence country of the parent company. In addition, for low-taxed passive income of subsidiaries in EU member states, an exception needs to be provided if the subsidiary conducts a substantial economic activity, with employees, assets, and property. This takes account of requirements implied by the jurisdiction of the European Court of Justice and offers options for circumventing the application of the rules.[162]

Without question, effective CFC rules would render BEPS unattractive for multinational corporations by tackling the first flaw of the international tax system identified in Chapter 2.3.

[156] For this and alternative economic neutrality concepts, see Endres/Spengel (2015), pp. 19-36; Spengel (2013); Schön (2009), pp. 78-84.
[157] See Spengel (2013); Schön (2009), p. 79; Kleinbard (2011b), p. 103.
[158] The last two sentences are taken from Fuest et al. (2013), p. 317.
[159] For an overview, see e.g. Deloitte (2014) and Chapter 3.6.1.
[160] See OECD (2015c)
[161] See Council Directive (EU) 2016/1164 of 12 July, 2016.
[162] See European Court of Justice (2006). On the compatibility of the OECD BEPS Proposals with EU Law, see Panayi (2016).

However, it is likely that, in particular in an EU context but also in countries like the US that actively weaken the application of CFC rules for policy reasons, the regulations will remain largely ineffective due to exemptions.[163] Besides this, most countries currently apply the exemption method to dividends.[164] This requires CFC rules to also target immediately distributed profits. Since the EU Anti-Tax Avoidance Directive states that CFC rules shall apply to undistributed passive income, it seems that countries do not need to apply the rules to distributed profits. This would enable circumvention of CFC rules by immediately distributing low-taxed passive income. Instead of applying CFC rules to income irrespective of its distribution, countries could apply a switch-over clause that ensures the taxation of distributed low-taxed passive income. A similar rule has been considered by the European Commission[165] but is not included in the final Anti-Tax Avoidance Directive. The OECD also does not recommend a switch-over clause.

An alternative option for reducing BEPS is to target the second element of the international tax system that fosters aggressive tax planning explained in Chapter 2.3. This includes amongst others the existence of tax havens, preferential tax regimes, favourable tax rulings and hybrid mismatches. A low taxation of mobile income exists in several countries engaging in tax competition and thus actively promoting BEPS. Different actions of the OECD BEPS action plan deal with such regimes. Dual resident corporations are targeted by a new regulation in Art. 4 (3) of the OECD model treaty, which stipulates a mutual agreement procedure to determine residence for purposes of the treaty.[166] In addition, under Action 5, countries have agreed on the nexus approach, requiring all existing IP-box regimes in Europe to be redesigned. In the future, such regimes may only grant beneficial treatment for income related to qualifying expenses that have been carried by the taxpayer itself, excluding to some extent acquisition costs and costs from outsourcing to related parties.[167] Costs under cost-sharing agreements may qualify if an appropriate portion of R&D activity is undertaken by the firm. Similar substance requirements have also been developed for other preferential regimes. Moreover, OECD member states are now obliged to exchange information on certain tax rulings, increasing the transparency of favourable tax treatments granted to individual companies. Since 2017, EU member

[163] For the US, see Kane (2014), p. 321, Finley (2015), p. 294; Ting (2015). For EU member states, see Parillo (2014). See also Dourado (2015b), p. 5.
[164] See Kofler (2012).
[165] See European Commission (2016b). However, this rule was not only targeted at passive income.
[166] See OECD (2015f).
[167] See OECD (2015e).

states must also automatically exchange cross-border rulings.[168] In addition, the European Commission has launched state aid investigations into past tax rulings granted to large multinationals in different member states. Some tax rulings have already been declared to constitute state aid.[169]

The binding restrictions for preferential tax regimes and the exchange of rulings are important measures against BEPS and will make it more difficult for multinationals to achieve very low effective tax rates on interest and royalty income.[170] However, these rules do not prevent multinationals from making use of generally low CIT rates and certain tax havens outside of OECD member states. In addition, countries engaging in tax competition may implement alternative preferential regimes that are not tackled by the OECD BEPS action plan, or they may generally reduce their CIT rates.[171] Besides, BEPS is not only related to an unequal taxation of different types of taxpayers but also to a perceived unfairness in the distribution of taxing rights, and consequently tax revenue, between countries.[172]

The latter issue can be targeted with anti-avoidance measures that directly deal with the third element of the international tax system generating BEPS risks identified in Chapter 2.3: the lack of taxation of interest and royalty payments in the residence country of the payer. Taxing (part of) these payments in the residence country of the payer is a way to ensure an effective minimum taxation of the worldwide income of multinational corporations while also reallocating taxing rights.[173] For both interest and royalty payments, there exists no clear notion of where such interest or royalty income originates and thus should be taxed.[174] For royalties, for example, up to four different jurisdictions may claim to be the state of origin due to the existence of a certain economic link: the country where the intangible has been developed, the country where the intangible is owned, the country where the intangible is used in production, and the country in which the finished products protected by a patent or trademark are sold.[175] The place of value

[168] See Council Directive (EU) 2015/2376 of 8 December, 2015.
[169] See also Chapter 2.1.2. For a general introduction to EU state aid, see Kalloe (2011).
[170] See also Aujean (2014), p. 63.
[171] See Hong and Smart (2010), reinterpreting an argument by Keen (2001). The authors argue that limiting profit shifting of multinational companies may intensify tax competition because profit shifting can be seen as a form of price discrimination between more and less mobile tax bases. Not allowing this price discrimination may force countries to reduce the tax burden on all firms. This is taken from Fuest et al. (2015).
[172] See also Sheppard (2013), p. 12.
[173] See also Pinto (2007), p. 282.
[174] See Schön (2015), p. 275. Generally, the following is also transferrable to other transfer prices. However, especially for transfer prices of common goods, the risk of extensive profit shifting can more easily be tackled by transfer pricing regulations, so that no further anti-avoidance regulations may be necessary. Consequently, the focus is on source taxation of interest and royalties in the following.
[175] See Schön (2012), p. 222-223.

creation of IP is rather ambiguous. Consequently, taxing at least part of interest and royalty income in the residence country of the payer can generally be justified. For interest payments, a limited taxing right in the residence country of the payer is reflected in Art. 11 (2) of the OECD and UN model treaty, while for royalties it is only reflected in Art. 12 (2) of the UN model treaty.

The taxation of interest and royalties in the country where they arise is easy to administer in a cross-border context and does not require knowledge of the whole company structure. Moreover, a taxation of outgoing interest and royalties in the residence country of the payer is not precluded by either the principle of capital export neutrality or the ability-to-pay principle.[176] However, these principles require that taxes withheld at source are credited in the residence country.

To conclude, partial taxation of interest and royalties in the residence country of the payer is a pragmatic way to reduce profit shifting incentives and thus the advantage stemming from tax planning. Simultaneously, it ensures that source countries where the multinational uses the capital and intangibles receive a certain share of the total tax revenue. However, it must be stressed that increased source taxation is only recommendable if double taxation is avoided.[177] This requires cooperation between countries and will lead to a redistribution of tax revenue.

4.2 Forms and effectiveness of existing measures for taxation of interest and royalties at source

Chapter 4.1 has demonstrated that anti-avoidance measures extending taxation of interest and royalties at source are a pragmatic and accurate way of combating BEPS. This chapter provides an overview of the different forms of such anti-avoidance rules that are currently applied and summarizes the recommendations of the OECD and the European Commission for increased source taxation of interest and royalties. In addition, empirical evidence on the effectiveness of these anti-avoidance measures is presented. Chapter 4.2.1 summarizes current country practice.[178] In Chapter 4.2.2, an overview of empirical findings on the effectiveness of transfer pric-

[176] See Schön (2009), p. 73 and 79.
[177] Although it is actually impossible to unambiguously define the source of interest and royalty income, in the following, the residence country of the interest and royalty payer will be referred to as the source state.
[178] This chapter is a slightly modified extract of Finke et al. (2014).

ing regulations and interest deduction limitation rules is given. In Chapter 4.2.3, the interdependency of profit-shifting channels and its consequences for the effectiveness of anti-avoidance measures are studied empirically.[179] Finally, Chapter 4.2.4 concludes.

4.2.1 Current country practice[180]

In the past two decades, in order to protect tax revenue, many developed countries have introduced regulations limiting opportunities for extensive tax base erosion through interest and royalty payments.

Most countries have transfer pricing regulations in place that are based on the arm's length principle for intragroup transactions as set out in Art. 9 of the OECD model treaty.[181] According to the arm's length principle, the price for transactions between related companies should equal the price that independent parties would have agreed on.[182] If a country applies the arm's length principle, royalties and interest payments will only be tax deductible up to the arm's length price. However, in many cases no comparable transactions between unrelated parties exist.[183] This is particularly true for royalty payments, since these are usually related to unique intangible property.[184] Similar difficulties arise for interest income, as a large range of levels of debt and corresponding interest rates may be justifiable.[185] Besides the general application of the arm's length principle, most countries have introduced detailed transfer pricing documentation rules in recent years.[186]

The new OECD transfer pricing guidelines developed under BEPS Actions 8-10 put a stronger focus on enhancing the alignment of transfer pricing outcomes with value creation.[187] While

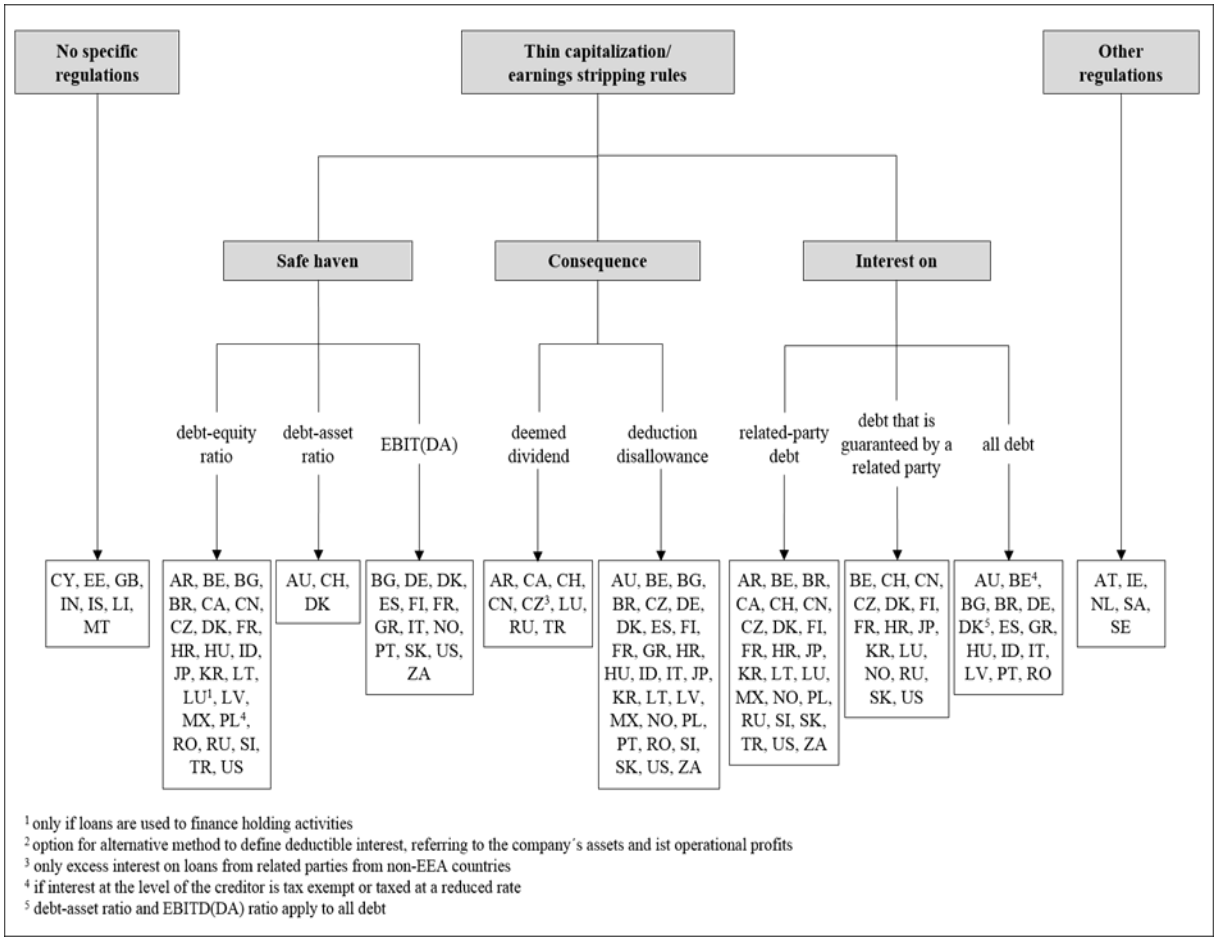
[179] This is a joint work with Katharina Nicolay and Olena Pfeiffer and was published in a modified version as ZEW Discussion Paper 17-066, see Nicolay et al. (2017).
[180] The following analysis excludes hybrid mismatch rules that deny the deduction of payments that give rise to deduction-no-inclusion or double-deduction outcomes. Such rules may apply in either the source or the residence country and are thus not an exclusive tool for enhancing source taxation. Clearly, in the context of BEPS resulting from hybrid mismatch arrangements, these rules are superior to the rules explained in this and the following chapter. Anti-hybrid mismatch rules are recommended by the OECD and included in the EU-Anti-Tax Avoidance directive.
[181] See Eden (2016), p. 153 and Eden (2009), p. 602. For an overview of country practice, see Zinn et al. (2014).
[182] For an in-depth consideration of the arm's length standard, see Schoueri (2015).
[183] See also Brauner (2014), p. 619.
[184] See Eden (2016), p. 164.
[185] See also Burnett (2014), pp. 62-63 and 70.
[186] For an overview of country practice with respect to different forms of transfer pricing regulations, see Zinn et al. (2014). See also Chapter 4.2.3.2.2.
[187] See OECD (2015h).

these new guidelines may help to determine an appropriate price in certain cases they cannot overcome the general difficulty in pricing highly company-specific assets and transactions.[188]

In addition to transfer pricing rules, an increasing number of countries apply regulations that limit interest deductibility. The precise regulations differ across countries and have changed over time. Figure 6 provides an overview of current country practices in all EU, EFTA, and G20 member states.[189]

Countries that do not stipulate specific regulations to limit interest deduction usually include excessive debt financing in their transfer pricing or general anti-avoidance rules (GAAR).

Figure 6: Regulations limiting interest deduction in domestic tax law in all EU, EFTA, and G20 member states (2016)[190]



[188] See also Owens (2013).
[189] For a comparison of country practice with respect to regulations limiting the deductibility of interest at source, see also Webber (2010); Henry et al. (2008); Bohn (2009); Hey (2015).
[190] The figure is based on data available from the IBFD tax research platform.

Thin capitalization or earnings stripping rules differ with respect to the defined acceptable level up to which interest expenses are fully deductible. This so-called safe haven[191] could refer to a predefined debt-to-equity ratio (D/E ratio) or debt-to-asset ratio (thin capitalization rules). It could also refer to the relation between earnings before interest and taxes (EBIT) or earnings before interest, taxes, depreciation and amortization (EBITDA) and interest expenses (earnings stripping rules). Under the debt-to-equity criterion, interest expenses are fully deductible if the D/E ratio does not exceed a certain threshold. Interest related to any excess debt is not deductible. However, in some countries that apply a D/E ratio rule, companies may deduct interest related to the excess debt if they demonstrate that the debt level is at arm's length.[192] Countries that apply a debt-to-asset ratio allow a full deduction of interest only to the extent that the debt is within the asset-based ratio. If the safe haven is defined with respect to some profit measure, net interest expenses are deductible as long as they do not exceed a certain share of profits (e.g. 30% of EBITDA in Germany). Some countries, such as France, the US, and Denmark, employ two or all three criteria in combination.

A second dimension in which the thin capitalization and earnings stripping regulations differ is the treatment of disqualified interest expenses. In some countries, these are considered as hidden profit distributions and are therefore reclassified as deemed dividends. Re-characterizing disqualified interest expenses ensures that the tax treatment in the hands of the creditor corresponds to the treatment at the level of the debtor and that the interest is thus not taxed twice. In the international setting, this can of course only be achieved if the residence country of the creditor endorses this re-classification. In most countries, disqualified interest is a non-deductible expense, which potentially results in double taxation of the underlying interest even in a purely domestic setting. However, in some countries (e.g. Germany), non-deductible interest expenses may be carried forward for several years. Especially in cases where the deductibility is defined with respect to a volatile measure such as EBIT(DA), this seems reasonable to mitigate business-cycle effects.

Finally, the different regulations can be distinguished with respect to the scope of covered debt. Some countries solely include related-party debt or debt that a related party guarantees for. The underlying rationale is that these financial contracts are the most likely to be influenced by tax planning considerations because they are controlled by the multinational group. Other countries

[191] Please note that although the term safe haven often refers to regulations that apply a fixed D/E ratio while still allowing excess interest deductions that are proven to be at arm's length, it is used in a broader sense here.
[192] See also Burnett (2014), p. 54.

extend the regulation to all debt. Hence, they target not only intragroup profit shifting but also the general tax incentive for debt financing, which is already present in a purely domestic setting.

Some countries do not apply general thin capitalization or earnings stripping rules but make use of regulations denying the deductibility of interest payments in specific cases. In Austria, for example, interest is qualified as a hidden profit distribution if the level of equity is considered to be inadequate. Moreover, with effect from March 2014, interest and royalties paid to related companies will not be deductible if the income is subject to an effective taxation at a rate of less than 10 % at the level of the recipient.[193] In addition to its thin capitalization rules, France applies two other provisions that limit interest deductibility. If the net financial expenses exceed €3 million, only 75% of the total net financial expenses on both intragroup and third-party debt are deductible for tax purposes. Moreover, interest is not deductible if the tax paid by the lender is lower than 25% of the French CIT. Ireland will treat an interest payment as hidden profit distribution if it is not paid in the course of trade to a non-EU foreign company that is a 75% affiliate. Additionally, interest is non-deductible insofar as it exceeds a (difficult to determine) normal commercial rate. The Netherlands abolished their thin capitalization rules in 2013 and now apply several complex and highly specific interest deduction restriction rules. Slovenia denies the deduction of interest paid to countries outside the EU that offer an average nominal tax rate of less than 12.5%. All relevant countries are included in a list published by the Ministry of Finance. In Sweden, interest paid to affiliated companies is not deductible if the interest income is taxed at a rate of less than 10% at the level of the recipient, unless the recipient is resident in an EU member state or treaty state and the loan is motivated by business reasons. In addition, Sweden denies the deduction of interest paid to affiliates even if the income is taxed at a rate of at least 10% in the case the main reason for the underlying loan is to obtain a substantial tax benefit.

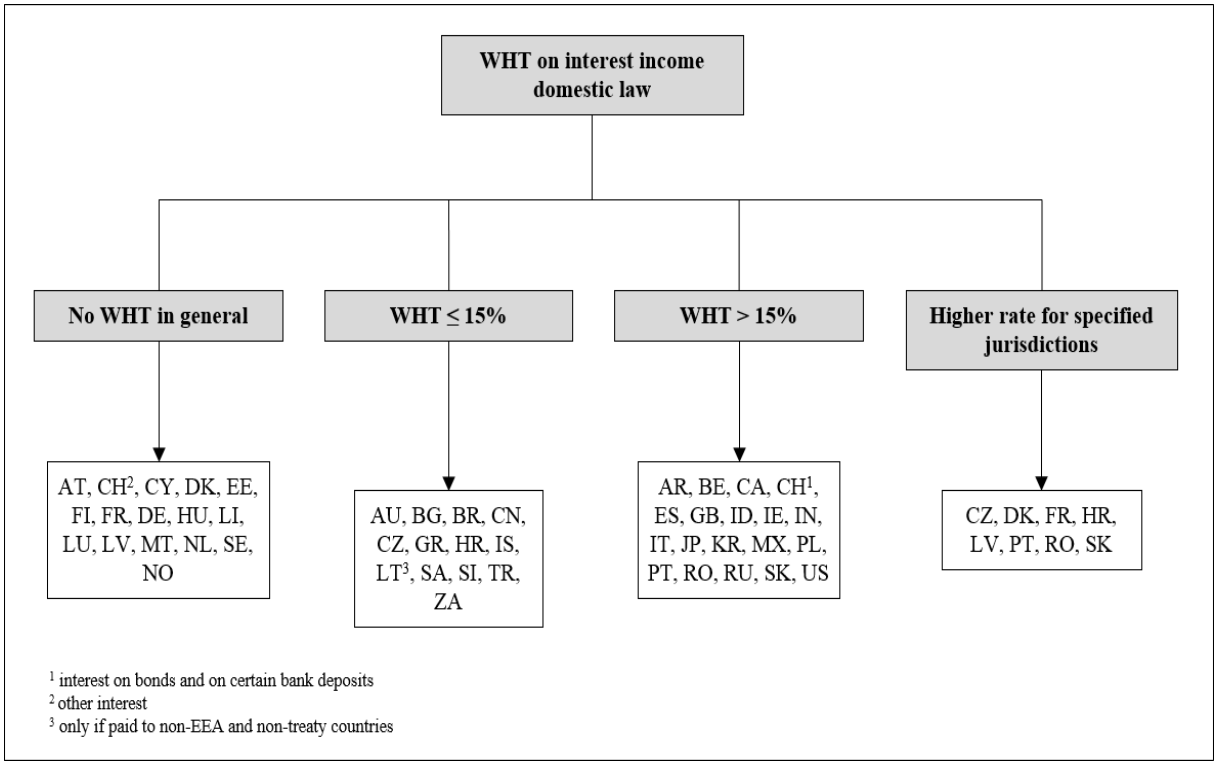
A problem of all interest deduction limitation rules based on a fixed ratio is that it is impossible to define one ratio that is appropriate for all kinds of businesses.[194] Hence, thin capitalization and earnings stripping rules usually remain quite broad in their general application and are not limited solely to aggressive tax planning. As a consequence, escape clauses may be necessary, such as de minimis rules or regulations that exempt companies with an equity-to-assets-ratio below the ratio of the worldwide group (as currently applied in Germany). Escape clauses,

[193] For details, see Peyerl (2014).
[194] See Burnett (2014), p. 63; Yuan (2015), p. 276.

however, increase the complexity of thin capitalization and earnings stripping rules and provide loopholes for multinationals to circumvent the application of the underlying rules. In addition, fixed ratio rules may result in double taxation, especially if no carry back or forward of non-deductible interest is provided or the company suffers from constant losses.

Another way to prevent extensive tax base erosion is to levy WHTs on interest and royalties. Due to the EU Interest and Royalties Directive, however, no WHTs may be levied on interest and royalty payments resulting from intragroup transactions within Europe. With respect to third countries, country practice differs.

Figure 7: WHT rates on interest income in domestic tax law in all EU, EFTA, and G20 member states (2016)[195]

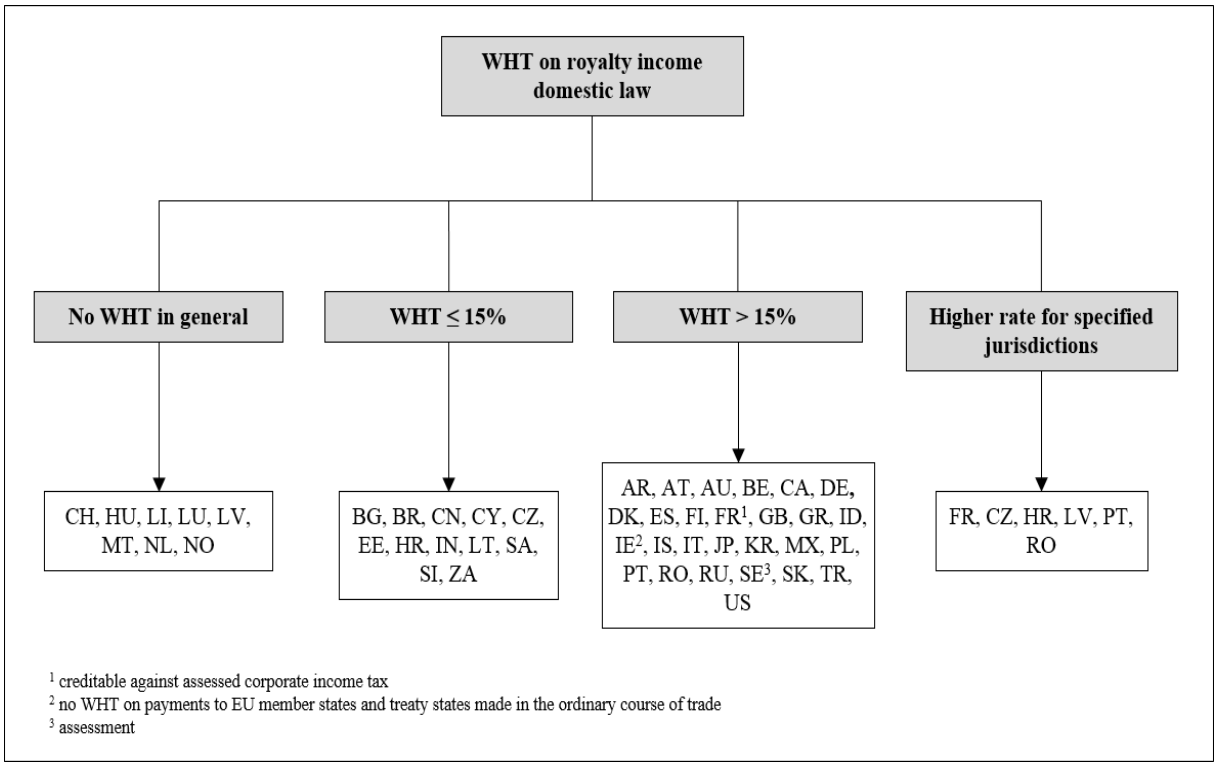


As illustrated by Figure 7 and Figure 8, several countries do not apply WHTs on interest and royalty income earned by foreigners under domestic law. Other countries levy WHTs on foreign interest and royalty income at differing rates. These rates usually remain in a range that corresponds to the applicable CIT rates, and they are reduced under tax treaties. Some countries apply specific WHT rates for interest and royalties paid to group entities resident in special low-tax jurisdictions. The Czech Republic and Romania, for example, apply a higher WHT rate on

[195] Figure 7 is based on data available from the IBFD tax research platform.

interest and royalty payments if the receiving company is resident in a country with which no treaty or information exchange agreement has been concluded. The Slovak Republic charges higher WHT rates on interest and royalty payments to so-called non-contracting countries, which are not listed on a white list. Croatia levies a higher WHT if no treaty with the residence country of the receiving company has been concluded and the tax level of the residence country is below a certain threshold. The same holds true for interest payments in Denmark. Portugal, France, and Latvia apply higher WHT rates for interest and royalty payments made to residents of listed tax havens.

Figure 8: WHT rates on royalty income in domestic tax law in all EU, EFTA, and G20 member states (2016)[196]



The OECD deals with base erosion using interest payments through Action 4 of the OECD action plan. In the final report on Action 4, the OECD calls on countries to introduce interest deduction limitation rules, and it presents best practices for these rules.[197] According to these best-practices an interest deduction limitation rule should target intragroup payments and restrict the allowable level of deductible net interest to 10%-30% of EBITDA. Moreover, the report advocates additionally including a group ratio test allowing companies that exceed the

[196] Figure 8 is based on data available from the IBFD tax research platform.
[197] See OECD (2015b).

acceptable ratio of interest/EBITDA to deduct interest up to the net third party interest/EBITDA ratio. Alternatively, the group ratio rule could be designed to compare the D/E ratio of the entity to that of the group. To take account of earnings volatility, the report proposes to refer to the average EBITDA of current and past years and to include a carry-forward and/or backward of non-deductible interest and unused EBITDA levels. In addition, countries may include de minimis thresholds, up to which interest is always deductible.[198]

Applying an earnings stripping rule will be mandatory for member states of the EU from the end of 2018. The rule defined in the EU Anti-Tax Avoidance Directive[199], like the rule proposed by the OECD, highly resembles the German earnings stripping rule. Under this rule, internal and external interest shall only be deductible up to 30% of EBITDA. In addition, the member states may apply the following: one of the group ratio tests that are also recommended by the OECD, an exemption for interest below €3 million and a stand-alone clause that exempts companies that are not part of a multinational group. For non-deductible interest, member states may allow an unlimited carry-forward, which may be combined with an option to carry back the interest up to three years.

Neither the OECD nor the European Commission recommends comparable rules for royalties or levying WHTs on interest and royalties as measures against base erosion.

4.2.2 Empirical evidence of the effectiveness of transfer pricing regulations and interest deduction limitation rules

There are several empirical studies of the effectiveness of transfer pricing regulations and interest deduction limitation rules.

Wamser,[200] Weichenrieder and Windischbauer,[201] and Overesch and Wamser[202] have analysed the impact of the 2001 tax reform in Germany, which led to a tightening of thin capitalization regulations. They argue that a direct consequence of the reform was a reduction in the amount of intra-company loans granted to German companies by their foreign affiliates. Buslei and Simmler[203] and Dressler and Scheuering[204] have investigated the new German interest stripping

[198] For an analysis of the OECD recommendations, see also Vleggeert (2016b).
[199] See European Commission (2016b); for details see also Gutmann et al (2016).
[200] See Wamser (2014).
[201] See Weichenrieder/Windischbauer (2008).
[202] See Overesch/Wamser (2010).
[203] See Buslei/Simler (2012).
[204] See Dressler/Scheuering (2012).

rule introduced in 2008 and show that companies affected by this reform responded by decreasing their debt-to-assets ratios.

Buettner et al. have used data on subsidiaries owned by German multinationals and located in EU and OECD member states. The data covers the period from 1996-2004.[205] This study shows that the introduction of thin capitalization regulations with a D/E ratio of 2:1 in a country with a tax rate of 34% (sample average tax rate) reduces the share of internal debt. This is by 3.2 percentage points if the D/E ratio refers to internal debt and 6.6 percentage points if it refers to total debt. Based on data for the years 1982-2004, Blouin et al. have provided evidence for a reduction of the internal and total debt of foreign U.S. affiliates in response to thin capitalization rules.[206] The study uses micro-level data on U.S. multinationals and their foreign subsidiaries in 54 countries over the period of 1982-2004. In contrast to previous studies, the authors compare the effect of a mere existence of thin capitalization rules with the impact of their stringency and the level of enforcement. They find that a presence of interest deduction restrictions reduces an affiliate's debt-to-assets ratio, with more profound results in the case of limitations on borrowing from a parent company. In addition, Blouin et al. have argued that the impact of thin capitalization rules on leverage is stronger in countries with an automatic application of the restrictions than those with discretionary enforcement.

The first-known attempt to measure the influence of transfer pricing regulations on profit shifting was carried out by Bartelsman and Beetsma.[207] Using sectoral data, they empirically tested the effects of a broad range of factors on the reported profits of multinationals. The authors argued that differences in CIT rates between countries, along with certain features of their tax systems and an enforcement of transfer pricing regulations, constitute major incentives or discouragements for profit shifting by multinationals. Lohse and Riedel[208] have used micro-level panel data on multinationals from 26 European states. In the first step of their analysis, the authors confirmed general findings in the related literature that state that CIT rates have a negative impact on the reported pre-tax profits of multinationals. In addition, Lohse and Riedel have found that transfer pricing regulations mitigate tax incentives to shift profits. According to the authors, firms in high-tax jurisdictions with strict transfer pricing regimes are less prone to income shifting than companies in high-tax countries without enforced transfer pricing rules.

[205] See Buettner et al. (2012).
[206] See Blouin et al. (2014).
[207] See Bartelsman/Beetsma (2003).
[208] See Lohse/Riedel (2013).

Beer and Loeprick[209] have confirmed these findings, arguing that the introduction of mandatory documentation requirements on average decreases the amount of profits shifted between subsidiaries of MNEs by approximately 60% within four years of the introduction. They show that the profit-shifting behaviour of subsidiaries with a high intangibles-to-total-assets ratio is less influenced by documentation requirements than the profit-shifting behaviour of subsidiaries with a low level of intangible assets.

Klassen and Laplante have investigated the effectiveness of transfer pricing regulations, employing micro-level data on U.S. multinationals and their foreign subsidiaries.[210] A major contribution of this study to the previous papers lies in its recognition that profit shifting depends not only on the enforcement of transfer pricing regulations in a given country but also on the implementation of transfer pricing rules in other jurisdictions. Saunders-Scott has contributed to the literature by analysing the relationship between reported profits and transfer pricing rules and trying to explain all possible channels through which these regulations might influence total tax revenues.[211] The author developed a theoretical model and found empirical evidence to support the idea that a stricter enforcement of transfer pricing laws limits both profit shifting outflows and profit shifting inflows. According to Saunders-Scott, if a company has more subsidiaries in high-tax jurisdictions, it reports fewer profits after strict transfer pricing regulations are introduced. On the other hand, if the affiliates of this firm are located in low-tax states, the firm reports higher profits after the enforcement of transfer pricing rules. Furthermore, Saunders-Scott argued that tighter transfer pricing laws induce greater compliance costs for individual firms. These additional expenses reduce companies' profitability and therefore contribute to an overall negative effect of the enforcement of transfer pricing regulations on reported profits and thus total tax revenues.

Another study of Saunders-Scott[212] is, as far as can be seen, the only study that investigates the impact of thin capitalization rules not on the level of an affiliate's debt but on its reported profits. In this, the author combined identification strategies of two flows of profit shifting literature: studies of a strategic use of related-party trade and papers on intragroup financing. Saunders-Scott used the Orbis database provided by Bureau van Dijk to extract firm-level financial information on MNEs from 55 countries within the period of 2006-2012. The author shows that the implementation of an earnings stripping rule in an affiliate's country reduces its EBIT by

[209] See Beer/Loeprick (2015).
[210] See Klassen/Laplante (2012).
[211] See Saunders-Scott (2013).
[212] See Saunders-Scott (2015).

3.8%. Saunders-Scott attributed this finding to a substitution between debt shifting and transfer pricing manipulation, arguing that the costs of shifting via transfer pricing manipulation depend on the total volume shifted. Therefore, if the volume of profit shifting using interest is restricted by thin capitalization or earnings stripping rules, the marginal costs of shifting via transfer pricing manipulation decrease.

4.2.3 The interdependency of profit-shifting channels and the effectiveness of anti-avoidance legislation

Most of the studies presented in Chapter 4.2.2 investigate the impact of either rules limiting interest deductibility or transfer pricing regulations, while the literature remains largely silent on the relationship between these two countermeasures and their mutual effect on BEPS. In order to judge the effectiveness of the two types of anti-avoidance rules, it is crucial to know whether restrictions of one profit-shifting channel are substituted by an intensified use of the remaining channels or whether they achieve an overall reduction in shifting activity.

Saunders-Scott has found evidence that interest deduction limitation rules affect reported EBIT. The author concluded that substitution from profit shifting using intragroup interest payments towards profit shifting via the transfer pricing channel exists.[213] Yet, Saunders-Scott has not investigated any interaction with transfer pricing rules. However, the interdependency of the two profit-shifting channels is relevant, since it allows for clearer predictions about the reduction of total profit shifting following the implementation of the respective anti-avoidance regulations. A substitutive relationship between the two channels of profit shifting could also explain why - despite the measured effectiveness and the suspected increase in the cost of capital[214] - several studies have not found clear evidence of reduced investment following the introduction of thin capitalization rules.[215]

Against this background, the purpose of the following empirical study is to analyse the interdependency between different anti-avoidance regulations. The study applies two empirical approaches. Firstly, firm-level panel data on the reported profits of European companies in 2004-2012 is used to exploit the variation in tax rates and the strictness of anti-avoidance regulations across countries and time. The second empirical method is based on a quasi-experimental setting in France, where in 2007 thin capitalization rules were strengthened for one group of firms

[213] See Saunders-Scott (2015)
[214] See Ruf/Schindler (2015).
[215] See e.g. Weichenrieder/Windischbauer (2008) and Buettner et al. (2012).

but remained unchanged for the other. Moreover, following the idea that shifting costs are related to firm characteristics, this study separately investigates the heterogeneity in the shifting response of knowledge-intensive companies.

The contribution of this study to previous literature is twofold: Firstly, it expands the earlier literature on the effectiveness of transfer pricing regulations by including an indicator for the strictness of interest deduction limitation rules and the interaction terms of different anti-avoidance regulations with the tax rate on reported EBIT. This accounts for potential interdependencies of the profit-shifting channels. Secondly, it investigates differences in the profit shifting behaviour of IP-intensive and other firms.

The study is structured as follows. Chapter 4.2.3.1 presents a simple theoretical model and outlines the main hypotheses. Chapter 4.2.3.2 provides the data sources and defines key variables used in the empirical estimations. Chapter 4.2.3.3 explains the two empirical approaches used in the study. Chapters 4.2.3.4 and 4.2.3.5 present the results of the panel data analysis and the quasi-experimental estimation.

4.2.3.1 Model

The simple model considers a multinational corporation with two affiliates resident in different countries: a high-tax country with a tax rate τ_H and a low-tax country with a tax rate τ_L. The affiliate resident in the high-tax country can shift part or all of its exogenous true pre-tax profit π_H to the affiliate in the low-tax country. π_H is defined as the taxable profit that would have been reported in the absence of profit shifting incentives and may have already been reduced by deductions for intragroup payments for goods and services or debt that are not induced by tax incentives.[216] This true profit can be shifted from the high-tax affiliate to the low-tax affiliate by increasing intragroup debt financing, by manipulating interest rates on existing intragroup loans, by using other additional intragroup transactions, or overpaying for goods, intangibles and services provided by the low-tax affiliate. The combined volume of shifted profits via both channels is denoted as S. The respective intragroup payments are deductible from the tax base in the high-tax country, and they increase taxable true profit π_L in the low-tax country.

[216] See also Fuest et al. (2011).

Shifting profits may induce costs of C, which are assumed to be non-deductible from the tax base in the high-tax country.[217] The aim of the multinational corporation is to maximize its total post-tax profit:

$$\text{Post-tax profit} = (1-\tau_H)(\pi_H - S) + (1-\tau_L)(\pi_L + S) - C \quad \textbf{(9)}$$

From Equation (9), it follows that the optimal amount of shifting out of the high-tax country S^* arises when the tax advantage from profit shifting equals marginal costs:

$$C'(S^*) = \tau_H - \tau_L \text{ with } \tau_H = 0 \text{ for } S - \pi_H \text{ if } S > \pi_H \quad \textbf{(10)}$$

The tax advantage from profit shifting will be 0 or negative for each unit of profit shifted in excess of the true profit of the high-tax affiliate. This is because the corresponding deductions do not reduce taxable income in the high-tax country in the same year. If the deductions can also not be used in future years, the maximum optimal amount of profit shifting will equal total true profit.

Transfer pricing manipulation and excess interest payments are considered as the two input factors to produce the output "shifted profit" S. As both shifting channels serve exactly the same purpose of reducing profit in the high-tax country and increasing profit in the low-tax country, the value of shifting one unit via one channel equals the value of shifting one unit via the other channel. Hence, the multinational will be indifferent to the choice between these two input factors and will always use the cheaper channel for each unit shifted. Hence, the profit-shifting channels are assumed to be perfect substitutes.

This means that the conditional input demand for shifting profit via transfer pricing manipulation is

$$S_T^*(S) = \begin{cases} S - S_D^*(S-\Delta S) & \text{if} \quad c_T(S - S_D^*(S-\Delta S)) > c_D(S - S_T^*(S-\Delta S)) \\ \left[0 + S_T^*(S-\Delta S), S - S_D^*(S-\Delta S)\right] & \text{if} \quad c_T(S - S_D^*(S-\Delta S)) = c_D(S - S_T^*(S-\Delta S)) \\ 0 + S_T^*(S-\Delta S) & \text{if} \quad c_T(S - S_D^*(S-\Delta S)) > c_D(S - S_T^*(S-\Delta S)) \end{cases} \quad \textbf{(11)}$$

and the conditional input demand for shifting profit via intragroup debt is

[217] Some costs may in fact be tax deductible but ignoring this here does not fundamentally affect the results. See also Dharmapala/Riedel (2013).

$$S_D^*(S) = \begin{cases} S - S_T^*(S-\Delta S) & if \quad c_D(S - S_T^*(S-\Delta S)) < c_T(S - S_D^*(S-\Delta S)) \\ \left[0 + S_D^*(S-\Delta S), S - S_T^*(S-\Delta S)\right] & if \quad c_D(S - S_T^*(S-\Delta S)) = c_T(S - S_D^*(S-\Delta S)) \\ 0 + S_D^*(S-\Delta S) & if \quad c_D(S - S_T^*(S-\Delta S)) > c_T(S - S_D^*(S-\Delta S)) \end{cases} \quad \textbf{(12)}$$

with $S_D^*(S-\Delta S) = S_T^*(S-\Delta S) = 0 \quad if \quad S = 1$.

Consequently, the total cost function of profit shifting is given by the minimum cost combinations of the two input factors (the two shifting channels) for all potential output levels:

$$C(S_T^*(S), S_D^*(S)) = \sum_{x=0}^{x=S_T^*(S)} c_T(x) + \sum_{y=0}^{y=S_D^*(S)} c_D(y) \quad \textbf{(13)}$$

$c_T(x)$ and $c_D(y)$ denote the cost of shifting unit x via transfer pricing and unit y via debt. Whether or not substitution between the two profit-shifting channels is optimal depends on how these costs per shifted unit are determined. Following existing literature, it is assumed that all profit shifting costs are convex in the amount of profit shifted.[218] This can be formalized by $C_i(S_i)$, $C_i'(S_i) > 0$ and $C_i''(S_i) > 0$ with $i\{D, T, Total\}$.

Firstly, consider the case, that the costs for each profit-shifting channel depend only on the volume of profit shifted via this channel (i.e. $C_T(S_T)$ and $C_D(S_D)$).[219] In this case, the optimal amount of profit shifting from the high-tax country to the low-tax country via each channel is determined by:

$$\frac{\partial C_D(S^*_D)}{\partial S^*_D} = \tau_H - \tau_L \text{ with } \tau_H = 0 \text{ for } S - \pi_H \text{ if } S > \pi_H \quad \textbf{(14)}$$

$$\frac{\partial C_T(S^*_T)}{\partial S^*_T} = \tau_H - \tau_L \text{ with } \tau_H = 0 \text{ for } S - \pi_H \text{ if } S > \pi_H \quad \textbf{(15)}$$

Whether it is optimal to substitute towards one channel following a cost increase of the other channel depends on the level of total profit shifted in the optimum before the change in costs. If the optimal amount of profit shifting has been below total true profit ($S^* < \pi_H$), an increase in the marginal cost of profit shifting via a certain channel will decrease the optimal amount of

[218] See e.g. Dharmapala/Riedel (2013), p.7; Saunders-Scott (2015).
[219] See also Saunders-Scott (2015) for different assumptions of the cost function.

profit shifted via this channel. The amount shifted via the other channel, however, should remain stable, as neither its costs nor the determination of the tax benefit are influenced by the reduction in the amount shifted via the first channel. In this case, substitution will not occur.

On the other hand, if it has been optimal to shift total true profit ($S^* = \pi_H$), an increase in the cost of shifting via one channel may either have no impact on or reduce the optimal amount shifted via this channel. In the considered example of shifting from a high- to a low-tax country with ($\tau_H > \tau_L$), the marginal benefit function is a step function that is constant at the positive values of the tax differential $\tau_H - \tau_L$ up to the amount of total true profit and turns negative for all units above total true profit ($S - \pi_H$). Thus, it is possible that the last unit shifted via one or both profit-shifting channels in the optimum bears marginal costs below the tax advantage of $\tau_H - \tau_L$. Up to the true profit, the company will always choose the cheaper channel for each unit shifted. Hence, if the costs of one channel increase while still staying below the tax differential and leaving the price ratio of the two channels unaffected for all units of profit shifted, the amount shifted via both channels should remain stable. If, ceteris paribus, the price ratio reverses for certain units of profit shifted (meaning that the other channel now yields the lowest cost), the amount shifted via the channel with increased cost should decline and the amount shifted via the other channel should increase. With respect to Equations (14) and (15), this substitution between the two channels in reaction to a reversion of the price ratio for certain units of profit shifted results from a change in the value of τ_H (from its real value to zero and vice versa) in both equations. In addition, if it is optimal to shift total true profit, an increase in the cost of one channel also decreases the amount shifted via this channel if the marginal costs rise above the tax advantage of $\tau_H - \tau_L$. A move towards the other channel will then only be optimal if the last unit shifted via the other channel yields a cost below the tax differential.

However, companies may also substitute between the profit-shifting channels if it is optimal to shift less than total true profit. This is the case if we allow for additional non-channel-specific shifting costs that are convex in the total amount shifted via both channels $C_{Total}(S_{Total})$ with $C'_{Total}(S_{Total}) > 0$ and $C''_{Total}(S_{Total}) > 0$. Such costs may result from an increased audit risk, an increased need for mitigation strategies and potential adjustments of intragroup transactions via one or both channels if profits are below a certain threshold. Moreover, shifting high volumes of profit carries the risk of reputational damage for multinationals, which might require internally set limits for total profit shifting. In the case of shifting costs that depend on the total

amount shifted, the company resident in the high-tax country defines the optimal amount of shifting for the two channels according to the following conditions:

$$\frac{\partial C_D(S^*)}{\partial S^*} = \tau_H - \tau_L \text{ with } \tau_H = 0 \text{ for } S - \pi_H \text{ if } S > \pi_H \quad \textbf{(}16\textbf{)}$$

$$\frac{\partial C_T(S^*)}{\partial S^*} = \tau_H - \tau_L \text{ with } \tau_H = 0 \text{ for } S - \pi_H \text{ if } S > \pi_H \quad \textbf{(}17\textbf{)}$$

It follows from Equations (16) and (17) that an increase in the channel specific costs of one channel will increase its marginal costs of profit shifting and consequently reduce the optimal amount shifted via this channel. The reduction in the total amount shifted (S) should then reduce the marginal costs of shifting via the other channel that enjoys unchanged channel-specific costs, which in turn may increase the optimal level of profit shifted via this channel.

In summary, if the costs of shifting depend exclusively on the amount shifted via the respective channel, companies may only substitute between the channels if it is optimal to shift total true profit. However, if there are other non-channel-specific costs of profit shifting that depend on the total amount shifted via both channels, it can be optimal to increase the amount shifted via one channel as a reaction to a cost increase of the other channel for profit shifting levels below true profit.

In this study, the focus is on substitution between profit-shifting channels as a consequence of the introduction or tightening of anti-avoidance regulations. The considerations above show that whether substitution between shifting channels is an optimal strategy for a company depends on the structure of the cost function for the two channels before and after the change in anti-avoidance legislation. To derive hypotheses, it is thus necessary to make some additional assumptions about the elements and structure of the cost functions of the two shifting channels.

The cost of profit shifting can generally be split into those costs arising from anti-avoidance legislation implemented by tax authorities and those costs not related to anti-avoidance regulations (which are referred to as costs from side effects in the following). Such costs arise from tax-induced intragroup transactions that deviate from the optimal structure of intragroup trade and debt from a management perspective.

Despite a potentially lower capacity to raise external debt, no obvious costs resulting from side effects of profit shifting via intragroup debt exist. Costs from side effects that arise from external debt financing, especially bankruptcy costs and costs from information asymmetries, do not

play a relevant role for internal financing under the precondition that the total third-party debt of the multinational corporation defines bankruptcy risk.[220] Costs from side effects of transfer pricing mainly result from conflicts with internal performance measurement and incentive setting systems. They constitute inefficiency costs, which increase with an increasing difference between the real transfer price and the tax-optimal transfer price.[221] If companies use two sets of books for tax-optimal transfer prices and internal transfer prices, these inefficiency costs can be avoided, and in this case the non-tax costs of transfer pricing are limited to the additional administrative effort in operating a two-book system.[222]

Costs related to anti-avoidance measures arise from complying with the regulations that tackle excessive intragroup profit shifting, as well as from establishing circumvention strategies. In addition, if the anti-avoidance regulations are effective, the tax advantage from profit shifting will become negative due to the non-deductibility of payments in the high-tax country.

A basic anti-avoidance regulation that targets both profit-shifting channels is the application of the arm's length principle, which has been adopted by most countries.[223] This principle requires intragroup transactions to follow similar conditions as transactions between independent third parties. As long as the arm's length principle is not strictly enforced, and no detailed documentation of the intragroup transactions is required, no direct costs from complying with the arm's length principle arise. Costs for circumvention and the cost from double taxation are likely to depend on the type of intragroup payments. In the case of intragroup debt, there is usually a large range of possible arm's length amounts of debt and corresponding interest rates, which easily allows companies to justify any level of intragroup debt.[224] In the case of intragroup royalty payments, an arm's length price is often hard to determine because of the highly specific nature of intangible assets.[225] Therefore, it is relatively easy to justify high levels of profits shifted via this channel, even under an application of the arm's length principle. With respect to the transfer of common tangible goods and services, companies should find themselves more restricted in their profit shifting behaviour even in the absence of detailed transfer pricing regulations. This is because comparable third-party transactions are available and strong deviations from the arm's length price are immediately obvious.[226] Hence, for corporations that only trade

[220] See also Chowdhry/Nanda (1994); Gordon (2010); Overesch/Wamser (2014).
[221] See Hiemann/Reichelstein (2012).
[222] See Hiemann/Reichelstein (2012), S. 4.
[223] See Eden (2016), p. 153. For an overview on country practice, see Zinn et al. (2014).
[224] See also Burnett (2014), p. 63.
[225] See Eden (2016), p. 164; Brauner (2014), p. 619.
[226] See also Dawson/Miller (2009), p. 35.

typical tangible assets or services that are easy to value, severe transfer pricing manipulation may result in double taxation, even if no strict transfer pricing regulations exist. This leads to a negative tax benefit for high levels of transfer pricing manipulation.

Based on these considerations, it is likely that, in the absence of specific anti-avoidance regulations, the marginal costs of an application of the arm's length principle for shifting high volumes of profit are lower in the case of intragroup interest and royalty payments than in that of transfer pricing manipulation using common tangible goods and services. If the marginal costs are identical for royalty payments and intragroup debt, the high-tax affiliate may either shift via one channel only or choose a specific combination of both channels. If the marginal costs are higher for one of the two channels, the high-tax affiliate will use the cheaper channel only. The costs from side effects may be minimized if the respective transaction is not purely artificial but only the price for the transaction is manipulated. Hence, for affiliates of multinational groups owning valuable intangible assets, royalty payments may be the profit-shifting channel that induces the least cost from side effects, while shifting via intragroup debt may be optimal for other companies. Following these considerations, the following hypothesis is derived:

Hypothesis 1: In the absence of strict anti-avoidance regulations, companies belonging to a group with a low intangible intensity mainly shift profits via intragroup debt, while companies belonging to a group with a high intangible intensity focus on shifting via royalty payments.

If the high-tax country has interest deduction limitation rules in place, interest payments on debt above the safe haven ratio or acceptable EBIT ratio will no longer be deductible and face double taxation. Consequently, the tax benefit of profit shifting will turn negative for excess interest payments. For companies that are shifting high levels of their total profit via interest payments it will be optimal to reduce the amount shifted via intragroup interest payments. These companies may substitute shifting high levels of debt with an increased use of transfer pricing manipulation if the costs of shifting via the other channel do not exceed the tax benefit.

Hypothesis 2: If a country introduces strict thin capitalization rules, companies that have been shifting high levels of profit via intragroup interest will reduce their interest payments and increase shifting via the transfer pricing channel.

If the high-tax country introduces transfer pricing documentation rules, the multinational corporation will face additional fixed costs if any intragroup transactions are present. In addition, strict transfer pricing regulations and enforcement increase the threat of being audited and having transfer prices not accepted by the tax authorities. Transfer pricing rules following the

OECD guidelines generally apply not only to intrafirm trade but also to the interest rate of intragroup loans. However, less focus is usually put on the level of intragroup debt.[227] Most countries target this aspect by more specific thin capitalization or earnings stripping rules. Thus, the introduction of transfer pricing documentation rules is likely to have a stronger impact on the marginal costs for profit shifted via transfer pricing manipulation. The additional fixed costs and the reduced potential for receiving a tax advantage derived from the shifting of high levels of profit using transfer pricing manipulation should make shifting via interest payments relatively cheaper. Hence, a reduction in shifting via transfer pricing manipulation and an increase in shifting via interest payments can be expected. Of course, such a substitution will only take place in firms that have been shifting parts of their profit via transfer pricing manipulation before the introduction of strict transfer pricing regulations.

Hypothesis 3: If a country introduces strict transfer pricing regulations, companies that have been shifting profit via transfer pricing manipulation before this will reduce transfer pricing manipulation of tangible and intangible assets and increase shifting via the debt channel.

If an anti-avoidance regulation targeting one profit-shifting channel is introduced, while the other shifting channel is already restricted by another anti-avoidance rule, the observable substitution depends on the extent to which firms have previously been using the two shifting channels. If interest deduction limitation rules exist, they should not provide leeway for a move towards the debt channel if transfer pricing documentation rules are introduced and if a company already fully exhausts the debt channel up to the allowed threshold. This should in particular apply to companies with a low intangible intensity, which are assumed to mainly rely on the transfer pricing channel according to Hypothesis 1. However, it may also apply to companies with a high intangible intensity that have been making greater use of the debt channel after the introduction of transfer pricing documentation rules. Strict transfer pricing documentation rules, on the other hand, do not pose such a clear limit to profit shifting but are more flexible. Determining the arm's length price is often very difficult, especially in the case of firm-specific intangible assets due to a lack of comparable transactions. Hence, most firms should generally have some leeway for moving towards the transfer pricing channel if interest deduction limitation rules are introduced even if transfer pricing documentation rules exist. However, the leeway for transfer pricing manipulation is likely to be smaller in the case of tangible goods and services than in the case of intangible goods. Thus, the marginal costs for an increased use of the transfer pricing channel should be higher for companies with a low intangible intensity.

[227] See OECD (2012).

Consequently, amongst companies affected by thin capitalization or earnings stripping rules, the volume of substitution should be higher for affiliates of multinational groups with a high intangible intensity than affiliates of groups with a low intangible intensity if strict transfer pricing regulations exist.

Hypothesis 4: If transfer pricing regulations exist and thin capitalization rules are introduced, most companies may have some leeway to substitute towards the transfer pricing channel. The substitution should, however, be more pronounced for companies with a high intangible intensity.

4.2.3.2 Data

4.2.3.2.1 Firm-specific data

In this study, firm-level accounting data from the Amadeus database provided by Bureau van Dijk is used. The database includes accounting information and information on group structures for more than 21 million companies in Europe. The empirical analysis includes two estimation strategies. Firstly, it makes use of panel data of European companies belonging to a multinational group. This analysis covers the period of 2004 to 2012. Secondly, a difference-in-difference estimation based on a reform in France in 2007 (see Chapter 4.2.3.3.2 for details) is conducted. For this analysis, a balanced panel with observations for French affiliates of multinational groups in 2004-2009 is used. Both datasets include only firms that report unconsolidated accounts, since the analysis requires information on the activities of the single affiliates. Multinational groups are defined by using information on direct parent and subsidiary companies, and a company is considered to be a part of a multinational group if at least one firm in the group is resident in a different country. Since the opportunity for profit shifting requires a substantial ownership share, this study follows other studies and only considers affiliates that are owned with a share of at least 90%.[228]

Also in line with other studies, headquarter firms are excluded from the sample due to the findings of Dischinger and Riedel, and Dischinger, Knoll and Riedel, who have argued that the location of profits and profitable assets may be biased in favour of these firms.[229] However, headquarter firms are again included as part of a robustness check. Moreover, the sample does

[228] See e.g. Becker/Riedel (2012) and Beer/Loeprick (2015).
[229] See Dischinger/Riedel (2010); Dischinger et al (2014).

not include loss-making companies, because these firms face different tax planning incentives.[230] Finally, firms active in the financial sector and years with implausible values for the main variables of interest (such as a negative number of employees) are excluded. The final sample for the panel analysis covering the years 2004-2012 includes 116,566 firms located in 32 countries. Of these companies, 103,714 provide information on all relevant variables of the main regression based on Equation (19) (see Chapter 4.2.3.3.1) and are thus included in the analysis. Table 35 in the Appendix provides an overview of the country distribution for all observations considered in the main regression results. The final sample for the analysis of the French tax reform in 2007 includes 1,040 French firms.

4.2.3.2.2 Tax rate data and measures for anti-avoidance regulations

The data on tax rates were obtained from the EU Commission's effective tax rates report and augmented by the University of Oxford's CBT Tax database, Ernst & Young's Worldwide Corporate Tax Guides and the Global Corporate Tax Handbooks published by the IBFD.[231] The information on transfer pricing regulations was collected from the transfer pricing guides published by Deloitte, Ernst & Young, KPMG, and PwC.[232] Information on thin capitalization and earnings stripping rules was collected from IBFD Tax Handbooks. In the case of both transfer pricing rules and regulations against intragroup debt shifting, the study does not focus on their mere existence in a country but rather measures their level of strictness This is because only rules that bite are likely to have an impact on profit-shifting behaviour.

This study follows Beer and Loeprick and uses the years since the introduction of mandatory transfer pricing documentation requirements in a country as an indicator of the strictness of transfer pricing rules.[233] Transfer pricing documentation requirements constitute a crucial element of increasing the transparency of transfer price determination and the detection of mispricing. In addition, the effect of time is considered to play a significant role in determining the actual strictness of the application of these rules, as tax authorities need to gain experience and knowledge of intragroup transfer prices to effectively detect mispricing. An advantage of this measure is that it brings a great deal of variation and is clearly defined.[234] In the robustness checks, the baseline findings are tested using a binary transfer pricing variable comparable to

[230] See also Huizinga/Laeven (2008); Dischinger/Riedel (2011); Beer/Loeprick (2015).
[231] See Oxford University Centre for Business Taxation (2016); Ernst & Young (2006-2012); IBFD (2004-2012).
[232] See Deloitte (2004-2012); Ernst & Young (2005-2012); KPMG (2004-2012); PwC (2004-2012).
[233] See Beer/Loeprick (2015).
[234] Opposed to that, the measure used by Saunders-Scott (2015) and based on a study of Mescall/Klassen (2014) cannot be constructed consistently for many country-year combinations due to missing data. Thus, it is not considered.

the one used by Lohse and Riedel.[235] This binary variable also focuses on formal transfer pricing documentation rules but does not take the effect of time into consideration. Thus, it leads to significantly less variation in the dataset. It is set to one if formal transfer pricing documentation rules exists and zero otherwise. In a further robustness check, informal transfer pricing documentation rules are also taken into account.[236] This is done be using a measure that considers the existence of informal transfer pricing rules, while also taking into account the effect of time since the introduction of formal transfer pricing regulations. The respective variable is set to zero if neither formal nor informal transfer pricing documentation rules exist, and it equals one if only informal transfer pricing documentation rules are present. In addition, it considers the number of years since and including the year of the introduction of formal transfer pricing documentation rules. If neither formal nor informal transfer pricing documentation rules exist, the variable is set to zero. Table 36 in the Appendix provides an overview of the existence of formal and informal transfer pricing documentation rules in all countries and years of the sample.

With respect to regulations that limit intragroup debt financing, a challenge emerges. This is the construction of a strictness measure that classifies both thin capitalization rules that limit shifting via interest payments to a certain D/E ratio and earnings stripping rules that limit profit shifting via interest to a specific percentage of EBIT(DA). As the accepted debt level is defined referring to different ratios, it is not feasible to directly use the levels of these ratios as an indicator. For D/E ratio rules, this approach has been previously taken by Buettner et al.[237], who have used the following non-linear transformation of the safe haven ratio denoted by σ as an indicator for the strictness of thin capitalization rules:

$$TC_{it} = \frac{1}{1+\sigma_{it}} \qquad \textbf{(}18\textbf{)}$$

This measure can only be determined for countries that apply a thin capitalization rule. The variable is zero if a country does not apply a thin capitalization rule and it increases up to a hypothetical maximum of one for the most restrictive case. The level of the safe haven ratio varies between 1.5 and 8 in the sample, which yields a maximum value of the strictness indicator of 0.5. This measure is used in one of the robustness checks by setting the indicator to

[235] See Lohse/Riedel (2013).
[236] In some countries, there are no formal transfer pricing documentation rules, but the documentation of transfer prices is required in practice.
[237] See Buettner et al. (2012).

missing for countries that apply an earnings stripping rule. Table 37 (listed in the Appendix) provides an overview of the D/E ratio rules applied in the countries included in the sample.

In the baseline analysis, a more comprehensive variable that allows for the consideration of earnings stripping rules and other anti-avoidance regulations is used. This variable classifies the different regulations into three categories. All countries that do not have rules restricting the deductibility of interest payments beyond a general application of the arm's length principle are assigned to Category 1. Countries that apply thin capitalization rules with a safe haven ratio above the average of all countries in the sample (which is 3) are assigned to Category 2. Moreover, countries that do not use a general thin capitalization rule but apply some anti-avoidance regulation against specific forms of excessive intragroup debt shifting are classified into Category 2. Table 38 in the Appendix provides some information on these special interest deduction limitation rules. In addition, countries that have a general thin capitalization rule with a safe haven ratio of 3 or lower but exclude a broad range of transactions from their rules are assigned to Category 2. An example of the latter is France during the years 2004-2006, when only interest payments to parent companies which were resident in certain non-EU countries were covered by the thin capitalization rule. Category 3 comprises all countries that apply a thin capitalization rule with a safe haven ratio of 3 or below without broad exceptions. In addition, the earnings stripping rules applicable in Germany (from 2008), Italy (from 2008), and Spain (from 2012) are assigned to Category 3. While thin capitalization rules and earnings stripping rules are not directly comparable, the latter are generally seen as being more binding, since they are less easy to manipulate.[238] Table 39 in the Appendix summarizes the main interest deduction limitation strictness indicators by country and year.

4.2.3.2.3 Macroeconomic control variables

Data on gross domestic product (GDP), GDP growth and GDP per-capita were extracted from the World Bank's Development Indicators[239] and are measured in constant United States dollar (USD). The unemployment rate parameters were also obtained from the World Bank's Development Indicators and they reflect a country's total unemployment rate (expressed as a percentage of total labour force, as estimated by the International Labour Office). Information on corruption is derived from the World Bank's Control of Corruption Indicator.[240] Data on inflation

[238] See OECD (2015d).
[239] See World Bank (2017).
[240] See World Bank (2016).

is taken from the database World Economic Outlook[241] provided by the International Monetary Fund which reflects the percentage change in average consumer prices.

Table 40 provides detailed descriptive statistics for all variables included in the panel estimation. Table 41 offers an overview of the main variables of interest in the analysis of the French tax reform. Both tables are included in the Appendix.

4.2.3.3 Estimation approaches

4.2.3.3.1 Estimation based on the variation of tax parameters over time

To investigate whether there is substitution from the interest channel towards the transfer pricing channel, this dissertation examines the tax rate sensitivity of EBIT at different strictness levels of interest deduction limitation rules and transfer pricing documentation requirements. Because they explicitly exclude interest payments, EBIT are not directly influenced by profit shifting via intragroup debt. This allows for the separation of the effects of anti-avoidance rules on shifting via the transfer of goods, services and intangibles. Firstly, the general tax rate sensitivity of EBIT is investigated. Subsequently, in line with Lohse and Riedel[242] and Beer and Loeprick,[243] a measure for the strictness of transfer pricing documentation requirements is added to the estimation. However, the main focus of the study is the interaction of the different profit-shifting channels and the respective anti-avoidance regulations. The following basic estimation approach is used to test the impact of transfer pricing rules on the tax rate sensitivity of EBIT in the context of no or strict thin capitalization rules:

$$\begin{aligned} Log\ EBIT_{it} = {} & \beta_0 + \beta_1 CIT_{it} + \beta_2 TP_{it} + \beta_3 CIT_{it} \times TP_{it} + \beta_4 TC_{it} + \beta_5 CIT_{it} \times TC_{it} \\ & + \beta_6 TC_{it} \times TP_{it} + \beta_7 CIT_{it} \times TP_{it} \times TC_{it} + x_{it}\gamma + \mu_i + \delta_{jt} + \varepsilon_{it} \end{aligned} \quad \textbf{(19)}$$

In Equation (19), Log EBIT is the dependent variable and denotes the natural logarithm of EBIT of affiliate i in year t. The variable CIT_{it}, represents the CIT rate augmented by local profit taxes on firms that is levied in year t in the country where firm i resides. Following previous literature, this variable is used as the main indicator for profit shifting incentive and its coefficient is expected to be negative. In accordance with the literature on the effect of transfer pricing regulations, strict transfer pricing regulations denoted by TP are expected to effectively reduce the tax rate sensitivity of EBIT ($\beta_3 > 0$).

[241] See International Monetary Fund (2016).
[242] See Lohse/Riedel (2013).
[243] See Beer/Loeprick (2015).

Assuming that some companies have leeway to substitute between the two dominant profit shifting channels (interest payments and transfer pricing manipulation) the measured tax rate sensitivity of EBIT should increase if thin capitalization rules are tightened while transfer pricing regulations are weak, at least for companies that have previously been shifting via intragroup debt. In Equation (19), this is accounted for by an interaction term between the tax rate and the existence of strict thin capitalization rules (denoted by TC). Thus, it is expected that $\beta_5 < 0$. The triple interaction of the corporate income tax rate (CIT), the thin capitalization strictness indicator (TC), and the transfer pricing strictness indicator (TP) considers that if there is a certain scope to substitute profit shifting via debt with profit shifting via transfer pricing manipulation, the impact of one anti-avoidance regulation would be conditional on the level of the other.

Finally, x_{it} represents a vector of relevant firm- and country-level control variables that vary over time. It includes companies' main input factors, such as fixed assets and costs of employees, as an indicator of true profits (as opposed to shifted profits). In addition, it captures a host country's characteristics including GDP (controls for market size), GDP per capita (controls for the level of a country's development), GDP growth rate, and unemployment rate. μ_i and δ_i are company and industry-year fixed effects, respectively. ε_{it} is an error term.

4.2.3.3.2 Exploiting a thin capitalization reform in France

The estimation approach presented in Chapter 4.2.3.3.1 relies on firms' reaction to the variation of relevant tax parameters over time and a correct classification of anti-avoidance strictness. A common concern of studies that use this approach is that the detected results are potentially prone to confounding effects that are not controlled for in the regression analysis. Therefore, to improve the identification of the relationship between shifting strategies and so further validate the findings from the panel analysis, a quasi-experimental reform setting in France is studied using a difference-in-difference approach. Here, the average changes in EBIT for firms that are and are not affected by a reform of thin capitalization rules in France are compared.

In particular, in 2007, a reform act extended the application of the French thin capitalization rules to related parties within the EU. Before 2007, French thin capitalization rules were restricted to interest payments to controlling shareholders. A controlling shareholder was defined as a shareholder that directly owns more than 50% of the company's share capital or voting

rights. Under this thin capitalization rule, a D/E ratio of 1.5:1 applied. Due to EU case law,[244] starting from 2004, this thin capitalization rule no longer applied to interest payments to controlling shareholders that were resident in EU member states. In addition, the rule also no longer applied to interest payments to controlling shareholders that were resident in countries that had signed a treaty with France. This treaty must have contained a non-discrimination clause similar to Art. 24(5) of the OECD Model Convention, not explicitly authorized the application of the French thin capitalization rules, and been negotiated or renegotiated after 23 July, 1992.

The Finance Act of 2006 introduced new interest deduction limitation rules for fiscal years beginning on or after 1 January, 2007.[245] These rules limit the tax deductibility for interest on loans granted by related parties. Thus, in addition to interest payments to parent companies, interest payments to other associated companies were also covered by this new thin capitalization rule. Associated companies are defined as two companies of which one directly or indirectly holds a minimum of 50% of the other's capital, or as two companies of which a third company directly or indirectly holds 50% of the capital. While only a D/E ratio of 1.5:1 applied before 2007, the new thin capitalization rules introduced an additional test. According to this test, interest is only deductible if it does not exceed 25% of the company's EBITDA. The interest that exceeds the higher of the thresholds is considered to be non-deductible for tax purposes. If the non-deductible interest is €150,000 or less, all interest is considered to be deductible.

The following difference-in-difference specification is used to study the impact of the 2007 reform on firms' EBIT:

$$Log\ EBIT_{it} = \beta_0 + \beta_1 Treat + \beta_2 After + \beta_3 Treat * After + x_{it}\gamma + \delta_{jt} + \mu_i + \varepsilon_{it} \quad (20)$$

Treat is a binary variable with a value of 1 for all firms that are assigned to the treatment group and of 0 for all firms assigned to the control group. Firms are classified as treated (Treat=1) if they face unrestricted debt shifting opportunities prior to the reform while being subject to interest deduction limitation rules from 2007 onwards. A company must fulfil three criteria to be assigned to the treatment group. Firstly, its parent company needs to be resident in one of the countries covered by the exemption of thin capitalization rules between 2004 and 2006 (EU member states and certain treaty countries). Moreover, companies are only included in the treatment group if their reported median interest paid in the three years prior to the reform exceeded

[244] See European Court of Justice (2002).
[245] See Ernst & Young (2008), pp. 12-15.

€150,000, as this amount of interest remained deductible after the reform irrespective of the D/E ratio of the company. The interest payments reported before the reform are used to ensure exogenous treatment. As a third criterion, only companies with a higher tax rate than that of their parent companies are included in the treatment group, since other companies have a disincentive to feature high levels of intragroup debt and are thus not likely to be affected by thin capitalization rules (either before or after the reform).[246] Consequently, the control group (Treat=0) includes all companies with a parent firm resident in any of the countries covered by thin capitalization rules before 2007, as well as all companies without a tax incentive towards the parent firm and all companies with low interest payments.

The variable "After" in Equation (20) equals zero for the pre-reform years of 2004-2006, and it equals one for the post-reform period of 2007-2009. The coefficient of interest in this specification is β_3. The identifying assumption is that, in the absence of the reform, the dependent variable would have followed a similar trend in both the treatment and the control group. Since treated firms face a higher cost of shifting profits via interest payments, they are expected to rely more on trade mispricing upon policy intervention if they have some discretionary leeway to do so. Consequently, the coefficient β_3 is expected to be negative. This would suggest that the firms affected by the thin capitalization reform on average reduce their EBIT as compared to the firms not affected by the reform. x_{it} comprises the relevant firm-level controls such as fixed assets and costs of employees. Industry-specific time trends and time-constant effects are accounted for by including industry-year fixed effects μ_{jt} and company fixed effects FE δ_i. ε_{it} is an error term.

Both the CIT rate and the strictness of transfer pricing regulations remained unchanged in France during the years considered in the analysis. In addition, as far as can be seen, there were no other major reforms that have had different effects on the treatment and control group.

[246] As data on interest paid and the debt level of the affiliates is often missing, it is not possible to additionally control for the actual D/E ratio of firms in determining the treatment group as this would reduce the sample of the treated firms to a number close to zero.

4.2.3.4 Results I: Panel data estimation of the interaction between thin capitalization and transfer pricing rules

4.2.3.4.1 Main analysis

The first column of Table 27 provides a basic profit shifting estimation, with the CIT rate as the main independent variable of interest. Subsequently, the transfer pricing strictness indicator and its interaction with the tax incentive is added to the estimation. In the third column, the estimation is further augmented by the thin capitalization strictness indicator and all interactions between both anti-avoidance strictness indicators and the CIT rate, as depicted in Equation (19). The last two columns display the results of splitting the sample into IP-intensive and other firms.

Column I of Table 27 shows a negative and statistically significant tax rate sensitivity of reported EBIT. Holding other factors constant, on average, a one percentage point increase in the tax rate leads to a 0.43% decrease in a company's reported profits. This negative relationship has already been identified in numerous other studies.[247] The effect size is, however, somewhat smaller than the average effect size derived in the meta-study of Heckemeyer and Overesch.[248] As for the other variables, a firm's input factors (such as fixed assets and costs of employees) seem to play an important role in determining its profits, which is also consistent with general predictions and findings of earlier studies.[249] A higher GDP growth rate also appears to be positively correlated with reported profits, while a higher unemployment rate in a country is likely to decrease firms' earnings.

Column II of Table 27 reinvestigates the influence of transfer pricing regulations on firms' profits.[250] In a manner consistent with previous studies, it shows that an implementation of transfer pricing documentation rules in high-tax countries leads to an increase in a firms' reported EBIT (i.e. reduces their tax sensitivity). The coefficient for the interaction between the CIT rate and the transfer pricing strictness indicator is positive, and with a t-value of 4.27, highly significant. It indicates that, on average, the tax rate sensitivity decreases by 0.10 percentage points every year after the introduction of transfer pricing documentation rules. The effect size is comparable to that reported in the study of Beer and Loeprick using the same

[247] For an overview, see Chapter 2.2 or the meta-study of Heckemeyer/Overesch (2017).
[248] See Heckemeyer/Overesch (2017).
[249] See e.g. Lohse/Riedel (2013); Beer/Loeprick (2015); Saunders-Scott (2015).
[250] Similar to e.g. Lohse/Riedel (2013), Beer/Loeprick (2015).

measure for transfer pricing regulation strictness.[251] The average marginal effects imply that the tax rate elasticity of EBIT is only negative and significant in the first year after the introduction of transfer pricing regulations, while it becomes positive and significant starting from year 6. This suggests that transfer pricing regulations fully eliminate tax-motivated profit shifting via transfer pricing manipulation if transfer pricing documentation rules have been existent for several years.

However, the effectiveness of transfer pricing regulations also depends on whether profit shifting via transfer pricing can be substituted by profit shifting via interest payments and vice versa. To account for this interdependency, the regression in column II is augmented by an indicator for interest deduction limitation rules. These rules target the potentially substitutive shifting channel (intragroup debt). Column III of Table 27 demonstrates the results of this estimation based on Equation (19). t includes the CIT rate, strictness indicators for transfer pricing documentation rules, and interest deduction limitation restrictions as the main independent variables of interest. In addition, it also includes pairwise interactions and an interaction term between all three variables of interest. The triple interaction considers that the effect of transfer pricing documentation rules on the tax rate sensitivity of EBIT depends on the strictness of interest deduction limitation rules in the same country.

In the presence of the triple interaction, the two-way interaction between the transfer pricing strictness measure and CIT reflects the case where only a formal transfer pricing documentation rule but no interest deduction limitation rule exists. The coefficient of the two-way interaction is highly significant, and its magnitude is substantially higher than in column II. The average marginal effects that measure the tax rate sensitivity at different levels of the transfer pricing strictness indicator for the case that no interest deduction limitation rule applies yield positive and statistically significant coefficients, starting from the first year after the introduction of transfer pricing regulations (see Figure 9). This suggests that, in the absence of interest deduction limitation rules, transfer pricing documentation regulations completely eliminate profit shifting via transfer pricing manipulation. Whether companies substitute transfer pricing manipulation with shifting via the debt channel depends on the effect of the interaction term on interest paid. Due to poor data availability, this is not investigated directly in this study.

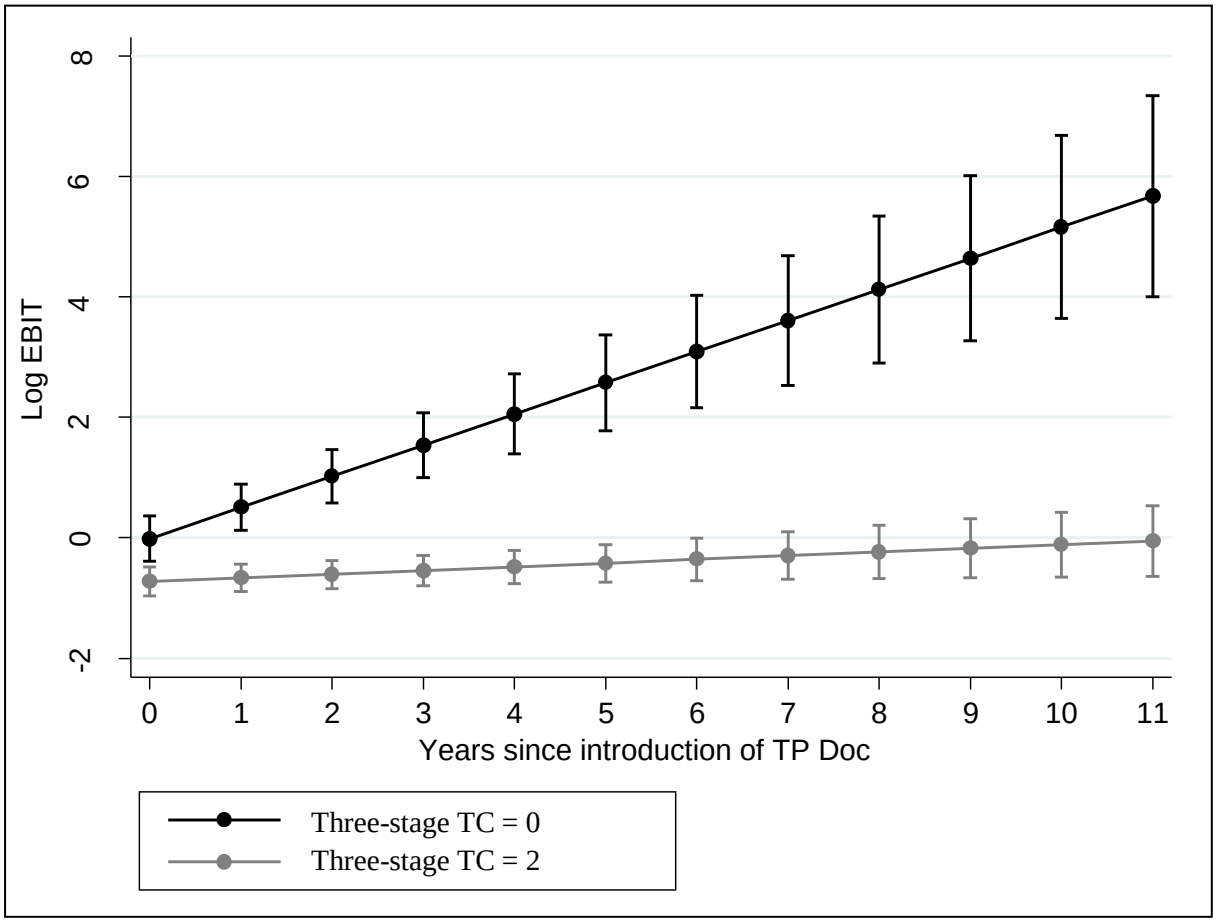
[251] See Beer/Loeprick (2015).

Table 27: Main regression results for Log EBIT as a dependent variable

Dependent variable: Log EBIT					
	All	All	All	IP	Non-IP
CIT	-0.430***	-0.351***	-0.013	-0.507**	0.563*
	(0.102)	(0.107)	(0.194)	(0.252)	(0.308)
TP		0.020***	0.054***	0.052***	0.057***
		(0.002)	(0.005)	(0.006)	(0.008)
CIT x TP		0.103***	0.517***	0.564***	0.442***
		(0.024)	(0.079)	(0.104)	(0.123)
TC			0.027***	0.004	0.052***
			(0.007)	(0.009)	(0.011)
CIT x TC			-0.358***	-0.065	-0.702***
			(0.109)	(0.142)	(0.171)
TP x TC			-0.025***	-0.024***	-0.027***
			(0.003)	(0.003)	(0.004)
CIT x TP x TC			-0.228***	-0.266***	-0.170**
			(0.044)	(0.057)	(0.070)
Log Fixed assets	0.082***	0.082***	0.082***	0.089***	0.074***
	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)
Log Costs of employees	0.394***	0.395***	0.393***	0.399***	0.385***
	(0.006)	(0.006)	(0.006)	(0.008)	(0.009)
Unemployment rate	-0.011***	-0.012***	-0.011***	-0.011***	-0.012***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Corruption	0.020	0.000	-0.002	-0.010	0.015
	(0.017)	(0.017)	(0.017)	(0.022)	(0.029)
GDP growth rate	0.007***	0.005***	0.006***	0.007***	0.006***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Log GDP	0.174	0.432**	-0.109	0.102	-0.341
	(0.183)	(0.189)	(0.207)	(0.273)	(0.320)
Log GDP/capita	-0.055	-0.268	0.349*	0.141	0.574*
	(0.167)	(0.174)	(0.195)	(0.259)	(0.296)
Year-Industry FE	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
# Companies	103,714	103,714	103,714	60,732	42,981
# Observations	541,323	541,323	541,323	325,494	215,827
R-squared (within)	0.087	0.087	0.087	0.092	0.082

Notes:
***, **, * indicate significance at the 1%, 5%, and 10% level. Robust standard errors are reported in parentheses. Units of observation are firms. Dependent variable is Log EBIT, which denotes the natural logarithm of a firm's earnings before interest and tax. TP measures the strictness of transfer pricing regulations. TC captures the strictness of interest deduction limitation rules. Log Fixed assets and Log Costs of employees are firm-level controls and represent natural logarithms of a company's fixed assets and the costs of employees, respectively. Unemployment rate stands for a country's rate of unemployment. Corruption represents a corruption index. GDP growth rate is a country's rate of GDP growth. Log GDP denotes a natural logarithm of a country's gross domestic product. Log GDP/capita stands for a natural logarithm of a country's GDP per capita. FE stands for fixed effects. IP represents a sample of IP-intensive firms as defined in Section 4.2.3.4.1 and Non-IP includes a sample of all other companies.

Figure 9: Average marginal effects of CIT – full sample



The interaction term between the CIT rate and the indicator for interest deduction limitation strictness in column III of Table 27 reflects the case where only interest deduction limitation rules exist while transfer pricing documentation rules do not apply. It is negative and statistically significant. It demonstrates that in the absence of strict transfer pricing documentation rules, strict interest deduction limitation rules increase the negative tax sensitivity of EBIT by an average of -0.37 percentage points with each increase in the three-stage interest deduction limitation strictness indicator. This yields a statistically significant tax rate sensitivity of EBIT of -0.73 in countries with very strict interest deduction limitation rules (strictness indicator=2) but no transfer pricing documentation requirement. Since EBIT is not directly influenced by interest payments, this relationship is an indicator for the existence of a substitutive relationship between the two profit-shifting channels.

The triple interaction of the CIT rate with the transfer pricing strictness indicator and the interest deduction limitation strictness indicator is also negative and highly significant. This suggests that the level of interest deduction limitation rules moderates the effect of strict transfer pricing regulations on the tax rate sensitivity of EBIT. The negative coefficient indicates that transfer

pricing documentation rules are less effective in reducing transfer pricing manipulation if there are strict thin capitalization rules in the same country. For example, three years after the introduction of formal transfer pricing documentation rules, the average marginal effect yields a tax rate sensitivity of -0.54 in the case of strict interest deduction limitation rules (strictness indicator = 2), while it yields one of 1.53 in the case of no thin capitalization or earnings stripping rules (strictness indicator = 0). The average marginal effects show that the tax rate sensitivity is negative irrespective of the level of transfer pricing strictness if interest deduction limitation rules are strict. Furthermore, it is statistically significant up to 6 years after the introduction of transfer pricing documentation rules (see Figure 9). Comparing these results to the findings of Beer and Loeprick[252] and the findings in column II of Table 27 suggests that prior studies may have overestimated the effectiveness of transfer pricing documentation rules because of ignoring the potential for substitution between the profit-shifting channels.

In column III of Table 27, the coefficient of the tax rate on EBIT when neither strict interest deduction limitation rules nor transfer pricing regulations exist is not statistically significant. A reason for this may be that, in the absence of anti-avoidance regulations, not all companies shift profits using transfer pricing manipulation. Some firms will mainly rely on shifting via intragroup debt, especially if costs from side effects of transfer pricing manipulation are higher than those of shifting via intragroup debt. This is likely to be the case for multinational groups without valuable intangible assets or other intragroup transactions for which transfer prices can easily be manipulated.

According to Hypothesis 1, companies belonging to groups with a high intangible intensity mainly shift via transfer pricing manipulation, while others engage in shifting via intragroup debt, if none of the profit-shifting channels is restricted by anti-avoidance rules. To test this hypothesis and to account for the fact that firms differ in their potential to substitute between the two profit-shifting channels, the sample is split into companies belonging to groups with an intangible intensity above and below the median. The intangible intensity of the group is used instead of the intangible intensity of the firm because the opportunity to shift profit via royalty payments does not depend on the company's own level of intangible intensity but on the existence of valuable intangible assets at the level of any of the group's other affiliates. Intangible intensity is defined as the median ratio of intangible assets to total fixed assets in the group across all years. Since certain countries, such as Germany, do not require or allow the capitalization of self-created intangible assets, all companies active in R&D-intensive industries are by

[252] See Beer/Loeprick (2015).

default assigned to the subsample of companies with a high intangible intensity. R&D-intensive industries are defined based on the Stifterverband report[253] on the aggregate internal firm R&D investments per industry in 2008 in Germany. All industries that featured aggregate internal firm R&D investment of at least €1 billion in 2008 are classified as R&D-intensive.

This includes the following sectors:

- Manufacturing of chemicals and chemical products;
- Manufacturing of basic pharmaceutical products and pharmaceutical preparations;
- Manufacturing of computer, electronic, and optical products;
- Manufacturing of electrical equipment;
- Manufacturing of machinery and equipment not elsewhere classified;
- Manufacturing of motor vehicles, trailers, and semi-trailers;
- Manufacturing of air and spacecraft and related machinery;
- Information and communication;
- Scientific research and development.

In a robustness check, alternative definitions of intangible intensity are also tested.

The regression results in columns IV and V of Table 27 confirm Hypothesis 1, especially in that particular companies belonging to a group with a high intangible intensity shift profits via transfer pricing manipulation in the absence of any anti-avoidance regulations. For this subgroup, the tax rate sensitivity of EBIT is statistically significant, with a coefficient of -0.51. In contrast, for companies with a low intangible intensity, an increase in the tax rate even has a weakly significant positive effect on EBIT. A reason for this may be that, despite the absence of strict channel-specific anti-avoidance rules, countries usually apply the arm's length principle. Thus, companies that mainly rely on shifting via intragroup debt have an incentive to increase EBIT because, in an arm's length comparison, higher levels of EBIT may justify higher levels of debt. However, this is only reasonable if the increase in EBIT is lower than that in the respective interest payments.

Most companies with a low intangible intensity do not seem to engage in transfer pricing manipulation in the absence of strict anti-avoidance measures for both profit-shifting channels. However, the highly significant negative coefficient of the interaction between the interest deduction limitation strictness indicator and the CIT rate in column V of Table 27 indicates that

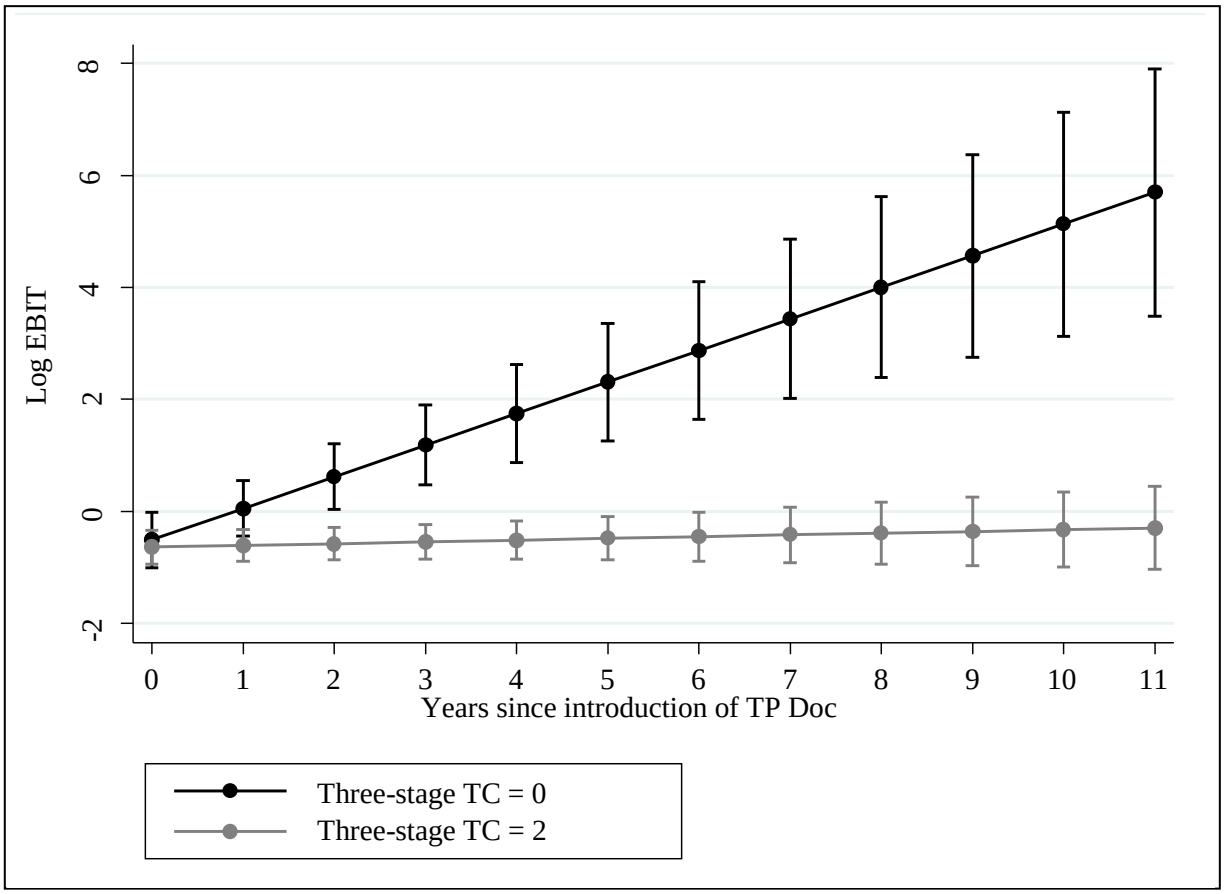
[253] See Stifterverband für die Deutsche Wissenschaft (2013).

these companies do engage in profit shifting via transfer pricing manipulation if strict interest deduction limitation rules exist. On average, with each increase in the strictness indicator of interest deduction limitation rules, a company reduces the tax rate sensitivity of EBIT by -0.70. In the case of very strict interest deduction limitation rules (a strictness indicator of 2) and the absence of strict transfer pricing regulations, this implies that a one percentage point increase in the tax rate reduces EBIT by -0.84%. The same interaction term is not significant for companies with a high group intangible intensity. This is plausible if Hypothesis 1 holds true, meaning that most of these companies do not extensively shift via the intragroup debt channel in the absence of strict transfer pricing documentation rules and are thus less affected by the introduction or tightening of an interest deduction limitation rule. Nevertheless, the average marginal effect of CIT on EBIT (see Figure 10) is -0.63 and statistically significant if interest deduction limitation rules are very strict. Meanwhile, it is only -0.50 if interest deduction limitation rules are not strict. This shows that some substitution from debt shifting to shifting via transfer pricing regulations is also observable in companies with a high intangible intensity, if only strict interest deduction limitation rules but not transfer pricing regulations exist.

The interaction of the transfer pricing strictness indicator and the CIT rate is positive and significant for both subsamples (columns 4 and 5). The average marginal effects suggest that an increase in the tax rate does not trigger profit shifting via transfer pricing manipulation for companies in both subsamples if only transfer pricing documentation rules (and no interest deduction limitation rules) are present (see Figure 10 and Figure 11). The results do not provide direct evidence that these companies substitute transfer pricing manipulation with debt shifting. However, the coefficient of the triple interaction in columns IV and V indirectly supports this assumption. The triple interaction is negative and significant for both subsamples. For IP-intensive firms, examining the average marginal effect at seven years after the introduction of transfer pricing documentation rules demonstrates that a one percentage point increase in the tax rate reduces the EBIT by -0.41% if strict interest deduction limitation rules exist. Meanwhile, it increases the EBIT by 3.40% if no interest deduction limitation rules exist. The negative tax rate sensitivity with strict interest deduction limitation rules is statistically significant for all levels up to seven years after the introduction of transfer pricing documentation rules (see Figure 10). For companies with a low group intangible intensity, the negative tax rate sensitivity is only significant in the first four years after the introduction of transfer pricing documentation rules if strict interest deduction limitation rules exist (see Figure 11). The size of the

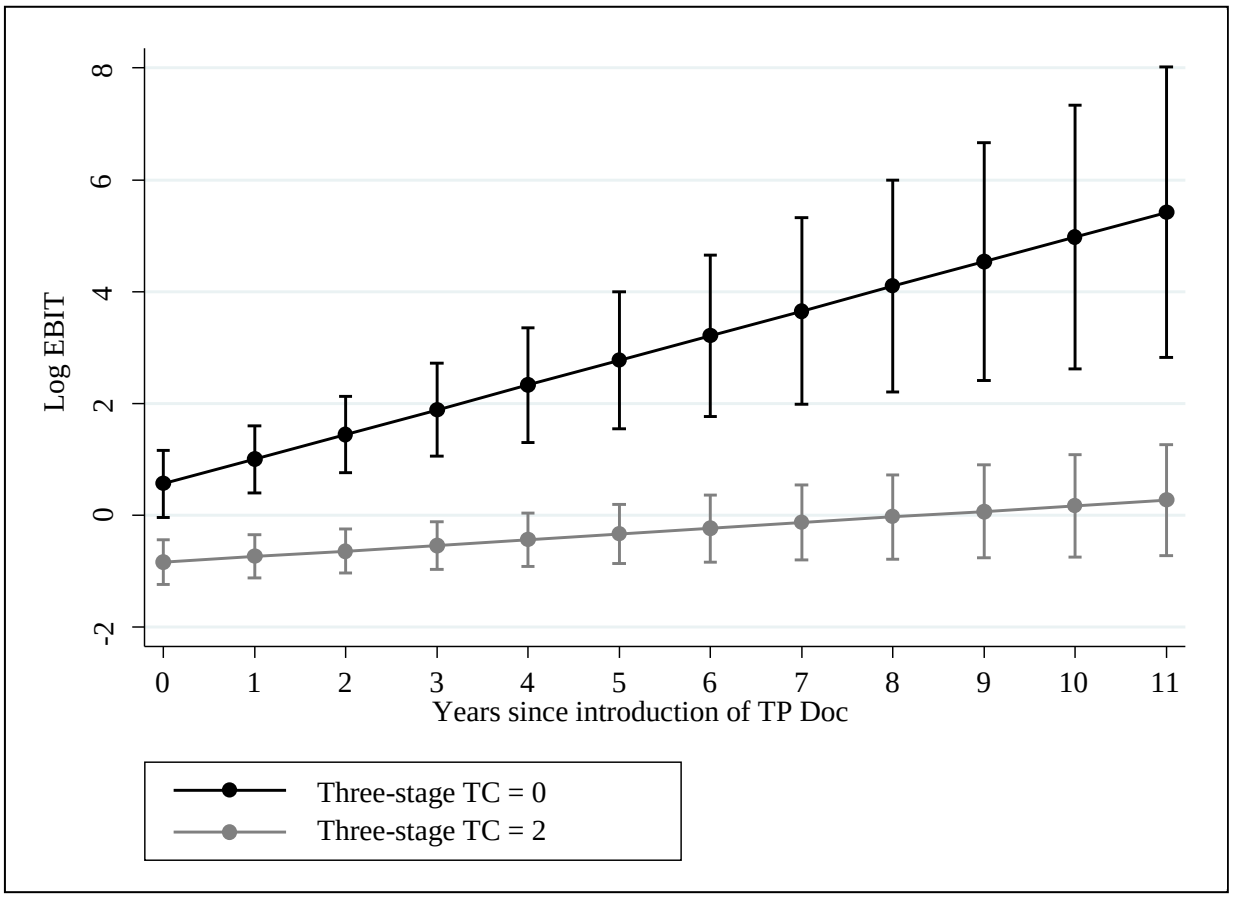
coefficient and its statistical significance declines with each additional year of the existence of these rules.

Figure 10: Average marginal effects of CIT – IP firms



These findings suggest that strict transfer pricing regulations are less effective in reducing transfer pricing manipulation if interest deduction limitation rules are also strict. This again points to a substitutive relationship between the two profit-shifting channels. While transfer pricing documentation rules increase the cost of shifting via the transfer pricing channel and induce a move towards the debt channel, they still leave considerable leeway for transfer pricing manipulation in case the debt channel is restricted. However, this leeway reduces with each year that transfer pricing documentation rules have been in place, which suggests that the increased experience of the tax authorities clearly enhances the effectiveness of transfer pricing regulations in tackling transfer pricing manipulation. This effect is particularly true with respect to transfer pricing manipulation of companies with a low group intangible intensity.

Figure 11: Average marginal effects of CIT – non-IP firms



Based on the results in columns III-V of Table 27, it can be concluded that, in the absence of anti-avoidance regulations for both channels, companies with a high group intangible intensity seem to shift profits mainly via transfer pricing. Consequently, the existence of interest deduction limitation rules does not substantially affect the shifting behaviour of these companies as long as no strict transfer pricing regulations exist. Strict transfer pricing regulations, on the other hand, increase the marginal costs of shifting via transfer pricing manipulation. This, in line with Hypothesis 3, leads to less profit shifting via transfer pricing manipulation in high-tax countries. However, if shifting via both channels is restricted by strict anti-avoidance regulations, transfer pricing rules seem to be far less effective in reducing profit shifting via transfer pricing manipulation. This confirms Hypothesis 4.

On the other hand, companies with a low group intangible intensity do not exhibit a negative tax rate sensitivity of EBIT in the absence of anti-avoidance regulations for both channels. This suggests that these companies either do not shift profits at all or mainly shift via interest payments. An indicator for the latter is that, if a strict interest deduction limitation rule but no transfer pricing documentation rule applies, companies with a low intangible intensity exhibit

a significant negative tax rate sensitivity of EBIT. This indicates that they substitute shifting via debt with shifting via transfer pricing. Moreover, if both anti-avoidance regulations are strict, these companies are still able to shift profits via transfer pricing manipulation; however, they cannot do this to the same extent as companies with a high intangible intensity. If transfer pricing documentation regulations have been present for several years, the leeway for transfer pricing manipulation clearly declines, especially for affiliates of a group with a low intangible intensity.

4.2.3.4.2 Robustness checks

To reassess the findings, several robustness checks are conducted. Firstly, the transfer pricing and thin capitalization strictness indictors are replaced by other measures used in previous studies. The results are provided in Table 42 in the Appendix. Following Buettner et al.[254], a non-linear transformation of the D/E ratio is used as an alternative strictness indicator of thin capitalization rules (columns I and II of Table 42). If no thin capitalization rules exist, the indicator is 0. In countries that apply an earnings stripping ratio, this indicator is set to missing. A detailed explanation of the variable is given in Chapter 4.2.3.2.2. With respect to the transfer pricing strictness indicator, a binary variable also applied by Lohse and Riedel is considered,[255] which equals 1 if formal transfer pricing documentation rules exist and 0 otherwise (columns III and IV of Table 42). Moreover, informal transfer pricing documentation rules are also incorporated into the study, using a variable that is set to 1 in all countries with an informal transfer pricing documentation requirement. This measure is combined with the main variable for transfer pricing strictness used in the baseline results to account for the effect of time. Consequently, this variable increases by 1 for each year after the introduction of formal transfer pricing documentation rules (columns V and VI of Table 42).

Using the D/E ratio as the thin capitalization strictness indicator, the results of Equation (19) are comparable to the main results with respect to their significance and direction of the coefficients. One main difference is that, although the interaction between the thin capitalization strictness indicator and the CIT rate in column II of Table 42 is still negative for companies with a low intangible intensity, it is no longer significant. The significant negative triple interaction suggests that companies mainly substitute towards the transfer pricing channel if both thin capitalization rules and strict transfer pricing documentation regulations are in place. While

[254] See Buettner et al. (2012).
[255] See Lohse/Riedel (2013).

the interest deduction limitation strictness indicator underlying the baseline results considers both thin capitalization rules and earnings stripping rules, the variable based on the D/E ratio excludes countries with an earnings stripping rule. Hence, the more significant and substantial coefficient of the two-way interaction between the thin capitalization strictness indicator and the CIT rate in column V of Table 27 may be driven by countries with an earnings stripping rule. This suggests that these rules are particularly effective in reducing profit shifting via interest payments.

If the alternative transfer pricing variable introduced by Lohse and Riedel is used,[256] most of the baseline results are again confirmed. The main difference is that, when using this measure, the tax rate sensitivity of companies with a high intangible intensity is negative but no longer significant in the absence of anti-avoidance regulations. These results, however, must be treated with caution, as this binary variable exhibits considerably less variation in the sample than the transfer pricing strictness indicator used in the main analysis.

The transfer pricing variable that considers both informal transfer pricing documentation rules and the effect of time on the strictness of transfer pricing regulations (columns V and VI of Table 42) shows no substantial differences with respect to the significance of the coefficients. The magnitude of the coefficients, however, differs slightly, and the results suggest an even lower effectiveness of transfer pricing documentation rules in the absence of interest deduction limitation rules.

In addition to alternative definitions of the anti-avoidance strictness indicators, alternative definitions of intangible intensity are tested. Table 43 in the Appendix shows the results of this. In the first variation (columns I and II), the sample is split by taking account of the level of intangible assets to total assets of the group only. Under this definition, companies active in R&D intensive industries are, differently to the main regression results, not automatically assumed to be intangible intensive. In the second alternative (columns III and IV), intangible intensity is defined based on the level of intangible assets held by an affiliate, rather than the ratio of intangible assets to total assets. In a third alternative (columns V and VI), the ratio of intangible assets to total fixed assets instead of total assets is used as a proxy for intangible intensity. In this specification, companies active in R&D intensive industries are again by default included in the sample of companies belonging to groups with a high intangible intensity. The alterations

[256] See Lohse/Riedel (2013).

in the definition of intangible intensity yield very similar results and confirm the baseline results presented in Chapter 4.2.3.4.1.

In a third robustness check, ultimate owners are re-added to the sample. The results are depicted in Table 44 in the Appendix. The findings for this sample also closely resemble the baseline findings. However, the magnitude of the tax sensitivity of EBIT in the absence of anti-avoidance regulations, as well as the magnitude of the tax sensitivity when both anti-avoidance regulations are strict, are somewhat smaller than the baseline results. This confirms prior findings that headquarter firms are less prone to profit shifting behaviour.

4.2.3.5 Results II: Quasi-experimental evidence from a thin capitalization reform in France

4.2.3.5.1 Main analysis

The empirical evidence presented in Chapter 4.2.3.4 suggests that multinationals are to some extent able to substitute profit shifting strategies. To further validate these findings, a reform setting in France is studied using a difference-in-difference approach, as described in Chapter 4.2.3.3.2.

Figure 12 illustrates that the average EBIT of treatment and control groups (as defined in Chapter 4.2.3.3.2) followed a parallel trend in the three years prior to the reform. Meanwhile, in the post-reform years, it declined more strongly for treated firms than untreated ones. Thus, the parallel trend assumption required for a difference-in-difference setting can be confirmed for both the total sample and the subsample of IP firms.

Figure 12: Common trend of EBIT in treatment and control group

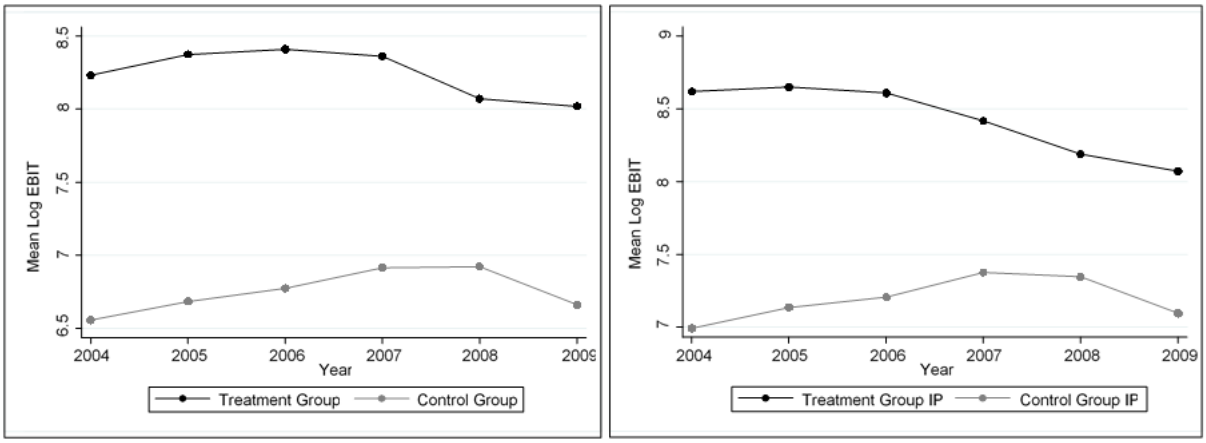


Table 28 summarizes the results of the difference-in-difference estimation, as defined in Equation (20). Column I presents the regression results, considering both industry-year and firm fixed effects but not controlling for firm-specific time-variant variables. The coefficient on the difference-in-difference estimator is negative and significant at the 1% level, with a magnitude of -0.37. It remains negative and significant if fixed assets and employee compensation are added to the regression (see column II). This finding confirms that firms react to an introduction or tightening of thin capitalization rules by reducing their EBIT. This again suggests that some firms substitute debt shifting with transfer pricing manipulation if the debt shifting channel becomes more restricted.

Table 28: Main results of difference-in-difference estimation

Dependent variable: Log EBIT					
	All	All	IP	Non-IP	All
After	1.525	-0.868**	-0.273***	-1.216**	-0.891**
	(0.966)	(0.410)	(0.053)	(0.523)	(0.405)
Treat x After	-0.367***	-0.314**	-0.573***	-0.097	-0.066
	(0.131)	(0.126)	(0.157)	(0.164)	(0.166)
After x IP high					0.056
					(0.046)
Treat x After x IP high					-0.497**
					(0.227)
Year-Industry FE	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
# Companies	938	938	506	432	938
# Observations	5,628	5,628	3,036	2,592	5,628
R-squared (within)	0.072	0.124	0.165	0.104	0.125

Notes:
***, **, * indicates significance at the 1%, 5%, and 10% level. Robust standard errors are reported in parentheses. Units of observation are firms. The dependent variable is Log EBIT, which denotes a natural logarithm of a firm's earnings before interest and taxes. After is equal to zero for pre-reform years between 2004 and 2006 and takes on the value of one for the post-reform period between 2007 and 2009. Treat is a binary variable that is equal to one for all firms that are assigned to the treatment group and is equal to zero for all companies assigned to the control group. Controls include Log Fixed Assets and Log Costs of employees, which represent natural logarithms of a company's fixed assets and the employee costs, respectively. FE stands for fixed effects. IP represents a sample of IP-intensive firms as defined in section 4.2.3.4.1 and Non-IP includes a sample of all other companies.

In order to reflect the idea that treatment firms differ in their ability to manage intragroup prices upward or downward (i.e. in switching from debt shifting to trade mispricing), the sample is split into firms with a high and a low intangible intensity. For this purpose, the same proxy for intangible intensity is used as in the previous estimation approach, which is explained in detail in Chapter 4.2.3.4.1. This means that all companies belonging to a group with an above-median ratio of intangible assets to total assets, as well as all companies active in industries with a high level of R&D investment, are classified as intangible intensive.

While France did not have formal transfer pricing documentation rules in the sample period of 2004-2009, it nevertheless had transfer pricing regulations in place that were rather strictly enforced. This suggests that, for companies not affected by thin capitalization rules before 2007, shifting high levels of profits via the debt channel might have been cheaper than excessively using transfer pricing manipulation. Consequently, the model suggests that companies with both a high and a low intangible intensity in the treatment group had incentives to make use of debt shifting prior to the reform. This is also implicitly confirmed by including only companies with high levels of interest paid in the treatment group. Thus, restricting the level of allowed debt shifting through the introduction of thin capitalization rules should have affected firms in the treatment group irrespective of their level of intangible intensity. However, the potential for moving towards the other channel is likely to be more pronounced for companies with a high intangible intensity, which suggests that these companies are able to substitute more debt shifting with shifting via transfer pricing. Moreover, as the new thin capitalization rules introduced in France in 2007 only applied to intragroup payments, companies with a low intangible intensity might have compensated for the lack of opportunities to substitute internal debt shifting with transfer pricing manipulation by making greater use of external debt.

In fact, the results shown in columns III and IV of Table 28 indicate a highly significant negative coefficient of the difference-in-difference estimator for intangible-intensive companies, as well as an insignificant coefficient for companies with a low intangible intensity. The magnitude of the coefficient for intangible-intensive companies is -0.57, which is notably higher than the coefficient for the full sample. To further validate this, instead of splitting the sample, a triple difference-in-difference estimation that also includes an indicator variable for intangible intensity is used. The triple difference estimator is highly significant at the 5% level and negative. The joint coefficient is statistically significant, with an F-Value of 6.41. These findings support the assertion of Hypothesis 4 that companies with a high intangible intensity have more leeway in substituting debt shifting with transfer pricing manipulation.

4.2.3.5.2 Robustness checks

The findings are further tested by using alternative definitions of the treatment group. The results are depicted in Table 29.

Table 29: Difference-in-difference estimation: Robustness tests using alternative definitions of treatment and control groups and a placebo test

Dependent variable: Log EBIT				
	All	All	All	All
After	-0.866**	-0.868**	0.060	
	(0.409)	(0.410)	(0.132)	
$Treat_2$ x After	-0.104*			
	(0.057)			
$Treat_3$ x After		-0.308**		
		(0.120)		
$Treat_4$ x After			-0.315**	
			(0.135)	
After(Placebo)				-0.184
				(0.574)
Treat x After(Placebo)				-0.082
				(0.133)
Log Fixed Assets	0.082***	0.082***	0.029	0.080**
	(0.025)	(0.027)	(0.036)	(0.034)
Log Costs of Employees	0.457***	0.464***	0.404***	0.596***
	(0.088)	(0.097)	(0.107)	(0.100)
Year-Industry FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
# Companies	1,040	938	204	938
# Observations	6,240	5,628	1,224	3,752
R-squared (within)	0.115	0.124	0.115	0.158

Notes:
***, **, * indicates significance at the 1%, 5%, and 10% level. Robust standard errors are reported in parentheses. Units of observation are firms. The dependent variable is Log(EBIT), which denotes a natural logarithm of a firm's earnings before interest and taxes. After is equal to zero for pre-reform years between 2004 and 2006 and takes on the value of one for the post-reform period between 2007 and 2009. After(Placebo) is equal to zero for 2004 and 2005 and takes on the value of one for 2006 and 2007. Treat is a binary variable that is equal to one for all firms that are assigned to the treatment group and is set to zero for all companies assigned to the control group. Controls include Log Fixed assets and Log Costs of employees, which represent natural logarithms of a company's fixed assets and employee costs, respectively. FE stands for fixed effects.

In column I of Table 29, the treatment group comprises only companies with a tax incentive and a parent firm in an EU member state or one of the other countries exempted from the application of thin capitalization rules before 2007. In this definition of the treatment group, the additional requirement of interest payments above €150,000 (used in the main analysis) is ignored. In a second alternative (see column II of Table 29), the mean instead of the median interest payments in the three years prior to the reform are taken as a proxy to define whether companies fulfil the requirement of interest payments above the exempt amount. Moreover, instead of referring to the tax incentive as a precondition to be assigned to the treatment group, all companies that have a parent in an EU member state or exempted treaty state and that have interest greater than €150,000 are assigned to the treatment group. In addition, the difference-

in-difference estimation is conducted for the subsample of all companies with a tax incentive (see column III of Table 29). The three alternative definitions of the treatment group and the sample yield highly significant negative coefficients for the difference-in-difference estimator on EBIT. Moreover, a placebo test is conducted. This placebo test assumes that the reform in France took place in 2006, one year prior to the actual reform. Based on this assumption, the difference-in-difference model is re-estimated for the years 2004-2007. This yields a statistically insignificant coefficient of the difference-in-difference estimator, which further supports the validity of the main findings.

Table 30: Robustness tests using different definitions for intangible intensity

Dependent variable: Log EBIT				
	IP= intangible assets/total assets of group above median of all groups		IP= intangible assets of group above median of all groups	
	IP	Non-IP	IP	Non-IP
After	0.838***	0.108***	0.831***	0.110**
	(0.253)	(0.040)	(0.247)	(0.046)
Treat x After	-0.563***	-0.126	-0.529***	-0.039
	(0.170)	(0.181)	(0.177)	(0.145)
Log Fixed Assets	0.051	0.077**	0.048	0.075*
	(0.047)	(0.036)	(0.039)	(0.042)
Log Costs of Employees	0.704***	0.422***	0.710***	0.406***
	(0.094)	(0.110)	(0.090)	(0.112)
Year-Industry FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
# Companies	427	385	434	378
# Observations	2,562	2,310	2,604	2,268
R-squared (within)	0.192	0.118	0.197	0.122

Notes:
***, **, * indicates significance at the 1%, 5%, and 10% level. Robust standard errors are reported in parentheses. Units of observation are firms. The dependent variable is Log(EBIT), which denotes a natural logarithm of a firm's earnings before interest and taxes. After is equal to zero for pre-reform years between 2004 and 2006 and takes on the value of one for the post-reform period between 2007 and 2009. After(Placebo) is equal to zero for 2004 and 2005 and takes on the value of one for 2006 and 2007. Treat is a binary variable that is equal to one for all firms that are assigned to the treatment group and is set to zero for all companies assigned to the control group. Controls include Log Fixed assets and Log Costs of employees, which represent natural logarithms of a company's fixed assets and employee costs, respectively. FE stands for fixed effects.

In addition, in line with the analysis presented in Chapter 4.2.3.4, alternative definitions of IP intensity are tested. In columns I and II of Table 30, IP is defined based on the ratio of intangible assets to total assets only, without considering companies active in R&D-intensive industries. In columns III and IV of Table 30, the ratio of intangible assets to total fixed assets is used as a proxy for companies that belong to intangible-intensive groups. In addition, all companies ac-

tive in R&D-intensive industries are classified as intangible intensive. Both alternative definitions yield highly significant negative coefficients of the difference-in-difference estimator, confirming that the results are robust.

In summary, the quasi-experimental setting verifies that a substitution from intragroup debt shifting towards transfer pricing manipulation takes place. Especially intangible-intensive firms react to a strengthening of thin capitalization rules by understating EBIT, possibly through increased trade mispricing.

4.2.4 Summary

Chapter 4.2.1 illustrates that the most prevalent anti-avoidance regulations that extend the taxation of interest and royalties at source are different kinds of interest deduction limitation rules and transfer pricing regulations. Furthermore, the OECD and the European Commission recommend the implementation of such regulations. Existing empirical evidence suggests that transfer pricing regulations and interest deduction limitation rules are rather effective in reducing BEPS.

This dissertation presents a theoretical and empirical analysis of the interdependency between the two main profit shifting channels: the strategic use of transfer pricing and internal debt. It particularly studies the interdependency of anti-avoidance measures targeting these channels. While most prior studies have studied the effectiveness of anti-avoidance measures without considering the existence of anti-avoidance measures targeting other channels, this study considers that there may be substitution between the profit-shifting channels.

The empirical analysis is based on two identification strategies. Firstly, a panel data analysis is performed using firm-level data on 103,714 European companies over the period of 2004-2012. Secondly, data on 1,040 French firms is employed to estimate the outcomes of the 2007 tax reform in France, which strengthened thin capitalization rules for one group of firms and left them unchanged for another.

In line with previous literature, the study finds a negative and statistically significant impact of the CIT rate on a firm's reported profits. In addition, the results suggest that transfer pricing documentation rules in a high-tax country reduce the tax rate sensitivity of EBIT. Taking into account that firms might be able to choose between transfer pricing shifting and debt shifting and that anti-avoidance regulations might interact with each other, a triple interaction of the tax rate and both the strictness of transfer pricing and thin capitalization rules are considered. It shows that the positive effect of transfer pricing rules on the tax rate sensitivity of EBIT is

reduced if a country applies both strict interest deduction limitation regulations and strict transfer pricing rules. Hence, if the debt shifting channel is restricted by strict interest deduction limitation rules, transfer pricing rules are less effective in reducing profit shifting via transfer pricing than when debt shifting is not restricted. This suggests that the positive effect of transfer pricing on the tax rate sensitivity of EBIT found by previous studies may partly be attributable to a move from transfer pricing manipulation towards debt shifting. Moreover, the study indicates that IP firms shift more via transfer pricing manipulation in the absence of anti-avoidance regulations and have greater potential to continue shifting via this channel even if transfer pricing documentation rules have been in place for several years.

A difference-in-difference analysis of a French thin capitalization reform in 2007 confirms that some firms substitute debt shifting with transfer pricing shifting if the former channel becomes restricted. It shows that companies affected by the new but not the old French thin capitalization rules decreased their EBIT following the reform, while other firms did not. This provides evidence that interest deduction limitation rules do not necessarily reduce total profit shifting but may to a certain extent only change the relative use of the two profit-shifting channels. In addition, the difference-in-difference estimation confirms that IP firms have greater leeway in shifting via transfer pricing manipulation.

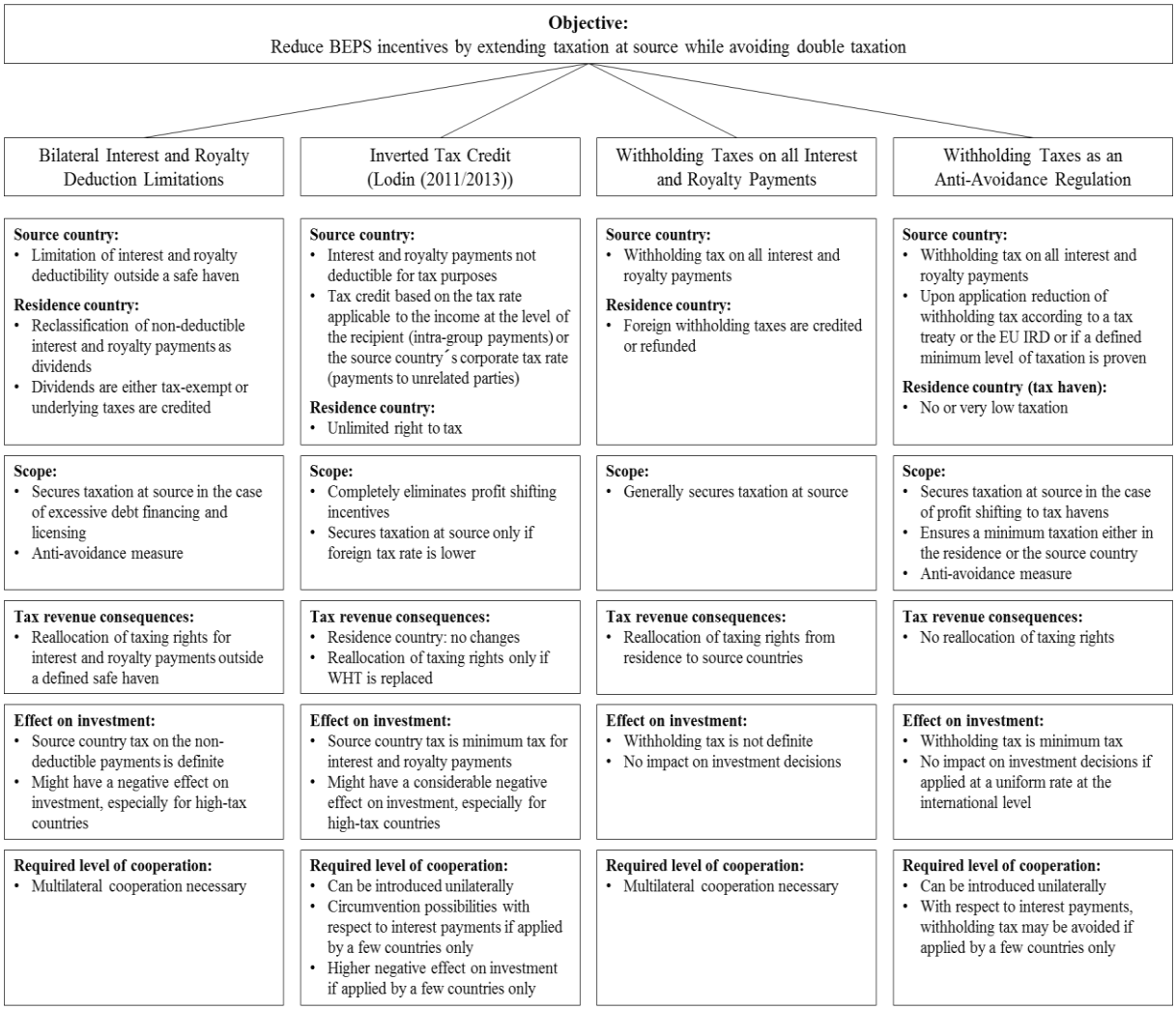
Regarding policy recommendations that can be drawn from this study, the results show that ignoring the interdependency of profit-shifting channels might provide biased conclusions on the effectiveness of transfer pricing regulations or thin capitalization rules. Policy-makers should be aware that transfer pricing documentation rules seem to be rather ineffective in reducing profit shifting via transfer pricing manipulations. This is particularly the case in the first years after the introduction of such rules and with regard to transfer pricing manipulation related to IP. Firms are likely to still have some capacity for profit shifting despite the existence of both transfer pricing regulations and interest deduction limitation rules.

4.3 Reform options for extending the taxation of interest and royalties at source

Chapter 4.2 demonstrated that prevalent measures for extending taxation of interest and royalties at source have certain drawbacks. In particular, evidence has been provided that, despite the existence of strict transfer pricing and interest deduction limitation rules, companies still have substantial leeway to engage in profit shifting, especially via the transfer pricing channel. In addition, interest deduction regulations may result in double taxation.

This chapter[257] presents and discusses four alternative methods to increase taxation of interest and royalties in the residence country of the payer. These are all based on the internationally accepted principle of avoiding double taxation. The four options are as follows: bilateral interest and royalty deduction limitations, an inverted tax credit, WHTs on all interest and royalty payments, and WHTs as an anti-avoidance regulation. None of these regulations are currently considered by either the OECD or the European Commission.

Figure 13: Comparison of the reform options



The options differ in the extent to which they limit profit shifting. Which measure is preferable depends on what specific objective countries want to achieve by strengthening taxation of interest and royalties at source: Is the purpose to generally change the allocation of taxing rights

[257] This chapter is a slightly modified extract of Finke et al. (2014).

and extend taxing rights of source countries? Or do countries try to guarantee a certain minimum tax level for profits of multinationals? Should this minimum level be determined by the tax level in the source country? The differences between the intended objectives result in the reform options having different effects on tax revenue. Moreover, the reforms are likely to have different effects on real investment and differ in the required level of cooperation between countries.

In Chapter 4.3.1, the reform options are presented and their scope, their general tax revenue consequences, their impact on real investment, and the required level of cooperation are analysed. Figure 13 summarizes the findings. In Chapter 4.3.2, an overview of cross-border royalty and license fee flows is provided. Based on this information, rough estimates of the value of tax revenue losses and gains arising from two of the reform options in selected countries are calculated. Chapter 4.3.3 summarizes the main findings.

4.3.1 Description and analysis of the reform options

4.3.1.1 Bilaterally limiting interest and royalty deductibility

Many OECD countries extend interest taxation at source through unilateral thin capitalization or earnings stripping rules. These rules forbid the deduction of interest payments from the tax base in cases where a company exceeds a given threshold.[258] In principle, similar rules could be introduced for royalty payments. However, to avoid double taxation, the residence country should reclassify the non-deductible payments as dividends. These dividends would then have to be either exempt from tax in the residence country or qualify for a credit of the underlying source tax.[259] This reform option requires multilateral cooperation, and countries would have to adapt both their national tax law and bilateral tax treaties accordingly.

Bilaterally limiting the deductibility of interest and royalty income based on a fixed ratio (e.g. interest/EBIT and royalty/EBIT) is designed to secure the source country's tax base in the case of high levels of debt financing and licensing. This measure only limits profit shifting above a defined acceptable level and basically constitutes an anti-avoidance measure. Part of the taxing rights would be reallocated from the residence to the source country and the source country would gain while the residence country would lose some tax revenue.

[258] See Chapter 4.2.1.
[259] Expenses related to royalty or interest income should nevertheless be deductible.

An important side effect of this reform option is that source tax becomes definite for the non-deductible part of the interest or royalty payment. Therefore, the nominal tax rate in the source country becomes more relevant for investment decisions. In high-tax countries, the tax burden on investments made by affected companies would increase. This constitutes a desired effect of anti-tax-avoidance measures but also raises the CoC on investments in that country and may thus have a negative effect on the level of firm investment.

4.3.1.2 Replacing the deductibility of payments by an inverted tax credit

Another possible method to ensure an effective taxation of cross-border interest and royalty payments has been proposed by Lodin.[260] According to his suggestion, the deduction of interest and royalty payments should be denied, and an inverted tax credit should instead be granted. The amount of this inverted tax credit should depend on whether the lender or licenser is a related or a third party. If the interest or royalties were paid to an external lender or licenser (foreign or domestic), the inverted tax credit would be based on the source country's corporate tax rate. If the lender or licenser was an associated or group company or if the loan was guaranteed for by a related party, the inverted tax credit would be based on the tax rate applied to the income at the level of the receiving company. However, the tax credit rate would be limited to the domestic income tax rate. In the case of losses, the inverted tax credit could be carried forward.

Table 31: Tax burden effect of the proposed inverted tax credit

Nominal CIT rate in residence country	**10%**	**40%**
Profits before interest/royalty payment	100	100
Interest/royalty payment	100	100
Taxable income	100	100
Tax on profits in source country (30%)	30	30
Tax credit based on interest/license cost	10	30
Final tax liability in source country	**20**	**0**
Interest/royalty income in residence country	100	100
Final tax liability in residence country	**10**	**40**
Total taxes	**30**	**40**

Table 31 illustrates the tax burden effects of this proposal. The example assumes profits of 100 and interest or royalty payments of 100 that are paid to a group company resident in either a

[260] For the proposal for interest payments, see Lodin (2011); for the proposal for royalty payments, see Lodin (2013).

low-tax country (corporate tax rate of 10%) or a high-tax country (corporate tax rate of 40%). The tax rate in the source country is 30%.

The calculations in Table 31 show that, under the proposed inverted tax credit system, intragroup interest and royalty payments are always at least subject to the source country's CIT rate but double taxation of the income is avoided. If the recipient is a third party, a domestic group company, or a group company that is resident in a country with the same or a higher tax rate than that of the source country, the tax treatment of the interest or royalty in the source country will equal the tax treatment under the current system, where interest and royalty payments are tax deductible. The tax treatment differs from the current system if interest and royalties are paid to a group company that is resident in a low-tax country. In this case, the overall tax burden of the multinational group increases compared to the current situation.[261]

Under Lodin's proposal, expenses related to the interest or royalty income are generally deductible in the residence country of the recipient. However, taxation of the net interest or royalty income is only ensured in cases of payments to countries with the same or a higher tax rate. If the recipient company was resident in a low-tax country and had deductible expenses, the net principle would be violated. To solve this problem, expenses related to the income at the level of the recipient need to be deducted from the taxable income in both the source country and the residence country. Furthermore, these expenses need to simultaneously be considered when determining the level of the inverted tax credit (Alternative 1). A drawback of this option is the difficulty of accurately allocating expenses to certain income, meaning that the administrative effort is likely to be high. As an easier option, the total expenses could be considered in the residence country only, and potential excess taxes levied in the source country could be refunded (Alternative 2).

Table 32 illustrates the tax burden effects of the inverted tax credit, accounting for expenses related to the interest or royalty income in the residence country. The example in Table 31 was adjusted by assuming additional expenses of 50 in the residence country. Columns 1 and 4 of Table 32 refer to the taxation under Lodin's proposal; columns 2 and 3 depict the two alternative approaches mentioned above.

It becomes clear that, if the interest or royalty payment is made to a low-tax country, the total tax burden under Lodin's proposal will be higher than if either the source or the residence country's income tax rate applied to the net profit of 50. Under Alternatives 1 and 2, such excess

[261] See also Lodin (2011), p. 178.

taxation is avoided and only the net income is taxed with the source country's income tax rate. For payments to countries with a higher tax rate, no adjustment of Lodin's proposal is necessary to ensure the taxation of the net income. In those cases, the net income always remains subject to the residence country's tax rate.

Table 32: Tax burden effect of the proposed inverted tax credit, alternatives for dealing with expenses

	Lodin	**Alternative 1**	**Alternative 2**	**Lodin**
Nominal CIT rate in residence country	**10%**	**10%**	**10%**	**40%**
Profits before interest/ royalty payment	100	100	100	100
Interest/royalty payment	100	100	100	100
Expenses related to interest/ royalty income	-	50	-	-
Taxable income	100	50	100	100
Tax on profits in source country (30%)	30	15	30	30
Tax credit based on (net) interest/ license cost	10	5	10	30
Final tax liability in source country	**20**	**10**	**20**	**0**
Interest/royalty income in residence country	100	100	100	100
Total expenses	50	50	50	50
Taxable income	50	50	50	50
Tax on profits in residence country	**5**	**5**	**5**	**20**
Tax credit	-	-	10	-
Final tax liability in residence country	**5**	**5**	**-5**	**20**
Total taxes	**25**	**15**	**15**	**20**

Unlike the other reform options considered, the inverted tax credit completely removes opportunities for tax-minimizing intragroup profit shifting via interest and royalties and ensures that purely domestic groups are not put at a disadvantage compared to multinational corporations. Generally, this reform option additionally ensures a corresponding treatment of intragroup interest and royalty payments at the level of the payer and the recipient.[262]

An important difference between Lodin's proposal and the first reform option (and the following option) lies in the taxing authority: the residence country would fully keep its taxing rights and would not lose tax revenue, given that the behaviour of firms does not change. However,

[262] See Lodin (2011), p. 178.

to ensure that only the net income is taxed, residence countries might have to refund excess taxes paid in the source country (see Alternative 2 in Table 32). In such cases, the countries would consequently lose some tax revenue, implying that some tax revenue would be reallocated from residence countries to source countries. The source country will only derive tax revenue from an inverted tax credit on interest and royalty income if the recipient resides in a country with a lower tax rate. In this situation, the source country's tax on either the gross payment (Lodin's proposal) or the net payment (Alternatives 1 and 2) is the minimum tax the multinational would have to pay. Conversely, the source country will not collect any tax revenue from applying an inverted tax credit in the case of profit shifting to countries with the same or a higher tax rate. The tax revenue effects of an inverted tax credit are discussed further in Chapter 4.3.2.2.3.

An inverted tax credit system is likely to be compatible with EU law and double taxation treaties (DTTs),[263] and countries could introduce it unilaterally without subjecting multinationals to double taxation. Hence, this reform option is comparatively easy to implement. It should be noted, however, that introducing an inverted tax credit in one country might prove ineffective if other high-tax countries do not apply it. To illustrate this, the example in Table 31 is reconsidered, assuming this time that the high-tax country with a tax rate of 40% does not grant an inverted tax credit. In this scenario, the multinational corporation may set up a subsidiary in the latter country and route the interest or royalty payment through this subsidiary before passing it on to the subsidiary in the low-tax country. In this case, a 30% tax credit would be granted in the source country, and the interest or royalty income would effectively be taxed at 10%.

It may be possible to prevent such avoidance schemes by tying the tax credit to the final beneficiary of the interest and royalty payments. However, this requires the identification of the final beneficiary. Lodin has argued that this may prove more difficult for interest payments than for royalties. Taking this into account, the credit system may only be an effective reform option for royalties if applied unilaterally.[264]

Upon the application of an inverted tax credit, the taxes in the source country become definite. Herein lies a potential drawback of the proposed system, as the result is an increase in the tax burden on investments in high-tax countries. Therefore, investment in these countries is likely to decrease. In particular, the inverted tax credit should have a stronger negative impact on real investment in high-tax countries than the reform option discussed in Chapter 4.3.1.1. This is

[263] See Lodin (2011), pp. 178-179.
[264] See Lodin (2013).

due to the lack of a safe haven, which makes the entire interest or royalty payment (as opposed to only the non-deductible part) subject to definite source taxation. The effect on investment is expected to be particularly strong if only a few high-tax countries applied the inverted tax credit. Even if all countries applied the same regulation, the investment effect would persist as long as tax rates are not harmonized.

4.3.1.3 Extending the use of WHTs

An alternative option worthy of discussion is imposing WHTs at the international level. Interestingly, neither the OECD[265] nor the European Commission[266] consider the introduction of WHTs on interest and royalties.

There are two different options for introducing WHTs to fight profit shifting via intragroup interest and royalty payments: (a) generally reintroducing WHTs on all intragroup interest and royalty payments and (b) specifically targeting profit shifting to zero- or low-tax countries. The following two subchapters describe and discuss these options in detail.

4.3.1.3.1 A general reintroduction of WHTs

As a first possible alternative, WHTs could be levied on all interest and royalty payments, irrespective of the location of the recipient and the taxation at the level of the receiving company. To avoid double taxation, countries would have to ensure that foreign WHTs are credited against the tax liability in the residence country and that excess foreign taxes are refunded. Therefore, unlike current country practice, the tax credit would not be limited to the amount paid on royalty income net of expenses but should always be granted in full, even if the tax liability was zero. This would eliminate frequently criticized excess tax credits, which may arise if the WHT is levied on the gross payment while taxes in the residence country of the recipient are levied on the net payment. It seems clear that such a general reintroduction of WHTs on all intragroup interest and royalty payments would require amendments of not only domestic law but also of tax treaties. In the case of EU member states, the modification of the EU Interest and Royalties Directive[267] would also be necessary.

Reintroducing WHTs on all interest and royalty payments and crediting or refunding these taxes in the residence country would considerably restrict the taxing rights of residence countries and redistribute tax revenue to source countries. To what extent taxing rights are reallocated would

[265] See OECD (2015a).
[266] See Council Directive (EU) 2016/1164 of 12 July, 2016.
[267] Council Directive 2003/49/EC.

depend on the level of applied WHT. In this respect, the 10% rate proposed in Art. 11 of the OECD Model Convention on Income and on Capital (OECD Model) could serve as a reasonable benchmark. Chapter 4.3.2.2.2 discusses the tax revenue redistribution implied by this reform for royalty payments for a selected group of countries.

Compared to the two reform options presented in Chapters 4.3.1.1 and 4.3.1.2, taxation at source would not be definite, and it would thus not be relevant for investment decisions. This remains an important advantage of refundable WHTs. Put differently, if the refunding system is working, this reform option will not introduce additional investment distortions.

4.3.1.3.2 Levying WHTs as an anti-avoidance regulation

Alternatively, countries could levy WHTs as an anti-avoidance regulation, which would only target interest and royalty payments to certain tax havens. To this end, countries should implement regulations in domestic law that provide for levying WHT. Such a WHT would then be reduced according to tax treaties or the EU Interest and Royalties Directive upon application from the recipient. Local tax authorities could, however, deny any reduction of the WHT on interest and royalty payments made to a third non-treaty country that taxes this income below an acceptable level. Several examples exist that provide some guidance for such an acceptable threshold. For instance, in the context of the EU Anti-Tax Avoidance Directive, the threshold for the application of CFC rules is 50% of the tax rate of the EU member state applying the rule.[268] Applying this 50% ratio to the average CIT rate across all EU member states, would yield an acceptable level of taxation, comparable to the already mentioned 10% rate specified in Art. 11 of the OECD Model. In addition, France and Sweden already apply measures that deny interest deductibility for certain income taxed below 10%. Hence, a 10% rate may serve as an adequate benchmark for an appropriate level of WHT. The procedure of claiming tax credit requires a disclosure of the recipient entity and recipient country, which enables tax authorities to efficiently control interest and royalty flows to low-tax countries and tax havens. Some countries, such as Croatia, the Czech Republic, Portugal, and Denmark, already operate similar anti-avoidance regulations.[269]

This reform option does not primarily aim to extent source taxation but to ensure a minimum taxation of royalty and interest income in either the source or the residence country. Differently

[268] See Council Directive (EU) 2016/1164 of 12 July, 2016.
[269] See Chapter 3.2.3.1. Other countries apply an even stricter approach, fully taxing interest and royalty payments to certain low-tax countries (e.g. Austria, Slovenia, and Sweden).

to a general levy of WHTs, a WHT targeted at payments to non-EU tax havens could be introduced unilaterally, and no changes to current treaty law and the EU Interest and Royalties Directive would be necessary. However, in a manner comparable to the inverted tax credit system, countries would have to be able to identify the final beneficiary of interest and royalty payments in order to apply a WHT on payments to tax havens effectively, as long as some treaty countries do not apply a similar rule. Otherwise, multinationals would be able to circumvent the anti-avoidance regulation by shifting profits via intermediate group members in treaty or EU member states that do not collect WHTs. As already mentioned in Chapter 4.3.1.2, identifying the final beneficiary of interest payments may be difficult, and levying WHTs on payments to tax havens may thus not be effective if only applied by a few countries.

In addition, countries must be aware that the above-presented anti-avoidance rule would not target profit shifting to EU member states and treaty states that undercut the defined acceptable level of taxation of interest and royalty income due to, for example, an IP-box regime. To ensure effective taxation in these cases as well, countries would have to agree on a minimum level of residence taxation of interest and royalties within the EU and in treaty states. Alternatively, an implementation of respective anti-avoidance rules within the EU Interest and Royalties Directive and tax treaties would be necessary, allowing countries to levy WHT if the income is not effectively taxed at the level of the recipient.[270]

If tax haven countries do not cooperate, the collected WHT will become definite. However, due to the low rate and the limited application of this rule, potential negative effects on investment should remain rather small, especially if applied multilaterally.

4.3.2 Cross-border royalty and license fee flows and the resulting tax revenue effects of selected reform options

The OECD.Stat database provides balance-of-payments data on trade in services by partner country for 34 OECD member countries as well as Hong Kong and Russia.[271] In a subset of this dataset, aggregate country-level data on cross-border royalty and license fee payments and receipts are available for these countries. Moreover, most countries publish royalty and license fee flow data disaggregated by partner country. Based on this data, Chapter 4.3.2.1 presents some stylized facts, and, Chapter 4.3.2.2 provides estimations of the tax revenue arising from

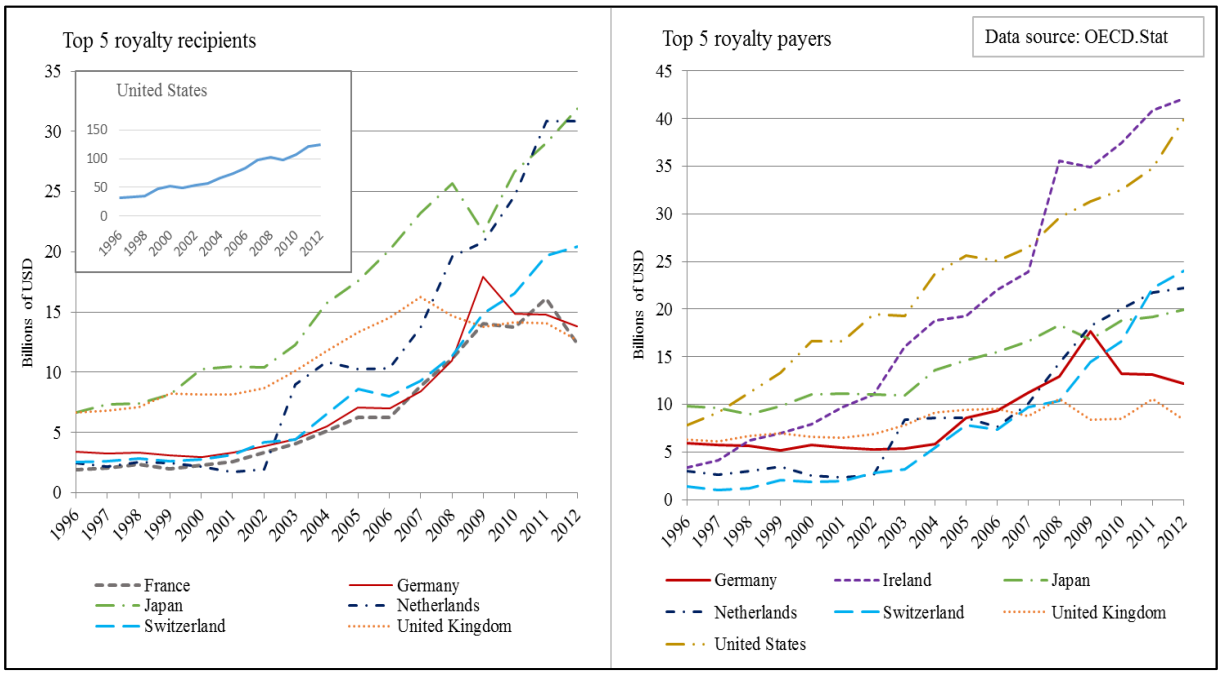
[270] The anti-avoidance rule in Art. 5 of the EU Interest and Royalties Directive, which allows the levying of withholding taxes in the case of fraud and abuse, is insofar not sufficient.
[271] OECD (2014).

cross-border royalty and license fee flows under the current tax system. These are compared to the presumable tax revenue resulting from two of the reform options proposed in Chapter 4.3.1.

4.3.2.1 Stylized facts on cross-border royalty and license fee flows

The time period for which royalty and license fee flow data are available in OECD.Stat differs from country to country. For most countries, aggregate country level data are published for the years 1996-2012.[272] In the following, the focus lies on this time span. Figure 14 depicts the royalty and license fee receipts as well as payments of all countries that have ranked among the top five recipient and top five payer countries, respectively, at least once during the years 1996-2012.

Figure 14: Development of royalty inflows and outflows 1996-2012: Top 5 recipients and payers



In all years of the time period observed, the value of U.S. royalty income was always a multiple of the value of royalty income of any other country. Other large economies, such as the UK, Japan, Germany, and France, are further top recipients of royalties and license fees. Some smaller economies like the Netherlands and Switzerland also ranked among the top five royalty income recipients in the last years of the period. All major recipient countries exhibit an overall increase in royalty inflows over the years 1996-2012. In some countries, royalty income

[272] For 2013, countries have only reported a provisional value at the time the study was conducted.

dropped in the years around the global financial crisis of 2007-2008. While this drop was followed by a stark increase in royalty income in the US and in Japan, the downward tendency in the UK, France, and Germany continued until 2012.

It is interesting to compare the OECD.Stat data on royalties and license fees income to data on the number of granted patents and utility models, registered trademarks, and industrial designs, by the applicant's country of origin (published by the World Intellectual Property Organization).[273] There is a positive correlation between the number of IP rights owned by residents of a country and royalty inflows to that country. However, the difference between the number of IP rights owned by the US and other major IP owner countries is notably smaller than the difference in royalty income received, suggesting that intangible assets owned by U.S. residents are more valuable or more frequently licensed across borders. In the same way, some countries like Germany, the Republic of Korea, and Italy in all observed years ranked higher than, for example, the Netherlands in terms of immaterial assets held but received less royalties and license fee income in the years 2003-2012.

With respect to royalty and license fee payments made to other countries, the US ranked the highest until 2008, when it was overtaken by Ireland. While royalty outflows of especially the US, Ireland, the Netherlands, and Switzerland have ascended steeply over time, a gentler increase in royalty payments occurred in France, Japan, and the UK. Royalty and license fee outflows of Germany also constantly increased until 2009 but, differently to the payments of the other top payer countries, decreased considerably afterwards. This trend may have been supported by the reduction of the German CIT rate in 2008, which made it less attractive to reduce the tax base in Germany by shifting profits via royalty payments to countries applying a lower tax rate.

Except for France and Ireland, all countries that ranked amongst the top five recipients of royalties and license fees in at least one year during 1996-2012 also ranked amongst the top five payers of royalties and license fees in one or more of those years. Unsurprisingly, countries like the US, Japan, the UK, Germany, and France rank among the economies with the largest border-crossing royalty flows. The high overall royalties and license fee flows from and to the Netherlands, Switzerland, and Ireland are more surprising; in this respect, it seems obvious to suggest that tax planning may play an important role.

[273] See World Intellectual Property Organization (2014).

For example, starting from 2005, the general CIT rate in the Netherlands had gradually been reduced. In addition, the Dutch government introduced an IP-box regime in 2007, under which certain royalty income is subject to an effective tax rate of merely 5%. These measures may explain the particularly steep increase of royalty income since 2006. Switzerland also reduced its general corporate tax rate during the years observed and offered preferential tax regimes for holding and mixed companies in all years, thereby considerably reducing the effective tax rate of IP holding companies. Ireland is a typical low-tax country. Since 2003, it has applied a corporate tax rate for active trade income of only 12.5%. Under certain conditions, IP holding companies also qualify for this low tax rate. In addition, until 2010, Ireland had offered a patent income exemption regime, under which certain patent income cropped to a certain amount per annum remained fully exempt from taxation.[274] Thus, in the observed years, all three countries offered special tax systems for royalty income, which made it attractive to shift profits via royalty payments from high-tax countries to their jurisdictions.

One reason for the high value of royalties and license fee payments flowing from the Netherlands and Switzerland to other countries could be the absence of WHTs on royalties applied by these countries in any of the observed years. The lack of WHTs on royalties makes it attractive to channel royalty payments from EU member states (where the EU Interest and Royalties Directive applies) to third countries (particularly tax havens) via the Netherlands or Switzerland. In the case of Switzerland, the OECD.Stat database only includes data on the total receipts and payments of royalties and license fees. The Netherlands and Ireland, however, provide royalty flow data disaggregated by partner country. This data supports anecdotal evidence that some US-based multinationals are channelling royalties free of WHT from Ireland via the Netherlands to Bermuda using the "Double Irish Dutch sandwich" tax-planning strategy described in Chapter 2.1.1.[275] The OECD.Stat data for Ireland show that, on average, 23% of all royalty outflows during the years 2004-2010 were attributable to payments to the Netherlands. For the remaining years, no data are available. According to the data reported by the Netherlands, the country received 50% of all royalties and license fees from Ireland in 2011. In 2008, the share was 44%, and it ranged between 17% and 19% in 2004-2007. For the remaining years, data are not available. Royalty payments from the Netherlands to Bermuda are not reported for any of the years in the period 1996-2012. However, for the years 2006 and 2007, the data show that payments from the Netherlands to non-OECD countries made up 42% and 26% of the overall

[274] See Kessler/Eicke (2008), p. 846.
[275] For this tax-planning strategy, see also Kleinbard (2011a); Sandell (2012) and Chapter 2.1.1.

royalty payments, respectively. Only a share of 7% and 8% of these payments is reported by partner country (including payments to China, Hong Kong, India, Russia, and South Africa). Thus, a considerable share of overall royalties and license fee payments could have been rendered to Bermuda or other tax havens.

In addition to these findings, the data for Ireland show that, from 2007 to 2011, on average, 17% of all royalties were paid to Luxembourg. Since 2008, when Luxembourg introduced an attractive IP-box regime, payments from Ireland to Luxembourg have shown a tendency to increase. During the same period, the share of Ireland's payments to the US constantly decreased, although they still accounted for 34% of overall payments, on average. For the US, the BEA publishes more detailed data on royalty flows by partner country, separately showing royalty flows from and to affiliates and non-affiliates and distinguishing between different royalty types.[276] The data reveal that, from 2006 to 2012, almost 100% of all payments received from Ireland were attributable to payments from affiliates to their U.S. parent companies, suggesting that licensing IP from U.S. parent companies to Irish affiliates offers substantial tax benefits. This, however, presupposes that the low-taxed profits arising from the exploitation of intangibles at the level of the Irish company are considerably higher than the royalty payments to the US.[277]

4.3.2.2 Tax revenue estimation

4.3.2.2.1 Sample selection and underlying assumptions

This chapter seeks to determine what the tax revenue consequences of the different reform options discussed in Chapter 4.3.1 are. In this, it provides a rough estimate of the tax revenue gains and losses for different countries using the OECD.Stat data on royalties and license fee flows between countries, that has been discussed in Chapter 4.3.2.1. For reasons of data availability, the focus lies on two alternatives of the reform options under consideration: the inverted tax credit and the general reintroduction of WHTs on cross-border royalty payments (see Chapters 4.3.1.2 and 4.3.1.3.1).

The tax revenue arising from cross-border royalties and license fee payments under the following four scenarios will be compared:

(1) The status quo.

[276] See BEA (2014).
[277] See also Mutti/Grubert (2009).

(2) The reform option of "a general reintroduction of WHTs on royalties", which implies that all OECD and EU member states agree to increase their WHT rate on all royalties and license fee payments to 10%. OECD and EU member states that already levy higher WHTs on royalty payments to certain countries keep their higher rates.

(3) The reform option of "implementing an inverted tax credit system" as proposed by Lodin (see Chapter 4.3.1.2). This scenario assumes that existing WHTs remain in place.

(4) The reform option "implementing an inverted tax credit system" as proposed by Lodin (see Chapter 4.3.1.2). This scenario assumes that WHTs on royalty payments are replaced in all OECD and EU member states.[278]

To account for variations in the royalty and license fee data, the tax revenue that would have resulted from the two reform options, as well as the actual tax revenue under the status quo, are calculated for the years 2006-2012.[279] To avoid distortions, only those countries for which at least 90% of both royalty and license fee inflows and outflows are published on a per country basis in all of these years are included in the calculations. This constraint reduces the sample to 12 countries. As the sources of data collection underlying the OECD.Stat data differ from country to country (i.e. surveys and compulsory reporting), the value of the royalty and license fee payments reported in one country usually differs from the respective value of royalty and license fee receipts of the partner country. The tax revenue estimates for each country are based on data reported by this country.

The tax revenue arising from cross-border royalty payments under the status quo is determined by

$$T_j = \sum_{i \neq j} [s_{ji} R_{ji}] + \sum_{i \neq j} [t_j R_{ij}] - \sum_{i \neq j} [min(t_j, s_{ij})\, R_{ij}] \qquad \textbf{(21)}$$

where s_{ji} denotes the WHT rate on payments from country j to country i, R_{ji} equals the total value of royalty payments from country j to country i, t_j represents the statutory profit tax rate of country j, s_{ij} stands for the WHT rate on payments from country i to country j and R_{ij} denotes the total value of royalty payments from country i to country j.

[278] Here, both the case that only withholding taxes on intragroup royalties are abolished and the case that all withholding taxes are replaced are considered.

[279] For the Republic of Korea, data disaggregated by partner country was not available for 2012. Thus, the calculations are restricted to the years 2006-2011.

Under the status quo, countries collect WHT revenue on royalty outflows to certain countries (first term of Equation (21)). In addition, authorities derive tax income by levying residence-based taxes on royalties received from abroad (second term of Equation (21)). This tax revenue will be reduced if foreign WHTs are credited (third term of Equation (21)). Two countries in the sample (the Czech Republic and France) will only credit foreign WHTs on royalties if a tax treaty exists between the residence country of the royalty payer and the country of the recipient. In all other cases, the foreign taxes can only be deducted from the domestic tax base. To account for this in the calculations for the Czech Republic and France, the third term of Equation (21) is replaced by $t_j s_{ij} R_{ij}$ for all partner countries i that are not DTT partners of the Czech Republic and France, respectively. One country (the Slovak Republic) does not grant any relief for foreign WHTs if no tax treaty with the residence country of the payer exists. This is also accounted for in the calculations.

For the calculation of the WHT balance under the status quo, s_{ji} and s_{ij} are set to the lower of either applicable domestic or treaty WHT rate. The domestic and treaty WHT rates stem from the Ernst & Young Worldwide Corporate Tax Guides for the years 2006-2012.[280]

As discussed in Chapter 4.3.1.3.1, the reform option of levying WHTs of 10% in all OECD and EU member states requires that countries fully credit or even refund all foreign WHTs. Thus, the tax revenue arising from levying and crediting WHTs under the reform option is given by

$$T_j = \sum_{i \neq j} [\theta_{ji} R_{ji}] + \sum_{i \neq j} [t_j R_{ij}] - \sum_{i \neq j} [\theta_{ij} R_{ij}] \quad \textbf{(22)}$$

For the calculation of the WHT revenue and WHT credit under the reform option, θ_{ji} and θ_{ij} are set to the higher value of 10% and the minimum of the applicable domestic and treaty WHT rate under the status quo for all royalty payments made by OECD and EU member states, irrespective of the partner country. For all R_{ij} where i is a non-OECD and non-EU member state, θ_{ij} is set to the lower of the applicable domestic or treaty WHT rate under the status quo. As the term $t_j R_{ij}$ is the same under the status quo and under the reform option of levying WHTs at a minimum rate of 10% in all OECD and EU member states, the change in tax revenue is given by

$$\Delta T_j^{WH} = S_j^{WH} - S_j^{SQ} \quad \textbf{(23)}$$

[280] Ernst & Young (2006-2012).

where

$$S_j^{SQ} = \sum_{i \neq j} [s_{ji} R_{ji}] - \sum_{i \neq j} [min(t_j, s_{ij}) R_{ij}] \quad \textbf{(24)}$$

denotes the balance of WHT revenue and credited foreign WHTs under the status quo and

$$S_j^{WH} = \sum_{i \neq j} [\theta_{ji} R_{ji}] - \sum_{i \neq j} [\theta_{ij} R_{ij}] \quad \textbf{(25)}$$

amounts to the balance under a uniform minimum WHT of 10% with full credits for foreign taxes.

The additional tax revenue arising from implementing an inverted tax credit system for all royalty payments is given by

$$\Delta T_j^{ITC1} = \sum_{i \neq j} [(t_j - min(t_j, t_i)) R_{ji}^{IG}] \quad \textbf{(26)}$$

Under this regime, intragroup royalty payments (R_{ji}^{IG}) are fully subject to CIT. There is, however, a credit which is equal to the tax payable in the residence country of the recipient as long as it does not exceed the domestic tax. Equation (26) assumes that existing WHTs remain in place. If the inverted tax credit replaced existing WHTs on intragroup royalty payments in all countries, the change in tax revenue compared to the status quo would be given by

$$\Delta T_j^{ITC2} = \sum_{i \neq j} [(t_j - min(t_j, t_i)) R_{ji}^{IG}] - \sum_{i \neq j} [s_{ji} R_{ji}^{IG}] + \sum_{i \neq j} [min(t_j, s_{ij}) R_{ij}^{IG}] \quad \textbf{(27)}$$

Since the analysis relies on the assumption that only OECD and EU member states agree to replace existing WHTs on intragroup royalties with an inverted tax credit, R_{ij}^{IG} is set to zero for all i which are neither OECD nor EU member states.

If countries abolished WHTs on all royalties (not only intragroup), R_{ji}^{IG} and R_{ij}^{IG} would have to be replaced by R_{ji} and R_{ij} in the second and third term of Equation (27).

The OECD.Stat data does not distinguish between corporate and individual royalty payers and recipients, and does not include information on the share of transactions between affiliates and (general) the taxation at the level of the recipient. The following assumptions are made to deal with this drawback of the used data:

(1) All royalties are paid for the use of patents. Thus, if a DTT or a country's domestic tax law provide different rates for different kinds of intangibles, the WHT rate for patent royalties is used. This assumption is based on U.S. BEA data (see Chapter 4.3.2.1), which shows that the highest percentage of both U.S. royalty payments and receipts are attributable to industrial processes.[281] For the US, the calculations are based on the more detailed BEA data and include different WHT rates depending on the reported type of intangible.

(2) All royalties and license fees are received by companies that are subject to corporate taxation. The possible bias resulting from the exclusive use of CIT rates in the calculations of the WHT credit under the status quo should remain rather small. This is because, for the vast majority of royalty flows considered, foreign WHTs are lower than both the personal and the CIT rate. At the level of the recipient, royalties may be subject to either the statutory corporate tax rate[282] or a reduced tax rate under an IP-box regime. Since the value of royalty payments benefiting from an IP-box regime remains unknown, the analysis estimates the tax revenue consequences for two different scenarios. The first scenario completely disregards IP-box regimes. The second scenario bases itself on the assumption that all royalties received by a country offering an IP-box regime qualify for low taxation under this regime.[283] The real value should lie within this estimated range.

(3) There are no deductible expenses related to the royalty income and the royalty income recipients did not incur any losses which could limit the amount of foreign WHTs credited under the status quo. In reality, due to excess tax credits, the WHT balance under the status quo is likely to be higher.

According to U.S. BEA data, U.S. resident companies received a share of between 62% and 66% of all foreign royalty income from foreign affiliates in the years 2006-2012. The share of royalty payments from U.S. resident companies to affiliates abroad ranged from 70% to 73% in the same period. Therefore, a range of possible tax balance values for all EU member states in the sample is calculated, assuming that a minimum of 50% and a maximum of 100% of all royalties and license fee flows between EU member states were made between affiliates and qualified for WHT rate reduction under the EU Interest and Royalties Directive. Since the inverted tax credit system proposed by Lodin is limited to royalty payments between affiliates, this dissertation also relies on a calculated range of possible values of additional tax revenue

[281] See BEA (2014).
[282] The corporate tax rates were taken from KPMG (2014b).
[283] The IP-box regime tax rates were taken from Evers et al. (2014).

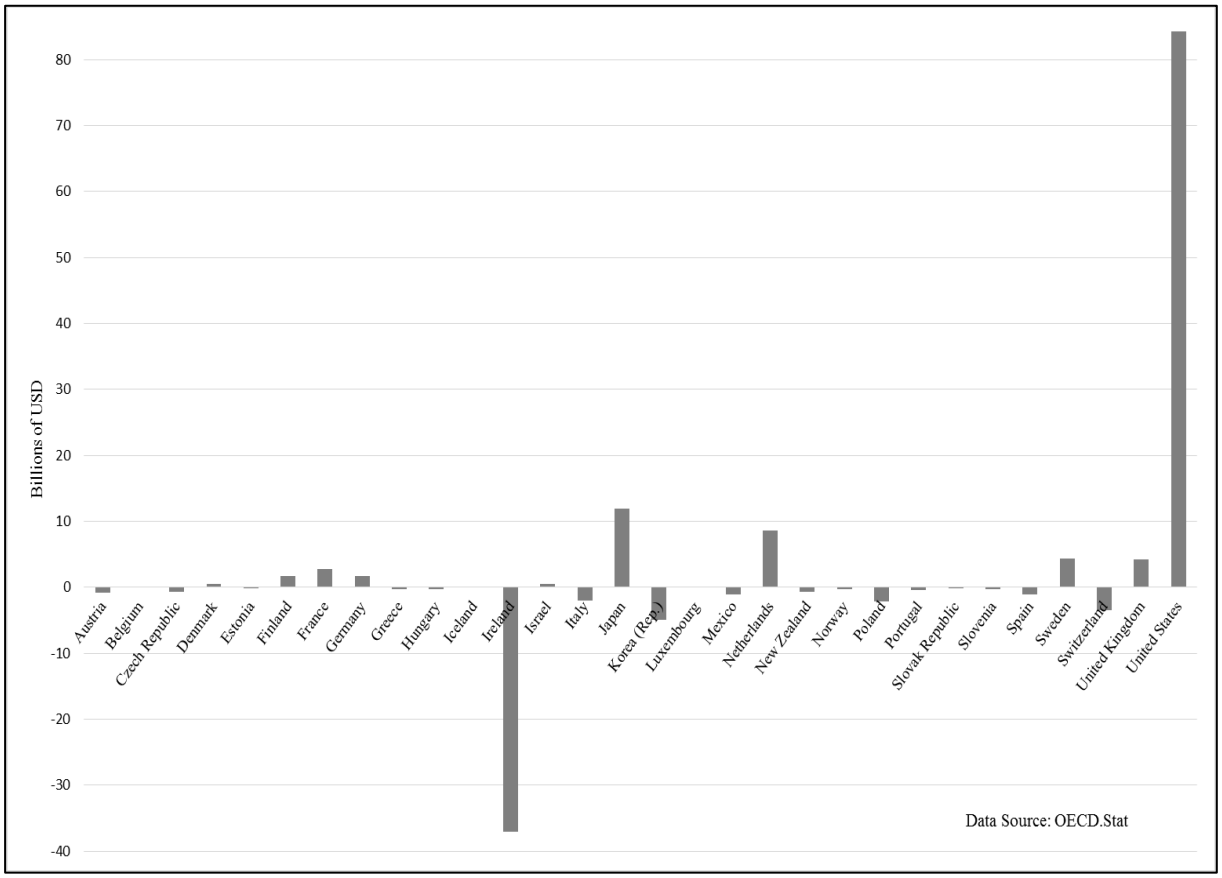
for this proposal, once again assuming a minimum of 50% and a maximum of 100% of all royalty and license fee flows are payments between affiliates. For the US, the analysis relies on the more detailed BEA data on royalty payments to affiliates. However, for all U.S. royalty payments to partner countries for which the BEA does not disclose the share of payments to affiliates, a range of prospective additional tax revenue (50%-100%) is calculated.

In all calculations, the analysis abstracts from behavioural responses of taxpayers.

4.3.2.2.2 Results I: Introduction of a minimum WHT of 10% in all OECD and EU member states

Figure 15 illustrates the balance of royalties and license fee receipts minus payments in 2012 for all countries reporting in OECD.Stat.

Figure 15: Royalties and license fee balance (receipts – payments) of reporting OECD countries in 2012



It shows that the US, Japan, and the Netherlands were the top net recipients in 2012, while Ireland, the Republic of Korea, and Switzerland were the top net payers of royalties and license fees. With respect to possible tax revenue consequences of a broader levy of WHTs one may

infer from Figure 15 that the top net recipient countries are likely to lose tax revenue as a result of the reintroduction of WHT on royalty payments in all OECD and EU member states. Meanwhile, the top net payer countries should experience an increase in their tax income thanks to such a reform.

Table 33: Net tax revenue from WHT under the status quo and a minimum WHT of 10% in all OECD and EU member states: 100% intragroup payments, IP-boxes considered

	Status quo	WHT 10% OECD + EU	Change	Status quo	WHT 10% OECD + EU	Change	Status quo	WHT 10% OECD + EU	Change
Millions of USD	WHT Rev. – WHT Credit	WHT Rev. – WHT Credit	Δ Balance	WHT Rev. – WHT Credit	WHT Rev. – WHT Credit	Δ Balance	WHT Rev. – WHT Credit	WHT Rev. – WHT Credit	Δ Balance
	AT			**FR**			**KR**		
2006	-5	80	84	-147	-233	-86	370	369	-2
2007	-8	79	87	-223	-323	-100	437	436	-1
2008	-9	78	87	-284	-480	-197	443	442	0
2009	-9	60	69	-130	-386	-256	530	529	-1
2010	-9	71	80	-139	-285	-146	755	754	-1
2011	-7	86	93	-190	-410	-219	406	404	-2
2012	-7	86	93	-137	-238	-100	-	-	-
	CZ			**IL**			**SK**		
2006	41	51	10	30	14	-15	-3	1	3
2007	47	65	18	13	2	-11	-5	-4	1
2008	55	72	17	27	16	-11	-3	1	4
2009	51	64	13	-13	-28	-15	1	7	6
2010	52	67	15	-15	-29	-14	3	8	5
2011	25	88	63	-24	-40	-17	4	15	11
2012	17	61	44	-27	-49	-21	3	13	10
	DE			**IT**			**SE**		
2006	-105	253	357	7	74	67	-125	-235	-110
2007	-115	262	377	4	63	59	-103	-275	-172
2008	-174	215	389	-50	355	406	-151	-268	-116
2009	-216	0	216	-117	270	387	-52	-265	-214
2010	-238	-133	106	-114	331	444	-98	-422	-324
2011	-273	-117	156	-118	286	404	-78	-402	-325
2012	-284	-125	159	-145	176	321	-63	-392	-329
	DK			**JP**			**US**		
2006	-39	-39	0	-739	-580	159	-2117	-5620	-3504
2007	-71	-59	12	-826	-792	34	-2375	-6394	-4019
2008	-112	-83	29	-987	-920	67	-2397	-6633	-4236
2009	-85	-100	-16	-731	-591	140	-2598	-6292	-3695
2010	-65	-32	33	-947	-953	-6	-3900	-7539	-3639
2011	-88	-39	49	-1096	-1165	-70	-4507	-8756	-4249
2012	-66	-33	32	-1202	-1377	-176	-4520	-8444	-3924

Abbreviations:
Rev. = Revenue; AT = Austria; CZ = Czech Republic; DE = Germany; DK = Denmark; FR = France; IL = Israel; IT = Italy; JP = Japan, KR = Republic of Korea; SK = Slovak Republic; SE = Sweden; US = United States

Note:
All numbers are rounded to the nearest million.

Table 33 presents the tax revenue estimation results for the reintroduction of a WHT on royalties at a minimum rate of 10% in all OECD and EU member states under the assumption that 100% of the royalty flows are intragroup payments and that all royalties qualify for low taxation under an IP-box regime, where available. The values for the remaining scenarios described in Chapter 4.3.2.2.1 are presented in Tables 45 and 46 in the Appendix.

Under the reform option of a broad introduction of WHTs, all net royalty recipient (payer) countries exhibit a negative (positive) balance of WHT income minus WHT credit. However, under the status quo, net payers of royalties and license fees do not necessarily exhibit a positive WHT balance. From 2006 to 2008, Germany, for example, was a net payer country but still featured a negative balance of WHT income minus WHT credits granted during these years. The same holds true for Italy with respect to the years 2009-2012.

Most importantly, the results show that a net recipient (payer) country of royalties and license fees would not necessarily lose (gain) tax revenue if OECD and EU member states agreed on levying WHTs on royalties at a minimum rate of 10%. For example, the tax revenue balance of Germany in 2012, which is one of the top net recipient countries, amounted to values between $-284 million (100% intragroup payments, see Table 33) and $-295 million (50% intragroup payments, see Tables 45 and 46 in the Appendix). Had all OECD and EU member states levied WHT of at least 10% in 2012, the tax loss from levying and crediting WHTs would have only amounted to $-125 million. As the tax revenue estimates for the other years yield similar results, a broader levy of WHTs in all OECD and EU member states is likely to increase Germany's tax revenue.

The reasoning behind this rather counterintuitive result is the following: under the status quo, countries levy WHTs on payments to some countries only and apply different rates. Thus, whether a country loses or wins from a broader levy of WHTs does not only depend on the country's net balance in royalties and license fee flows; it also depends on how the reform changes the composition of WHTs. Ultimately, whether the resulting increase in WHT revenue exceeds the increase in WHT credit is decisive.

The analysis renders similar results for Austria, the Czech Republic, and Italy for all years observed. These countries would have earned more tax revenue than during the status quo if OECD and EU member states had levied WHTs of at least 10% on royalty payments during the years 2006-2012. The same holds true for Denmark and the Slovak Republic, except for the years 2006/2009 and 2007/2008 (50% intragroup payments)[284], respectively.

By contrast, France, Israel, Sweden, and the US would lose tax revenue. Among these countries, the US would incur the highest loss by far. According to the calculations, the balance of WHT revenue and WHT credit under the reform option would have amounted to $-8.44 million compared to $-4.52 million under the status quo in 2012. The calculations for the remaining years

[284] See Table 34.

yield comparable results. Thus, the tax loss of the US that results from levying and crediting WHTs would likely almost double if countries agreed to reintroduce WHTs on royalties of at least 10%.

For the Republic of Korea, WHT revenue under the status quo and under a broader levy of WHTs would remain unchanged, while the overall amount of WHT credited would marginally increase. Consequently, the WHT balance of the Republic of Korea would probably remain almost the same if countries agreed on a broader levy of WHTs. The reason for this lies in the DTTs concluded by the Republic of Korea: all the major partner countries already provide for a 10% WHT rate on royalties and license fee payments.

For Japan, the analysis yields an increase compared to the status quo in net WHT revenue resulting from the reform option for the years 2006-2009 and a decrease for the years 2010-2012. This result is partly driven by the decrease in the value of royalty payments to the US net of royalty receipts from the US that occurred in the years following 2009. Japan has concluded one of its few DTTs with the US, which reduces the WHT rate on royalties to zero. Thus, an increase of the WHT rate on royalty payments from Japan to the US, as well as on royalty payments from the US to Japan to 10%, would have resulted in far higher additional tax revenues in the years 2006-2009 than in the years 2010-2012. This highlights that the tax revenue effect of reintroducing WHTs strongly depends on the WHT rates currently levied on royalty flows between major partner countries.

The example of France further illustrates this. The WHT balance of France (status quo) increased in the years after 2008, although the value of the balance of royalty inflows to the country minus royalty outflows from the country was comparable in the years 2008, 2009, and 2011, as well as in the years 2007 and 2010. One reason for this is the WHT rates on royalties in the DTTs with the US and Japan, which were reduced to zero with effect from 2009 and 2008, respectively. As the royalty inflows from both countries exceeded the royalty payments to both countries in all years observed, France gained more from the resulting lapse of foreign WHT credits on the royalty inflows than it lost from refraining to levy WHTs on the royalty outflows. Reintroducing WHTs on royalty flows between France, the US, and Japan would reverse this effect.

4.3.2.2.3 Results II: Implementing an inverted tax credit system

In the calculations for the inverted tax credit, two reform options are considered:

1. The inverted tax credit is introduced in addition to existing WHTs.

2. The inverted tax credit replaces the levy of WHTs in all OECD and EU member states.

The results accrued under the assumption that 100% of the royalty flows consist of intragroup payments and that all royalties qualify for low taxation under an IP-box regime (where available) are presented in Table 34. For the alternative scenarios, the tax revenue effects are presented in Tables 47 and 48 in the Appendix.

It seems clear that the inverted tax credit significantly increases the tax revenue of high-tax countries like France, Germany, Italy, Japan, and the US, irrespective of whether WHTs are replaced. If WHTs were not replaced, no country would lose tax revenue. However, the lower a country's tax rate is in comparison to other national tax rates, the lower the additional tax revenue earned from the inverted tax credit is. The example of Germany helps to illustrate this. Although royalty outflows from Germany have constantly been growing from 2006 to 2009, an inverted tax credit system would have resulted in lower additional tax revenue in 2008 and 2009 than 2006 and 2007, given that IP-box regimes are not considered (see Tables 47 and 48 in the Appendix). This can be traced back to the 2008 tax rate cut in Germany. If IP-box regimes were considered (see Table 34), the German tax revenue resulting from an inverted tax credit system would have been highest in 2009, despite the tax rate cut in 2008. One reason for this is that payments to France and the Netherlands, which both offer a low-tax IP-box regime, were considerably higher in 2009 than in any other year observed. Therefore, the domestic tax rate and the destination of the royalty outflows are key determinants of the tax revenue effect of implementing an inverted tax credit. When comparing the tax revenue resulting from reintroducing WHTs (see Table 33) to implementing an inverted tax credit in Germany in the years 2006-2012, it becomes evident that the former option is far less dependent on the destination of royalty outflows.

If an inverted tax credit system replaced the levy of WHTs, low-tax countries that are net payers of royalties and license fees and currently levy WHT on royalty payments to some countries (e.g. the Czech Republic, the Republic of Korea, and the Slovak Republic) would especially lose tax revenue. The Republic of Korea, for example, would have earned $568 million less than during the status quo if all OECD and EU member states had replaced levying WHTs on intragroup royalties with an inverted tax credit in 2012.[285]

[285] Assuming that 100% royalty payments were made intragroup and considering IP-box regimes. Tables 47 and 48 show that the losses would also have been considerable under the other scenarios.

Table 34: Tax revenue effect of the inverted tax credit: 100% intragroup payments, IP-boxes considered

	Inverted Tax Credit					
	In addition to WHT	**Instead of WHT**	**In addition to WHT**	**Instead of WHT**	**In addition to WHT**	**Instead of WHT**
Millions of USD	Δ Status Quo	Δ Status Quo	Δ Status Quo	Δ Status Quo	Δ Status Quo	Δ Status Quo
	AT		**FR**		**KR**	
2006	9	13	5	130	34	-454
2007	20	26	24	222	61	-471
2008	26	34	43	284	62	-533
2009	23	30	87	130	49	-621
2010	31	38	180	237	46	-877
2011	44	48	275	344	37	-568
2012	47	50	239	275	-	-
	CZ		**IL**		**SK**	
2006	12	-30	25	-11	1	3
2007	24	-23	35	21	2	6
2008	19	-36	40	12	6	10
2009	16	-35	11	21	3	2
2010	10	-42	11	23	3	0
2011	22	-3	12	32	2	-2
2012	18	-1	16	39	2	-1
	DE		**IT**		**SE**	
2006	573	623	128	115	17	46
2007	934	980	171	154	59	91
2008	561	639	803	713	93	118
2009	1259	1366	734	726	62	79
2010	746	856	806	774	71	113
2011	886	986	903	871	84	113
2012	931	1025	796	771	131	152
	DK		**JP**		**US**	
2006	31	59	676	686	1409	2253
2007	43	96	833	810	1900	2911
2008	65	146	1099	1030	2711	3776
2009	53	101	1063	912	2909	3907
2010	47	89	1239	1025	2723	4078
2011	91	144	1372	1148	3338	4831
2012	80	116	1326	1127	4005	5159

Abbreviations:
AT = Austria; CZ = Czech Republic; DE = Germany; DK = Denmark; FR = France; IL = Israel; IT = Italy; JP = Japan, KR = Republic of Korea; SK = Slovak Republic; SE = Sweden; US = United States

Notes:
All numbers are rounded to the nearest million. "Instead of WHT" implies that all OECD and EU member states replace WHTs with an inverted tax credit.

In summary, the tax revenue estimates show that the reallocation of taxing rights caused by a general levy of WHTs of 10% in all OECD and EU member states would lead to a significant redistribution of tax revenues. Interestingly, there is no perfect correlation between net royalty payment flows and revenue gains or losses. Introducing an inverted tax credit system to replace WHTs would also lead to a redistribution of tax revenue. It seems clear that, if an inverted tax credit was introduced without abolishing the WHTs levied under the status quo, no country would lose revenue and high-tax countries in particular would collect more tax revenue. How-

ever, if expenses related to the income were taken into account and Lodin's proposal was adjusted so that potential excess taxes paid in the source country are refunded by the residence country (see Chapter 4.3.1.2, Table 32), a reallocation of tax revenue would occur. Clearly, the drawback of an inverted tax credit lies in the increase of the tax burden on investments in high-tax countries, which may lead to firms investing less or restructuring their business activities. The calculations abstract from these behavioural changes.

4.3.3 Summary

As an option for reform, thin capitalization and earnings stripping rules could be introduced by more countries, and similar rules could be applied to intragroup royalties. To avoid double taxation of interest and royalty income, these regulations would need to be modified to reclassify non-deductible interest or royalty payments in the source country as deemed dividends in the residence country of the recipient. The deemed dividends would either have to be tax exempt or a tax credit would have to be granted for them. This reform option requires at least bilateral cooperation between countries and secures source countries' tax revenue in cases of what is defined as "excessive" debt financing or "excessive" levels of royalties. Defining such thresholds, however, remains both challenging and controversial.

Alternatively, countries could choose broader reform options and change the general tax rules for all interest and royalty payments. One option considered in this dissertation entails the introduction of a minimum WHT on interest and royalty payments in all OECD countries. This would require residence countries to credit or refund the WHTs. To achieve this, changes to DTT and the EU Interest and Royalties Directive would be necessary. Moreover, such a reform would most likely give rise to a significant redistribution of tax revenue. According to rough estimations, the US as the world's largest net recipient of royalty income would have suffered revenue losses of approximately $4 billion in 2012 (or 5% of their net royalty inflows). Surprisingly, other net royalty recipients including Germany would have likely benefited from such a reform. Clearly, the revenue effects would make it difficult to reach an agreement. It should also be kept in mind that incentives for shifting profits through royalties would not be completely neutralized by a 10% WHT, given that the headline corporate profit tax is often close to 30%.

A more limited approach would be to levy WHTs on payments to tax havens only. This type of anti-avoidance regulation solely requires changes to domestic tax law. However, in order to apply this measure effectively and to also tackle profit shifting to EU member states and treaty

countries that undercut the acceptable level of taxation, international coordination and consent would also be necessary for this reform option.

Another reform option is the inverted tax credit as proposed by Lodin.[286] The inverted tax credit is the only presented reform option that completely eliminates profit shifting incentives and ensures that purely domestic companies are not put at a disadvantage compared to multinationals. In addition, an inverted tax credit system allows for unilateral strengthening of source taxation without causing double taxation, thus ensuring it is easy to implement. However, if only applied by a few countries, the inverted tax credit system may prove ineffective because companies route royalties or interest payments through high-tax countries that do not apply the tax credit. This probably remains impossible for interest payments, but it may prove challenging even for royalty payments.

Moreover, applying an inverted tax credit would most likely increase the tax burden on economic activity, resulting in declining investment. This is an important difference to WHTs. If fully credited in the residence countries, the overall tax burden on investment would remain the same. Of course, a country that does introduce the inverted tax credit could use the additional revenue to cut corporate taxes, so that the negative impact on investment could be avoided or reduced. The same holds true for additional tax revenue from WHTs.

[286] See Lodin (2011) and Lodin (2013).

5 Conclusion

(1) Anecdotal and empirical evidence shows that multinational corporations engage in BEPS. Both intragroup debt and intragroup transfer pricing are used to channel profits from high-tax countries to low-tax countries. These profit-shifting strategies are fostered by three main elements of the international tax system: (a) the lack of concurrent taxation of world-wide income at the level of the ultimate parent company; (b) the existence of tax havens, preferential tax systems, favourable tax rulings and hybrid mismatch arrangements, enabling zero- or low taxation of passive income like interest and royalties; and (c) the lack of taxation of interest and royalty payments in the residence country of the payer.

(2) Calculations of the CoC and EATR for cross-border investments between EU member states and the US show that the effective tax burden of investments can be substantially reduced using typical tax-planning strategies. For profit shifting via intragroup financing, locating the financing company in an EU member state and making use of a hybrid loan provides the lowest CoC and EATRs among the financing structures considered. If this tax-planning strategy was used, the mean CoC would decrease by 1.9 percentage points (from 5.7% to 3.8%) and the mean EATR would decrease by 6.6 percentage points (from 20.9% to 14.3%) across all 28 countries included in the analysis. For profit shifting via intragroup licensing, locating the IP holding company in a tax-exempt country would reduce the mean CoC to 4.7% and the mean EATR to only 2%, assuming that the multinational generated its income solely from the use of intangibles. Even lower CoC and EATRs result if the IP holding company is resident in one of the EU member states offering an IP-box regime that allows an asymmetric treatment of income and expenses, such as Portugal or Hungary. Anti-avoidance measures like WHTs, switch-over clauses for intercompany dividends, thin capitalization rules, and CFC regulations neutralize the tax savings from tax-planning strategies and may even increase the tax burden above that experienced without tax planning.

(3) Extending taxation of interest and royalties in the residence country of the payer is a pragmatic way to reduce profit shifting incentives. In addition, it ensures that source countries with an economic connection to the interest and royalty income receive a share of the total tax revenue. Source taxation of interest and royalties is also in line with basic legal and economic principles as long as double taxation is avoided.

(4) Currently, countries mainly rely on transfer pricing regulations and interest deduction limitation rules as measures to prevent tax base erosion by interest and royalty payments.

No WHTs are levied on intragroup payments within the EU and many countries also do not apply WHTs on such payments to third countries. Empirical studies suggest that both transfer pricing regulations and interest deduction limitation rules are effective in reducing profit shifting. However, these studies usually ignore the interdependency of different profit-shifting channels. In this dissertation, empirical evidence is provided that there is a substitutive relationship between debt shifting and shifting via transfer pricing. It is also indicated that the high effectiveness of transfer pricing regulations found by earlier studies may partially be attributable to a move towards debt shifting. The results suggest that, even if both transfer pricing and interest deduction limitation rules are strict, companies still enjoy a degree of leeway in profit shifting, especially in using transfer pricing manipulation related to IP.

(5) Four alternative measures extending taxation of interest and royalties at source are presented: bilateral interest and royalty deduction limitations, an inverted tax credit, WHTs on all interest and royalty payments, and WHTs as an anti-avoidance regulation. While the measures have different objectives and consequences for both tax revenue and location attractiveness for real investment, they all prevent harmful double taxation and double non-taxation and may be applied to both interest and royalty payments. However, to prevent double taxation and ensure an effective application of the measures, a certain degree of international cooperation between countries is required for all reform options.

(6) Generally, countries face a trade-off between combating base erosion through profit shifting and attracting real investment. Full elimination of profit shifting incentives arising from interest and royalty payments can be achieved under an inverted tax credit system. However, this reform option is likely to have the strongest negative impact on real investment of all the measures considered. Potentially the simplest and most feasible reform option is to levy WHTs on interest and royalties that are creditable in the residence country of the recipient. This reform option would ensure a certain minimum tax level of interest and royalty payments and reallocate taxing rights while not affecting the attractiveness of the source country as an investment location. Rough estimates suggest that, as the world's largest net recipient of royalty income, the US would have suffered revenue losses of approximately $4 billion in 2012 if WHTs were levied on all royalties in all OECD member states at a rate of 10%. However, other net royalty recipients (e.g. Germany) and net royalty payers would have benefited from an increase in tax revenue fol-

lowing this reform option. Alternatively, instead of generally levying WHTs on all interest and royalty payments, the decision could be made to only target interest and royalty payments subject to low taxation at the level of the recipient. Due to the limited impact of this reform option on the allocation of taxing rights, consensus on its implementation might be easier to reach.

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Appendix

Table 35: Country statistics

	Full sample		IP		Non-IP	
Country	**Observations**	**%**	**Observations**	**%**	**Observations**	**%**
Austria	9,017	1.67	6,129	1.88	2,888	1.34
Belgium	24,799	4.58	12,040	3.70	12,759	5.91
Bosnia Herzegovina	1,177	0.22	634	0.19	543	0.25
Bulgaria	3,625	0.67	1,882	0.58	1,743	0.81
Croatia	5,525	1.02	3,044	0.94	2,481	1.15
Czech Republic	22,997	4.25	12,333	3.79	10,664	4.94
Denmark	10,766	1.99	4,956	1.52	5,810	2.69
Estonia	4,502	0.83	1,841	0.57	2,661	1.23
Finland	11,011	2.03	7,089	2.18	3,922	1.82
France	99,863	18.45	70,775	21.74	29,088	13.48
Germany	35,339	6.53	24,395	7.49	10,944	5.07
Hungary	2,850	0.53	1,938	0.60	912	0.42
Iceland	106	0.02	37	0.01	69	0.03
Ireland	581	0.11	229	0.07	352	0.16
Italy	54,878	10.14	45,782	14.07	9,096	4.21
Latvia	102	0.02	57	0.02	45	0.02
Luxembourg	2,160	0.40	1,112	0.34	1,048	0.49
Malta	6	0.00	5	0.00	1	0.00
Montenegro	15	0.00	9	0.00	6	0.00
Netherlands	8,437	1.56	3,456	1.06	4,981	2.31
Norway	21,620	3.99	15,117	4.64	6,503	3.01
Poland	20,952	3.87	11,751	3.61	9,201	4.26
Portugal	9,086	1.68	4,686	1.44	4,400	2.04
Romania	20,764	3.84	10,595	3.26	10,169	4.71
Serbia	6,248	1.15	2,909	0.89	3,339	1.55
Slovak Republic	5,675	1.05	3,311	1.02	2,364	1.10
Slovenia	3,310	0.61	2,298	0.71	1,012	0.47
Spain	55,495	10.25	34,309	10.54	21,186	9.82
Sweden	24,177	4.47	9,515	2.92	14,662	6.79
Switzerland	15	0.00	7	0.00	6	0.00
Ukraine	7,084	1.31	2,552	0.78	4,532	2.10
UK	69,141	12.77	30,701	9.43	38,440	17.81
Total	541,323	100	325,494	100	215,827	100

Notes:
This table shows a distribution of observations across countries in the full sample, the sample of IP-intensive firms, and the sample of non-IP firms. IP intensity is defined in Section 4.2.3.4.1.

Table 36: Transfer pricing documentation requirements

Country	Formal	Informal
Austria	No	All sample years
Belgium	No	All sample years
Bosnia Herzegovina	No	Since 2008
Bulgaria	No	Since 2006
Croatia	Since 2005	
Czech Republic	No	All sample years
Denmark	Since 2006	All sample years
Estonia	Since 2007	
Finland	Since 2007	All sample years
France	Since 2010	All sample years
Germany	Since 2003	All sample years
Hungary	Since 2010	All sample years
Iceland	No	
Ireland	Since 2011	
Italy	Since 2010	All sample years
Latvia	No	Since 2007
Luxembourg	No	Since 2005
Malta	No	
Montenegro	No	All sample years
Netherlands	Since 2002	
Norway	Since 2008	All sample years
Poland	Since 2001	
Portugal	Since 2002	
Romania	Since 2007	All sample years
Serbia	No	All sample years
Slovak Republic	Since 2009	All sample years
Slovenia	Since 2005	
Spain	Since 2009	All sample years
Sweden	Since 2007	All sample years
Switzerland	No	All sample years
Ukraine	No	
UK	Since 2008	All sample years

Notes:
Formal refers to transfer pricing documentation requirements that are explicitly stated in national law. Informal refers to transfer pricing documentation requirements that are not explicitly mentioned in national law but are required in practice.

Table 37: D/E ratios under thin capitalization rules

Country	2004	2005	2006	2007	2008	2009	2010	2011	2012
Belgium	0	0	0	0	0	0	0	0	5
Bulgaria	2	2	2	3	3	3	3	3	3
Croatia	4	4	4	4	4	4	4	4	4
Czech Republic	4	4	4	4	2	4	4	4	4
Denmark	4	4	4	4	4	4	4	4	4
France	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Germany	1.5	1.5	1.5	1.5	-	-	-	-	-
Hungary	3	3	3	3	3	3	3	3	3
Italy	5	4	4	4	-	-	-	-	-
Latvia	4	4	4	4	4	4	4	4	4
Lithuania	4	4	4	4	2	4	4	4	4
Netherlands	3	3	3	3	3	3	3	3	3
Poland	3	3	3	3	3	3	3	3	3
Portugal	2	2	2	2	2	2	2	2	2
Romania	1	3	3	3	3	3	3	3	3
Serbia	4	4	4	4	4	4	4	4	4
Slovenia	0	8	8	8	6	6	6	5	4
Spain	3	3	3	3	3	3	3	3	-

Table 38: Special interest deduction limitation rules and thin capitalization rules with exceptions

Country	Rules
Belgium	7:1 D/E ratio if interest is tax-exempt or taxed at a reduced rate at the level of the lender
France	2004-2006: applicable only in case of payments to Non-EU parent companies that are not resident in one of the exempted treaty countries
Luxembourg	85:15 D/E ratio if debt is used for the funding of participations or real estate located in Luxembourg
Portugal	2006-2012: applicable only in cases of payments to non-EU parent companies. Before: escape possible if D/E ratio is considered arm's length
Spain	2004-2011: applicable only in cases of payments to non-EU parent companies
Sweden	No deduction of interest paid on intragroup debt relating to the intragroup acquisition of shares if there are no justifying business or commercial reasons and the income is not subject to tax of at least 10%
Ukraine	Interest deductible up to the own interest income and 50% of other income if paid to a foreign company
UK	Included in transfer pricing regulations, generally a 1:1 ratio is used as a guideline

Table 39: Three-stage interest deduction limitation strictness indicator

Country	2004	2005	2006	2007	2008	2009	2010	2011	2012
Austria	0	0	0	0	0	0	0	0	0
Belgium	1	1	1	1	1	1	1	1	1
Bosnia Herzegovina	0	0	0	0	0	0	0	0	0
Bulgaria	2	2	2	2	2	2	2	2	2
Croatia	0	1	1	1	1	1	1	1	1
Czech Republic	1	1	1	1	2	1	1	1	1
Denmark	1	1	1	1	1	1	1	1	1
Estonia	0	0	0	0	0	0	0	0	0
Finland	0	0	0	0	0	0	0	0	0
France	1	1	1	2	2	2	2	2	2
Germany	2	2	2	2	2	2	2	2	2
Hungary	2	2	2	2	2	2	2	2	2
Iceland	0	0	0	0	0	0	0	0	0
Ireland	0	0	0	0	0	0	0	0	0
Italy	1	1	1	1	2	2	2	2	2
Latvia	1	1	1	1	1	1	1	1	1
Luxembourg	0	0	0	0	0	0	0	0	0
Malta	0	0	0	0	0	0	0	0	0
Montenegro	0	0	0	0	0	0	0	0	0
Netherlands	2	2	2	2	2	2	2	2	2
Norway	0	0	0	0	0	0	0	0	0
Poland	2	2	2	2	2	2	2	2	2
Portugal	1	1	1	1	1	1	1	1	1
Romania	2	2	2	2	2	2	2	2	2
Serbia	1	1	1	1	1	1	1	1	1
Slovak Republic	0	0	0	0	0	0	0	0	0
Slovenia	0	1	1	1	1	1	1	1	1
Spain	1	1	1	1	1	1	1	1	2
Sweden	0	0	0	0	0	1	1	1	1
Switzerland	2	2	2	2	2	2	2	2	2
Ukraine	1	1	1	1	1	1	1	1	1
UK	1	1	1	1	1	1	1	1	1

Notes:
The three-stage variable measures the strictness of interest deduction limitation rules. It is denoted as follows: 0 - no specific interest deduction limitation rule; 1 – a special rule or a thin capitalization rule with broad exceptions or D/E ratio above 3; 2 – a thin capitalization rule without broad exception and D/E ratio of 3 or lower or an earnings stripping rule.

Table 40: Descriptive statistics: Panel data analysis

	Full Sample				IP				Non-IP			
	Obs.	**Mean**	**Min**	**Max**	**Obs.**	**Mean**	**Min**	**Max**	**Obs.**	**Mean**	**Min**	**Max**
EBIT	541,323	4,605.62	0.00	9,535,506	325,494	5,127.08	0.00	6,219,053	215,827	3,819.23	0.00	9,535,506
Fixed assets	541,323	25,631.88	0.00	5.06E+07	325,494	28,875.49	0.00	5.06E+07	215,827	20,740.31	0.00	3.52E+07
Costs of employees	541,323	7,689.78	0.00	7,336,624	325,494	8,792.55	0.00	7,336,624	215,827	6,026.75	0.00	6,041,358
Interest paid	410,742	1,334.33	0.00	1.94E+08	261,046	1,600.01	0.00	1.94E+08	149,696	871.02	0.00	6,567,206
Sales	515,216	66,994.01	0.00	1.15E+08	312,625	70,072.53	0.00	5.00E+07	202,589	62,244.02	0.00	1.15E+08
Net PPE/assets	541,139	0.18	0.00	79.64	325,399	0.17	0.00	79.63	215,740	0.18	0.00	1.96
EBITDA/assets	527,346	0.18	-0.81	329.39	319,423	0.17	-0.81	329.39	207,923	0.18	-0.31	157.50
Intangibles	535,215	2,665.22	0.00	1.80E+07	323,057	3,722.45	0.00	1.80E+07	212,158	1,055.35	0.00	3,762,855
Intangibles/assets	541,321	0.01	0.00	0.99	325,494	0.02	0.00	0.99	215,827	0.00	0.00	0.00
CIT	541,323	0.29	0.09	0.40	325,494	0.30	0.09	0.40	215,827	0.28	0.09	0.40
TP Doc Years	541,323	1.53	0.00	11.00	325,494	1.46	0.00	11.00	215,827	1.63	0.00	11.00
TP Doc Binary	541,323	0.49	0.00	1.00	325,494	0.49	0.00	1.00	215,827	0.51	0.00	1.00
TP Doc Years + Informal TP Doc	541,176	2.51	0.00	12.00	325,417	2.45	0.00	12.00	215,757	2.6	0.00	12.00
TC three-stage	541,323	1.24	0.00	2.00	325,494	1.28	0.00	2.00	215,827	1.18	0.00	2.00
TC 1/(1+D/E-ratio)	481,995	0.18	0.00	0.50	280,267	0.21	0.00	0.50	201,728	0.16	0.00	0.50
Corruption	541,323	1.18	-1.03	2.56	325,494	1.15	-1.03	2.56	215,827	1.23	-1.03	2.56
Unemployment	541,323	8.57	2.30	31.80	325,494	8.63	2.30	31.80	215,827	8.45	2.30	31.80
Inflation	541,323	2.74	-1.71	25.20	325,494	2.61	-1.71	25.20	215,827	2.94	-1.71	25.20
GDP	541,323	1.09E+12	1.81E+09	2.55E+12	325,494	1.15E+12	2.18E+09	2.55E+12	215,827	9.88E+11	1.81E+09	2.55E+12
GDP/capita	541,323	25,751.01	1421.18	70,569.24	325,494	26,021.74	1,421.18	70,569.24	215,827	25,342.54	1,421.18	70,569.24
GDP growth	541,323	1.47	-14.80	12.10	325,494	1.37	-14.80	12.10	215,827	1.63	-14.80	12.10
Growth opportunities	492,009	0.06	-0.99	140.86	295,803	0.06	-0.99	140.86	196,204	0.06	-0.99	23.57

Notes:
Fixed assets represents total fixed assets. Interest paid denotes a firm's interest payments. Sales stands for a company's total turnover. Net PPE/assets is a ratio of a company's net property, plant, and equipment to total assets. EBITDA/assets is a ratio of earnings before interest, taxes, depreciation, and amortization to total assets. Intangibles shows total intangible assets of a company. Intangibles/assets represents a ratio of the MNE's intangibles to total assets (median in the group). TP-variables measure the strictness of transfer pricing regulations. TC-variables measure the strictness of interest deduction limitation rules. Corruption represents a corruption index. Unemployment stands for a country's rate of unemployment. Inflation denotes a country's rate of inflation. GDP denotes a natural logarithm of a country's gross domestic product. GDP/capita stands for a natural logarithm of a country's GDP per capita. GDP growth is a country's rate of GDP growth. Growth opportunities denotes the median annual sales growth per industry and country. IP represents a sample of IP-intensive firms as defined in section 4.2.3.4.1 and Non-IP represents a sample of all other companies. Obs. stands for number of observations.

Table 41: Descriptive statistics: Difference-in-difference estimation

Full Sample						
	Obs.	**Mean**	**Median**	**Std. Dev.**	**Min**	**Max**
Treatment Group						
EBIT	120	8,377.94	3,373.41	11,857.69	156.30	53,744.78
Costs of employees	120	15,506.77	9,793.83	20,690.72	851.26	110,785
Fixed assets	120	55,012	11,621.67	136,975.80	78.09	704,268.70
Control Group						
EBIT	5,508	11,893.03	718.48	106,761.80	0.19	3,232,000
Costs of employees	5,508	16,833.22	2,011.11	73,509.92	0.33	1,769,000
Fixed assets	5,508	39,757.99	1,007.44	265,506.80	0.00	4,920,454
All Firms						
EBIT	5,628	11,818.08	745.51	105,632.60	0.19	3,232,000
Costs of employees	5,628	16,804.94	2,075.49	72,784.34	0.33	1,769,000
Fixed assets	5,628	40,083.24	1,039.74	263,423.90	0.00	4,920,454
IP-intensive firms						
	Obs	**Mean**	**Median**	**Std. Dev.**	**Min**	**Max**
Treatment Group						
EBIT	60	10,025.57	4,050.25	13,793.34	209.69	53,744.78
Costs of employees	60	21,617.45	11,612.07	26,851.96	851.26	110,785
Fixed assets	60	81,250.91	16,460.96	186,250.40	321.64	704,268.70
Control Group						
EBIT	2,976	15,668.66	1,274.36	135,135.90	0.50	3,232,000
Costs of employees	2,976	21,241.59	3,739.15	59,276.42	2.78	641,069
Fixed assets	2,976	56,932.31	2,097.93	332,521.40	0.00	4,920,454
All Firms						
EBIT	3,036	15,557.14	1,337.52	133,809.60	0.50	3,232,000
Costs of employees	3,036	21,249.02	3,869.67	58,806.89	2.78	641,069
Fixed assets	3,036	57,412.92	2,166.21	330,258.10	0.00	4,920,454

Note:
IP-intensive firms are defined in Section 4.2.3.5.1. Obs. stands for number of observations. Std. Dev. stands for standard deviation.

Table 42: Robustness tests using alternative definitions of anti-avoidance strictness

Dependent variable: Log EBIT						
TP Measure:	TP Doc Years		TP Doc Binary		TP Doc Years + TP Doc required in practice	
TC Measure:	$1/(1+\sigma)$ $\sigma =$ TC D/E Ratio		TC three-stage		TC three-stage	
	IP	Non-IP	IP	Non-IP	IP	Non-IP
CIT	-1.207***	0.345	-0.103	0.970***	-1.018***	0.203
	(0.291)	(0.319)	(0.250)	(0.301)	(0.285)	(0.348)
TP	0.070***	0.082***	0.048***	0.054***	0.051***	0.054***
	(0.006)	(0.007)	(0.014)	(0.016)	(0.006)	(0.008)
CIT x TP	0.999***	0.915***	0.677**	0.366	0.557***	0.453***
	(0.122)	(0.139)	(0.267)	(0.314)	(0.101)	(0.119)
TC	0.036	0.066	0.016*	0.068***	0.027***	0.077***
	(0.096)	(0.109)	(0.010)	(0.012)	(0.010)	(0.013)
CIT x TC	1.761	-1.572	0.025	-0.518***	0.177	-0.566***
	(1.184)	(1.351)	(0.146)	(0.176)	(0.161)	(0.194)
TP x TC	-0.188***	-0.275***	-0.031***	-0.031***	-0.023***	-0.026***
	(0.018)	(0.022)	(0.008)	(0.011)	(0.003)	(0.004)
CIT x TP x TC	-2.729***	-2.325***	-0.761***	-0.680***	-0.264***	-0.180***
	(0.400)	(0.472)	(0.169)	(0.201)	(0.056)	(0.068)
Log Fixed Assets	0.085***	0.076***	0.089***	0.074***	0.089***	0.074***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Log Costs of	0.414***	0.385***	0.400***	0.386***	0.399***	0.385***
Employees	(0.009)	(0.009)	(0.008)	(0.009)	(0.008)	(0.009)
Unemployment rate	-0.012***	-0.010***	-0.010***	-0.010***	-0.011***	-0.012***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)
Corruption	-0.016	0.053*	-0.000	0.006	-0.010	0.012
	(0.024)	(0.030)	(0.021)	(0.028)	(0.022)	(0.029)
GDP growth rate	0.008***	0.007***	0.007***	0.007***	0.007***	0.006***
	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)
Log GDP	-1.048***	-1.760***	0.718***	0.345	0.118	-0.315
	(0.306)	(0.367)	(0.263)	(0.311)	(0.273)	(0.322)
Log GDP/capita	1.097***	1.890***	-0.578**	-0.259	0.110	0.528*
	(0.288)	(0.338)	(0.238)	(0.278)	(0.260)	(0.297)
Year-Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
# Companies	57,719	42,163	60,732	42,981	60,729	42,980
# Observations	280,267	201,728	325,494	215,827	325,417	215,757
R-squared (within)	0.094	0.085	0.092	0.082	0.092	0.082

Notes:
***, **, * indicates significance at the 1%, 5%, and 10% level. Robust standard errors are reported in parentheses. Units of observation are firms. The dependent variable is Log EBIT, which denotes a natural logarithm of a firm's earnings before interest and taxes. TP measures the strictness of transfer pricing regulations. TC measures the strictness of interest deduction restrictions. Log Fixed assets and Log costs of employees are firm-level controls and represent natural logarithms of a company's fixed assets and employee costs, respectively. Unemployment rate stands for a country's rate of unemployment. Corruption represents a corruption index. GDP growth rate is a country's rate of GDP growth. Log GDP denotes a natural logarithm of a country's gross domestic product. Log GDP/capita stands for a natural logarithm of a country's GDP per capita. FE stands for fixed effects. IP represents a sample of IP-intensive firms as defined in section 4.2.3.4.1 and Non-IP includes a sample of all other companies.

Table 43: Robustness tests using alternative definitions of intangible intensity

Dependent variable: Log EBIT						
	IP_2	Non-IP_2	IP_3	Non-IP_3	IP_4	Non-IP_4
CIT	-0.450*	0.353	-0.525*	0.046	-0.581**	0.647**
	(0.270)	(0.285)	(0.274)	(0.298)	(0.261)	(0.298)
TP	0.050***	0.058***	0.052***	0.059***	0.054***	0.055***
	(0.006)	(0.007)	(0.007)	(0.007)	(0.006)	(0.008)
CIT x TP	0.613***	0.431***	0.513***	0.528***	0.617***	0.379***
	(0.108)	(0.116)	(0.112)	(0.120)	(0.107)	(0.118)
TC	0.007	0.044***	0.011	0.044***	0.008	0.043***
	(0.010)	(0.010)	(0.010)	(0.011)	(0.009)	(0.011)
CIT x TC	-0.143	-0.531***	-0.044	-0.348**	-0.073	-0.655***
	(0.152)	(0.159)	(0.154)	(0.166)	(0.148)	(0.165)
TP x TC	-0.022***	-0.029***	-0.019***	-0.031***	-0.025***	-0.025***
	(0.003)	(0.004)	(0.004)	(0.004)	(0.003)	(0.004)
CIT x TP x TC	-0.275***	-0.187***	-0.248***	-0.222***	-0.298***	-0.131*
	(0.060)	(0.066)	(0.062)	(0.068)	(0.059)	(0.068)
Log Fixed assets	0.090***	0.076***	0.082***	0.078***	0.084***	0.079***
	(0.004)	(0.003)	(0.004)	(0.004)	(0.003)	(0.004)
Log Costs of	0.399***	0.387***	0.405***	0.375***	0.401***	0.382***
employees	(0.009)	(0.008)	(0.010)	(0.008)	(0.008)	(0.009)
Unemployment rate	-0.011***	-0.012***	-0.010***	-0.015***	-0.012***	-0.010***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Corruption	0.002	-0.005	-0.008	0.006	-0.014	0.022
	(0.023)	(0.027)	(0.023)	(0.028)	(0.022)	(0.028)
GDP growth rate	0.007***	0.006***	0.008***	0.005***	0.007***	0.006***
	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)
Log GDP	0.096	-0.288	0.292	-0.301	0.130	-0.275
	(0.287)	(0.300)	(0.298)	(0.316)	(0.279)	(0.311)
Log GDP/capita	0.149	0.509*	0.016	0.507*	0.130	0.543*
	(0.274)	(0.278)	(0.290)	(0.288)	(0.266)	(0.287)
Year-Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
# Companies	52,985	50,728	66,842	68,459	60,389	43,324
# Observations	284,806	256,515	278,859	261,107	323,655	217,666
R-squared (within)	0.093	0.083	0.083	0.082	0.093	0.081

Notes:
***, **, * indicates significance at the 1%, 5%, and 10% level. Robust standard errors are reported in parentheses. Units of observation are firms. The dependent variable is Log EBIT, which denotes a natural logarithm of a firm's earnings before interest and taxes. TP measures the strictness of transfer pricing regulations. TC measures the strictness of interest deduction restrictions. Log Fixed assets and Log Costs of employees are firm-level controls and represent natural logarithms of a company's fixed assets and employee costs, respectively. Unemployment rate stands for a country's rate of unemployment. Corruption represents a corruption index. GDP Growth Rate is a country's rate of GDP growth. Log GDP denotes a natural logarithm of a country's gross domestic product. Log GDP/capita stands for a natural logarithm of a country's GDP per capita. FE stands for fixed effects. IP represents a sample of IP-intensive firms and Non-IP includes a sample of all other companies.

Table 44: Main regression results based on the sample that includes ultimate owners

Dependent variable: Log EBIT			
	Full Sample	IP	Non-IP
CIT	-0.008	-0.426*	0.378
	(0.175)	(0.236)	(0.269)
TP	0.055***	0.051***	0.062***
	(0.005)	(0.006)	(0.007)
CIT x TP	0.528***	0.535***	0.515***
	(0.073)	(0.099)	(0.109)
TC	0.027***	0.009	0.044***
	(0.006)	(0.009)	(0.010)
CIT x TC	-0.337***	-0.107	-0.534***
	(0.100)	(0.135)	(0.152)
TP x TC	-0.025***	-0.023***	-0.028***
	(0.002)	(0.003)	(0.004)
CIT x TP x TC	-0.235***	-0.261***	-0.202***
	(0.041)	(0.055)	(0.063)
Log Fixed assets	0.084***	0.085***	0.082***
	(0.002)	(0.003)	(0.004)
Log Costs of employees	0.394***	0.405***	0.378***
	(0.006)	(0.008)	(0.008)
Unemployment rate	-0.012***	-0.013***	-0.010***
	(0.001)	(0.001)	(0.002)
GDP growth rate	0.007***	0.007***	0.006***
	(0.001)	(0.001)	(0.001)
Log GDP/capita	0.185	-0.115	0.482*
	(0.183)	(0.251)	(0.270)
Corruption	0.003	-0.003	0.018
	(0.016)	(0.021)	(0.027)
Log GDP	0.086	0.376	-0.139
	(0.193)	(0.261)	(0.292)
Year-Industry FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
# Companies	114,918	66,877	48,039
# Observations	605,489	362,482	243,000
R-squared (within)	0.089	0.095	0.082

Notes:

***, **, * indicates significance at the 1%, 5%, and 10% level. Robust standard errors are reported in parentheses. Units of observation are firms. The dependent variable is Log EBIT, which denotes a natural logarithm of a firm's earnings before interest and taxes. TP measures the strictness of transfer pricing regulations. TC measures the strictness of interest deduction restrictions. Log Fixed assets and Log Costs of employees are firm-level controls and represent natural logarithms of a company's fixed assets and employee costs, respectively. Unemployment rate stands for a country's rate of unemployment. Corruption represents a corruption index. GDP Growth Rate is a country's rate of GDP growth. Log GDP denotes a natural logarithm of a country's gross domestic product. Log GDP/capita stands for a natural logarithm of a country's GDP per capita. FE stands for fixed effects. IP represents a sample of IP-intensive firms and Non-IP includes a sample of all other companies.

Table 45: Tax revenue from WHT under the status quo and a minimum WHT of 10% in all OECD and EU member states: all scenarios (part 1)

	Status quo						WHT 10% OECD + EU			Change	
Millions of USD	WHT Rev. 50% IRD	WHT Rev. 100% IRD	WHT Credit 50% IRD	WHT Credit 100% IRD	Balance 50% IRD	Balance 100% IRD	WHT Rev.	WHT Credit	Balance	Δ Balance 50% IRD	Δ Balance 100% IRD
AT											
2006	41	1	9	6	32	-5	129	49	80	47	84
2007	46	1	13	9	33	-8	145	66	79	46	87
2008	49	3	19	12	31	-9	160	82	78	47	87
2009	36	1	16	10	19	-9	126	66	60	40	69
2010	31	1	13	9	18	-9	130	59	71	53	80
2011	30	1	13	8	17	-7	148	62	86	69	93
2012	33	2	15	9	18	-7	153	67	86	68	93
CZ											
2006	42	42	1	0	40	41	55	3	51	11	10
2007	48	48	2	1	47	47	68	3	65	18	18
2008	56	56	3	2	54	55	77	5	72	18	17
2009	57	57	7	6	50	51	73	9	64	14	13
2010	59	59	8	7	51	52	77	10	67	16	15
2011	54	32	8	7	46	25	99	11	88	42	63
2012	44	28	14	11	30	17	81	20	61	31	44
DE											
2006	46	36	148	141	-102	-105	932	680	253	355	357
2007	69	60	181	174	-112	-115	1076	814	262	374	377
2008	68	57	242	230	-175	-174	1291	1076	215	390	389
2009	74	45	270	261	-197	-216	1770	1770	0	197	216
2010	70	55	304	293	-234	-238	1325	1458	-133	101	106
2011	93	72	368	345	-275	-273	1315	1432	-117	158	156
2012	79	58	374	341	-295	-284	1214	1338	-125	170	159
DK											
2006	17	16	56	55	-39	-39	132	171	-39	0	0
2007	3	3	75	73	-72	-71	135	194	-59	13	12
2008	6	5	120	117	-113	-112	173	256	-83	30	29
2009	29	3	102	87	-73	-85	174	274	-100	-27	-16
2010	22	6	82	71	-61	-65	172	205	-32	28	33
2011	20	3	106	92	-87	-88	188	227	-39	48	49
2012	23	5	87	71	-64	-66	187	220	-33	31	32
FR											
2006	73	57	207/ 206	205/ 204	-134/ -133	-148/ -147	328	562	-233	-100/ -101	-85/ -86
2007	121	97	324/ 323	321/ 320	-202	-224/ -223	465	788	-323	-121	-99/ -100
2008	115	92	380/ 379	377/ 375	-266/ -265	-285/ -284	516	996	-480	-215/ -216	-196/ -197
2009	90	37	185/ 184	168/ 167	-95/ -94	-131/ -130	898	1284	-386	-291/ -293	-255/ -256
2010	73	27	181/ 178	168/ 167	-107/ -105	-141/ -139	985	1270	-285	-177/ -180	-144/ -146
2011	95	33	245/ 242	225/ 224	-150/ -148	-192/ -190	1097	1506	-410	-259/ -262	-218/ -219
2012	75	24	186/ 184	162/ 161	-111/ -109	-138/ -137	910	1148	-238	-126/ -128	-99/ -100
IL											
2006	81	81	52	52	30	30	91	77	14	-15	-15
2007	69	69	55	55	13	13	75	72	2	-11	-11
2008	84	84	57	57	27	27	92	76	16	-11	-11
2009	43	43	56	56	-13	-13	47	75	-28	-15	-15
2010	44	44	59	59	-15	-15	48	77	-29	-14	-14
2011	48	48	71	71	-24	-24	53	93	-40	-17	-17
2012	60	60	88	88	-27	-27	67	115	-49	-21	-21

Abbreviations:

IRD = EU Interest and Royalties Directive; AT = Austria; CZ = Czech Republic; DE = Germany; DK = Denmark; FR = France; IL = Israel

Notes:

All numbers are rounded to the nearest million. The first two columns illustrate the amount of tax revenue received from levying WHT on royalty outflows of a country. Columns 3 and 4 depict the value of foreign WHTs credited in the respective country. For France, the tax credit is calculated for two scenarios: (a) the assumption holds that the IP-box regime does not apply (first value in columns 3 and 4) and (b) it is assumed that all royalties are taxed under the IP-box regime (second value in columns 3 and 4). Columns 5 and 6 show the balance of WHT income minus WHT credit. For the EU member states, a range for WHT revenue, credit and balance is calculated, assuming that at least 50% (columns 1, 3, and 5) and at most 100% (columns 2, 4, and 6) of all royalty payments were made between at least 25% of affiliates qualifying for WHT reduction under the IRD. Columns 7-9 illustrate the WHT revenue, WHT credit and balance that would have resulted if all EU and OECD member states had levied WHT on royalties at a minimum rate of 10%. Columns 10 and 11 highlight the change in WHT balance resulting from the reform option of a broader levy of WHT on royalties. For France, the second number in columns 10 and 11 depicts the change in tax revenue if IP-box regimes are considered.

Table 46: Tax revenue from WHT under the status quo and a minimum WHT of 10% in all OECD and EU member states: all scenarios (part 2)

	Status quo						WHT 10% OECD + EU			Change	
Millions of USD	WHT Rev. 50% IRD	WHT Rev. 100% IRD	WHT Credit 50% IRD	WHT Credit 100% IRD	Balance 50% IRD	Balance 100% IRD	WHT Rev.	WHT Credit	Balance	Δ Balance 50% IRD	Δ Balance 100% IRD
IT											
2006	90	47	51	40	38	7	182	109	74	36	67
2007	76	38	46	34	30	4	165	102	63	32	59
2008	341	197	275	247	65	-50	772	417	355	290	406
2009	293	163	303	280	-10	-117	669	399	270	280	387
2010	273	143	278	256	-5	-114	711	380	331	336	444
2011	259	117	264	235	-5	-118	697	412	286	291	404
2012	223	98	272	243	-49	-145	603	427	176	225	321
JP											
2006	445	445	1184	1184	-739	-739	1528	2108	-580	159	159
2007	412	412	1238	1238	-826	-826	1626	2418	-792	34	34
2008	443	443	1430	1430	-987	-987	1757	2677	-920	67	67
2009	432	432	1163	1163	-731	-731	1643	2234	-591	140	140
2010	518	518	1465	1465	-947	-947	1830	2783	-953	-6	-6
2011	525	525	1620	1620	-1096	-1096	1864	3030	-1165	-70	-70
2012	527	527	1729	1729	-1202	-1202	1939	3317	-1377	-176	-176
KR											
2006	596	596	226	226	370	370	596	228	369	-2	-2
2007	655	655	218	218	437	437	655	219	436	-1	-1
2008	719	719	277	277	443	443	719	277	442	0	0
2009	917	917	387	387	530	530	917	387	529	-1	-1
2010	1114	1114	359	359	755	755	1114	360	754	-1	-1
2011	916	916	510	510	406	406	916	512	404	-2	-2
SK											
2006	5	1	5	4	0	-3	11	10	1	0	3
2007	6	2	8	7	-2	-5	12	16	-4	-2	1
2008	8	3	7	6	1	-3	18	18	1	-1	4
2009	9	5	5	4	4	1	16	9	7	2	6
2010	7	4	1	1	6	3	15	7	8	2	5
2011	8	4	0	0	8	4	15	0	15	7	11
2012	7	3	0	0	6	3	13	0	13	6	10
SE											
2006	12	11	138	136	-126	-125	164	399	-235	-108	-110
2007	21	19	124	122	-103	-103	182	457	-275	-171	-172
2008	23	22	175	173	-152	-151	198	465	-268	-116	-116
2009	23	21	75	73	-51	-52	180	446	-265	-214	-214
2010	10	6	105	103	-94	-98	146	568	-422	-328	-324
2011	10	8	91	85	-82	-78	188	590	-402	-321	-325
2012	26	23	96	86	-70	-63	233	625	-392	-322	-329
US											
2006	443	443	2560	2560	-2117	-2117	2479	8100	-5620	-3504	-3504
2007	547	547	2921	2921	-2375	-2375	2733	9127	-6394	-4019	-4019
2008	564	564	2960	2960	-2397	-2397	2972	9605	-6633	-4236	-4236
2009	482	482	3080	3080	-2598	-2598	3134	9426	-6292	-3695	-3695
2010	229	229	4130	4130	-3900	-3900	3014	10553	-7539	-3639	-3639
2011	311	311	4819	4819	-4507	-4507	3240	11996	-8756	-4249	-4249
2012	797	797	5317	5317	-4520	-4520	4063	12507	-8444	-3924	-3924

Abbreviations:
IRD = EU Interest and Royalties Directive; IT = Italy; JP = Japan, KR = Republic of Korea; SK = Slovak Republic; SE = Sweden; US = United States

Notes:
All numbers are rounded to the nearest million. The first two columns illustrate the amount of tax revenue received from levying WHT on royalty outflows of a country. Columns 3 and 4 depict the value of foreign WHTs credited in the respective country. Columns 5 and 6 show the balance of WHT income minus WHT credit. For the EU member states, a range for WHT revenue, credit and balance is calculated, assuming that at least 50% (columns 1, 3, and 5) and at most 100% (columns 2, 4, and 6) of all royalty payments were made between at least 25% of affiliates qualifying for WHT reduction under the IRD. Columns 7-9 illustrate the WHT revenue, WHT credit and balance that would have resulted if all EU and OECD member states had levied WHT on royalties at a minimum rate of 10%. Columns 10 and 11 highlight the change in WHT balance resulting from the reform option of a broader levy of WHT on royalties.

Table 47: Tax revenue effect of the inverted tax credit: all scenarios (part 1)

	ITC in addition to WHT				ITC instead of WHT					
Millions of USD	Δ Status Quo 50% IG no IP Box	Δ Status Quo 100% IG no IP Box	Δ Status Quo 50% IG IP Box	Δ Status Quo 100% IG IP Box	Δ Status Quo 50% IG no IP Box IG WHT	Δ Status Quo 50% IG no IP Box all WHT	Δ Status Quo 100% IG no IP Box	Δ Status Quo 50% IG IP Box IG WHT	Δ Status Quo 50% IG IP Box all WHT	Δ Status Quo 100% IG IP Box
AT										
2006	3	7	4	9	5	-30	10	6	-29	13
2007	4	7	10	20	7	-31	13	13	-25	26
2008	5	11	13	26	9	-27	18	17	-19	34
2009	5	9	12	23	8	-16	17	15	-9	30
2010	7	15	16	31	11	-13	21	19	-5	38
2011	8	16	22	44	10	-12	20	24	2	48
2012	11	21	23	47	12	-10	25	25	2	50
CZ										
2006	2	5	6	12	-18	-38	-37	-15	-35	-30
2007	3	7	12	24	-20	-43	-41	-12	-35	-23
2008	2	5	9	19	-25	-52	-50	-18	-45	-36
2009	2	5	8	16	-23	-47	-46	-18	-42	-35
2010	2	3	5	10	-25	-49	-49	-21	-46	-42
2011	2	4	11	22	-10	-44	-21	-1	-35	-3
2012	1	3	9	18	-8	-29	-16	0	-22	-1
DE										
2006	244	488	286	573	270	292	539	312	334	623
2007	306	612	467	934	329	350	659	490	511	980
2008	119	238	280	561	158	198	316	319	360	639
2009	231	461	630	1259	284	318	568	683	717	1366
2010	185	370	373	746	240	291	480	428	479	856
2011	190	379	443	886	239	291	479	493	544	986
2012	212	424	465	931	259	318	519	513	571	1025
DK										
2006	13	26	16	31	27	40	54	30	43	59
2007	8	16	21	43	35	62	69	48	75	96
2008	12	24	33	65	52	94	104	73	115	146
2009	10	20	27	53	34	46	68	51	63	101
2010	10	21	23	47	32	48	63	45	61	89
2011	19	37	46	91	45	70	90	72	97	144
2012	16	32	40	80	34	50	68	58	75	116
FR										
2006	73	146	2	5	136	184	271	65	113	130
2007	111	222	12	24	210	287	420	111	188	222
2008	145	289	22	43	265	366	530	142	243	284
2009	210	420	44	87	232	217	463	65	50	130
2010	249	497	90	180	277	272	554	118	112	237
2011	298	596	138	275	332	326	665	172	164	344
2012	269	539	119	239	287	278	575	137	127	275
IL										
2006	11	21	13	25	-8	-26	-15	-6	-24	-11
2007	14	28	18	35	7	0	13	10	3	21
2008	15	30	20	40	1	-13	2	6	-8	12
2009	1	1	6	11	5	10	11	10	15	21
2010	1	1	5	11	7	13	13	11	18	23
2011	1	1	6	12	11	21	21	16	26	32
2012	1	2	8	16	12	24	25	19	31	39

Abbreviations:
ITC – Inverted Tax Credit; IG – intragroup; AT – Austria; CZ – Czech Republic; DE – Germany; DK – Denmark; FR – France; IL – Israel

Notes:
All numbers are rounded to the nearest million. Columns 1-4 depict the range of additional tax revenue income that in the respective years would have resulted from the implementation of an inverted tax credit system in addition to existing WHTs. The lower boundary is calculated assuming that at least 50% of all royalty payments were made between affiliates and thus were subject to the inverted tax credit (columns 1 and 3). The upper boundary is calculated assuming that all payments were made between affiliates (columns 2 and 4). In columns 1 and 2, the case where no royalty income benefits from an IP-box regime is considered. Columns 3 and 4 assume that all royalty income benefits from an IP-box regime, where available. Columns 5-10 present the results for the case where the inverted tax credit replaces WHTs in all OECD and EU member states. In columns 5, 6, 8, and 9, it is assumed that 50% of all royalty payments were made between affiliates. In columns 7 and 10, 100% affiliate payments are assumed. In columns 5-7, IP-box regimes are not considered. In columns 8-10, the assumption is that all royalty income benefits from an IP-box regime, where available. In columns 5 and 8, only WHTs on intragroup royalties are replaced. In columns 6 and 9, all WHTs are replaced.

Table 48: Tax revenue effect of the inverted tax credit: all scenarios (part 2)

	ITC in addition to WHT				ITC instead of WHT					
Millions of USD	Δ Status Quo 50% IG no IP Box	Δ Status Quo 100% IG no IP Box	Δ Status Quo 50% IG IP Box	Δ Status Quo 100% IG IP Box	Δ Status Quo 50% IG no IP Box IG WHT	Δ Status Quo 50% IG no IP Box all WHT	Δ Status Quo 100% IG no IP Box	Δ Status Quo 50% IG IP Box IG WHT	Δ Status Quo 50% IG IP Box all WHT	Δ Status Quo 100% IG IP Box
IT										
2006	47	95	64	128	41	3	82	57	20	115
2007	53	106	85	171	45	10	90	77	43	154
2008	197	394	401	803	152	-8	305	357	196	713
2009	185	370	367	734	181	69	362	363	252	726
2010	196	393	403	806	180	56	360	387	263	774
2011	196	393	451	903	181	52	361	436	307	871
2012	172	344	398	796	159	50	319	385	277	771
JP										
2006	303	605	338	676	307	312	615	343	348	686
2007	342	684	417	833	330	319	660	405	393	810
2008	454	907	549	1099	419	384	838	515	480	1030
2009	450	900	532	1063	374	298	748	456	380	912
2010	532	1063	620	1239	425	318	849	513	406	1025
2011	560	1120	686	1372	448	335	895	574	462	1148
2012	522	1045	663	1326	423	324	846	564	464	1127
KR										
2006	5	10	17	34	-239	-484	-479	-227	-472	-454
2007	9	18	31	61	-257	-523	-515	-236	-502	-471
2008	7	14	31	62	-290	-588	-581	-267	-564	-533
2009	4	7	24	49	-331	-666	-662	-310	-645	-621
2010	4	9	23	46	-457	-919	-914	-439	-900	-877
2011	4	8	19	37	-299	-601	-597	-284	-587	-568
SK										
2006	0	1	0	1	2	0	3	2	0	3
2007	0	1	1	2	2	1	5	3	2	6
2008	0	0	3	6	2	-1	4	5	1	10
2009	0	0	1	3	0	-4	0	1	-3	2
2010	0	0	1	3	-1	-6	-2	0	-5	0
2011	0	0	1	2	-2	-8	-3	-1	-7	-2
2012	0	0	1	2	-1	-6	-2	0	-5	-1
SE										
2006	7	14	9	17	21	38	43	23	39	46
2007	12	24	29	59	28	44	56	46	62	91
2008	26	51	47	93	38	51	76	59	72	118
2009	12	24	31	62	20	28	40	39	48	79
2010	17	33	35	71	38	55	75	56	74	113
2011	20	40	42	84	34	53	69	56	75	113
2012	35	70	66	131	45	62	90	76	93	152
US										
2006	1027	1118	1318	1409	1444	1871	1450/1962	1735	2162	1741/2253
2007	1377	1452	1824	1900	1854	2387	1874/2463	2302	2835	2322/2911
2008	2214	2214	2711	2711	2620	3280	2620/3280	3117	3776	3117/3776
2009	2493	2493	2909	2909	2838	3491	2838/3491	3254	3907	3254/3907
2010	2182	2187	2718	2723	2763	3536	2762/3541	3299	4072	3298/4078
2011	2425	2452	3311	3338	3079	3919	3058/3945	3965	4805	3944/4831
2012	3065	3072	3998	4005	3281	4219	3279/4226	4213	5152	4212/5159

Abbreviations:
ITC – Inverted Tax Credit; IG – intragroup; IT = Italy; JP = Japan; KR = Republic of Korea; SK = Slovak Republic; SE = Sweden; US = United States

Notes:
All numbers are rounded to the nearest million. Columns 1-4 depict the range of additional tax revenue income that in the respective years would have resulted from the implementation of an inverted tax credit system in addition to existing WHTs. The lower boundary is calculated assuming that at least 50% of all royalty payments were made between affiliates and thus were subject to the inverted tax credit (columns 1 and 3). The upper boundary is calculated assuming that all payments were made between affiliates (columns 2 and 4). In columns 1 and 2, the case where no royalty income benefits from an IP-box regime is considered. Columns 3 and 4 assume that all royalty income benefits from an IP-box regime, where available. Columns 5-10 present the results for the case where the inverted tax credit replaces WHTs in all OECD and EU member states. In columns 5, 6, 8, and 9, it is assumed that 50% of all royalty payments were made between affiliates. In columns 7 and 10, 100% affiliate payments are assumed. In columns 5-7, IP-box regimes are not considered. In columns 8-10, the assumption is that all royalty income benefits from an IP-box regime, where available. In columns 5 and 8, only WHTs on intragroup royalties are replaced. In columns 6 and 9, all WHTs are replaced. For the US, in columns 7 and 10, the first value refers to the change in revenue if only WHTs on intragroup royalties are replaced and the second value refers to the change in revenue if WHTs on all royalties are replaced. The reason why those values differ only for the US is that the more detailed BEA data is used for the US, which shows the share of affiliate payments for most royalty flows.

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