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# Transfer pricing as tax avoidance under different legislative schemes<sup>†</sup>

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## Abstract

This paper investigates transfer pricing as tax avoidance before and after reforms of anti-avoidance legislation. The reforms introduced and tightened obligatory documentation requirements for transfer prices to enforce that multinational enterprises (MNEs) set internal transfer prices at an arm's-length. Linking data from the *Microdatabase Statistics on International Trade in Services* that comprehends prices of MNEs' international service transactions to the *Microdatabase Direct Investment*, I create a unique, novel data set to obtain information on whether MNEs' transaction partners are affiliated companies or not. The results provide empirical evidence for tax-motivated transfer pricing during the entire first decade of the 2000s. Interestingly, MNEs target different types of service transactions for profit shifting via transfer pricing depending on the at the time applicable anti-shifting legislation. The findings show transfer pricing legislation to be effective in case of service transactions with observable market values. In contrast, the results clearly reveal the short-comings of transfer pricing legislation in case of intellectual property (IP) where an effective enforcement of the arm's-length principle is very limited as market values are unobservable. Here, the findings suggest the need for a change in tax policy in order to effectively prevent base erosion in case of IP-related transfer pricing.

**Keywords:** multinational firms, corporate taxation, profit shifting, anti-tax-avoidance legislation, European Court of Justice ruling

**JEL classification:** F23, H25, H32

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## 1 Introduction

Multinational firms' business activities have been an important part of the development towards today's integrated global economy. In 2014, the United Nations Conference on Trade and Development (UNCTAD) estimated the total outward stock of foreign direct investment (valued at current prices) to be \$ 25,875 billion, as compared to the total outward stock of FDI in 1990, which amounted to \$ 2,254 billion, representing an increase by a factor of more than ten (UNCTAD, 2015). Multinational firms are big. It is not an isolated case that their revenues are of the magnitude of medium-sized economies' annual GDP.<sup>1</sup> Further, multinational firms are very profitable. Profit margins in the two-digit range are rather the norm as the exemption.<sup>2</sup> From a fiscal perspective, their size and profitability make multinational firms promising tax payers. But multinational firms have proven to be very hard to tax. Their firm structures are stretching across the globe, typically, incorporating a multitude of entities located in different countries worldwide. And precisely this internationality allows them to avoid taxation in high tax countries.

There is remarkable anecdotal evidence of extreme cases of international tax avoidance of multinational enterprises (MNEs). Due to an elaborated international tax strategy, Apple Inc., for instance, paid (at least) between 2009 and 2011 an effective corporate tax rate below 1% on its pre-tax earnings generated from foreign non-US sales of Apple products.<sup>3</sup>

Empirical evidence that substantiates anecdotes on international tax avoidance of MNEs is compelling. Numerous studies show a sensitivity of MNEs' pre-tax profits to corporate taxation

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<sup>1</sup> For an example, consider the world's largest technology companies (measured by total revenue), the US company Apple Inc. and the Korean company Samsung Electronics. Apple's 2015 revenue amounted to 233.7 billion US-dollars, Samsung's generated a revenue of 167.9 billion US-dollars. Ireland, a developed European economy and OECD member, showed in 2014 a GDP of 241 billion US-dollars.

<sup>2</sup> In 2015, for instance, 21 of the 30 multinational firms that are listed in the US stock exchange index Dow Jones Industrial reported profit margins in the two-digit range.

<sup>3</sup> See the memorandum of the Permanent Subcommittee on Investigations (PSI) of the U.S. Senate Homeland Security and Government Affairs Committee on Offshore Profit Shifting and the U.S. Tax Code - Part 2 (Apple Inc.) (2013, p.21).

which is both statistically and economically significant (see e.g. Huizinga and Laeven, 2008; Dharmapala and Riedel, 2013). While the existence of profit shifting is an empirically well established fact, the exploration of the methods used by MNEs to manipulate the allocation of taxable profits is still continuing. The literature discusses two main methods that MNEs use to shift profits from high to low tax jurisdictions: intra-firm debt and the manipulation of transfer prices. The use of intra-firm debt to avoid taxation has been analyzed both theoretically and empirically, amongst others, by Desai et al. (2004); Huizinga and Laeven (2008); Gordon (2010); Buettner and Wamser (2013). Further, a large body of literature has established theories on MNEs' tax-motivated transfer pricing (see e.g. Kant, 1988; Haufler and Schjelderup, 2000; Grubert, 2003; Becker and Davies, 2014; Nielsen et al., 2014). While the theoretical literature on tax avoidance through transfer pricing is well developed, direct empirical evidence for tax-motivated transfer pricing is rather sparse. In the past, data limitations<sup>4</sup> have been an insuperable obstacle for profound empirical analyses of tax implications for transfer pricing.

Despite sparse empirical evidence, transfer pricing has become a top item on the fiscal policy agenda during the last fifteen years. The fact that four out of 15 Actions on the Organisation for Economic Co-operation and Development's (OECD) Action Plan against "Base Erosion and Profit Shifting" (BEPS) are concerned with different aspects of transfer pricing clearly illustrates the political importance of the topic.<sup>5</sup> In order to prevent profit shifting via transfer pricing and protect national tax bases, the last decade saw many countries implementing transfer pricing legislation (Lohse and Riedel, 2013). Core of these legislative schemes is the arm's-length principle for transfer pricing. The OECD has been actively promoting the arm's-length principle for years to ensure that MNEs set intra-firm transfer prices at a market value basis

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<sup>4</sup> Standard firm-micro data sets neither provide MNEs' prices of products and transaction modes nor reveal whether transactions are at arm's-length or intra-firm.

<sup>5</sup> Precisely, these are actions 8, 9, 10 and 13 that are concerned with assuring that transfer pricing outcomes are in line with value creation and with transfer pricing documentation (OECD, 2013).

(without tax intension).<sup>6</sup> Typically, these legislations oblige MNEs to compile comprehensive documentation of their transfer price setting. Using this documentation, tax authorities are to be enabled to check whether transfer prices are set at arm's-length and, thus, comply with the tax law. Although transfer pricing legislation reportedly leads to high administrative burden both for firms and tax administrations and, therefore, could potentially create large inefficiencies, we though know little about transfer price setting of MNEs under these legislative schemes.

This paper studies the case of German MNEs' transfer pricing during the first decade of the 2000s, a period of time that covers different changes in German legislative schemes against tax-motivated transfer pricing. The analysis investigates patterns in the tax sensitivity of MNEs' internal transfer prices before and after reforms of anti-shifting legislation. German MNEs are a perfect testing ground for the reason of availability of exceptional high-quality data that provides all the information needed to empirically study tax-motivated transfer pricing. The data set consists of a link of the *Microdatabase Statistics on International Trade in Services* with the *Microdatabase Direct Investment*. This newly generated dataset comprehends both prices of MNEs' international service transactions and, as an unique feature, information on whether MNEs' transaction partners are affiliated companies or not. A further advantageous feature is the long time period covered. The generated dataset comprehends monthly cross-sectional data on MNEs' international service transactions for almost an entire decade (2001-2010). Compared to the datasets used in previous studies, this is a clear advantage as MNEs' response in tax-motivated transfer pricing to changing anti-shifting legislation can be traced over time.

The results provide empirical evidence for tax-motivated transfer pricing during the entire decade. Interestingly, MNEs target different types of service transactions for profit shifting via transfer pricing depending on the then applicable anti-shifting legislation. The findings

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<sup>6</sup> In 1995, the OECD Council approved the original version of the OECD Transfer Pricing Guidelines.

show transfer pricing rules to be effective in cases where it can be reasonably assumed that tax authorities can verify the compliance of transfer prices with the arm's-length principle as arm's-length prices are observable. Despite policy efforts on comprehensive transfer pricing legislation, transfer pricing that involves intellectual property (IP) becomes a source for base erosion in the second half of the decade due to unobservable arm's-length prices in case of IP. The fact that profit shifting via IP-related transfer pricing occurs after an European Court of Justice's ruling in 2006 that restricted the application of controlled foreign corporation (CFC) rules within the EU clearly indicates that before 2006 not transfer pricing legislation but the more general CFC legislation effectively had prevented profit shifting via IP-related transfer pricing. In general, the empirical results reveal the short-comings of transfer pricing legislation in cases where an effective enforcement of the arm's-length principle is limited as arm's-length prices are unobservable.

This paper relates to two strands of empirical literature. The first strand consists of papers that investigate the relevance of transfer pricing as a profit shifting channel for MNEs. The second strand of literature analyzes the effect of transfer pricing legislation on MNEs' tax-motivated transfer pricing. Empirical evidence on tax-motivated transfer pricing is in most cases indirect. Studies typically analyze whether there is systematic correlation between tax rates and profit rates (see for a survey Dharmapala, 2014). Most analyses find a statistically significant association between taxation and firm's pre-tax profit rates, however, the strength of the relationship varies across studies.<sup>7</sup> One general drawback of these studies is that MNEs' profit shifting cannot clearly be pinned down to tax-motivated transfer pricing which is just one of various potential profit shifting channels. There are few empirical attempts to shed light on the relevance of transfer pricing compared to other profit shifting channels, moreover, with op-

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<sup>7</sup> A meta-study by Heckemeyer and Overesch (2013) estimates a semi-elasticity of profits with respect to the corporate tax rate of 0.8: an increase in the corporate tax rate of 10 percentage points decreases the reported pre-tax profit by 8%.

posite conclusions. Dharmapala and Riedel (2013) find that profit shifting is mainly conducted via debt shifting. In contrast, Grubert (2003) shows that income derived from research and development (R&D) based intangibles accounts for about half of the income shifted from high-tax to low-tax countries.

Previous to this paper, there are only a few studies that intent to estimate the direct effect of taxation on MNEs' transfer pricing. In general, these studies' findings are in line with tax-motivated transfer pricing at work. Empirical evidence is provided by Bartelsman and Beetsma (2003) for the value added in different manufacturing sectors for a sample of OECD countries, by Overesch (2006) for German MNEs' balance sheet positions which reflect intra-firm transaction values, by Swenson (2001) for US import prices, by Clausing (2003) and Bernard et al. (2008) for intra-firm trade prices of US MNEs, and by Davies et al. (2014) for intra-firm export prices for a sample of French firms.

Although transfer pricing legislation potentially imposes considerable enforcement and compliance cost on tax administrations and firms, there is previous to this paper only one study that analyzes the relationship between tax-motivated transfer pricing and transfer pricing legislation. Lohse and Riedel (2013) employ in their study information on the scope and evolution of a number of countries' transfer pricing laws. The analysis uses an indirect approach based on profit rates to analyze MNEs response in tax-motivated transfer pricing to respective restrictions. Their results suggest that transfer pricing rules statistically and economically significantly reduce profit shifting.

The paper proceeds as follows. Section 2 provides the institutional background. Section 3 derives the hypotheses. Section 4 presents the data set. Section 5 describes the empirical strategy. Section 6 analyzes tax-motivated transfer pricing and evaluates the effectiveness of transfer pricing legislation. Section 7 concludes.

## 2 Institutional background

### 2.1 Incentives for profit shifting via transfer pricing

In a world of fiscal sovereignty and nationally organized taxation MNE activity creates the necessity to split MNEs' profits between the jurisdictions that host MNEs' entities. One of the issues that arises in this context is transfer pricing where the term *transfer pricing* describes the pricing of MNE-internal cross-border transactions. In order to shift profits by means of transfer pricing, MNEs relate transfer prices negatively to foreign corporate tax rates. Hence, for one and the same good or service, high-tax entities would charge low transfer prices from low-tax entities, in contrast to low-tax entities that would charge high transfer prices from high-tax entities. In this way, tax base is shifted from high to low-tax jurisdictions and the MNE's aggregated tax burden reduced.

To prevent tax-motivated transfer pricing and to ensure for governments an alignment of rights to tax with real economic activity, the Organisation for Economic Co-operation and Development (OECD) addressed transfer pricing in its 1995 published OECD Transfer Pricing Guidelines (OECD, 2010). These guidelines established the so called arm's-length principle as international consensus on transfer pricing. The arm's length principle is supposed to ensure that transfer prices between entities of MNEs are established on a market value basis. Hence, the principle means that (transfer) prices should be the same as they would have been, had the parties to the transaction not been part of the same MNE. The idea is that the arm's-length principle prevents profits being systematically shifted to low-tax countries.<sup>8</sup>

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<sup>8</sup> Whether the arm's-length principle effectively prevents profit shifting is controversial and has been questioned in economic literature. Bauer and Langenmayr (2013) demonstrate that, in the presence of cost heterogeneity across firms, profit shifting may occur even if the firm fully complies with the arm's-length principle. In their model, firms have an incentive to engage in intra-firm trade if their cost is small (or high) relative to the arm's-length price such that profit is effectively shifted to the low-tax jurisdiction.



To enforce the arm's-length principle effectively, it is internationally considered key to oblige MNEs to comprehensively document their transfer pricing. First, comprehensive transfer pricing documentation could facilitate tax audits as reference arm's-length prices are documented. Second, through the obligation to provide comprehensive documentation, MNEs' compliance with the arm's-length principle could increase. As MNEs have to justify every transfer price with an arm's-length price that is in line with tax law, the scope for profit shifting via transfer pricing potentially narrows.

## **2.2 German legislative schemes against tax-motivated transfer pricing**

### **2.2.1 Transfer pricing legislation**

Although already referring to the arm's-length principle as reference for the international profit split in case of transfer pricing since 1983, German tax law incorporated no legally binding documentation requirements until 2003. In 2003, German legislator introduced obligatory documentation requirements for transfer prices into the tax law. It precisely determined content, scope, and time of provision of transfer pricing documentation.<sup>9</sup> Accordingly, MNEs had to disclose any information that was necessary for tax administration to judge whether a transfer price was set at arm's-length. In particular, MNEs had to disclose underlying (arm's-length) reference prices and applied transfer pricing methods. Further, the documentation had to include information on the circumstances under which the underlying transaction was conducted. This contains e.g. information on business terms and conditions, cost splits, markups, as well as price-relevant competitive conditions on the market. The new documentation requirements meant a major change for tax practice. In surveys from the early 2000s, the majority of German firm responsables consider transfer pricing as the most important international taxation issue

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<sup>9</sup> See GAufzV v. November 13, 2003 (BGBl. I 2003, 2296) for reference.

faced by their firms (Ernst and Young, 2003). Based on an in detail transfer pricing documentation, tax authorities are to be enabled to check whether transfer prices comply with the tax law. In the beginning, however, transposing the new transfer pricing legislation in tax audits should have been challenging. For the purpose of clarification, the German Ministry of Finance provided additional guidelines for tax audits to the tax administration in form of administrative principles in April 2005.

In 2008, German legislator tightened transfer pricing legislation. The ranking of transfer pricing methods, a precedence of standard methods compared to profit methods, became tax law. Further, tax administrations were hence allowed to conduct penalty estimations of transfer prices at the disfavor of the tax payer in case a transfer price is not in line with the arm's-length principle. Before 2008, tax administrations used to adjust non-compliant transfer prices to (from the tax payer's perspective) the most favorable arm's-length price. Consequently, up from 2008 very aggressive transfer pricing strategies bare high tax risks for MNEs, as potential adjustments by the tax administration are tendentially larger (Bernhardt et al., 2008). Further, German legislator shortened MNEs' time limits for documentation submission in case of tax audits from 60 to 30 days for extraordinary business transactions. This considerably increased the necessity for MNEs to contemporarily document their transfer pricing, as a time window of 30 days is usually too short for an adhoc provision of comprehensive and correct transfer pricing documentation.

## 2.2.2 Controlled foreign corporation rules

Germany applies since the 1970s strict CFC rules to prevent German MNEs from profit shifting to low-tax jurisdictions. Basically, this is enforced through a save harbor foreign corporate tax rate of 25% that (majority owned) foreign low-tax subsidiaries' passive income must be at least

subject to. If 25% is undercut, foreign low-tax subsidiaries' passive income would be treated as if it was generated by the German parent (and, hence, taxed with the German corporate tax rate<sup>10</sup>). Although German CFC rules are not particularly concerned with tax-motivated transfer pricing, yet the rules have implications for IP-related transfer pricing. German CFC rules define foreign low-tax subsidiaries' royalty and licence income from IP as passive income if the underlying IP was not genuinely developed by the respective foreign low-tax subsidiary. Hence, if the underlying IP had been reallocated to (or acquired by) low-tax subsidiaries, German CFC legislation allocates the respective IP income to the German parent's tax base. In this case, the IP income is taxed with the (higher) German corporate tax rate, no tax relief results. Thereby, German CFC rules should prevent German parents' profit shifting to foreign low-tax subsidiaries.

In September 2006, a ruling of the European Court of Justice (ECJ) rather unexpectedly restricted the application of CFC legislation within the European Economic Area<sup>11</sup> (EEA). The ECJ decision affected also German CFC rules. As I argue in the following, the cessation of CFC legislation enabled German MNEs to shift profits via IP-related transfer pricing. German MNEs' IP transactions with low-tax subsidiaries had until September 2006 been subject to two different German anti-shifting provisions. Transfer pricing legislation generally applied to all IP-related transfer prices. CFC rules were particularly concerned with cases where IP was not originally developed by low-tax subsidiaries. After September 2006, however, only transfer pricing legislation remained.

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<sup>10</sup> Between 2002 and 2008 the German corporate tax rate is approximately 40%. Up from 2008, Germany's corporate tax rate is around 30%.

<sup>11</sup> The European Economic Area consists of the EU member states, Island, Liechtenstein, and Norway.

### 3 Hypotheses

The rationale behind the legal obligation to document transfer prices is to disentangle transfer pricing from any tax motive. According to transfer pricing rules, only (MNE-external) market prices can serve as valid references, i.e. arm's-length prices. Market prices are supposed to be free of any tax motives. Hence, MNEs that are obliged to strictly refer their transfer prices to arm's-length prices should have no scope for tax-motivated transfer pricing. The documentation is essential for the enforcement of the rules. Transfer pricing documentation is supposed to create a transparency in MNEs' transfer pricing procedures that enables tax authorities to check whether transfer prices comply with the tax law. This implies, however, that the enforcement's effectiveness should crucially depend on whether tax authorities can verify the information (in particular, the reported arm's-length prices) that MNEs provide in the documentation. As I argue in the following, in this point the numerous MNE-internal transactions might substantially differ. I derive in the following separate hypotheses for different types of service transactions.

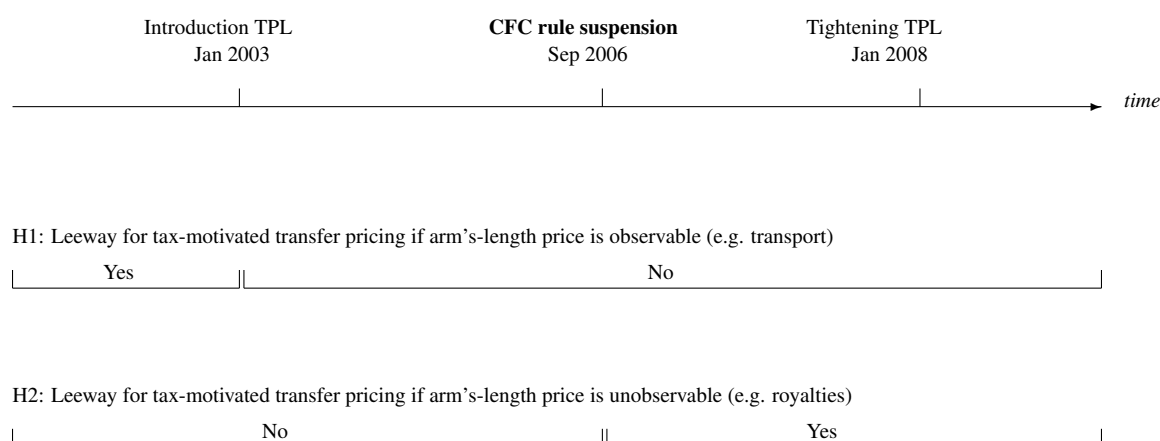
The assessment whether a transfer price is in line with the arm's-length principle should for tax authorities be the easier, the more common a service transaction is, i.e. the more firms conduct similar, comparable transactions. Other firms' (MNE-external) prices could then serve as a reliable reference, hence, arm's-length price. Transactions related to transport services are examples for transactions with observable arm's-length prices. Transport costs mainly depend on the transport distance and on the means of transport. These price components should (at least approximately) be observable for tax administrations which makes similar transport transactions of different firms comparable with each other. Consequently, tax authorities could assess the compliance of transfer prices with the arm's-length principle. The leeway for tax-motivated transfer pricing should in case of transport services be very small.

In contrast, transactions related to intellectual property are examples for transactions without observable arm's-length prices. An example for IP-related transactions are royalty payments, payments by a third to the patent holder for the right to exploit the patent. Patents, a type of intellectual property (IP), protect an exclusive right that is guaranteed uniquely by a sovereign state to the patent holder. Due to the exclusive character of a patent, in case the rights to use patents are forwarded to entities in the same MNE, tax administrations presumably have difficulties to judge transfer prices (Grubert, 2003), as there are no other MNEs that conduct similar, comparable IP transactions. Firm-external market values that could function as a reference for the arm's-length price exist neither for the patent nor for the royalty. The case of licences, limited rights in IP, is similar. Firm-external market values that could be considered as a reference for the arm's-length price do not exist neither for the underlying IP nor for the licence payment. As it is in these cases unclear what the correct arm's-length price for a transfer price is, the leeway for tax-motivated transfer pricing should be substantial.

There are cases of service transactions in which it is a priori unclear whether arm's-length prices are fully observable and, thus, whether one would expect to observe tax-motivated transfer pricing. Examples are advertising services, R&D services and IT services. For some cost components, there should exist observable arm's-length prices, like cost for material and labor. If, for instance, the R&D process involves specific knowhow or the usage of MNE-internal patents or licences, however, it should be much more difficult to assess whether transfer prices are in line with the arm's-length principle. Similar, transfer prices for IT services will be difficult to judge if e.g. firm-specific software is provided. Consequently, the MNE-internal provision of R&D services and IT services could provide some leeway for tax-motivated transfer pricing. In case of advertising services, arm's-length prices should (at least partly) be observable. Therefore, there should be limited leeway for tax-motivated transfer pricing.

During the entire analysis period (2001-2010), the institutional preconditions with respect to taxation were such that German MNEs had incentives to reduce their aggregate tax burden by shifting taxable base from the German parent to foreign (low-tax) subsidiaries. Germany showed during the entire analysis period a relatively high level of corporate taxation. From 2001 to 2008, its statutory corporate tax rate of almost 40% is among the highest in the EU. Up from 2008, the corporate tax rate is around 30% (Table A9 presents for benchmark years statutory corporate tax rates within the EU). Further, the repatriation of foreign subsidiaries' profits to the German parent in form of dividends is exempt from German corporate tax (here, Germany applies a tax exemption regime since 2001). The EU Parent-Subsidiary Directive ensures zero withholding taxes on cross-border dividend payments between MNE entities located in EU member states. Hence, the repatriation of profits from EU (low-tax) subsidiaries is free of any withholding taxes.

**Figure 1**  
**Hypotheses about tax-motivated transfer pricing within the EU**



Note: Timeline illustrates changes in German anti-shifting provisions against MNEs' profit shifting via transfer pricing between 2001 and 2010. TPL denotes transfer pricing legislation. CFC rule is the controlled foreign corporation rule.

Figure 1 illustrates changing German anti-shifting provisions over time and hypotheses about German MNEs' responses in tax-motivated transfer pricing depending on whether arm's-length prices are observable for tax authorities or not. Before the introduction of transfer pricing legislation in 2003, I expect some room for tax-motivated transfer pricing. Although the arm's-length principle has already been established and used as a reference by tax administrations since 1983, the lack of a legal obligation for firms to establish standardized and comprehensive transfer pricing documentation could provide opportunities for tax-motivated transfer pricing. I do not expect any anticipation effects in case of the 2003 reform as the precise embodiment of the new transfer pricing legislation was unknown until November 2003.

Once transfer pricing legislation is effectively in place, tax-motivated transfer pricing should diminish in cases where arm's-length prices are observable. As compared to the period before 2003, legally required comprehensive transfer pricing documentation should enable tax authorities to enforce the (observable) arm's-length principle more effectively. Further, through the obligation to provide comprehensive documentation, MNEs' compliance with the arm's-length principle could increase. As MNEs have to justify every transfer price with an arm's-length price that complies with tax law, the scope for tax-motivated transfer pricing potentially narrows. Since the new rules meant a major change in the practice of transfer pricing, I expect that it took MNEs some time to actually adapt their transfer prices.<sup>12</sup> Consequently, transfer prices for transport service imports should at some point after January 2003 become independent from foreign subsidiaries' corporate tax rates (Figure 1 H1). With respect to the tightening of transfer pricing legislation in 2008, I do not expect any further impact as MNEs should already fully comply.

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<sup>12</sup> The precise embodiment of the new transfer pricing legislation was unclear until November 2003. Once the German Ministry of Finance published the circular that more precisely determined type, content, scope, and time of provision of transfer pricing documentation in November 2003, MNEs could have adopted the new rules.

In cases where arm's-length prices are unobservable, I expect transfer pricing legislation to be ineffective. In case of genuinely developed IP this implies that tax-motivated transfer pricing should have existed during the entire time span. In the case of non-genuinely developed IP I do expect tax-motivated transfer pricing to occur once the ECJ decision in 2006 severely restricted the application of the German CFC rule within the EU. Therefore, tax-motivated transfer pricing related to IP should (within the EU) only occur after 2006 when the German CFC rule is suspended. Hence, I expect a negative sensitivity of MNE-internal royalty and licence payments and R&D related transfer prices (in case IP is involved) with respect to foreign subsidiaries' corporate tax rates up from 2006 (Figure 1 H2). The tightening of transfer pricing legislation in 2008 should have no effect on MNEs' tax-motivated transfer pricing related to IP, as the 2008 reform provides no solution to the key problem that arm's-length prices for IP are unobservable.

#### 4 Data

The analysis is based on a dataset that consists of two linked databases: the *Microdatabase Direct Investment* (MiDi) and the *Microdatabase Statistics on International Trade in Services* (SITS).<sup>13</sup> The MiDi comprehends annual unconsolidated firm-level panel data on German outbound foreign direct investment (FDI). As German firms investing abroad are legally required to report, MiDi includes comprehensive and reliable balance sheet information on almost all foreign subsidiaries of German firms (for details see Lipponer, 2011). The SITS includes monthly data on German MNEs' international service transactions that exceed a reporting threshold of 12,500 Euro (for details see Biewen et al., 2013). As reporting of international service transactions is legally obligatory for German MNEs, the SITS provides comprehensive and reliable

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<sup>13</sup> Both databases are provided by *Deutsche Bundesbank* and accessible in its research center in Frankfurt am Main, Germany.



information on transaction values, transaction types and the countries of foreign transaction partners. The SITS and the MiDi have common numeric firm identifiers that can be used to link both databases.

From the MiDi, I retrieve information on German MNEs' subsidiary locations. I consider subsidiaries which are owned at least 50% by their German parent. Further, I only include corporations. I exclude all MNEs operating in the agricultural, mining and banking sector as well as governmental institutions and private households which are generally subject to different tax rules. Using the numeric firm identifiers, I merge information on German MNEs' EU service imports from SITS. A unique feature of the dataset is that different types of transactions are included. I include in the analysis transactions related to (1) transport service imports, (2) R&D service imports, (3) IT service imports, (4) royalty and licence payments related to IP, and (5) advertising service imports.

I define MNEs' transactions as firm-external if they are conducted with countries that are not subsidiary locations. In contrast, I assume firm-internal transactions if they are conducted with a country which is the location of at least one MNE subsidiary in the respective year. The dataset provides for the firm-internal case not sufficient information to eventually determine whether the transaction partner is the respective subsidiary or a third party. This data restriction implies for the analysis that MNEs' tax-motivated transfer pricing will potentially be underestimated. Hence, the estimates provide lower bounds for the tax sensitivity of transfer prices.

Previous research found tariffs and exchange rates to be important determinants of trade prices (see e.g. Clausing, 2003; Bernard et al., 2008). As I focus on German MNEs' transactions with transactions partners that are located in the member states of the EU as of 2004<sup>14</sup> and all EU member states are part of the European Union Customs Union (EUCU), there are no tariffs

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<sup>14</sup> EU member states as of 2004: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Slovenia, Slovakia, Spain, Sweden, and United Kingdom.

on service transactions with these countries. With respect to exchange rate fluctuations, there is so far no consensus in the literature on how to prevent bias from exchange rate fluctuations in transfer pricing analyses.<sup>15</sup> In the following analysis the values of transactions with non-Euro countries are converted into Euro using the respective foreign currency's average nominal Euro exchange rate from a fixed month, January 2001.<sup>16</sup> In doing so, I ensure that transfer prices are not artificially altered by fluctuations of the exchange rate.

Tables A4 to A8 provide descriptive statistics on the analysis sample listed by transaction type for three reference years. Information on statutory corporate tax rates and statutory tax rates on royalty and licence income stem from Ernst & Young's annually published Worldwide Corporate Tax Guides. The resulting dataset allows to analyze German MNEs' tax-motivated transfer pricing related to service imports and royalty and licence payments from 2001 to 2010. It comprehends 654,021 observations on German MNEs' import transactions for the time period January 2001 to December 2010.

Figure 2 traces quarterly mean residual values that result from a regression of transport service import transactions on a set of EU-country indicators (to control for the transport-price determinant distance), Figure 3 traces quarterly mean transaction values related to royalty payments. If there is tax-motivated transfer pricing, hence, a tax-driven deviation of transfer prices from arm's-length prices, MNE-internal should exceed external average transaction values when the foreign corporate tax rate is relatively low. In this way, tax base would be shifted to the foreign low-tax subsidiary. In case the foreign corporate tax rate is relatively high, MNE-internal transaction values should be smaller than externals. The dashed lines in the Figures depict MNE-internal transactions, the solid lines MNE-external transactions. The graphs cover

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<sup>15</sup> Some studies apply nominal exchange rates (Clausing, 2003), others real exchange rates (Bernard et al., 2008) as control variables. In some studies the problem is ignored (Grubert, 2003; Overesch, 2006; Davies et al., 2014). In turn, Swenson (2001) purges transaction values of country-year effects.

<sup>16</sup> Monthly average exchange rates are calculated using daily exchange rates provided by the European Central Bank for the entire analysis period.

the time period between the third quarter 2002 and the fourth quarter 2010. The lower panels refer to German transactions with (high-tax) countries with a statutory corporate tax rate above 25% and the upper panels to transactions with (low-tax) countries with a statutory tax rate below 25%.<sup>17</sup>

Figure 2 traces quarterly mean residuals of transaction values related to German imports of transport services. The comparison of the upper panel with the lower panel does not reveal any patterns that would suggest tax-motivated transfer pricing during the analysis period. Mean residuals of internal and external transaction values differ in most periods, however, the arising gaps do not clearly correspond to tax minimization considerations. The graphs suggest that even in the absence of obligatory transfer pricing documentation requirements (before 2003) MNEs' transfer prices for transport service imports were not tax motivated.

The idea to compare internal transfer prices to external market prices in order to detect tax-motivated transfer pricing draws on the rational behind the the arm's-length principle. An alternative approach is to consider tax-sensitivities of transfer prices, thus, compare transfer prices paid to low-tax subsidiaries with transfer prices paid to high-tax subsidiaries. Figure 4 traces quarterly mean residuals of transfer prices related to German imports of transfer services. The dashed line represents transfer prices paid to low-tax subsidiaries, the solid line transfer prices paid to high tax subsidiaries. The graphs reveals a pattern that indicates tax-motivated transfer pricing at the beginning of the analysis period: mean transfer prices paid to low-tax subsidiaries clearly exceed those paid to high-tax subsidiaries until the end of the year 2004. Up from 2005 mean transfer prices for service imports are at a similar level. German transfer pricing rules were introduced in 2003. Given that market values, i.e. arm's-length prices for

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<sup>17</sup> The threshold corporate tax rate of 25% to distinguish high- from low-tax countries draws on the definition of low-tax subsidiaries in the then German CFC rules.

transport services are observable, the disentangling of transport transfer prices from any tax motive happened within a time span of approximately three years.

Figure 3 traces means of German royalty and licence payments to high-tax countries (lower panel) and low-tax countries (upper panel). The comparison of the upper and the lower panel shows that up from the cessation of CFC legislation in September 2006, the average of internal royalty and licence payments exceeds externals if foreign corporate tax rates are low. In contrast, MNE-internal and MNE-external royalty payments to high-tax countries are at a similar level during the entire analysis period. This suggests tax-motivated IP-related transfer pricing to low-tax countries - despite transfer pricing legislation. Tax-motivated transfer pricing even continues beyond 2008 when German transfer pricing legislation was further tightened. Therefore, the graphs suggest that transfer pricing legislation relying on an enforcement of the arm's-length principle as mechanism to prevent profit shifting seems to be ineffective in case of IP where arm's-length prices are unobservable. For the time period before 2006, the findings indicate that CFC legislation effectively prevented profit shifting via IP-related transfer pricing. Interestingly, until the end of 2006, average MNE-internal royalty payments to low-tax subsidiaries were very low (absolutely and relative to average external royalty payments). This reflects the incentives provided by German CFC legislation. Under CFC legislation, royalty income of foreign low-tax subsidiaries would be principally taxed at the level of the German parent (at the then German corporate tax rate of 40%) if the underlying IP was not originally developed by the respective low-tax subsidiary (independent from whether the transfer prices were at a arm's length or not). Obviously, MNEs did ensure not to accumulate passive profits in their CFCs. An interesting implication of this finding is that German MNEs apparently did not develop IP in the considered low-tax subsidiaries. Because if they had, they could have used the IP to conduct profit shifting even under the then CFC legislation. As transfer pricing to low-tax

subsidiaries starts only after the suspension of CFC legislation, it seems that MNEs conduct IP-related transfer pricing based on IP that is tax-optimally reallocated to low-tax subsidiaries (after it was developed somewhere else).

In terms of tax sensitivity of MNE-internal royalty and licence payments, Figure 5 clearly illustrates the tax motive behind IP-related transfer prices for the time period after the suspension of German CFC rules. Up from the last quarter of the year 2006, transfer prices paid to low-tax subsidiaries exceed those paid to high-tax subsidiaries. The pace of MNEs' response is remarkable. The graphs reveal that after transfer prices were at similar levels until the end of 2006, transfer prices to low-tax subsidiaries rise sharply after the CFC rules's suspension within two quarters of years.<sup>18</sup> The reform of German transfer pricing legislation in 2008 seems not to decrease the tax-driven gap between the mean transfer prices. The gap continuous to enlarge even after 2008. However, at the end of the analysis period in 2010 the difference between the mean transfer prices seems to decrease. Whether this decrease in tax sensitivity is persistent or not, however, cannot be analyzed with the data at hand due to the lack of observations after 2010.

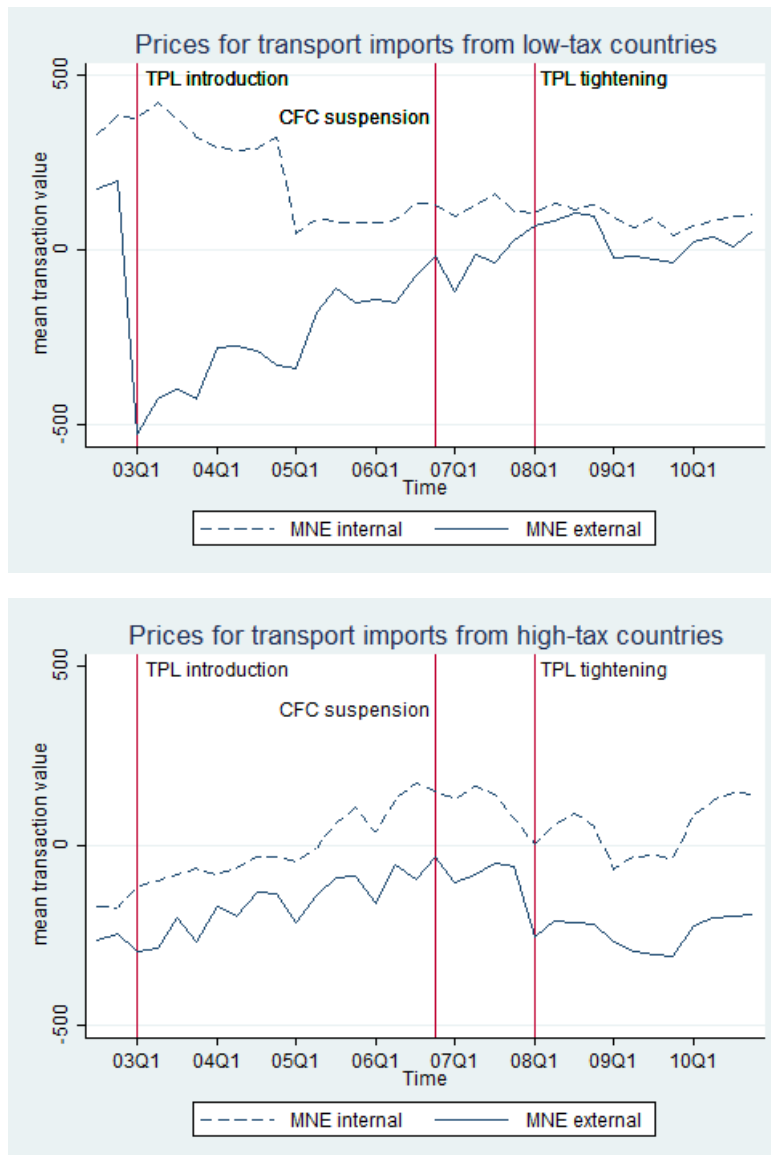
The argument is that transfer pricing legislation relying on an enforcement of the arm's-length principle as mechanism to prevent tax-motivated transfer pricing is ineffective in case of IP where arm's-length prices are unobservable. Indeed, transfer prices for MNE-internal royalty and licence payments seem to respond to taxes despite transfer pricing rules (Figure 5). Similarly, Figure A4 in the appendix shows for R&D-related transfer prices a pattern in tax sensitivities that suggests that transfer prices are tax-driven after the CFC rules suspension in 2006 - despite transfer pricing rules that are supposed to enforce arm's-length prices. However, the scope for profit shifting seems to be much smaller in case of R&D transfer prices as compared

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<sup>18</sup> This quick response in MNEs transfer pricing is in line with ? who find that MNEs are generally very flexible in changing their transfer pricing strategies.

**Figure 2**

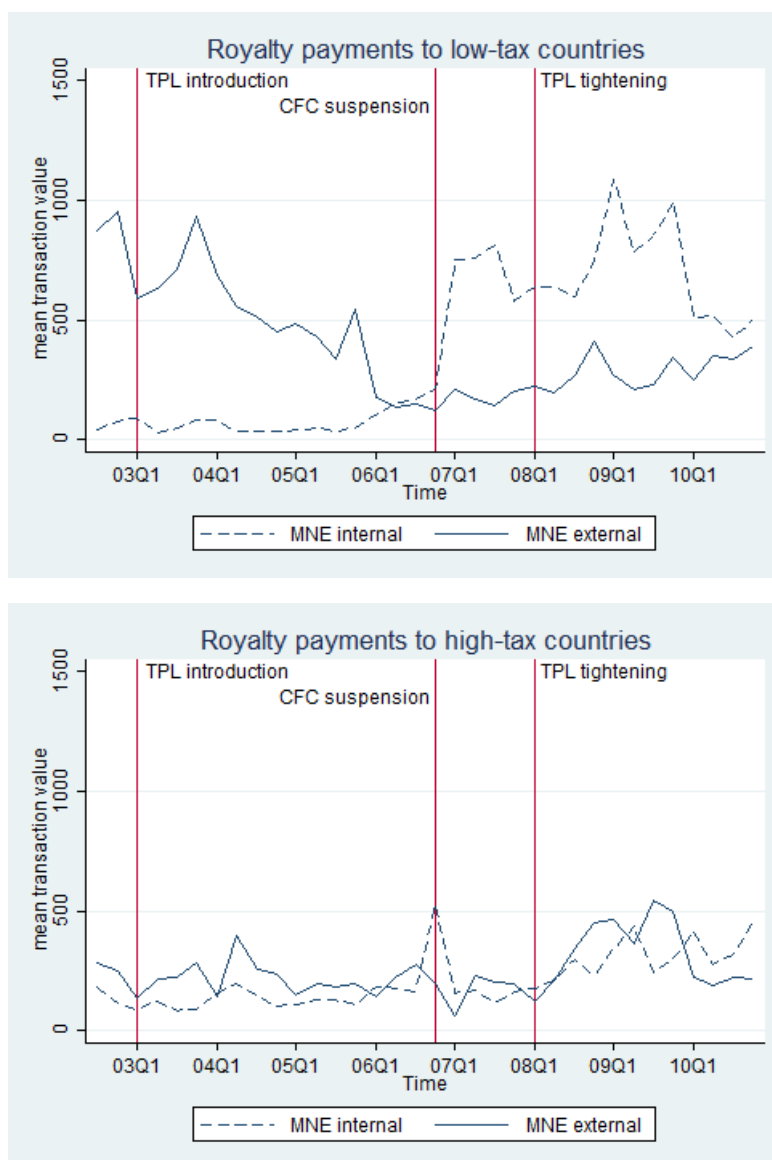
**Average residuals of transaction values for imports of transport services from the third quarter 2002 to the fourth quarter 2010**



Note: Average residual of OLS regression of transaction value (in thousand euros) on a set of country indicators (member countries of the EU as of 2004) expressed in thousand euros and per quarter of year. Residuals above the 99% percentile value in each quarter of year are excluded. The lower panel refers to imports from countries with a statutory corporate tax rate above 25%, the upper panel to import from countries with a statutory tax rate below 25%. The dashed line refers to firm-internal transactions, the solid line to firm-external transactions. All transactions were conducted with transaction partners located in the member countries of the EU as of 2004. Data source: Microdatabase Direct Investment (MiDi) and Microdatabase Statistics on International Trade in Services (SITS), Deutsche Bundesbank, 2001-2010, own calculations.

**Figure 3**

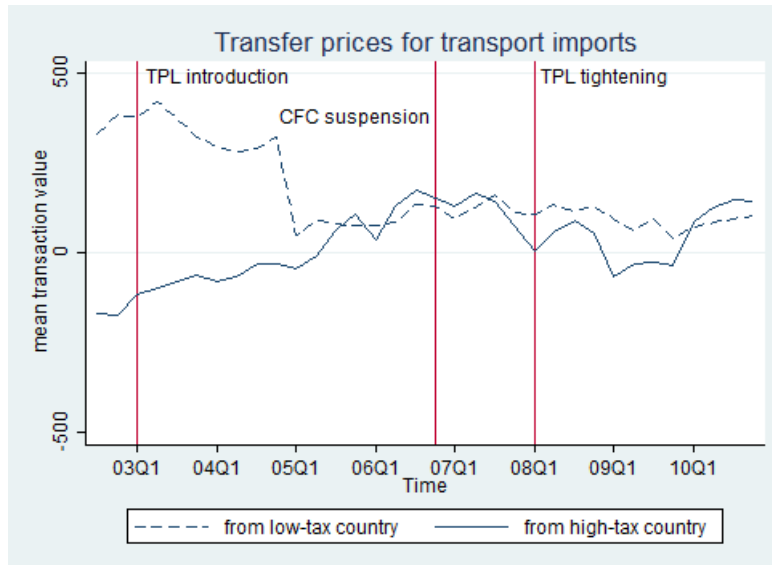
**Average transaction values for royalty and licence payments from the third quarter 2002 to the fourth quarter 2010**



Note: Average transaction values are expressed in thousand euros and per quarter of year. Transaction values above the 99% percentile value in each quarter of year are excluded. The lower panel refers to royalty payments to countries with a statutory corporate tax rate above 25%, the upper panel to royalty payments to countries with a statutory tax rate below 25%. The dashed line refers to firm-internal royalty payments, the solid line to firm-external transactions. All transactions were conducted with transaction partners located in the member countries of the EU as of 2004. Data source: Microdatabase Direct Investment (MiDi) and Microdatabase Statistics on International Trade in Services (SITS), Deutsche Bundesbank, 2001-2010, own calculations.

**Figure 4**

**Average transfer prices from the third quarter 2002 to the fourth quarter 2010: transport service imports**



Note: Average residual of OLS regression of transaction value (in thousand euros) on a set of country indicators (member countries of the EU as of 2004) per quarter of year. Residuals above the 99% percentile value in each quarter of year are excluded. All transactions were conducted with transaction partners located in the member countries of the EU as of 2004. Data source: Microdatabase Direct Investment (MiDi) and Microdatabase Statistics on International Trade in Services (SITS), Deutsche Bundesbank, 2001-2010, own calculations.

to the case of MNE-internal royalty and licence payments. Further, the pace of the response in R&D transfer prices to the suspension of CFC rules is lower. In line with previous findings in the literature (Grubert, 2003), Figure A6 in the appendix reveals no tax motive behind transfer prices for advertising services. Further, transfer prices for IT services seem not to depend on foreign corporate tax rates either (Figure A5 in the appendix).

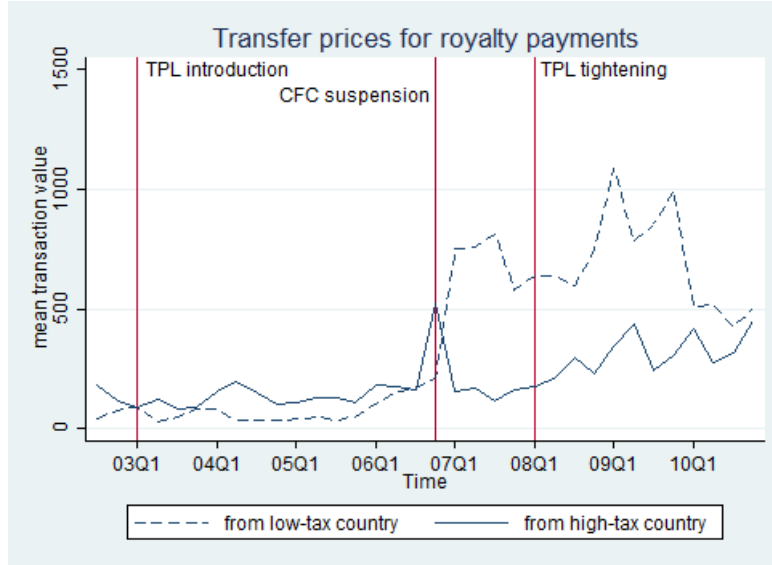
## **5 Empirical strategy**

The empirical analysis investigates the tax sensitivity of MNEs' transfer prices over the time period 2001-2010. I test whether MNE-internal transaction values vary systematically with foreign tax rates in years where the respective MNE-internal transaction values are not (effectively) subject to anti-shifting provisions. I estimate the following regression model for repeated cross-sectional data (Stock and Watson, 2007) that provides tax sensitivity estimates for transaction



**Figure 5**

**Average transfer prices from the third quarter 2002 to the fourth quarter 2010: royalty and licence payments**



Note: Average transaction values (in thousand euros) per quarter of year. Transaction values above the 99% percentile value in each quarter of year are excluded. All transactions were conducted with transaction partners located in the member countries of the EU as of 2004. Data source: Microdatabase Direct Investment (MiDi) and Microdatabase Statistics on International Trade in Services (SITS), Deutsche Bundesbank, 2001-2010, own calculations.

values for each year between 2002 and 2010:

$$\begin{aligned}
 \text{transaction value}_{it} = & \beta_0 + \beta_1 \text{internal}_i + \beta_2 \text{low tax}_{it} + \beta_3 (\text{internal}_i \times \text{low tax}_{it}) \\
 & + \delta'_0 \text{year}_t + \delta'_1 (\text{internal}_i \times \text{year}_t) + \delta'_2 (\text{year}_t \times \text{low tax}_{it}) \\
 & + \delta'_3 (\text{internal}_i \times \text{year}_t \times \text{low tax}_{it}) + \theta_1 \text{country}_i + \theta_2 \text{MNE}_i + \varepsilon_{it}
 \end{aligned} \tag{1}$$

The variable  $\text{transaction value}_{it}$  is the value of the transaction  $i$  at time  $t$ .  $\text{internal}_i$  is an indicator variable that equals one if the transaction is conducted MNE-internally,  $\text{low tax}_{it}$  takes the value one if the foreign statutory corporate tax rate is equal to 25% or lower.<sup>19</sup> The approach takes account of unobserved factors that might affect the transaction price on the country, MNE, and/or year level by controlling for country effects, MNE effects and year effects:  $\text{country}_i$  is

<sup>19</sup> Cases of countries with specific statutory tax rates on corporate royalty and licence income are considered (see Evers et al., 2015). Tables A9 and A10 in the appendix present corporate tax rates for certain years.

a set of indicator variables for every European Union member country (as of 2004).  $MNE_i$  describes a full set of indicator variables for each MNE in the dataset.  $year_t$  represents a full set of indicator variables for each year.  $\beta_0$  denotes a constant term and  $\varepsilon$  is the error term. I apply OLS regressions. Heteroscedasticity robust standard errors are reported.

The model specification in equation 1 includes a set of interaction terms that allows the tax sensitivity of MNEs' transaction values to vary over time and, importantly, between MNE-internal and MNE-external transactions. The partial effect of tax rates on the transactions value in the model, which is indicative of the tax sensitivity, is:

$$\frac{\partial \text{transaction value}}{\partial \text{low tax}} = \beta_2 + \beta_3 \text{internal} + \delta'_2 \text{year} + \delta'_3 \text{internal} \times \text{year}. \quad (2)$$

Referring to H1, the case where arm's-length prices are observable, I expect a negative tax sensitivity of transfer prices for transport service imports before 2003. As transfer pricing legislation is introduced in 2003, however, I expect for subsequent years (presumably with some delay after 2003) transfer prices to be unrelated to foreign corporate tax rates due to effective transfer pricing legislation.

Under CFC legislation, I do not expect MNE-internal transaction values of royalty and licence payments to be sensitive with respect to foreign corporate tax rates (H2). Neither I expect R&D transfer prices to respond to foreign corporate tax rates. After the German CFC rules' suspension in September 2006, MNEs are unrestricted in tax-motivated IP-related transfer pricing as transfer pricing legislation is expected to be ineffective due to unobservable IP arm's-length prices. Therefore, I expect MNE-internal royalty and licence payments and transfer prices for R&D service imports to respond negatively to foreign corporate taxation. In case of advertising service imports and IT service imports it is a priori not clear whether one would expect transfer

prices to respond sensitive to taxation as market prices should at least for some components of the transfer price be observable.

## **6 Empirical analysis**

This section presents estimates of annual tax sensitivities of MNEs transfer prices (equation 2). Figures 6 - 10 show graphical depictions of the tax sensitivities for the five considered types of transactions. The marginal effects are derived from the estimates of OLS regressions of equation (1). The full regression results are presented in the Tables A1 - A3 in the appendix. The dependent variable in the regressions is the transaction value in thousand euros.

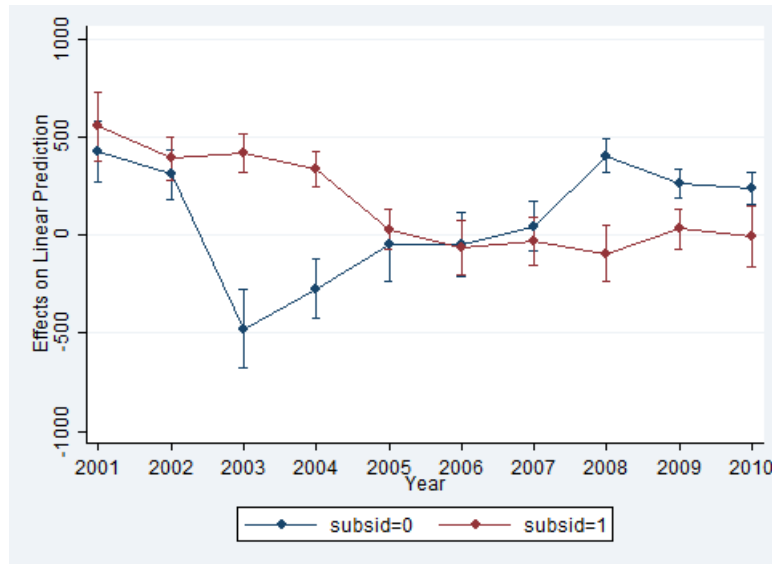
For transport service imports, the red line in Figure 6 traces the annual tax sensitivities of transfer prices. It reveals a statistically significantly negative relation between foreign corporate tax rates and transfer prices in the early 2000s that diminishes towards the mid-2000s. The negative relation diminished, as expected, with some delay after 2003. Up from 2005 the marginal effect of taxation on transfer prices is, like in the case of external transaction values, statistically insignificantly different from zero. One reason for the delay in the response of MNEs' transfer pricing to the new transfer pricing legislation might be the fact that the precise embodiment of the new rules was unclear until November 2003, which is eleven month after the law's introduction.<sup>20</sup> Another reason could be that the new transfer pricing rules meant a major change for transfer pricing practice. Therefore, it took MNEs some time to fully implement the new documentation requirements and to adjust their transfer prices in order to comply with the new legislation. For the year 2004 the results imply a difference between transport transfer prices that MNEs pay to low-tax subsidiaries as compared to high-tax subsidiaries is 335,000 Euro on average. Referring to the average transfer price paid to high-tax subsidiaries for this type

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<sup>20</sup> The German Ministry of Finance published a circular that clarified the precise embodiment of the new transfer pricing legislation only in November 2003.

of transaction that is around 425,000 Euro in the fourth quarter of 2004, this translates into a tax-driven increase by 78% in transfer prices if paid to low-tax subsidiaries.<sup>21</sup>

**Figure 6**  
**Annual marginal effects: transport service imports**



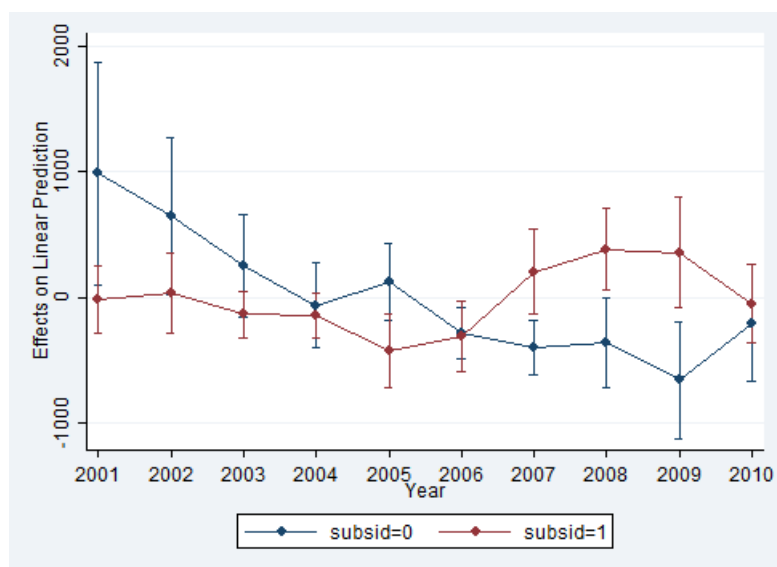
Note: Annual marginal effects of indicator variable *low tax* on external transactions values (subsid=0) and transfer prices (subsid=1). 95% confidence intervals depicted, delta method for standard errors. Transaction values in thousand euros. All transactions were conducted with transaction partners located in the member countries of the EU as of 2004. Data source: Microdatabase Direct Investment (MiDi) and Microdatabase Statistics on International Trade in Services (SITS), Deutsche Bundesbank, 2001-2010, own calculations.

Figures 7 - 9 present tax-sensitivity estimates for IP-related transfer prices. For MNE-internal royalty and licence payments, the red line in Figure 7 indicates no statistically significant relation between corporate tax rates and transfer prices until 2006. Up from 2006, MNE-internal royalty and licence payments depend negatively on foreign corporate tax rates, though the marginal effects do not in all years achieve statistical significance at conventional levels<sup>22</sup>. Still, the point estimates show economically significant values and reveal a substantial relationship in the data set which represents the entire population of royalty and licence payments made by German MNEs. According to the empirical results, the difference between

<sup>21</sup> In 2004 the average corporate tax rate in low-tax countries is around 18% as compared to approximately 32.5% in high-tax countries.

<sup>22</sup> F-tests of the overall significance of the regression very strongly reject the null hypothesis that all coefficients are zero. Hence, the model explains some variation in transfer pricing.

**Figure 7**  
**Annual marginal effects: royalty and licence payments**



Note: Annual marginal effects of indicator variable *low tax* on external transactions values (subsid=0) and transfer prices (subsid=1). 95% confidence intervals depicted, delta method for standard errors. Transaction values in thousand euros. All transactions were conducted with transaction partners located in the member countries of the EU as of 2004. Data source: Microdatabase Direct Investment (MiDi) and Microdatabase Statistics on International Trade in Services (SITS), Deutsche Bundesbank, 2001-2010, own calculations.

transport transfer prices that MNEs pay to low-tax subsidiaries as compared to high-tax subsidiaries is in the year 2007 207,000 Euro on average. Referring to the average MNE-internal royalty and licence payment to high-tax subsidiaries in the first quarter of 2007 that amounts to 121,000 Euro, this implies a tax-driven increase in transfer prices by around 170% if paid to low-tax subsidiaries.<sup>23</sup>

The results for R&D services, which potentially include some sort of IP usage, show similar patterns in tax-sensitivities of transfer prices over time (red line in Figure 8). Transfer prices for R&D services respond up from 2007 negatively to foreign corporate tax rates. The tax sensitivities are statistically significant at the 10% significance level up from 2009. The difference between transfer prices for R&D services that MNEs pay to low-tax subsidiaries as compared to high-tax subsidiaries is in the year 2009 1,270,000 Euro on average. Given an average R&D

<sup>23</sup> In the year 2007 the average corporate tax rate on IP income in low-tax countries is around 17% as compared to approximately 31% in high-tax countries.

service transfer price of 672,000 Euro paid to high-tax subsidiaries in the first quarter of 2009, this translates into an increase of almost 200% in transfer prices paid to low-tax subsidiaries.

The results show no tax-minimization motive behind transfer prices neither in case of IT services (Figure 9) nor in case of marketing services (Figure 10). The finding that transfer prices for marketing services do generally not respond to taxation is in line with previous findings by Grubert (2003) who shows for the case of US MNEs that marketing-related transactions are typically not employed for profit shifting.

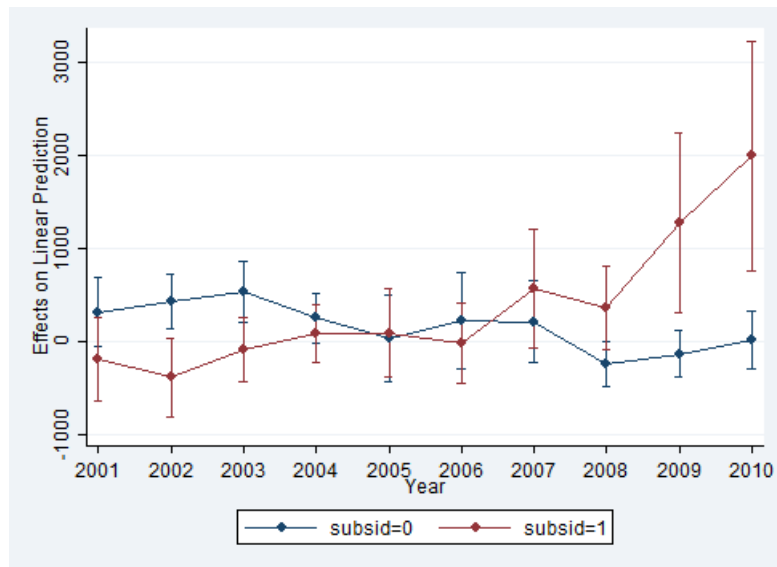
Concerning the economic significance of the findings, the effects describe strong responses of transfer prices with respect to corporate taxation in the absence of anti-shifting legislation, particularly in cases of IP-related transactions. Depending on the transaction type, transfer prices paid to low versus high-tax subsidiaries differ between 78% and almost 200%. Given that the data set does not allow to exactly distinguish between MNE-internal and MNE-external transactions, the analysis reveals lower bounds for the tax sensitivities of transfer prices. Hence, the true effects could even be larger.

## **7 Conclusion**

This paper provides an in detail assessment of MNEs' tax-motivated transfer pricing from 2001 to 2010. I study the tax sensitivity of transfer prices for certain service imports and royalty and licence payments during a time period of changing anti-shifting legislation. On the one hand, transfer pricing legislation in Germany was introduced in 2003 and tightened in 2008. On the other hand, German CFC legislation, that prevented profit shifting via IP-related transfer pricing, is suspended by a ruling of the ECJ in the year 2006.

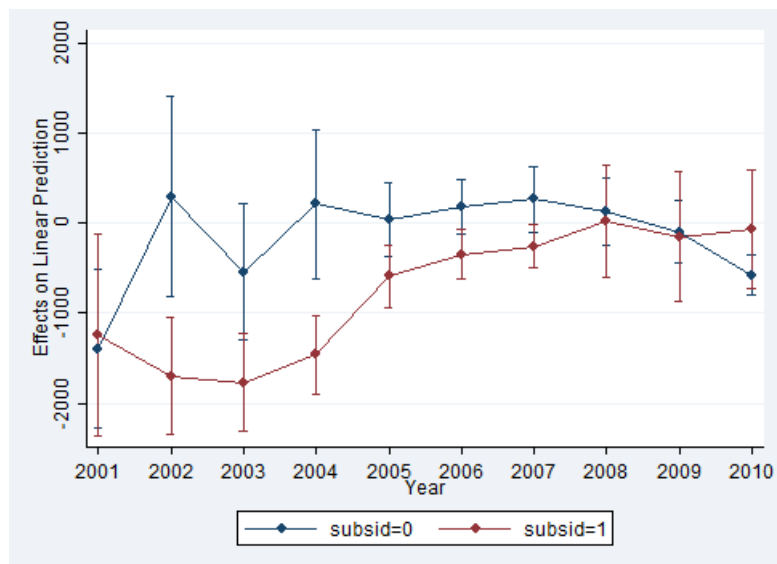
The results provide empirical evidence for tax-motivated transfer pricing during the entire decade. Depending on the at the time applicable anti-shifting legislation, however, MNEs target

**Figure 8**  
Annual marginal effects: R&D service import prices



Note: Annual marginal effects of indicator variable *low tax* on external transactions values (subsid=0) and transfer prices (subsid=1). 95% confidence intervals depicted, delta method for standard errors. Transaction values in thousand euros. All transactions were conducted with transaction partners located in the member countries of the EU as of 2004. Data source: Microdatabase Direct Investment (MiDi) and Microdatabase Statistics on International Trade in Services (SITS), Deutsche Bundesbank, 2001-2010, own calculations.

**Figure 9**  
Annual marginal effects: IT service import prices



Note: Annual marginal effects of indicator variable *low tax* on external transactions values (subsid=0) and transfer prices (subsid=1). 95% confidence intervals depicted, delta method for standard errors. Transaction values in thousand euros. All transactions were conducted with transaction partners located in the member countries of the EU as of 2004. Data source: Microdatabase Direct Investment (MiDi) and Microdatabase Statistics on International Trade in Services (SITS), Deutsche Bundesbank, 2001-2010, own calculations.

different types of service transactions for profit shifting via transfer pricing. The findings show transfer pricing rules to be effective in case of service transactions with observable arm's-length prices. In contrast, the results clearly reveal the short-comings of transfer pricing legislation in case of IP where an effective enforcement of the arm's-length principle is very limited as arm's-length prices are unobservable. Up from 2006, when CFC legislation was ineffective due to a decision of the European Court of Justice, MNEs start profit shifting via IP-related transfer pricing - despite comprehensive transfer pricing legislation. This suggests that, before 2006, German CFC legislation (and not German transfer pricing legislation) effectively prevented profit shifting via IP-related transfer pricing. The tightening of transfer pricing legislation in 2008 seems not to effectively prevent profit shifting via IP-related transfer pricing in the short term. This suggests that even the then tighter transfer pricing legislation could not effectively solve the problem that the arm's-length principle is difficult to enforce in case of IP as arm's-length prices that could serve as a reference cannot be observed by tax authorities.

The empirical findings provide a couple of important policy implications. In case of transfer prices with observable arm's-length prices transfer pricing legislation increases firms' compliance with the arm's-length principle. Here, policy makers should, however, be aware that transfer pricing documentation requirements go with a cost-benefit trade-off: transfer pricing documentation requirements improve MNEs compliance with the arm's-length principle and, therefore, generate tax revenues but also impose considerable enforcement and compliance cost on tax administrations and firms. In this constellation, there is an efficient level of transfer pricing documentation which, once exceeded, creates economic inefficiencies.

Further, certain transaction types e.g. marketing services seem generally not to be employed for tax-motivated transfer pricing by MNEs. In the literature, there is so far no clear explana-



tion for this finding.<sup>24</sup> However, if governments knew that certain types of transactions are for particular reasons generally not used for tax-motivated transfer pricing, cutting down on documentation requirements for these types would provide efficiency gains.

The empirical results reveal the ineffectiveness of transfer pricing legislation in preventing IP-related transfer mispricing. The fundamental problem is that arm's-length prices for IP and IP-related transactions are unobservable for third-parties like tax authorities, as there are usually no (firm-external) market prices that could serve as a reference. Therefore, it is very difficult for tax authorities to estimate arm's length prices for IP-related transactions such as patents or licences. A range of uncertainty that companies seem to exploit. As transfer pricing legislation selectively relies on documentation requirements to enforce the arm's-length principle and to prevent profit shifting, there is a need for a fundamental change in tax policy to effectively prevent base erosion caused by IP-related transfer mispricing.

The OECD, which once established the arm's-length principle as the international consensus on profit split in case of transfer pricing, is also aware of the problem of IP-related transfer mispricing (see Action 8 of action plan OECD, 2013). However, so far, the OECD has not been considering the arm's-length principle as the fundamental problem. Instead, first recommendations resulting from the current OECD initiative against "Base Erosion and Profit Shifting" promote even stricter and even more comprehensive transfer pricing documentation requirements to enforce the arm's-length principle in case of IP more effectively (OECD, 2014a,b). My empirical findings question whether this rigidly holding to the status quo will be effective. Even if firms are obliged to document IP arm's-length prices even more comprehensively, there is still the very fundamental problem that these documented arm's-length prices are for

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<sup>24</sup> Grubert (2003) argues that advertising intensive US companies engaged in many fewer intercompany transactions and, therefore, had fewer opportunities for shifting income. However, I find advertising service imports with a total of 41,187 transactions in the dataset to be the second most frequent transaction type and around 55% of these transactions are MNE-internal.

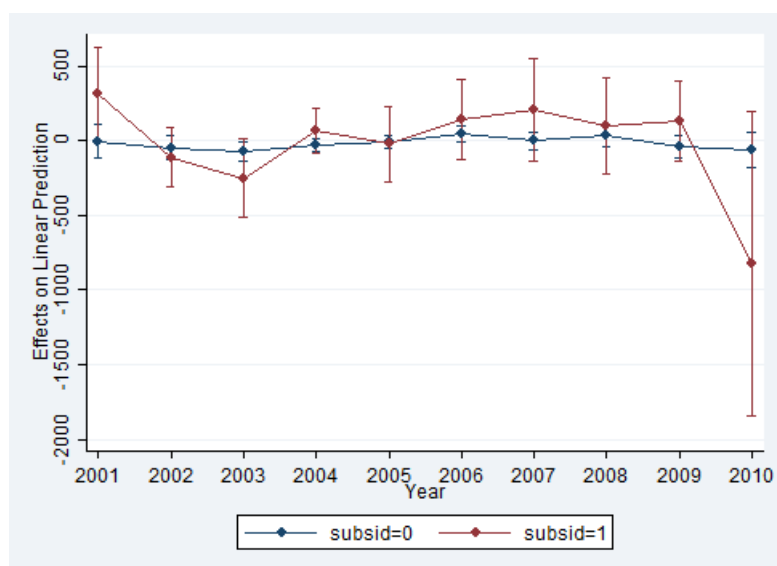
tax authorities extremely difficult to assess. This study's results suggest that firms will continue exploiting this for tax planning.

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**Figure 10**  
**Annual marginal effects: advertising service import prices**



Note: Annual marginal effects of indicator variable *low tax* on external transactions values (subsid=0) and transfer prices (subsid=1). 95% confidence intervals depicted, delta method for standard errors. Transaction values in thousand euros. All transactions were conducted with transaction partners located in the member countries of the EU as of 2004. Data source: Microdatabase Direct Investment (MiDi) and Microdatabase Statistics on International Trade in Services (SITS), Deutsche Bundesbank, 2001-2010, own calculations.

## **Appendix**

### **Supplementary material for**

#### **Multinational firms' tax-motivated transfer pricing before and after reforms of transfer pricing legislation**

##### **Contents**

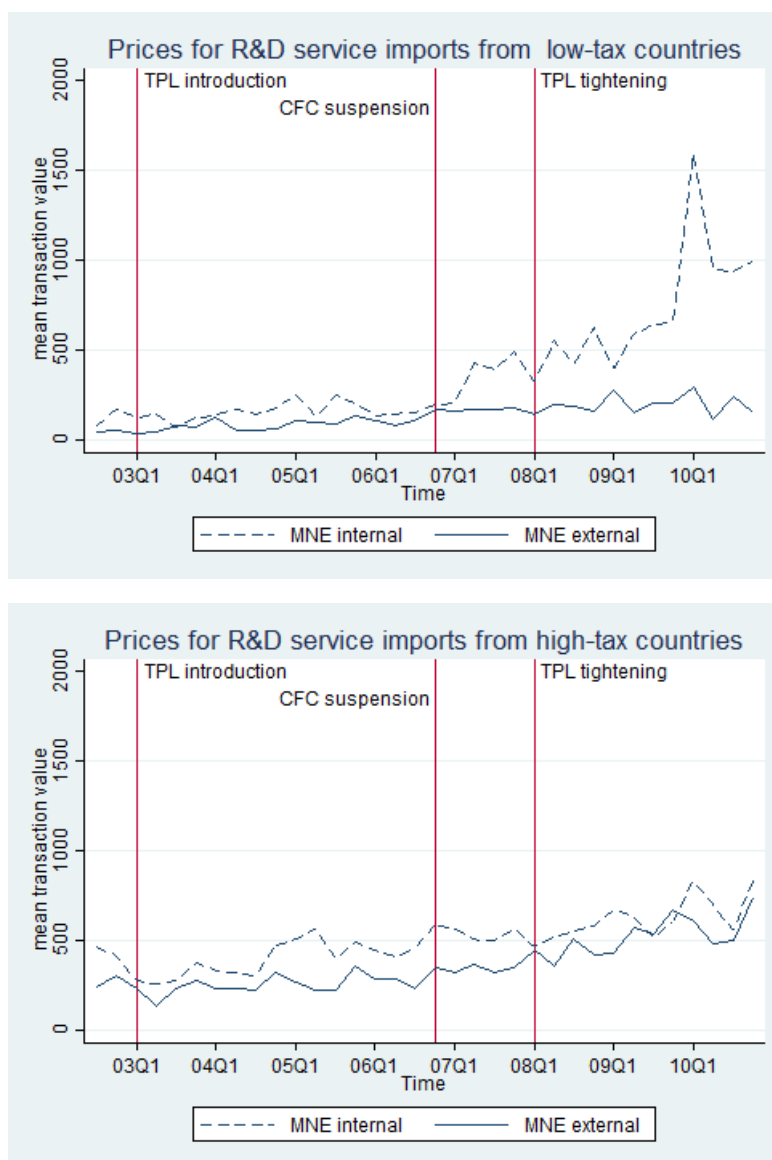
<b>A Graphics</b>	<b>37</b>
<b>A.1 Average transaction values</b>	<b>37</b>
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## A Graphics

### A.1 Average transaction values

**Figure A1**

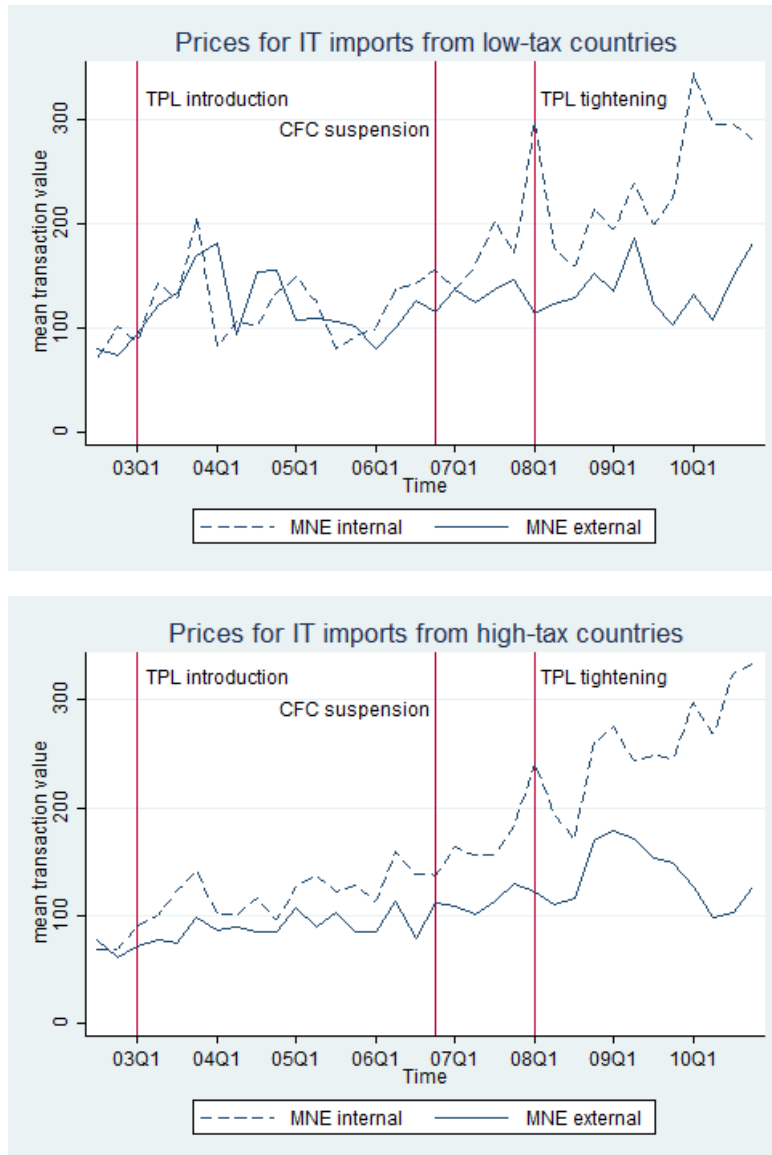
**Average transaction values for imports of R&D services from the third quarter 2002 to the fourth quarter 2010**



Note: Average transaction values are expressed in thousand euros and per quarter of year. Transaction values above the 99% percentile value in each quarter of year are excluded. The lower panel refers to royalty payments to countries with a statutory corporate tax rate above 25%, the upper panel to royalty payments to countries with a statutory tax rate below 25%. The dashed line refers to firm-internal royalty payments, the solid line to firm-external transactions. All transactions were conducted with transaction partners located in the member countries of the EU as of 2004. Data source: Microdatabase Direct Investment (MiDi) and Microdatabase Statistics on International Trade in Services (SITS), Deutsche Bundesbank, 2001-2010, own calculations.

**Figure A2**

**Average transaction values for imports of IT services from the third quarter 2002 to the fourth quarter 2010**

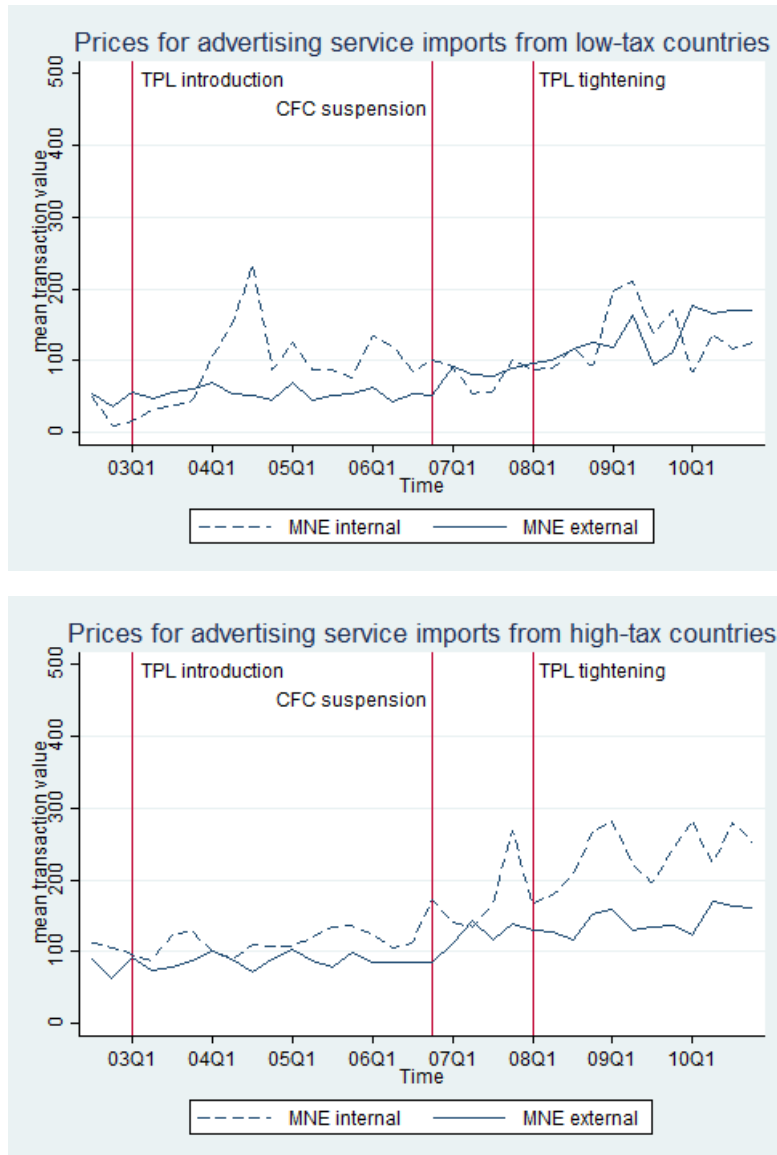


Note: Average transaction values are expressed in thousand euros and per quarter of year. Transaction values above the 95% percentile value in each quarter of year are excluded. The lower panel refers to royalty payments to countries with a statutory corporate tax rate above 25%, the upper panel to royalty payments to countries with a statutory tax rate below 25%. The dashed line refers to firm-internal royalty payments, the solid line to firm-external transactions. All transactions were conducted with transaction partners located in the member countries of the EU as of 2004. Data source: Microdatabase Direct Investment (MiDi) and Microdatabase Statistics on International Trade in Services (SITS), Deutsche Bundesbank, 2001-2010, own calculations.



**Figure A3**

**Average transaction values for imports of advertising services from the third quarter 2002 to the fourth quarter 2010**

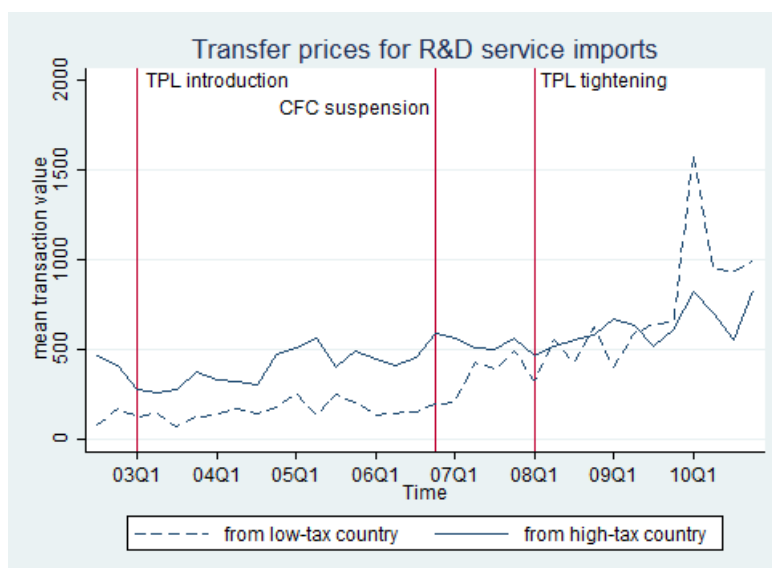


Note: Average transaction values are expressed in thousand euros and per quarter of year. Transaction values above the 99% percentile value in each quarter of year are excluded. The lower panel refers to royalty payments to countries with a statutory corporate tax rate above 25%, the upper panel to royalty payments to countries with a statutory tax rate below 25%. The dashed line refers to firm-internal royalty payments, the solid line to firm-external transactions. All transactions were conducted with transaction partners located in the member countries of the EU as of 2004. Data source: Microdatabase Direct Investment (MiDi) and Microdatabase Statistics on International Trade in Services (SITS), Deutsche Bundesbank, 2001-2010, own calculations.

## A.2 Tax sensitivities of transfer prices

**Figure A4**

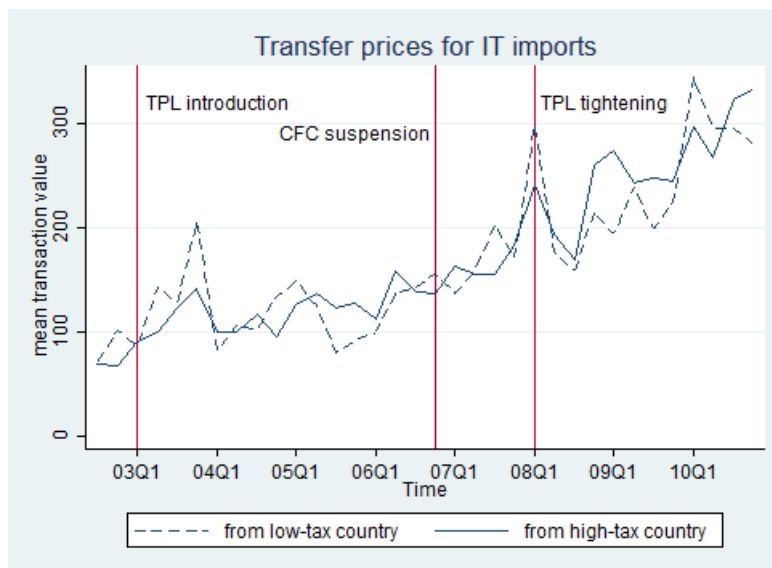
**Average transfer prices for imports of R&D services from the third quarter 2002 to the fourth quarter 2010**



Note: Transfer prices above the 99% percentile value in each quarter of year are excluded. The transactions were conducted with transaction partners located in the member countries of the EU as of 2004. Data source: Microdatabase Direct Investment (MiDi) and Microdatabase Statistics on International Trade in Services (SITS), Deutsche Bundesbank, 2001-2010, own calculations.

**Figure A5**

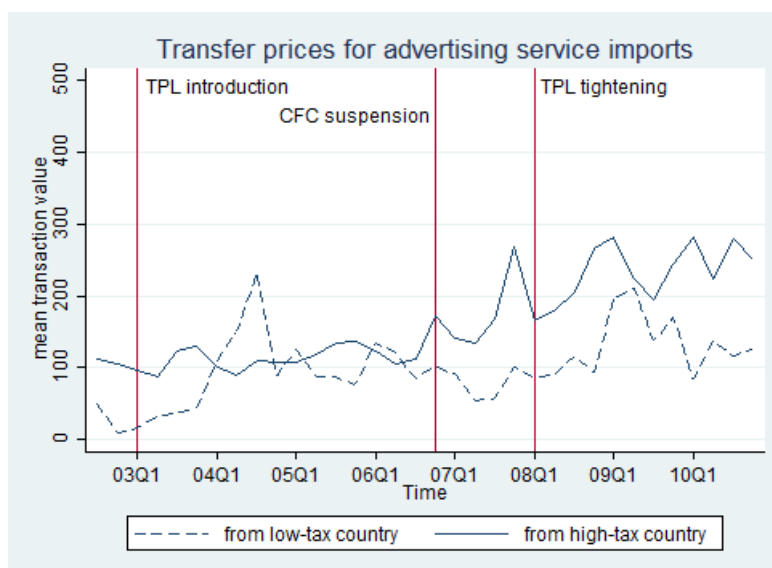
**Average transfer prices for imports of IT services from the third quarter 2002 to the fourth quarter 2010**



Note: Transfer prices above the 95% percentile value in each quarter of year are excluded. The transactions were conducted with transaction partners located in the member countries of the EU as of 2004. Data source: Microdatabase Direct Investment (MiDi) and Microdatabase Statistics on International Trade in Services (SITS), Deutsche Bundesbank, 2001-2010, own calculations.

**Figure A6**

**Average transfer prices for advertising services from the third quarter 2002 to the fourth quarter 2010**



Note: Transfer prices above the 99% percentile value in each quarter of year are excluded. The transactions were conducted with transaction partners located in the member countries of the EU as of 2004. Data source: Microdatabase Direct Investment (MiDi) and Microdatabase Statistics on International Trade in Services (SITS), Deutsche Bundesbank, 2001-2010, own calculations.

## **B Regression results**

**Table A1**  
**Regression results: Transport service and R&D service imports**

	Transport services		R&D services	
	(1)	(2)	(3)	(4)
	Estimate	p-value	Estimate	p-value
internal ( $\beta_1$ )	218.06	(0.000)	311.27	(0.035)
tax ( $\beta_2$ )	426.20	(0.000)	313.97	(0.100)
internal $\times$ tax ( $\beta_3$ )	129.88	(0.206)	-514.05	(0.032)
( $\delta_3$ )				
internal $\times$ tax $\times$ 2002	-48.54	(0.664)	-303.06	(0.320)
internal $\times$ tax $\times$ 2003	765.56	(0.000)	-117.54	(0.663)
internal $\times$ tax $\times$ 2004	480.70	(0.000)	352.33	(0.208)
internal $\times$ tax $\times$ 2005	-51.84	(0.718)	572.73	(0.136)
internal $\times$ tax $\times$ 2006	-143.29	(0.332)	267.41	(0.489)
internal $\times$ tax $\times$ 2007	-205.01	(0.133)	868.70	(0.051)
internal $\times$ tax $\times$ 2008	-628.41	(0.000)	1124.89	(0.001)
internal $\times$ tax $\times$ 2009	-362.17	(0.002)	1920.63	(0.000)
internal $\times$ tax $\times$ 2010	-377.81	(0.004)	2502.10	(0.000)
( $\delta_1$ )				
internal $\times$ 2002	-48.28	(0.130)	95.31	(0.614)
internal $\times$ 2003	-57.93	(0.192)	-362.73	(0.028)
internal $\times$ 2004	-40.39	(0.394)	-84.38	(0.608)
internal $\times$ 2005	17.04	(0.775)	-77.94	(0.619)
internal $\times$ 2006	46.99	(0.557)	-96.17	(0.550)
internal $\times$ 2007	96.13	(0.187)	-145.84	(0.366)
internal $\times$ 2008	265.33	(0.000)	-61.18	(0.719)
internal $\times$ 2009	74.91	(0.122)	82.17	(0.639)
internal $\times$ 2010	286.98	(0.000)	203.64	(0.293)
( $\delta_2$ )				
2002 $\times$ tax	-116.54	(0.131)	110.11	(0.514)
2003 $\times$ tax	-904.69	(0.000)	220.53	(0.165)
2004 $\times$ tax	-700.85	(0.000)	-65.13	(0.703)
2005 $\times$ tax	-474.78	(0.000)	-282.81	(0.272)
2006 $\times$ tax	-475.52	(0.000)	-91.30	(0.727)
2007 $\times$ tax	-381.92	(0.000)	-103.62	(0.660)
2008 $\times$ tax	-19.69	(0.819)	-558.61	(0.002)
2009 $\times$ tax	-162.18	(0.055)	-450.38	(0.011)
2010 $\times$ tax	-186.27	(0.029)	-302.95	(0.143)
( $\delta_0$ )				
2002	-76.90	(0.000)	-91.69	(0.386)
2003	-101.24	(0.011)	60.07	(0.550)
2004	-106.91	(0.016)	10.62	(0.919)
2005	-91.46	(0.086)	-1.94	(0.985)
2006	-14.02	(0.805)	29.94	(0.789)
2007	-89.58	(0.168)	-2.06	(0.988)
2008	-248.43	(0.000)	55.97	(0.727)
2009	-181.39	(0.001)	63.88	(0.643)
2010	-218.32	(0.000)	-13.26	(0.932)
Constant ( $\beta_0$ )	-21.36	(0.894)	598.77	(0.002)
Observations	114,993		20,222	
F-Statistic	43.00	(0.000)	12.23	(0.000)

Note: The dependent variable is the transaction value in thousand euros. Coefficients from OLS estimations. The analysis period covers the years 2001 to 2010. The following control variables are included in each regression: MNE indicators, country indicators, quarterly foreign GDP, quarterly foreign GDP per capita. In the regressions with the transport sample, I additionally control for the precise type of service transaction. P-values are based on heteroscedasticity robust standard errors. Data source: Microdatabase Direct Investment (MiDi) and Microdatabase Statistics on International Trade in Services (SITS), Deutsche Bundesbank, 2001-2010, own calculations.

**Table A2**  
**Regression results: IT-Service imports and royalty payments**

	Royalties		IT services	
	(1) Estimate	(2) p-value	(3) Estimate	(4) p-value
internal ( $\beta_1$ )	191.5719	(0.157)	-268.8227	(0.140)
tax ( $\beta_2$ )	989.9695	(0.029)	-1394.494	(0.002)
internal $\times$ tax ( $\beta_3$ )	-1006.548	(0.027)	156.5106	(0.803)
( $\delta_3$ )				
internal $\times$ tax $\times$ 2002	395.17	(0.475)	-2148.98	(0.007)
internal $\times$ tax $\times$ 2003	614.59	(0.214)	-1380.86	(0.062)
internal $\times$ tax $\times$ 2004	925.75	(0.053)	-1822.74	(0.014)
internal $\times$ tax $\times$ 2005	459.72	(0.350)	-780.70	(0.245)
internal $\times$ tax $\times$ 2006	976.73	(0.041)	-683.31	(0.299)
internal $\times$ tax $\times$ 2007	1607.25	(0.001)	-681.90	(0.309)
internal $\times$ tax $\times$ 2008	1753.65	(0.001)	-266.74	(0.720)
internal $\times$ tax $\times$ 2009	2020.54	(0.000)	-208.37	(0.785)
internal $\times$ tax $\times$ 2010	1158.74	(0.032)	359.49	(0.621)
( $\delta_1$ )				
internal $\times$ 2002	-159.16	(0.251)	466.29	(0.010)
internal $\times$ 2003	-99.77	(0.469)	500.22	(0.014)
internal $\times$ 2004	-129.30	(0.431)	852.28	(0.000)
internal $\times$ 2005	358.10	(0.054)	939.96	(0.000)
internal $\times$ 2006	441.43	(0.019)	672.22	(0.001)
internal $\times$ 2007	51.59	(0.769)	568.63	(0.004)
internal $\times$ 2008	-173.57	(0.456)	487.25	(0.009)
internal $\times$ 2009	-268.75	(0.414)	775.74	(0.000)
internal $\times$ 2010	-186.40	(0.557)	882.02	(0.000)
( $\delta_2$ )				
2002 $\times$ tax	-341.26	(0.519)	1691.08	(0.005)
2003 $\times$ tax	-733.57	(0.131)	852.42	(0.110)
2004 $\times$ tax	-1049.69	(0.025)	1605.57	(0.005)
2005 $\times$ tax	-863.10	(0.068)	1434.07	(0.002)
2006 $\times$ tax	-1271.97	(0.005)	1577.30	(0.000)
2007 $\times$ tax	-1383.26	(0.003)	1659.39	(0.001)
2008 $\times$ tax	-1351.03	(0.005)	1529.02	(0.002)
2009 $\times$ tax	-1643.97	(0.001)	1299.66	(0.006)
2010 $\times$ tax	-1189.93	(0.021)	816.41	(0.066)
( $\delta_0$ )				
2002	142.79	(0.245)	-461.08	(0.005)
2003	277.52	(0.025)	-345.60	(0.053)
2004	454.53	(0.002)	-603.24	(0.001)
2005	210.63	(0.119)	-594.96	(0.001)
2006	194.62	(0.184)	-619.59	(0.002)
2007	380.20	(0.042)	-496.07	(0.022)
2008	490.38	(0.050)	-328.91	(0.114)
2009	754.71	(0.013)	-338.03	(0.081)
2010	668.63	(0.029)	-185.05	(0.337)
Constant ( $\beta_0$ )	830.49	(0.004)	909.633	(0.002)
Observations	13,107		23,237	
F-Statistic	6.92	(0.000)	10.63	(0.000)

Note: The dependent variable is the transaction value in thousand euros. Coefficients from OLS estimations. The analysis period covers the years 2001 to 2010. The following control variables are included in each regression: MNE indicators, country indicators, quarterly foreign GDP, quarterly foreign GDP per capita. P-values are based on heteroscedasticity robust standard errors. Data source: Microdatabase Direct Investment (MiDi) and Microdatabase Statistics on International Trade in Services (SITS), Deutsche Bundesbank, 2001-2010, own calculations.

**Table A3**  
**Regression results: Advertising service imports**

	Advertising services	
	(1) Estimate	(2) p-value
internal ( $\beta_1$ )	132.27	(0.014)
tax ( $\beta_2$ )	-5.61	(0.925)
internal $\times$ tax ( $\beta_3$ )	312.73	(0.065)
( $\delta_3$ )		
internal $\times$ tax $\times$ 2002	-377.98	(0.051)
internal $\times$ tax $\times$ 2003	-489.86	(0.023)
internal $\times$ tax $\times$ 2004	-218.15	(0.235)
internal $\times$ tax $\times$ 2005	-327.21	(0.126)
internal $\times$ tax $\times$ 2006	-217.05	(0.324)
internal $\times$ tax $\times$ 2007	-101.36	(0.683)
internal $\times$ tax $\times$ 2008	-245.17	(0.307)
internal $\times$ tax $\times$ 2009	-138.87	(0.522)
internal $\times$ tax $\times$ 2010	-1075.97	(0.057)
( $\delta_1$ )		
internal $\times$ 2002	-74.77	(0.223)
internal $\times$ 2003	-87.19	(0.171)
internal $\times$ 2004	-83.57	(0.115)
internal $\times$ 2005	-6.40	(0.929)
internal $\times$ 2006	31.72	(0.670)
internal $\times$ 2007	43.36	(0.608)
internal $\times$ 2008	49.28	(0.567)
internal $\times$ 2009	35.53	(0.585)
internal $\times$ 2010	609.61	(0.235)
( $\delta_2$ )		
2002 $\times$ tax	-42.40	(0.491)
2003 $\times$ tax	-68.62	(0.244)
2004 $\times$ tax	-25.46	(0.668)
2005 $\times$ tax	-.743	(0.990)
2006 $\times$ tax	48.85	(0.440)
2007 $\times$ tax	1.63	(0.981)
2008 $\times$ tax	34.32	(0.626)
2009 $\times$ tax	-37.32	(0.589)
2010 $\times$ tax	-56.98	(0.512)
( $\delta_0$ )		
2002	6.68	(0.851)
2003	40.18	(0.247)
2004	40.42	(0.290)
2005	8.76	(0.829)
2006	.63	(0.989)
2007	36.08	(0.526)
2008	46.37	(0.438)
2009	129.44	(0.026)
2010	199.09	(0.017)
Constant ( $\beta_0$ )	101.39	(0.290)
Observations	41,187	
F-Statistic	10.54	(0.000)

Note: The dependent variable is the transaction value in thousand euros. Coefficients from OLS estimations. The analysis period covers the years 2001 to 2010. The following control variables are included in each regression: MNE indicators, country indicators, quarterly foreign GDP, quarterly foreign GDP per capita. P-values are based on heteroscedasticity robust standard errors. Data source: Microdatabase Direct Investment (MiDi) and Microdatabase Statistics on International Trade in Services (SITS), Deutsche Bundesbank, 2001-2010, own calculations.

## **C Descriptives**



**Table A4**  
**Descriptive statistics of transport service imports**

	internal					third party				
	Mean	Median	Standard error	Obs. transactions	Obs. MNEs	Mean	Median	Standard error	Obs. transactions	Obs. MNEs
2003										
Transaction value	375.84	51	1,519.70	3,846	271	543.81	42	3,055.91	8,554	464
Statutory tax rate on corporate income	0.331	0.34	0.042	3,846	271	0.320	0.340	0.054	8,554	464
2005										
Transaction value	506.50	49	2,378.91	3,677	239	664.14	45.78	3,651.33	8,096	418
Statutory tax rate on corporate income	0.309	0.315	0.058	3,677	239	0.294	0.30	0.063	8,096	418
2007										
Transaction value	667.45	68	3,153.58	4,454	257	672.51	49	3,510.11	9,284	430
Statutory tax rate on corporate income	0.301	0.30	0.055	4,454	257	0.280	0.255	0.060	9,284	430
2009										
Transaction value	485.29	69	2,005.10	3,970	229	317.81	53	1,346.20	7,613	406
Statutory tax rate on corporate income	0.288	0.28	0.048	3,970	229	0.278	0.263	0.052	7,613	406

Note: Transaction values are presented in in thousand euros. Data source: Microdatabase Direct Investment (MiDi) and Microdatabase Statistics on International Trade in Services (SITS), Deutsche Bundesbank, 2001-2010, own calculations.

**Table A5**  
**Descriptive statistics of R&D service imports**

	internal					third party				
	Mean	Median	Standard error	Obs. transactions	Obs. MNEs	Mean	Median	Standard error	Obs. transactions	Obs. MNEs
2003										
Transaction value	445.36	65.35	1,518.48	836	85	377.46	40	2,154.31	1,309	151
Statutory tax rate on corporate income	0.334	0.345	0.048	836	85	0.319	0.34	0.053	1,309	151
2005										
Transaction value	602.82	85.5	1,623.96	892	81	390.26	52.69	1,758.73	1,239	125
Statutory tax rate on corporate income	0.314	0.315	0.062	892	81	0.30	0.30	0.059	1,239	125
2007										
Transaction value	737.47	113.5	2,316.60	1,012	81	451.86	63	2,236.11	1,245	145
Statutory tax rate on corporate income	0.308	0.30	0.055	1,012	81	0.290	0.2932	0.061	1,245	145
2009										
Transaction value	1,071.98	103	3,813.83	855	77	548.29	100.36	1,504.13	1,161	135
Statutory tax rate on corporate income	0.29	0.280	0.049	855	77	0.278	0.280	0.055	1,161	135

Note: Transaction values are presented in in thousand euros. Data source: Microdatabase Direct Investment (MiDi) and Microdatabase Statistics on International Trade in Services (SITS), Deutsche Bundesbank, 2001-2010, own calculations.

**Table A6**  
**Descriptive statistics of IT service imports**

	internal					third party				
	Mean	Median	Standard error	Obs. transactions	Obs. MNEs	Mean	Median	Standard error	Obs. transactions	Obs. MNEs
2003										
Transaction value	437.60	44.29	2,159.27	877	126	495.68	31	2,531.38	1,589	251
Statutory tax rate on corporate income	0.317	0.34	0.052	877	126	0.302	0.34	0.075	1,589	251
2005										
Transaction value	569.56	50	2,871.14	930	122	468.48	31.96	2,734.17	1,500	258
Statutory tax rate on corporate income	0.291	0.30	0.062	930	122	0.271	0.30	0.077	1,500	258
2007										
Transaction value	453.93	67.99	1,378.92	1,185	125	521.21	42	3,114.69	1,819	278
Statutory tax rate on corporate income	0.283	0.293	0.056	1,185	125	0.263	0.28	0.074	1,819	278
2009										
Transaction value	734.63	87.57	3,124.21	1,198	121	455.89	47.48	2,473.32	1,710	267
Statutory tax rate on corporate income	0.278	0.280	0.052	1,198	121	0.262	0.263	0.069	1,710	267

Note: Transaction values are presented in in thousand euros. Data source: Microdatabase Direct Investment (MiDi) and Microdatabase Statistics on International Trade in Services (SITS), Deutsche Bundesbank, 2001-2010, own calculations.

**Table A7**  
**Descriptive statistics of royalty payments**

	internal					third party				
	Mean	Median	Standard error	Obs. transactions	Obs. MNEs	Mean	Median	Standard error	Obs. transactions	Obs. MNEs
2003										
Transaction value	89.70	14.72	279.06	615	75	424.28	7.64	279.06	983	144
Statutory tax rate on corporate income	0.297	0.3	0.067	615	75	0.298	0.30	0.066	983	144
2005										
Transaction value	352.86	11	2,369.67	687	78	352.92	20	1,664.43	966	163
Statutory tax rate on corporate income	0.288	0.30	0.065	687	78	0.280	0.30	0.067	966	163
2007										
Transaction value	481.27	30	2,045.36	563	74	292.81	26	1,527.29	762	149
Statutory tax rate on corporate income	0.235	0.25	0.096	563	74	0.250	0.28	0.083	762	149
2009										
Transaction value	782.62	76.72	2,445.74	470	57	468.37	46	2,302.30	757	163
Statutory tax rate on corporate income	0.196	0.20	0.085	470	57	0.188	0.214	0.090	757	163

Note: Transaction values are presented in in thousand euros. Data source: Microdatabase Direct Investment (MiDi) and Microdatabase Statistics on International Trade in Services (SITS), Deutsche Bundesbank, 2001-2010, own calculations.

**Table A8**  
**Descriptive statistics of advertising service imports**

	internal					third party				
	Mean	Median	Standard error	Obs. transactions	Obs. MNEs	Mean	Median	Standard error	Obs. transactions	Obs. MNEs
2003										
Transaction value	89.70	14.72	279.06	615	75	424.28	7.64	279.06	983	144
Statutory tax rate on corporate income	0.297	0.3	0.067	615	75	0.298	0.30	0.066	983	144
2005										
Transaction value	352.86	11	2,369.67	687	78	352.92	20	1,664.43	966	163
Statutory tax rate on corporate income	0.288	0.30	0.065	687	78	0.280	0.30	0.067	966	163
2007										
Transaction value	481.27	30	2,045.36	563	74	292.81	26	1,527.29	762	149
Statutory tax rate on corporate income	0.235	0.25	0.096	563	74	0.250	0.28	0.083	762	149
2009										
Transaction value	782.62	76.72	2,445.74	470	57	468.37	46	2,302.30	757	163
Statutory tax rate on corporate income	0.196	0.20	0.085	470	57	0.188	0.214	0.090	757	163

Note: Transaction values are presented in in thousand euros. Data source: Microdatabase Direct Investment (MiDi) and Microdatabase Statistics on International Trade in Services (SITS), Deutsche Bundesbank, 2001-2010, own calculations.

## **D Corporate tax rates**

**Table A9**  
**Statutory corporate tax rates**

	2003	2005	2007	2009
Austria	0.34	0.25	0.25	0.25
Belgium	0.3399	0.3399	0.3399	0.3399
Cyprus	0.15	0.10	0.10	0.10
Czech Republic	0.31	0.26	0.24	0.20
Denmark	0.30	0.28	0.25	0.25
Estonia	0.26	0.24	0.22	0.21
Finland	0.29	0.26	0.26	0.26
France	0.3542	0.3493	0.3443	0.3443
Greece	0.35	0.32	0.25	0.35
Hungary	0.1964	0.1771	0.2138	0.2144
Ireland	0.125	0.125	0.125	0.125
Italy	0.3825	0.3725	0.3725	0.3112
Latvia	0.19	0.15	0.15	0.15
Lithuania	0.15	0.15	0.18	0.20
Luxembourg	0.3038	0.3038	0.2932	0.2859
Malta	0.35	0.35	0.35	0.35
Netherlands	0.345	0.315	0.255	0.255
Poland	0.27	0.19	0.19	0.19
Portugal	0.30	0.25	0.265	0.265
Slovenia	0.25	0.25	0.23	0.21
Slovakia	0.25	0.19	0.19	0.19
Spain	0.403	0.403	0.3801	0.3574
Sweden	0.28	0.28	0.28	0.263
United Kingdom	0.30	0.28	0.28	0.28

Data source: Ernst and Young, Worldwide Corporate Tax Guides.

**Table A10**  
**Statutory corporate tax rates considering IP box regimes**

	2003	2005	2007	2009
Austria	0.34	0.25	0.25	0.25
Belgium*	0.3399	0.3399	<b>0.068</b>	<b>0.068</b>
Cyprus	0.15	0.10	0.10	0.10
Czech Republic	0.31	0.26	0.24	0.20
Denmark	0.30	0.28	0.25	0.25
Estonia	0.26	0.24	0.22	0.21
Finland	0.29	0.26	0.26	0.26
France*	<b>0.2019</b>	<b>0.1991</b>	<b>0.155</b>	<b>0.155</b>
Greece	0.35	0.32	0.25	0.35
Hungary*	0.1964	<b>0.08<sup>§</sup></b>	<b>0.08<sup>§</sup></b>	<b>0.08<sup>§</sup></b>
Ireland	0.125	0.125	0.125	0.125
Italy	0.3825	0.3725	0.3725	0.3112
Latvia	0.19	0.15	0.15	0.15
Lithuania	0.15	0.15	0.18	0.20
Luxembourg*	0.3038	0.3038	0.2932	<b>0.058<sup>§</sup></b>
Malta*	0.35	0.35	0.35	0.35
Netherlands*	0.345	0.315	<b>0.10<sup>§</sup></b>	<b>0.10<sup>§</sup></b>
Poland	0.27	0.19	0.19	0.19
Portugal	0.30	0.25	0.265	0.265
Slovenia	0.25	0.25	0.23	0.21
Slovakia	0.25	0.19	0.19	0.19
Spain*	0.403	0.403	<b>0.15</b>	<b>0.15</b>
Sweden	0.28	0.28	0.28	0.263
United Kingdom	0.30	0.28	0.28	0.28

Note: One asterisk marks countries that have an IP box regime with preferential tax rates on corporate royalty and licence income in at least one year between 2002 and 2010. Bold tax rates are the respective preferential rates. <sup>§</sup> marks cases in which the respective preferential rate also applies to income from software licences (Evers et al., 2015). Malta introduced an IP box regime in 2010 with a preferential rate of 0.00<sup>§</sup>. Data source: Ernst and Young, Worldwide Corporate Tax Guides.