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Do Transfer Pricing Laws Limit International Income Shifting? Evidence from European Multinationals

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Abstract

In recent years several countries have augmented their national tax laws by transfer pricing legislations which intend to limit the leeway of multinational firms to exploit international corporate tax rate differences and relocate profit to low-tax affiliates by distorting intra-firm transfer prices. The aim of this paper is to empirically investigate whether these laws are instrumental in restricting shifting behaviour. To do so, we exploit unique information on the scope and evolution of national transfer pricing laws and link it with panel data on European multinationals. In line with previous studies, we find evidence for tax-motivated profit shifting. The analysis further suggests that transfer pricing rules significantly reduce shifting activities. The effect is economically relevant, suggesting that the legislations may be socially desirable despite the high administrative burden they impose on firms and tax authorities.

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Keywords: corporate taxation, international profit shifting, transfer pricing laws.

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1 Introduction

The economic literature has provided compelling evidence that multinational entities (MNEs) strategically relocate income to low-tax affiliates in order to reduce their overall tax bill (see e.g. Hines (1999) and Devereux and Maffini (2007)). Recent studies moreover suggest that a major fraction of these shifting activities are related to the strategic distortion of prices for intra-firm trade, especially in MNEs with intangible property holdings (e.g. Clausing (2003), Grubert (2003)). To prevent profit outflows through the manipulation of transfer prices, several countries have recently augmented their tax laws by transfer pricing regulations. The scope and design of these legislations differ substantially. Some countries only loosely acknowledge that the price setting must adhere to the arm's length principle (i.e. intra-firm transfer prices must correspond to prices that would have been chosen by unrelated parties), while others require corporations to submit detailed documentation to the tax authorities in which they justify their corporate intra-firm prices and hence the profit distribution across affiliates. Detected mispricing behavior and the failure to provide adequate documentation moreover trigger non-negligible penalties in many countries. A major drawback of (the stricter versions of the) transfer pricing laws is that they entail considerable administrative costs for both, firms and tax authorities. Their welfare consequences thus largely depend on their effectiveness in limiting international income shifting activities.

Anecdotal evidence suggests that transfer pricing laws are rigorously applied. In a number of prominent cases, tax authorities in the US, Canada and the UK have challenged the transfer pricing of multinational companies like Astra Zeneca, Daimler Chrysler and Motorola seeking billions of additional tax revenues (see e.g. US Today (2004, 2006) and The Globe and Mail (2011)). In 2006, the US Internal Revenue Service (IRS) announced that it had settled a transfer pricing dispute with the pharmaceutical company GlaxoSmithKline under which GlaxoSmithKline payed \$3.4 billion, making it the largest tax dispute in IRS history (see New York Times (2006)). Nonsurprisingly, a large majority of MNEs thus perceive transfer pricing as "very important" or even consider it to be the "most important tax issue for their group" (Ernst and Young (2008)).[1] Systematic empirical studies which assess whether and to what extent transfer pricing legislations are effective in limiting international profit shifting behavior are to the best of our knowledge still missing though. The aim of our paper is to fill this gap. For that purpose, we collected detailed information on the scope and evolution of transfer pricing laws in 26 European countries (see also Lohse et al. (2012)) and merged the data with rich

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[1]The Ernst and Young survey suggests that 46%/76%/29% of MNEs headquartered in the US/Germany/UK consider transfer pricing to be more important than any other tax issue.

panel information on multinational firms and corporate tax legislations in Europe.

In a first step, we exploit the data to replicate existing evidence for multinational profit shifting behaviour. The avoidance nature of income shifting implies that MNEs try to hide related activities from the public and mispricing of intra-firm trade is not directly observable to researchers. We thus follow previous studies and indirectly test the shifting hypothesis by assessing whether corporate taxes reduce the reported operating pre-tax profitability of multinational affiliates. Methodologically, we rely on panel estimations that control for unobserved affiliate heterogeneity and for time-varying firm, industry and host-country characteristics. In line with previous work, we find a negative correlation between the host country's corporation tax and firms' pre-tax profitability. Quantitatively, an increase in the corporate tax rate by 10 percentage points reduces the corporate pre-tax profitability by around 3.9% on average, while the sensitivity, in absolute terms, declines over time.

Using these estimates as a starting point, we, in a second step, assess the relationship between tax-motivated income shifting and transfer pricing legislations. Our baseline analysis divides countries into three categories depending on the existence and scope of national transfer pricing laws: category 1 comprises countries without transfer pricing legislations or with very general anti-avoidance rules only; category 2 comprises countries in which transfer pricing regulations do exist in practice and where tax authorities may require some form of transfer price documentation; category 3 comprises countries in which documentation requirements are introduced into national tax law and imply that firms must provide transfer price documentation upon request or directly with the annual tax return. In robustness checks, we additionally exploit information on specific transfer price penalties.

Our empirical analysis suggests that transfer pricing legislations significantly reduce multinational income shifting as measured by the sensitivity of corporate pre-tax profits to changes in the corporate tax rate. Relative to countries without transfer pricing legislations, the implementation of transfer price documentation regimes is found to reduce profit shifting behaviour by around 50% on average, whereas stricter rules tend to induce stronger declines. On top, special transfer pricing penalties are found to exert a limiting effect on shifting behaviour. The qualitative and quantitative results are robust against a number of sensitivity checks.

We moreover augment our estimations by another characteristic feature of transfer pricing regimes which is the possibility to enter into advance pricing agreements (APA) where tax authorities and firms agree on future transfer prices for goods traded within the firm on an upfront basis. APAs thus mainly serve as a device to reduce corporate risk related to later transfer price adjustments. One may expect that MNEs are willing to give up after-tax profits to buy this type of insurance and accept more conservative transfer prices and, consequently, a reduction in tax

savings. While we find some evidence in line with this hypothesis, the pattern does not turn out to be stable across specifications.

Our paper contributes to several strands of the recent public finance literature. First, we add to the large and growing literature on international profit shifting. Similar to our approach, most papers provide indirect evidence on multinational shifting behaviour by identifying a negative effect of host country corporate taxes on the reported pre-tax profitability of affiliates (see e.g. Grubert and Mutti (1991), Hines and Rice (1994), Huizinga and Laeven (2008), and Weichenrieder (2009)). Some studies moreover assess the importance of individual income shifting channels. Clausing (2003) provides evidence in favor of tax-motivated transfer price distortions using data on intra-firm trade prices of US multinationals (see also Swenson (2001) and Bartelsman and Beetsma (2003) for related studies). Several papers moreover show that intangible assets play a prominent role in transfer pricing strategies as their firm-specific nature implies that arm's length prices from third-party trade are commonly unavailable (see e.g. Grubert (1998), Grubert (2003), and Dischinger and Riedel (2011)). Altshuler and Grubert (2003), Huizinga et al. (2008) and Buettner and Wamser (2013) moreover determine the effect of corporate taxation on the multinational's debt-equity structure providing evidence in favour of tax-motivated debt-shifting. Karkinsky and Riedel (2012) and Boehm et al. (2012) show that multinationals strategically locate high-value patents in low-tax countries.

While profit shifting strategies are in general well-documented, the literature is largely silent on the effectiveness of legislations which aim to limit international income shifting. Exceptions are Buettner et al. (2012) and Ruf and Weichenrieder (2012). Buettner et al. (2012) provide evidence that thin capitalization rules which restrict the deductibility of interest payments from the corporate tax base indeed limit multinational debt shifting behaviour. Similarly, Ruf and Weichenrieder (2012) report evidence that controlled foreign company regulations are effective in reducing the attractiveness of passive investments in low-tax jurisdictions. Our paper complements these studies by showing that transfer pricing legislations reduce the relocation of multinational income towards low-tax countries.

The rest of the paper is structured as follows: Section 2 presents a simple theoretical model to motivate the set up of the empirical analysis. Sections 3 and 4 describe our data and estimation strategy. Section 5 presents the results and Section 6 concludes.

2 A Simple Theoretical Model

Consider a representative multinational group with two affiliates in countries a and b that produce and sell an output s_i, with $i \in \{a, b\}$. Affiliate a additionally produces

an input good that is required for production by both affiliates and is sold to affiliate b at a transfer price q. For simplicity, the price of the final output good is normalized to 1 and we abstract from any costs related to the production of the goods. The affiliates' pre-tax profits thus read $\pi_a = s_a + q$ and $\pi_b = s_b - q$. Both countries levy tax rates on corporate earnings denoted by t_i, $i \in \{a, b\}$.

The MNE may shift income between the affiliates by choosing a transfer price q which deviates from the input's true value $\bar{q}$. Price distortions incur positive costs though as aggressive mispricing would, if challenged by the tax authorities, have a lower probability of being sustained by courts or may require more resources to defend successfully. Moreover, the structure of the costs plausibly depends on the countries' transfer pricing laws. The stricter the laws, the higher the probability that mispricing is challenged which increases the concealment costs. Formally, we choose a simple multiplicative formulation of the cost function: $C = \phi(\gamma_a, \gamma_b) \cdot K(q - \bar{q})$, where $K(q - \bar{q})$ is assumed to be u-shaped in q, with a minimum at $\bar{q}$: $K(q = \bar{q}) = 0$, sign $K_q = \text{sign}(q - \bar{q})$ and $K_{qq} > 0$ (see e.g. Haufler and Schjelderup (2000)). The function $\phi(\gamma_a, \gamma_b)$ captures how the scope of the countries' transfer pricing laws γ_i affects the level of transparency in price setting behaviour and the costs of profit shifting. We assume $\phi \geq 0$ and $\phi_{\gamma_i} \geq 0$, $i \in \{a, b\}$ (where ϕ_{γ_i} may differ across countries, see the discussion below).[2] The multiplicative structure implies that tighter transfer pricing legislations increase the MNE's absolute and marginal costs to engage in mispricing behaviour.[3]

The MNE maximizes its after-tax profit

$$\pi = (1 - t_a)(s_a + q) + (1 - t_b)(s_b - q) - C \tag{1}$$

by choosing the optimal transfer price q. The first order condition is given by

$$t_b - t_a = \phi K_q \tag{2}$$

The optimal transfer pricing choice is thus determined by international differences in corporate taxation. If $t_a > t_b$ ($t_a < t_b$), the MNE chooses a transfer price $q < \bar{q}$ ($q > \bar{q}$) and thus relocates income from high-tax country A (B) to low-tax country B (A) by underpricing (overpricing) the input good. Comparative statics read

$$\frac{dq}{dt_a} = -\frac{dq}{dt_b} = -\frac{1}{\phi K_{qq}}, \quad \frac{dq}{d\gamma_i} = -\frac{\phi_{\gamma_i} K_q}{\phi K_{qq}}, \quad \frac{d^2 q}{dt_a d\gamma_i} = -\frac{d^2 q}{dt_b d\gamma_i} = \frac{\phi_{\gamma_i}}{\phi^2 K_{qq}},$$

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[2](Double) subscripts denote first (second) derivatives with respect to the indicated variables.

[3]In practice, some of the types of costs noted above may be tax-deductible, while others are not. For simplicity, it is assumed here that C is non-deductible. The results are not fundamentally affected if the costs are deductible. However, taking account of deductibility adds considerable complexity, as it is not entirely obvious in which country the costs would be incurred, and there would be an incentive to shift these deductions from the low-tax to the high-tax country.

with $i \in \{a,b\}$. Transfer price distortions are thus reduced if the scope of a country's transfer pricing laws, as modelled by the parameter γ_i, rise. Formally, $\text{sign}(\frac{dq}{d\gamma_i}) = -\text{sign}K_q$, $\frac{dq}{dt_a} = -\frac{dq}{dt_b} < 0$ and $\frac{d^2q}{dt_a d\gamma_i} = -\frac{d^2q}{dt_b d\gamma_i} > 0$. As a side remark, note that ϕ_{γ_i} and hence the quantitative effect of transfer pricing laws on profit shifting behaviour may differ across countries. Precisely, while the high-tax country benefits from less income shifting, the low-tax country loses in pre-tax profits and tax revenues. Consequently, the latter has no incentive to implement transfer pricing legislations in first place and, even if it has implemented them, authorities will have no incentive to challenge tax-motivated mispricing behaviour. However, transfer price documentation required by the low-tax country may nevertheless increase transparency in price setting behaviour as the documentation results may have to be shared with authorities in the high-tax countries, e.g. in the course of court disputes. Consequently, it plausibly holds that $0 \leq \phi_{\gamma_i} < \phi_{\gamma_j}$, with $t_i < t_j$, $i, j \in \{a,b\}$, $i \neq j$.

As the price q impacts on the affiliates' pre-tax profits, it furthermore follows

$$\frac{d\pi_i}{dt_i} = -\frac{1}{\phi K_{qq}} < 0, \quad i, j \in \{a,b\} \tag{3}$$

$$\frac{d^2\pi_i}{dt_i d\gamma_i} = \frac{\phi_{\gamma_i}}{\phi^2 K_{qq}} > 0, \quad i, j \in \{a,b\} \tag{4}$$

Our empirical analysis will test the link between multinational profit shifting and the scope of transfer pricing legislations. As information on intra-firm transfer prices is unavailable in firm-level databases, we follow the previous literature and assess the profit shifting hypothesis by testing if the corporate tax rate reduces multinational pre-tax profits as spelled out in Equation (3). In line with Equation (4), we furthermore assess whether this sensitivity is reduced when the scope of transfer pricing legislations increases.

3 Data

Our empirical analysis links firm-level information on multinational affiliates in Europe with detailed data on the host countries' corporate taxation system.

Firm Data
The firm information is taken from Bureau van Dijk's AMADEUS database (version February 2011). The data comprises panel information on corporate balance sheets and profit & loss accounts for firms in 26 European countries between 1999 and 2009. The firms included in our analysis belong to multinational groups in the sense that either their parent company or one of their wholly owned subsidiaries is located in a foreign economy. The observational unit of the analysis is the multinational

affiliate per year. In total, our sample comprises 151,716 observations from 32,508 affiliates for the years 1999 to 2009. Hence, we observe each affiliate for 4.7 years on average. A country distribution of the affiliates is presented in Table 1.[4]

Corporate Tax Rates and Transfer Price Legislations

We furthermore augment our firm level data by information on statutory corporate tax rates and the scope and evolution of transfer pricing laws in our European sample countries. The corporate tax data was obtained from Ernst & Young's worldwide corporate tax guide. Information on transfer pricing regulations was collected from various sources, in particular from the transfer pricing guides published by Deloitte, Ernst & Young, KPMG, and PwC (see Lohse et al., 2012).

Transfer pricing regulations vary across countries and differ in a number of characteristics. One challenge of the analysis is thus to develop a quantitative measure for the scope and evolution of a country's transfer pricing laws. Our baseline analysis classifies countries in three categories.

The first category comprises countries without or with very limited transfer price legislations. During our sample period, most European countries had implemented the arm's length principle in their national tax law.[5] Especially in early years, legislations were often imprecise though and did not include further details on the applicability of the law, the determination of transfer prices, and the required transfer price documentation. As the legislations lacked the scope to restrict transfer pricing behaviour, we assign the according country-year-cells to the first category.

Categories 2 and 3 comprise countries in periods with more comprehensive transfer pricing regulations, especially concerning the required transfer price documentation which is the main regulatory instrument to increase the transparency of price choices and reduce corporate mispricing behavior. The second category comprises countries where formal transfer pricing legislations are still weak but transfer price documentation is nevertheless regularly required in practice in the case of formal audits by the tax authorities. Countries in the third category, in turn, explicitly introduced transfer price documentation requirements into their national tax law and specified that documentation must either be available upon request or has to be handed in directly with the firm's annual tax return.[6] See Table 2A for a categorisation of all country-year-cells in our data. The table conveys that transfer pricing regulations

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[4]The firm distribution broadly corresponds to the distribution of economic activity across our sample countries. As Bureau von Dijk collects data from different information sources, the precise sample coverage varies across countries though and thus some caution is warranted when drawing conclusions from our results for the population of firms.

[5]The arm's length principle requires prices for intracompany transactions to correspond to the price that would have been chosen by unrelated parties.

[6]Note that in most cases the burden of proof with respect to the appropriateness of a transfer price moreover switches from the tax authorities to the taxpayer if no or only insufficient documentation is provided.

have been introduced or tightened during our sample period in all European countries. While in 1999, the majority of countries is assigned to Categories 1 and 2, by 2009, the majority has moved up to Category 3.

Complementary to this measure, we define a variable for the country's enforcement of transfer pricing regulations. Besides penalties for the wrong determination of taxable income, regulations may include penalties for wrong, missing or incomplete transfer price documentation. Most countries apply general tax penalties to the mispricing of intra-firm trade (i.e. the underreporting of income). Some countries additionally introduced special transfer pricing penalties, mainly concerning non-compliance with transfer price documentation laws. General as well as specific transfer price legislations commonly offer a wide range of penalties, which depend on the particularity of the specific case, so that a quantification and concise comparison across countries is impossible to implement (see Lohse et al. (2012)). For the analysis to come, we thus revert to defining a dummy variable which indicates whether a country has implemented specific transfer pricing penalties. Specific penalties suggest that authorities pay particular attention to the transfer pricing sphere which is in turn expected to increase compliance with the transfer price (documentation) laws. See Table 2B for a classification of our sample countries.

The analysis furthermore exploits information on so-called advance pricing agreements (APAs). APAs allow tax payers and tax authorities to negotiate a transfer price for a certain transaction and pre-determined time period in advance. From the tax payer's perspective, any risk related to possible transfer price adjustments in later audits is thus eliminated. APAs can be structured as unilateral or bilateral agreement. A unilateral agreement is entered by the taxpayer and the national tax authority of the hosting country, while a bilateral agreement also includes the tax authority of the foreign country which is affected by the transaction. Bilateral agreements are thus much more favourable for taxpayers as transfer prices are approved by both affected countries. In the following, we define a dummy variable indicating whether the tax authorities in the firm's host country offer bilateral APAs. In 1999, none of our sample countries applied APAs. By 2009, ten countries had started offering bilateral APA procedures (see Table 2C for details).

Transfer price documentation rules commonly also specify methods for the calculation of arm's length prices for intrafirm trade. In most cases, the rules follow the OECD transfer pricing guidelines which allow various methods, e.g. the calculation of arm's length prices referring to prices, profit margins or profit splits of comparable uncontrolled transactions. As there is little variation in the allowed methods across countries and different methods do not systematically imply more or less leeway in the transfer pricing choice, the analysis to come will abstract from this aspect.[7]

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[7]The detection risk of transfer price distortions may also differ across asset types. For instance,

Finally note that, in line with our brief discussion in Section 2, the scope of a country's transfer price legislations tends to be correlated with its corporate tax rate. While, by the end of our sample period, many high-tax countries required transfer price documentation and charged specific transfer pricing penalties, tax haven economies like Ireland had not implemented according legislations.

Country Control Variables

We moreover augment our data by various other host country characteristics, including GDP as a proxy for the country's market size, GDP per capita as a proxy for a country's income and development level, the GDP growth rate and unemployment rate as a proxy for the state of a country's economy and the corruption index as a proxy for the state of a country's governance institutions. The corruption index is obtained from Transparency International. All other country data is retrieved from the World Development Indicator Database. See Table 3 for descriptive statistics.

4   Estimation Strategy

As described in Section 2, the aim of our analysis is to determine the impact of transfer pricing laws on multinational profit shifting behaviour. To test the hypotheses derived in Section 2, we estimate a model of the following form

$$\ln\ EBIT_{it} = \beta_0 + \beta_1\tau_{it} + \beta_2(\tau_{it} \cdot TP_{it}) + \beta_3 TP_{it} + \beta_4 X_{it} + \rho_t + \phi_i + \epsilon_{it} \qquad (5)$$

where $\ln\ EBIT_{it}$ stands for the natural logarithm of earnings before interest and tax of affiliate i at time t. We thus follow earlier research (e.g. Huizinga and Laeven, 2008) and limit the sample to affiliates with positive operating pre-tax profits, for which profit-shifting incentives are most likely to be relevant. As sketched in Section 2, we test for profit shifting behaviour by assessing the hypothesis that the host country's corporate tax rate τ_{it} exerts a negative impact on the affiliate's reported profits as measured by EBIT (see Equation (3) in Section 2).[8] The theoretical model further predicts that this sensitivity is reduced when the affiliate's host country introduces or tightens transfer pricing legislations TP_{it} (see Equation (4) in Section 2). The model accounts for this by including an interaction term between the corporate tax rate τ_{it} and the scope of the country's transfer pricing laws TP_{it}. We expect $\beta_1 < 0$ and $\beta_2 > 0$. The ratio between the absolute coefficients ($0 \leq \beta_2/|\beta_1| \leq 1$) provides an indicator for the fraction of income shifting activities which

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transfer prices for firm-specific intangible assets are more difficult to assess and offer a greater scope for manipulation than tangible assets. This difference, however, is not specific to any particular country and is consequently not reflected in the construction of our transfer pricing variables.

[8] We furthermore run robustness checks which replace the tax regressor by the corporate tax rate difference to other affiliates in the same multinational group (see Section 5 for details).

is eliminated by the introduction or tightening of transfer pricing legislations.

We furthermore expect a negative or zero coefficient estimate β_3 for the transfer pricing variable TP_{it} which captures the effect of stricter transfer price legislations on EBIT in countries with a zero corporate tax rate. As tax havens are at the receiving end of profit shifting activities, the introduction or tightening of transfer price documentation requirements is presumed to (weakly) reduce inward shifting and reported EBIT (see our discussion in Section 2).[9]

The estimation model moreover includes a full set of affiliate fixed effects to absorb time-constant unobserved heterogeneity across entities. We further augment the set of regressors by time-varying control variables X_{it}, comprising firm characteristics (the fixed asset stock and the costs for employees of affiliate i at time t) as well as host country controls (GDP, GDP per capita, the GDP growth rate, the unemployment rate and the TPI corruption index in the affiliate's host country). All specifications furthermore include a full set of one-digit industry-year fixed effects which absorb common shocks to all affiliates within the same industry over time.

5 Results

The baseline results are presented in Table 4. Heteroscedasticity robust standard errors which account for clustering at the firm level (column (a)), the country-year level (column (b)) and the industry level (column (c)) are reported in parentheses below the coefficient estimates.[10] In Specification (1), we regress the logarithm of EBIT on the statutory corporate tax rate and the full set of control variables specified in Section 4. In line with previous studies, we find a negative coefficient estimate for the corporate tax variable, providing indirect evidence for multinational profit shifting. The coefficient estimate remains statistically significant at conventional significance levels when standard errors are adjusted for clustering at the firm or industry level. Quantitatively, the results suggest that an increase of the corporate tax rate by 10 percentage points decreases reported pre-tax profits by 3.94%. Specification (2) augments the set of regressors by an interaction term between the host country's corporate tax and a linear time trend, thus allowing the scope of profit shifting activities to change over time. The coefficient estimates for the corporate tax variable and the interaction term turn out significantly negative and positive respectively. The latter indicates that the sensitivity of operating profits to corporate

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[9]In specifications where τ_{it} is modelled by the corporate tax rate difference to other affiliates within the same multinational group (see footnote 8), the coefficient estimate β_3 is expected to be weakly negative (positive) if affiliates whose host country corporate tax rate corresponds to the average corporate tax rate of other affiliates within the multinational group are at the receiving (sending) end of tax-motivated income shifting strategies.

[10]As our sample comprises 26 countries only, there are not enough clusters for reliable inference when standard errors are adjusted for clusters at the country level.

tax rates decreased by 0.18 annually during our sample period.

Specification (3) additionally accounts for transfer pricing legislations in the affiliates' host countries by including a dummy variable which indicates whether a country requires some form of transfer price documentation (corresponding to Categories 2 and 3 defined in Section 3) and its interaction with the corporate tax rate. The coefficient estimate for the interaction term between the corporate tax rate and the transfer price documentation dummy turns out positive and statistically significant, suggesting that documentation rules are instrumental in limiting income shifting activities. Evaluated at the tax elasticity for 1999, the results imply that shifting activities are reduced by around 50% (= $1.709/(-3.425)$). As expected, the coefficient estimate for the transfer pricing variable is negative, indicating that implementing transfer price documentation rules in countries with a zero tax rate reduces inward shifting and operating profits.[11] All results are robust to adjusting standard errors for clusters at the firm, industry or country-year level.

Specification (1) of Table 5 reassesses the relationship between transfer pricing laws and profit shifting behaviour by modelling the scope of a country's transfer pricing legislations by the three categories described in Section 3.[12] The results resemble our baseline findings. Again, operating profits are found to respond negatively to corporate tax incentives and the sensitivity is significantly reduced by documentation requirements. Specification (2) models the transfer price system by including separate indicators for Categories 2 and 3 and their interactions with the corporate tax variable. In line with the previous estimates, we find that, evaluated at the tax sensitivity of operating profits in 1999, moving from Category 1 to Category 2 (Category 1 to Category 3) reduces profit shifting by around 61% (= $1.789/(-2.942)$) (85% (= $2.494/(-2.942)$)). Specifications (4) to (6) reestimate the models employing EBIT over total assets as corporate profitability measure which leaves the pattern of the results unaltered, although the quantitative effects turn out somewhat smaller. Specification (6) suggests that moving from Category 1 to Category 2 (Category 1 to Category 3) limits income shifting by 35% (53%). Moreover, in line with the considerations of Section 2, the introduction and tightening of transfer price legislations significantly reduces the operating profitability of low-tax affiliates. If Ireland, which was the sample country with the lowest corporate tax rate during our sample period (=10%), had introduced transfer price documentation requirements of Category 2

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[11]Note that the control variables show the expected signs. Fixed asset investment and the sum of the costs of employees exert a positive impact on reported EBIT. The coefficient estimate for GDP per capita is equally positive, indicating that profits increase with general economic development. A positive (negative) coefficient estimate for the GDP growth (unemployment) variable points to procyclicality of profits over the business cycle. The negative coefficient estimate for the GDP variable may suggest that competition is more intense in larger markets which drives down profits.

[12]Precisely, we define a variable which takes on the values 1,2,3 for country-year cells in Categories 1,2,3 defined in Section 3.

or 3, the model predicts that the operating profitability of Irish affiliates would have been reduced by $10.5\%(= -0.23 + 0.10 \cdot 1.25)$ and 28.3% $(= -0.47 + 0.10 \cdot 1.89)$ respectively (see Specification (6)).[13]

The baseline specification employs EBIT - and thus operating profits - as the corporate profitability measure. This reflects that transfer price distortions for goods and services traded within the group first and foremost affect a company's operating income. However, financial profits may also be affected by transfer pricing regulations as they require interest rates for intra-group lending to be set according to the arm's length principle. We thus rerun our baseline model using corporate pre-tax profits as the dependent variable which comprises operating and financial income. The results are presented in Table 6. Specifications (1) to (3) ((4) to (6)) use pre-tax profits (pre-tax profits over total assets) as the dependent variable. We find a strong negative effect of corporate taxes on pre-tax profits (comparable in size to the baseline specifications), which indicates that MNEs relocate financial (and operating) income in response to international tax rate differentials. There are two channels through which financial income can be shifted: first, MNEs may distort the affiliates' debt-equity structure by injecting equity into low-tax affiliates which then lend to high-tax affiliates and thus strip the associated interest income from the high-tax economy; second, MNEs may distort interest rates on intra-group lending activities as mentioned above. Transfer price documentation requirements may impose restrictions on the second channel, but are not instrumental in capping distortions of the debt-equity structure.[14] Arm's length prices for financial transactions are moreover readily available in many instances, implying that shifting opportunities are limited even in the absence of documentation requirements. Taken together, we expect transfer price legislations to be less effective in curtailing the shifting of financial income relative to operating income. This is confirmed by the estimation analysis. The negative effect of transfer pricing legislations on profit shifting behavior is smaller than in the baseline specifications. Column (3) suggests that, evaluated at the tax sensitivity of 1999, moving from a transfer price regime of Category 1 to Category 2 (Category 3) reduces the profit sensitivity to corporate tax rate changes by around 38% (63%). Using pre-tax profits over total assets as dependent variable, Column (6) reports that the profit sensitivity to corporate tax rate choices shrinks by 19% (39%).

As described in Section 3, we furthermore augment our data by information on bilateral APAs which eliminate the firms' risk for later transfer price adjustments in

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[13]In line with the notion that low-tax countries lack incentives to implement transfer price documentation requirements, Ireland's transfer pricing policy corresponds to Category 1 throughout the sample period though (see Section 3).

[14]Several countries have enacted so-called thin-capitalisation rules to limit distortions in affiliates' debt-equity structures. See our discussion below.

the course of tax audits. Multinational corporations might thus be willing to give up after-tax income to buy this type of insurance and agree on less aggressive transfer prices. In the context of our estimation model this implies that the possibility to enter into bilateral APAs is expected to reduce the sensitivity of reported operating profits to corporate tax rate changes. To assess this hypothesis, we augment our baseline model by an indicator variable whether a firm's host country offers bilateral APA procedures and an interaction term between the APA variable and the corporate tax rate. The results can be found in Table 7. In line with the above presumption, we find a positive coefficient estimate for the interaction between APAs and the corporation tax in the baseline specification in Column (1). The estimate does not turn out to be robust against using alternative corporate profitability measures and alternative definitions of the transfer price documentation variable though (see specifications (2) to (4)), suggesting that APAs do no induce a systematic reduction in tax-motivated price distortions. Note that the negative effect of transfer price documentation laws on profit shifting behaviour prevails in all model specifications.

So far, our empirical analysis followed the theoretical predictions of Equations (3) and (4) and assessed multinational profit shifting behaviour by testing for a negative effect of the host country's corporate tax *rate* on affiliate pre-tax profitability. Theory suggests that the affiliates' pre-tax profitability is also determined by corporate taxes at other group affiliates, more precisely, by the corporate tax rate *difference* between the entities ($\frac{d\pi_i}{d(t_i-t_j)} = -\frac{1}{\phi K_{qq}} < 0$, $\frac{d^2\pi_i}{d(t_i-t_j)d\gamma} = \frac{\phi_{\gamma_i}}{\phi^2 K_{qq}} > 0$, $i,j \in \{a,b\}, i \neq j$). We thus reassess the profit shifting hypothesis by testing for a negative effect of the affiliates' corporate tax rate difference to all other majority-owned entities within the multinational group (calculated as an unweighted average[15]) on reported operating profitability. The results are shown in Table 8. Specification (1) reestimates the baseline model in Column (3) of Table 4. In line with expectations, we find a negative and statistically significant coefficient estimate for the tax difference variable. The coefficient estimate for the interaction between the corporate tax rate and the transfer price documentation dummy turns out positive and statistically significant, again suggesting that the income shifting effect is significantly reduced by the introduction of transfer price documentation rules. Quantitatively, the findings imply a decline by around 74%.[16] This pattern prevails when we model transfer price

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[15]For subsidiaries, the group structure was determined by identifying the global ultimate owner and all its majority-owned subsidiaries. If information on the global ultimate owner was not available, the immediate shareholder was used. If the immediate shareholder was also not available, we restricted the view to the majority-owned subsidiaries of the firm itself. For parent firms, the group structure was determined by accounting for all majority-owned subsidiary firms. Further note that we refrain from calculating size-weighted average corporate tax rates, as AMADEUS comprises subsidiary lists on a worldwide basis but often does not report reliable size information for affiliates outside Europe.

[16]Note that the coefficient for the transfer pricing variable turns out positive (while it was negative in the baseline model), reflecting that the introduction of transfer pricing legislations

legislations by including dummy variables for transfer pricing regimes of Categories 2 and 3 in Specification (2) and augment the specification by information on APAs and their interaction term with the corporate tax rate in Specification (3). Again, APAs are not found to significantly affect shifting behavior. The results are further confirmed when we reestimate the specifications, employing EBIT over total assets as the dependent variable (see Specifications (4) to (6)). Quantitatively, Specification (6) suggests that implementing transfer price documentation rules into national tax law (Category 3) reduces shifting activities by 76% relative to scenarios without documentation requirements (Category 1).

Moreover, we augmented the baseline information on the existence and scope of a country's transfer price documentation requirements by data for specific penalties related to the transfer pricing sphere. As described above, the latter may indicate a particular attention and commitment of a country's authorities to punish mispricing behavior and may thus additionally deter profit shifting activities. Specifications (1) and (2) of Table 9 reestimate the baseline model using EBIT and EBIT over total assets as dependent variable and augment the set of regressors by a dummy variable for the existence of specific transfer price penalties and its interaction with the corporate tax variable. While the baseline findings are confirmed in the sense that transfer price documentation requirements reduce the tax sensitivity of operating profits, we also find a positive and significant coefficient estimate for the interaction between the corporate tax rate and the penalty variable, indicating that beyond effects related to transfer price documentation rules, the introduction of specific transfer pricing penalties is instrumental in reducing shifting behavior. Quantitatively, the model in Column (2) suggests that implementing transfer price documentation laws reduces shifting behaviour by around 62%, while implementing special transfer pricing penalties leads to a reduction in shifting behaviour by another 14%.[17] Specification (3) shows that the result is robust to modelling the transfer price legislations by the three categories defined in Section 3. Specifications (4) and (5) furthermore reestimate the models in Columns (2) and (3) using the tax difference measure instead of the statutory tax rate as the corporate tax variable. Again, the pattern of the results remains unaltered.

One may still have concerns that our results (partly) reflect effects related to anti-profit shifting measures other than transfer price legislations. In particular, countries may simultaneously enact or tighten several anti-shifting policies, in particular thin-capitalisation rules and controlled foreign company legislations (CFC). Debt-shifting and thin-capitalisation rules, however, affect affiliates' financial profits

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exerts a positive impact on reported EBIT for affiliates whose host country corporate tax is equal to the *average* corporate tax rate of other affiliates in the multinational group.

[17]The coefficient estimate for the penalty variable is negative, indicating that the introduction of transfer price penalties reduces shifting towards countries with a zero corporate tax rate.

only, while our baseline analysis employs EBIT as the dependent variable and thus tests for variation in the affiliates' *operating* income in response to changes in transfer price documentation requirements (which excludes financial income). Even if the introduction and scope of thin-capitalisation rules and transfer pricing legislations were correlated, the results would thus not be confounded. Moreover, CFC legislations reduce income relocations from the group's headquarters country by means of passive investments in low-tax countries. One major source of passive income are lending activities that earn interest income in low-tax affiliates. As our baseline analysis abstracts from financial income, effects related to such activities can again not confound the results. Another source of passive income which affects the operating profit measure though are royalty and license fees from intangible property holdings. We thus reestimate our model, controlling for CFC legislations by including a dummy variable indicating whether an affiliate is affected by CFC legislations and the interaction term of this variable with the host country's corporate tax rate.[18] The results are presented in Table 10 and qualitatively and quantitatively resemble our baseline findings.

Concluding, our analysis presents evidence that transfer price documentation requirements and special transfer pricing penalties are instrumental in reducing international profit shifting behaviour. The effect turns out to be quantitatively relevant, suggesting that income shifting activities are reduced by around 50%, with stricter legislations inducing stronger declines. A concise cost-benefit analysis of the policy goes beyond the scope of our paper as it required detailed information on compliance costs of multinational corporations related to transfer price documentation and resource costs of transfer pricing departments in national tax authorities. Both informations are, to the best of our knowledge, not publicly available. Moreover, in evaluating the welfare consequences of transfer price documentation policies, one has to keep in mind that the welfare effects of multinational profit shifting behaviour are still debated in the academic literature. While many papers stress the adverse consequences of shifting activities related to revenue losses in high-tax countries and detrimental international tax competition between governments for the mobile tax base, a number of recent studies also claim that the ability to relocate income may foster real investment activity of MNEs in high-tax countries and increase welfare (see e.g. Hong and Smart (2010)).

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[18]The dummy is coded 1 if the considered firm is the parent of a multinational group (or a subsidiary located in the parent country) and CFC legislations are enacted in its home country or if the considered firm is a subsidiary of a multinational group whose parent country has enacted CFC legislations which are binding with respect to the subsidiary's host country (i.e. the subsidiary's host country is considered to be a tax haven by the home country's CFC legislations).

6 Summary and Conclusion

The aim of this paper was to assess the impact of transfer price documentation laws on international profit shifting behaviour. Profit shifting activities related to the mispricing of intra-firm trade have been well documented in the academic literature and are widely perceived to belong to the most important strategies which allow multinational firms to relocate income to low-tax affiliates (see e.g. Clausing (2003)). In many countries, policy makers have raised increasing concerns about the implied corporate tax base losses (see e.g. Heinemann and Janeba (2011)) and implemented transfer pricing documentation requirements in their national tax laws with the purpose to increase transparency in price setting behaviour and reduce the scope for tax favourable transfer price distortions.

To the best of our knowledge, our paper is the first to empirically assess whether these rules are instrumental in reducing multinational income shifting behaviour. For that purpose, we collected information on transfer price legislations in 26 European countries over the past decade and linked it with panel data on multinational firms in Europe. Our findings suggest that multinational profit shifting activities are significantly reduced when countries introduce or tighten transfer price documentation requirements. Depending on the model specification, the results indicate a reduction by around 50%, with stricter rules inducing stronger declines in shifting behavior. Specific transfer pricing penalties exert an additional dampening effect on income shifting behaviour. The strong decline in tax-motivated international profit shifting activities suggest that transfer pricing laws may exert positive welfare effects despite the high administrative burden they impose on firms and tax authorities. A thorough welfare analysis is a fruitful avenue for future research.

7 References

Altshuler, Rosanne and Harry Grubert (2003), Taxes, repatriation strategies and multinational financial policy, Journal of Public Economics 87, pp. 73-107

Bartelsman, Eric J. and Roel M.W.J. Beetsma (2003), Why pay more? Corporate tax avoidance through transfer pricing in OECD countries, Journal of Public Economics 2003, pp. 2225-2252

Boehm, T., T. Karkinsky and N. Riedel (2012), The Impact of Corporate Taxes on R&D and Patent Holdings, Paper Presented at the NBER TAPES Conference, University of Oxford, 2012. ,

Buettner, Thiess, Michael Overesch, Ulrich Schreiber, and Georg Wamser (2012), The Impact of Thin-Capitalization Rules on the Capital Structure of Multinational Firms, Journal of Public Economics, 96, pp. 930-938.

Buettner, Thiess and Georg Wamser (2013), Internal Debt and Multinationals' Profit Shifting Empirical Evidence from Firm-Level Panel Data, National Tax Journal 66, pp. 63-95.

Clausing, Kimberley A. (2003), Tax-motivated transfer pricing and US intrafirm trade prices, Journal of Public Economics 87, pp. 2207-2223

Devereux, Michael P. and Giorgia Maffini (2007), The Impact of Taxation on the Location of Capital, Firms and Profit: A Survey of Empirical Evidence, Oxford University Centre for Business Taxation, WP 07/02

Dischinger, Matthias and Nadine Riedel (2011), Corporate taxes and the location of intangible assets within multinational firms, Journal of Public Economics 95, pp. 691-707

Ernst & Young (2008), Precision under Pressure - Global Transfer Pricing Survey 2007/2008, Ernst & Young Limited.

Grubert, Harry (1998), Taxes and the division of foreign operating income among royalties, interest, dividends and retained earnings, Journal of Public Economics 68, pp. 269-290

Grubert, Harry (2003), Intangible income, intercompany transactions, income shifting, and the choice of location, National Tax Journal 56, pp. 221-242

Grubert, Harry and John Mutti (1991), Taxes, Tariffs and Transfer Pricing in Multinational Corporate Decision Making, The Review of Economics and Statistics 17, pp. 285-293

Haufler, Andreas and Guttorm Schjelderup (2000), Corporate tax systems and cross country profit shifting, Oxford Economic Papers 52, pp. 306-325

Heinemann, F. und E. Janeba (2011), Viewing Tax Policy Through Party-Colored Glasses: What German Politicians Believe, German Economic Review 12, pp. 286-311.

Hines, James R. (1999), Lessons from Behavioral Responses to International Taxation, National Tax Journal 52, pp. 305-322

Hines, James R. and Eric M. Rice (1994), Fiscal paradise: foreign tax havens and American business, Quarterly Journal of Economics 109, pp. 149-182

Hong, Q. and M. Smart (2010), In praise of tax havens: International tax planning and foreign direct investment, European Economic Review 54(1), pp. 8295.

Huizinga, Harry and Luc Laeven (2008), International profit shifting within multinationals: A multi-country perspective, Journal of Public Economics 92, pp. 1164-1182

Huizinga, Harry, Luc Laeven, and Gaetan Nicodeme (2008), Capital structure and international debt shifting, Journal of Financial Economics 88, pp. 80-118

Karkinsky, T. and N. Riedel (2012), Corporate Taxation and the Location of Patents within Multinational Firms, 2012, Journal of International Economics, 88(1), pp. 176185.

Lohse, Theresa, Nadine Riedel, and Christoph Spengel (2012), The Increasing Importance of Transfer Pricing Regulations ? a Worldwide Overview, Oxford University Centre for Business Taxation Working Paper 12/27.

Ruf, Martin and Alfons Weichenrieder (2012), The Taxation of Passive Foreign Investment: Lessons from German Experience, Canadian Journal of Economics, forthcoming.

Swenson, Deborah (2001), Tax Reforms and Evidence of Transfer Pricing, National Tax Journal 54, pp. 7-25

The New York Times (2011), Astra Zeneca to Settle Tax Issues for $1.1 Billion, The New York Times, 3/28/2011.

The Globe and Mail (2011), Daimler pays $1.5-billion to end tax fight, The Globe and Mail, 2/28/2011.

US Today (2006), Glaxo to Pay $3.4B to Settle Biggest Tax Dispute in History, US Today, 9/11/2006.

US Today (2004), IRS Seeks Extra $500M in Taxes from Motorola, US Today, 8/11/2004.

Weichenrieder, Alfons (2009), Profit shifting in the EU: evidence from Germany, International Tax and Public Finance 16, pp. 281-297

8 Appendix

Table 1: Country Statistics	
Country	**Firm Number**
Austria	300
Belgium	2,187
Bulgaria	633
Croatia	365
Czech Republic	551
Denmark	1,771
Estonia	282
Finland	544
France	3,001
Germany	1,510
Hungary	34
Ireland	33
Italy	2,348
Latvia	8
Luxembourg	18
Netherlands	2,196
Norway	1,101
Poland	934
Portugal	337
Romania	4,735
Slovak Republic	78
Spain	2,803
Sweden	2,127
Switzerland	136
Ukraine	133
United Kingdom	4,343
Sum	**32,508**

Table 2A: Transfer Price Documentation Requirements											
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Austria	.	.	2	2	2	2	2	2	2	2	2
Belgium	2	2	2	2	2	2	2	2	2	2	2
Bulgaria	1	1	1	1	1	1	1	1	.	.	2
Croatia	1	1	1	1	1	1	.	.	.	.	3
Czech Republic	.	.	2	2	2	2	2	2	2	2	2
Denmark	.	.	3	3	3	3	3	3	3	3	3
Estonia	.	.	.	.	.	.	.	.	3	3	3
Finland	.	.	.	.	2	2	2	2	3	3	3
France	.	.	2	2	2	2	2	2	2	2	2
Germany	.	.	2	2	3	3	3	3	3	3	3
Hungary	.	.	2	2	3	3	3	3	3	3	3
Ireland	1	1	1	1	1	1	1	1	1	1	1
Italy	.	.	2	2	2	2	2	2	2	2	2
Latvia	.	.	.	.	.	.	.	.	2	2	2
Luxembourg	.	.	.	.	.	.	2	2	2	2	2
Netherlands	1	1	1	3	3	3	3	3	3	3	3
Norway	.	.	.	.	.	2	2	2	2	3	3
Poland	.	.	3	3	3	3	3	3	3	3	3
Portugal	1	1	1	3	3	3	3	3	3	3	3
Romania	.	.	.	.	2	2	2	2	3	3	3
Slovak Republic	.	.	.	.	.	.	2	2	2	2	3
Spain	.	.	2	2	2	2	2	2	3	3	3
Sweden	.	.	2	2	2	2	2	2	3	3	3
Switzerland	.	.	2	2	2	2	2	2	2	2	2
Ukraine	1	1	1	1	1	1	1	1	1	1	1
United Kingdom	3	3	3	3	3	3	3	3	3	3	3

Notes: The table indicates the existence and scope of national transfer price documentation requirements. Category 1 comprises countries without or with very limited transfer price legislations. Category 2 indicates countries where formal transfer pricing legislations are still weak but transfer price documentation is nevertheless regularly required in practice. Category 3 comprises countries which explicitly introduced transfer price documentation requirements into their national tax law and specified that documentation must either be available upon request or has to be handed in directly with the firm's annual tax return. '.' indicates that we were unable to obtain concise information on the transfer price documentation requirements.

Table 2B: Specific Transfer Pricing Penalties									
1 height	2001	2002	2003	2004	2005	2006	2007	2008	2009
Austria	0	0	0	0	0	0	0	0	0
Belgium	0	0	0	0	0	0	0	0	0
Czech Republic	0	0	0	0	0	0	0	0	0
Denmark	0	0	0	0	0	1	1	1	1
Finland	0	0	0	0	0	0	0	0	0
France	1	1	1	1	1	1	1	1	1
Germany	0	0	0	1	1	1	1	1	1
Hungary	0	0	0	0	0	0	0	0	0
Ireland	0	0	0	0	0	0	0	0	0
Italy	0	0	0	0	0	0	0	0	0
Luxembourg	0	0	0	0	0	0	0	0	0
Netherlands	0	0	0	0	0	0	0	0	0
Norway	0	0	0	0	0	0	0	0	0
Poland	0	0	0	0	0	0	0	0	0
Portugal	0	0	0	0	0	0	0	0	0
Romania	0	0	0	0	0	0	0	1	1
Slovak Republic	0	0	0	0	0	0	0	0	0
Spain	0	0	0	0	0	0	0	0	1
Sweden	0	0	0	0	0	0	0	0	0
Switzerland	0	0	0	0	0	0	0	0	0
Ukraine	0	0	0	0	0	0	0	0	0
United Kingdom	0	0	0	0	0	0	0	0	0

Notes: The table indicates whether a country does (= 1) or does not (= 0) levy specific penalties related to the transfer pricing sphere.

Table 2C: Possibility to enter into a bilateral advance pricing agreement											
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Austria	0	0	0	0	0	0	0	0	0	0	0
Belgium	0	0	0	0	0	0	0	0	0	0	0
Bulgaria	0	0	0	0	0	0	0	0	0	0	0
Croatia	0	0	0	0	0	0	0	0	0	0	0
Czech Republic	0	0	0	0	0	0	0	0	0	0	0
Denmark	.	.	.	1	1	1	1	1	1	1	1
Estonia	0	0	0	0	0	0	0	0	0	0	0
Finland	0	0	0	0	0	0	0	0	0	0	0
France	.	.	1	1	1	1	1	1	1	1	1
Germany	0	0	0	0	0	0	0	1	1	1	1
Hungary	0	0	0	0	0	0	0	0	1	1	1
Ireland	0	0	0	0	0	0	0	0	0	0	0
Italy	0	0	0	0	0	0	0	0	0	0	0
Latvia	0	0	0	0	0	0	0	0	0	0	0
Luxembourg	0	0	0	0	0	0	0	0	0	0	0
Netherlands	0	0	1	1	1	1	1	1	1	1	1
Norway	0	0	0	0	0	0	0	0	0	0	0
Poland	0	0	0	0	0	0	0	1	1	1	1
Portugal	0	0	0	0	0	0	0	0	0	0	1
Romania	0	0	0	0	0	0	0	0	1	1	1
Slovak Republic	0	0	0	0	0	0	0	0	0	0	0
Spain	.	.	1	1	1	1	1	1	1	1	1
Sweden	0	0	0	0	0	0	0	0	0	0	0
Switzerland	.	.	.	.	.	.	.	.	.	.	.
Ukraine	0	0	0	0	0	0	0	0	0	0	0
United Kingdom	.	.	1	1	1	1	1	1	1	1	1

Notes: The table indicates whether a country's tax authorities do (= 1) or do not (= 0) offer bilateral advanced pricing agreements. '.' indicates that we were unable to obtain concise information.

Table 3: Descriptive Statistics					
Variable	*Obs*	*Mean*	*Std.Dev.*	*Min*	*Max*
Earnings Before Interest and Taxes (EBIT)★	150,214	17,086.5	255,592.8	0.0011	3.54e+07
Pre-tax Profits★	151,716	21,565.42	272,660	0.0004	3.45e+07
Earnings Before Interest and Taxes over Total Assets★	150,214	0.1277	0.2075	1.41e-06	22.9051
Pre-tax Profits over Total Assets★	151,716	0.1380	2.0007	1.62e-06	764.946
Fixed Assets★	151,716	181,206.8	2,207,504	0.0014	2.36e+08
Costs of Employees★	151,716	27,373.47	222,174.1	0.0003	2.26e+07
Corporate Tax Rate	151,716	0.3019	0.0627	0.1	0.4025
Tax Differential▼	87,152	0.0097	0.0626	-0.303	0.314
TP Legislation Binary	151,716	0.9596	0.1970	0	1
TP Legislation Continuous	151,716	2.3863	0.5639	1	3
Category 1	151,716	0.0404	0.1970	0	1
Category 2	151,716	0.5329	0.4989	0	1
Category 3	151,716	0.4267	0.4946	0	1
APA	146,321	0.5243	0.4994	0	1
GDP per Capita▲	151,716	20,688.4	9,660.09	594	56,600
GDP▲	151,716	7.40e+11	6.42e+11	8.19e+09	2.1e+12
GDP growth rate□	151,716	2.1978	3.0162	-18	12.1
Corruption Index■	151,716	6.9147	1.9872	1.5	9.7
Unemployment♦	151,716	7.3699	2.9651	2.1	20.5

Notes:

Firm data is exported from the AMADEUS database offered by Bureau van Dijk, version: February 2011. 'TP Legislation Binary' describes an indicator variable for the existence of transfer pricing legislation in the affiliate's host country, 'TP Legislation Continuous' depicts the scope of a country's transfer pricing legislation, taking on the value 1/2/3 if a country's transfer price regime is classified in Categories 1/2/3 as defined in Section 3. 'APA' stands for an indicator variable that takes on the value 1 if a country offers bilateral advanced pricing procedures.

★ taken from unconsolidated accounts, in thousand USD
▼ difference between the host country's corporate tax rate and the unweighted average tax rate of other major affiliates in the corporate group (ownership >50%)
▲ in USD, constant prices, year 2000 (Source: World Development Indicator Database, World Bank)
□ in % (Source: World Development Indicator Database, World Bank)
■ index ranges from 1 (high level of corruption) to 10 (no corruption) (Source: Transparency International)
♦ in % of total labor force (Source: World Development Indicator Database, World Bank)

Table 4: Baseline Results

Dep. Variable: Log Earnings Before Interest and Tax

	(1) (a)	(1) (b)	(1) (c)	(2) (a)	(2) (b)	(2) (c)	(3) (a)	(3) (b)	(3) (c)
Corporate Tax Rate	(0.166**)	**-0.394** (0.300)	(0.194**)	(0.299***)	**-1.854** (0.387***)	(0.358***)	(0.409***)	**-3.425** (0.638***)	(0.365***)
TP Legislation Binary × Corporate Tax Rate							(0.363***)	**1.709** (0.624***)	(0.324***)
TP Legislation Binary							(0.124***)	**-0.468** (0.221**)	(0.111***)
Log Fixed Assets	(0.005***)	**0.082** (0.005***)	(0.016***)	(0.005***)	**0.083** (0.005***)	(0.015***)	(0.005***)	**0.083** (0.005***)	(0.016***)
Log Cost of Employees	(0.012***)	**0.433** (0.021***)	(0.016***)	(0.012***)	**0.437** (0.020***)	(0.016***)	(0.012***)	**0.437** (0.020***)	(0.016***)
$GDP/10^3$	(0.132**)	**-0.304** (0.154**)	(0.221)	(0.131)	**-0.209** (0.140)	(0.223)	(0.134)	**-0.095** (0.152)	(0.223)
$GDPpC/10^4$	(0.074***)	**0.569** (0.100***)	(0.089***)	(0.081***)	**0.757** (0.122***)	(0.100***)	(0.081***)	**0.791** (0.118***)	(0.102***)
Unemployment Rate	(0.002***)	**-0.006** (0.003*)	(0.003*)	(0.002***)	**-0.009** (0.004***)	(0.003***)	(0.002***)	**-0.010** (0.004***)	(0.003***)
Corruption	(0.010)	**-0.012** (0.016)	(0.011)	(0.010)	**-0.006** (0.013)	(0.010)	(0.010)	**0.005** (0.014)	(0.010)
GDP Growth	(0.002***)	**0.009** (0.004**)	(0.002***)	(0.002***)	**0.006** (0.003***)	(0.002***)	(0.002***)	**0.006** (0.003*)	(0.002***)
Corporate Tax Rate × Time					**0.176** (0.052***)			**0.185** (0.054***)	
Industry-Year-Effects		√			√			√	
# Observations		150,214			150,214			150,214	
Within R Squared		0.1571			0.1575			0.1578	

Notes:

Notes: Heteroscedasticity robust standard errors adjusted for firm, country-year or industry clusters in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level. Observational unit is the multinational affiliate per year. The dependent variable is the logarithm of the firm's earnings before interest and taxes (EBIT). 'Corporate tax rate' depicts the host country's statutory corporate tax rate including local income taxes and possible surcharges. 'Corporate Tax Rate x Time' stands for the interaction term of the corporate tax rate and a time indicator (values 1 to 11 for the years 1999-2009). 'TP Legislation Binary' describes an indicator variable for the existence of transfer pricing legislation in a country, 'TP Legislation Binary x Corporate Tax Rate' stands for its interaction term with the corporate tax rate. 'Log Fixed Assets' depicts the logarithm of the affiliate's fixed asset stock and 'Log Costs of Employees' stands for the logarithm of the costs of employees. 'Corruption Index' is the Transparency International Corruption Index (1=high corruption, 10=no corruption). 'GDP (per Capita)' stands for the host country's gross domestic product (per capita). 'GDP Growth Rate' accounts for the growth of GDP. 'Unemployment' depicts the host country's unemployment rate in % of the total labor force. Industry-year-effects are constructed based on one-digit NACE-codes.

	Table 5: Alternative Definitions of Firm Profitability and Transfer Pricing Variable				
Dependent Variable: Log EBIT (Columns (1)-(2)), Log EBIT/Total Assets (Columns (3)-(5))					
	(1)	(2)	(3)	(4)	(5)
Corporate Tax Rate	-3.339***	-2.942***	-4.018***	-4.246***	-3.560***
	(0.377)	(0.412)	(0.397)	(0.359)	(0.400)
TP Leg. Binary × Corp. Tax Rate			1.155***		
			(0.354)		
TP Legislation Binary			-0.219*		
			(0.121)		
TP Leg. Cont. × Corp. Tax Rate	1.058***			0.977***	
	(0.145)			(0.138)	
TP Legislation Continuous	-0.327***			-0.287***	
	(0.047)			(0.044)	
Category 2 × Corporate Tax Rate		1.789***			1.250***
		(0.366)			(0.357)
Category 3 × Corporate Tax Rate		2.494***			1.886***
		(0.396)			(0.383)
Category 2		-0.478***			-0.230*
		(0.124)			(0.121)
Category 3		-0.737***			-0.472***
		(0.135)			(0.131)
Corporate Tax Rate × Time	0.069*	0.087**	0.406***	0.291***	0.313***
	(0.037)	(0.037)	(0.032)	(0.035)	(0.035)
Firm and Country Controls	✓	✓	✓	✓	✓
Industry-Year-Effects	✓	✓	✓	✓	✓
#Observations	150,214	150,214	150,214	150,214	150,214
Within R-Squared	0.1580	0.1582	0.0341	0.0341	0.0345

Notes: Heteroscedasticity robust standard errors adjusted for firm clusters in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level. Observational unit is the multinational firm per year. The dependent variable is the logarithm of the firm's EBIT (Columns (1) and (2)) and EBIT over total assets (Columns (3) to (5)) respectively. See the notes to Table 4 for a definition of the regressors. On top, 'TP Legislation Continuous' depicts the scope of a country's transfer pricing legislation (see Section 3 for details) and 'TP Legislation Continuous x Corporate Tax Rate' its interaction term with the corporate tax rate. 'Category 2' and 'Category 3' depict indicator variables for transfer pricing regimes of Categories 2 and 3 as defined in Section 3. 'Category 2 x Corporate Tax Rate' and 'Category 3 x Corporate Tax Rate' describe the respective interaction terms with the corporate tax rate.

Table 6: Alternative Definitions of Firm Profitability and Transfer Pricing Variable						
Dependent Variable: Log Profit Before Taxes (Columns (1)-(3)), Log Profit Before Taxes/Total Assets (Columns (4)-(6))						
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Corporate Tax Rate	-4.464***	-4.705***	-3.788***	-5.104***	-5.760***	-4.430***
	(0.448)	(0.410)	(0.451)	(0.436)	(0.395)	(0.440)
TP Leg. Binary × Corp. Tax Rate	1.252**			0.628		
	(0.405)			(0.398)		
TP Legislation Binary	-0.355**			-0.079		
	(0.139)			(0.137)		
TP Leg. Cont. × Corp. Tax Rate		1.186***			1.134***	
		(0.157)			(0.151)	
TP Legislation Continuous		-0.405***			-0.373***	
		(0.050)			(0.048)	
Category 2 × Corp. Tax Rate			1.451***			0.829**
			(0.409)			(0.401)
Category 3 × Corp. Tax Rate			2.370***			1.741***
			(0.437)			(0.426)
Category 2			-0.376***			-0.101
			(0.139)			(0.137)
Category 3			-0.744***			-0.468**
			(0.149)			(0.146)
Corp. Tax Rate × Time	0.354***	0.194***	0.211***	0.589***	0.427***	0.446***
	(0.037)	(0.041)	(0.041)	(0.036)	(0.039)	(0.039)
Firm and Country Controls	✓	✓	✓	✓	✓	✓
Industry-Year-Effects	✓	✓	✓	✓	✓	✓
#Observations	151,716	151,716	151,716	151,716	151,716	151,716
Within R-Squared	0.1425	0.1431	0.1432	0.0326	0.0330	0.0334

Notes: Heteroscedasticity robust standard errors adjusted for firm clusters in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% level. Observational unit is the multinational firm per year. The dependent variable is the logarithm of the firm's pre-tax profits (Columns (1) and (3)) and pre-tax profits over total assets (Columns (4) to (6)) respectively. See the notes to Tables 4 and 5 for a definition of the regressors.

	Table 7: Advanced Pricing Agreements			
Dependent Variable: Log EBIT (Columns (1)-(2)), Log EBIT/Total Assets (Columns (3)-(4))				
	(1)	*(2)*	*(3)*	*(4)*
Corporate Tax Rate	-2.438***	-2.401***	-3.294**	-3.228***
	(0.432)	(0.431)	(0.420)	(0.419)
TP Legislation Binary × Corp. Tax Rate	1.673***		1.087***	
	(0.368)		(0.358)	
TP Legislation Binary	-0.466***		-0.188	
	(0.125)		(0.122)	
Category 2 x Corp. Tax Rate		1.689***		1.081***
		(0.373)		(0.363)
Category 3 x Corp. Tax Rate		1.837***		1.408***
		(0.417)		(0.404)
Category 2		-0.459***		-0.173
		(0.126)		(0.122)
Category 3		-0.528***		-0.304**
		(0.142)		(0.138)
APA x Corp. Tax Rate	0.387**	0.231	0.020	-0.264
	(0.175)	(0.231)	(0.167)	(0.220)
APA	-0.213***	-0.156**	-0.118**	0.016
	(0.050)	(0.073)	(0.048)	(0.070)
Corp. Tax Rate x Time	0.037	0.031	0.307***	0.298***
	(0.040)	(0.040)	(0.038)	(0.038)
Firm and Country Controls	√	√	√	√
Industry-Year-Effects	√	√	√	√
#Observations	146,321	146,321	146,321	146,321
Within R-Squared	0.1575	0.1575	0.0350	0.0351

Notes: Heteroscedasticity robust standard errors adjusted for firm clusters in parentheses. ***, **, and *indicate significance at the 1%, 5%, and 10% level. Observational unit is the multinational affiliate per year. The dependent variable is the logarithm of the affiliate's EBIT (Columns (1) and (2)) and EBIT over total assets (Columns (3) and (4)). See the notes to Tables 4 and 5 for a definition of the regressors. Furthermore, 'APA' is a dummy variable indicating whether an affiliate's host country offers the possibility to enter into bilateral advance pricing agreements. 'APA x Corporate Tax Rate' depicts the interaction term of this variable with the corporate tax rate.

Table 8: Profit Shifting Incentives and the Corporate Tax Rate Differential						
Dependent Variable: Log EBIT (Columns (1)-(3)), Log EBIT/Total Assets (Columns (4)-(6))						
	(1)	(2)	(3)	(4)	(5)	(6)
Tax Differential	-1.427***	-1.436***	-1.479***	-1.054***	-1.037***	-1.031***
	(0.363)	(0.367)	(0.382)	(0.338)	(0.343)	(0.363)
TP Leg. Binary $\times$ Tax Differential	1.054***			0.667*		
	(0.385)			(0.359)		
TP Leg. Binary	0.105***			0.138***		
	(0.032)			(0.031)		
Category 2 x Tax Differential		1.079***	1.191***		0.615	0.615
		(0.410)	(0.423)		(0.387)	(0.402)
Category 3 x Tax Differential		1.032**	1.256***		0.703*	0.782*
		(0.399)	(0.431)		(0.372)	(0.405)
Category 2		0.102***	0.072*		0.141***	0.126***
		(0.037)	(0.039)		(0.036)	(0.037)
Category 3		0.106***	0.072**		0.138***	0.124***
		(0.032)	(0.034)		(0.031)	(0.033)
APA x Tax Differential			-0.116			-0.094
			(0.239)			(0.234)
APA			-0.006			-0.032
			(0.027)			(0.026)
Tax Differential $\times$ Time	0.031	0.032	0.016	0.040	0.039	0.032
	(0.030)	(0.031)	(0.034)	(0.029)	(0.029)	(0.032)
Firm and Country Controls	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$
Industry-Year-Effects	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$
Within R-Squared	0.1790	0.1790	0.1776	0.0370	0.0370	0.0367
#Obs	87,152	87,152	85,415	87,152	87,152	85,415

Notes: Heteroscedasticity robust standard errors adjusted for firm clusters in parentheses. ***, **, and *indicate significance at the 1%, 5%, and 10% level. Observational unit is the multinational affiliate per year. The dependent variable is the logarithm of the EBIT (Columns (1)-(3)) and EBIT over total assets (Columns (4)-(6)). 'Tax Differential' depicts the difference between the host country's statutory corporate tax rate (including local income taxes and possible surcharges) and the unweighed average tax rate of all other group members. See the notes to the previous tables for a definition of the other regressors.

Table 9: Transfer Price Penalties					
Dependent Variable: Log EBIT (Columns (1)), Log EBIT/Total Assets (Columns (2)-(5))					
Tax Measure: Corporate Tax Rate (Columns (1)-(3)), Corporate Tax Rate Differential (Columns (4)-(5))					
	(1)	*(2)*	*(3)*	*(4)*	*(5)*
Tax Measure	-10.64***	-6.201***	-5.542**	-1.698**	-1.597**
	(2.579)	(2.329)	(2.337)	(0.695)	(0.712)
Tax Measure × TP Leg. Binary	9.291***	3.848*		1.112*	
	(2.551)	(2.296)		(0.666)	
TP Legislation Binary	-3.162***	-1.185		0.136***	
	(0.893)	(0.804)		(0.036)	
Category 2 × Tax Measure			3.451		0.964
			(2.300)		(0.703)
Category 3 × Tax Measure			3.616		1.144*
			(2.300)		(0.666)
Category 2			-1.014		0.148***
			(0.805)		(0.040)
Category 3			-1.108		0.136***
			(0.805)		(0.036)
Penalty × Tax Measure	0.567***	0.839***	0.762***	0.519*	0.505*
	(0.206)	(0.197)	(0.210)	(0.286)	(0.287)
Penalty	-0.140**	-0.227***	-0.194***	0.003	0.004
	(0.055)	(0.052)	(0.056)	(0.024)	(0.024)
Tax Measure × Time	0.151***	0.342***	0.303***	0.035	0.030
	(0.040)	(0.038)	(0.040)	(0.034)	(0.034)
Firm and Country Controls	√	√	√	√	√
Industry-Year-Effects	√	√	√	√	√
Within R-Squared	0.1465	0.0338	0.0339	0.0351	0.0351
# Observations	138,758	138,758	138,758	81,015	81,015

Notes: Heteroscedasticity robust standard errors adjusted for firm clusters in parentheses. ***, **, and *indicate significance at the 1%, 5%, and 10% level. Observational unit is the multinational affiliate per year. The dependent variable is the logarithm of the EBIT (Column (1)) and EBIT over total assets (Columns (2)-(5)). 'Tax Measure' stands for the corporate tax rate in Specifications (1) to (3) and the unweighted average corporate tax rate difference between the affiliate and other members in the same multinational group in Specifications (4) and (5). 'Penalty' depicts a dummy variable indicating whether the affiliate's host country levies special penalties related to transfer pricing. See the notes to the previous tables for a definition of the other regressors.

Table 10: CFC Legislations					
Dependent Variable: Log EBIT (Columns (1)-(2)), Log EBIT/Total Assets (Columns (3)-(5))					
Tax Measure: Corporate Tax Rate (Columns (1)-(3)), Corporate Tax Rate Differential (Columns (4)-(5))					
	(1)	*(2)*	*(3)*	*(4)*	*(5)*
Tax Measure	-3.206***	-2.778***	-3.336***	-1.098***	-1.075***
	(0.418)	(0.420)	(0.409)	(0.343)	(0.348)
TP Legislation Binary	1.691***			0.619*	
$\times$ Tax Measure	(0.362)			(0.359)	
TP Legislation Binary	-0.454***			0.149***	
	(0.124)			(0.031)	
Category2 $\times$ Corporate Tax Rate		1.786***	1.243***		0.564
		(0.366)	(0.357)		(0.387)
Category 3 $\times$ Corporate Tax Rate		2.439***	1.810***		0.663*
		(0.396)	(0.384)		(0.373)
Category 2		-0.467***	-0.215*		0.156***
		(0.124)	(0.121)		(0.036)
Category 3		-0.713***	-0.439***		0.149***
		(0.135)	(0.131)		(0.031)
CFC $\times$ Tax Measure	-0.195	-0.138	-0.149	0.345*	0.338*
	(0.156)	(0.156)	(0.150)	(0.188)	(0.189)
CFC	0.085*	0.066	0.082*	0.045***	0.046***
	(0.049)	(0.049)	(0.047)	(0.016)	(0.017)
Time $\times$ Tax Measure	0.172***	0.079**	0.300***	0.030	0.028
	(0.035)	(0.038)	(0.036)	(0.029)	(0.030)
# Observations	150,214	150,214	150,214	87,152	87,152

Notes: Heteroscedasticity robust standard errors adjusted for firm clusters in parentheses. ***, **, and *indicate significance at the 1%, 5%, and 10% level. Observational unit is the multinational firm per year. The dependent variable is the logarithm of the EBIT (Column (1)) and EBIT over total assets (Columns (2)-(5)). 'Tax Measure' stands for the corporate tax rate in Specifications (1) to (3) and the unweighted average corporate tax rate difference between the affiliate and other members in the same multinational group in Specifications (4) and (5). See the notes to Tables 4 and 5 for a definition of the regressors. Additionally, CFC indicates whether the affiliate is affected by controlled foreign company rules. The variable is coded 1 if the considered firm is the parent of a multinational group (or a subsidiary located in the parent country) and CFC legislations are enacted in its home country or if the considered firm is a subsidiary of a multinational group whose parent country has enacted CFC legislations which are binding with respect to the subsidiary's host country (i.e. the subsidiary's host country is considered to be a tax haven by the home country's CFC legislations).