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The Impact of Transfer Pricing Regulations on Profit Shifting within European Multinationals

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Abstract

Over the past decade, several countries augmented their national tax law by transfer pricing legislations in order to limit opportunities for tax-motivated transfer price distortions and the associated relocation of multinational income from their borders. The aim of this paper is to empirically investigate the impact of transfer pricing laws on multinational profit shifting behaviour. To do so, we collect unique data on the evolution of national transfer price requirements in Europe over the past decade. This data is linked to accounting information on multinational firms in the EU and to corporate tax rate data. In line with previous studies, we find that multinational firms engage in significant tax-motivated profit shifting behaviour. The analysis furthermore suggests that transfer price documentation rules are instrumental in restricting income shifting activities. The effect is statistically significant and economically relevant. Our analysis thus underpins the benefits of implementing transfer price documentation requirements and suggests that they may be socially desirable despite the high administrative burden they impose on firms and tax authorities.

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JEL Classification: F23, H25

1 Introduction

In recent years, the literature has provided compelling evidence that multinational entities (MNEs) strategically relocate income across affiliate in order to reduce their overall tax bill (see e.g. Hines (1999) and Devereux and Maffini (2007) for surveys). This type of shifting activity may significantly impact on countries' corporate tax revenues. Huizinga and Laeven (2008) find that in 1999 the corporate tax base of Germany, which was the country with the highest corporate tax rate in Europe at that time, would have been by 14% larger in the absence of tax rate differentials between European countries. One channel through which MNEs relocate income to foreign low-tax affiliates is the distortion of prices for intra-firm trade. Recent empirical evidence moreover suggests transfer pricing to be quantitatively important relative to other shifting channels, especially in MNEs with intangible property holdings (see e.g. Clausing, 2003; Grubert, 2003).¹

Several (high-tax) countries have implemented transfer pricing legislations during the last decade which require MNEs to document their intra-firm transfer prices for tax purposes. The strictness of these legislations vary across countries, ranging from a mere acknowledgement that price setting must adhere to the arm's length principle (i.e. intra-firm prices must correspond to prices that would have been set between third parties) up to strict legal requirements for transfer price documentation that have to be submitted with the tax return on an obligatory basis. A major shortcoming of the stricter versions of transfer pricing rules is that they imply considerable administrative costs for both, firms and tax authorities. Whether their use is beneficial from a social perspective thus largely depends on whether they are indeed instrumental in dampening earnings stripping from high-tax economies.

To assess this question, we collected detailed information on the transfer pricing requirements in 26 European countries over the past decade (see also Lohse, Riedel, and Spengel (2012) for details). This data is then merged with information on corporate tax rates and rich accounting and ownership data on European MNEs between 1999 and 2009.

¹A second shifting channel which has attracted interest by academics and policy makers is international debt shifting. Debt shifting strategies imply that affiliates in low-tax countries provide loans to high-tax entities within the multinational group. The associated interest payment is deductible from the corporate tax base at the high-tax entity and accrues with the low-tax affiliate. Buettner and Wamser (2007) find evidence that MNEs engage in significant debt shifting activities but the estimated effects are quantitatively small in size.

In a first step, we exploit this data to replicate existing evidence on multinational profit shifting behaviour. Precisely, we follow previous studies and determine the impact of corporate tax rate changes on the reported profitability of multinational affiliates using panel data estimations that control for unobserved affiliate heterogeneity and for time-varying firm, industry and host-country characteristics. In line with previous evidence, we find a negative correlation between the host country's corporate tax rates and firm profitability. Quantitatively, our estimates suggest that an increase in the corporate tax rate by 10 percentage points reduces corporate pre-tax profitability by around 3.9%. The findings moreover also indicate that the sensitivity of pre-tax profits to corporate tax rate changes has significantly decreased over the last decade.

Using these estimates as a starting point, we in a second step assess the relation between tax-motivated income relocations and the implementation of transfer pricing legislations. For this purpose, we define three transfer pricing categories that reflect the existence and strictness of a country's transfer pricing legislations: the first category comprises countries without transfer pricing legislations or with very general anti-avoidance rules only; the second comprises countries in which transfer pricing regulations do exist in practice and where tax authorities may require some form of transfer price documentation while the transfer price legislations are not implemented in national tax law; the third category comprises countries in which documentation requirements are introduced into national tax law and imply that firms must disclose their transfer pricing choices to the tax authorities upon request or directly with the annual tax return.

Our empirical analysis suggests that transfer pricing legislations significantly dampen multinational income shifting strategies as measured by the sensitivity of corporate pre-tax profits to changes in the corporate tax rate. Compared to countries without transfer pricing legislations (category 1), introducing transfer price regulations is found to reduce profit shifting activities substantially. The implementation of transfer pricing regimes of category 2 dampens profit shifting activities by around 60%, the introduction of regimes of category 3 induces an even larger decline in shifting activities by around 85%.

This qualitative and quantitative result is robust against a number of sensitivity checks, including the reliance on alternative definitions for the strictness of transfer pricing legislations, the use of alternative measures for the profitability of affiliate activities and the modelling of transfer pricing incentives via the corporate tax rate differential to other affiliates within the multinational corporate group rather than the host country's corporate tax rate. On top, we augment our estimations by another characteristic of transfer pricing regimes which is the possibility to enter into advance pricing agreements (APA) where tax authorities and firms agree on 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 thus 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 through transfer price distortions instead. 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 establishing a significantly negative effect of the affiliates' host country tax on the reported pre-tax profitability of firms (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 an important role in profit shifting strategies as for them arm's length prices from third-party trade are hardly available due to their firm-specific nature (see e.g. Grubert (1998), Grubert (2003), and Dischinger and Riedel (2011)). Huizinga, Laeven, and Nicodeme (2008), Altshuler and Grubert (2003) and Buettner and Wamser (2007) moreover determine the effect of corporate taxation on the multinational's debt-equity structure providing evidence in favour of tax-motivated debt-shifting. The evolution of profit shifting behaviour over time has in turn received less attention. The only paper we are aware of which tackles that issue is Altshuler, Grubert, and Newlon (2001) who show that between 1984 and 1992 US multinationals have increased their outward profit shifting. Our evidence in turn suggests the reverse trend for later years starting in 1999.

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

equally hamper 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 our estimation strategy. Section 3 describes the construction of the variables of main interest which are the corporate tax rate and the country's transfer pricing legislation rules and presents the company data and other country control variables. Section 4 describes the 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. Both firms produce an output s_i with $i \in \{A, B\}$. For simplicity reasons, the price for the final output good is normalized to 1. Moreover, we presume that affiliate A produces an input good that is required for production by both affiliates and is sold to affiliate B. The true price for this input good is \bar{q} . Following previous papers, we assume that the true transfer price is unobservable to the tax authorities and the MNE can thus choose a transfer price which deviates from the true price.

Distorting the transfer price from its true price is not costless though. Following Haufler and Schjelderup (2000), we assume that the MNE accrues positive costs denoted by C if the transfer price is deviated from \bar{q} , whereas the costs convexly increase in the absolute deviation. This may either reflect that the probability for the tax authorities to detect price distortions convexly increases in the deviation from the true price. Alternatively, the MNE may incur convex concealment costs as it may find it increasingly difficult to cover transfer pricing activities from the tax authorities the further the price is deviated from its true price. Plausibly, transfer pricing costs are moreover determined by the country's level of transfer price documentation requirements. If tax authorities for example require firms to document and justify transfer prices in their common tax returns, the firm's ability to deviate the transfer price from the true price is presumed to be significantly restricted. Formally, the transfer pricing costs are thus modelled as a u-shaped cost function with a local minimum at \bar{q} : $C = \gamma K(q - \bar{q})$, whereas $\gamma > 0$ and $K(\bar{q}) = 0$, $sign(K') = sign(q - \bar{q})$ and $K'' > 0$.² The strictness of the country's transfer pricing requirements are reflected by the parameter γ which increases the absolute and marginal shifting costs for all q .³

²We assume that the parent is located in a country which fully exempts foreign profits.

³Note that we assumed a simple modelling strategy to implement transfer pricing legislations into the costs functions, essentially assuming that they increase the firm's detection risk and hence proportionally raise the MNE's cost function. Note that our results are robust to more complex formulations of the cost function.

The MNE's after-tax profit reads

$$\pi = (1 - t_a)(s_a - q) + (1 - t_b)(s_b + q) - C \quad (1)$$

The MNE maximizes the after-tax profit in (1) by choosing the optimal transfer price q . The first order condition reads

$$t_a - t_b = \gamma K'(q - \bar{q}) \quad (2)$$

The optimal transfer pricing choice thus equates marginal shifting costs (right hand side of equation (2)) and marginal benefits from shifting activities (left hand side of equation (2)). Thus, if $t_a > t_b$, the MNE chooses a transfer price $q > \bar{q}$ and thus relocates income from country A to country B by overpricing the input good delivered from affiliate A to affiliate B. Analogously, if $t_b > t_a$, the MNE chooses a transfer price $q < \bar{q}$ and thus relocates income from country B to country A by underpricing the input good delivered from affiliate A to affiliate B.

Comparative statics read

$$\frac{dq}{d(t_a - t_b)} = \frac{1}{\gamma K''}, \quad \frac{dq}{d\gamma} = -\frac{K'}{\gamma K''}, \quad \frac{d^2q}{d(t_a - t_b)d\gamma} = -\frac{1}{\gamma^2 K''}.$$

Thus, profit shifting incentives imply that the optimal transfer price q increases in the tax rate differential between countries A and B. Moreover, transfer price distortions are reduced if transfer price documentation requirements, as modelled by the parameter γ , rise. Formally, $\text{sign}(\frac{dq}{d\gamma}) = -\text{sign}K'$. For the same reason, the marginal effect of changes in the tax rate difference on the transfer price choice is dampened with rising documentation requirements γ .

The model thus predicts that transfer price documentation lowers the MNE's incentive to engage in income shifting behaviour and dampens the sensitivity of transfer prices (and in consequence reported pre-tax profits) to changes in the corporate tax rate.

3 Data

We assess this hypothesis using firm level data on multinational affiliates in the EU. The data is taken from the firm database AMADEUS (version February 2011) provided by the Bureau van Dijk. It includes rich information on accounting and financial data which comprises balance sheets, profit & loss accounts and several financial indicators. Data is available in panel format for the years 1999 to 2009 and includes firms in 26 European countries. The firms included in our analysis belong

to a multinational group in the sense that either their parent company or one of their wholly owned subsidiaries is located in a foreign economy. As Bureau von Dijk draws on different sources of information across countries, sample coverage varies and thus some caution is warranted when drawing conclusions from our results for the population of firms. A country distribution of our sample affiliates is presented in Table 1.

The observational unit in our 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. Besides the rich set of accounting information available in AMADEUS, we enlarge our dataset by merging information on the country's tax system, i.e. the statutory corporate tax rates and information on transfer pricing legislations. The corporate tax information is taken from Ernst & Young's worldwide corporate tax guide, while we collected the information on transfer pricing regulations from various sources, mainly transfer pricing guides published by Deloitte, Ernst & Young, KPMG, and PwC. In the following, we will briefly sketch the development of corporate tax rates and transfer pricing rules in our sample countries over time and describe how this information is classified and exploited for our empirical analysis.

In general, transfer pricing regulations vary across countries and may differ in a number of characteristics, most importantly in their applicability and scope, in the allowed methods for transfer price calculation, in the documentation requirements, or penalties for non-compliance with the rules.

In the following, we will classify countries in three categories reflecting the strictness of their transfer pricing legislations. A first natural step is to assess whether a country has enacted any form of transfer price legislation at all. Transfer pricing rules are commonly based on the so called arm's length principle which requires that prices for intercompany transactions have to correspond to the price that would have been chosen between two unrelated parties. While most European countries have implemented arm's length principles in their national tax law, the legislation is often imprecise and does not include further details as to its applicability, the determination of transfer prices, or the required documentation and hence lacks in scope to restrict transfer pricing behaviour. Countries without or with only limited transfer pricing legislations are hence assigned to our first transfer pricing category.

In the next step, we identify differences in the strictness of existing transfer pricing legislation. The major instrument to limit transfer pricing opportunities is the introduction of documentation requirements for controlled transactions and prices as the increased level of transparency reduces the scope for deviations of the transfer pricing choice from the 'true' price. The importance of transfer pricing requirements is underpinned by the fact that in most jurisdictions the burden of proof as to the

appropriateness of a transfer price switches from the tax authorities to the taxpayer if only insufficient documentation is available. The introduction of documentation requirements into national tax law is furthermore in general accompanied by special transfer pricing penalties on missing or wrong documentation. Jurisdictions, however, differ in the stage at which the transfer price documentation must be made available to the tax authorities. While some jurisdictions require the documentation only in case of a formal audit, others require the documentation to be available upfront to answer requests by the tax authority or hand it in with the tax return. In the following, we will classify the former countries in category 2 and the latter countries in category 3. An overview of the categories can be found in Tables 2A and 2B (for a more detailed study on the different transfer pricing regulations see Lohse, Riedel, and Spengel (2012)).⁴

Note that the definition of the above categories abstracts from issues related to the calculation methodology for intra-firm transfer prices as there is little variation in the allowed pricing methods across countries and different methods are not considered to imply more or less leeway in the transfer pricing choice.⁵ We furthermore abstract from general and special penalties for transfer price adjustments as we were not able to find reliable information on (changes in) the design of such penalties (over time). But our research revealed that special transfer pricing penalties are in almost all cases introduced together with the implementation of documentation requirements in national tax law. We, therefore, believe that our measure for the strictness of transfer pricing regulations also reflects that documentation requirements are enforced by penalties.

In all our sample countries, transfer pricing regulations have been either introduced or tightened between 1999 and 2009. Not a single country has relaxed its regulations. While in the first year of their inclusion in the sample, the great majority of countries was allocated to category 2 (16 countries), and only six countries were allocated to category 1 and four countries to category 3, in the last year of the sample, the majority of countries moved up to category 3 (15 countries), while only two countries remained in category 1 and nine in category 2.

⁴Note that the detection risk of transfer pricing activities likely differs across asset types. For instance the transfer of an intangible asset, where no market of comparable goods exists, are more difficult to assess and offer a greater scope for manipulation than other types of assets. This difference, however, is not specific to any particular country but plausibly holds for all economies within our sample.

⁵Countries have formulated regulations on how to determine transfer prices depending on the type of transaction. In most cases, such rules are based on the OECD transfer pricing guidelines. The available methods either follow an opportunity cost approach that determines arm's length prices considering prices or profit margins of comparable uncontrolled transactions or they make use of benchmark analyses of competitors. The methods available may lead to different ranges of possible transfer prices. Which method is best suited from the viewpoint of the company to distort transfer prices from the 'true' price thus very much depends on the specific situation and the type of transaction. No general proposition can be made about the generocity of a certain method.

Furthermore, we augmented our data by another aspect of transfer pricing regimes which is the possibility to enter into an advance pricing agreement (APA). Such an agreement allows tax payers and tax authorities to negotiate a transfer price for a certain transaction in advance and for a certain period of time. It, therefore, significantly reduces the risk of a transfer pricing adjustment. APAs are generally offered in different forms, they can either be unilateral or bilateral. 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 a foreign country which is affected by the transaction. Therefore, bilateral agreements are generally more favourable for taxpayers as transfer prices are approved by both affected countries. None of the countries considered in this study offered bilateral advance pricing agreements in 1999, but this changed substantially over our sample period. In 2009, ten countries had started offering APA procedures (see Table 2C in the Appendix).

Moreover, we augment our data set by information on various host country control variables, precisely, GDP as a proxy for market size, GDP per capita as a proxy for a country's income and development level, the GDP growth rate as a measure for economic growth, the unemployment rate as a proxy for the state of a country's economy and the corruption index as a proxy for the state of governance institutions. The corruption index is obtained from Transparency International while other country data is retrieved from the World Development Indicator Database. For an overview of the descriptive statistics see Table 3.

4 Estimation Strategy

We estimate a model of the following form

$$EBIT_{it} = \beta_0 + \beta_1\tau_{it} + \beta_2(\tau_{it} \cdot TP_{it}) + \beta_3TP_{it} + \beta_4X_{it} + \rho_t + \phi_i + \epsilon_{it} \quad (3)$$

where $EBIT_{it}$ depicts the earnings before interest and taxes of affiliate i at time t . As the distribution of the variable is strongly skewed, we use a logarithmic transformation of the variable.

The regressors of main interest are the corporate tax rate, denoted by τ_{it} , and the variable indicating the strictness of a country's transfer pricing regulations (as defined in the previous section) denoted by TP_{it} . Following previous papers, we test for international profit shifting activities by regressing the affiliate's earnings before interest and taxes (EBIT) on the host country's corporate tax rate. If MNEs engage in significant income shifting behaviour, we presume that a high corporate tax rate dampens the reported earnings and vice versa, expecting $\beta_1 < 0$. But at the same time, we suppose that profit shifting activities and hence the sensi-

tivity of a company’s reported pre-tax earnings with respect to corporate tax rate changes is influenced by transfer pricing legislation. We, therefore, expect the tax rate sensitivity of profit shifting for European multinationals to decrease with the introduction or tightening of transfer pricing legislations. Regarding the interaction of the corporate tax rate and TP_{it} we expect a positive coefficient $\beta_2 > 0$ since reported pre-tax profits are supposed to increase due to less profit shifting activity. The coefficient estimate β_3 captures the effect of stricter transfer price legislations on EBIT in countries with a corporate tax rate of zero. Here, the sign of the coefficient estimate is expected to be negative as tax haven countries are, in the absence of transfer pricing legislations, expected to be at the receiving end of profit shifting relations implying high reported earnings. If tax haven countries in turn introduce transfer price documentation requirements (the result of which may in the course of disputes also become accessible to authorities in high-tax countries), profit shifting opportunities are likely dampened, inducing the reported level of the EBIT to fall.

Furthermore, the estimations are augmented by a large set of control variables X_{it} . Most importantly, we control for affiliate size as measured by a company’s fixed asset stock and costs of employees. Moreover, we include a set of time-varying country controls comprising the country’s GDP (to proxy for country size), GDP per capita (to proxy for the country’s level of development), the GDP growth rate (as a measure for economic growth), the unemployment rate (as a proxy for the economic state of the country) and a corruption index (to proxy for the governance situation in a country). Additionally we include a full set of affiliate fixed effects to absorb any time-constant differences between the entities. All specifications furthermore include a full set of one-digit industry-year effects which capture common shocks to all affiliates within the same industry over time.

5 Results

The results are presented in the following subsections. In Section 5.1, we present the findings of our baseline specifications. A number of robustness checks are discussed in Section 5.2.

5.1 Basic Results

The baseline results are presented in Table 4. Following the estimation strategy specified in equation (4), the dependent variable is the logarithm of corporate operating profits before taxes as measured by earnings before interest and tax (EBIT). Heteroscedasticity robust standard errors which account for clustering at the firm level (columns (a)), the country-year level (columns (b)) and the industry level

(columns (c)) are reported in parentheses below the coefficient estimates.

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 (firm fixed effects, year fixed effects, industry-year fixed effects as well as time-varying firm and host country characteristics). In line with previous studies, the estimate for the corporate tax rate turns out negative, indicating a negative impact of corporate tax increases on the reported profitability of corporate operating activities. The coefficient estimate is moreover statistically significant at conventional significance levels irrespective of the level of clustering (see the standard errors reported in sub-columns (a), (b) and (c)). Quantitatively, the results suggest that an increase of the corporate tax rate by 10 percentage point decreases reported profits before tax by 3.94%.

In Specification (2), we augment the set of regressors by an interaction term between the affiliate's host country corporate tax rate and a linear time trend, allowing for the possibility that profit shifting activities have systematically changed over time. The findings indicate that the sensitivity of operating profits to corporate tax rate changes has significantly decreased over our sample period. The linear framework suggests an annual decline in the semi-elasticity by 0.18, implying that, in 1999, an increase in the corporate tax rate by 1 percentage points led to a substantial drop in operating income by 1.9%, while, in 2009, the effect shrank to a small 0.1, indicating that an increase in the corporate tax rate by 1 percentage points decreased operating income by 0.1% only.

Following our estimation model in equation (4), Specification (3) furthermore includes an additional regressor indicating whether the affiliate's host country has implemented binding transfer pricing legislations (the variable takes on the value 1 if the country has implemented transfer price legislations as defined in categories 2 or 3 in a given year, see Section 3 for details), as well as its interaction term with the corporate tax rate. The results suggest that the implementation of binding transfer pricing legislations reduces profit shifting activities significantly. The coefficient estimate for the corporate tax variable again turns out statistically significant, indicating that, in 1999, an increase in the host country's corporate tax rate by 1 percentage point led to a decrease in operating profits by 3.4%. The positive coefficient estimate for the interaction between the corporate tax variable and the linear time trend confirms the previous finding that income shifting activities have quantitatively reduced during our sample period. Note that the relative quantitative decrease turns out substantially smaller than in the previous estimate though, suggesting a semi-elasticity of EBIT with respect to the corporate tax rate of 1.58, indicating that an increase in the corporate tax rate by 1 percentage point dampens reported EBIT by 1.6%.

The coefficient estimate for the interaction term between the corporate tax rate and the variable indicating the implementation of transfer pricing legislations is positive and quantitatively large. It moreover turns out statistically significant if we account for clustering at the firm, industry and country-year level respectively. It suggests that the implementation of transfer pricing legislations is instrumental in limiting income shifting activities as measured by the sensitivity of operating income with respect to corporate tax rate changes. Quantitatively, income shifting activities are found to be reduced by around 50% ($= 1.709/(-3.425)$). As presumed, the coefficient estimate for the transfer pricing indicator variable moreover turns out negative and statistically significant, suggesting that the implementation of transfer pricing rules in a low-tax country levying a zero corporate tax rate reduces the affiliate's operating profitability as the legislations may restrict the multinational group's ability to shifting income *towards* the low-tax affiliate.

Note, furthermore, that in all specifications, the control variables show the expected signs. Firm size, measured by the logarithm of fixed assets and the logarithm of costs of employees, exerts a positive impact on reported EBIT. With increasing unemployment rates, the reported earnings before interest and taxes decrease, while they increase with an increasing GDP per capita and an increasing GDP growth rate. The coefficient for the GDP variable has a negative sign which may reflect that competition levels rise in larger markets and therefore drive down firm profitability.

5.2 Robustness Checks

To assess the sensitivity of our results to alternative model specifications, we ran a number of robustness checks. For all robustness checks, we report heteroskedasticity robust standard errors adjusted for firm clusters.

Specification (1) of Table 5 resembles the baseline specification in Column (3) of Table 4. Specification (2) reestimates this baseline model but includes a continuous measure for the transfer price legislation which takes on the values 1 to 3 for the transfer price categories defined in Section 3. The findings again resemble our baseline estimates by suggesting that increasing the strictness of transfer price legislation by one category reduces the elasticity of the sensitivity of operating profits to corporate tax rate changes by 1.1, or, in relative terms, by around one third. Specification (3) furthermore models the transfer price legislation system by including indicator variables for categories 2 and 3 as well as their interaction terms with the corporate tax rate variable. This, again, confirms the previous results in the sense that we find a negative and quantitatively large coefficient estimate for the corporate tax rate variable, which suggests substantial profit shifting activities in the

absence of transfer price legislations (category 1). The negative tax effect is dampened, however, if the affiliate's host country has implemented transfer pricing legislations. Introducing legislations of category 2, dampens the sensitivity by around 61% ($= 1.789/(-2.942)$) relative to category 1. Introducing legislations of category 3, dampens the effect by around 85% relative to category 1 ($= 2.494/(-2.942)$). Specifications (4) to (6) furthermore reestimate the models in Columns (1) to (3) but employ EBIT over total assets as dependent variable to capture corporate profitability. This leaves the qualitative pattern of the results unaltered. Quantitatively, the dampening effect of transfer pricing legislation on shifting behavior is somewhat smaller than in the baseline results. Column (6) for example suggests that introducing transfer price legislations of category 2, dampens the profit sensitivity to corporate tax rate changes by around 35% ($= 1.250/(-3.560)$) relative to category 1. Introducing legislations of category 3, dampens the effect by 53% ($= 1.886/(-3.560)$) relative to category 1.

So far, all estimation models furthermore employed profit information as measured by EBIT which captures the firm's operating profits before interest and tax. From our point of view, it is the best suited profit measure in the context of our analysis since transfer price distortions for goods and services traded within the multinational group are expected to affect a company's operating income in first place. However, financial profits may also be affected by transfer pricing regulations since transfer price legislations also require interest rates to be set according to the arm's length principle. We thus, as a robustness check, rerun our baseline estimations using corporate pre-tax profits as dependent variable which comprises both, the company's operating as well as its financial profit. The results are presented in Table 6. Specifications (1) to (3) reestimate the models in Columns (1) to (3) of Table 5 but employ pre-tax profits instead of EBIT as the dependent variable. The qualitative pattern of the results remains the same, while the dampening effect of transfer pricing legislations on profit shifting behavior, again, is found to be somewhat smaller than in the baseline estimates. Precisely, the results in Column (3) suggest that introducing transfer price legislations of category 2 (category 3), dampens the profit sensitivity to corporate tax rate changes by around 38% (63%) relative to category 1. Using pre-tax profit over total assets as the dependent variable reduces the dampening effect even further, see Columns (4) to (6). Column (6) suggests that introducing transfer price legislations of category 2 (category 3), reduces the profit sensitivity to corporate tax rate choices by only 19% (39%) relative to category 1. This pattern is in line with intuition since arm's length prices for financial transactions are readily available and shifting possibility for financial income through the distortion of interest rate choices thus appear to be limited (contrary to the intra-firm trade of firm specific goods and services).

As described in Section 3, we furthermore augmented our data by information on advanced pricing agreements (APAs). The possibility to enter into an advanced pricing agreement and to negotiate intra-firm transfer prices with the tax authorities on an upfront basis, is expected to reduce the company’s risk for later transfer price adjustments in the course of tax audits. Multinational corporations may thus be willing to give up after-tax income and agree on less aggressive transfer prices which imply less income relocation to low-tax countries. If this held true, we would expect that the possibility to enter bilateral advanced pricing agreements reduced the sensitivity of reported operating profits to corporate tax rate changes. We estimate a model of the following form

$$EBIT_{it} = \alpha_0 + \alpha_1\tau_{it} + \alpha_2(\tau_{it} \cdot TP_{it}) + \alpha_3TP_{it} + \alpha_4(\tau_{it} \cdot APA_{it}) + \alpha_5APA_{it} + \alpha_6X_{it} + \rho_t + \phi_i + \epsilon_{it} \quad (4)$$

whereas the variable definition corresponds to equation (4) and APA_{it} indicates that the tax authorities in affiliate i ’s host country allow for advanced pricing agreements in period t . If advanced pricing agreements indeed dampen income shifting activities, we expect $\alpha_4 > 0$. The sign of the coefficient estimate for the APA_{it} variable in turn is expected to be negative ($\alpha_5 < 0$) since giving up income shifting opportunities in a low-tax country would imply a reduction in pre-tax profitability.

The results are depicted in Table 7. In Columns (1), we reestimate the model presented in Column (3) of Table 4, augmenting the set of regressors by an indicator for the opportunity to engage in advanced pricing agreements and its interaction term with the corporate tax rate. The results in Column (1) confirm our basic hypothesis. The coefficient estimate for the interaction between the advanced pricing variable and the corporate tax rate turns out positive and statistically significant, indicating that advanced pricing agreements reduce income shifting activities. Moreover, as expected, the coefficient estimate for the advanced pricing variable turns out negative and significant. Moreover, our baseline results on the effect of transfer pricing legislations on income shifting activities remain qualitatively and quantitatively unaffected by the inclusion of the new regressors.

The finding does not turn out to be robust across specifications though. Modelling the strictness of transfer pricing legislations through indicator variables for the categories 2 and 3 renders the coefficient estimate for the interaction term between the advanced pricing variable and the corporate tax rate statistically insignificant (although it remains positive and only slightly drops in size). If we reestimate the two specifications employing EBIT over total assets as dependent variable in Columns (3) and (4), the latter finding is confirmed. Thus, while the availability of advanced pricing agreements does not appear to have a robust negative impact on

the dimension of tax-motivated income shifting activities, the dampening effect of transfer pricing legislations is confirmed by all model specifications.

Finally, note that our analysis so far has relied on information on the statutory corporate tax rate in the affiliate's host country to model income shifting incentives. As shown in the sketched theoretical model in Section 2 income shifting incentives are plausibly determined by the corporate tax rate difference between the entities of a multinational corporation. We thus reestimate our baseline specifications using the tax rate differential between the considered affiliate and all other affiliate within the multinational group. The tax differential is calculated by determining the un-weighted average tax rate of all corporate group members (ownership >50%) of the firm and deducting it from the corporate tax rate in the firm's host country.

The results are reported in Table 8. Specification (1) regresses the affiliate's EBIT on the corporate tax rate differential as well as its interaction term with a linear time trend and a dummy variable indicating the presence of transfer price legislations (categories 2 and 3). Analogously to the previous specifications, the set of control variables described in Section 4 is included in the model. In line with expectations, we find a negative and statistically significant coefficient estimate for the tax difference variable, indicating that an increase in the tax rate differential between the considered entity and other affiliates within the multinational group increases the multinational's incentive to relocate income away from the affiliate. The coefficient estimate for the interaction between the corporate tax rate variable and the indicator for transfer pricing rules turns out positive and statistically significant in turn, suggesting that the income shifting effect is significantly dampned by transfer pricing legislations. Quantitatively, the findings suggest a reduction in shifting activities through the implementation of transfer pricing rules by around 74%.⁶

The pattern of these results prevails when we model transfer price legislations by including dummy variables which indicate transfer pricing regimes of category 2 and 3 in Specification (2) and augment the specification by information on advanced pricing agreements and their interaction term with the corporate tax rate in Specification (3). As before, advanced pricing agreements are not found to significantly affect shifting behavior. These results are further confirmed when we reestimate

⁶Interestingly, the coefficient for the transfer pricing variable is now positive as well. This might appear surprising at first sight. Note, however, that the transfer pricing variable now reflects the impact of the introduction of transfer pricing legislations on reported operating profits for affiliates which exhibit a corporate tax rate differential of zero relative to other affiliates in the multinational group (as compared to a corporate tax rate of zero in the previous estimations). The coefficient thus does no longer capture the impact of the introduction of transfer pricing regulations in low-tax countries, but in 'middle-tax' countries with comparable corporate tax rates as other firms in the multinational group. For this reference group, the introduction of transfer pricing legislations appears to exert a positive impact on reported EBIT.

the specifications, employing EBIT over total assets as the dependent variable (see Specifications (4) to (6)).

Summarizing, our findings suggest that transfer pricing legislations are instrumental in limiting income shifting activities, while advanced pricing agreements do not reveal a stable negative impact on shifting behavior.

6 Conclusion

The aim of this paper was to investigate multinational profit shifting within Europe and to assess whether international shifting is significantly dampened by the introduction and tightening of transfer price documentation requirements. As transfer pricing is widely acknowledged to be an (perhaps the most) important income shifting channel (see e.g. Clausing (2003) and Buettner and Wamser (2007)), many countries have implemented transfer pricing documentation requirements in recent years to hedge against profit outflows through intra-firm price distortions. As these rules, especially the stricter versions, give rise to significant compliance costs for multinational firms and bind valuable resources within tax authorities, evaluating their effectiveness in restricting transfer pricing behaviour by MNEs is crucial to assess their welfare implications.

To the best of our knowledge, our paper is the first to assess the link between transfer price documentation and 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 to panel data on multinational firms in the EU. In line with previous studies, we find evidence for multinational profit shifting from high-tax to low-tax countries. These shifting activities, however, turn out to be reduced significantly when countries introduce transfer pricing regulations. Depending on the model specification, our findings suggest that transfer pricing legislations may reduce income shifting behavior by more than 50%, whereas stricter rules also tend to imply stronger negative effects on shifting behavior.

The results thus suggest that the high administrative burden associated with transfer pricing regulations may be justified as they lead to a strong decline in tax-motivated profit shifting activities across borders.

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8 Appendix

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

Category	Description
Category 1	No or only very general anti-avoidance regulations; no documentation requirements
Category 2	Transfer pricing rules exist; documentation requirement is not introduced in national tax law, but is required to exist in an audit
Category 3	Transfer pricing rules exist; documentation requirement exists in national tax law

	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

	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

<i>Variable</i>	<i>Obs</i>	<i>Mean</i>	<i>Std.Dev.</i>	<i>Min</i>	<i>Max</i>
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
Existence of Transfer Pricing Legislation	151,716	0.9596	0.1970	0	1
Transfer Pricing Legislation Category 1	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 AMADEUS database offered by Bureau van Dijk, version: February 2011

★ taken from unconsolidated accounts, in thousand USD

▼ difference between the host country's corporate tax rate and the unweighted average tax rate of the corporate group (ownership $\geq 50\%$)

▲ 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)	(2)	(3)	(a)	(b)	(c)
	(a)	(b)	(c)	(a)	(b)	(c)
Corporate Tax Rate	-0.394 (0.166) (0.300) (0.194)	-1.854 (0.299) (0.387) (0.358)	-3.425 (0.409) (0.638) (0.365)			
Corporate Tax Rate × Time		0.176 (0.0331) (0.0524) (0.0329)	0.185 (0.0341) (0.0537) (0.0306)			
TP Legislation Binary			-0.468 (0.124) (0.221) (0.111)			
TP Legislation Binary × Corporate Tax Rate			1.709 (0.363) (0.624) (0.324)			
Fixed Assets	0.082 (0.005) (0.005) (0.016)	0.083 (0.005) (0.005) (0.015)	0.083 (0.005) (0.005) (0.016)			
Cost of Employees	0.433 (0.012) (0.021) (0.016)	0.437 (0.012) (0.020) (0.016)	0.437 (0.012) (0.020) (0.016)			
GDP/10 ³	-0.304 (0.132) (0.154) (0.221)	-0.209 (0.131) (0.140) (0.223)	-0.095 (0.134) (0.152) (0.223)			
GDPpC/10 ⁴	0.569 (0.074) (0.100) (0.089)	0.757 (0.081) (0.122) (0.100)	0.791 (0.081) (0.118) (0.102)			
Unemployment Rate	-0.006 (0.002) (0.003) (0.003)	-0.009 (0.002) (0.004) (0.003)	-0.010 (0.002) (0.004) (0.003)			
Corruption	-0.012 (0.010) (0.016) (0.011)	-0.006 (0.010) (0.013) (0.010)	0.005 (0.010) (0.014) (0.010)			
GDP Growth	0.009 (0.002) (0.004) (0.002)	0.006 (0.003) (0.003) (0.002)	0.006 (0.002) (0.003) (0.002)			
# 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 levels in parentheses. Observational unit is the multinational firm, i.e. either the parent or a wholly owned subsidiary is located in a foreign jurisdiction. 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). 'Existence of Transfer Pricing Legislation' describes an indicator variable for the existence of transfer pricing legislation in a given country. 'Existence of TP Leg. x Corporate Tax Rate' stands for the interaction term of such an indicator variable and the corporate tax rate. 'Log Fixed Assets' depicts the logarithm of the 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 based on one-digit NACE-codes.

Dependent Variable: Log EBIT (Columns (1)-(3)), Log EBIT/Total Assets (Columns (4)-(6))						
	(1)	(2)	(3)	(4)	(5)	(6)
Corporate Tax Rate	-3.425*** (0.409)	-3.339*** (0.377)	-2.942*** (0.412)	-4.018*** (0.397)	-4.246*** (0.359)	-3.560*** (0.400)
Corporate Tax Rate × Time	0.185*** (0.034)	0.069* (0.037)	0.087** (0.037)	0.406*** (0.032)	0.291*** (0.035)	0.313*** (0.035)
TP Legislation Binary	-0.468*** (0.124)			-0.219* (0.121)		
TP Legislation Binary × Corporate Tax Rate	1.709*** (0.363)			1.155*** (0.354)		
TP Legislation Continuous		-0.327*** (0.047)			-0.287*** (0.044)	
TP Legislation Continuous × Corporate Tax Rate		1.058*** (0.145)			0.977*** (0.138)	
Category 2			-0.478*** (0.124)			-0.230* (0.121)
Category 3			-0.737*** (0.135)			-0.472*** (0.131)
Category 2 × Corporate Tax Rate			1.789*** (0.366)			1.250*** (0.357)
Category 3 × Corporate Tax Rate			2.494*** (0.396)			1.886*** (0.383)
Fixed Assets	0.083*** (0.005)	0.083*** (0.005)	0.083*** (0.005)	-0.171*** (0.005)	-0.171*** (0.005)	-0.171*** (0.005)
Costs of Employees	0.437*** (0.012)	0.436*** (0.012)	0.437*** (0.012)	0.162*** (0.010)	0.160*** (0.010)	0.162*** (0.010)
Corruption Index	0.005 (0.010)	0.012 (0.010)	0.014 (0.010)	-0.007 (0.010)	-0.004 (0.009)	0.002 (0.009)
GDP/10 ¹³	-0.095 (0.134)	-0.242* (0.134)	-0.189 (0.135)	-0.291** (0.128)	0.106 (0.128)	0.198 (0.129)
GDPpC/100	0.008*** (0.000)	0.008*** (0.000)	0.008*** (0.000)	0.010*** (0.000)	0.009*** (0.000)	0.009*** (0.000)
GDP Growth Rate	0.006*** (0.002)	0.006*** (0.002)	0.006*** (0.002)	0.007*** (0.002)	0.008*** (0.002)	0.007*** (0.002)
Unemployment	-0.010*** (0.002)	-0.008*** (0.002)	-0.007*** (0.002)	-0.008*** (0.002)	-0.007*** (0.003)	-0.005** (0.002)
Industry-Year-Effects	√	√	√	√	√	√
Within R-Squared	0.1578	0.1580	0.1582	0.0341	0.0341	0.0345
#Obs	150,214	150,214	150,214	150,214	150,214	150,214

Notes: Heteroscedasticity robust standard errors adjusted for firm clusters in parentheses. ***, **, and * indicate significance at the 10%, 5%, and 1% level respectively. Observational unit is the multinational firm, i.e. either the parent or a wholly owned subsidiary is located in a foreign jurisdiction. The dependent variable is the logarithm of the firm's earnings before interest and taxes. '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). 'Existence of Transfer Pricing Legislation' describes an indicator variable for the existence of transfer pricing legislation in a given country. 'Existence of TP Leg. x Corporate Tax Rate' stands for the interaction term of such an indicator variable and the corporate tax rate. 'Transfer Pricing Legislation' depicts the strictness of transfer pricing legislation (1= no or only very general anti-avoidance regulations; 2= Transfer pricing rules exist; documentation requirement is not introduced in national tax law, but is required to exist in an audit; 3 = Transfer pricing rules exist; documentation requirement exists in national tax law, but must only be available upon request). 'TP Leg. x Corporate Tax Rate' describes the interaction term of the categorial transfer pricing variable and the corporate tax rate. 'Category 2' and 'Category 3' stand for indicator variables for categories 2 and 3 as defined above. 'Category 2 x Corporate Tax Rate' and 'Category 3 x Corporate Tax Rate' describe the interaction term of the respective category and the corporate tax rate. For a description of the control variables, see the notes to Table 4.

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*** (0.448)	-4.705*** (0.410)	-3.788*** (0.451)	-5.104*** (0.436)	-5.760*** (0.395)	-4.430*** (0.440)
Corporate Tax Rate × Time	0.354*** (0.037)	0.194*** (0.041)	0.211*** (0.041)	0.589*** (0.036)	0.427*** (0.039)	0.446*** (0.039)
TP Legislation Binary	-0.355** (0.139)			-0.079 (0.137)		
TP Legislation Binary × Corporate Tax Rate	1.252** (0.405)			0.628 (0.398)		
TP Legislation Continuous		-0.405*** (0.050)			-0.373*** (0.048)	
TP Legislation Continuous × Corporate Tax Rate		1.186*** (0.157)			1.134*** (0.151)	
Category 2			-0.376*** (0.139)			-0.101 (0.137)
Category 3			-0.744*** (0.149)			-0.468** (0.146)
Category 2 × Corporate Tax Rate			1.451*** (0.409)			0.829** (0.401)
Category 3 × Corporate Tax Rate			2.370*** (0.437)			1.741*** (0.426)
Costs of Employees	0.359*** (0.011)	0.359** (0.011)	0.360*** (0.011)	0.101*** (0.009)	0.100*** (0.009)	0.102*** (0.009)
Fixed Assets	0.083*** (0.006)	0.083*** (0.006)	0.084*** (0.006)	-0.169*** (0.006)	-0.168*** (0.006)	-0.168*** (0.006)
Corruption Index	-0.013 (0.011)	-0.003 (0.011)	-0.001 (0.011)	-0.026** (0.010)	-0.020** (0.010)	-0.012 (0.010)
GDP	-4.66e-13*** (1.41e-13)	-6.84e-13*** (1.41e-13)	-6.15e-13*** (1.42e-13)	-1.81e-14 (1.33e-13)	1.67e-13 (1.35e-13)	1.67e-13 (1.35e-13)
GDP per Capita	0.0001*** (8.72e-6)	0.0001*** (8.72e-6)	0.0001*** (8.71e-6)	0.0001*** (8.30e-6)	0.0001*** (8.29e-6)	0.0001*** (8.29e-6)
GDP Growth Rate	0.009*** (0.002)	0.009*** (0.002)	0.009*** (0.002)	0.011*** (0.002)	0.010*** (0.002)	0.010*** (0.002)
Unemployment	-0.015*** (0.003)	-0.012*** (0.003)	-0.010*** (0.003)	-0.013*** (0.002)	-0.008*** (0.002)	-0.008*** (0.002)
Industry-Year-Effects	√	√	√	√	√	√
Within R-Squared	0.1425	0.1431	0.1432	0.0326	0.0330	0.0334
#Obs	151,716	151,716	151,716	151,716	151,716	151,716

Notes: Heteroscedasticity robust standard errors adjusted for firm clusters in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level respectively. Observational unit is the multinational firm, i.e. either the parent or a wholly owned subsidiary is located in a foreign jurisdiction. The dependent variable is the logarithm of the firm's profit before taxes. '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). 'Existence of Transfer Pricing Legislation' describes an indicator variable for the existence of transfer pricing legislation in a given country. 'Existence of TP Leg. x Corporate Tax Rate' stands for the interaction term of such an indicator variable and the corporate tax rate. 'Transfer Pricing Legislation' depicts the strictness of transfer pricing legislation (1= no or only very general anti-avoidance regulations; 2= Transfer pricing rules exist; documentation requirement is not introduced in national tax law, but is required to exist in an audit; 3 = Transfer pricing rules exist; documentation requirement exists in national tax law, but must only be available upon request). 'TP Leg. x Corporate Tax Rate' describes the interaction term of the categorial transfer pricing variable and the corporate tax rate. 'Category 2' and 'Category 3' stand for indicator variables for categories 2 and 3 as defined above. 'Category 2 x Corporate Tax Rate' and 'Category 3 x Corporate Tax Rate' describe the interaction term of the respective category and the corporate tax rate. For a description of the control variables, see the notes to Table 4.

Dependent Variable: Log EBIT (Columns (1)-(2)), Log EBIT/Total Assets (Columns (3)-(4))				
	(1)	(2)	(3)	(4)
Corporate Tax Rate	-2.438*** (0.432)	-2.401*** (0.431)	-3.294** (0.420)	-3.228*** (0.419)
Corporate Tax Rate x Time	0.037 (0.040)	0.031 (0.040)	0.307*** (0.038)	0.298*** (0.038)
Existence of Transfer Pricing Legislation	-0.466*** (0.125)		-0.188 (0.122)	
Existence of TP Leg. x Corporate Tax Rate	1.673*** (0.368)		1.087*** (0.358)	
Category 2		-0.459*** (0.126)		-0.173 (0.122)
Category 3		-0.528*** (0.142)		-0.304** (0.138)
Category 2 x Corporate Tax Rate		1.689*** (0.373)		1.081*** (0.363)
Category 3 x Corporate Tax Rate		1.837*** (0.417)		1.408*** (0.404)
APA	-0.213*** (0.050)	-0.156** (0.073)	-0.118** (0.048)	0.016 (0.070)
APA x Corporate Tax Rate	0.387** (0.175)	0.231 (0.231)	0.020 (0.167)	-0.264 (0.220)
Log Costs of Employees	0.431*** (0.012)	0.431*** (0.012)	0.162*** (0.010)	0.163*** (0.010)
Log Fixed Assets	0.083*** (0.005)	0.083*** (0.005)	-0.171*** (0.005)	-0.171*** (0.005)
Corruption Index	-0.005 (0.011)	0.004 (0.011)	-0.010 (0.010)	-0.012* (0.010)
GDP	1.41e-13 (1.50e-13)	1.09e-13 (1.51e-13)	5.42e-13*** (1.43e-13)	4.92e-13*** (1.44e-13)
GDP per Capita	0.00007*** (8.25e-6)	0.00007*** (8.42e-6)	0.00009*** (7.84e-6)	0.00009*** (8.00e-6)
GDP Growth Rate	0.008*** (0.002)	0.007*** (0.002)	0.009*** (0.002)	0.009*** (0.002)
Unemployment	-0.012*** (0.002)	-0.011*** (0.002)	-0.011*** (0.002)	-0.010*** (0.002)
Industry-Year-Effects	√	√	√	√
Within R-Squared	0.1575	0.1575	0.0350	0.0351
#Obs	146,321	146,321	146,321	146,321

Notes: Heteroscedasticity robust standard errors adjusted for firm clusters in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level respectively. Observational unit is the multinational firm, i.e. either the parent or a wholly owned subsidiary is located in a foreign jurisdiction. The dependent variable is the logarithm of the firm's earnings before interest and taxes. '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). 'Existence of Transfer Pricing Legislation' describes an indicator variable for the existence of transfer pricing legislation in a given country. 'Existence of TP Leg. x Corporate Tax Rate' stands for the interaction term of such an indicator variable and the corporate tax rate. 'Category 2' and 'Category 3' stand for indicator variables for categories 2 and 3 (1= no or only very general anti-avoidance regulations; 2= Transfer pricing rules exist; documentation requirement is not introduced in national tax law, but is required to exist in an audit; 3 = Transfer pricing rules exist; documentation requirement exists in national tax law, but must only be available upon request). 'Category 2 x Corporate Tax Rate' and 'Category 3 x Corporate Tax Rate' describe the interaction term of the respective category and the corporate tax rate. 'APA' is an indicator variable for the possibility to enter into advance pricing agreements. 'APA x Corporate Tax Rate' is the interaction term of this indicator variable and the corporate tax rate. For a description of the control variables, see the notes to Table 4.

Table 8: Robustness Checks: Tax Rate Differential, Fixed Effects, Panel 1999-2009						
Dependent Variable: Log EBIT (Columns (1)-(2)), Log EBIT/Total Assets (Columns (3)-(4))						
	(1)	(2)	(3)	(4)	(5)	(6)
Tax Differential	-1.427*** (0.363)	-1.436*** (0.367)	-1.479*** (0.382)	-1.054*** (0.338)	-1.037*** (0.343)	-1.031*** (0.363)
Tax Differential x Time	0.031 (0.030)	0.032 (0.031)	0.016 (0.034)	0.040 (0.029)	0.039 (0.029)	0.032 (0.032)
Existence of Transfer Pricing Legislation	0.105*** (0.032)			0.138*** (0.031)		
Existence of TP Leg. x Tax Differential	1.054*** (0.385)			0.667* (0.359)		
Category 2		0.102*** (0.037)	0.072* (0.039)		0.141*** (0.036)	0.126*** (0.037)
Category 3		0.106*** (0.032)	0.072** (0.034)		0.138*** (0.031)	0.124*** (0.033)
Category 2 x Tax Differential		1.079*** (0.410)	1.191*** (0.423)		0.615 (0.387)	0.615 (0.402)
Category 3 x Tax Differential		1.032** (0.399)	1.256*** (0.431)		0.703* (0.372)	0.782* (0.405)
APA			-0.006 (0.027)			-0.032 (0.026)
APA x Tax Differential			-0.116 (0.239)			-0.094 (0.234)
Log Costs of Employees	0.502*** (0.017)	0.502*** (0.017)	0.493*** (0.018)	0.210*** (0.014)	0.210*** (0.014)	0.208*** (0.014)
Log Fixed Assets	0.087*** (0.008)	0.087*** (0.008)	0.087*** (0.008)	-0.198*** (0.008)	-0.198*** (0.008)	-0.197*** (0.008)
Corruption Index	0.037*** (0.013)	0.037*** (0.013)	0.016 (0.014)	0.034*** (0.012)	0.035*** (0.012)	0.016 (0.013)
GDP	-5.71e-14 (1.64e-13)	-5.12e-14 (1.66e-13)	2.29e-13 (1.90e-13)	3.51e-13** (1.53e-13)	3.42e-13** (1.56e-13)	5.98e-13*** (1.80e-13)
GDP per Capita/100	0.004*** (0.001)	0.004*** (0.001)	0.004*** (0.001)	0.003*** (0.001)	0.003*** (0.001)	0.003*** (0.001)
GDP Growth Rate	0.014*** (0.004)	0.014*** (0.004)	0.015*** (0.004)	0.021*** (0.004)	0.021*** (0.004)	0.023*** (0.004)
Unemployment	0.001 (0.003)	0.001 (0.003)	-0.001 (0.003)	0.007** (0.003)	0.007** (0.003)	0.004 (0.003)
Industry-Year-Effects	√	√	√	√	√	√
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 10%, 5%, and 1% level respectively. Observational unit is the multinational firm, i.e. either the parent or a wholly owned subsidiary is located in a foreign jurisdiction. The dependent variable is the logarithm of the firm's earnings before interest and taxes (EBIT). '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 group members. 'Tax Differential x Time' stands for the interaction term of the tax differential and a time indicator (values 1 to 11 for the years 1999-2009). 'Existence of Transfer Pricing Legislation' describes an indicator variable for the existence of transfer pricing legislation in a given country. 'Existence of TP Leg. x Tax Differential' stands for the interaction term of such an indicator variable and the tax differential. 'Category 2' and 'Category 3' stand for indicator variables for categories 2 and 3 (1= no or only very general anti-avoidance regulations; 2= Transfer pricing rules exist; documentation requirement is not introduced in national tax law, but is required to exist in an audit; 3 = Transfer pricing rules exist; documentation requirement exists in national tax law, but must only be available upon request). 'Category 2 x Tax Differential' and 'Category 3 x Tax Differential' describe the interaction term of the respective category and the tax differential. 'APA' is an indicator variable for the possibility to enter into advance pricing agreements. 'APA x Corporate Tax Rate' is the interaction term of this indicator variable and the corporate tax rate. For a description of the control variables, see the notes for Table 4.

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