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Transfer Pricing and Partial Tax Harmonization

Abstract

This paper investigates regulation on corporate income taxation with multinationals and transfer pricing. We recommend full cooperation within the EU if profit shifting costs are sufficiently low and cannot be influenced to a large extend. Otherwise, high profit shifting costs or the potential to significantly influence them imply that partial cooperation is beneficial for all member states.

JEL-Codes: F210, H210, H260.

Keywords: tax harmonization, transfer pricing, multinational, profit shifting.

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1 Introduction

Tax competition within the OECD countries is under debate for decades, especially in the European Union (EU), both in public discussions and academic contributions. In recent years, multinational enterprises (MNEs) work with business models that are more complex, maintain more cross-border activities and use more resources to reduce their tax burden (Hines 1999, European Commission 2015). An increasing body of literature provides evidence for profit shifting activities caused by tax rate differentials between countries. Davies et al. (2014) estimate an annual loss of 333 million Euro for the French tax authorities due to profit shifting. The authors find that the bulk of the loss is driven by exports to tax havens. Grubert and Mutti (1991) as well as Hines and Rice (1994) argue that profit shifting between foreign subsidiaries allows US-Multinationals' to substantially reduce overall tax payments. Huizinga and Laeven (2008) obtain similar results for European subsidiaries. Egger, Eggert and Winner (2010) compare tax payments of multinational and domestic firms in Europe and analyze the magnitude of profit shifting activities. In a nutshell, results suggests that multinational firms cut their tax payments by half as a consequence of profit shifting.[1]

It is well understood from the existing literature that non-cooperative choice of taxes generates fiscal externalities. To implement efficient tax policy, it must be the case that no profitable deviation to tax competition is available for any country. Recent theoretical literature on corporate income taxation (CIT) focuses on harmonization of tax bases rather than tax rates.[2]

[1] For a detailed survey on the empirical literature see Dharmpala (2014).

[2] See e.g., Nielsen et al. (2010) or Eichner and Runkel (2011).

Under FA countries apportion their consolidated tax bases. Despite this tax base coordination approach, cooperation of subgroups of countries has surprisingly received relatively little attention. In this paper, we aim to analyze cooperation between countries when they form subgroups in the harmonization of CIT rates. Thus, this paper fills the existing research gap and focuses on whether individual and collective incentives coincide under full and partial tax harmonization. We find that (partial) tax harmonization is Pareto-superior to non-cooperation. Whether partial or full tax harmonization is a stable outcome crucially depends on the costs of profit shifting and the countries' potential to influence them. Additionally, we characterize economic environments where the individually optimal action is at the Pareto-frontier.

The potential discrepancy of individual and collective action is based on the competition for international profits. A benchmark argument in the existing literature on capital taxation is that tax competition between countries results in lower tax rates as compared to a tax harmonization. A simultaneous increase in tax rates would result in higher welfare levels of the countries as fiscal externality are internalized (Zodrow and Mieszkowski 1986, Wildasin 1988). However, the implication for tax policy reform among sovereign countries is not easy to characterize. Wilson (1991) shows that small countries may have an incentive not to participate in tax harmonization as gains and losses from tax competition can be asymmetrically distributed between countries of different size. There can be considerable gains of tax competition for small countries, which therefore may oppose tax coordination. Accordingly the gain from non-cooperation may prevent Pareto-efficient outcomes in a

one-shot tax competition setting (Wildasin 1989, Bucovetsky and Wilson 1991). Related, Mintz (1999) argues that a race to the bottom can occur as a consequence of profit shifting activities by MNEs. These activities result in the same prisoner's dilemma structure on an intra-governmental level as they cause fiscal externalities and result in inefficient choice of tax rates. In benchmark cases countries have an incentive to lower tax rates in order to attract profits from abroad.

To overcome a race-to-the-bottom, the European Commission (2001) proposed a shift away from the currently used arm's length principle under separate accounting towards a formula apportionment (FA) regime. This aims at targeting the fiscal externality by eliminating the incentives of profit shifting. As Riedel and Runkel (2007) point out, this line of reasoning assumes that the MNEs headquarter is located within a FA coalition whereas this may not be the case in reality. Thus, a major obstacle of tax coordination is coalition formation. A proposal for this equilibrium concept can be found in Burbidge et al. (1997). Since the countries' decision whether to join a coalition is based on a federal level, coalition stability is crucial for durable tax harmonization agreements. Konrad and Schjelderup (1999) show for capital taxation that a coalition of a subgroup of countries is Pareto-improving as compared to non-cooperation. In the present paper, we aim at identifying conditions under which measures of tax harmonization within the EU become implementable as an outcome under decentralized decision-making by countries. The first part in this paper addresses issues that are prominent since the Werner Report (1970) and the Ruding Report (1992). The second part of our analysis focuses on the effects of increasing the costs of profit

shifting as proposed in the Code of Conduct for business taxation (CCBT) by the European Communities (1998).

The remainder is organized as follows: In section 2, we present a three-country model of asymmetric tax competition with four stages 2.1–2.4. Section 3 describes the comparative statics and results whereas section 4 offers concluding remarks.

2 The Model

The one period model consists of three countries. In the first stage the countries decide upon the harmonization of tax rates. Each of the countries can decide to participate in a tax rate harmonization agreement. There are five possible outcomes: The grand coalition, no cooperation and small coalitions. In the second stage each countries' tax authority chooses the corporate income tax rate. In the third stage a multinational enterprise sets the transfer prices of its affiliates as to maximize global profits. In the forth stage the affiliates decide upon the optimal production level and capital demand for a chosen set of transfer prices.

We analyze the agents' optimal decisions by backwards induction. Thus, we start with the optimal production level and capital demands in of the affiliate in stage four.

2.1 Stage 4: Affiliates

Let there be a representative affiliate of a MNE in each of the countries $i \in I = [1, 2, 3]$. With a sales price normalized to one, each affiliates' revenue

is $f_i(k_i)$. Per capita capital costs are rk_i where r is the price of capital and k_i the per capita capital input of affiliate i. The affiliates produce with a constant-returns-to-scale production technology.[3] Specify $f_i(k_i) = (A_i - k_i)k_i$ to allow for heterogeneity between countries where A_i describes marginal productivity of the first unit of capital. Let $A_i = A - (i-2)\epsilon$, where ϵ measures the difference between the countries' technology levels. Affiliates' profits before tax depend on the transfer pricing strategy chosen by the MNE and can be described by

$$\pi_i = f_i(k_i) - rk_i + \sum_j \rho_{i,j}, \tag{1}$$

with $i \in I$ and $j \in I \setminus i, i \neq j$. The variable $\rho_{i,j}$ captures the ability to shift profit between the affiliates in countries $i, j \in I$ with $i \neq j$. If $\rho_{i,j} = 0$, the transfer price is according to the arm's length principle and no tax-induced profit shifting occurs. In case of a higher (lower) $\rho_{i,j}$, the firms over-invoice (under-invoice) and may be able to shift profits (costs) to an affiliate in a country with lower (higher) tax rates applied. Shifting profits from country j to country i implies that the profits in i increase with the same amount as they decrease in j. Thus, $\rho_{i,j} = -\rho_{j,i}$ must be satisfied. Furthermore, costs of profit shifting will only occur once for each pair of transfer prices.

The affiliates' technology is $f_i(k_i(r))$. Profit maximizing capital demands $k_i(r)$ are given for the condition for optimal factor pricing

$$\frac{\partial f_i(k_i)}{\partial k_i} = r. \tag{2}$$

[3]We use a quadratic formulation of the production frontier as in Bucovetsky 1991, Devereux et al. 2008, as well as Eggert and Itaya 2014.

The market price for capital r solves the capital clearing condition

$$\sum_{i}^{3} k_i(r) = 3\bar{K}, \tag{3}$$

where the LHS describes the sum of capital demands and the RHS equals total capital supply depended on the average capital supply $\bar{K}$. Using factor pricing decisions and the capital price r^*, we obtain the capital market interest price $r^* = A - 2\bar{K}$ and market capital employment $k_i^* = \bar{K} + (1 - i/2)\epsilon$. We assume a positive marginal productivity of capital, i.e. $A > 2\bar{K}$ and positive factor inputs, i.e., $2\bar{K} > \epsilon$.[4] The affiliates arm's length profits are

$$f_i(k_i^*) - r^* k_i^* = \left[\bar{K} + \left(1 - \frac{i}{2}\right)\epsilon\right]^2. \tag{4}$$

In what follows $\eta_i \equiv f_i(k_i^*) - r^* k_i^*$. Clearly, the affiliate in the most productive country earns the highest profits before transfer pricing.

2.2 Stage 3: Multinational Enterprises

A multinational enterprise with affiliates in all of the three countries maximizes global profits by choosing the transfer prices applied between the affiliates. This can either happen in the range of "true", on arm's length, transfer prices or by manipulation of the transfer price. Assume that any deviation from the arms length price causes convex concealment costs[5] $q_i = \beta/2\rho_{i,j}^2 \quad \forall \beta \in (0, \bar{\beta}]$. The cost parameter assures that profit shifting is not costless whereas $\bar{\beta}$ implies the upper boundary of tax rates is never confisca-

[4]From section 2.2 on, we assume the MNE's and affiliates' profits to be non-negative under all tax-scenarios.

[5]See, e.g., Kind et al. 2005, Eggert and Itaya 2014 for the concealment function.

tory.

The MNE takes into account the countries' tax rates τ_i and the costs of profit shifting β when choosing the set of transfer prices which maximizes global profits

$$\Pi = \sum_{i}^{3} \left[(1 - \tau_i)\pi_i^* - q_i \right]. \tag{5}$$

We obtain these profits by substituting the market interest rate r, capital demands k_i^* and the transfer prices $\rho_{i,j}$ into equation (1). This gives the optimal distance $\rho_{i,j}^* = \frac{\tau_j - \tau_i}{\beta}$ to the arms' length price. Thus, if two countries levy the same tax rate, the MNE chooses the transfer price of one which is the arms' length transfer price and there is no tax induced profit shifting.

2.3 Stage 2: Tax Authorities

In a next step, the tax authorities choose the tax rates $\tau_i \in [0, 1)$ to maximize their payoff R_i. The set of tax rates for each countries' strategy profile $s_i \in S_i = [C, N]$ contains the possible tax rates under cooperation C and non-cooperation N. Thus, the set of tax rates can be divided into three subsets: cooperative tax rates, best deviation tax rates and Nash tax rates.

First, in the cooperative case all three countries maximize the joint payoffs $\sum R_i(\tau^C)$ and harmonize tax rates $\tau_i = \tau_{-i} = \tau^C$. Harmonization of the tax rates implies that there is no tax-induced profit shifting for any level of τ^C. Under tax harmonization, the MNE's profit is

$$\Pi^C = (1 - \tau^C) \sum \eta_i. \tag{6}$$

Thus, there is no incentive for tax induced profit shifting under full tax harmonization. Clearly, profits increase as the costs of capital decrease. Additionally, an increase in ϵ yields to higher profits since capital shifts to the more productive country. This affects the tax revenues

$$R_i^C(\tau^C) = \tau^C \eta_i. \tag{7}$$

We find that $R_i - R_{i+1} = \tau^C(\eta_i - \eta_{i+1}) > 0$. Thus, higher technology levels imply higher tax revenues in the respective countries.

Second, one country may deviate from the joint tax rate harmonization and choose a best deviation tax rate τ_i^D which maximizes its one-shot tax revenue given the coalition of two countries harmonizing tax rates. Country i deviates and chooses a tax rate knowing that countries j, l cooperate. Solving the system of country i's best response and the common best response tax rate of countries i, j gives

$$\tau_i^D = \frac{\beta}{6}\left[2\eta_i + \sum \eta_{-i}\right], \tag{8}$$

$$\tau_{-i}^D = \frac{\beta}{6}\left[\eta_i + 2\sum \eta_{-i}\right]. \tag{9}$$

Comparing equations (8) and (9) shows that the deviating country always levies a lower tax rate than the remaining coalition. We substitute (8) and (9) in the expression of R_i, given $\tau_j = \tau_l = \tau^C$ but $i \neq j \neq l$, to get the best-deviation tax revenue

$$R_i^D(\tau_i^D, \tau_{-i}^D) = \frac{\tau_i^D}{3}\left[2\eta_i + \sum \eta_{-i}\right]. \tag{10}$$

One can see that $R_i^D(\tau_i^D, \tau_{-i}^D) > R_{i+1}^D(\tau_i^D, \tau_{-i}^D)$, thus, the deviation gains are

the highest for the country with the most productive technology. Additionally, we obtain the revenue of country j remaining in the union of countries j, l with deviator i

$$R^D_{-ijl}(\tau^D_i, \tau^D_{-i}) = \frac{\tau^D_{-i}}{6}\left[\eta_i + 5\eta_j - \eta_l\right], \tag{11}$$

with $i, j, l \in I, i \neq j \neq l$.

Third, non-cooperative (Nash) tax rates $\tau_i := \arg\max_{\tau_i} R_i(\tau_i, \tau^N_{-i})$ which differ by country as they are motivated by differences in the technology levels. The countries' best response tax rates are

$$\tau_i(\tau_{-i}) = \frac{1}{4}\left[\sum \tau_{-i} + \beta\eta_i\right], \tag{12}$$

which entails the existence of the unique Nash equilibrium

$$\tau^N_i = \frac{\beta}{10}\left[3\eta_i + \sum \eta_{-i}\right]. \tag{13}$$

It is straightforward that different technology levels (i.e., $\epsilon \neq 0$) induce different tax rates and thus, tax induced profit shifting. Nash taxes and profit shifting imply that the countries tax revenue is

$$R^N_i(\tau_i, \tau_{-i}) = \frac{\tau^N_i}{5}\left[3\eta_i + \sum \eta_{-i}\right]. \tag{14}$$

With this set of tax rates in mind, the countries choose the strategy s_i from their strategy set S_i as to maximize payoffs given the strategy of the other countries. This will be analyzed in the following stage.

2.4 Stage 1: Countries

Each country chooses a strategy $s_i \in S_i = [C, N]$. The set of possible combinations is $S = \prod S_i$. Consider a subset of countries Ω, i.e., $\Omega \subseteq \{1, 2, 3\}$ which includes the four possible coalitions $\Omega \in \{\{1, 2\}, \{1, 3\}, \{2, 3\}, \{1, 2, 3\}\}$. We denote the set $\{i, j\}$ with $i, j \in I, i \neq j$ by $C_{i,j}$. The remaining situation of non-cooperation is denoted by C_0. Additionally, C_G denotes that all countries cooperate and form a grand coalition which maximizes the joint payoff by harmonizing the tax rates. Thus, in this scenario there is no tax induced profit shifting. Additionally, a coalition might be formed by two out of the three countries, whereas the third player remains the outsider $C_{1,2}, C_{1,3}, C_{2,3}$. Furthermore, there may not exist cooperation at all C_0. Each country maximizes its valuation $v_i(s_i, s_{-i}) = R_i(\tau_i(s_i, s_{-i}), \tau_{-i}(s_i, s_{-i}))$ for every outcome of the game.

3 Results and Comparative Statics

Result 1: Every country always prefers either full or partial tax rate harmonization to the situation of non-cooperation.

To obtain full or partial tax rate harmonization, countries have to prefer the grand coalition and the scenario of a two country coalition for all countries inside and outside the coalition to non-cooperation, i.e., $v_i(C_G) > v_i(C_0) \quad \forall i \in I$ and $v_i(C_{j,l}) > v_i(C_0) \quad \forall i, j, l \in I, j \neq l$. Thus, revenues in the cooperation scenarios must exceed the Nash tax revenues. The comparison of equations (7), (10) and (11) with (14) yields $R_i^C > R_i^N$, $R_i^D > R_i^N$ and

$R_{-i}^D > R_i^N$. Hence, cooperation is always desirable.

Result 2: Countries form the grand coalition for concealment costs lower than $\hat{\beta}$.

The argument behind result 2 is as follows. A strategy constitutes an equilibrium in the game $\Gamma[I, S_i, v_i(\cdot)]$ if for any given strategy s_{-i} the strategy s_i^* is the best response, i.e., $v_i(s_i^*, s_{-i}) > v_i(s_i, s_{-i}) \quad \forall s_i \in S_i$. Thus, every country prefers the grand coalition to every coalition of two, i.e., $v_i(C_G) > v_i(C_{j,l}) \quad \forall i, j, l \in I, i \neq j \neq l$. This is the case for $R_i^C > R_i^D$. Solving the inequality gives the result, $\beta := \hat{\beta} < \frac{18\eta_3}{(\sum \eta_i + \eta_3)^2}\tau^C$. This result may appear to be striking since one might expect a lower degree of cooperation if profit shifting is less costly. The explanation is that the deviator's revenue decreases for a lower β.

$$\frac{\partial R_i^D}{\partial \beta} = \tau_i^D \frac{\partial \pi_i^D}{\partial \beta} + \pi_i^D \frac{\partial \tau_i^D}{\partial \beta} > 0. \tag{15}$$

The total effect of a variation in β on R_i^D can be decomposed into two effects. First, a change in the costs of profit shifting β does not affect the affiliates profits. Given tax rates are in the optimum, transfer prices do not depend on the costs of profit shifting since the elasticity of the tax differentials $\tau_i - \tau_j$ is one. Hence, $\partial \pi_i^D / \partial \beta = 0$. Second, with low concealment costs the countries in the coalition of two levy lower tax rates as otherwise more profits may be shifted into the deviating country, i.e., $\frac{\partial \tau_{-i}^D}{\partial \beta} > 0$. Therefore, the deviating country also levies a lower tax rate to attract profits from those

countries, i.e., $\frac{\partial \tau_i^D}{\partial \beta} > 0$. Thus, decreasing costs of profit shifting lead to lower revenues for the deviator resulting in full cooperation. On the other hand, concealment costs above $\beta > \hat{\beta}$ imply an equilibrium with partial tax rate harmonization.

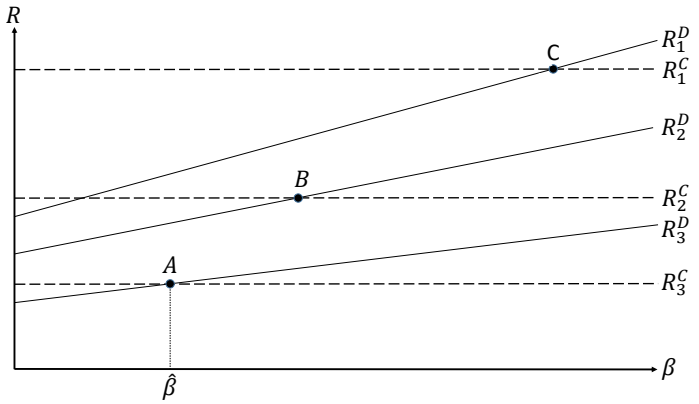

Figure 1 Incentives to deviate from full tax harmonization.

Figure 1 shows the revenues under full cooperation and the deviator's revenue under partial tax rate harmonization. Points A, B, C describe the threshold values determining when the countries are indifferent between full and partial tax rate harmonization. Above the points A, B, C, the respective countries $1, 2, 3$ have an incentive to deviate. For full harmonization it is necessary that no country deviates. Thus, $\hat{\beta}$ defines the upper boundary of full cooperation.

Result 3: The grand coalition is at the Pareto-frontier if the concealment costs are sufficiently low.

The socially optimal strategy maximizes the joint payoffs given the strategy set, i.e., $\max \sum_i v_i(s_i, s_{-i})$. This is the case if the sum of the revenues

under full cooperation exceeds the sum of revenues of any other possible scenario,

$$\underbrace{\sum_{l=1}^{3} R_l^C}_{\equiv \Psi^C} > \underbrace{R_i^D + \sum_j R_{-ij}^D}_{\equiv \Psi_i^D}, \quad i \in I, j \in I \setminus i, \tag{16}$$

$$\Psi^C > \underbrace{\sum_{l=1}^{3} R_l^N}_{\equiv \Psi^N}. \tag{17}$$

Clearly, from result 1 we know that equation (17) is always true. Additionally, equation (16) is satisfied for $\beta := \tilde{\beta} < \frac{18 \sum \eta_i}{(2 \sum \eta_i)^2 + (\eta_1 + \eta_2)^2 + \eta_3^2} \tau^C$. On the other hand, if $\beta > \tilde{\beta}$, there is an equilibrium with partial tax harmonization on the Pareto-frontier. As we know from proposition 3, $\frac{\partial R_i^C}{\partial \beta} = 0$ implies that the costs of transfer pricing do not affect Ψ^C. However, equation (18) shows that higher profit shifting costs increase the sum of revenues under partial tax rate harmonization Ψ_i^D,

$$\frac{\partial \Psi_i^D}{\partial \beta} = \underbrace{\tau_i^D \frac{\partial \pi_i^D}{\partial \beta}}_{\substack{\text{tax-base} \\ \text{effect (0)}}} + \underbrace{\pi_i^D \frac{\partial \tau_i^D}{\partial \beta}}_{\substack{\text{tax-rate} \\ \text{effect (+)}}} + \underbrace{\tau_{-i}^D \left(\sum_j \frac{\partial \pi_{-ij}^D}{\partial \beta} \right)}_{\substack{\text{tax-base} \\ \text{effect (0)}}} + \underbrace{\left(\sum_j \pi_{-ij}^D \right) \frac{\partial \tau_{-i}^D}{\partial \beta}}_{\substack{\text{tax-rate} \\ \text{effect (+)}}} > 0. \tag{18}$$

This result follows the logic of result 2: Lower concealment costs imply lower tax rates for all countries. Due to the tax-rate effects, a lower costs parameter implies a lower sum of revenues. This determines the threshold value of the profit shifting cost parameter where full and partial tax rate cooperation coincide on the Pareto-frontier. This is shown in figure 2 which illustrates the sum of revenues under full or partial tax rate harmonization depending on the cost parameter. The points D, E, F determine the intersection of

the aggregated revenues given the strategies of partial harmonization (Ψ_i^D) with the aggregated revenues under full cooperation (Ψ^C). Point D describes

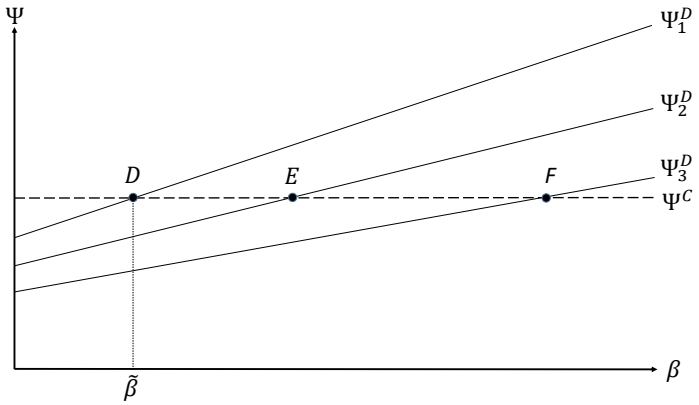

Figure 2 Socially optimal strategies.

the scenario where at least one strategy of deviation (weakly) dominates full harmonization. The corresponding $\tilde{\beta}$ defines the threshold value up to which full cooperation is optimal from an aggregated point of view.

Result 4: The cost parameter determines whether the socially optimal strategy and the Nash-stable strategy coincide.

Figure 3 illustrates the combined results from results 1–3. As we know from result 2 $\hat{\beta}$ defines the lower boundary where a country has an incentive to deviate from full cooperation. Below $\hat{\beta}$ full tax harmonization is optimal from an individual as well as aggregate point of view. Result 3 states that partial tax harmonization is socially optimal for $\beta > \tilde{\beta}$. Clearly, for cost parameters above $\tilde{\beta}$ partial cooperation is individually rational as this is the case for every $\beta > \hat{\beta}$. In-between $\hat{\beta}$ and $\tilde{\beta}$ the countries do not choose the socially

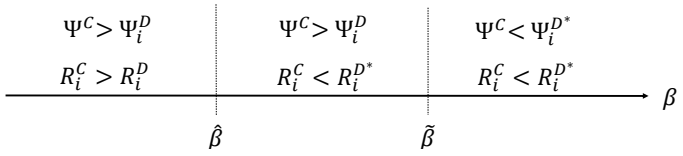

Figure 3 The influence of the profit shifting costs.

optimal strategy. From an aggregated point of view full harmonization is the preferred action whereas an individual incentive for deviation exists.

4 Concluding Remarks

As cross-border activities and intra-firm trade raise, MNEs face the opportunity to shift profits between countries to minimize their tax burden. Although the EU member states form a union, fiscal decisions are still decentralized. Each of the member states has the power to independently levy a national corporate tax rate. In combination with the profit shifting activities of MNEs this implies inflows from some countries into other member states. Clearly, although some member states win, this can lead to a waste of resources in the EU. There are two main proposals of how to overcome this prisoner's dilemma situation where some countries have an individual incentive to deviate from the outcome which would be optimal on an EU level.

The first is a full harmonization of tax rates within the EU which would cause tax-induced profit shifting to cease. Our results suggest that full tax rate harmonization is optimal from a EU's point of view as well as the member states level if two conditions are satisfied. Full harmonization is desirable if profit shifting is relatively inexpensive for firms and if at the same time governments are not able to influence the costs of profit shifting to a sufficiently

large extent. Thus, one should follow the proposals by the Werner Report (1970) and the Ruding Report (1992) and harmonize the CIT rates within the EU or levy a European CIT rate. Introducing the CCBT, could have negative effects. For a better understanding, we discuss the following two scenarios. If the costs of transfer pricing are within the range of $\hat{\beta} < \beta < \tilde{\beta}$ the socially optimal level is full tax harmonization. However, countries face an individual incentive to deviate. A regulation which forces all EU member states to engage in full tax harmonization would solve the prisoner's dilemma situation. If, on the other hand $\beta < \hat{\beta}$, full tax harmonization is individually and socially optimal. Thus, the introduction of a common CIT tax rate regulation would not affect the countries behavior as they levy harmonized tax rates per se. The CCBT, may incentify a country to deviate from full tax harmonization and is potentially harmful.

The second proposal which aims to increase the costs of profit shifting instead of regulating tax rates is in line with the CCBT. It should be applied if governments have the potential to affect the costs of transfer pricing to a great extend, i.e. governments can adjust the costs to $\beta > \tilde{\beta}$ independently of their initial level. Under this scenario, CCBT yields better outcomes than the proposals by the Ruding Report. A partial tax harmonization is socially optimal and rational from an individual countries perspective. Furthermore, if the initial level is above $\tilde{\beta}$ the implication holds independently of the ability to influence profit shifting costs. Whenever one should follow the proposals of CCBT, regulation should assure that countries can coordinate tax rates partially without being discouraged by regulatory instruments.

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