# Economic Integration and the Taxation of Multinationals: Separate Accounting vs. Formula Apportionment

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## Abstract

Multinational Enterprises (MNE) are a distinctive characteristic of the globalized economy. Though not all, many multinational firms are big corporations, able to excise substantial market power. Since they are spread over a range of different countries they can circumvent national policies and regulations by shifting activities between their subsidiaries. This footloose character of multinational firms creates the fear, that fiscal autonomy of countries can be undermined by shifting profits from high- to low-tax jurisdictions, using transfer pricing. Thus, for the European Union, a major reform of taxing multinational firms will be introduced: the present system of separate taxation (SA), in which profits are taxed in the region where the subsidiary is located, will be replaced by a system of formula apportionment (FA), in which all profits of a multinational firm will be lumped together and taxed with an average tax rate that is made of several apportionment factors, reflecting the economic activity of the MNE in various regions.

The present paper analyzes the effects of economic integration on the use of transfer pricing under the two different taxation schemes of SA and FA. It uses a model of oligopolistic competition in a market with spatial product differentiation. In lowering the traveling costs of consumers, necessary to reach the seller (i.e. modeling a closer integration of the economy), we find that in a more integrated economy the transfer price reacts more sensitive to relative tax rate variations in a FA setting than in the SA scenario.

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# 1 Introduction

With ongoing economic integration, the debate on the role of multinational enterprises (MNEs) within different national tax systems is primarily driven by the notion of the strategic interaction of the location of investment, production and profits. Major concerns are expressed that due to a worldwide extended network of affiliated companies, a multinational firm could easily shift profits from high-tax to low-tax jurisdictions or countries. By means of artificially increasing costs of production in regions with high tax rates, in choosing a high transfer price for intermediate goods or services, income can be relocated to other entities of the MNE, which are located in regions with lower tax rates on profits. To stave off this strategic flow of profits, policymakers and economists in the European Union (EU) have proposed to change the way MNEs are taxed[1]. Presently, most countries apply a separate accounting (SA) profit tax scheme. Referring to the fiscal accounts of MNE entities, SA allows national tax authorities to only tax the share of MNE overall profits that accrues to MNE affiliates with the jurisdictional territory. To prevent MNEs from an excessive use of transfer pricing for arm's length intra-firm transactions within the current tax code of separate accounting, costly control systems have been installed by governments to estimate the "true" value of services and intermediate products exchanged by MNE entities across national boarders. Following the example of Canada[2] on taxing its domestic firms operating in several provinces, the European Commission aims to replace the contemporary way of taxing MNE profits with a formula apportionment (FA) profit tax scheme.[3] This system operates with formulas calculating the tax base for each jurisdiction according to apportionment factors, based on certain key variables like assets, turnover and/ or payroll, which should reflect the "real" entrepreneurial activity in each jurisdiction. Since this system takes the overall profits of each MNE and allocates the tax base to the jurisdictions in which the MNE operates affiliated entities, this system is praised for not offering any scope for profit shifting.

This paper investigates what the aspects of economic integration, leading to increased competition, additionally imply for the strategic interaction of headquarters and affiliates on the background of different MNE profit taxation schemes. We therefore focus on the effects of economic integration on the transfer pricing strategy of a MNE under the two taxation schemes SA and FA in a stylized fashion. We envision a world consisting of two regions and two enterprises, one MNE (consisting of a main office and an affiliate) and one single firm.

[1] See e.g. Wellisch (2004).
[2] See e.g. Wildasin (2000) and Nielsen (2003).
[3] Cf. COM (2005).

Our analysis then draws on an oligopolistic Bertrand competition model of spatial product differentiation à la Hotelling (1929). Two firms, the affiliate of the MNE headquarter and a competitor, are each located at the end of a straight line (region 2), producing and selling a homogeneous good. By choosing the price of the final consumption good, both firms are competing for customers who incur travelling expenses to purchase the good from one of the two firms. To account for the fact that the administrative center of the MNE (region 1) and the affiliate can engage in profit shifting, we assume that the head office delivers business services, which the affiliate has to pay for. We model this transfer in a broader way, so that it can also be interpreted in terms of a loan or the direct shift of financial funds.[4] While the affiliate is allowed to maximize its profits by choosing autonomously the optimal price in its market (region 2), the holding company selects the optimal transfer price to maximize the overall profits of the MNE: this offers the scope for strategic interaction of market power and competition in the region 2 market.

Plain empirical evidence, revealing that MNEs use transfer pricing to shift profits in order to avoid taxation, can be found in Swenson (2001) and in Clausing (2003). However, shown by Grubert (2003), this is not the only tool applied by MNEs to relocate profits from high- to low-tax jurisdictions. Hence, MNEs also carry out various kinds of direct financial transactions (e.g. intra-firm loans) to shift their overall profits, which is empirically proved by Mintz and Weichenrieder (2005) or Hines (2005).

The structure of our model can easily be applied to a whole range of different industries within the EU. Companies operating on markets for homogeneous products can be found on all stages of production.[5] As an example for the commodities processing industries we would propose the market for newsprint and magazinpaper[6,7], the market for rustless steel[7] and discarded copper[6]. Further examples for industrial goods can be found on the market for standardized plant and machinery equipment, e.g. supersonic testing facilities[6] or heavy steam raising units[6] as well as machine tools. Parts for automobiles[6], as well as construction material[8] can further be added. Finally, considering consumer goods, we would propose pharmaceutical products[9].

[4] Examples for different ways of intra-firm resource allocation mentioned in the business literature can be found in Mahoney (1992) or in Rajan and Reichelstein (2004).
[5] Information about the degree of product homogeneity has been taken from the main reports of the German Monopolies Commission (Monopolkommission).
[6] Cf. Monopolkommission (2000).
[7] Cf. Monopolkommission (2002).
[8] Cf. Monopolkommission (2004).
[9] Cf. Monopolkommission (1998).

We find the following results. First, no matter which taxation scheme is applied, the MNE has always an incentive to engage in profit shifting to counteract the adverse tax rate changes. This is due to the strategic affect of transfer pricing on the market power the affiliate can exert on its market. However, we show that for relative small tax differentials SA gives a stronger incentive to use transfer pricing than FA, while this relationship changes for relative large tax differentials. Second, with travelling costs decreasing, i.e. a further integration of the economy, the incentive for profit shifting in reply for increasing tax differentials becomes smaller under SA while it grows under FA. This indicates that with further integration of the world economy a change of the current system of MNE profit taxation (i.e. SA) to FA may not lead to the expected results namely to discourage MNEs to use transfer pricing for profit shifting.

Models of oligopolistic competition and strategic interaction have been used in international economics (Brander and Spencer (1985), Eaton and Grossman (1986))[10] and also in the setting of MNE behaviour. Nielsen et al. (2003) analyze the different incentives to use transfer pricing as a mean to shift profits to avoid taxation under SA and FA in a Cournot style setting, while Schjelderup and Sørgard (1997) compare the strategic effects of transfer pricing along with SA under Cournot and Bertrand competition, using imperfect substitutes in the later case. Though, the contributions closest in spirit to ours are the latter two articles, both do not take spatial aspects of competition and taxation into consideration, which have an impact on the optimal choice of the transfer price.

The paper is set up as follows. We present the basic model in the next section. Section 3 then studies the optimal choice of transfer pricing under separate accounting and formula apportionment. Section 4 performs the analysis under the assumption of economic integration before Section 5 concludes.

[10] A survey of this topic can also be found in Helpman and Krugman (1989).

# 2 The model

## 2.1 Basic Structure

Since the objective of the model is to shed light on the optimal choice of transfer pricing within a multinational firm (MNE), we abstract from the basic decision, concerning the optimal choice of sites for all kinds of production and distribution facilities used for serving customers in the different market places.[11] A further simplification applies by assuming that the MNE does not maintain two different systems of bookkeeping (one for the tax authorities and one for internal controlling purpose)[12] since this would incur high transactions costs.[13]

[Figure 1 about here]

As shown in figure 1, the MNE consists of a main office, located in region 1 and an affiliate, located in region 2. The main office produces a final consumption good, which is solely sold in region 1, so that the central office acts as a monopolist in this market, while the affiliate produces and sells a consumption good in region 2. Within the holding company, funds can be transferred between the main office and the affiliate. These transfers are related to the output produced by the affiliate, so that they can be thought of as kinds of administrative services that the affiliate has to pay for, but they can also be seen as loans or other funds transferred from one party to another, depending on the economic activity of the affiliate. There is an additional business rival operating in region 2. The structure of this market builds on a simple version of an oligopolistic competition model with spatial product differentiation, as introduced by Hotelling (1929).[14] The two competing firms $(i=1,2)$ are each offering a homogeneous good at positive prices $p_i$ on the market in region 2. This market place will be illustrated by a horizontal line, on which the consumers of this good are equally distributed; the number of consumers is normalized at 1. Each firm is immobile and located at the very end of this line, and produces a homogeneous good at constant marginal cost $c_i > 0$. In order to buy a unit of the good, each consumer has to travel to one of the two firms, which incurs linear travel expenses of $\tau > 0$. In the following we will therefore take $\tau$ as a measure for the degree of spatial product differentiation. Since every consumer minimizes her expenses, she will always buy the good from the nearest producer (in terms of distance and price). Both

[11] Cf. Grosse (1985) for an overview on this issue.
[12] Cf. Choi and Day (1998). However, a survey conducted by Ernst & Young (2007) reveals that transfer pricing is mainly a taxation issue.
[13] The purpose of two different bookkeeping systems is illustrated in Knirsch (2007).
[14] The description in this part draws on Bester (1992).

firms have similar costs of production, and we assume that both firms are always operating in equilibrium. Each consumer will have enough money to demand one unit of the commodity. As illustrated in the appendix, the two firm specific demand functions can be derived to

$$x_1(p_1, p_2) = \frac{\tau + p_2 - p_1}{2\tau} \tag{1a}$$

$$x_2(p_1, p_2) = \frac{\tau + p_1 - p_2}{2\tau}, \tag{1b}$$

with $x_i$ denoting the firm-specific demand of the homogeneous good from the affiliate and the competitor, and with $p_i$ expressing the corresponding sales price.

Together with the assumption of a linear demand function for the final good sold by the main office in region 1

$$x_3 = a - p_3, \tag{1c}$$

with $x_3$ indicating the demand, $p_3$ showing the sales price for the monopolist good and the demand parameter $a > 0$, the profits of the main office, the affiliate, the competitor as well as the holding company be derived to

$$\pi_3 = [p_3 - c_3]x_3 + \theta x_1 \tag{2a}$$

$$\pi_1 = [p_1 - c_1]x_1 - \theta x_1 \tag{2b}$$

$$\pi_2 = [p_2 - c_2]x_2 \tag{2c}$$

$$\pi_{MNE} = \pi_3 + \pi_1, \tag{2d}$$

with $\theta$ denoting the transfer price between the headquarter and the affiliate. Firms aim to maximize their profits, using the price as the strategic variable.

## 2.2 The Strategic Effect of Transfer Pricing

In the following we assume a two stage game: first, the central office of the MNE would set and announce its transfer price $\theta$. Subsequently, the affiliate and its business rival maximize their profits by setting their sales prices independently, taking the transfer price as given.

Solving this problem via backward induction, the first order conditions of the affiliate and the business rival in region 2 can be derived by differentiating the each firm's profits with respect to its own price:

$$\frac{\partial \pi_1}{\partial p_1} = \frac{\tau + \theta + c_1 - 2p_1 + p_2}{2\tau} \overset{!}{=} 0 \tag{3a}$$

$$\frac{\partial \pi_2}{\partial p_2} = \frac{\tau + c_2 - 2p_2 + p_1}{2\tau} \overset{!}{=} 0. \tag{3b}$$

These two equations can then be resolved to get the following reaction functions

$$p_1 = \frac{\tau + c_1 + \theta + p_2}{2} \tag{4a}$$

$$p_2 = \frac{\tau + c_2 + p_1}{2}, \tag{4b}$$

illustrated by the solid lines in figure 2, labeled $R_1(p_2)$ and $R_2(p_1)$ respectively.

[Figure 2 about here]

Solving (4a) and (4b) then indicates the pair of optimal prices

$$p_1^* = \frac{3\tau + 2(c_1 + \theta) + c_2}{3} \tag{5a}$$

$$p_2^* = \frac{3\tau + 2c_2 + (c_1 + \theta)}{3}, \tag{5b}$$

as well as the pair of optimal quantities demanded

$$x_1^* = \frac{3\tau - c_1 + c_2 - \theta}{6\tau} \tag{6a}$$

$$x_2^* = \frac{3\tau + c_1 - c_2 + \theta}{6\tau}, \tag{6b}$$

which both depend on the transfer price, chosen by the main office of the MNE. Then the headquarter maximizes its monopoly profit, choosing the optimal price in region 1, in which it is the only vendor of the good $x_3$. The first order condition of the headquarter in region 1 will then be

$$\frac{\partial \pi_3}{\partial p_3} = a + c_3 - 2p_3 \overset{!}{=} 0$$

indicating the optimal price (optimal quantity) the main office charges in its monopoly market (region 1) $p_3^* = \frac{a+c_3}{2}$ ($x_3^* = \frac{a-c_3}{2}$).

Finally, taking the reaction functions (4a) and (4b) into consideration, the first order condition of the MNE holding company is the derivation of the overall profits with respect to the transfer price

$$\frac{\partial \pi_{MNE}}{\partial \theta} = \frac{3\tau - 4\theta - c_1 + c_2}{18\tau} \overset{!}{=} 0$$

leading to an optimal transfer price of

$$\theta^* = \frac{3\tau - c_1 + c_2}{4}. \tag{7}$$

Substituting (7) into (5a) and (5b) then gives the optimal prices chosen by the affiliate and the competitor

$$p_1^* = \frac{3\tau + c_1 + c_2}{2} \tag{8}$$

$$p_2^* = \frac{5\tau + c_1 + 2c_2}{4} \tag{9}$$

in region 2.

The idea of the strategic effect of the transfer price is illustrated in figure 2. If the MNE headquarter chooses a transfer price $\theta = 0$, the intersection of the reaction functions $R_1(p_2)$ and $R_2(p_1)$ shows the unique Nash equilibrium of the Bertrand competition game in region 2. Furthermore, the two sets of u-shaped lines labeled $\pi_1$ (dashed lines) and $\pi_2$ (dot-dashed lines) indicate the level of profits of the subsidiary and the competitor respectively, with lines further up/ to the right representing higher profit levels.

Since the reaction function of the affiliate (4a) directly depends on the transfer price, an increase of $\theta$ would induce the subsidiary to raise the price of its final good as can be seen in (5a). This would shift the subsidiary's reaction function to the right, shown by the bold dotted line in figure 2. Note, that this shift of the reaction function would increase the profits of the subsidiary, as long as the increase is not too large (i.e. to the left of point S). Since the reaction functions have a positive slope, the larger the price of the consumption good is, the larger is the profit of the firm. Therefore, by choosing an appropriate transfer price the head office can trigger a favorable reaction of the competitor and thus lift the affiliate in the position of a Stackelberg-Leader, increasing its profit[15]. The last iso-profit line that is just tangent to the reaction function of the competitor indicates the maximum profit and thus gives the head office the optimum transfer price, respectively.

Equation (7) reveals that in this scenario the transfer price will be larger than 0, as long as $\tau > \frac{c_1 - c_2}{3}$ holds. Since $\tau$ is an index of the degree of spatial product differentiation and $(c_1 - c_2)$ reflects the differences in production costs between the affiliate and the competitor, the transfer price exceeds 0 as long as market power (due to spatial market separation $\tau$) is persistent enough to dominate certain differences in the cost pattern of production.

Note that although this strategic effect prevails if the two competing firms choose over the output to maximize their profits (Cournot competition), the implications for the optimum transfer price are of the opposite direction: in order to raise profits in the market where the affiliate operates, the output has to be raised, which is only possible if the transfer price is *below* 0 in the Cournot competition scenario.

# 3 Transfer Pricing under Taxation

The proceeding section has illustrated the benefits for a holding company to give an affiliate autonomy in its own pricing decision and set a transfer price at the central level, taking the affiliate's decision into consideration. Thus, even without taxation the MNE has an incentive to engage in transfer pricing, since there is a strategic effect due to market power.

The strategic implications of transfer pricing however, are usually debated in the context of taxation. Since MNEs are spread over several countries, this offers MNEs the chance to shift

[15] This will also increase the profit of the competitor (Bertrand setting).

income from high-tax jurisdictions to low-tax jurisdictions just by choosing transfer prices that increase the production costs in regions with high taxes and lower the productions costs in regions with relatively low tax rates.[16] This suggests that MNEs would choose transfer prices that are either the highest or the lowest possible (depending on the tax differential between two or more regions), which would result in a binary system of maximum or minimum transfer price with in certain (e.g. statutory) limits.

### 3.1 Transfer Pricing under Separate Accounting (SA)

The first approach to highlight the additional implications of taxation on transfer pricing (i.e. taxation effect) we analyze a situation in which the government of each region levies a non-negative source tax on profits, i.e. there is separate (tax) accounting within each region, indicating that we abstract from the existence of tax credit rules between several regions.

Again the head office first sets and announces its transfer price and eventually the affiliate and the competitor decide over the optimal sales price. With taxes, the total profits of the MNE now amount to

$$\pi_{MNE}^{SA} = \pi_3 \left(1 - t_1\right) + \pi_1 \left(1 - t_2\right), \tag{8}$$

with $t_1$ and $t_2$ denoting the tax rates of region 1 and region 2 respectively. Further, the first order condition reads to

$$\frac{\partial \pi_{MNE}^{SA}}{\partial \theta} = \frac{3\tau - 4\theta + \left(6\theta - 9\tau\right)t_1 - \left(2\theta - 6\tau\right)t_2 + \left(c_1 - c_2\right)\left(3t_1 - 2t_2 - 1\right)}{18\tau} \overset{!}{=} 0,$$

which finally gives the optimal transfer price under taxation

$$\theta^{SA} = \left(\frac{3\tau - c_1 + c_2}{4}\right)\left(\frac{6t_1 - 4t_2 - 2}{3t_1 - t_2 - 2}\right). \tag{9}$$

Now, the optimal transfer price consists of two components. The first term in brackets reflects the strategic effect of transfer pricing as already indicated by (7): the higher the spatial product differentiation, the higher the transfer price chosen by the MNE. This effect is now augmented by a tax effect, which is always positive for $t_1 < t_2$ (i.e. a tax advantage of region 1 over region 2). Note, that as long as region 1 offers a tax advantage over region 2 (i.e. $t_1 < t_2$) the strategic effect of transfer pricing

[16] Cf. Nielsen et al. (2003, S. 420f.) and Wellisch (2003, p. 333ff.).

will be augmented by the positive effect of profit shifting, indicating that $\theta^{SA} > \theta$. The relative higher tax burden in region 2 prompts the main office to shift profits from the high-tax to the low-tax-region, using transfer pricing. The pure strategic effect is independent from the degree of tax rate differentials, while the pure tax effect only depends on the tax rate differentials. Consequently, a relative increase of the tax rate in region 2 will induce the headquarter to shift profits to the relative low-tax region (region 1), via an increase of the transfer price, no matter how large spatial product differentiation will be. This line of argument can be illustrated by figure 3, depicting the dashed lines labeled $\theta^{SA}$.

[Figure 3 about here][17]

Returning to the part of spatial product differentiation, (9) also shows that for each given tax differential $t_1 < t_2$, the higher $\tau$, the higher the transfer price will be chosen by the MNE, since the strategic effect increases. With an increase in $\tau$, market power rises and thus firms engage more intensively in transfer pricing at a given tax rate differential, shown by the dotted line (labeled $\theta$) in comparison to the dashed line (labeled $\theta^{SA}$) in figure 4.

[Figure 4 about here][18]

*Result: Under taxation according to a separate accounting scheme, the strategic incentive of transfer pricing is augmented by a tax incentive for transfer pricing, increasing the overall incentive for transfer pricing. Thus, the transfer price under taxation increases more rapidly with the degree of spatial product differentiation than the transfer price without taxation.*

### 3.2 Transfer Pricing under Formula Apportionment (FA)

The outcome of the preceding section revealed that besides the strategic role of the transfer price in terms of market power, taxation implies an additional incentive for transfer pricing: depending on the tax rate differential, the transfer price can be used to shift profits from the high tax jurisdiction to the low tax jurisdiction. To limit the scope to which MNEs can shift profits, various countries proposed and implemented the formula apportionment method of taxing firms with subsidiaries in various regions.[19] Under such a taxation scheme, global profits of a MNE are apportioned to each region according to the activities of the MNE in the

[17] Figure 3 is based on the following assumptions: $a = 7,\ c_1 = c_2 = c_3 = 1,\ \tau^{\text{high}} = 3.5,\ \tau^{\text{low}} = 0.8,\ t_1 = 0$.

[18] Figure 4 is based on the following assumptions: $a = 7,\ c_1 = c_2 = c_3 = 1,\ t_2 = 0.2,\ t_1 = 0$.

[19] Cf. Wellisch (2003, p. 333ff.) and Nielsen et al. (2003, p. 420f.).

respective region, proportional to the world wide activities of the MNE. A general formula apportionment system allocates parts of the total tax base of a MNE to a region, according to the relative capital invested, the relative payroll paid and the relative revenue received by the MNE in this region, each factor weighted by a specific factor.[20] Since these apportionment factors are tied to "real" economic activities of MNE affiliates, shifting profits between different MNE entities remains a sole "virtual" exercise. Then each regional government can independently choose its own rate at which it taxes the MNE activities assigned to its jurisdiction. Without loss of generality, two simplifying assumptions are applied: revenues are taken as the only apportionment factor and taxable profits do not deviate from true profits, due any kinds of tax exemptions. Thus, the after tax profits of the MNE under FA become

$$\pi_{MNE}^{FA} = (\pi_3 + \pi_1) + t_1\left(\frac{R_3}{R}\right)(\pi_3 + \pi_1) + t_2\left(\frac{R_1}{R}\right)(\pi_3 + \pi_1)$$

$$\Leftrightarrow \quad \pi_{MNE}^{FA} = (\pi_3 + \pi_1)\left(\frac{R_3(1-t_1) + R_1(1-t_2)}{R}\right), \tag{10}$$

with $R = R_3 + R_1$, denoting the sum of the return generated by the headquarter and the affiliate and the fraction in the second bracket indicating the average tax burden of the MNE. The first order condition of the MNE becomes

$$\frac{\partial \pi_{MNE}}{\partial \theta} = \frac{ABC(1-t_2) - D\big(AC - B(3\tau - c_1 + c_2 - 4\theta)\big)}{18\tau B^2} \overset{!}{=} 0, \tag{11}$$

with

$$A = (3\tau - 4c_1 + c_2 - 4\theta)$$

$$B = 6\theta\tau - 4(\theta^2 + c_1^2) + 9\tau(a^2 + 2\tau - c_3^2) - 2\big(c_1(4\theta - 3\tau - c_2) - c_2(\theta + 6\tau + c_2)\big)$$

$$C = 6\theta\tau - 4\theta^2 + 9\tau(a^2 + 2\tau) - 2(c_1 - c_2)(6\tau - c_1 + c_2 + \theta) - 9\tau c_3(18a - c_3)$$

$$\begin{aligned} D = & -6\theta\tau + 4\theta^2 - 9\tau(a^2 + 2\tau) + 9\tau\big(c_3^2(1-t_1) + a^2 t_1\big) + \\ & 2(1-t_2)\Big((2c_1^2 - c_2^2) + \big(c_1(4\theta - 3\tau - c_2) - c_2(\theta + 6\tau)\big)\Big) - 2t_2(\theta - 3\tau)(2\theta + 3\tau). \end{aligned}$$

[20] See Nielsen et al. (2003, p. 423f.) for a more detailed description.

Since it is not possible to solve (11) explicitly for the optimal transfer price under a FA tax schedule, we would have to rely on numerical simulations to illustrate the optimal response of the MNE to tax rate changes in the region where the affiliate is located. Referring to figure 3, it can be seen, that also under the FA tax scheme, there is in incentive for the MNE to use transfer pricing to shift profits away from the high-tax region to the low-tax region. This incentive increases with the tax rate differential $\left(t_1 < t_2\right)$ between the two regions (solid lines labeled $\theta^{FA}$). Since the transfer price influences the optimal price chosen by the affiliate, it becomes obvious by looking at (A11)[21], that the MNE can shift the tax burden between the two regions. Given that $t_1 < t_2$ (i.e. region 1 has a tax advantage over region 2), by increasing the transfer price, the MNE depresses the revenues of the affiliate and thus decreases the average tax rate. Referring to figure 4 it can be seen, that the incentive to engage in transfer pricing is almost invariant with increasing spatial product separation $\left(\tau \uparrow\right)$.

*Result: Under taxation according to the formula apportionment scheme the MNE increases its optimal transfer price with an increasing tax rate differential. However, the MNE engages less exhaustively in transfer pricing for relatively low tax rate differentials between the two regions, than for relatively high tax rate differentials. The overall incentive to do transfer pricing to reduce the tax burden of the MNE is virtually invariant to changes in the spatial market separation.*

Finally, a comparison of the general incentives for transfer pricing under the two different taxation schemes leads to the following:

*Result: In both taxation schemes, the MNE has an incentive to use transfer pricing to shift profits form the high-tax region to the low-tax region. Switching from a tax system of $SA$ to a tax system of FA does not prevent the MNE from the use of transfer pricing to lower its overall tax burden.*

# 4 Economic Integration and Transfer Pricing under Taxation

Finally, the optimal behaviour of the MNE will be analyzed on the background of decreasing trade integration. As explained earlier, the linear travel costs $\tau$, incurred by every consumer

[21] Illustrated in table 1.

to reach a producer of the homogeneous good, can be interpreted as an indicator of economic integration (spatial market separation). While decreasing this cost, competition between the affiliate and the competitor increases and letting the travel costs approaching zero $(\tau \rightarrow 0)$, we will get the well known Betrand paradoxon, where one firm will serve the entire market as soon as one firm would raise its price over the price of the competitor. This already implies that the strategic effect of the transfer price, as a mean to exhaust market power in region 2, declines with a decline of $\tau$ , no matter which rule of profit taxation applies.

[Figure 3 about here]

This can be seen in figure 3: for zero tax rates in both regions, i.e. referring to (7), the lower $\tau$ , the lower the optimal transfer price without taxation (moving along the vertical axis in figure 3).

Increasing the tax rate on profits in region 2 now shows, that the MNE has an incentive to shift its profits from the affiliate to the headquarter, i.e. from the high- to the low-tax jurisdiction, in both tax schemes by increasing its transfer price. However, it is apparent that for a lower value of $\tau$ (i.e. lower spatial market separation) the MNE is less active in transfer pricing with an increasing tax rate differential under the separate accounting tax scheme, than it is with a higher degree of spatial market separation. As explained earlier, there are two effects at work: the strategic effect and the taxation effect, which both pull in the same direction.

[Table 1 about here]

With lower spatial market separation the sole strategic effect (i.e. assuming that $t_1 = t_2 = 0$) of the transfer price, which is the same for both taxation schemes, declines. With lower travelling costs, the market power of each firm in region 2 declines, which makes it more difficult to increase the price of the affiliate. This can be seen by looking at the optimal prices without taxation (8), which positively depend on the spatial market separation $\tau$ .

*Result: For a given tax rate differential, the degree to which the MNE uses transfer pricing to shift profits from the high-tax region to the low-tax region declines with the degree of spatial product differentiation in both taxation schemes.*

Referring to (A9) and isolating the taxation effect (i.e. assuming that $\rho^{s}_{p_2,p_1} = 0$) under SA taxation reveals that the ability to shift profits, in response to tax rate differentials, will also be curbed by a declining $\tau$. The taxation effect depends on the price elasticity of demand (which increases with a decline in $\tau$), making it more difficult to shift profits via transfer pricing.

The proceeding section showed, that under the FA tax scheme, the MNE also has an incentive to shift profits in setting transfer prices. However, in opposite to the case of taxation according to SA, figure 3 and figure 4 show that the incentive to engage in transfer pricing for an increasing tax differential does only slightly decline along with a decline in spatial product differentiation $(\tau \downarrow)$. Analysing the tax effect of (A11) reveals the reason for this observation. Price increases (due to an increased transfer price) evoke reactions in the quantities demanded (cf. (6b)), which are larger for a low degree of spatial product separation (low values of $\tau$).[22] Thus, with low degrees of $\tau$, even small manipulations of the transfer price are sufficient to get the desired result for $t_1 < t_2$: a decline in $R_1$ and $\pi_1$, necessary to shift profits from the affiliate to the main office by lowering the average tax burden. This can be interpreted as an indirect way of shifting profits, since the transfer price does not have to directly work through the goods market, as under the SA taxation scheme, but takes place within the bookkeeping system of the MNE.

*Result: With declining spatial market separation the ability of the MNE to engage in transfer pricing to shift profits from the high-tax to the low-tax region fades under SA but remains under FA.*

[22] The price elasticity of demand increases with a decline in $\tau$.

# 5 Conclusion

This paper analyzes the implications on optimal transfer pricing under two different ways of profit taxation of MNEs. We have found that the results in Nielsen et al. (2003) about the strategic impact on transfer pricing under the different tax regimes are robust as to whether the two companies are engaged in Cournot or Betrand competition with perfect substitutes. In particular, MNEs have strong incentives to use transfer pricing for profit shifting, no matter if they were taxed according to SA or FA.

However, our analysis revealed a crucial insight concerning the effects of economic integration (reflected in declining spatial market separation) on the way the MNE conducts transfer pricing: with enhanced economic integration, the market power of the MNE in region 2 declines and thus, the strategic effect of the transfer price also declines. Therefore, the lower the travel costs of consumers in region 2 are, the lower the transfer price implemented by the MNE. Further, it could be seen that the taxation effect on the transfer price only declines in the SA taxation scheme, while it remains almost stable in the FA taxation scheme. Hence, with market integration, MNEs engage more actively in transfer pricing under the FA scheme than they do under the SA scheme, whenever the tax differential increases.

Governments which are afraid of loosing their profit tax base because of enhanced profit shifting due to transfer pricing should be very careful about relying on FA as the right mean to retain MNEs from using transfer pricing. Besides shifting profits from one jurisdiction to another, firms use transfer pricing also to exert the market power of their affiliates. This strategic device should be carefully taken into consideration, while talking about an optimal way of taxing profits of MNEs.

**Figure 1**

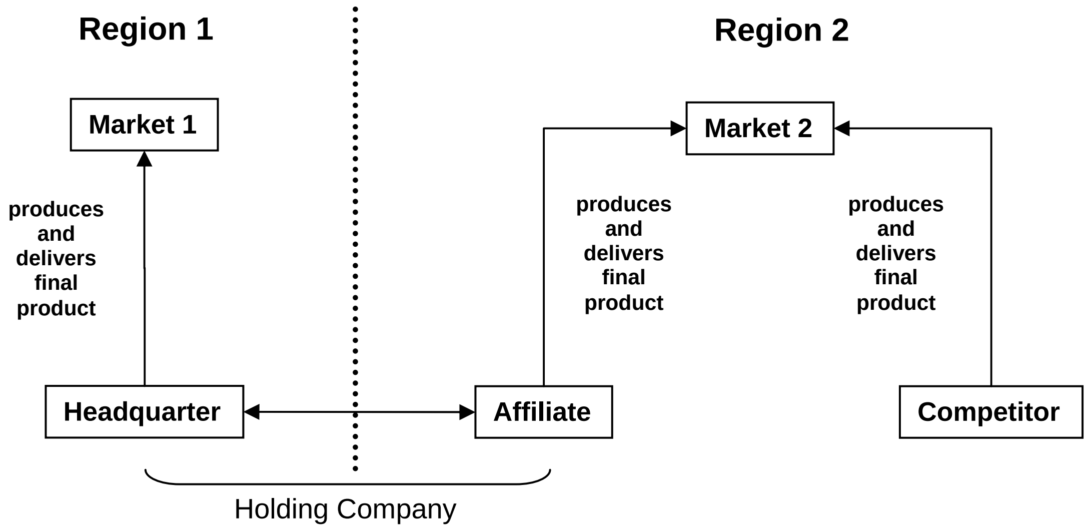


**Figure 2**

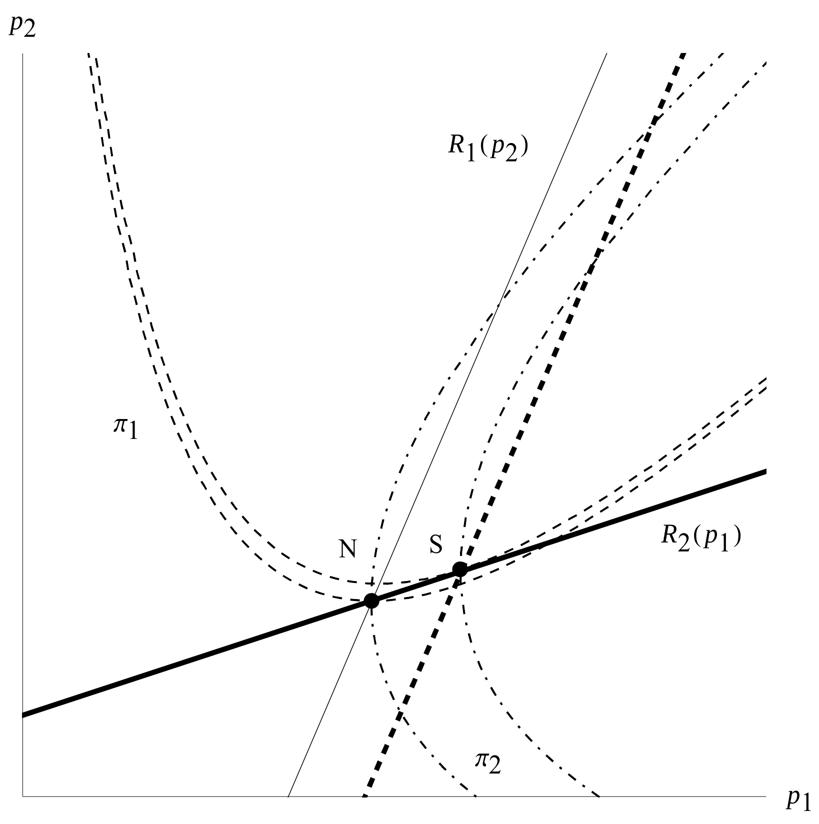

**Figure 3**

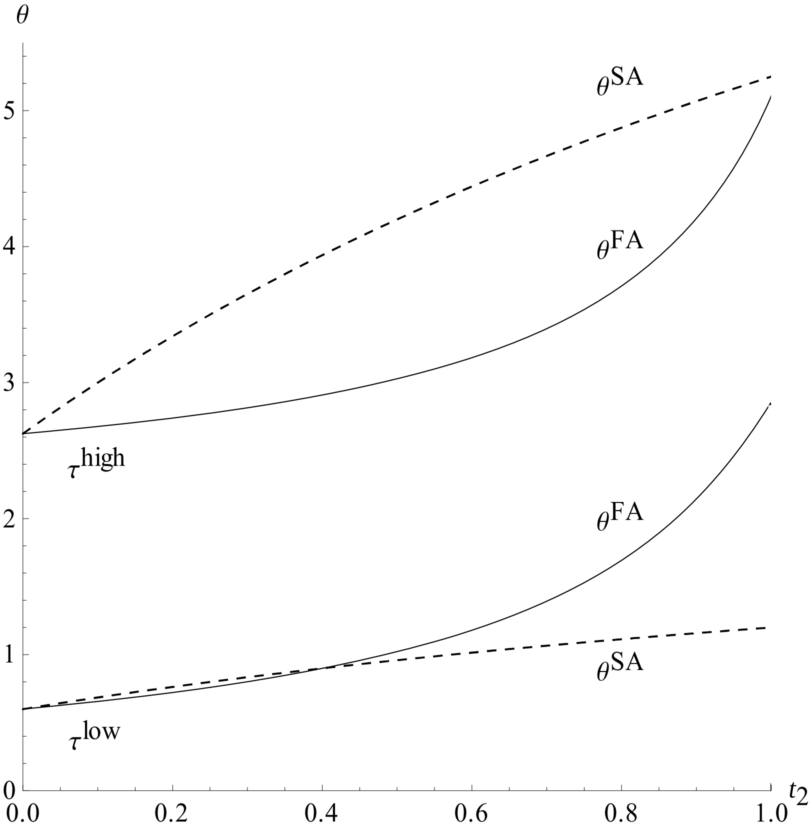


**Figure 4**

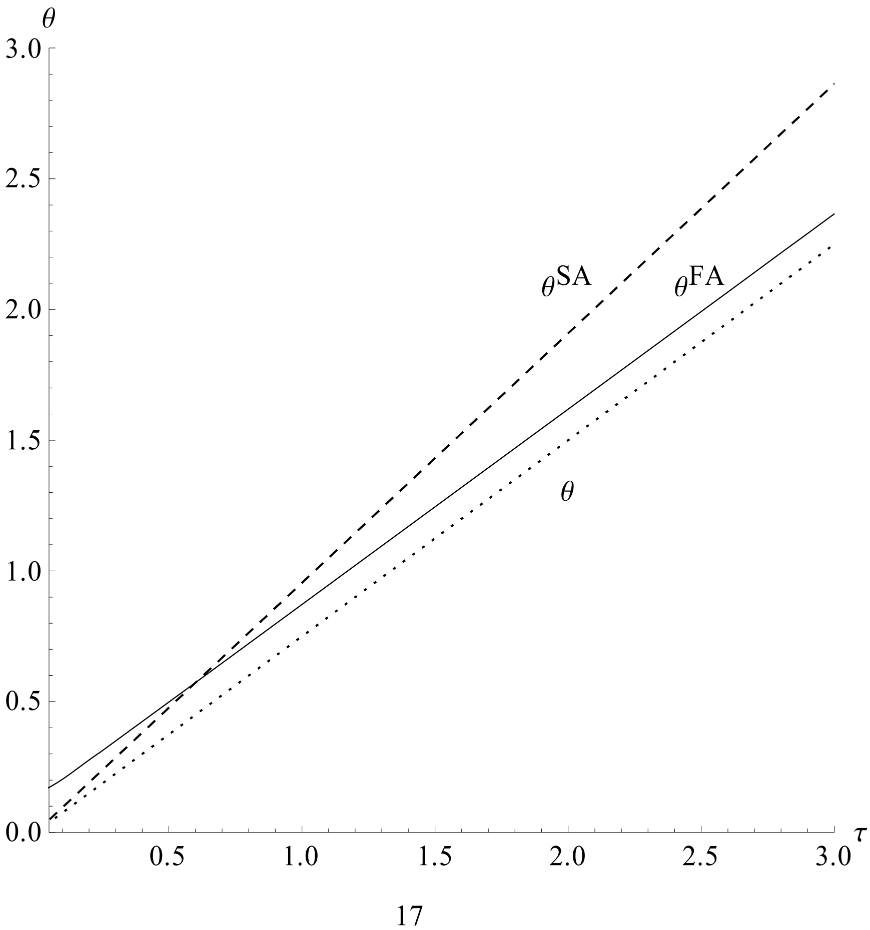

**Table 1**

| Total effect | | Strategic effect $\left(t_1 = t_2 = 0\right)$ | Taxation effect $\left(\rho^s_{p_2,p_1} = 0\right)$ |
|---|---|---|---|
| $\theta = \left( c_1 \dfrac{\varepsilon^d_{x_1,p_2}}{\varepsilon^d_{x_1,p_1}} - p_1 \dfrac{\eta^r_{r_1,p_2}}{\varepsilon^d_{x_1,p_1}} \right) \rho^s_{p_2,p_1}$ | (A7) | $\left( c_1 \dfrac{\varepsilon^d_{x_1,p_2}}{\varepsilon^d_{x_1,p_1}} - p_1 \dfrac{\eta^r_{r_1,p_2}}{\varepsilon^d_{x_1,p_1}} \right) \rho^s_{p_2,p_1}$ | ------------------ |
| $\theta^{SA} = \dfrac{\left( c_1 \dfrac{\varepsilon^d_{x_1,p_2}}{\varepsilon^d_{x_1,p_1}} - p_1 \dfrac{\eta^r_{r_1,p_2}}{\varepsilon^d_{x_1,p_1}} \right) \rho^s_{p_2,p_1} + \left(1-\Lambda\right) \dfrac{p_1}{\varepsilon^d_{x_1,p_1}}}{\Lambda - \dfrac{\varepsilon^d_{x_1,p_2}}{\varepsilon^d_{x_1,p_1}} \left(1-\Lambda\right) \rho^s_{p_2,p_1}}$ | (A9) | $\left( c_1 \dfrac{\varepsilon^d_{x_1,p_2}}{\varepsilon^d_{x_1,p_1}} - p_1 \dfrac{\eta^r_{r_1,p_2}}{\varepsilon^d_{x_1,p_1}} \right) \rho^s_{p_2,p_1}$ | $\dfrac{\left(1-\Lambda\right)}{\Lambda} \dfrac{p_1}{\varepsilon^d_{x_1,p_1}}$ |
| $\theta^{FA} = \dfrac{\psi \left( c_1 \dfrac{\varepsilon^d_{x_1,p_2}}{\varepsilon^d_{x_1,p_1}} - p_1 \dfrac{\eta^r_{r_1,p_2}}{\varepsilon^d_{x_1,p_1}} \right) \rho^s_{p_2,p_1} - \gamma c_1}{\gamma + \psi}$ | (A11) | $\left( c_1 \dfrac{\varepsilon^d_{x_1,p_2}}{\varepsilon^d_{x_1,p_1}} - p_1 \dfrac{\eta^r_{r_1,p_2}}{\varepsilon^d_{x_1,p_1}} \right) \rho^s_{p_2,p_1}$ | $\dfrac{\gamma}{\gamma + \psi} \left(-c_1\right)$ |

$\Lambda = \dfrac{1-t_1}{1-t_2}$ $\gamma = \left(\pi_3 + \pi_1\right) \dfrac{\left(t_1 - t_2\right) R_3}{\left(R_1 + R_3\right)^2}$ $\psi = \left(1 - t^d\right) = \dfrac{R_3\left(1-t_1\right) + R_1\left(1-t_2\right)}{R_3 + R_1}$ ($t^d$ ≡ average tax rate of the MNE)

$\varepsilon^d_{x_1,p_1} = \dfrac{\partial x_1}{\partial p_1} \dfrac{p_1}{x_1}$ $\varepsilon^d_{x_1,p_2} = \dfrac{\partial x_1}{\partial p_2} \dfrac{p_2}{x_1}$ $\eta^r_{r_1,p_1} = \dfrac{\partial r_1}{\partial p_2} \dfrac{p_2}{r_1}$ $\rho^s_{p_2,p_1} = \dfrac{\partial p_2}{\partial p_1} \dfrac{p_1}{p_2}$

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# Appendix

## A.1 Derivation of the demand functions

As mentioned, the model consists of a continuum of consumers, which are equally distributed on a straight line over the interval $[0,1]$ and two firms $(i = 1, 2)$, each offering a homogeneous product, and each located at the opposite end of the interval. The firms face constant marginal costs $(c_i > 0)$ and compete for consumers by setting prices $(p_i > 0)$. Each consumer needs and demands one unit of the homogeneous good from either firm. In order to buy one unit of the homogeneous good, each consumer has to go to one of the firm, incurring linear travel costs of $\tau > 0$.

A consumer located at some point $\omega$ of the interval incurs total costs of $p_1 + \tau|0-\omega|$ if she buys from firm 1 and $p_2 + \tau|1-\omega|$ if she buys from firm 2. Therefore, all consumers for which $p_1 + \tau\omega < p_2 + \tau(1-\omega)$ holds, will buy from firm 1 indicating that there will be a consumer $\tilde{\omega}$ which is indifferent between buying from firm 1 and firm 2. This gives us the demand for firm 1, namely $x_1(p_1, p_2) = \tilde{\omega}$ and for firm 2, which is $x_2(p_1, p_2) = 1-\tilde{\omega}$, respectively. Solving $p_1 + \tau\tilde{\omega} = p_2 + \tau(1-\tilde{\omega})$ for $\tilde{\omega}$ gives us the position of indifferent consumer on the line and thus the firm-specific demand functions for the two homogeneous goods

$$x_1(p_1, p_2) = \frac{\tau + p_2 - p_1}{2\tau} \tag{1a}$$

$$x_2(p_1, p_2) = \frac{\tau + p_1 - p_2}{2\tau}. \tag{1b}$$

We assume that the cost advantage of producing the good is not too large between the two firms, so that both firms will always be active. Note, that consumers are equally divided across the two firms, when $p_1 = p_2$ holds. The demand of a firm declines in its own price and rises in the other firm's price. Spatial product differentiation ensures that demand changes with the degree of price differentiation.