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Abusive Transfer Pricing and Economic Activity

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Abstract

We demonstrate that the choice of the transfer price and its effect on intra-firm trade and investment depends on the probability of detection and thus on the measure, on which tax authorities base their audit. A policy implication of the paper is that it should be preferable to condition audits on the amount of income shifted rather than on the distortion of the transfer price proper. Another policy finding is that improving the quality of tax law might be superior to higher detection effort. The former reduces profit shifting and concealment effort, whereas the latter leads to more wasteful use of resources on concealment and has an ambiguous effect on profits shifted.

JEL-Code: H250.

Keywords: transfer pricing, investment, concealment costs, economic activity.

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1 Introduction

In the public debate, policymakers and international organizations such as the OECD have voiced concern that tax planning and tax evasion by multinationals through transfer pricing and profit shifting generate unintended competitive advantages over domestic companies, which could lead to the distortion of investment decisions as well as posing issues of fairness.[1] The OECD in a report on "base erosion and profit shifting" even argues that a failure to take action against profit shifting by multinationals would put "*the integrity of the corporate income tax*" at stake (OECD, 2013, p. 8).

Multinationals in effect report income by choosing prices on intra-firm trade. By selecting to overinvoice (underinvoice) sales to affiliates in high-tax (low-tax) countries, multinationals can shift profits to low-tax countries and thus save taxes. For instance, royalties for using a brand name or a patent do not have an obvious market parallel; hence, multinationals have considerable discretion in setting prices on such transactions. Although there clearly is a grey area between strictly legal tax planning and illegal tax evasion, multinationals also calculate and may be willing to take the risk of being caught and fined for trade mis-pricing.

Policy makers naturally ponder how they can go about curbing the undesirable profit shifting behavior on the part of multinationals, while at the same time interfering as little as possible with multinationals' production activity. This is the starting point of the present article. We demonstrate that the choice of the transfer price and its effect on intra-firm trade and investment will depend on the probability of detection and thus on the measure, on which tax authorities base their audit. A main finding of the paper is that audits based on deviations from the arm's length price is inferior to measures where an audit is contingent on the amount of income evaded. To our knowledge, we are the first to conduct such a comparison.

A standard assumption in the literature on multinationals and profit shifting is that mis-declaration of a transfer price is costly. Two different modelling approaches have been adopted in the literature. In the first approach, following the tradition of Allingham and Sandmo, the firm maximizes expected profits taking into account a probability of audit and a penalty for cheating. The issue then is whether the probability of a fine depends on the difference between the true price and the deviation from the true price (see, e.g., Kant, 1988)[2] or on total profits shifted (e.g., Allingham and Sandmo, 1972).[3] In both variants, the probability of detection is endogenous. In our model below, we include that the detection probability increases with detection effort exerted by tax authorities, but

[1] Actually, another worry is that transfer pricing in production factors also triggers inefficiencies in the production structure within multinationals. That most transfer-price manipulation takes place in intangibles is therefore often explained by saying that multinationals would like to avoid distortions in production. Of course, valuing intangibles is also a more fuzzy affair.

[2] Along the lines of OECD's comparable uncontrolled price (CUP) method, cf OECD (2010).

[3] This would be more in line with OECD's comparable profit method.

decreases with concealment effort of firms. The second, alternative approach is to let the firm incur costly concealment efforts related to the use of accountants and lawyers to hide misdeclaration. We capture this effect by adding a cost function that depends on the level of firm's concealment effort.

More specifically, we set up a model, in which an internal shipment between a multinational's affiliates needs to be priced. A certain level of the transfer price is considered appropriate by the tax authorities, and a deviation from this level may with some likelihood trigger an audit and an associated fine. Two possibilities are examined: On one hand, authorities may condition on the amount of profit shifted (i.e., evaded tax base) or on total tax savings (i.e., evaded tax payments); we show that this will leave investment and production decisions unaffected. On the other hand, authorities may condition an inspection on the deviation of the transfer price from the appropriate arm's-length price; this will trigger distortive responses in the investment and production of the multinational. A main implication of analysis in the paper therefore is that it should be preferable to condition audits on the amount of income shifted rather than on the deviation from the 'market price' (OECD's arm's length principle). The former rule leaves firms' investment behavior undistorted, whilst the latter may entail an efficiency loss.[4]

A second set of results ensues from analyzing the effect of government action against profit shifting. We point out that increasing the detection effort by tax authorities will have an ambiguous effect on profit shifting. Higher detection effort directly increases the detection probability, but also fosters firms' concealment effort. The latter counteracts the effect of a higher detection effort. Furthermore, higher concealment effort will imply a greater waste of resources from society's point of view. Therefore, it might be preferable to improve the quality of transfer pricing regulation in the tax law. Tighter transfer pricing regulation, for example by requiring corporations to document that the chosen transfer price is in line with the arm's length principle, renders concealment more expensive and so reduces concealment effort, leading to less profit shifting and less waste of resources on concealment.

The paper is structured as follows. In section 2 we present our model and study how a multinational firm behaves, if it must exert effort to conceal tax evasion by transfer pricing, and if there is a likelihood of an audit plus a fine related to abusive transfer pricing. We derive a condition under which transfer pricing will not affect the firm's investments nor the use of intermediate inputs.

In section 3 we analyze how different measures that tax authorities can apply to condition an audit on, will affect firm behavior. We point out that a firm's real activities remain unchanged, if the probability of detection depends on evaded taxes or on unde-

[4]Becker and Davies (2014) propose in a recent working paper a negotiation-based model of tax-induced transfer pricing, where a high-tax jurisdiction sets transfer pricing requirements to avoid a low-tax jurisdiction to enter negotiations on transfer prices. Their paper complements ours in the attempt to understand the setting of transfer prices and the role of tax authorities.

clared tax bases, but that real activity will respond, if the probability of an audit depends on deviation from the true price of the traded good.

A brief comparative-static analysis is conducted in section 4 in order to understand how the intensity of inspection on the part of authorities as well as the quality of the tax law will affect the extent of abusive transfer pricing and multinationals' effort directed at concealment. Finally, section 5 offers some conclusions.

2 The model

Consider a multinational corporation (MNC) with two affiliates, one located in a high-tax country B (affiliate B) and one in a low-tax country A (affiliate A). Tax rates are defined as $t_A < t_B$ so that the MNC would like to shift profit from affiliate B to affiliate A. The affiliate in country A produces an intermediate input good S at marginal cost q using a linear production technology, and ships the intermediate good at price $G + q$ to the affiliate in country B.[5]

Firm B wants to conceal the true cost of the input good S and does so by incurring costly concealment effort c. Tax authorities try to reveal the true nature of the transaction by exerting detection effort d. If the tax authorities in country B detect that the intermediate good is overinvoiced to shift income, firm B is fined. We define the fine as $\Phi = \Phi(G, S)$; Φ is non-decreasing in its arguments.[6] Further, let $p = p(G, S, c, d) \in [0; 1]$ be the probability of detection. p is increasing in mispricing G, the detection effort d of the tax authorities, and the level of the intermediate good S, whereas we assume it to be decreasing in the firm's concealment effort c. Thus, we have $p_G, p_S, p_d > 0$ and $p_c < 0$. We shall without consequence for any of the results assume that both the concealment

[5] Alternatively, affiliate A could be interpreted as a vendor that buys the intermediate good from an unrelated third party at price q and re-sells it (without adding any value to the good) to affiliate B with a surcharge G at price $G + q$.

[6] The expression for the fine $\Phi(G, S)$ can be made to encompass the way fines for distorted transfer pricing often work in practice. Define by z the fine rate set by the country which is cheated against, i.e. the high tax country; it measures the required fine payment for every dollar underreported by the subsidiary in B. We take z to be greater than unity ($z > 1$). If the entity in B is detected, the fine z is levied on the size of the shipment S times the overpricing G, times the high tax rate t_B, i.e., altogether $zSGt_B$.

If tax authorities in country B detect abusive transfer pricing and adjust taxable income of the subsidiary there, it is possible that the authorities in country A will undertake a so-called corresponding correction of the MNC's taxable income in that country. The extent to which this is expected to happen can be captured by the parameter x ($0 \leq x \leq 1$). Alternatively, x may stand for the before-tax net present value of every dollar, by which taxable income in A is lowered after a possibly lengthy process. If taxable income in B is corrected, the expected decline in taxable income in A thus amounts to xSG, giving rise to a tax rebate of value $xSGt_A$. Overall, if detected, the MNC as a whole can reckon with an additional net tax of $(zt_B - xt_A)SG$.

So, if the function Φ is understood to subsume the difference $(zt_B - xt_A)$ between fine per dollar underreported in B and associated expected corresponding correction in A, taxable income correction in practice should be covered by the $\Phi(G, S)$ expression. Explicitly taking these mechanisms into account would have implications for the comparative statics analysis in section 4, though.

costs and the fine are tax deductible in order to simplify the analysis.

It is costly for the firm to exert effort c to conceal transfer pricing and we denote the concealment effort cost function by $e = e(c, l)$, where l is a parameter for the quality of transfer pricing regulation in the tax code. A high l increases the effort-related costs of concealing mispricing. Thus, $e_{cl} > 0$. We also make the reasonable assumption that concealment costs are convex in concealment effort, i.e., $e_c, e_{cc} > 0$. It should be noted that countries differ substantially when it comes to transfer pricing regulation. Some countries do not have explicit rules in domestic law for transfer pricing regulation, but rely on the OECD double tax convention and the arm's length principle. Other countries have the arm's length principle stated explicitly in domestic law. This group of countries typically can also require that the firm document the transfer price during a public audit. Finally, some countries have transfer pricing regulation that requires firms that trade with related companies to document how the transfer price is calculated. Such documentation must either be submitted with the firm's annual return or submitted upon request.[7]

The affiliate in country B uses the imported intermediate input good S jointly with capital K to produce a final good y, which is sold in a competitive market in country B at a constant selling price that is normalized to one. In order to ensure inner solutions, we assume a standard neoclassical production function $y = F^B(K, S)$ with $F^B_K, F^B_S, -F^B_{KK}, -F^B_{SS} > 0$ and impose the Inada conditions, i.e., $\lim_{K\to 0}, \lim_{S\to 0} \to \infty$ and $\lim_{K\to\infty} = \lim_{S\to\infty} = 0$.

We shall in line with most of the literature on (multinational) firms (see, e.g., Ethier, 1986; Tirole, 1988), assume that the MNC is risk neutral and maximizes expected global after-tax profits. In order to conform to standard OECD corporate income tax codes, we assume that costs of equity are not tax deductible, and for simplicity we assume that the firm is financed by equity only. These assumptions are not restrictive and do not affect our results, because the incentive to shift profits is present whether the firm is debt or equity financed.

In our analysis, we shall assume that all decisions of the MNC are centralized. It has been shown in the literature that a MNC may benefit from delegating decisions to a de-centralized authority level by allowing subsidiaries to set prices or quantities in local markets under oligopoly. The theoretical underpinnings of this is the delegation principle in the industrial organization (IO) literature, where a principal may benefit from hiring an agent and giving him/her the incentive to maximize something other than the welfare of the principal.[8] As shown by Nielsen et al. (2008), if tax differentials across countries are large, centralized decision making is better than a decentralised structure even under oligopoly. In our setting, we have assumed perfect competition in order to focus purely

[7] In countries with high quality transfer pricing regulation, there may be penalties for wrong, missing or incomplete documentation of how the transfer price has been calculated. This fine would come in addition to fines related to misdeclaration of taxable income (see Lohse et al. 2012).

[8] See Schjelderup and Sørgard (1997) for an analysis.

on the tax incentives. This means that there are no strategic gains from delegating decisions.[9]

We can express after-tax profit in affiliate A as

$$\pi^A = (1 - t_A)[(G + q)S - qS] = (1 - t_A)GS.$$

If abusive transfer pricing is not detected by the tax authorities, the after-tax profit π_n^B in affiliate B is

$$\pi_n^B = (1 - t_B)[F^B(K, S) - (G + q)S - e(c, l)] - RK,$$

where R is the constant world-market interest rate.

In the case that tax authorities detect that the transfer price deviates from the arm's length price (market price), affiliate B's after-tax profit (π_d^B) is given by

$$\pi_d^B = (1 - t_B)[F^B(K, S) - (G + q)S - e(c, l) - \Phi(G, S)] - RK.$$

The risk neutral MNC maximizes global expected net-of-tax income, that is,

$$\begin{aligned} \max_{c,K,G,S} \mathrm{E}[\Pi] &= \pi^A + [1 - p(G, S, c, d)]\pi_n^B + p(G, S, c, d)\pi_d^B \qquad (1) \\ &= (1 - t_B)[F^B(K, S) - qS] - RK + (t_B - t_A)GS - (1 - t_B)C(G, S, c, d, l) \end{aligned}$$

where we have defined $C(G, S, c, d, l) \equiv e(c, l) + p(G, S, c, d)\Phi(G, S)$ as the sum of the concealment effort cost and the expected fine, and where the term $(t_B - t_A)GS$ is the net tax gain from shifting profit to country A.[10]

Optimal concealment effort c is determined by

$$-(1 - t_B)\frac{\partial C}{\partial c} = 0 \quad \Leftrightarrow \quad e_c(c, l) = -p_c(G, S, c, d) \cdot \Phi(G, S). \qquad (2)$$

The firm balances marginal effort costs of its investment into concealing (left hand side) and the marginal return from reducing expected fines on abusive transfer pricing, that is to the decrease in the detection probability times the fine payment; see the right hand side of equation (2) (and note that $p_c < 0$).

[9] Yet, even if we had assumed oligopoly, there is not necessarily any reason why MNCs cannot use multiple transfer prices for different roles. As a matter of fact, most countries do not have rules that ban the use of two books – precisely because of the multiple roles transfer prices may have. Cf., for example, Nielsen and Raimondos-Møller (2012).

[10] Note that the formulation entails that there is a tax rebate for both concealment effort cost $e(c, l)$ and the fine $\Phi(G, S)$.

The first-order condition for capital investment K can be written as

$$F_K^B(K,S) = \frac{R}{(1-t_B)}. \tag{3}$$

The left-hand side is the marginal productivity of capital (F_K^B), while the right-hand side is the effective marginal cost of capital. Since equity is not tax deductible, the required return to capital is higher than the interest rate R. From equation (3), it can be seen that trade mispricing ($G \neq 0$) only affects the demand for capital via the use of the intermediate good S in the production function.

Maximizing expected profit $E[\Pi]$ w.r.t. the optimal transfer price (G) yields

$$(t_B - t_A)S = (1-t_B)\frac{\partial C}{\partial G}, \tag{4}$$

which shows that the transfer price should be increased until the marginal tax savings from transfer pricing (left-hand side) is equal to the after-tax marginal concealment costs (right-hand side).

The first-order condition for S is given by

$$F_S^B = \left[q - \frac{(t_B - t_A)G}{1-t_B} + \frac{\partial C}{\partial S}\right]. \tag{5}$$

In optimum, the firm balances the marginal after-tax income from sales of the final good in country B (left-hand side) to the net effective after-tax marginal costs of using the intermediate input S. The marginal costs of S consist of the three terms in the squared bracket. The first is the true resource costs q of the input good S. The two last terms in the squared bracket give the net after-tax cost of using S to shift profit. The first of these terms, $(t_B - t_A)G/(1-t_B)$, is the net tax savings of a marginal increase in the imports of the intermediate good S.[11] The last term is the increase in concealment costs that follows from a marginal increase in S (that is, $\partial C/\partial S$).

Making use of equation (4) to substitute for $(t_B - t_A)/(1-t_B)$, we can rewrite the first-order condition (5) as

$$F_S^B = q + \left[\frac{\partial C}{\partial S} - \frac{G}{S}\frac{\partial C}{\partial G}\right] = q - \frac{C(G,S,c,d,l)}{S} \cdot (\varepsilon_{CS} - \varepsilon_{CG}), \tag{6}$$

where we define the concealment-cost elasticities of input manipulation and trade mispricing as $\varepsilon_{CS} = \frac{\partial C}{\partial S}\frac{S}{C}$ and $\varepsilon_{CG} = \frac{\partial C}{\partial G}\frac{G}{C}$; both elasticites are non-negative.

The two last terms in squared brackets on the (near) right-hand side are the net effective after-tax marginal costs of using the intermediate input S to shift profit. If they cancel out, the first-order condition reduces to $F_S^B = q$, and the use of the intermediate

[11] Increasing S is tantamount to broadening of the base for distorted transfer pricing.

input S is not affected by profit shifting due to differences in international tax rates. For this to happen, the weighted increase in concealment costs that follows from generating more tax savings by a higher transfer price ($G \cdot \frac{\partial C}{\partial G}$) must be equal the weighted increase in concealment costs from employing more units of the intermediate production factor ($S \cdot \frac{\partial C}{\partial S}$). Put differently, transfer pricing has real effects on firm behavior, if and only if the concealment-cost elasticities of input manipulation and trade mispricing differ from each other:

$$-\frac{G}{S}\frac{\partial C}{\partial G} + \frac{\partial C}{\partial S} \neq 0 \quad \Leftrightarrow \quad \varepsilon_{CS} \neq \varepsilon_{CG}. \tag{7}$$

We conclude[12]

Proposition 1 *Transfer pricing does not affect investment and real activity of multinational firms if the total concealment costs of transfer pricing imply that the concealment-cost elasticities of input manipulation and trade mispricing are identical.*

In the next section, we explore the relationship between the two terms in equation (7) in depth and begin in section 3.1 with a case for which Proposition 1 is fulfilled.

3 Variable concealment costs and firms' real activity

In the literature on personal income taxation, for example, Allingham and Sandmo (1972), Yitzhaki (1987) and more recently Kleven et al. (2011), the probability of detection is an increasing function of undeclared income.[13] In our setting, that approach corresponds to the situation where fines and the probability of being detected depend on the amount of profits shifted, i.e., $P = G \cdot S$. Implementing a structure such as in Yitzhaki (1974) would imply that the detection probability should depend on evaded tax payments. In our model, this will not change any of our results as can be seen immediately from adjusting the definition of P to $P' = t_B \cdot G \cdot S$ (and recalculating equations (9) and (10) below).

An alternative would, however, be to base detection on the OECD arm's length principle, so that the detection is an increasing function of the deviation from the true price of the good. This approach was used by Kant (1988) and is standard in the literature focusing on concealment effort instead of expected fines (cf. Haufler and Schjelderup, 2000; Grubert, 2003; and Nielsen et al., 2010).

[12]Proposition 1 has an analogy to the Atkinson-Stiglitz theorem, which states that a tax on capital should be zero under certain conditions because the capital tax just exactly reproduces the labor tax, but distorts intertemporal consumption (see Atkinson and Stiglitz, 1976). In our case, the parallel is that the MNC should never manipulate its factor demand in order to shift profit income if the concealment-cost elasticities of input manipulation and trade mispricing are identical. The reason is that such manipulation would trigger the same concealment costs as pure mispricing, but in addition lead to production inefficiency.

[13]In Allingham and Sandmo (1972), the probability of an audit is actually modelled as a decreasing function of declared income. For given pre-tax income (as in their model), this setup fully corresponds to the modelling in the other papers.

3.1 Concealment costs based on the amount of profits shifted

If the cost of concealing transfer pricing depends on the amount of profits shifted, the concealment-cost function can be written as

$$C(G,S,c,d,l) = C(P,c,d,l) = e(c,l) + p(P,c,d)\Phi(P), \tag{8}$$

where $C(P,c,d,l)$ is convex in profits shifted and $P = G \cdot S$.[14] Inserting for P in equation (8), taking derivatives, we obtain

$$\frac{\partial C}{\partial G} = [p_P(P,c,d)\Phi(P) + p(P,c,d)\Phi'(P)]S, \tag{9}$$

$$\frac{\partial C}{\partial S} = [p_P(P,c,d)\Phi(P) + p(P,c,d)\Phi'(P)]G. \tag{10}$$

Substituting these derivatives into equation (7), we find that the two terms cancel, as

$$\frac{\partial C}{\partial S} = \frac{G}{S}\frac{\partial C}{\partial G}. \tag{11}$$

The reason why the two terms cancel is that both the tax savings and the effective marginal concealment costs from manipulating either the intermediate good (S) or the transfer price (G) are identical. However, using S to shift profit causes an additional efficiency loss in production that makes it optimal to only use G for profit shifting.

We may now state:

Proposition 2 *When the cost of concealing transfer pricing depends on the amount of undeclared tax bases (or tax payments evaded), the transfer price affects neither the use of the intermediate input S nor capital investments K_B.*

The proof of this proposition consists of using (11) in (6), where it is seen that the transfer price does not affect economic activity of the MNC.

If firms are heterogeneous (either due to differences in productivity or costs), it is straightforward to show that within our model of two horizontally integrated firms results are unchanged. We show in appendix B that results may change if the two firms are vertically integrated (see Appendix B). In this case when audits are based on the amount of profits shifted (Proposition 2), our results may change since the firm has an incentive

[14] This cost structure also corresponds (or comes very close, at least) to the so-called 'comparable-profit method' proposed by the OECD (cf. OECD, 2010; Gresik and Osmundsen, 2008) if we, for instance, rely on a comparison of the profitability ratio (before taxes and fines) between the upstream and the downstream affiliates (that is, $\frac{\pi^A}{\pi^B_e} = \frac{GS}{F(K,S)-(q+G)S-RK-e(c,l)}$) to the ratio between unrelated firms in these markets. Note that due to our assumption of linear production technology in the upstream market, unrelated firms will have zero profits and the detection probability will read $p = p(\frac{GS}{F(K,S)-(q+G)S-RK-e(c,l)}, c, d)$. Taking derivatives, applying the definition of concealment costs C and inserting into condition (6) for optimal S implies $F_S = q$.

to overinvest in the intermediate good in order to generate more profits in the upstream affiliate

3.2 Concealment costs based on the deviation from the arm's-length price

In the subsection above, we have assumed the probability of detection and concealment effort to depend on the amount of profits shifted. An alternative would be to let the sum of concealment costs (fine and effort) depend on the difference between the declared price and the true price (or market price). According to the OECD guidelines, the true price is the price that would have been negotiated between unrelated parties.[15] As a proxy, it is represented by q in our model (assuming perfect competition). The implication of this approach is that a large price deviation from the true transfer price can be very costly for the firm even if the total amount of profit shifted may be small, whereas a small price deviation is not costly even if a large amount of profit is shifted.

In order to facilitate an analysis based on the arm's length principle, we assume that the probability of being detected depends on the deviation from the true price, that is, G, but that the fine depends on total profits shifted P.

Given these assumptions, the concealment cost function C is given by

$$C(G, S, c, d, l) = e(c, l) + p(G, c, d)\Phi(P), \tag{12}$$

where $P = GS$ as before. The marginal concealment costs are now given by

$$\frac{\partial C}{\partial G} = p_G(G, c, d)\Phi(P) + p(G, c, d)\Phi'(P)S, \tag{13}$$

$$\frac{\partial C}{\partial S} = p(G, c, d)\Phi'(P)G. \tag{14}$$

Substituting these derivatives into equation (7), we find

$$-\frac{G}{S}\frac{\partial C}{\partial G} + \frac{\partial C}{\partial S} = -\frac{G}{S}p_G(G, c, d)\Phi(P) < 0. \tag{15}$$

Using equation (15) in the first-order condition for the optimal use of S, we obtain

$$F_S^B = q - \frac{G}{S}p_G(G, c, d)\Phi(P) < q. \tag{16}$$

We thus have:[16]

[15] Among several characteristics for such a comparison, the most prominent one is the 'comparable uncontrolled price' (CUP) method that implies observing and drawing on the price charged on equivalent trades with non-related third parties. See OECD (2010). Gresik and Osmundsen (2008) provide institutional details and an economic analysis of alternative transfer pricing methods.

[16] The result in the Proposition will be further strengthened if concealment costs are defined over the

Proposition 3 *When the probability of detection focuses on deviations from the true arm's-length price and places no emphasis on profits shifted, abusive transfer pricing has real effects on the use of the input good* (S) *and investments* (K).

Inspection of equation (16) shows that transfer pricing leads to more of the intermediate good S being shipped, because achieving extra tax savings now is comparably cheaper via raising S than via increasing G, as only the latter will lead to a higher probability of detection.[17] Since transfer pricing changes the use of S, it is clear that transfer pricing also affects K, because the marginal productivity of capital depends on the level of S, see equation (3).

When concealment costs predominantly depend on the deviation from the arm's-length price, it is profitable for the MNC to use both G and S to shift profit to the tax haven affiliate. The reason is that increasing S allows the MNC to reduce concealment costs by lowering G (all else equal). Together with an increased use of the intermediate good S, demand for capital goes up and production increases in the high-tax country if inputs K and S are complements, i.e., if $\partial^2 F(K,S)/(\partial K \partial S) > 0$. If, in contrast, inputs are substitutes, $\partial^2 F(K,S)/(\partial K \partial S) < 0$, the effect on firm activity is ambiguous, since K would fall, while S would increase.

When we have complementarity, the increase in the use of S mitigates the underutilization of capital that follows from the lack of tax deductibility of equity (confer eq. (3). This is an effect that reduces the tax wedge on capital investments, but it should be interpreted with caution. It is too hasty to conclude that transfer pricing implies that economic efficiency is improved. The reason is that the use of the intermediate factor S to shift profits carries both concealment and efficiency costs that counteract the rise in production.

To see this, consider the case of a tax on economic profits only (full deductibility of all capital costs or complete financing with tax deductible debt). The incentive to shift profits implies an increase in S that only triggers overinvestment and concealment costs. Manipulating the transfer price now clearly leads to inefficient production.[18]

price deviation (and effort) only, that is, $C(G,c,d,l) = e(c,l) + p(G,c,d)\Phi(G)$ and $\partial C/\partial S = 0$. Note as well that defining costs of concealment effort $e = e(c,l)$ also over GS, respectively G will have no qualitative effect on any of the results in sections 3.1 and 3.2.

[17] The tendency to raise S will eventually be counteracted by increasing inefficiency in production.

[18] There could, of course, be (unexplained) reasons for taxation of capital at the rate t_B, such as distributional concerns or income shifting between labor and capital income.

4 Effects of higher detection effort and increased tax-law quality

In this section, we focus on the case of concealment costs being based on the amount of profits shifted (cf. section 3.1). First, the comparative-static analysis confirms the findings on non-affected economic activity, because we derive[19]

$$\frac{dS}{dt_A} = \frac{dS}{dd} = \frac{dS}{dl} = 0, \quad \text{and} \quad \frac{dS}{dt_B} = -\left[\frac{F_{KS}}{F_{KK}F_{SS} - F_{KS}^2}\right]\frac{R}{(1-t_B)^2}.$$

Neither detection effort d nor tax-law quality l or the tax rate t_A in the tax haven affect the optimal demand for the intermediate good. The domestic tax rate t_B affects the intermediate good only via the capital tax distortion from denying tax deductibility for costs of equity. Since production is not affected by transfer pricing, any government measures to reduce transfer pricing will not reduce output. Hence, governments can fight against profit shifting without experiencing (negative) investment effects.

However, fighting against profit shifting via increased detection effort by the tax authorities cuts both ways and the final effect on profits shifted is ambiguous since $dS/dd = 0$ and

$$\frac{dG}{dd} = -\frac{C_{Pd} - \frac{C_{Pc}}{C_{cc}}C_{cd}}{S \cdot \left(C_{PP} - \frac{C_{Pc}}{C_{cc}}C_{Pc}\right)} \gtrless 0, \tag{17}$$

$$\frac{dc}{dd} = -\frac{1}{C_{cc}}\left[C_{Pc} \cdot S \cdot \frac{dG}{dd} + C_{cd}\right] = -\frac{1}{C_{cc}}\frac{C_{cd}C_{PP} - C_{Pc}C_{Pd}}{C_{PP} - \frac{C_{Pc}}{C_{cc}}C_{Pc}} \gtrless 0, \tag{18}$$

where C_{Pd} etc. refer to double derivatives of the concealment cost function C, and $C_{cd}, C_{Pc} < 0$, but $C_{PP}, C_{Pd} > 0$. (The relation between derivatives of C with respect to P on one hand and with respect to G and S on the other is made clear in the appendix.) A higher detection effort ceteris paribus makes it more attractive to invest into concealing since the reduction in expected fines increases. At the same time, the higher detection effort has a negative direct effect on overpricing G. If G falls, that gives a negative incentive for concealment effort c; however, if c increases that gives a boost to overpricing. Hence, both effects are ambiguous and it is likely that the final outcome of higher detection effort is a larger waste of resources on increased concealment effort while the intended reduction in profit shifting is at least moderated.

Therefore, the preferable choice is to write a consistent tax law without loopholes. A higher tax-law quality makes concealment more difficult and expensive and by that reduces concealment effort. Less concealment effort will increase the effective detection

[19] See the appendix for an explicit derivation of all expressions to come in this section.

probability and via this effect reduce overpricing and profit shifting. Formally, we find

$$\frac{dG}{dl} = \frac{S}{u}\frac{C_{Pc}}{C_{cc}}e_{cl} < 0, \tag{19}$$

because $u = C_{GG} - \frac{C_{Gc}}{C_{cc}}C_{cG} > 0$, $C_{Pc} < 0$ and $C_{cc}, e_{cl} > 0$. The effect of the law quality on concealment effort can be signed as

$$\frac{dc}{dl} = -\frac{1}{C_{cc}}\left[C_{Pc} \cdot S \cdot \frac{dG}{dl} + e_{cl}\right] < 0, \tag{20}$$

as again $C_{Pc} < 0$ and $C_{cc}, e_{cl} > 0$ and $\frac{dG}{dl} < 0$. Consequently, a better quality of tax law unambiguously reduces both transfer pricing and the (unproductive) activity of concealing the mispricing of the intermediate good.

We summarize

Proposition 4 *Investing in higher quality of tax law unambiguously reduces transfer pricing and dampens wasteful concealment activity. In contrast, more investment in detection effort spurs wasteful concealment activity and has an ambiguous effect on profit shifting.*

Proposition 4 has some empirical support. Lohse and Riedel (2013) study whether countries that strengthened their transfer pricing regulation in the tax code experience less profit shifting. They base their study on European panel data from 26 countries over the last decade. A main finding is that in countries that have tightened or introduced tougher transfer pricing documentation requirements, profit shifting is significantly reduced.[20] Their finding is in line with other studies that consider the effect of a stricter tax law. For example, Büttner et al. (2012) show that thin-capitalization rules reduce profit shifting by interest deductions, whilst Ruf and Weichenrieder (2012) find evidence for that controlled-foreign-company regulations are effective in reducing passive investments in low-tax countries.

5 Some concluding remarks

A transaction between related parties requires a transfer price to be set. In general, governments demand this price to be consistent with the price that would have been paid by unrelated firms, that is, an arm's length price. As shown here, an affiliate in a low-tax jurisdiction has an incentive to charge an artificially high price on sales to its sister entity in a high-tax country, and vice versa. The OECD transfer pricing

[20] Lohse and Riedel (2013) do not find empirical support for that advanced pricing agreements (APA) curb profit shifting. Under an APA agreement the firm and the tax authorities agree up-front on the transfer price. Such arrangements reduce the risk of the transfer price being adjusted later.

guidelines, along with those tax jurisdictions that have adopted the same principles, allow multinationals to choose from several approaches in determining reasonable transfer prices. Among the most common approaches are: (i) The comparable uncontrolled price method (CUP); (ii) the resale price method; and (iii) the cost plus method. Under CUP, the tax authorities compare the transaction with identical or similar transactions between independent trading parties. The resale price method is often used, if a product sold between related parties is subsequently resold to an unrelated party. Finally, the cost plus method adds a (customary) profit mark-up to the cost of producing a good. In practice, multinational enterprises adhere to these guidelines to a greater or lesser extent and risk triggering inspection from tax authorities, followed by a correction of the price and possibly a fine.

In this paper, we have examined the link between inspection policy and multinational firm behavior. Specifically we have considered a couple of different formulations of the probability of detection of profit shifting by transfer pricing, and we have analyzed how they affect investment and input use. We have shown that if the probability of an audit depends on the size of the deviation from the arm's-length price as approximated by the 'comparable uncontrolled price' (CUP) method, the firm's use of production factors will be distorted. In contrast, if the basis for control and the probability of an audit depend on the amount evaded (profit shifted) and is oriented at the 'comparable profit method', the use of production factors remains unaffected by transfer pricing and differences in national tax systems. For tax authorities, it will be less expensive to combat profit shifting by using a profit measure since it avoids undesirable side effects on multinational production activity.

Furthermore, we have shown that there is something to be said for fighting profit shifting by improving the tax law so that less room is left for inconsistency and tax loopholes. Such better tax-law quality unambiguously reduces profit shifting and wasteful concealment effort. More investment in detection effort by the tax authorities, instead, fosters concealment effort, has a (theoretically) ambiguous effect on profit shifting and leads to a more wasteful use of resources.

The policy recommendation that follows from our analysis are therefore to make audits contingent on how much profit is shifted because this imposes less of a distortion on production efficiency. Further, consider improving the quality of tax law in order to shut down loopholes as a complement to a sound auditing policy.

One caveat applies, however: The analysis in the paper featured a centralized MNC, and the sole purpose of transfer pricing in the MNC was to delimit taxable incomes in the two affiliates. If decision making in the MNC instead were decentralized, transfer pricing would in addition become an instrument for delegation of decision power to affiliates.[21]

[21] Nielsen et al. (2008) demonstrate that if tax minimization is really important for the MNC (because of bit tax differences), the best option is to stay centralized; decentralization may be superior, if tax

As long as two (sets of) transfer prices were utilized, one for delegation and another for taxation, the gist of the analysis above might well go through. According to a number of surveys, however, many MNCs only use 'one book', one set of transfer prices. In this case, overinvoicing the intermediate good by the headquarters could trigger negative effects on the investment decision at affiliate level. More generally, transfer pricing for tax purposes might collide with decentralized decision making (see, e.g., Smith, 2002; Nielsen and Raimondos-Møller, 2012). In such cases, implementing the CUP method could be advantageous, because it could mitigate the decentralization-related underinvestment effect.[22] These issues will have to be left for future work.

A Comparative statics

To avoid confusion in the notation to come, let us define the concealment cost function as $C = X(G, S, c, d, l)$ and label the second derivative taken for variables i and j as $X_{ij} = \frac{\partial^2 X}{\partial i \partial j}$. The first-order conditions for optimal firm behavior can be summarized and transformed into

$$F_K(K,S) - \frac{R}{1-t_B} = 0, \tag{21}$$

$$F_S(K,S) - q + \frac{t_B - t_A}{1-t_B} \cdot G - \frac{\partial X(G,S,c,d,l)}{\partial S} = 0, \tag{22}$$

$$\frac{t_B - t_A}{1-t_B} \cdot S - \frac{\partial X(G,S,c,d,l)}{\partial G} = 0, \tag{23}$$

$$\frac{\partial X(G,S,c,d,l)}{\partial c} = 0. \tag{24}$$

Totally differentiating the first-order conditions leads to

$$F_{KK}dK + F_{KS}dS - \frac{dR}{1-t_B} - \frac{R}{(1-t_B)^2}dt_B = 0, \tag{25}$$

$$\begin{aligned} F_{KS}dK + (F_{SS} - X_{SS})\,dS + \left(\frac{t_B - t_A}{1-t_B} - X_{SG}\right)dG - X_{Sc}dc \\ -dq + \frac{G(1-t_A)}{(1-t_B)^2}dt_B - \frac{G}{1-t_B}dt_A - X_{Sd}dd - X_{Sl}dl = 0, \end{aligned} \tag{26}$$

$$\begin{aligned} \left(\frac{t_B - t_A}{1-t_B} - X_{GS}\right)dS - X_{GG}dG - X_{Gc}dc \\ +\frac{S(1-t_A)}{(1-t_B)^2}dt_B - \frac{S}{1-t_B}dt_A - X_{Gd}dd - X_{Gl}dl = 0 \end{aligned} \tag{27}$$

$$X_{cS}dS + X_{cG}dG + X_{cc}dc + X_{cd}dd + X_{cl}dl = 0. \tag{28}$$

manipulation is a lesser concern.

[22] We are grateful to Chris Heady for drawing our attention to this issue.

From equation (28), we can infer

$$dc = -\frac{1}{X_{cc}}\left[X_{cS}dS + X_{cG}dG + X_{cd}dd + X_{cl}dl\right]. \tag{29}$$

Substituting that expression into equation (27) delivers after some rearrangements

$$\begin{aligned} dG &= \frac{1}{u}\left[\left(\frac{t_B - t_A}{1-t_B} - X_{GS} + \frac{X_{Gc}}{X_{cc}}X_{cS}\right)dS + \frac{S(1-t_A)}{(1-t_B)^2}dt_B - \frac{S}{1-t_B}dt_A \right. \\ &\quad \left. - \left(X_{Gd} - \frac{X_{Gc}}{X_{cc}}X_{cd}\right)dd - \left(X_{Gl} - \frac{X_{Gc}}{X_{cc}}X_{cl}\right)dl\right], \end{aligned} \tag{30}$$

where $u = X_{GG} - \frac{X_{Gc}}{X_{cc}}X_{cG}$. Moreover, by manipulating equation (25), we can extract

$$dK = -\frac{F_{KS}}{F_{KK}}dS + \frac{1}{F_{KK}}\frac{dR}{1-t_B} + \frac{1}{F_{KK}}\frac{R}{(1-t_B)^2}dt_B. \tag{31}$$

Inserting now the terms in equations (29), (30) and (31) into equation (26) and using $X_{ij} = X_{ji}$, we obtain an explicit solution for the comparative-static effects on the use of the intermediate good S:

$$\begin{aligned} &\left[F_{SS} - X_{SS} - \frac{F_{KS}^2}{F_{KK}} + \frac{1}{u}\left(\frac{t_B - t_A}{1-t_B} - X_{GS} + \frac{X_{Gc}}{X_{cc}}X_{cS}\right)^2 + \frac{X_{cS}^2}{X_{cc}}\right]dS = v \cdot dS \quad = \\ &-\frac{F_{KS}}{F_{KK}}\frac{dR}{1-t_B} + dq - \frac{1}{(1-t_B)^2}\left[\frac{F_{KS}R}{F_{KK}} + G + \frac{S}{u}\left(\frac{t_B - t_A}{1-t_B} - X_{SG} + \frac{X_{Gc}}{X_{cc}}X_{Sc}\right)\right]dt_B \\ &\qquad + \frac{1}{1-t_B}\left[G + \frac{S}{u}\left(\frac{t_B - t_A}{1-t_B} - X_{SG} + \frac{X_{Gc}}{X_{cc}}X_{Sc}\right)\right]dt_A \\ &+ \left[X_{Sd} + \frac{1}{u}\left(X_{Gd} - \frac{X_{Gc}}{X_{cc}}X_{cd}\right)\left(\frac{t_B - t_A}{1-t_B} - X_{SG} + \frac{X_{Gc}}{X_{cc}}X_{Sc}\right) - \frac{X_{Sc}}{Xcc}X_{cd}\right]dd \\ &+ \left[X_{Sl} + \frac{1}{u}\left(X_{Gl} - \frac{X_{Gc}}{X_{cc}}X_{cl}\right)\left(\frac{t_B - t_A}{1-t_B} - X_{SG} + \frac{X_{Gc}}{X_{cc}}X_{Sc}\right) - \frac{X_{Sc}}{Xcc}X_{cl}\right]dl, \end{aligned} \tag{32}$$

where $v = F_{SS} - X_{SS} - \frac{F_{KS}^2}{F_{KK}} + \frac{1}{u}\left(\frac{t_B - t_A}{1-t_B} - X_{GS} + \frac{X_{Gc}}{X_{cc}}X_{cS}\right)^2 + \frac{X_{cS}^2}{X_{cc}} < 0$ (from second-order conditions). Furthermore, it must be $u = X_{GG} - \frac{X_{Gc}}{X_{cc}}X_{cG} > 0$.

A.1 The case of shifted profits as basis for detection

Assume in this subsection that $C = X(G, S, c, d, l) = X(P, c, d, l)$ with $P = G \cdot S$. We then have

$$\begin{aligned} &X_G = X_P \cdot S \quad \Rightarrow \quad X_{GG} = X_{PP} \cdot S^2,\ X_{GS} = X_{PP} \cdot GS + X_P = X_{SG}, X_{Gc} = X_{Pc} \cdot S, \\ &X_S = X_P \cdot G \quad \Rightarrow \quad X_{SS} = X_{PP} \cdot G^2,\ X_{Sc} = X_{Pc} \cdot G. \end{aligned}$$

Inserting these expressions into equation (32) and collecting terms delivers

$$\begin{aligned} v \cdot dS &= -\frac{F_{KS}}{F_{KK}} \frac{dR}{1-t_B} + dq - \left[\frac{F_{KS}}{F_{KK}}\right] \frac{R \cdot dt_B}{(1-t_B)^2} + \frac{S}{u} \underbrace{\left[\frac{t_B - t_A}{1-t_B} - X_P\right]}_{=0 \text{ from FOC}} \frac{dt_A}{1-t_B} \\ &+ \frac{GS^2}{u} \left(X_{Pd} - \frac{X_{Pd}}{X_{cc}} X_{cd}\right) \underbrace{\left[X_{PP} - \frac{X_{Pc}^2}{X_{cc}} + \frac{X_{Pc}^2}{X_{cc}} - X_{PP}\right]}_{=0} dd \\ &+ \frac{GS^2}{u} \left(X_{Pl} - \frac{X_{Pl}}{X_{cc}} X_{cl}\right) \underbrace{\left[X_{PP} - \frac{X_{Pc}^2}{X_{cc}} + \frac{X_{Pc}^2}{X_{cc}} - X_{PP}\right]}_{=0} dl \\ &= -\frac{F_{KS}}{F_{KK}} \frac{dR}{1-t_B} + dq - \left[\frac{F_{KS}}{F_{KK}}\right] \frac{R \cdot dt_B}{(1-t_B)^2}. \end{aligned} \tag{33}$$

Moreover, the expressions enable simplification of v to

$$v = F_{KS}^2 / F_{KK} - F_{SS} \tag{34}$$

Equation (33) shows that transfer pricing does not affect factor allocation and economic activity. The use of the intermediate input good is independent of the tax rate t_A in the tax haven as well as of detection effort by tax authorities d and the quality of tax law l. The domestic tax rate t_B affects the intermediate good only via the capital tax distortion from denying tax deductibility for costs of equity.

Let us specify the concealments cost now as $C = X(P, c, d, l) = e(c, l) + p(P, \frac{d}{c}) \cdot \Phi(P)$ so that we have $X_{Pl} = 0$ and remember that $X_{cl} = e_{cl} > 0$. Applying these specifications together with $\frac{dS}{dl} = 0$ in equation (30), we can show that

$$\frac{dG}{dl} = \frac{S}{u} \frac{X_{Pc}}{X_{cc}} X_{cl} < 0, \tag{35}$$

because $X_{Pc} < 0$ and $X_{cc}, X_{cl} > 0$. Making use of (35) in equation (29), we can sign the effect of law quality on concealment effort as

$$\frac{dc}{dl} = -\frac{1}{X_{cc}} \left[X_{Pc} \cdot S \cdot \frac{dG}{dl} + X_{cl}\right] < 0, \tag{36}$$

as again $X_{Pc} < 0$ and $X_{cc}, X_{cl} > 0$ and $\frac{dG}{dl} < 0$. Consequently, a better quality of tax law unambiguously reduces transfer pricing and the (unproductive) activity of concealing the mispricing of the intermediate good.

For an increase in the detection effort of tax authorities, we do not find a clear-cut result, and specifying the concealment cost function does not help much. A compact

presentation of results, collecting effects from equations (30) and (29) would be

$$\frac{dG}{dd} = -\frac{X_{Pd} - \frac{X_{Pc}}{X_{cc}} X_{cd}}{S \cdot \left(X_{PP} - \frac{X_{Pc}}{X_{cc}} X_{Pc} \right)} \gtrless 0, \tag{37}$$

$$\frac{dc}{dd} = -\frac{1}{X_{cc}} \left[X_{Pc} \cdot S \cdot \frac{dG}{dd} + X_{cd} \right] = -\frac{1}{X_{cc}} \frac{X_{cd} X_{PP} - X_{Pc} X_{Pd}}{X_{PP} - \frac{X_{Pc}}{X_{cc}} X_{Pc}} \gtrless 0, \tag{38}$$

where $X_{cd}, X_{Pc} < 0$ but $X_{PP}, X_{Pd} > 0$. Higher detection effort ceteris paribus makes it more attractive to invest into concealing since the reduction in expected fines increases. At the same time, higher detection effort has a negative direct effect on overpricing G. If G is reduced, that gives a negative incentive for concealment effort c; however, if c increases, that gives a boost to overpricing. Hence, both effects are ambiguous.

B Heterogenous firms and upstream production

We take our basic model as a starting point. But now, we assume that the MNCs differ in their productivity (or costs) to produce the intermediate input S in an vertically integrated upstream affiliate and that they can decide to produce the intermediate themselves at marginal costs $q_i = \alpha_i c'(S_i)$ (with $c''(S_i) > 0$) or to buy it on the market from an unrelated firm at market price q. Let us further assume that the differences in production costs cannot be observed by the tax authorities and that the firm-specific cost parameter α has support $\alpha \in [\underline{\alpha}, \bar{\alpha}]$. For simplicity, let us also assume that there are specialized independent firms that only produce the intermediate input using a linear technology and determining the world-market price q.[23]

For our model set-up in section 2, this implies that a vertically integrated affiliate in country A, belonging to MNC i, can charge a mark-up G_i^F on its effective marginal costs q_i such that the cost advantage relative to the world market is eliminated, $G_i^F = q - q_i > 0$, without violating any law or transfer-price regulation. Hence, inspired by Bauer and Langenmayr (2013), an integrated MNC can use a transfer price at 'gorilla's arm's length' in order to transfer profits to the low-tax country A. In addition, affiliate A can still charge a further, abusive mark-up G_i so that the final transfer price for the intermediate good S is given by $q + G_i = q_i + G_i^F + G_i$.

All concealment-cost functions remain unchanged, but the profit functions need to be adjusted in order to find global profits of MNC i as

$$\begin{aligned} \mathrm{E}[\Pi_i] &= (1 - t_B)[F^B(K_i, S_i) - q_i S_i] - RK_i + (1 - t_A)[q_i - \alpha_i c(S_i)] \\ &+ (t_B - t_A) G_i^F S_i + (t_B - t_A) G_i S_i - (1 - t_B) C(G_i, S_i, c_i, d, l), \end{aligned} \tag{39}$$

[23] Alternatively, the world-market price would be determined by the least-productive firm that decides to enter the production of the intermediate good in a world with market-entry costs. Cf., for example, Bauer and Langenmayr (2013).

where still $C(G_i, S_i, c_i, d, l_i) = e(c_i, l) + p(G_i, S_i, c_i, d)\Phi(G_i, S_i)$.

As long as $t_B > t_A$, an integrated MNC will always exploit gorilla's arm's length, which is free of cost, and choose G_i^F such that $G_i^F = q - q_i$. For evaluating whether transfer pricing (regulation) affects production decisions, then, the first-order conditions for maximizing global profits (39) with respect to the abusive mark-up G_i and the demand for the intermediate good S_i are relevant.

The condition for the optimal abusive mark-up G_i is analogous to condition (4) in the basic model,

$$(t_B - t_A)S_i = (1 - t_B)\frac{\partial C}{\partial G_i}, \tag{40}$$

whereas the condition for the optimal intermediate turns into

$$(1 - t_B)[F_S^B - q_i] + (1 - t_A)[q_i - \alpha_i c'(S_i)] + (t_B - t_A)(G_i^F + G_i) - (1 - t_B)\frac{\partial C}{\partial S_i} = 0. \tag{41}$$

Utilizing the definition $q_i = \alpha_i c'(S_i)$ and rearranging first and then inserting equation (40) allows to write this condition as

$$\begin{aligned} F_S^B &= q_i - \frac{t_B - t_A}{1 - t_B}(G_i^F + G_i) + \frac{\partial C}{\partial S_i} = q_i + \left[\frac{\partial C}{\partial S_i} - \frac{G_i^F + G_i}{S_i}\frac{\partial C}{\partial G_i}\right] \\ &= q_i - \frac{C(G_i, S_i, c_i, d, l)}{S_i} \cdot (\varepsilon_{CS} - \varepsilon_{CG}), \end{aligned} \tag{42}$$

where the elasticity of concealment costs with respect to the abusive transfer price is now defined over the total mark-up $G_i^F + G_i$, i.e., $\varepsilon_{CG} = \frac{\partial C}{\partial G}\frac{G_i^F + G_i}{C}$.

Consequently, it follows that Proposition 1 still holds. Even for MNCs producing the intermediate good in an integrated upstream affiliate under unobservable productivity (cost) heterogeneity, transfer pricing does not affect real investment and activity as long as the total concealment costs of transfer pricing imply that the concealment-cost elasticities of input manipulation and trade mispricing are identical.

However, the neutrality of basing audits on the amount of profits shifted is challenged under such heterogeneity. Since the concealment costs are not affected by the extension of the basic model, we can still rely on the concealment cost derivatives (9) and(10),

$$\begin{aligned} \frac{\partial C}{\partial G_i} &= [p_P(P, c, d)\Phi(P) + p(P, c, d)\Phi'(P)]S, \\ \frac{\partial C}{\partial S} &= [p_P(P, c, d)\Phi(P) + p(P, c, d)\Phi'(P)]G_i. \end{aligned}$$

Plugging them into equation (42) results in

$$F_S^B = q_i + \left[\frac{\partial C}{\partial S_i} - \frac{G_i^F + G_i}{S_i}\frac{\partial C}{\partial G_i}\right] = q_i - \frac{G_i^F}{S_i}\frac{\partial C}{\partial G_i} < q_i. \tag{43}$$

The fact that there are real profits involved in producing the intermediate good in the upstream affiliate and that the gorilla's arm's length allows a mark-up G_i^F free of (concealment) cost, sets incentives to increase the use of the intermediate good in final good production in affiliate B. Depending on the magnitude of the mark-up G_i^F and the marginal concealment costs from abusive transfer pricing, production in affiliate B will increase in order to generate and to shift more profits to the low-tax country A.

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