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The Economics of Advance Pricing Agreements

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The Economics of Advance Pricing Agreements*

by

Johannes Becker†, Ronald B. Davies‡ and Gitte Jakobs§

Abstract

Advance pricing agreements (APAs) determine transfer prices for intra-firm transactions in advance. This paper interprets these contracts as a means to overcome a hold-up problem that occurs because governments cannot commit to non-excessive future tax rates. In addition, with private information, just as in practice, our APAs will be complex and require lengthy negotiations. Nevertheless, implemented APAs lead to a Pareto improvement even when all agents are risk neutral. However, not all efficient APAs are concluded in equilibrium. International agreements to avoid double taxation will likely reduce the number of realized APAs.

JEL classification: H25, M41, G32

Keywords: Advance Pricing Agreements, Corporate Taxation, Multinational Firms, Transfer Pricing

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1 Introduction

Up to one third of all cross-border trade takes place within multinational firms (MNEs).[2] For accounting and tax purposes, MNEs apply transfer prices to all transactions which effectively determine the income, and thus the tax base, in a given location. The setting of transfer prices is contentious, however, as not only does the firm's desire to minimize taxation conflict with both governments' tax revenue objectives, but so too is there conflict between governments as an increase in one tax base reduces that in another. Thus, when choosing transfer prices, firms do not know whether they will be accepted by tax authorities and, if they are not, to what extent they will be adjusted by the authorities or even whether the authorities will agree at all thereby exposing the firm to double taxation. From this perspective, it is not surprising that, in a recent survey among multinational enterprises (MNEs), one of the most pressing problems mentioned is transfer pricing (Ernst & Young, 2011).

One means to reduce this tax uncertainty is to implement advance pricing agreements (APAs). In an APA, the firm and the two (or more) involved tax authorities negotiate a contract in which the future transfer pricing method is settled. The use of APAs is on the rise, growing from 758 such agreements in 2009 to 2055 in 2012 (EU Joint Transfer Pricing Forum, 2013).[3] Figure 1 shows their usage for the dozen countries that jointly account for roughly 95 percent of APAs. As can be seen, the US, Japan, and Canada were early adopters. In just three years, their usage in the US increased ten-fold. Further, other major sources and hosts of FDI have begun using them much more often.

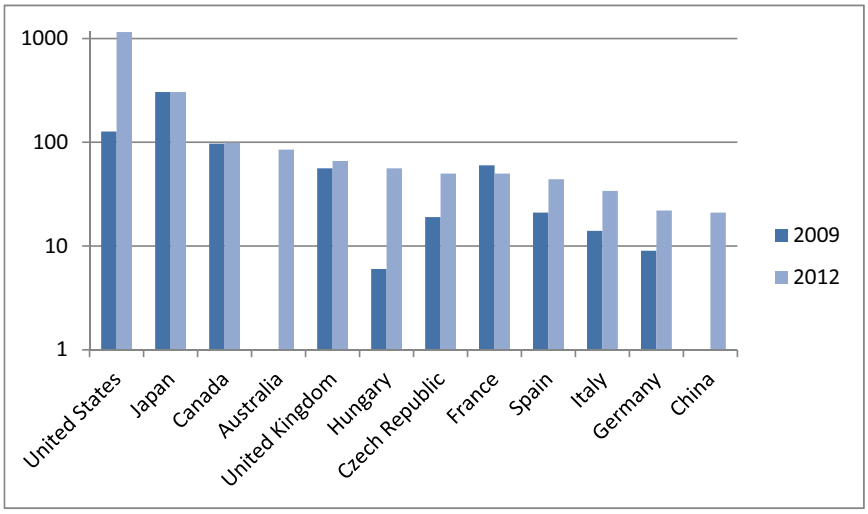
There is an abundant literature which describes and interprets APAs as a kind of insurance against future shocks in tax treatment (e.g. Vollert, et al. 2013). This may in itself be of value as long as firms can be assumed to be risk averse and have a desire to be insured. However, if all parties are risk neutral, as is typically assumed, then with a fixed surplus to be distributed between the MNE and the tax authorities (via taxation), an APA cannot increase the welfare of all involved parties. Given that APA negotiations are costly, both in terms of manpower and fees, this calls into question why the firm would choose to agree to it. With this in mind, in this paper we interpret APAs as a commitment for governments to not excessively tax the MNE in the future. An implemented APA's commitment solves a hold-up problem and increases the firm's activity, the proceeds of which can be used to increase the payoff of all involved even if they are risk neutral.

We build a model in which a MNE considers an investment project which can be done in the two countries under consideration (a high-tax and a low-tax one) or elsewhere. The investment requires an input from the low-tax country

[2] Precise data that distinguishes between intra-firm and inter-firm trade is often missing. Lanz & Miroudot (2011) estimate the proportion of intra-firm trade in global trade to be around thirty per cent. In 2013, about 50 per cent of US consumption imports and 30 per cent of total US exports can be traced back to related-party trade (U.S. Census Bureau, 2014).

[3] In 2013, 29 of 34 OECD countries and 21 of 28 EU member states offered at least the opportunity for unilateral APAs (Ernst & Young 2013).

Figure 1: Number of APAs in force in 2009 versus 2012



Sources: IRS (2013), EU Joint Transfer Pricing Forum (2013), Australian Tax Office (2011), Canada Revenue Agency (2013), National Tax Agency Japan (2013), State Administration of Taxation (China) (2011)

which must be priced for tax purposes. In the absence of an APA, the firm is audited and transfer prices are set by tax authorities after investment is sunk. In particular, these transfer prices may but need not be equal, i.e. there may be double taxation. We show that the larger the firm's investment income, the larger the incentive to double tax the income.[4] Since the firm anticipates this, it may not utilize its investment opportunities to the fullest extent, resulting in inefficiencies.[5] With an APA, however, transfer prices are set before the investment. As such, the firm will fully utilize the capacity of its investment, increasing surplus and increasing both after-tax profits and the tax revenues of both countries.

We find that APAs lead to a Pareto improvement. However, since they are concluded before profits are realized, they may create an information problem when firms have better information on future profits than the involved governments. This information problem causes APAs to be complex and comprehen-

[4] Thus the firm's income is partly expropriated, see Eaton and Gersovitz (1984), Thomas and Worrall (1994).

[5] This may be understood from the viewpoint of a common pool problem that typically may arise in federations. In contrast to the literature that analyzes overtaxation in federations (e.g. Keen and Kotsogiannis (2002) as well as Kessing et al. (2009)), it is not the vertical allocation of taxing rights that causes problems here, but the (a priori unclear) horizontal allocation of taxing rights.

sive contracts that actually determine a transfer price *function* that depends on future income, market prices, cost parameters, etc., i.e. depending on all "facts and circumstances" (as the OECD Transfer Pricing Guidelines suggest). This is why APA negotiations may take years and likely incur costs. Thus, APAs may be understood as mechanisms to ensure that firms are taxed according to their type (i.e. their profitability) even when profitability is unknown to governments in advance. In fact, with risk neutral agents, the complexity of the APAs can only be justified when the firm has private information on profitability. Moreover, although APAs are complex, they are a limited instrument as they only determine the distribution of the tax base. This constraint has two interesting implications. First, some Pareto-improving APAs are not concluded in equilibrium, as governments prefer excessive taxation over increased investment; if the firm could make side payments, this would not happen. Second, separating contracts may work without paying an information rent. The reason is that APAs cannot be used to extract the full rent from firm activity. We finally discuss APAs in a broader policy context and show that international agreements to avoid double taxation are likely to reduce the number of APAs.

The remainder of the paper is organized as follows. Section 2 provides some institutional and legal background, reviews the literature and discusses some of the empirical work on APAs. In section 3, we build a model to analyze the rationale for APAs with risk neutral agents. Section 4 concludes.

2 Institutional background, literature and some evidence

Transfer prices allocate income and, thus, tax bases across jurisdictions. If local tax rates differ, MNEs have an incentive to manipulate transfer prices in order to shift taxable income from high- to low-tax locations.[6] In order to curb profit shifting, tax authorities require transfer prices to comply with the so-called 'arm's length principle', as defined in article 9 of the 'Model Tax Convention on Income and on Capital' and corresponding national rules (e.g. § 482 of Internal Revenue Code in the US). The 'arm's length principle' means that a transfer price for a specific intra-firm transaction has to be comparable to that which would be agreed with an unrelated third party for the same transaction.

While the principle in itself seems simple, its implementation in practice has proven difficult. Except for interest rates (if the traded asset is an intra-firm loan) and commodity prices, comparables are often imperfect or outright missing. The arm's length reference price therefore has to be constructed – and it is obvious that the involved parties may have diverging opinions on how

[6] Related evidence is found by using firm-level data on intra-firm and arm's length transactions in U.S. data by Bernard, Jensen, and Schott (2006) and in French data by Davies, Martin, Parenti, and Toubal (2014). Clausing (2000) uses information on firm trade balances as it depends on host tax rates while Bartelsman and Beetsma (2003) examines the allocation of profits as it depends on taxes. All of their results are consistent with transfer pricing for tax minimization purposes.

this is done best. The OECD Transfer Pricing Guidelines give some guidance on how the comparable benchmark may be constructed, but at the same time leave substantial room for interpretation precisely because of the varied situations in which a constructed price is needed.

Since the methods of constructing an arm's length reference price are – though to a differing degree – information intensive, a growing number of countries oblige the firms to prepare thorough transfer pricing documentation (§ 1.78 OECD TP Guidelines). Three in four interviewed MNEs in an Ernst and Young survey (2011) mention that transfer pricing documentation has been gaining importance. The penalties of not complying with the documentation duties are severe (§ 4.18 OECD TP Guidelines). While documentation itself involves high costs for the firms, even proper documentation does not eliminate the uncertainty of whether or not tax authorities will accept the proposed transfer prices.[7] Indeed, tax authorities still may conduct costly audits and, if they find the transfer prices to breach the 'arm's length principle', alter the transfer prices used or even apply penalties (article 9 Model Tax Convention, 26 U.S.C. § 6662). Moreover, the risk of an audit is rising. The Ernst and Young survey (2011) reports that, in 2010, two-thirds of respondents underwent an audit, by contrast only 52 percent of respondents did in 2007. Further in a 2013 survey, Taxand (2014) finds that 73 per cent of respondents have seen a rise in the frequency of tax audits. This is also reflected by the release of the 'Transfer Pricing Audit Roadmap' of the Internal Revenue Service in February 2014, which contains practical tools for planning, execution and resolution of transfer pricing audits (PwC 2014). Additionally, even if one tax authority accepts the transfer price and its documentation, it may still be that the other authority unilaterally adjusts the transfer price.[8] In this case, at least part of the firm's income is taxed in more than one tax jurisdiction (§ 4.109 OECD TP Guidelines). In another Ernst and Young survey (2003), it is found that 40 per cent of transfer price adjustments lead to double taxation.

A means to overcome tax uncertainty and prevent the risk of double taxation is an advance pricing agreement (APA) which determines the appropriate transfer pricing method for a certain period (§ 4.123 OECD TP Guidelines).[9] An APA specifies a means of calculating an arm's length reference price and commits the firm and tax authorities to this price. That said, there is a degree of flexibility built into the agreement, as the APA indicates circumstances (so-called validity constraints) under which the transfer pricing method would be violated and has to be rearranged (§ 4.123, § 4.135 OECD TP Guidelines).

In practice, this process begins with the MNE requesting an APA from the responsible tax authorities. Some but not all tax authorities require a fee for an

[7] For 2003, the U.S. Department of Treasury (2003) estimates the costs for preparing the transfer pricing documentation between $100,000 and $1 million.

[8] See Becker and Davies (2014) for a thorough discussion.

[9] The length of the period in which the APA is applied depends on the steadiness of the business area, the interests of the MNE and the tax authority and country-specific administration (BMF-Schreiben v. 5.10.2006, Tz. IV B 4 - S 1341 - 38/06, S.15-16).

APA.[10] An APA can be unilateral, bi- or multilateral, according to the number of tax authorities participating in the negotiations (§ 4.129, § 4.130 OECD TP Guidelines).[11] As part of this request, the MNE is allowed to propose a transfer pricing method and to participate in the negotiations. In doing so the MNE has to motivate the elected transfer pricing method (§ 4.133, § 4.134 OECD TP Guidelines) and submit all necessary and relevant information on the specific intracompany transactions (§ 4.123 OECD TP Guidelines).[12] Following this, the relevant parties negotiate the terms of the offered APA. In 2012, the average negotiation in the Slovak Republic for APAs within the European Union took 2 months, compared to 25 months in the United Kingdom (EU Joint Transfer Pricing Forum 2013). If these negotiations are successful, the MNE signs the contract and the APA enters into force. As long as the MNE complies with the validity constraints the tax authorities are bound by contract that they will accept the admitted transfer pricing method during the APAs duration (§ 4.135 OECD TP Guidelines). According to the European Commission (2014), within the EU an APA length of five years is standard.[13]

In the literature, the main supposition is that the advantage of an APA is that it achieves planning reliability in terms of future tax burden and lowers the risk of double taxation.[14] In one of the earliest studies, Brem (2003) argues that an APA may be a means for countries to show the willingness to reduce the danger of double taxation or tax adjustments for the MNE when the firm is unable to observe their willingness to engage is such de facto expropriation. This is supported by Whitford (2010) who finds that APAs are more common in high-tax countries, something he posits may lead these countries to use APAs as a commitment device to stop them from excessive taxation. In addition, he finds that countries with large FDI flows tend to use more APAs, leading him to suggest that such countries benefit the most from reductions in regulatory uncertainty. The model of Waegenaere et al. (2009) takes a similar approach by arguing for an APA on the basis of reduced compliance costs when the tax environment is made more stable.[15] Thus, the literature mainly describes the

[10] In Germany, the applicant in general has to pay 20.000 € to the German tax authority (Bundeszentralamt für Steuern) for the enforcement of an APA (§ 178a Abgabenordnung).

[11] Within the EU, at the end of 2010, 284 APAs were negotiated in the EU (not counting the Netherlands for which there are no data). Of these, 126 were bi- or multilateral APAs and 158 were unilateral. Some countries such as France, Ireland and Germany tend to use bilateral or multilateral APAs whereas others, such as Spain and Italy, tend to use unilateral APAs.

[12] Borkowski (1993) reports that the application fee and the publication of the intracompany information is the most important deterrent of applying for an APA.

[13] Recently, Ireland came under fire from the EC due to its APA with Apple, an APA which, with minor modification, has been in place for twenty years.

[14] Very few studies examine the impact of APAs on MNE behavior. Tomohara (2004) analyzes production distortions that arise under a bilateral APA. These distortions, however, are not APA-specific, but rather due to tax rate differentials. More recently, Hofmann, Lohse and Riedel (2014) utilize firm level data on European MNEs and find that profit shifting is lower with an APA.

[15] In addition, their model suggests that bilateral APAs are more likely with large corporate tax rate differentials and low income. This arises because the first increases the firm's gain from an APA, the latter makes an agreement easier for the tax authorities.

merits of an APA as to reduce tax uncertainty. However, if agents are risk neutral, this is not enough to make an APA worth the negotiation costs, as the two governments (and the firm) have diametrically opposed objectives. We will therefore argue in the following that the main justification of an APA is an effective increase in surplus, making it of benefit even to risk neutral agents.

3 The Model

Consider a world with three countries: a high-tax country (h), a low-tax country (l) and an outside country (o). A multinational firm has affiliates in h and l. Production takes place in country h, as do sales, but it involves a zero-cost investment from the affiliate in l to the one in h, e.g. a license to use a patent. The internal price for this investment must be approved of by the tax authorities, as we assume that the firm is audited with certainty.[16] The potential role of profit shifting via transfer price manipulation by the firm is discussed in Sect. 3.7.2. Let γ^i denote the transfer price that location $i \in \{h, l\}$ applies when calculating the tax bill. Governments aim to maximize their individual expected tax revenues; the firm seeks to maximize expected after-tax profits.

The firm is described by its profit capacity, which allows it to generate a maximum profit level of π. This is determined by random draws of two variables, p and ε, so that $\pi = p + \varepsilon$. The value of p is drawn at the start of the game and can take on two values, $p \in \{p^-, p^+\}$.[17] Let λ denote the probability that the firm's expected return is high, $p = p^+$. The value of ε is drawn after the investment has been made and has a mean of zero. Conditioning on p, profit capacity is thus a stochastic variable with distribution function $F_p(\pi)$ and associated density function $f_p(\pi) = F_p'(\pi)$. To avoid lengthy discussion of the tax treatment of losses, we will assume that $F_p(0) = 0$ for $p \in \{p^-, p^+\}$.[18] Since $\mathrm{E}(\varepsilon) = 0$, $\int_{-\infty}^{\infty} \pi f_p(\pi)\, d\pi = p$. As with λ, this distribution function is known by all agents.

After ε has been drawn, the firm knows its profit capacity $\tilde{\pi}$ where the tilde denotes the realization of the variable π. It may then decide to use less than its full capacity, i.e. to realized profits $\hat{\pi} \leq \tilde{\pi}$ where the hat denotes the actual realization of profits. Whereas $\tilde{\pi}$ is the firm's private information, the capacity utilization $\hat{\pi}$ is observable by all agents.

One interpretation of this setup is that the firm's potential profits are the function of a technology parameter (p) and a demand parameter (ε). The firm knows its technology when making locations decisions, however, it does not know its demand conditions until it has committed to a market. Once demand conditions are known, the firm chooses how much of its maximum pre-tax profits to realize, information which is available to governments when they calculate

[16] Transfer prices are not only implied for tax reasons. In the framework of this model, however, accounting or governance reasons will not play a role and are therefore neglected.

[17] Allowing for a continuum of types adds complication but does not provide additional intuition. We therefore use this more parsimonious setup.

[18] Note that we allow the realization of p to affect the distribution of ε.

the tax bill. As will be explained momentarily, the reason why firm may choose to not realize its full profit capacity is taxation.

Before detailing the model, it is helpful to give an overview of the timing of the game, which is represented in Figure 2. After learning its realization of p, the firm decides whether or not to apply for an APA. If it does not request an APA, it then decides whether or not to exercise its outside option. If it leaves, it earns $\pi^o(p)$ while the tax revenues of the two countries are zero. Alternatively, if it chooses to stay, the firm learns its realization of ε, and thus $\tilde{\pi}$, and decides on capacity utilization $\hat{\pi} \leq \tilde{\pi}$. This $\hat{\pi}$ is observed by governments who then bargain over the transfer price to be applied. If this bargaining fails, the firm faces double taxation.[19] Although double taxation increases the revenues both governments derive from the firm, this comes at cost. We will assume that the cost is given by a tax base reduction of R^i for $i = \{l, h\}$ and may be interpreted as a reputational cost which leads to a decrease in tax base, e.g. due to less investment by other firms who are put off by the inability of the involved governments to agree on a reasonable tax environment. If bargaining is successful, the governments agree on a transfer price, $\gamma^l = \gamma^h = \gamma^N(\cdot)$ which will depend on the firm's profit capacity utilization. In any case, after this, payoffs accrue.

Alternatively, the firm can request an APA. Following the request, the two tax authorities decide whether or not to consider the request.[20] If they decline to offer an APA, then the firm's decision process becomes what it would have been if it hadn't requested an APA. If they choose to make APA offers, the governments bargain over transfer prices (or transfer price schedules). If the negotiations fail or the firm refuses to take the APA, the game continues as in the absence of an APA. Then, the firm decides between leaving (and, thus, effectively losing the APA) or staying. If the firm stays, ε is revealed, capacity utilization is chosen, and a transfer price is determined using the APA. Then, payoffs accrue.

Note the key difference in the APA and non-APA cases: with an APA the transfer pricing schedule is set before the governments know the capacity utilization $\hat{\pi}$, without an APA, it is set after.

Normalizing input costs to zero, the net profit of the MNE is given by

$$\Pi = \hat{\pi} - t^h\left(\hat{\pi} - \gamma^h\right) - t^l\gamma^l \tag{1}$$

where t^i is the source based tax in country $i = \{l, h\}$ with $t^l \leq t^h$ – as the labels suggest.[21] We assume that tax rates are exogenously given.

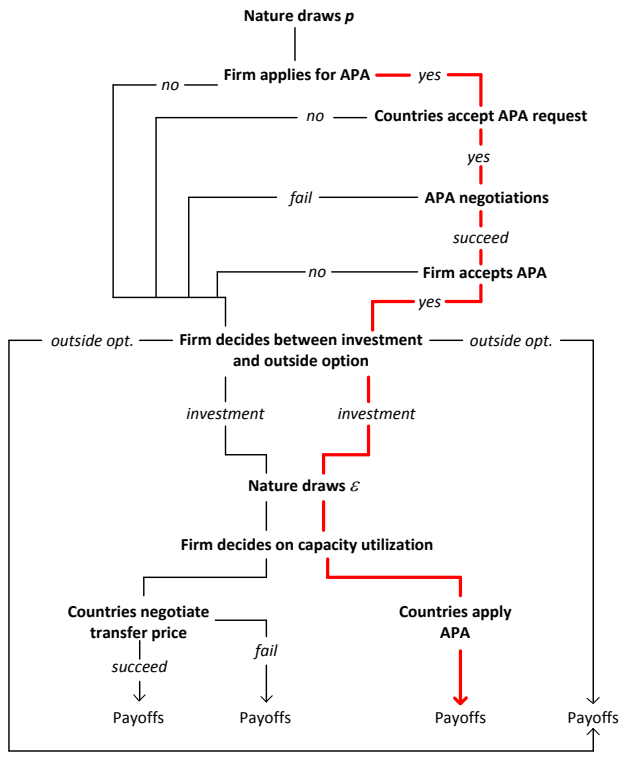
We solve the game by backward induction.

[19] We restrict the range of applied transfer prices in this case to $\gamma^i \in [0, \hat{\pi}]$.

[20] In 2012, 785 request were made, 88 of which were rejected and 84 of which were withdrawn by the applicant (EU Joint Transfer Pricing Forum, 2013).

[21] We assume that income is only taxed at source, i.e. foreign income is exempt from taxation in country l.

Figure 2: Timing of the Model



3.1 Investment in the absence of an APA

In this subsection, we analyze the subgame that is initiated when firm does not request an APA, the governments reject the request, the APA negotiations fail or the firm rejects the APA offer.

If the firm draws the outside option, its payoffs are given by $\pi^o(p)$ and both countries receive no tax revenue. In contrast, if the firm stays and invests, it draws a value of ε and chooses a profit capacity utilization $\hat{\pi} \leq p + \varepsilon$. Then, countries negotiate the transfer price which determines tax bases in both countries. If these negotiations fail, both authorities apply their most favorable unilateral transfer prices, i.e. $\gamma^l = \hat{\pi}$ and $\gamma^h = 0$. The MNE is thus subject to double taxation, obtaining after-tax profits are given by $\hat{\pi}\left(1 - t^h - t^l\right)$. Recall that double taxation comes at a reputation cost R^i, resulting in tax revenues by $t^h\left(\hat{\pi} - R^h\right)$ and $t^l\left(\hat{\pi} - R^l\right)$ for the high- and low-tax country respectively. If negotiations are successful, the negotiated transfer price $\gamma^N(\hat{\pi})$ applies and the reputation loss is prevented. In this case, after-tax profits are given by $\hat{\pi}\left(1 - t^h\right) + \left(t^h - t^l\right)\gamma^N(\hat{\pi})$ and tax revenues by $t^h\left(\hat{\pi} - \gamma^N(\hat{\pi})\right)$ and $t^l\gamma^N(\hat{\pi})$.

How is the transfer price negotiated?[22] Since investment is sunk and income $\hat{\pi}$ is realized, the firm has no role at this stage. Negotiations can only be successful if there is a transfer price that implies higher tax revenue for *both* tax authorities in comparison to what they would get if negotiations fail. This only holds if there exists a transfer price γ that satisfies $\gamma \geq \hat{\pi} - R^l$ as well as $\hat{\pi} - \gamma \geq \hat{\pi} - R^h$, i.e. $\hat{\pi} - R^l \leq \gamma \leq R^h$. Put differently, as long as $\hat{\pi} \leq R^h + R^l$ there will be some γ which satisfies the participation constraint of each country. Thus, for $\hat{\pi} > R^h + R^l$, firm profits will be double taxed because one (or both) governments will prefer to absorb the reputation cost for the chance to tax the entire profit.[23] In contrast, for $\hat{\pi} \leq R^h + R^l$, negotiations choose γ to maximize the Nash bargaining product:

$$\max_{\gamma} \left(t^l \left(\gamma - \max\left[\hat{\pi} - R^l, 0\right]\right)\right)^{\beta} \left(t^h \left(\hat{\pi} - \gamma - \max\left[\hat{\pi} - R^h, 0\right]\right)\right)^{1-\beta} \tag{2}$$

where β is the bargaining power of the low-tax country. Note that, as pointed out by Becker and Davies (2014), negotiations are over tax bases, not revenues. The solution is given by $\gamma^N(\hat{\pi}) = \beta\left(\hat{\pi} - \max\left[\hat{\pi} - R^h, 0\right]\right) + (1-\beta)\left(\max\left[\hat{\pi} - R^l, 0\right]\right)$ which can be expressed as

$$\gamma^N(\hat{\pi}) = (1-\beta)\,\hat{\pi} + \beta \min\left[\hat{\pi}, R^h\right] - (1-\beta)\min\left[\hat{\pi}, R^l\right]. \tag{3}$$

The firm anticipates that its choice of $\hat{\pi}$ will affect whether or not negotiations succeed. For $\hat{\pi} \leq R^h + R^l$, its payoffs will be given by $\hat{\pi}\left(1 - t^h\right) + \left(t^h - t^l\right)\gamma^N(\hat{\pi})$, whereas for $\hat{\pi} > R^h + R^l$, it is $\hat{\pi}\left(1 - t^h - t^l\right)$. Thus, for some profit levels $\tilde{\pi}$, it turns out that the firm is better off by voluntarily reducing its profits to $\hat{\pi} = R^h + R^l$. This is true until profits get sufficiently large such that it pays off to accept double taxation; this is true for $\tilde{\pi} > \bar{\pi}$ with $\bar{\pi}$ denoting a cutoff level defined by

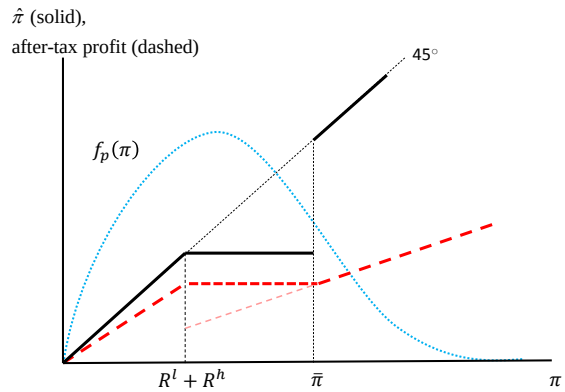
$$\bar{\pi} = \frac{\left(1 - t^h\right)R^l + \left(1 - t^l\right)R^h}{1 - t^h - t^l} \tag{4}$$

Thus, the firm will reduce its profits to $\hat{\pi} = R^h + R^l$ for $R^h + R^l < \tilde{\pi} < \bar{\pi}$ and use its full capacity otherwise. Figure 3 illustrates the incentive to underutilize profit capacity. It shows the choice of $\hat{\pi}$ as a function of profit capacity $\tilde{\pi}$. For $R^h + R^l < \tilde{\pi} < \bar{\pi}$, the firm has an incentive to reduce its profit to $R^h + R^l$ in order to prevent a drop in after-tax profit (see the thin dashed line). An illustrative pdf curve shows that an interesting implication is that it is the moderately profitable firm that will fail to utilize its full capacity. Finally, note that underutilization is Pareto inefficient as the firm could increase utilization, and the surplus generated from its activities, at zero cost. This is the inefficiency an APA will help to overcome.

[22] See Becker & Davies (2014) for a full treatment of transfer price negotiations without an APA.

[23] Due to the reputation cost, the tax base under double taxation may, in principle, be negative. In this case, a country could simply forego its taxation right. However, since $R^h + R^l > \max\left\{R^l, R^h\right\}$, no country will ever do so.

Figure 3: Capacity Utilization and after-tax Profits without an APA



Going backwards, the firm's decision on whether to invest or to exercise its outside option depends on its expected profits (recall that, at this point, the firm knows p but not ε). Expected profits are

$$\begin{aligned}\pi^E(p) &= \left(1-t^h\right)p - \left(t^l - t^h\right)\bar{\gamma}^N(\pi) \\ &\quad - \int_{R^h+R^l}^{\bar{\pi}} \left(\left(\pi - \left(R^h + R^l\right)\right)\left(1-t^h\right) - \left(t^l - t^h\right)\left(\gamma^N(\pi) - \gamma^N\left(R^h + R^l\right)\right)\right) f_p(\pi)\, d\pi \\ &\quad - \int_{\bar{\pi}}^{\infty} \left(t^l \pi - \left(t^l - t^h\right)\gamma^N(\pi)\right) f_p(\pi)\, d\pi \qquad (5)\end{aligned}$$

where $\bar{\gamma}^N(\pi) = \int_{-\infty}^{\infty} \gamma^N(\pi) f_p(\pi)\, d\pi$ denotes the expected value of $\gamma^N(\pi)$ before ε has been drawn. The expression in the first row depicts expected profits in the absence of double taxation (recall that $\mathrm{E}(\varepsilon) = 0$). The second row shows the expected loss due to capacity underutilization which occurs for $\tilde{\pi} \in \left[R^h + R^l, \bar{\pi}\right]$. The third row shows the loss due to double taxation for $\tilde{\pi} > \bar{\pi}$. The firm will invest as long as $\pi^E(p) \geq \pi^o(p)$.

3.2 Investment with an APA

In this subsection, we analyze the subgame starting with the firm and the countries signing an APA. An APA is a schedule that maps from $\hat{\pi}$ to a transfer price and may or may not condition upon firm type. Accordingly, we denote an APA schedule by γ_p^A and a transfer price at a given level of $\hat{\pi}$ by $\gamma_p^A(\hat{\pi})$. Moreover, we define the expected transfer price resulting from an APA for firm type p as

$\bar{\gamma}_p^A = \int_{-\infty}^{+\infty} \gamma_p^A(\pi) f_p(\pi) d\pi$. If the firm has accepted an APA of type p and utilizes capacity at $\hat{\pi}$, its after-tax profits are given by $\left(1-t^h\right)\hat{\pi} + \left(t^h - t^l\right)\gamma_p^A(\hat{\pi})$.

Since, as is shown below, marginal tax rates will be less than 100 per cent, the firm has no incentive to underutilize its profit capacity when it has an APA, i.e. $\hat{\pi} = \tilde{\pi}$. This then gives expected profits:

$$\pi^{E,A}(p) = \left(1-t^h\right)p + \left(t^h - t^l\right)\bar{\gamma}_p^A \tag{6}$$

and tax revenues for l and h of $t^l\bar{\gamma}_p^A$ and $t^h\left(p - \bar{\gamma}_p^A\right)$.

Before nature draws ε, the firm decides whether to make the investment or draw the outside option. For a type p firm to invest, it must be that

$$\pi^{E,A}(p) \geq \pi^o(p). \tag{7}$$

Otherwise, it will either invest in l and h without an APA or leave altogether and invest in the outside option, whichever yields higher expected profits. This is then the firm's participation constraint.

3.3 Initiating APA negotiations

Now, we turn to the APA negotiations which are initiated by the firm that requests an APA. For ease of presentation, we assume that there are no APA fees and no negotiation cost neither for the firm nor the governments. We will discuss the implication of relaxing this assumption in Sect. 3.7.1.

The firm will request an APA if, in expected terms, its associated profits are at least as high as in the absence of an APA or if the firm draws the outside option, i.e. if

$$\pi^{E,A}(p) \geq \max\left\{\pi^E(p), \pi^o(p)\right\}. \tag{8}$$

Since the firm does not need to accept the APA, the above equation can be interpreted as the participation constraint of the APA negotiations.

For the APA request to be accepted by the two governments, neither government can expect to lose tax revenues if the APA is accepted. With $\bar{T}_p^h$ and $\bar{T}_p^l$ denoting the expected tax revenues from a type p firm in the absence of an APA (which are zero if the firm chooses the outside option), expected tax revenues with an APA have to satisfy

$$t^l \mathrm{E}\left(\bar{\gamma}_p^A\right) \geq \mathrm{E}\left(\bar{T}_p^l\right) \tag{9}$$

$$t^h \mathrm{E}\left(p - \bar{\gamma}_p^A\right) \geq \mathrm{E}\left(\bar{T}_p^h\right) \tag{10}$$

where the expectations arise because p is the firm's private information.[24] Again, since initiating negotiations does not commit the involved parties to accepting the negotiation outcome, the two above conditions can be interpreted as the participation constraints for countries l and h.

[24] If only one firm type applies for an APA, then (9) and (10) reduce to $t^l\bar{\gamma}_p^{APA} \geq \bar{T}_p^l$ and $t^h\left(p - \bar{\gamma}_p^{APA}\right) \geq \bar{T}_p^h$ for $p \in \left\{p^-, p^+\right\}$.

Conditions (9) and (10) imply that the aggregate tax base under an APA has to be at least as large as the aggregate tax base in the absence of an APA. This result is stated in the following Lemma.

Lemma 1 *If all agents are risk neutral, an APA is only desirable for the two countries if the sum of expected tax bases under the APA (equal to E(p)) exceeds the sum of the expected tax bases in the absence of an APA, i.e. if*

$$E(p) \geq E\left(\frac{\bar{T}_p^h}{t^h} + \frac{\bar{T}_p^l}{t^l}\right) \tag{11}$$

Proof. It follows from equations (9) and (10) that the set of transfer prices that (weakly) increase the countries' tax revenues is given by $\mathrm{E}\left(\bar{\gamma}_p^A\right) \in \left[\mathrm{E}\left(\frac{\bar{T}_p^l}{t^l}\right), \mathrm{E}\left(p - \frac{\bar{T}_p^h}{t^h}\right)\right]$. This set is only non-empty if eq. (11) holds. ■

Eq. (11) is always satisfied if both firm types use the outside option without an APA, since then the right hand side is zero. If the firm invests without an APA and has no probability of being double-taxed, (11) holds with equality as profits are taxed in l or in h but never in both, meaning that the expected tax bases sum to p. However, with double taxation, (11) need not hold. On the one hand, double taxation increases the sum of the tax bases because the same profits are taxed twice; on the other, for firms with $\tilde{\pi} \in \left[R^h + R^l, \bar{\pi}\right]$, profit capacity is underutilized, resulting in smaller combined tax bases. Thus, it is an open question whether the condition in (11) holds or not.[25]

3.4 APA negotiations

Negotiations are supposed to have the following timing. First, both governments negotiate their offer and then, second, the firm decides whether or not to accept it. Thus, this is a classical principal-agent situation (as in Baron and Myerson, 1982), with the firm as the agent having private information on p, rather than a common agency problem.

As mentioned above, an APA may or may not be conditioned upon firm type. We will describe the negotiations for the case in which the APA conditions upon p; the simpler case of a pooling offer is described below.

With APAs being designed for both types p^- and p^+, the authorities have to rely on the firm to self-select into their desired APAs. This can be done by soliciting a reported type, p^r, and then offering the firm the APA corresponding to this reported type. For this to work, the firm must have an incentive to

[25] Eq. (11) can be simplified to

$$\mathrm{E}\left(\int_{R^l+R^h}^{\bar{p}} \left(\pi - \left(R^l + R^h\right)\right) f_p(\pi)\, d\pi\right) \geq \mathrm{E}\left(\int_{\bar{p}}^{\infty} \pi f_p(\pi)\, d\pi\right).$$

The constraint will thus hold if the expected increase in tax base due to the reduction in underutilization under an APA exceeds the expected loss in the tax base due to the cessation of potential double taxation.

reveal its true type, i.e. the incentive compatibility constraint must be satisfied. Let $\bar{\gamma}^A_{p^r,p}$ denote the expected value of the transfer price for a type p firm that reports type p^r.

If the two countries only want a type p firm to accept an APA but not type p' firm (with $p' \neq p$ denoting 'the other type' of firm), the incentive compatibility constraint (ICC) for the p' firm reads

$$\left(1-t^h\right)p' + \left(t^h - t^l\right)\bar{\gamma}^A_{p,p'} \leq \max\left\{\pi^E\left(p'\right), \pi^o\left(p'\right)\right\} \tag{ICC1}$$

while that of the type p firm is just (8) (i.e. it does not wish to misrepresent itself as the type that does not take an APA). Thus, if the condition in Lemma 1 for type p holds, the APA negotiations solve the following optimization problem:

$$\max_{\gamma^{APA}_p(\hat{\pi})} \left[t^l\bar{\gamma}^A_p - \bar{T}^l_p\right]^{\beta}\left[t^h\left(p-\bar{\gamma}^A_p\right) - \bar{T}^h_p\right]^{1-\beta} \quad \text{s.t. (8) for } p \text{ and (ICC1) for } p'$$

with $\bar{\gamma}^A_p = \bar{\gamma}^A_{p^r,p}$ for $p^r = p$ (i.e. the governments constrain themselves to truth-inducing mechanisms). That is, the two countries negotiate over the expected value of the transfer price ensuring that the type p firm applies (and invests) and that the type p' firm does not apply.

If, however, both firm types are offered APAs, the ICC for the two firms is given by

$$\bar{\gamma}_{p,p} \leq \bar{\gamma}_{p^r,p} \quad \text{for all } p^r \tag{ICC2}$$

i.e. that each firm type gets a more favorable transfer price by truthfully revealing its type. (ICC2) does not imply that both firm types have to be given the same transfer price function. To the contrary, as firm types differ in p and in the distribution function $F_p(\pi)$, the transfer price functions will generally differ and still be the preferred ones from the viewpoint of the type for which the schedule has been designed.

Then, if the condition in Lemma 1 holds for both types p the APA negotiations solve the following optimization problem:

$$\max_{\gamma^A_p(\hat{\pi})} \left[t^l\mathrm{E}\left(\bar{\gamma}^A_p\right) - \mathrm{E}\left(\bar{T}^l_p\right)\right]^{\beta}\left[t^h\mathrm{E}\left(p-\bar{\gamma}^A_p\right) - \mathrm{E}\left(\bar{T}^h_p\right)\right]^{1-\beta} \quad \text{s.t. (8) and (ICC2)}$$

for both types of p.

Before we characterize the negotiation outcome, we will discuss the role of the shape of the transfer price function γ^A_p. As (6), (9) and (10) show, since they are risk neutral, the firm only cares about expected profits and governments only about expected revenues. That is, all agents are indifferent about changes in the transfer price function that leave expected profits and revenues unchanged. This raises the question why negotiations are about transfer price functions and not, much simpler, about transfer prices – since any transfer price function has some expected value which can be applied as a transfer price. The answer[26] is that choosing an adequate shape of the transfer price function may relax the

[26] There is a second, more practical, answer to this question. Applying a single fixed transfer price to all profit outcomes would increase the probability of negative tax bases. This would

ICC. For purpose of illustration, consider the case in which type p^+ has some attractive outside option, but may be held back by a favorable APA implying a high level of $\bar{\gamma}^A_{p^+}$. Such an APA may, however, be desirable for firm type p^- as well. Governments may now alter the shape of the transfer price function by offering high transfer prices for high profit levels (which are less probable for firm type p^-) and low levels for low profit levels (which are more probable for p^-). Thus, an adequate function shape may prevent other types from mimicking the type for which the APA has been designed.

The following Lemma summarizes the properties of the transfer price function γ^A_p.

Lemma 2 *(i) The transfer price function γ^A_p will never involve effective marginal tax rates greater than or equal to 100%, but it may have effective marginal tax rates below 0%.*
(ii) The shape of the transfer price function γ^A_p is supposed to separate types. It typically assigns low values of the transfer price function to levels of $\hat{\pi}$ at which the associated type p has relatively large density and vice versa.

Proof. (i) For the proof of the first part, recall that firms may underutilize capacity. Assume that the transfer price schedule implies, at some profit level $\hat{\pi}$, an effective marginal tax rate of 100 per cent or more. The firm has no incentive to increase its capacity utilization beyond this point. Adjusting the transfer pricing schedule so that the effective marginal tax rate is equal to (instead of above) 100 per cent, would make the firm indifferent between increasing utilization for holding it constant. If the firm is supposed to weakly prefer using its full potential, tax revenues are increased without affecting the ICC. Therefore, governments would never offer APAs with effective marginal tax rate above 100 per cent. Since the firm cannot overstate its profits, marginal tax rates below 0 per cent do not distort the firm's behavior, but may be helpful in making offers incentive-compatible. (ii) Assume a variation in $\gamma^A_p(\hat{\pi})$ at two arbitrary but different values $\hat{\pi}'$ and $\hat{\pi}''$ that leave the value $\bar{\gamma}^A_p$ unaffected. Since p^- and p^+ differ in their distribution functions $F_p(\pi)$, the value of $\bar{\gamma}^A_{p'}$ will most probably change (except in special cases). Thus, by choosing adequate mean-preserving changes of γ^A_p, the ICC can be relaxed. This is done by choosing high values of $\gamma^A_p(\hat{\pi})$ at profit levels $\tilde{\pi}$ that have relatively low density and low (i.e. firm-favored) values of $\gamma^A_p(\hat{\pi})$ at $\hat{\pi}$ with high density. ■

The above Lemma rationalizes the complexity that is observed with real-world APAs. As we will show in the next subsection, the complexity only comes into play if negotiations are bound by some restriction (some type of firm being indifferent between an APA or no APA or going abroad).

imply that, for some profit outcomes, some government would have to pay a tax refund. For some reason, governments may not like this and favor a transfer price schedule that implies lower transfer prices for lower profits. Such a schedule could take a simple form like $\gamma^{APA}(\hat{\pi}) = \kappa\hat{\pi}$ for all $\hat{\pi}$ with $\kappa > 0$ some constant.

3.5 Properties of equilibrium APAs

We will now characterize the APAs that are applied in equilibrium. Depending on the outside options of the firm and the similarity of firm types (i.e. the difference between p^- and p^+), the realized APA may take different forms.

The governments will usually start by considering an APA that solves the Nash bargaining product (see above) without any restrictions, except for those in Lemma 1. If only one firm type (p) applies, the countries would like to implement $\bar{\gamma}_p^A = \beta\left(p - \frac{\bar{T}_p^h}{t^h}\right) + (1-\beta)\frac{\bar{T}_p^l}{t^l}$. If, at that point, type p' has no incentive to mimic p and type p wants to accept the APA, the APA is concluded, as a single transfer price APA or, if necessary,[27] as a schedule. If, at that offer and with optimal shape of γ_p^{APA}, (ICC1) is binding, $\bar{\gamma}_p^{APA}$ is reduced in order to discourage type p' from mimicking. Note that country h profits from this increase in terms of higher revenue. If, however, only (8) is binding, with the outside option the most attractive option, the expected transfer price on offer will be $\bar{\gamma}_p^{APA} = \frac{p\left(1-t^h\right)-\pi^o(p)}{t^l-t^h}$, making the firm just indifferent between investing or not. If then, at an optimal shape of the transfer price function, (ICC1) is binding as well, the countries either accept no request or both APA requests, the latter of which is analyzed in the following.

If both types apply for an APA, the solution preferred by the governments is given by $\mathrm{E}\left(\bar{\gamma}_p^{APA}\right) = \beta\left(p - \frac{\mathrm{E}(\bar{T}_p^h)}{t^h}\right) + (1-\beta)\frac{\mathrm{E}(\bar{T}_p^l)}{t^l}$. If, at this point, both firms accept, the two governments have no incentive to offer separating APAs. In this case, both firm types would get the same schedule, $\gamma_{p^-}^{APA} = \gamma_{p^+}^{APA} = \gamma^{APA}$, either as a single fixed transfer price or, when necessary,[28] as a transfer price function. If (8) is binding for one of the firms, two things may happen, both of which involves separating contracts. First, countries may reject the APA request for this firm type (the case which is analyzed above; note that this is equivalent to offering an APA that this reported firm type would reject). Alternatively, governments may adjust the offer such that both firm types take an APA and invest (which improves the expected tax revenues of country l). In this case, the type that is bound by the investment constraint will get $\bar{\gamma}_p^{APA} = \frac{p\left(1-t^h\right)-\pi^o(p)}{t^l-t^h}$ and the other firm type receives the largest transfer price $\bar{\gamma}_p^{APA}$ that is incentive compatible. If (8) is binding for the two firm types, again two things can happen. First, the offer will be $\bar{\gamma}_p^{APA} = \frac{p\left(1-t^h\right)-\pi^o(p)}{t^l-t^h}$ for both types as long if the ICC holds with these offers. Second, if at this does not hold, then one offer is improved such that only one participation constraint is binding (see above for this case). As an alternative, the countries may decide to reject the APA by one firm type (see above).

Without further assumptions on parameters, little can in general be said about which of these contracts will actually be realized. We can, however, stress some general properties of the mechanism described above.

[27] A schedule may become necessary if, otherwise, the type $-p$ had an incentive to mimic.
[28] A schedule may become necessary if, otherwise, some type preferred the outside option.

Proposition 1 *The optimal APA contract has the following properties:*
(i) An APA is only complex if the firm's informational advantage matters.
(ii) Even if offered APAs are type-dependent, the mechanism may be perfect in the sense that the firm does not receive an information rent.
(iii) The mimicking constraint may lead to higher transfer prices than with full information, but also to lower transfer prices. The latter would imply an information 'penalty' instead of an information rent.

Proof. (i) Since the firm as well as the governments only care about expected income and revenues, respectively, the shape of the transfer price function only plays a role to affect firm types differently. With symmetric information, the latter could be achieved by simply offering type-dependent single fixed transfer price contracts. Thus, complexity is due to informational constraints. (ii) This finding can be explained by two features that are unusual for this kind of mechanism. The first is the limited set of instruments (as opposed to the typical lump sum payment/marginal extraction setup). On the one hand, countries can extract at most a share t^h of firm income, since tax rates are given and the transfer price is bound to be within 0 and actual profits. On the other hand, countries usually do not desire to extract as much revenue from the firm as possible, since there are no side payments between countries, i.e. the only way that the low-tax country gets revenue is via the tax system. Therefore, if country l has some bargaining power, in expectation the firm will receive some rent even with complete information. The second feature is that the instrument available is sophisticated. By assigning a transfer price to each level of $\tilde{\pi}$, the countries may attain a certain level of differentiation without paying an information rent. (iii) This part of Proposition 1 has been explained above. Higher transfer prices imply larger tax savings, i.e. an information rent received by the firm – a typical feature of standard mechanisms following Baron and Myerson (1982). However transfer prices may as well be reduced if, for instance, otherwise the other firm type had an incentive to mimick. Then, the firm is worse off relative to the case of full information and, thus, incurs an information 'penalty'. See also part (ii) of this proof.
■

3.6 Welfare and policy implications

We can now characterize the equilibrium APA from a welfare point of view.

Proposition 2 *(i) A concluded APA is a Pareto improvement.*
(ii) Some requests for Pareto-improving APAs will be rejected in equilibrium.

Proof. (i) This follows from the fact that all three involved parties can veto the APA. (ii) This can happen for two reasons. First, as noted above, with a binding incentive compatibility constraint separation can be achieved by rejecting requests by one reported firm type even though there might exist a non-incentive compatible APA that is Pareto-improving. Second, because of double-taxation for high $\tilde{\pi}$ realizations, a government might prefer to not offer an APA on the

chance that the firm has a realization of profit capacity which it can fully tax. Without a second instrument to transfer revenues between countries, this can result in governments rejecting surplus increasing APAs because they do not receive a sufficiently large share of that surplus.

■

Thus, by mitigating underutilization of capacity and minimizing the use of the outside option, APAs can be welfare improving even though they may not achieve full efficiency.

Because the inefficiency APAs correct for is caused by the potential for double taxation, agreements that reduce the scope for double taxation, such as bilateral tax treaties, eliminate the need for APAs in our model.

Corollary 1 *A reduction in double taxation by other agreements reduces the number of Pareto-improving APAs.*

Finally, in addition to solving the problems created by time inconsistency in tax authorities, an APA is a potential improvement over a "one size fits all" tax policy which is not tailored to a given firm's circumstances (including its draw of p and its outside option). Indeed, it is because the APA is tailored to the firm that it is able to achieve investment in the active countries in cases where this does not occur without the APA. As a result, as long as negotiation costs are sufficiently small (something discussed below), APAs represent a improvement over an inflexible tax policy even if that inflexible policy is time consistent – at least if the welfare in country o is neglected.

3.7 Extensions

In this section, we discuss how the model results change when specific assumptions are relaxed.

3.7.1 Bargaining cost and fees

The above model abstracts from costs associated with applying for and negotiating an APA, although real-world fees can be substantial and practitioners report that negotiations are costly. Allowing for negotiation cost C^i for authority i associated with APA negotiations is straightforward, though. The implication is obvious: the gain from successful negotiations must outweigh negotiation cost. This has two effects. First, when gains are small, some applications for APAs will be rejected. Second, the necessary gains for negotiations to take place will affect the transfer price schedule set under the APA. Despite these changes, this does not affect the nature of the above results, i.e. an APA is a Pareto improvement because it reduces underutilization for some range of realized profit capacities.

Of greater interest is a fee F imposed on the firm if it applies for the APA. This has three implications. First, if this fee is set appropriately, it is possible for governments to use this as a mechanism for separating firm types since a sufficiently high fee will stop a firm type that expects insufficient surplus from an

APA from applying in the first place.[29] Second, if this fee then becomes revenue, by splitting it between countries it can serve as a side payment, increasing the set of mutually agreeable APAs. Third, if the fee becomes type contingent, then this increases the policy dimension for the governments as they write the APA schedules. This can therefore increase the rent extraction possible under the APA further increasing the set of implemented APAs. Therefore, an APA application fee can act to further reduce underutilization beyond what an APA on its own can do.

3.7.2 Allowing for profit shifting via transfer price manipulation

The firm in our model cannot avoid taxes by using transfer pricing or other profit shifting techniques. For plausibility, we assumed that the firm is audited with certainty, which seems a realistic assumptions for large firms (see Becker and Davies 2014). Allowing for profit shifting in this model would likely add some complexity, but the consequences are rather simple. Above all, assuming that transfer pricing for tax saving purposes is only possible in the absence of an APA decreases the attractiveness of an APA. In accordance with this assumption, a recent study by Hofmann, Lohse and Riedel (2014) finds that an APA reduces the firm's ability to reduce tax minimizing transfer pricing. It follows that less efficiency-enhancing APAs are concluded and that, in principle, APAs could be efficiency-enhancing even if activity stayed the same. Otherwise, the results derived above remain the same.

3.7.3 Multilateral and unilateral APAs

In our model, we have focused on bilateral APAs, that is, those involving the firm and two tax authorities. This framework is easily extended in obvious ways to a multilateral APA setting in which the firm potentially invests in three or more countries which jointly negotiate over the allocation of the tax base. In addition, the model can be used to describe the formation of a unilateral APA in which only one country commits to the transfer price. For the country not participating in the APA, its decision is similar to that in the no-APA case, i.e. it can choose to tax the entire utilized profit $\hat{\pi}$ and incur the reputation cost. The APA granter country, however, commits to an APA schedule, which creates two differences. First, if the non-APA participant double taxes, this still restrains the transfer price applied by the APA country. This restriction in its ability to double tax shrinks the range of values of $\tilde{\pi}$ in which there is underutilization (because the firm will pay less taxes when double taxed, implying a greater willingness to use its full capacity). Second, one can suppose that as long as the APA country abides by its agreement, it will not incur the reputation cost should double taxation occur. In general which country would be most likely to offer a unilateral APA depends on the model's parameters, including the relative

[29] See Davies (2014) for a discussion of how such fees can be used as a separating mechanism in other settings.

size of the reputation costs and the countries' relative bargaining strengths in negotiations.

4 Discussion and conclusion

The number of advance pricing agreements has been growing and, with increased efforts to curb tax base erosion and profit shifting, there is every reason to expect their use to accelerate. Although the predominant argument for APAs is that they reduce tax uncertainty, unless some agents are risk averse, a mutually agreeable APA must result in an increase in the economic surplus to be distributed, not only a reduction in uncertainty. In this paper we provide such a setting. When the firm anticipates that its high profit levels will trigger double taxation, it has an incentive to either underutilize its profit capacity or leave the country entirely. By committing to not do so via an APA, governments can avoid capacity underutilization and firm exit, increasing both tax bases (and thus revenues) as well as the firm's after tax profits. This then creates a situation which is agreeable to all parties - the firm, the high tax country and the low tax country - and thus constitutes a Pareto improvement.

Agreeing on transfer prices before the investment is made (and profits are realized) solves the commitment problem, but may create a new problem. Since firms likely have better information on profit capacity, they have an informational advantage that can be used in the negotiations. The question whether or not an APA is desirable can thus be understood as a trade-off between the hold-up problem in the absence of an APA and a principal-agent problem with an APA. We use the latter to explain the complexity of real-world APAs and the associated cost, and why some potential APAs are not realized in equilibrium.

Our analysis offers a number of empirical predictions and policy implications. First, and most basically, APAs should in general increase measured profits, be it by preventing firms from shifting activity abroad or by increasing the use of their profit capacity. Second, the complexity of an APA (i.e. the extent of the contract and the length of negotiations) should be inversely correlated to the available information. Third, the higher the incidence of double taxation, the higher the number of APAs (if available). Fourth, and closely related, Double Taxation Agreements (DTAs) *ceteris paribus* crowd out APAs. Fifth, the availability of APAs makes supranational agreements on unique transfer pricing guidelines less attractive. Therefore we hope that our model provides a basis for further work on this increasingly important policy instrument.

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