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OWNERSHIP RESTRICTIONS, TAX COMPETITION AND TRANSFER PRICING POLICY

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Ownership Restrictions, Tax Competition and Transfer Pricing Policy

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Abstract

This paper analyzes tax/subsidy competition and transfer pricing regulation between governments involved in trade through a multinational firm and a joint venture using an input provided by the former. The paper takes into account the fact that in absence of bargaining, any model of such JV is discontinuous in the ownership distribution in that for different ownership distributions, control is either fully held by one party, or no party in particular. The paper therefore model control problems that are inherent to JVs without strongly dominant shareholder and provides along the way a rationale for indigenization policies that restrict foreign ownership.

Keywords: Control, Ownership, Taxation, Transfer pricing.
JEL classification: F23, L22, H25

1 Introduction

There is a large literature on international transfer pricing and tax competition. This literature has overlooked two important aspects. Firstly, while it extensively focused on firms' transfer pricing policy, little has been done to analyze government's transfer pricing policy (TPP). Indeed, many countries have a transfer pricing policy, which the firm should obey when pricing internal transactions. If one takes a closer look to the number of (court) cases between transfer pricing regulators and Multinational firms (MNF), it then becomes clear that TPP are set to be complied with[1]. Secondly, many of the transactions implying transfer pricing take place between a multinational firm, and a joint venture (instead of a fully-owned subsidiary) because of MNF's ownership restrictions (often referred to as indigenization policy) that many countries-especially developing-impose[2]. A fundamental issue which arises then is which party in the joint venture (JV) makes production decision? Production decision (either by local firms or by MNF) has a fundamental impact on government's policies (transfer pricing, taxation), and vice-versa.

JV in which MNF are involved usually have a special feature. It often happen that at least, one input is provided by the MNF[3]. Therefore, while any non input-supplying party in the venture would (if in control) take production decision that maximizes the profit of the JV, the MNF (if in control) will instead attempt to maximize its joint profit, that is, transfer pricing revenue plus its share of profit in the JV[4]. Recognizing this fact, one should expect conflicts within any JV in witch one of the parties supplies an input, especially when there is no (strongly) dominant shareholder as is the case in countries with an indigenization policy. Such kind of conflicts can be resolved (or worsened) by government's policies related to transfer pricing, taxation and/or subsidization.

In this paper, I combine some issues that have been little analyzed in the literature, usually separately. In particular, I look at optimal transfer pricing regulations and tax/subsidy policies for governments involved in trade through an MNF and JV. Acknowledging control issues, I model the conflict that arise between the MNF and local shareholders whose only interest is in the JV, rather than taking control (by one party) as exogenous. Along the way, the paper provides a rationale for ownership restriction. While my setting can be characteristic of any two countries involved in trade, it is more descriptive of trade situations that involve a developed and a developing country. Furthermore, our model provides predictions that can be tested empirically.

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[1]In April of 1992, then Chief Tax Court Judge Arthur L. Nims III stated that his court had a backlog of section 482 cases with an amount in controversy of \$32 billion and that the amount had doubled in two or three years. These figures are the tip of an iceberg; according to the IRS, about 90% of contested section 482 adjustments are settled at the appeals level, without going to court." Statement of Robert S. McIntyre, Director, Citizens for Tax Justice,

& Michael J. McIntyre, Professor of Law, Wayne State University Law School

Before the Senate Committee on Government Affairs

On the Breakdown of IRS tax enforcement regarding multinational corporations:

revenue loss, excessive litigation, and unfair burdens for U.S. producers. March 25, 1993

[2]Many developing countries have a policy that allows foreign direct investment (FDI) only through ventures with local firms (see Svejnar and Smith, 1984 for examples).

[3]This input can be a technology over which the MNF has a patent, or a common input which can be found in the market but supplied by the MNF as part of conditions to enter the venture.

[4]This was already noted by Falvey and Fried (1986). It could be that a more advantageous scheme for the MNF is to offer to the shareholders of the foreign subsidiary a combination of equities in both subsidiaries, against the authorization to maximize global profit. However, to the best of my knowledge, this kind of arrangement is not observed.

The importance of FDI for host countries (especially developing countries) is unquestionable. Growingly, foreign ownership in these JV is often limited for reasons which are not yet totally understood by academics. A common explanation for such restriction policy, is to shift control to local firms. However, such explanation is not fully satisfactory, for two simple reasons. Firstly, for some ownership range, no formal relation between ownership and control exists. It is even claimed that MNF often have control in JV in which they do not have majority ownership. Secondly, is control by local parties always associated with higher benefits for the country? One thing is however undeniable: limiting MNF's ownership share increases the bargaining power of local firms. This means that although they might not be in total control, they have a minimum to say in the JV's management. Groot and Merchant report that "Morris (1998), for example, noted that JVs require special cooperation, because no one party has total control..." They further add that "Gordon Redding, director of the university of Hong Kong Business School, estimated that "About 50% of joint ventures fail"(Young, 1994, p.35)" and argue that control problems have been suggested by some authors as being at the origin of such failures. Svejnar and Smith (1984) note that "For example, Dymsza [1972, pp.206-07] warns that the TNC has to "share control, as well as profits" and bargain with their local partners over crucial managerial issues including sources of inputs, payments of dividends, and transfer pricing." Therefore, regarding the intrinsic conflict between the MNF's objectives and that of the JV, more ownership by local partners can allow them to veto an MNF's production (and hence input purchasing) decision that clearly is intended to benefit it, rather that the JV in which they are involved. For instance, on the web site of the Indian ministry of finance, a report on FDI[5] notes the following

> Thought 100 percent FDI is allowed in private petroleum refineries, FDI in public sector refineries is restricted to 26 percent. The public sector refineries are under the control of government appointed boards. Government as owner has the right to decide how much if any of its shares it wants to sell to a domestic or foreign investor. Further, as long as these refineries remain in the public sector government either has management control (50.1 percent) or the right to veto any fundamental changes (25.1 percent equity).[25]
>
> Footnote 25. It can even have management control with 25 percent share.

In order to provide a theory of ownership restriction, one has to compare different models. In other words, any model in which two parties in a JV have different objectives is discontinuous in the ownership share. For instance, assuming that party A makes decisions, and trying to derive an optimal ownership distribution can be a wrong methodology. It could well be that the optimal ownership distribution is such that party B has 98% ownership, which very likely provides control over the JV. In this case, the optimal ownership derived is irrelevant since it is based on the wrong control assumption. This point is illustrated in Falvey and Fried (1984) in which the authors claim at some point that "One could in principle compute an 'optimal' indigenization level, with the additional constraint that the domestic ownership share must allow host control of the subsidiary" (host control being their working assumption). Although for some levels of ownership (close to zero or one) there is no ambiguity about who is in control, there is no formal relation between ownership and control for intermediate levels of ownership (footnote 25 of the quotation above perfectly illustrates this). Since some indigenization policies restrict foreign equity to 50%, the difficulty of knowing which party is then in control is obvious. But at the same time, picking randomly one party as being in control can imply misleading results.

When control is unambiguously held by one party, then outcomes are easily determined. When

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[5]See http://planningcommission.nic.in/aboutus/committee/strgrp/stgp_fdi.pdf p. 41

no one party in particular has control, then it is difficult for the researcher to predict who will make decisions in the JV. Building on the evidence of conflicts in JV, I propose a simple rule that determines which party is in control in equilibrium when no one party has ex-ante total control. I analyze one aspect of control problems that might arise in joint ventures: control over production, or equivalently input purchasing. Although not being the whole problem in JVs, it is the one that seems the most obvious just by looking at the objective of both parties in the JV. Trivially, unless a coincidence, the profit maximizing level of input/output will be different depending on which party is in control. This implies that the input amount that the MNF would like to sell to the JV (exportation) differs from the one that maximizes the profit of the JV and hence the local partner (importations). Building on the evidence about control problems, I therefore assume that such conflict gets resolved by the law of supply and demand. This means that, if we assume that bargaining is ineffective[6], the MNF and the JV end up exchanging the minimum out of the two input maximizing levels for each party. Therefore, the party which needs to buy/sell less inputs in the end gets control over input purchasing, and hence production decision[7].

They are several factors which affect the optimal input supply (demand) by the MNF (JV). Some are exogenous, like the cost characteristics of producing the inputs, demand characteristics in the market for final good, etc. Some other factors are endogenous and depend on countries policies, like tax/subsidy, ownership distribution and transfer pricing policies. This means that through their policies governments are able to shift control to one party by influencing the optimal input supply/demand, or equivalently the optimal export by MNF and import by the JV. For instance, transfer pricing regulations have a strong influence on import/export. If the transfer price is high (low), then the optimal import for the JV will very likely be lower (higher) than the optimal export for the MNE, shifting control to the JV (MNF). Similarly, taxes and subsidies have a strong influence on importations/exportations.

The paper is organized as follows. The next section provides a revue of the literature that relates to this paper. Section 3 introduces the model. Section 4 deals with a model of ownership distribution for which no party in a JV has total control. This model is compared in section 5 with models of full control by one of the parties, providing a rationale for indigenization. Section 6 discuses some empirical facts and relates them to our results. Section 7 concludes.

2 Related literature

Our paper is related to several earlier works. In this literature, we can distinguish between two mainstreams. On one hand, there are models that involve an MNF, its JV partner (or subsidiary), and the JV's host government. In the other type of model, there is an extra player which is the MNF's government.

Along the first type of model, we can make a further distinction depending on whether governments are passive (exogenous policies) or active (endogenous policy). Svejnar and Smith (1984) develop a bargaining model between an MNF, its JV partner and the JV's host government. Their model

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[6]That might explain the high failure rates in JV mentioned earlier by Gordon Redding.

[7]With respect to the alternative of bargaining, such a situation is equivalent to a Prisoner's dilemma for particular values of bargaining power that would make each party better off if bargaining was to take place.

includes both the endogenous aspect (when host government is a bargainer) and the exogenous aspect (when bargaining takes place between the MNF and its local partner only). In their model, the host government does not control transfer pricing, and control issues are solved by bargaining. The JV always generates the largest possible profit, and allocates it to the three parties according to their bargaining power. One of their main finding is that the JV's institutionally determined share is irrelevant to the distribution of after-tax profits, a feature that also holds in our model where bargaining power is about control over input purchase, tax/subsidy, and transfer pricing. In a model with exogenous governments' policies, Falvey and Fried (1986) show that indigenization can be a good policy against MNF's transfer pricing policy that shift income away from the host (high tax) country, when in the form of domestic portofolio (without effect on MNF's control). When indigenization shifts control to local firms, then the MNF's substitution possibilities are reduced in that more local input is used.

Al Saadon and Das (1996) analyze a setting similar to Svejnar and Smith. They analyze different game sequences, depending on whether the different parties set their policies prior or after ownership shares are negotiated (commitment vs no commitment). The host country either sets a tax/subsidy policy while the MNF's transfer pricing is exogenous, or vice versa. Ownership shares are determined in the bargaining process. They find that both the host country and the MNF prefer no commitment to commitment. However, Al Saadon and Das derive an equilibrium ownership distribution, based on the assumption that the local partners have control over production decision, which per se puts a constraint on ownership distribution. This problem does not arise in Svejnar and Smith because production is negotiated, while only ownership shares are negotiated in Al Saadon and Das.

Along the second type of models, Scharf and Raimondos-Mller (2000) and Mansori and Wichenrieder (1999) analyze competition between governments in setting their transfer pricing regulations. In both papers, taxes are exogenous, and the MNF has to comply with two transfer prices, one in each country. Also, they deal with fully owned subsidiaries, which implies that control issues are absent.

Although dealing with games of complete and symmetric information, this paper also relates to the literature on incentive regulation of transfer pricing. See Prusa (1990), Gresik and Nelson (1994) and Elitzur and Mintz (1996) among others.

Our paper contributes to the literature by combining in the same model, the different issues analyzed by the papers cited here-above (ownership distribution, control issues, tax competition and transfer pricing regulation)

3   The model

The firms   A multinational firm based in a domestic country (country d) produces an amount q of an intermediate good at constant marginal cost θ. The good is transferred to a another firm located in a foreign (host) country (country f) at a unit (transfer) price t. The foreign firm is either a partially-owned foreign subsidiary, or a joint venture (we will use the two terms interchangeably). The domestic firm owns a share $0 \leq \delta \leq 1$ in the venture. A local partner in country f own the share $(1 - \delta)$. Obviously, we only consider voting shares.

The foreign subsidiary, which is a monopolist, turns the intermediate good into a final good at a cost (normalized to) zero. The final good is then sold in the local market where prevails an inverse

demand function $P(q) = a - bq$, bringing revenues $R(q) = P(q)q$.

The (after-tax) profits of the MNF and the JV can be expressed as

$$\pi_d(q) = (t - \theta)q - T_d(q) + \delta\pi_f \tag{1}$$

$$\pi_f(q_f) = R(q_f) - (\theta_f + t)q_f - T_f(q) \tag{2}$$

where $T_i(q)$ is the tax (subsidy) paid by (to) the firm in country i. (more on this later)

Control in the joint venture We shall analyze 3 different scenarios. The first two correspond to the case in which control is unambiguously exerted by one party (MNF or local partner). Although the numbers themselves are irrelevant for our analysis, one could assume this range to be $\delta \in [0, 25\%]$ or $\delta \in [75, 100\%]$. In the third scenario, the right to make production decision is endogenous, because no party has ex-ante total control (one could assume this range to be $\delta \in]25\%, 75\%[$). Specifically, when the quantity that the domestic firm would like to sell to the joint venture differs from the quantity that this latter would like to buy from the former, then the quantity exchanged will simply be the *minimum* of the two quantities. Notice that our equilibrium concept of control is equivalent to saying that for some ownership distribution, the party on the short side of the 'market' has full bargaining power

The governments Each branch of the MNF is under the jurisdiction of the government in the country it operates. Governments set a tax/subsidy contingent on output $T_i(q)$. Later on, we will see that for the domestic country only, such tax has the same characteristics as a proportional tax (standard in developed countries). This is not true for the foreign government. Indeed, many developing countries negotiate tax liabilities with MNFs based on the amount of capital invested in the country, the jobs created etc. All these variables are likely proportional to output. The objective of each government is to maximize social welfare, that is, consumers' net surplus (only for government f) plus tax revenues, plus the profit of the local firm.

$$SW_d = T_d(q)(q) + \lambda_d\pi_d$$

$$SW_f = \int_0^q P(x)dx - R(q) + T_f(q) + \lambda_f(1 - \delta)\pi_f,$$

where $0 \leq \lambda_i \leq 1$ is the weight given to the local firm's profit by government G_i.

The transfer pricing authority In the first stage of the game, *one* of the two governments sets a transfer pricing policy by maximizing the same welfare function as in the tax game of the second stage. The model therefore differentiate itself from existing literature in which the firm's profit is calculated using two different transfer prices set by the two countries as in Scharf and Raimondos-Mller (2000) and Mansori and Weichenrieder (1999). In these models, double taxation occur in equilibrium only because the MNF faces two transfer prices. However, as the existence of Advance Pricing Agreements suggest, most tax authorities are concerned with double taxation especially when they have signed

agreements to avoid double taxation (as it is the case with many countries)[8]. Empirically, there is no evidence about which country's TPP prevails when two countries' policies lead a firm to face two different prices. However, we shall discuss different cases, depending on which country's TPP prevails.

We make the following assumptions:

Assumption A1: $a - \theta > 0$, and $\lambda \delta < 1$

The first inequality is standard and ensures that the quantity exchanged in equilibrium is strictly positive, i.e. that trade occurs. The second inequality ensures that transfer prices and social welfare are always determined. Given that $\lambda \leq 1$ and $\delta \leq 1$, it states that we never have simultaneously $\lambda = \delta = 1$.

Without any precision, Indigenization refers to any restriction on foreign ownership. We introduce the following definitions (notation)

Definition 1 *Partial Indigenization refers to the situation in which foreign ownership is restricted in such a way that the MNF still has full control.*

Definition 2 *Semi Indigenization refers to the situation in which foreign ownership is restricted in such a way that no one party in the JV has ex-ante full control.*

Definition 3 *Full Indigenization refers to the situation in which foreign ownership is restricted in such a way that the local partner gets full control.*

Let us summarize the timing of the game.

- Stage 1: The transfer price is set by the authority in charge (G_f or G_d)

- Stage 2: After having observed the transfer price (which is publicly revealed), government G_i sets its tax/subsidy policy $T_i(q)$, where q is the quantity exchanged between the two countries.

- Stage 3: Each firm chooses its strategy, namely the quantity to export (MNF) and to import (JV).

4 Optimal policies under Semi Indigenization

We shall solve the game by backward induction. We first determine the equilibrium of the supply/demand game between the MNF and the JV for a given (unique) transfer price, and tax/subsidy policies by the two governments. Then we determine the governments tax/subsidy policy for a given transfer price, and finally, the transfer pricing policy by the government whose transfer pricing policy prevails. However, as we shall see, it will be not possible to know the second and third stage equilibrium before solving the first stage game. Indeed, the outcome of the second stage depends on the transfer price that will be set in the first stage.

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[8]Furthermore, double taxation through different transfer prices presents a fundamental difference with double taxation through proportional corporate tax rates (with a single transfer price): Assuming no tax differentials, the former case can imply negative profits even if under a unique transfer price double taxation would imply positive profits.

4.1 Production strategies

Before solving for the quantity equilibrium, it is necessary to first determine the player's set of strategies. Each firm can play any strategy q in $(0, +\infty)$. However, it is important to notice that in our model, the production strategy of a firm, and that of its tax authority are equivalent. The reason is that, having the advantage of being first-movers, tax authorities set their policy in such a way that they induce their firms to behave in the desired way. Therefore, when talking about quantity strategy, we shall often assimilate a firm with its government and vice-versa.

We make the following assumption:

Assumption A2: The MNF and the JV do not play dominated strategies.

We are first going to show that each government has dominated strategies within its strategy set. The following lemma helps us in doing so.

Lemma 1 *There exists q_f and q_d such that SW_f is concave and single-peaked at q_f and SW_d is concave and single-peaked at q_d. Therefore, both countries' welfare are increasing in q on the interval $(0, \min\{q_f, q_d\})$*

Proof. For a given transfer price t, government G_d solves in the second stage

$$\max_{T_d(q*), \pi_d} T_d(q^*) + \pi_d(q^*)$$

$$\text{s.t.} \quad (i) \quad \pi_d - \delta\pi_f \geq \overline{\pi}_d$$

$$(ii) \quad q^* \in argmax\{\pi_d(q)\}$$

Constraint (i) is an individually rational constraint. It states that the after-tax profit of the MNF has to be at least equal to the after tax profit that the firm would be able to make in another country with equivalent business conditions. For simplicity, this outside opportunity is assumed to be constant, i.e. independent of the MNF's profit in the domestic country [9]. This captures the strategic effect of tax setting by governments. Notice that the taxable income of the MNF in country d is net of the after-tax share of profit in country f meaning that double taxation does not occur. Our results are qualitatively unaffected and quantitatively little affected if we had assumed double taxation[10]. This however, would not be true if double taxation would occur because of different transfer prices imposed by each government.

Constraint (ii) is the MNF's reaction function to the transfer price and the tax policies in both countries

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[9]The fact that the outside opportunity is constant is also consistent with the fact that some governments negotiate in advance with firms about the amount of taxes that will be paid in a given period. This is especially true with developing countries, but also with some developed countries. For instance, the Primarolo report about harmful tax practices in Europe list the case of The Netherlands that secretly negotiate taxes in advance. In this case, the fixed part a non linear tax (based on production) ensures that the firm is left with the negotiated after-tax profit agreed upon, while the slope of the tax is used to provide the right production incentive to the firm.

[10]In a previous version of this paper, I assumed double taxation. I also used a more general model in which the intermediate good was also sold in the domestic market, leading the domestic government to also consider consumer's surplus. Moreover, I assumed a common (and convex) cost function for the MNF, instead of the linear cost used here. None of the qualitative results obtained in the current version differ from those obtained in the previous (more general) model.

As we are under complete (and symmetric) information, it can be shown that the above program is equivalent to a modified program in which constraint (ii) is dropped and the government directly chooses q, and sets a lump-sum tax/subsidy T_d[11].

$$\max_{T_d,q,\pi_d} T_d + \lambda\pi_d$$

$$\text{s.t.} \qquad \pi_d - \delta\pi_f \geq \overline{\pi}_d$$

Substituting T_d using (1), the objective of government G_d can then be rewritten as:

$$\max_{q,\pi_d}(t - \theta)q + \delta\left[R(q) - tq - T_f\right] - (1 - \lambda_d)\pi_d$$

$$\text{s.t.} \qquad \pi_d - \delta\pi_f \geq \overline{\pi}_d$$

Since profit is costly (π_d negatively affect social welfare), G_d will leave the minimal (after-tax) profit to the MNF, and the individually rational constraint will be binding, meaning that the MNF is left with a rent equal to its share of foreign after-tax profit plus its outside opportunity. Without loss of generality, we normalize the outside opportunity $\overline{\pi}_d$ to zero. Substituting π_d from the binding IR constraint, the program of G_d finally becomes

$$\max_{q}(t - \theta)q + \delta\lambda_d\left[R(q) - tq - T_f\right] \tag{3}$$

Maximizing with respect to q yields[12]:

$$\delta\lambda_d R'(q_d) = \theta - (1 - \delta\lambda_d)t \tag{4}$$

To find q_f, we perform for government G_f a similar exercise. After the same manipulations as above, government G_f's program summarizes to

$$\max_{q,\pi_f} \int_0^x P(x)dx - tq - [1 - (1 - \delta)\lambda_d]\pi_f$$

$$\text{subject to} \quad \pi_f \geq \overline{\pi}_f$$

where $\overline{\pi}_f$ is the outside opportunity of the JV.

Again, as profit is costly, G_f will leave the minimal rent to the JV, i.e $\overline{\pi}_f$. Normalizing $\overline{\pi}_f$ to zero, the final program of G_f is

$$\max_{q_f} \int_0^x P(x)dx - tq$$

Solving this program yields[13]

$$P(q_f) = t \tag{5}$$

The socially optimal policy implies marginal cost pricing (recall that the only cost of the JV is t). Therefore, when production equals q_f, the JV makes a before-tax profit equal to zero. This

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[11]It is a simple exercise to determine the tax $T_d(q)$ which will achieve the same outcome as the solution of the modified program in which lump sum tax is used. The slope of the tax function is used to induce the firm to select the tax authority's optimal production, and the fixed part is used to set the firm's rent at the desired level. This exercise is performed later on.

[12]The second order condition is $R''(q) < 0$, which is satisfied by assumption.

[13]The second order condition is $P'(q) < 0$, which is satisfied, and hence the concavity.

result is due to the simplifying assumption that the same weight is given to consumer's surplus and tax revenues[14] and is especially realistic when the JV sells a basic (or vital) product for which the government has a particular concern to make it available to as many consumers as possible (drugs for instance), or when the JV is a public utility provider. Note that in this case, the JV does not make a net profit equal to zero. In order to meet the participation constraint, the foreign government needs to provide the JV with a subsidy, as long as its outside opportunity is strictly positive (we come back on this later).

Given that in equilibrium $\pi_f = 0$, λ_f has no influence in our model. Therefore, to simplify notation, we shall denote $\lambda_d \equiv \lambda$. ■

The quantity q_d (q_f) is what the domestic (foreign) tax authorities ideally would like to induce the MNF (the JV) to export (respectively import). However, each firm can in equilibrium be rationed by the other. Given assumption $A2$ and lemma 1, each government's set of strategies shrinks to the pair (q_f, q_d). In fact, both governments will induce their firm to play $\min(q_f, q_d)$ in equilibrium (remember that in the second stage, the minimum of the two quantities is known). It is therefore never optimal to play less than $\min(q_f, q_d)$, as this strategy is dominated (last statement of lemma 1), and playing more than $\min(q_f, q_d)$ does not affect the equilibrium outcome.

For a given transfer price, which of q_f or q_d determines the equilibrium value of q? At this point, it is not yet possible to determine the second stage (or quantity) equilibrium as it depends on the transfer pricing policy that has been set in the first stage. Total differentiation of (4) and (5) yields

$$\frac{dq_d}{dt} = \frac{1 - \lambda\delta}{2b\lambda\delta} > 0, \quad \text{and} \quad \frac{dq_f}{dt} = -\frac{1}{b} < 0.$$

This remark has some important implications. It indeed reflect all the tradeoffs that a government faces when setting its TPP in the first stage of the game (which we solve in the next subsection). Let us first examine the tradeoff government G_d faces. Because transfer pricing revenue positively enters the profit of the domestic firm[15], which in turn is valued by G_d, a high transfer price implies high welfare, ceteris paribus. However, a high transfer price would also have the effect that the MNF wants to sell more in the second stage (q_d high), and the JV to buy less (q_f low), making it more likely that the quantity exchanged will be q_f. As a consequence, transfer pricing revenues (tq_f) might decrease because although t is high, the quantity exchanged in equilibrium might be too low. Depending on the net effect, G_d might want either a high or a low t. In the next subsection, we give to the terms "high" and "low" a more explicit meaning.

For G_f, the effects are simpler. The transfer price acts as an additional cost to the subsidiary, which implies that G_f might want a low transfer price, at first sight. However, a low t increases q_f and decreases q_d, making it more likely that q_d will be the equilibrium quantity exchanged. This is bad news for G_f since the quantity sold in its local market will be smaller, and so will be consumers' net surplus. Again, depending on which effect dominates, G_f might either set a low or a high transfer price.

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[14]Had we put a weight $\alpha \leq 1$ to tax revenues, we would have different market situations ranging from monopoly outcome ($\alpha = 0$) to the one of perfect competition obtained here ($\alpha = 1$).

[15]For a given production q, $\frac{\partial \pi_d}{\partial t} = (1 - \delta)q > 0$.

4.2 Optimal transfer pricing policy

We now turn to the issue of which transfer price a government will impose, if given the authority to control the transfer price. Let $\bar{t}$ denotes the transfer price which clears the (international) market, i.e which is such that $q_d = q_f$.

The government which sets the transfer price has two possibilities. It can set a transfer price smaller than $\bar{t}$, in which case the quantity exchanged will be q_d; or, it can set a transfer price larger than $\bar{t}$, in which case the quantity exchanged will be q_f. The following result is obtained:

Lemma 2 *Let t^i denote the optimal transfer price that government G_i would set if given the transfer pricing authority. We have that*

$$t^d = \frac{a+\theta}{2} > \bar{t}$$

$$t^f = \frac{\lambda\delta a(1 - 3\lambda\delta) + \theta(1 + \lambda\delta)}{(1 - \lambda\delta)(1 + 3\lambda\delta)} < \bar{t}.$$

Both t^d and t^f lead to strictly positive productions in both countries.

Proof. See Appendix A ∎

(In the remainder of the paper, most proofs will use some results derived in the proof of lemma 2.)

To find the optimal transfer that G_i will set in the first stage, we proceed in the following way: find the optimal transfer price within the range $(0, \bar{t})$, then within the range $(\bar{t}, +\infty)$. We proceed this way because there is a non-differentiability in each government's welfare function at $t = \bar{t}$, due to the equilibrium concept we use here, i.e the min criterium. We then compare social welfare under the two optimal prices in each range. For government G_f, we find that welfare is higher under the optimal transfer price in the range $(0, \bar{t})$, which we denoted t^f. For government G_d, it is found that welfare is higher under the optimal transfer price in the range $(\bar{t}, +\infty)$, denoted t^d.

The optimal transfer pricing policy of the domestic government coincides with the policy that the MNF would have chosen, if it was free to set its transfer price. Indeed, since the after tax profit of the foreign subsidiary is nil in equilibrium, from (3) we see that the objective of the transfer pricing authority and that the MNF are the same. Therefore, whenever we talk about the TPP of the domestic government, the reader should keep in mind that it is equivalent to that of the MNF. This relation does not hold between the JV and the foreign government. We discuss these patterns in more detail in the third paragraph of subsection 5.1 (see also footnote 18)

The implications of lemma 2 are summarized in the next proposition.

Proposition 1 *Assume that the host government's transfer pricing policy prevails. In equilibrium, the MNF will have control over the JV. On the contrary, local firms will have control over the JV if the transfer pricing policy of the domestic country prevails.*

Proposition 1 is somewhat surprising. One would have expected that each government would choose the transfer price such that its importations (or exportations) will not be rationed, or equivalently to provide its firm with control. However, avoiding the rationing is socially expensive. For instance, if government G_f wants to have the JV importing the socially optimal quantity q_f, and avoid being

rationed by the parent firm, it would have to accept setting a high transfer price. But a high transfer price is also synonym of a high cost, and government f in the end prefers that the subsidiary be rationed and in this way, it will have a larger freedom to set a lower transfer price.

We now relate the analysis to the discussion at the end of the previous subsection (about the tradeoffs faced by a government). We can conclude that for government G_f, the cost-cutting effect (implied by a low transfer price) is larger than the quantity decrease effect (implied by a high transfer price). For government G_d, the revenue effect from a high transfer price is higher than the quantity effect from less exportation.

An interesting implication of proposition 1 is that under the TPP of the domestic government, high restrictions on MNF's ownership are not necessary to transfer full control to the local partner. If the local partner has just enough (voting) shares such that it can veto an MNF's decision, then it will have full control in equilibrium. This might explain (among others) why most indigenization policies do not limit foreign equity to very small participation (below 25 percent for example).

Finally, contrary to the usual international transfer pricing models, we do not obtain the "bang-bang" result. Put differently, it is not the case in our model that the exporting government wants an infinite transfer price, and the importing government a zero transfer price. In fact, as we shall see later, the transfer pricing policy of the importing government turns out to be quite surprising for certain level of ownership share.

4.3 Optimal tax/subsidy policies

In this subsection only, we remove the assumption of the outside opportunities being normalized to zero. We analyze governments choice related to tax versus subsidy. We perform this analysis under the TPP of the domestic government. As said earlier, it is a simple exercise to show that the optimal allocations (T_i, q_i), $i = d, f$, can be replicated by a non linear tax $T_i(q_i)$. For example, when the TPP of the domestic government prevails, the foreign non linear tax would have a fixed component and a (negative) quadratic component, implying higher 'discount' in tax liabilities for higher productions.

Assume that government G_i offers the non linear tax schedule $T_i(q)$ where q is the quantity exchanged in equilibrium. Under the TPP of the domestic government, $q = q_f$.

The maximization program of the JV is

$$\max_q R(q) - t^d q - T_f(q)$$

The FOC of this program is

$$P(q) + qP'(q) - t^d - T_f'(q) = 0$$

For this program to yield the outcome q_f, it must be that the above FOC is the same as (5). This necessarily implies that

$$T_f'(q) = qP'(q) = -bq \tag{6}$$

Since the foreign government values consumer's welfare, the only way to encourage the JV to produce the (high) competitive output level is to offer a tax schedule which is decreasing in output, which explains that $T_f'(.)$ is negative.

Therefore, the non linear tax offered by G_f is of the form $T_f(q) = \alpha - \frac{b}{2}q^2$, where α is set to leave the JV with its outside opportunity, i.e

$$R(q_f) - t^d q_f - \alpha + \frac{b}{2}q_f^2 = \bar{\pi}_f$$

Similarly, the FOC of the MNF's optimization program is

$$t^d - \theta - T_d'(q) + \delta[P(q) + qP'(q) - t^d - T_f'(q)] = 0,$$

which coincides with (5) iff

$$P(q) - \theta - T_d'(q) + \delta[P(q) + qP'(q) - t^d - T_f'(q)] = 0,$$

Taking into account the equilibrium value of $T_f'(q)$ given in (6), it simplifies to

$$(1 + \delta)P(q) - (\theta + \delta t^d) = T_d'(q), \tag{7}$$

Unlike the foreign government, the tax liabilities of the MNF increase in production under the domestic government tax policy. Indeed, strictly considering productions on the increasing part of the MNF's profit function, we have that $P(q) \geq t^d > \theta$ for any production level in $[0, q_f]$ because of the fact that $P'(q) < 0$ (the first inequality being binding at the optimum $q = q_f$). This implies that the LHS of (7) is strictly positive. The intuition for this is the following. Because the transfer price t^d is high, the MNF wants to sell a high quantity to the JV (higher than q_f). So if the domestic government wants to induce the MNF to select the (smaller) preferred input level q_f, he has to discourage it from selecting the high level. This is done by setting a tax schedule which is increasing in the input level exported to the JV.

The tax schedule of the domestic government is of the form $T_d(q) = \beta + [(1 + \delta)a - (\theta + \delta t)]q - (1 + \delta)\frac{b}{2}q^2$, where again β is set such that the MNF is left with its outside opportunity at $q = q_f$.

Note that both governments' tax schedules are quadratic, and the quadratic terms have a negative coefficient. This means that both governments offer some tax discount for high production levels.

At this point, it is important to notice that the characteristics of the tax schedules are consistent with what we commonly observe. Indeed, most developing countries put a high weigh on MNF's production level, as high production is likely synonym of high employment, high investment level, and lower prices. Because of all these benefits, developing countries provide MNFs with all sort of tax advantages depending on how much money the MNF will invest, how many jobs it will create etc. On the contrary, since the MNF's domestic part of profit (transfer pricing revenues) is increasing in q, the fact that $T_d'(q) > 0$ implies that the higher the MNF's domestic part of profit, the higher the taxes it pays. This is characteristic of proportional taxes which are implemented by most developed countries.

Now, another interesting issue relates to wether governments offer in aggregate a tax or a subsidy, i.e to the sign and magnitude of the fixed part of the tax schedules.

Proposition 2 *The foreign government provides a subsidy to the JV iff the TPP of the domestic government prevails. Otherwise he provides a subsidy to the JV if its before-tax profit is smaller than its outside opportunity, and collects strictly positive tax revenues in the opposite case. The domestic government provides a a subsidy to the MNF if its before-tax profit is smaller than its outside opportunity, and collects strictly positive tax revenues in the opposite case.*

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When the TPP of the domestic government prevails, the quantity exchanged q_f is such that the JV makes a before-tax profit equal to zero. The foreign government must therefore provide a subsidy in order to meet the participation constraint of the JV. When the TPP of the foreign government prevails, the quantity exchanged q_d is smaller than the competitive quantity q_f, meaning that the JV makes a strictly positive before-tax profit. Once the outside opportunity is deducted, the net income becomes taxable if positive, and subsidized if negative. Regarding the MNF, it always gets the share δ of the JV's outside opportunity plus the transfer pricing revenues net of production cost. This income is taxable or subsidized depending on whether it is higher or lower than its outside opportunity.

In practice, MNFs have a higher bargaining power with developing countries than with developed countries. The reason is that developing countries value more capital, and there are many of them which compete to attract foreign capital. It is then fairly reasonable to assert that the JV's outside opportunity is likely high while that of the MNF is likely low. Furthermore, since it is more likely that developed countries' TPP prevail (we discuss this issue later), we obtain the realistic pattern that MNFs are more likely to get subsidies in developing countries while they are more likely to be taxed in their home countries.

5   Providing a rationale for indigenization

Now, let us try to provide a rationale to the indigenization policy. In order to do so, one needs first to know which country's transfer pricing regulations prevails. It is very hard to find evidence about this issue. All what one knows is that some transfer pricing methods seem to be accepted unanimously. This is the case of the arm's length method and the cost plus method, this latter being the most used method according to an estimation by Benvignati (1985). These two methods are used by the IRS (the tax authority in the US) and the OECD transfer pricing guidelines.

However, it seems that developed countries (especially the US), are able to impose their TPP internationally. For instance, in a survey by Elliot and Emmanuel, the authors emphasize the influence of the IRS and Inland Revenue (tax authority in the UK) at international level. They report that

> Companies 2,5,8 and 9 (which have US parent companies) have all implemented policies to comply with US requirements. In relation to documentation, company 2 has adopted the IRS regulations on document retention as group policy for all subsidiaries ("This is the policy that we follow for US purposes *and we feel that this will be good anywhere else)*"... emphasis by the author.

and later, about another company

> "The group operates on the basis that if the Inland Revenue and the IRS can be satisfied, *then a comparable level of documentation should be adequate for overseas tax jusrisdictions*". emphasis by the author

We shall first analyze the case in which the domestic government's TPP prevails.

5.1   Domestic government's Transfer Pricing Policy prevails

In this case, although a partial indigenization policy per se does not ex-ante allocate control to the local firms involved in the JV[16], we have seen that it does in equilibrium. Very importantly, this

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[16]This statement holds if one agrees that there is no formal relation between ownership and control.

means that partial and full indigenization are equivalent in this case, since they both allocate control to the local partners.

So far, what we have done is to take indigenization policy (namely partial) as exogenous, and analyze the effect of this policy on control, as well as discussing the welfare effect of marginal variations in the level of ownership restriction that do not affect control. However, what is the gain from indigenization (if any) in the first place? To provide a rationale for indigenization, one has to compare the situation pre and post indigenization. This is what we are going to do now. It is quite obvious that the pre-indigenization era is characterized by full control by the MNE (usually through fully-owned subsidiary). We therefore need to analyze the different parties' behavior under this scenario characterized by ex-ante production control by the MNF.

Referring to the endogenous control case, we know that when $q = q_d$, then government G_d's social welfare is then convex and strictly increasing in the transfer price (see appendix A2). This means that G_d has incentive to set the highest transfer price[17]. However, some highly arbitrary transfer prices clearly will be perceived as unacceptable. For many reasons, it is fairly reasonable to assume that G_d will dictates a transfer price that leaves the JV with a before-tax profit equal to zero[18].

We assume that when making zero profit, the JV does not pay any tax. If the JV were to make negative profits, it would just not buy the intermediate good in the first place. In the first stage of the game, government G_d's program is therefore

$$\max_t Sw_d = (t - \theta)q_d(t)$$

$$\text{s.t.} \qquad R(q_d) - tq_d \geq 0$$

The binding participation constraint determines the optimal transfer price, characterized by

$$t^{FC} = \frac{R[q_d(t)]}{q_d} = P(q_d)$$

The optimal transfer price would then equal the market price, as it was also the case under Semi Indigenization [19]

Substituting q_d by its value in (9) and solving yields

$$t_d^{FC} = \frac{\lambda\delta a + \theta}{1 + \lambda\delta} = \bar{t} > \theta \tag{8}$$

The coincidence between t_d^{FC} and $\bar{t}$ is easily explained. t_d^{FC} is equal to the market price $P(q_d)$, and so is the transfer price under output level q_f under indigenization. Therefore, we necessarily have $q_d(t_d^{FC}) = q_f(t_d^{FC})$, which correspond to the definition of $\bar{t}$. It is interesting to note that although

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[17]These corner solutions are common in much of the work on international transfer pricing.

[18]Overinvoicing transfer prices to show no profit or even losses is a commonly reported practice for MNFs in developing countries. If this can happen, it is necessarily because the domestic country's TPP allowed such high transfer prices. In our model, this congruence between the domestic authority and the MNF also occurs in that they share the same optimal transfer pricing policy.

[19]Note that it corresponds to the (accepted) Resale Price method, which consist of taking the reseller (JV)'s final price, and deducting a profit margin that any independent seller would make. In absence of an independent reseller (recall that the JV is a monopolist), the only margin available is that of the JV itself. Since the JV sells at marginal cost, its margin is zero, and the Resale Price transfer price would just equal the market price.

under both regimes the JV makes the same before-tax profit equal to zero, the MNF ends up setting a lower transfer price under Partial Indigenization than under Semi or Full Indigenization.

Substituting t_d^{FC} in (9) yields the actual output exchanged between the two firms

$$q_d = \frac{a - \theta}{b(1 + \lambda \delta)}$$

Social welfare in country f is then (recall that tax revenues and the firm's after-tax profits are both equal to zero)

$$
\begin{aligned}
SW_f &= \int_0^{q_d} P(x)dx - R(q) \\
&= aq_d - (b/2)q_d^2 - (a - bq_d)q_d \\
&= (b/2)q_d^2 \\
&= \frac{(a - \theta)^2}{2b(1 + \lambda \delta)^2}
\end{aligned}
$$

Social welfare in country d is given by

$$SW_d = (t^d - \theta)q_d$$

From (8), we see that $t^d - \theta = \frac{\lambda \delta (a - \theta)}{1 + \lambda \delta}$. Therefore

$$
\begin{aligned}
SW_d &= \frac{\lambda \delta (a - \theta)}{1 + \lambda \delta} \times \frac{a - \theta}{b(1 + \lambda \delta)} \\
&= \frac{\lambda \delta (a - \theta)^2}{b(1 + \lambda \delta)^2}
\end{aligned}
$$

A first interesting result that emerges is the following

Proposition 3 *Assume that when facing incentives for high transfer pricing, the domestic government (MNF) will set a price that leaves the JV with no before-tax profits. Under full control by the MNF, the transfer price set by the domestic government is increasing in δ. Social welfare in the foreign (domestic) country is decreasing (increasing) in δ.*

Proof. Simple derivation of the relevant variables ∎

This proposition provides a first hint about the desire for indigenization. Indeed, by reducing δ under the full control case, the foreign government can limit the capital fly implied by high transfer prices. Since a lower transfer price is synonym of lower cost and hence higher efficiency for the JV, indigenization policy increases welfare in the foreign country, at the expense of the domestic country. When the MNF controls production, a lower transfer price implies a decrease in its supply of input. Both the (transfer) price and quantity effects imply a decrease of transfer pricing revenues, and therefore a decrease in profits for the MNF and welfare for the domestic country. A natural question for the foreign country is then why not restrict foreign ownership share to a minimal level. Three answers can be provided. Firstly, by restricting δ to a very small level, MNFs may find it uninteresting to enter the JV in the first place. Even if they do, having little equity means that they

bring in the country little FDI. Therefore, this policy may not be interesting for all parties in the JV, especially the foreign government which crucially needs and want to encourage FDI. Secondly, as our model predict, if ownership restriction is intended at shifting control to local partners without any other welfare effects, high restrictions are not necessary , but just a minimal amount that would provide them with enough bargaining power to veto an MNF's production decision that clearly does not benefit the JV. Thirdly,...

Lemma 3 *Proposition 3 is technically true, conceptually not always true*

The above lemma is at the heart of this paper's concern. Technically, by looking at the derivatives of the variables analyzed, proposition 3 holds. However, it has to be interpreted with care. One might be tempted to say that any restriction on δ improves welfare in the foreign country. This is not always true. This means that, yes foreign welfare is improved by restricting δ, but only as long as the MNF unambiguously have control over the JV. Using our terminology, indigenization is beneficial as long as it is partial. When it is more than partial, then we are analyzing the wrong model. Indeed, in restricting further δ, the MNF's grip on control is reduced, for the benefit of the local partners to the JV. Therefore, for some value of δ, it is not clear who is making decisions. It could well be that for some restriction, control is not exercised by anyone party in particular, or switches to the local partners of the JV, in which case $q = q_f$. We would then be in a different model in which any further restriction on δ may actually makes the foreign country worse off. Loosely speaking, the model is discontinuous in δ. When δ is restricted to some intermediate level, then we are in the Semi Indigenization model. If it is further restricted to a minimal level, then we are in the Full Indigenization model (which in equilibrium is equivalent to Semi Indifgenization).

Proposition 4 *Assume that when facing incentives for high transfer pricing, the domestic government (MNF) will set a price that leaves the JV with no before-tax profits. Compared to the scenario of Partial Indigenization, Semi or Full Indigenization strictly deteriorates (improves) social welfare in the foreign (domestic) country.*

Proof. For the domestic government, Welfare under Semi (or Full) indigenization (see appendix A2) minus welfare under full MNF control is

$$\Delta SW_d = \frac{(a-\theta)^2}{4b} - \frac{\lambda\delta(a-\theta)^2}{b(1+\lambda\delta)^2} = \frac{(a-\theta)^2}{b}[\frac{1}{4} - \frac{\lambda\delta}{(1+\lambda\delta)^2}]$$
$$= \frac{(a-\theta)^2}{b} \times \frac{(1-\lambda\delta)^2}{4(1+\lambda\delta)^2} > 0$$

For the foreign government, Welfare under Semi (or Full) indigenization (see appendix B) minus welfare under full MNF control is

$$\Delta SW_f = \frac{(a-\theta)^2}{8b} - \frac{(a-\theta)^2}{2b(1+\lambda\delta)^2}$$

Given that $1 + \lambda\delta < 2$, which implies that $(1+\lambda\delta)^2 < 4$, the difference ΔSW_f is strictly negative. ∎

Proposition 4 confirms the concern expressed in lemma 3. Proposition 3 established that under full

control, an ownership restriction improves welfare in the foreign country. Proposition 4 states that this is true as long as the MNF still control the JV. Therefore, Proposition 4 provides the third answer to the question raised earlier: a maximal restriction on δ undeniably switches control to local partners, and makes the foreign country worse off.

The intuition for proposition 4 is the following. Under Partial Indigenization, the optimal output has the same properties as the the optimal output under Semi Indigenization, in that they both yield marginal cost pricing in the foreign final market. Therefore, with respect to partial indigenization, there is only one factor which can make welfare under Semi Indigenization different, i.e. the transfer price. This latter is higher under Semi Indigenization than under Partial Indigenization, as $t^d > t_d^{FC} = \bar{t}$. Therefore, under Semi Indigenization, the JV is more inefficient than under Partial Indigenization, which implies a lower welfare for the foreign country.

Corollary 1 *The optimal national ownership restriction $\delta^*$is the minimal ownership for which the MNF still has full control over the JV*

More surprising is the following result

Corollary 2 *With respect to Partial Indigenization, Semi or Full Indigenization strictly increases the MNF's before-tax profit.*

This result is very counterintuitive. Indeed, one would expect the MNF to be better off when (i) it has full control, (ii) it has a higher ownership in the JV. However, the corollary is not surprising in view of the fact that $t^d > t_d^{FC} = \bar{t}$. There are two ways to achieve zero profits for the JV. Under Semi or Full Indigenization, the MNF does not control production, and therefore it (the domestic government) has a higher degree of freedom for transfer pricing. Under Partial Indigenization, the MNF decides how much to sell, and this constrains the domestic government's transfer pricing. Therefore, when the MNF (domestic government) can set the transfer price, both are better off when the MNF holds the JV at arm's length. Svejnar and Smith (1984) report that "Interestingly, Armand Hammer, Chairman of Occidental Petroleum, recently claimed that after the required sale of 51 percent of its Mexican subsidiary the profit on the remaining 49 percent was higher than previous profit under full ownership. (New York Times, Op Ed page, Jan.5, 1981)". This is exactly the above corollary. Svejnar and Smith's results are consistent with this fact, because the authors argue that ownership distribution is irrelevant in sharing profits. All what matters is the bargaining power of the parties in negotiating transfer prices. Corollary 2 also goes in favor of Svejnar and Smith's argument.

The result that Semi or Full Indigenization deteriorates the foreign country's welfare is obtained under the assumption that the domestic government's TPP prevails. As we shall see later, this result is affected if one assumes that the foreign government can impose its transfer pricing rule.

5.2   Foreign government's Transfer Pricing Policy prevails

In the previous subsection, we have assumed that the domestic government's transfer pricing policy prevails. However, governments of developing countries would also like to have a grip on transfer pricing. Indeed, when the country's TP rule prevails, welfare can be expected to be higher than when the domestic TPP prevails. Many developing countries have by now implemented transfer pricing policies or are in the process of doing so. We have seen that the transfer pricing policy of the domestic

country takes the form of cost-plus or something that could be assimilated to the resale price method, both methods being accepted by many transfer pricing regulations. Now, let us take a closer look at the optimal transfer pricing policy of the foreign government.

As before, we first analyze the pre-indigenization period. Since the MNF has total control, the transfer pricing policy of the foreign government will be the same as in the endogenous case (in which control was exerted by the MNF in equilibrium), i.e. t^f.

Proposition 5 *Assume that the TPP of the foreign country prevails. Under Partial or Semi Indigenization (the two are equivalent in equilibrium), social welfare in the foreign country is higher than under any control mode when the domestic TPP prevails. The foreign government sets a transfer price higher than marginal cost iff $\delta < 1/3\lambda$!*

Proof. Under the domestic TPP, we have seen that the highest welfare is obtained under full control by the MNF, and equals $\frac{(a-\theta)^2}{2b(1+\lambda\delta)^2}$. The difference between welfare under foreign TPP (see appendix A1) and welfare under domestic TPP is then

$$\Delta SW_f = \frac{(a-\theta)^2}{2b(1-\lambda\delta)(1+3\lambda\delta)} - \frac{(a-\theta)^2}{2b(1+\lambda\delta')^2}$$

where $\delta \leq \delta'$. Indeed, we reasonably assume that when in full control, the MNF has at least as much ownership than it has when no party has full control.

As $(1-\lambda\delta)(1+3\lambda\delta) = 1 + 2\lambda\delta - 3\lambda^2\delta^2$, and $(1+\lambda\delta')^2 = 1 + 2\lambda\delta' + \lambda^2\delta'^2$, we have $\Delta SW_f > 0$

As for the transfer price, from equation (15) which defines t^f, it is obvious that $t^f > \theta$ iff $\lambda\delta < 1/3$. This is true because $q^d(t^f) > 0$ from (20). ∎

Under Partial or Semi Indigenization, the foreign country has more instruments when it can control transfer pricing, and this leads to higher welfare. This therefore provides the foreign country with incentives to have its own TPP. However, having its own regulation is not synonym of imposing them at international level. A necessary (but not sufficient) condition is that these regulations are consistent with currently observed regulations. While the domestic country always sets a cost-plus policy[20], the foreign country's optimal policy would be a "cost-minus" policy if the MNF's ownership share is high enough, i.e greater than $1/3\lambda$. Such a transfer price can be reasonably though off as unreasonable[21]. It is only under certain ownership restriction ($\delta < 1/3\lambda$) that the foreign country's optimal policy becomes consistent (not necessarily equal) with the domestic government's TPP. Therefore, another rationale for indigenization policy can be the need to conciliate developing countries's welfare-maximization objectives with those of having an attractive and acceptable transfer pricing policy if the country wants to impose its transfer pricing rule.

What we have proven so far is the fact that under Partial or Semi Indigenization, the foreign country is better off when its TPP prevails. However, recall that under both modes, control lies with

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[20]This was the case under full control by the MNF, but also in the Partial (or Full) Indigenization case; indeed, in the latter scenario, the transfer price then derived was $t^d = \frac{a+\theta}{2} = \theta + \frac{a-\theta}{2} > \theta$.

[21]The literature on transfer pricing also backs this statement. For example in Samuelson (1982), an MNF sets its transfer price subject to an arm's length constraint that it has to be greater than marginal cost. In Elitzur and Mintz (1996), the regulating government imposes a transfer price of the form (1+k) times the marginal cost, where $k > 0$.

the MNF. Again, a natural question is wether full indigenization does not improve welfare even more. For this, we need to analyze the foreign country's optimal policy when $q = q_f$. Refereing to the endogenous case, we know that government G_f's social welfare is then convex and strictly decreasing in the transfer price. This means that it has incentive to set the lowest allowable transfer price. However, if again, one agrees that cost-minus transfer pricing is not acceptable, the optimal transfer pricing policy of the foreign government will be marginal cost pricing. Again, we assume that in this case, the MNE does not pay any tax. Social welfare in country f is then

$$SW_f = (b/2)q_f^2 = \frac{(a-\theta)^2}{2b}$$

Since social welfare in country d is tax on transfer pricing revenues, it is equal to zero. Therefore

Proposition 6 *Assume that the foreign country can impose its TPP, at the condition that it dictates at least marginal cost (this impose $\delta < 1/3\lambda$ under partial indigenization). The following ranking can then be established for the foreign country's welfare*

Full indigenization > Partial/Semi indigenization > Any control mode under domestic TPP.

Proof. Proof that Full indigenization > Partial/Semi indigenization

The welfare difference is

$$\Delta SW_f = \frac{(a-\theta)^2}{2b} - \frac{(a-\theta)^2}{2b(1-\lambda\delta)(1+3\lambda\delta)}$$

But $(1-\lambda\delta)(1+3\lambda\delta) = 1 + \lambda\delta(2-3\lambda\delta) > 1$ iff $\delta < \frac{2}{3\lambda}$. Such condition is satisfied if $\delta < \frac{1}{3\lambda}$

Proof that Partial indigenization > Any control mode under domestic TPP: see proposition 5 ∎

While under the TPP of the domestic country, the foreign government prefers Partial to Semi or Full indigenization, proposition 6 establishes the fact that if the foreign government can impose its TPP, then Full indigenization is the optimal strategy. Therefore, our model predicts that we should observe more ownership restriction in developing countries which have a credible transfer pricing policy that they can enforce, and less ownership restriction in countries without or with less enforcing transfer pricing policy.

6   Policy implications

In the early seventies, many emerging and developing countries have introduced an ownership restriction on foreign investment[22]. This was the case for instance with India, and also Korea where, "as of the mid-1980s, only 5% of TNC subsidiaries were wholly-owned , whereas the corresponding figures were 50% for Mexico and 60% for Brazil, countries that are often believed to have had much more "anti-foreign" policy orientations than that of Korea."[23]

These restrictions went together with the development of transfer pricing regulations. Still according to the same source cited above, "Policy measures other than those concerning entry and

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[22]See Svejnar and Smith (1984) for more on this.
[23]CAFOD policy papers, http://www.cafod.org.uk/policy/wtoforeigninvestment200305.shtml.

ownership were also used to control the activities of TNCs in accordance with national developmental goals: technology brought in by the investing TNCs was carefully screened to check that it was not overly obsolete and that the royalties charged to the local subsidiaries were not excessive;" The question is wether these TPP were always effective.

Recently, however, some of these countries have clearly developed sophisticated TPP, with detailed guidelines and documentation requirements[24], following the internationalization of TPP that adopt standard rules (highly influenced by IRS 482 code). As a coincidence, the IRS has become more aggressive in enforcing transfer pricing rules, which might suggest that some developing countries have become more effective in keeping part of MNF's revenues through their own TPP.

Also recently, some developing or emerging countries are increasing or simply removing ceilings on foreign equity. This is the case of Thailand (who removed most ceilings), and also of India who recently announced that it would rise its ceilings. This change is mainly due to pressure by developing countries (especially the US), through the World Trade Organization. For example, according to the same source cited here-above, here are some examples of requests coming from the EU:

> Chile is being asked to drop its rule that foreign investors should employ 85% of staff of Chilean nationality, when the US formerly insisted on 100% US nationality. Pakistan is being pressured to drop its requirement of maximum foreign equity participation of 51%, when Japan put a 50% ceiling on foreign ownership of 33 key industries.

Obviously, developing countries have suddenly become unhappy about these restrictions, while these have been set a long time ago. There might be many reasons for this, but let me try to provide one explanation, in view of my model.

According to our model, if by the past, (say) India's TPP were ineffective, meaning the US TPP prevailed, then we have seen that India would prefer partial indigenization, which is a welfare loss for the US, compared to full US ownership. Then it makes sense for the US to put pressure in order to lift these restrictions. However, in some sectors, India limit foreign ownership to 49 or 50 percent, which constitutes more than a partial indigenization. One may then ask why India implemented this Semi indigenization in the first place, as we know that its optimal policy should be partial indigenization? An obvious answer is that either (i) the Indian government failed to identify the discontinuity of the model, i.e ignored lemma 3, or (most likely) (ii) thought that it would be able to (and effectively did) enforce its own TPP. In case (i), the Indian government could adjust the situation by raising the ceiling (it actually did over time). In case (ii), the US government should exert pressure to lift the ceilings. Indeed, when developing countries have some bargaining power, in that they can implement and enforce their TPP, they increase their welfare at the expense of the developing countries and their MNFs. These latter will then be better off by returning to a situation of full control by the MNF, which again may explain the pressure exerted on developing countries to remove foreign equity ceilings.

7   Conclusion and remarks

In this paper, I have tried to provide a rationale for indigenization, and the motives behind governments to implement or remove such policies. One of the main lessons from our model is that in absence of

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[24]See for example the web site of the Indian finance minister

a clear control rule, one has to be careful with the assumptions about decision making in partially owned subsidiaries, for some values of ownership which are neither too close to zero, nor too one. Our model assumed perfect (and symmetric) information for all players. Although, typically, these kind of games are subject to asymmetric information, our model provides interesting insights and intuitions and can be seen as a first step to modelling control problems. Our paper could also address the issue of which government's TPP should prevail if one is concerned with maximizing joint social welfare. Although not presented in the paper, this issue has been addressed in the case of Semi Indigenization (and is even easier to address under other control modes). A supranational authority would obviously set a transfer price such that optimal exportation coincide with optimal importation, i.e. the transfer price we denoted $\bar{t}$. In absence of such authority, it is found that such decision is dictated by the same condition as the one that determines whether the foreign government sets a cost-plus or a cost-minus policy, i.e the relative value of δ with respect to $1/3\lambda$: it is optimal to let the TPP of the foreign government prevail when it is of the form cost-plus, and let the TPP of the domestic government prevail when the foreign government would set a cost-minus policy.

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Appendix

Appendix A: Proof of lemma 2   Let us first determine q_d, q_f and $\bar{t}$. Substituting the demand function in (4), we get

$$\delta(a - 2bq_d) = \theta - (1 - \lambda_d\delta)t$$

which is equivalent to

$$q_d = \frac{\delta\lambda_d a - \theta + (1 - \delta\lambda_d)t}{2b\delta\lambda_d} \tag{9}$$

A similar exercise with (5) yields

$$q_f = \frac{a - t}{b} \tag{10}$$

$\bar{t}$ is such that $q_d(\bar{t}) = q_f(\bar{t})$. Solving this equation yields

$$\bar{t} = \frac{\lambda\delta a + \theta}{1 + \lambda\delta} \tag{11}$$

For the remaining, it is useful to notice that

$$bq_f(\bar{t}) = a - \bar{t} = \frac{a - \theta}{1 + \lambda\delta} \qquad \text{and} \qquad \bar{t} - \theta = \lambda\delta \times \frac{a - \theta}{1 + \lambda\delta} \tag{12}$$

Appendix A1: Transfer Pricing policy of Government G_f

If G_f sets $t \geq \bar{t}$, then the quantity exchanged is will be the one decided by the joint venture, i.e q_f. Social welfare in country f is then given by (recall the firms make zero profit in equilibrium)

$$SW_f = \int_0^{q_f} P(x)dx - tq_f,$$

which government G_f maximizes by choosing its transfer pricing policy t. The first derivative of this welfare function is

$$\frac{\partial SW_f}{\partial t} = P(q_f)\frac{dq_f}{dt} - q_f - t\frac{dq_f}{dt}$$

Using equation (5) which defines q_f, we get

$$\frac{\partial SW_f}{\partial t} = -q_f < 0 \tag{13}$$

Given that $\frac{dq_f}{dt} < 0$, the program of G_f is convex. As Social welfare function is decreasing on the interval $(\bar{t}, +\infty)$, it is then optimal for government f to set the lowest feasible transfer price, i.e. $\bar{t}$.

Social welfare is then equal to

$$SW_f = (a - b/2.q_f(\bar{t}) - \bar{t})q_f(\bar{t})$$
$$= (b/2)q_f^2(\bar{t})$$
$$= (1/2b)(\frac{a - \theta}{1 + \lambda\delta})^2$$

If G_f sets $t < \bar{t}$, then the quantity exchanged will be q_d. Given that, social welfare in country f is now

$$SW_f = \int_0^{q_d} P(x)dx - tq_d,$$

Maximizing wrt t yields the following first order condition

$$(P(q_d) - t)\frac{dq_d}{dt} - q_d = 0.$$

From (9), we know that $\frac{dq_d}{dt} = \frac{1-\lambda\delta}{2b\lambda\delta}$. The first order condition now becomes

$$(a - bq_d - t)(1 - \lambda\delta) = 2b\lambda\delta q_d. \tag{14}$$

Subtracting $bq_d(1 - \lambda\delta)$ on both sides yields

$$(R'(q_d) - t)(1 - \lambda\delta) = b(-1 + 3\lambda\delta)q_d$$

Taking into account equation (4), we get

$$\frac{\theta - t}{\lambda\delta b}(1 - \lambda\delta) = b(-1 + 3\lambda\delta)q_d.$$

or equivalently (where t^f denotes the transfer price we are looking for)

$$q_d(t^f) = \frac{t^f - \theta}{\lambda\delta b} \times \frac{1 - \lambda\delta}{1 - 3\lambda\delta}, \tag{15}$$

Confronting (15) with (9) taken at $t = t^f$ yields, after simple algebra, the optimal transfer price t^f

$$t^f = \frac{\lambda\delta a(1 - 3\lambda\delta) + \theta(1 + \lambda\delta)}{(1 - \lambda\delta)(1 + 3\lambda\delta)}\text{QED} \tag{16}$$

Now, we need to prove that indeed $t^f < \bar{t}$ (proof by contradiction).

We know that t^f is the optimal transfer price when the quantity exchanged is $q_d = \min\{qd, q_f\}$. Furthermore, we also know that

$$q_f(\bar{t}) = (a - \bar{t})/b$$

which, using equation (11), can be also rewritten as

$$q_f(\bar{t}) = \frac{\bar{t} - \theta}{\lambda\delta b} \tag{17}$$

Now assume that $t^f > \bar{t}$. Because $\frac{1-\lambda\delta}{1-3\lambda\delta} > 1$, we have from (15) that $q_d(t^f) > q_f(\bar{t})$. Because $q'_f(t) < 0$, we have $q_d(t^f) > q_f(\bar{t}) > q_f(t^f)$, which contradicts the fact that $\min\{qd, q_f\} = q_d$ at the optimal price t^f. QED

Now we compute social welfare under the optimal price t^f

Firstly, let us re-express $q^d(t^f)$ differently than in (15). By substituting the RHS of (14) by its value in (9), we get

$$(a - bq_d - t)(1 - \lambda\delta) = \lambda\delta a - \theta + (1 - \lambda\delta)t, \tag{18}$$

or (after re-arranging)

$$q_d(t^f) = \frac{2(1 - \lambda\delta)(a - t^f) - (a - \theta)}{(1 - \lambda\delta)b} \tag{19}$$

Social welfare is then equal to

$$SW_f = [a - b/2.q_d(t^f) - t^f]q_d(t^f)$$

Substituting $q_d(t^f)$ in the above [.] by its value in (19) yields

$$SW_f = \frac{a - \theta}{2(1 - \lambda\delta)} \times q_d(t^f)$$

Equation (16) can be rewritten as

$$(1 - \lambda\delta)(a - t^f) = \frac{(1 + \lambda\delta)(a - \theta)}{1 + 3\lambda\delta}.$$

Substituting the above in equation (19) yields

$$q_d(t^f) = \frac{a - \theta}{(1 + 3\lambda\delta)b}, \tag{20}$$

and hence the final value of social welfare

$$SW_f = \frac{(a - \theta)^2}{2b(1 - \lambda\delta)(1 + 3\lambda\delta)}$$

Now let's compare social welfare under the two regimes

$$\Delta SW_f = SW_f(t^f) - SW_f(\bar{t}) = \left[\frac{1}{(1 - \lambda\delta)(1 + 3\lambda\delta)} - \frac{1}{(1 + \lambda\delta)^2}\right]\frac{(a - \theta)^2}{2b}$$

$$= \frac{2\lambda\delta^2(a - \theta)^2}{b(1 - \lambda\delta)(1 + 3\lambda\delta)(1 + \lambda\delta^2)}$$

$$> 0$$

meaning that it is optimal for G_f to set the transfer price $t = t^f$. Notice from (20) that the quantity exchanged in equilibrium $q_d(t^f)$ is strictly positive.

Appendix A2: Transfer Pricing policy of Government G_d

   <u>If G_d sets $t > \bar{t}$</u>, then $q = q_f$. Government G_d then solves the following program

$$\max_t SW_d = (t - \theta)q_f$$

The first order condition is[25]

$$q_f = (t - \theta)/b,$$

which, given that P(.) is strictly monotonic, is equivalent to

$$P(q_f) = P[(t - \theta)/b],$$

or equivalently

$$t = a - (t - \theta).$$

Solving this equation yields

$$t^d = (a + \theta)/2,$$

It is then easily shown that

$$t^d - \bar{t} = \frac{a - \theta + \lambda\delta(a + \theta)}{2(1 + \lambda\delta)} > 0.$$

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[25]The second order condition is $-2/b < 0$, which is satisfied.

Social welfare in country d

$$q_f(t^d) = (a - t^d)/b = (a - \theta)/2b \tag{21}$$

and hence

$$Swd = (\frac{a + \theta}{2} - \theta)(\frac{a - \theta}{2b}) = \frac{(a - \theta)^2}{4b}$$

<u>If G_d sets $t \leq \bar{t}$</u>, then $q = q_d$. Government G_d then solves the following program

$$\max_t SW_d = (t - \theta)qd$$

Notice that government G_d will never set a transfer price $t < \theta$, for that its welfare will be negative. This means that within the range $(0, \bar{t})$, the transfer price is bounded in the lower level at θ, and ultimately to be chosen in $[\theta, \bar{t}]$ (recall that $\bar{t} > \theta$)

$$\frac{\partial Swd}{\partial t} = q_d + (t - \theta)q_d'(t) > 0,$$

and

$$\frac{\partial^2 Swd}{\partial t^2} = 2q_d'(t) + (t - \theta)\underbrace{q_d''(t)}_{=0} > 0$$

The program is therefore convex. The optimal transfer price is thus a corner solution. Since $\frac{\partial Swd}{\partial t} > 0$, G_d will set $t = \bar{t}$.

Using (12), social welfare is easily determined

$$Swd = \lambda\delta \times \frac{a - \theta}{1 + \lambda\delta} \times \frac{a - \theta}{b(1 + \lambda\delta)} = \frac{\lambda\delta}{b}(\frac{a - \theta}{1 + \lambda\delta})^2$$

Finally, comparing social welfare under the two regimes yields

$$\Delta SW_d = SW_d(t^d) - SW_d(\bar{t}) = \frac{\lambda\delta}{b}(\frac{a - \theta}{1 + \lambda\delta})^2 - \frac{(a - \theta)^2}{4b}$$
$$= \frac{(1 - \lambda\delta)^2(a - \theta)^2}{4b(1 + \lambda\delta)^2}$$
$$> 0$$

meaning that it is optimal for G_d to set the transfer price $t = t^d$. Notice from (21) that the quantity exchanged in equilibrium $q_f(t^d)$ is strictly positive.

Appendix B Under the transfer price t^d, we already computed welfare in country d. Under the transfer price t^f, we also computed welfare in country f. In this appendix, we compute welfare in the other country under both transfer prices (welfare in country f under the transfer price t^d, and welfare in country d under the transfer price t^f)

Under the transfer price t^d, welfare in country f is given by

$$SW_f(t^d) = (a - b/2.q_f(t^d) - t^d)q_f(t^d)$$
$$= (b/2)q_f^2(t^d)$$

Using equation (21), which defines $q^f(t^d)$, we get

$$SW_f(t^d) = \frac{(a-\theta)^2}{8b}$$

Under the transfer price t^d, total welfare is therefore equal to

$$SW(t^d) = \frac{(a-\theta)^2}{8b} + \frac{(a-\theta)^2}{4b} = \frac{3(a-\theta)^2}{8b}$$

Under the transfer price t^f, welfare in country d is given by

$$SW_d(t^f) = (t^f - \theta)q^d(t^f)$$

From (15), it comes that

$$t^f - \theta = \frac{\lambda\delta b(1 - 3\lambda\delta)}{1 - \lambda\delta}q_d(t^f)$$

Using the value of $q^d(t^f)$ given in (20), we get

$$SW_d(t^f) = \frac{\lambda\delta(1 - 3\lambda\delta)}{b(1 - \lambda\delta)(1 + 3\lambda\delta)^2}(a-\theta)^2$$