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Illustration**

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**CIES DISCUSSION PAPER 0040**

**Are Multinational Sales to Affiliates in High Tax Countries  
Overpriced? A Simple Illustration**

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## ABSTRACT

# Are Multinational Sales to Affiliates in High Tax Countries Overpriced? A Simple Illustration

**Ramkishen S. Rajan**

Empirical evidence of transfer pricing suggests that US sales to affiliates based in low taxed countries are underpriced. The argument has been made that, by symmetry, US sales to affiliates in high tax countries are overpriced. We show that this symmetry assumption is far from certain once realistic assumptions of international tax principles and laws are applied and a non zero import tariff by the foreign country is introduced into a simple model of transfer pricing.

**Keywords:** multinational enterprises, tariffs, taxation, trade, transfer pricing

**JEL codes:** H25, F23

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## 1. Introduction

Intrafirm transactions account for a substantial share of world trade. For instance, in 1994, 36 percent of US exports and 43 percent of US imports were of the intrafirm variety (Clausing, 1998). There is evidence that other countries that trade with the US are engaged in relatively more intensive intrafirm trade, at least in terms of their bilateral relations with the US (He, 1995). Consequently, with the global dominance of multinational enterprises (MNEs) in trade and related transactions, one of the major tax policy issues is the allocation of the tax base of these firms between countries.

Accounting manipulations allow for a transfer of tax bases (paper profits) even if physical capital (real activity) remains intact, as MNEs attempt to exploit differences in marginal statutory tax rates across countries - either actual or *de facto* - if there exist different laxities with which tax administration is carried out. In most situations, this entails maintaining a judicious setting of the imputed values on the internal transfer of goods and services between operations in different countries. Such tax shifting manipulations in which intrafirm sales are invoiced (i.e. "transfer pricing") are often arbitrary, since no formal (i.e. market based and arms length) transactions occur. A recent survey of 400 multinational firms worldwide by Ernst & Young (1997) reveals transfer pricing to be among the most important and urgent issues faced by firms.

The empirical literature in transfer pricing is gradually growing. Three recent studies are particularly noteworthy. First, Clausing (1998) has found that, for the period 1982 to 1994, the US has had a less favorable intrafirm trade balance with low tax countries. This is rationalized as being due to underpricing of US sales to affiliates based in low taxed countries. Second, using firm level data of selected US manufacturing MNEs for the period 1984 to 1992, Collins et al. (1996) have concluded that US MNEs with tax rates in excess of the US tax rate have lower pre tax foreign profit margins than other US MNEs. They take this as evidence of income shifting from high tax foreign countries to the US. Third, on the basis of firm level data of ninety five

US manufacturing based MNEs between 1984 to 1988, Harris et al. (1993) have concluded that US MNEs reduce their tax burden between 3 and 22 percent by shifting reported incomes from high to low tax countries.

Clausing (1998) presents a simple model to illustrate the “straightforwardness” of the above results with regard to underpricing of sales to low tax countries, and argues that the result is symmetric in the case of high tax ones (i.e. overpricing). This paper attempts to develop a simple model to determine if these results are robust - particularly the symmetry argument - once more realistic assumptions of international tax principles are applied, and a non zero import tariff by the foreign country is introduced in the model set up.

By way of background, it is useful to remind ourselves that international direct taxation is usually guided by two criteria, viz. the residence based or worldwide principle and the source based or territorial principle. The residence based principle assesses tax liabilities on the basis of the residence of the taxpayer regardless of where the income is earned. Nonresidents are not liable for income earned in the country. A residence based (or worldwide) tax is therefore essentially a tax on savings. The source (or territorial) principle assesses tax liabilities on the basis of where the income originates, regardless of whether it is by residents or nonresidents. Residents are not liable for income earned abroad.

## **2. A Simple Model of Transfer Pricing**

The starting point of any model on transfer pricing is the canonical model by Horst (1971). Specifically, the model assumes a single MNE which sells its product in two countries, viz. home (h) - the US - and foreign (f). Since the focus is on income shifting as opposed to tax incentives in impacting real economic (i.e. production) activity, assume for simplicity that all production is done only in the home country, with part of

the production being exported to the affiliate in the foreign country<sup>1</sup>. To abstract from strategic gaming issues, assume the MNE is a monopolist in both countries.

Let  $C(\cdot)$  be the cost function and  $F(\cdot)$  be the production function, where  $C' > 0$ ,  $F' > 0$ ,  $C''(\cdot) \geq 0$  and  $F''(\cdot) \leq 0$ . Assume simply that the production of the output is fixed, using a fixed amount of input  $X$ . Accordingly, for notational convenient, assume  $F(X) = \underline{E}$  and  $C(X) = \underline{C}$ . The price of the good in country  $h$  is normalized to 1. Let  $\alpha$  be the proportion of the good that is exported to country  $f$ , which we take to be constant<sup>2</sup>. Assume the (foreign) country  $f$  imposes an ad valorem tariff of  $m$  per unit of imports. Let  $p$  be the price per unit sold to the affiliate in country  $f$  (i.e. transfer price)<sup>3</sup>. Profit functions for the MNE's operations in the two countries are as follows:

$$\Pi_h = (1 - \alpha)\underline{E} - \underline{C} + \alpha p \underline{E} \quad (1)$$

$$\Pi_f = \alpha \underline{E} - \alpha p \underline{E}(1 + m) \quad (2)$$

Let the  $t_h$  and  $t_f$  respectively be the home and foreign tax rates. Let  $\beta$  be the fraction of profits earned in county  $f$  ( $\Pi_f$ ) repatriated to country  $h$ . The objective of the MNE is to maximize net global profits. Since the transfer price ( $p$ ) is the only strategic variable, this objective is akin to saying that the aim is to minimize the overall tax burden.

There are three alternatives to consider, viz. residence tax, source tax with  $t_h >$

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1 This leads us to the question of why the MNE internalizes its operations. Williamson (1979) produces an early discussion of the efficiency gains of internalization (common governance).

2 Note that this assumption implies that the home country always has a positive trade balance (surplus) with the foreign country, the issue being one of relative size of the surplus.

3 Realistically,  $p$  cannot differ too much from  $(1 + m)$ , i.e. the price at home plus import tariff. We could complicate the analysis by assuming that the probability of being caught (and punished/fined) by the tax authorities is an increasing function of the difference between  $p$  and  $(1 + m)$ . This adds little by way of the main focus of this paper, and is thus ignored. See Kant (1995) for a model incorporating this tradeoff between the probability of being fined and the optimal transfer price.

$t_f$ ; and source tax with  $t_h < t_f$ <sup>4</sup>.

## 2.1 Residence Based Principle

Assume that both countries impose the residence based tax. This is the simplest case considered. The tax rate faced by the MNE is  $t_h$ , regardless of where the profits are made. In other words, with a residence based tax, the tax rate of the home country is the only relevant one. Thus, net global profit ( $\Pi$ ) is as follows:

$$\begin{aligned}\Pi &= (1 - t_h)(\Pi_h + \Pi_f) \\ &= (1 - t_h)[E - \underline{C} - \infty(mpE)]\end{aligned}\quad (3)$$

$$\frac{\partial \Pi}{\partial p} = -\infty(1 - t_h)mE < 0 \quad (4)$$

The intuition here is straightforward. The MNE would always prefer a low transfer price so as to save the tariff cost.

## 2.2 Source Principle: $t_h > t_f$

If  $t_h > t_f$  and the country h provides a tax credit for repatriated profits, the MNE operating in country f only pays the excess of tax rate in country h relative to country f on the profits repatriated. Thus, the effective tax rate ( $t^e$ ) is:

$$t^e = t_f + \beta(t_h - t_f) \quad (5)$$

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<sup>4</sup> To be sure, we need to define the marginal effective tax rate (METR), which refers to the tax wedge between the pre tax and post tax rate of return (inclusive factors such as depreciation and exemptions, which affect net tax burden). As noted by Shah and Slemrod (1991),  $t_h$  is more appropriately seen as the statutory tax rate (as the home country will generally not allow accelerated depreciation, etc.), while  $t_f$  should be the marginal effective tax rate (METR). Given the difficulty of measuring METR, most use the average effective tax rate (AETR), i.e. the difference in the rate of return between two tax competing countries. Both Collins et al. (1996) and Clausing (1998) use the AETR.

The MNE's global profits are:

$$\begin{aligned}
 \Pi &= (1 - t_h)\Pi_h + (1 - t^e)\Pi_f \\
 &= (1 - t_h)[(1 - \infty)E - \underline{C} + \infty pE] + (1 - t^e)[\infty E - \infty(1 + m)E] \\
 &(6)
 \end{aligned}$$

$$\begin{aligned}
 \partial\Pi/\partial p &= \infty[(1 - t_h) - (1 - t^e)(1 + m)]E \\
 &= -\infty[(t_h - t_f)(1 - \beta - \beta m) + (1 - t_f)m]E \quad (7)
 \end{aligned}$$

Note that eq. (7) is unambiguously negative, i.e. the MNE indisputably gains by underpricing goods sold to the low tax countries, the result reached and empirically confirmed by Clausing (1998). With the introduction of import tariffs by the foreign country, there is a reinforcing mechanism for underpricing sales to the foreign affiliate, i.e. there is a benefit both in terms of the tax differential as well as the ad valorem tariff.

### 2.3 Source Principle: $t_f > t_h$

Clausing (1998) noted that if  $t_f > t_h$ , the above results are completely symmetric. However, this need not necessarily be so in the presence of tax credits and exemptions. In this case, the firm will usually be entirely exempt from taxes levied in country h on repatriated profit, but will have to pay the taxes imposed by country f. Thus, the effective tax rate is in fact just  $t_f$ , and global profits are:

$$\begin{aligned}
 \Pi &= (1 - t_h)\Pi_h + (1 - t_f)\Pi_f \\
 &= (1 - t_h)[(1 - \infty)E - \underline{C} + \infty pE] + (1 - t_f)[\infty E - \infty(1 + m)pE] \quad (8)
 \end{aligned}$$

$$\begin{aligned}
\partial\Pi/\partial p &= \propto[(1 - t_h) - (1 - t_f)(1 + m)]E \\
&= \propto[(t_f - t_h) - (1 - t_f)m]E
\end{aligned}
\tag{9}$$

Eq. (9) cannot be signed a priori. Obviously, eq. (9) > (<) 0 if and only if  $(t_f - t_h) > (<) (1 - t_f)m$ . The cause of this ambiguity is straightforward. On the one hand, the MNE has the incentive to overprice sales to the subsidiary in country f, given the higher tax rate in country f vis-à-vis country h. This motivation is tempered by the fact that the subsidiary will have to pay a tariff (of m) per unit of imports (given the assumption of fixity of production and export/import volumes). Thus, if no tariffs are imposed by country f ( $m = 0$ ), eq. (4) is unambiguously negative, i.e. the MNE unambiguously gains by overpricing goods sold to the high tax country. Contrary to Clausing (1998), this conclusion is, however, not generally applicable, and is an empirical issue.

In view of the preceding analysis, the empirical results using firm level data of US MNEs by Collins et al. (1996) is revealing, in that they find that income shifting does occur from high tax foreign jurisdictions into the US between 1984 and 1992 by selected manufacturing MNEs. Over this period, these firms are estimated to have shifted some US\$ 41 billion of income from overseas to the US in aggregate. On the other hand, revealingly, Clausing (1998, fn 25) states that “the relationship between taxes and intrafirm trade is much stronger for low tax countries.” This would be expected *a priori* from the above model.

### 3. Conclusion

This paper has revealed the fair degree of robustness of the conclusion that a MNE has an incentive to underprice goods sold to low tax countries. Clausing (1998) has empirically validated this. However, the result is not necessarily symmetric, i.e. overpricing to high tax countries in which MNE affiliates are located. Intuitively, while there is an incentive for the MNE to overprice its internal sale price to the affiliate

overseas so as to shift profits to the (lower taxed) home country, this is offset by the higher import tariff having to be paid on imports by the foreign country<sup>5</sup>. There are a number of ways in which the simple model in this paper could be extended. These include allowing for oligopolistic market structures and the consequent strategic interactions between firms, relaxing the constancy assumptions of output and export/import volumes and share of profits to be repatriated (these also being choice variables in reality), admitting production and cross hauling between countries, and increasing the number of affiliate operations (i.e. more than two countries). Paradoxically, this theoretical ambiguity makes the empirical results by Collins et al. (1996), viz. that income shifting does occur from high tax foreign jurisdictions into the US, all the more significant and in need for further confirmation.

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<sup>5</sup> While this was not the focus of Horst (1971), he included ad valorem tariffs by the foreign country in his original model.

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