

# CASH FLOW TAXES IN AN OPEN ECONOMY

**Stephen Bond**

University of Oxford and Institute for Fiscal Studies, London

**Michael P. Devereux**

University of Warwick, Institute for Fiscal Studies, London and CEPR

February 2002

## **Abstract**

Academic and policy debates generally consider levying tax on corporate profit on either a residence or source basis. We explore two alternatives, based on the location of consumption, rather than production – destination-based, as opposed to source-based or residence-based, taxes. We analyse the properties of these taxes, especially with respect to their impact of location and domestic welfare.

## **Acknowledgements**

This paper was initially prepared for the ISPE conference “Income Taxation and Financial Innovation” held at the University of California, Berkeley on December 7-8, 2001. We are grateful for helpful comments from conference participants, seminar participants at the IMF, and especially from Alan Auerbach, Robert Green, Michael Keen and Jack Mintz.

## 1 INTRODUCTION

This paper investigates the properties of alternative forms of taxation of corporate profit on the location of economic activity, and on economic welfare. In particular, we contrast the properties of a source-based cash flow tax with two alternative notions of a destination-based cash flow tax.

A destination-based tax on corporate profit has not previously been rigorously analysed.<sup>1</sup> Indeed, almost all existing economic theory on the international taxation of companies is based on a model with only a residence and source country. A corporation is typically assumed to be resident in the former, and owned by individuals resident in the same country. It is typically assumed to have an affiliate in the latter which serves the market in that country. This leads naturally to a debate about whether profits are more appropriately taxed in the residence country or the source country.

But the world is more complex than this. There are (at least) four groups of potentially relevant locations: (1) the residence of the ultimate owners of the firm; (2) the residence of the "head office" of the firm; (3) the location of the active affiliates of the firm; and (4) the location of the ultimate consumers. In practice, each of these locations – especially (1), (3) and (4) – may actually consist of sites in several countries. Existing international tax rules give the primary taxing rights at the level of the company to (3) – this is usually thought of as source-based taxation. Residual rights are often – though by no means universally – claimed by governments of location (2). In addition, most countries attempt to levy personal tax on the worldwide capital income of their residents – effectively based on (1).

By contrast, the standard theoretical model suggests that the optimal rate of source-based tax in a small open economy is zero (see, for example, Gordon, 1986). In this model, the aggregate capital stock in any country depends negatively on the tax rate. Raising this tax rate raises the required pre-tax rate of return in that location. This reduces the quantity of capital

---

<sup>1</sup> Two recent papers in law journals – Avi-Yonah (2000) and Bradford (2000) – have raised the possibility of such a tax, as have Grubert and Newlon (1997). But none of these contributions offers a rigorous economic analysis of the properties of such a tax.

located there, which in turn creates an excess burden which could be avoided by taxing immobile factors directly. If it is not possible to raise the required revenue from other taxes, then public goods will be under-provided (see, for example, Zodrow and Mieszkowski, 1986). And the belief that source-based taxes have such an effect have such an effect underlies the notion of governments competing with each other to attract capital by reducing their source-based tax rates.<sup>2</sup>

The impact of source-based taxes on the location of capital stem ultimately from the mobility of capital. This suggests it would be useful to identify tax bases which are less mobile. In the context of multinational firms, it seems reasonable to suppose that individuals are less mobile than firms – either the affiliates or the head office. It therefore seems natural to investigate whether profits can be taxed at the location of individuals, based either on (1) or (4) above, rather than - as at present - on (2) and (3). Of course, most countries already attempt to levy a tax on the worldwide capital income of their residents. However, such taxes raise little revenue, for a variety of reasons, the most important being that it is very hard to tax the accretion to wealth of a resident arising from the profits of a non-resident firm in which a resident owns shares.

In this paper, we therefore investigate two forms of taxes on profits based on the location of consumption, which we term destination-based corporation taxes. In each case, we analyse a cash flow tax, based on real, rather than financial, flows (the R-base, in the terminology of Meade, 1978). Under the R-base cash flow tax, expenditure on capital qualifies for immediate write-off, but interest payments are not deductible and interest receipts are not taxable. In the context of a closed economy, the properties of the R-base cash flow tax have been studied at length. This includes the relationship to the personal income tax system: for example, if the income tax system continues to tax interest receipts, then an incentive is introduced to receive interest in an incorporated form. However, we do not review these issues here since our focus is on the location of the tax base. We analyse the R-based tax for

---

<sup>2</sup> There is now a body of empirical evidence indicating that source-based corporation taxes do affect the location of production. See the reviews by Hines (1999), De Mooij, R.A. and S. Ederveen (2001) and Devereux and Griffith (2002). And Mintz and Chen (2001) have predicted that the problems of source-based corporation taxes will lead to their demise within twenty years.

a number of reasons: its well known neutrality properties; its similarity to a destination-based VAT; and because it is not susceptible to manipulation through use of financial instruments.

We define the destination-based cash flow taxes more precisely in Section 2. Broadly, the first, which we term a “full” destination-based cash flow tax is based on dividing up the worldwide profit of a multinational firm on the basis of where it makes sales to third parties, rather than where it produces its output. All costs associated with making such sales would be deductible, irrespective of where they were incurred.

The second, which we term a “VAT-type” destination-based cash flow tax, is based on the definition of a destination-based VAT. Here there is an asymmetry – revenue is taxed only in the country in which are sales to a third party take place – implying that exports are tax free, but imports are taxed. However, costs are allowable against tax only in the country in which they are incurred. Such a tax differs from a destination-based VAT only insofar that – unlike under the VAT - domestic wage costs are deductible from the tax.

As is well know, a cash flow tax has an effective marginal tax rate of zero. This immediately distinguishes the tax from those analysed in the standard models described above. The distorting tax effect in those models arises because the tax raises the pre-tax required rate of return on capital; in effect, the “tax rate” in those models is the effective marginal tax rate. A cash flow tax therefore avoids the distortions in these models; and revenue is raised only from infra-marginal investment.

However, this implies that we cannot use the standard model to analyse the impact of the destination-based cash flow taxes. In any case, in keeping with the nature of the issue raised at the outset, we want to model the location and investment decisions of multinational firms. We therefore adapt the literature on such firms (notably Horstman and Markusen, 1992) to model a small open economy in which one sector is controlled by a monopolist. A similar version of our model was used by Haufler and Wooton (1999) to analyse source-based profit taxes. The monopolist expects to earn some economic rent, and chooses the location which generates the highest post-tax rent. A cash flow tax reduces this post-tax rent, and

hence can potentially affect the location decision. However, conditional on location, the tax does not affect the scale of the monopolist's operations.

Before proceeding with the model, two other issues are worth mentioning. The first concerns profit shifting between countries. Conventional source-based taxes are difficult to enforce since (among other things) they require a valuation of all goods produced within a country, including a valuation of sales to other affiliates of the same multinational firm (a transfer price). Arms length pricing may be possible in some contexts, where there is a clear and observable price for the same good sold to a third party. But in many cases, there is no arms length price. In such contexts, it may be possible for the firm to manipulate transfer prices to reduce tax liabilities.<sup>3</sup> We address this issue in the context of the taxes we analyse: we examine the extent to which these taxes are open to manipulation of transfer prices, or other mechanisms, to reduce tax liabilities.

A second, and related, issue concerns the use of royalty payments. It is possible that the profit of the affiliate of a non-resident multinational is due to the use of a patent owned by the parent company. The patent may represent a return to the research and development undertaken by the parent company. As such, the profit earned by the affiliate could be paid to the parent in the form of a royalty; and thus be taxed in the residence country of the parent, rather than in the source country. Of course, if this were a typical description of the situation of multinationals, then most corporation tax would be levied on a residence basis. But, in practice, the allocation of profit is not so clear cut. The profits generated by multinational firms arise from a large number of sources, and cannot easily be allocated to specific sources. A significant part of such profits arise from intangible assets which cannot easily be identified or valued. The commonly-accepted OLI approach (see, for example, Markusen, 1995), emphasis, among other things, the "internalisation" required by multinationals: if the benefits arising from the multinational could be pinned down by a patent, then the multinational could simply license other firms to undertake production in other countries, and set a royalty payment to capture the benefits. The fact that multinationals actually use their own affiliates suggests that this is not commonly the case.

---

<sup>3</sup> Further problems typically arise through financial management, although we rule these out by analysing only R-based cash flow taxes.

But, in any case, in this paper we examine how royalty payments affect the tax base under each of the destination-based cash flow taxes. It turns out that the issues in these cases are rather different from the case of a source-based tax.

The main part of this paper is Section 2, which is split into five parts. We begin in Section 2.1 by outlining the basic model in the absence of tax. The next three parts analyse a source-based cash flow tax and each of the destination-based cash flow taxes in turn. A fifth part makes some further comments in comparing the three different taxes. Section 3 concludes.

## **2 THE INCIDENCE AND EFFECTS OF ALTERNATIVE CASH FLOW TAXES**

We are interested in examining the properties of alternative cash flow corporation taxes in an open economy. Given the well known property of such a tax that it does not distort marginal investment decisions, we use a model in which economic rent is earned. Drawing on the literature on multinational firms (notably Horstman and Markusen, 1992), we consider a small open economy in which one sector is controlled by a monopolist.

We begin by setting up the model in the absence of tax. We then consider in turn the following cash flow taxes levied by the home country: (a) a source-based tax, levied on the value of output produced less costs arising in the home country, wherever that output is sold; (b) a “full” destination-based tax, levied on domestic sales less the costs of producing the output sold domestically, wherever those costs are incurred; and (c) a “VAT-type” destination-based tax, where again only domestic sales are taxed – including any imported goods, whether final goods or intermediate inputs – but only costs incurred domestically are deductible against tax. The last case is based on the conventional destination-based VAT; it differs from such a VAT only in that domestic wage costs are deductible from the tax base.

## 2.1 No tax

The monopoly supplies good 1 to two locations: the domestic country and a foreign country (denoted throughout by an asterisk). Residents in each country are immobile. Hence the two markets are segmented; there is no cross border shopping. Because of fixed costs in setting up in either location, the monopoly is assumed to choose to produce in only one of these countries. Each of these two countries is small relative to the world economy: hence each takes the post-tax required rate of return on capital as given. The size of the domestic economy is normalised to unity. The foreign country is of size  $n$ , which may be larger or smaller than 1. The basic setting we have in mind is therefore of a multinational company operating in a regional setting, for example, a US company operating in Europe, or a Japanese company operating in Canada and the US. Transport costs preclude the multinational exporting to these two markets rather than producing in one of them. Transport costs between the home and foreign country are  $s$  per unit of output; these costs are not large enough to induce the monopoly to produce in both countries.

We assume that a proportion  $\varphi$  of the multinational is owned by immobile domestic residents. This proportion is not large enough to give control of the firm's decisions. Neither is the firm controlled by residents of the foreign country. We assume a simple production function: one unit of output requires one unit of labour and one unit of some other input, which for convenience we label capital. In the case of domestic production, capital is imported. We also assume that the input represented by the fixed cost is imported. In the home country, there is a second, relatively large, perfectly competitive sector which produces good 2. This sector is wholly-owned by domestic residents. Part of the output from this sector may be exported at a fixed world producer price, taken to be the numeraire. One unit of labour is used to produce one unit of good 2. Labour is completely mobile between the two sectors.

The utility of the representative domestic consumer/worker in the home country depends on consumption of each good and leisure. It is useful to give this a specific functional form. We assume that:

$$u(c_1, c_2, l) = ac_1 - \frac{\beta}{2}c_1^2 + \gamma l - \frac{\delta}{2}l^2 + c_2 \quad (1)$$

where  $c_i$  is consumption of good  $i$ ,  $i=1,2$  and  $l$  is leisure. We assume that  $a > 1$  and  $\gamma > 1$ . Normalising the time endowment to one unit, labour supply is  $L = 1 - l$ . The individual maximises utility subject to the budget constraint:

$$qc_1 + pc_2 = w(1 - l) + E + \varphi\pi^M \quad (2)$$

where  $q$  is the consumer price of good 1,  $p$  is the consumer price of good 2,  $w$  is the wage rate,  $E$  is an exogenous endowment of income and  $\pi^M$  is the profit of the monopolist. It is convenient, although not necessary, to think of  $E$  as exogenous income from abroad. In turn this may include the domestic consumer/worker's share of any profits that the monopolist earns from activities elsewhere in the world, and income from any previously accumulated capital.

Solving this optimisation problem yields:

$$c_1 = \frac{a - q/p}{\beta} \Rightarrow q = p(a - \beta c_1), \quad (3)$$

$$l = \frac{\gamma - w/p}{\delta} \Rightarrow L = 1 - l = \frac{\delta - \gamma + w/p}{\delta}, \text{ and} \quad (4)$$

$$c_2 = \frac{w}{p}L + \frac{E}{p} + \frac{\varphi\pi^M}{p} - \frac{q}{p}c_1. \quad (5)$$

Hence demand for good 1 is a linear function of the relative price of good 1 and good 2, and the demand for leisure is a linear function of the relative price of labour and good 2. Note that this formulation implies that there are no income effects on either the consumption of good 1 or leisure: any change in  $E$  or  $\varphi\pi^M$  affects only the consumption of good 2.



The price of good 2 in the foreign country is assumed to be unity. We assume that the two countries are symmetric, except that the foreign country is of size  $n$ . The demand for good 1 in the foreign country is therefore

$$c_1^* = n \frac{a - q^* / p^*}{\beta} \Rightarrow q^* = a - \frac{\beta c_1^*}{n}. \quad (6)$$

Given free entry into the perfectly competitive sector, profits in that sector can be written as:

$$\pi^C = x_2 + p c_2 - w L_2 = (1 - w)x_2 + (p - w)c_2 = 0 \quad (7)$$

where  $x_2$  is exports of good 2,  $L_2$  is labour used in production of good 2, and the second expression uses the assumed production function:  $x_2 + c_2 = L_2$ . Clearly the free-entry condition requires zero profit, and hence  $p = w = 1$ .

To examine the behaviour of the monopoly we must consider separately the two possibilities of producing in the home country or in the foreign country.

### 2.1.1 Production in the home country

If the monopoly produces at home, then it maximises profits defined as

$$\pi^M = (a - \beta c_1)c_1 + \left(a - \frac{\beta c_1^*}{n} - s\right)c_1^* - (c_1 + c_1^*)g - F. \quad (8)$$

This expression uses the production function:  $c_1 + c_1^* = L_1 + K$ , where  $L_1$  is domestic labour used by the monopoly, at wage  $w$  and  $K$  is capital, at cost  $r$  per unit. Hence the constant marginal cost is  $g = w + r$ . The fixed cost of production is denoted by  $F$ . This expression also uses the demand functions (3) and (6) to substitute for the prices of the output in the

two countries. Exports to the foreign country incur transport costs of  $s$  per unit. Using  $p = w = 1$ , then differentiating to find the profit-maximising sales in each country yields:

$$c_1 = \frac{a-g}{2\beta} \quad ; \quad q = \frac{a+g}{2} \quad (9)$$

$$c_1^* = \frac{n(a-s-g)}{2\beta} \quad ; \quad q^* = \frac{a+s+g}{2} \quad (10)$$

Note that exactly half of the transport cost,  $s$ , incurred in exporting to the foreign country is passed on to foreign consumers through a higher price. Consequently, consumption in the foreign country is less than  $n$  times consumption in the home country.

Combining these elements of the model yields explicit solutions for the remaining elements of the model:

$$L_1 = K = c_1 + c_1^* = \frac{(n+1)(a-g) - ns}{2\beta} \quad (11a)$$

$$L_2 = 1 - l - L_1 = \frac{\delta - \gamma + 1}{\delta} - L_1 \quad (11b)$$

$$\pi^M = \frac{1}{4\beta} \left\{ (a-g)^2 + n(a-s-g)^2 \right\} - F \quad (11c)$$

$$c_2 = 1 - l + E + \varphi\pi^M - qc_1 \quad (11d)$$

$$x_2 = L_2 - c_2 \quad (11e)$$

It is straightforward to show that these expressions yield a balanced balance of payments in which the value of exports,  $(q^* - s)c_1^* + x_2$ , match net payments to non-residents,  $(1 - \varphi)\pi^M + rK + F - E$ . Finally, the model yields an explicit expression for the utility of the representative domestic individual:

$$\begin{aligned}
u(c_1, c_2, l) &= ac_1 - \frac{\beta}{2}c_1^2 + \gamma l - \frac{\delta}{2}l^2 + 1 - l + E + \varphi\pi^M - qc_1 \\
&= \frac{(a-g)^2}{8\beta} + \frac{(\gamma-1)^2}{2\delta} + 1 + E + \varphi \left[ \frac{1}{4\beta} \left\{ (a-g)^2 + n(a-s-g)^2 \right\} - F \right].
\end{aligned} \tag{12}$$

### 2.1.2 Production in the foreign country

We now consider the case in which the monopoly chooses to produce abroad, assuming for simplicity that the wage in this location is also unity, and the fixed cost of producing there is again  $F$ . This case is denoted by a hat over all relevant variables. In this case, monopoly profit is

$$\hat{\pi}^M = (a - \beta\hat{c}_1 - s - g)\hat{c}_1 + \left(a - \frac{\beta\hat{c}_1^*}{n} - g\right)\hat{c}_1^* - F. \tag{13}$$

Maximising profit yields:

$$\hat{c}_1 = \frac{a-s-g}{2\beta}; \quad \hat{q} = \frac{a+s+g}{2} \tag{14}$$

$$\hat{c}_1^* = \frac{n(a-g)}{2\beta}; \quad \hat{q}^* = \frac{a+g}{2} \tag{15}$$

Half the transport cost is now borne by the domestic consumer. In this case, monopoly profit is:

$$\hat{\pi}^M = \frac{1}{4\beta} \left\{ (a-s-g)^2 + n(a-g)^2 \right\} - F. \tag{16}$$

All domestic labour is used to produce good 2. Expressions for consumption of good 2 and exports of good 2 are equivalent to those in (11d) and (11e). The utility of the representative domestic individual is

$$U(\hat{c}_1, \hat{c}_2, \hat{l}) = \frac{(a-s-g)^2}{8\beta} + \frac{(y-1)^2}{2\delta} + 1 + E + \varphi \left[ \frac{1}{4\beta} \left\{ (a-s-g)^2 + n(a-g)^2 \right\} - F \right]. \quad (17)$$

It is again straightforward to confirm that the balance of payments balances. In this case, the value of net imports of  $\hat{q}\hat{c}_1 - \hat{x}_2$  is matched by net receipts from abroad of  $\varphi\hat{\pi}^M + E$ .

### 2.1.3 Choice of location

Comparing monopoly profit in the two locations:

$$\pi^M - \hat{\pi}^M = \frac{(1-n)}{4\beta} \left\{ (a-g)^2 - (a-s-g)^2 \right\}. \quad (18)$$

A profit-maximising monopolist will choose to produce in the home country if this expression is positive, and in the foreign country if it is negative. The last part of this expression is positive for  $s > 0$ . So the monopoly will choose to locate in the home country if and only if  $n < 1$ . Hence, the monopoly will choose to locate in the largest country. This reflects transport costs: part of the incidence of such costs is borne by the monopolist, which therefore minimises such costs by choosing to locate in the larger country. Given these transport costs, a larger market creates a limited location-specific rent associated with production in the larger economy.

Clearly home country welfare is also affected by the monopoly's location decision.

Comparing utility given the two possible locations yields:

$$U(c_1, c_2, l) - U(\hat{c}_1, \hat{c}_2, \hat{l}) = \left\{ \frac{(a-g)^2 - (a-s-g)^2}{8\beta} \right\} (1 + 2\varphi(1-n)) \quad (19)$$

The first part of this expression is positive for  $s > 0$ . Given this, consider first the case in which the domestic individual does not own any of the monopoly:  $\varphi = 0$ . Utility is then always higher if the monopolist produces in the home country. This is again due to transport

costs: since part of the cost is incident on the consumer, there is an advantage to the consumer if the monopolist locates in the home country.

This may be offset by the second factor - the individual's share of the monopoly profit. Suppose that  $n > 1$ , so that profit is higher by locating in the foreign country. The individual's share of the higher profit may offset the loss in utility from higher consumer prices, depending on the size of  $\varphi$ .

To summarise: (a) For values of  $n$  below 1, the monopolist will choose to locate in the home country; that will generate a higher utility for the domestic individual than location in the foreign country; (b) for values of  $n$  above  $1 + 1/2\varphi$ , the monopolist will choose to locate abroad; that will generate a higher utility for the domestic individual than location in the home country; (c) however, for intermediate values of  $n$ , such that  $1 < n < 1 + 1/2\varphi$ , the domestic individual would prefer the monopolist to locate in the home country, but it in fact locates abroad.

We now consider each of the three cash flow taxes in turn. In each case, all tax revenue is used to compensate the representative consumer in a lump sum transfer. Hence there is assumed to be no need to introduce a distortionary tax in order to raise revenue. We continue to assume that there is no tax in the foreign country.

## 2.2 A source-based cash flow tax

To begin with, we analyse a conventional corporation tax in the sense that it is levied on a source basis. It differs from the usual corporation tax in that we consider a R-based cash flow tax: thus all real costs, including capital costs, are deductible, but financial costs are not deductible. As is well known, in a closed economy such a tax falls only on economic rent.

Tax is levied on all sales arising from domestic production, less all costs incurred domestically to generate those sales. Hence the tax liabilities in the two sectors (assuming that the monopoly produces in the home country) are:

$$T^C = t\{(1-w)x_2 + (p-w)c_2\}; \quad T^M = t\{(q-g)c_1 + (q^* - s - g)c_1^* - F\}. \quad (20)$$

The monopoly escapes this tax if it produces in the foreign country.

Given the zero profit condition in the perfectly competitive sector, then no tax is levied in this sector, and hence there is no impact on the consumer price of good 2 or the wage rate. Again  $p=w=1$ , and labour supply is also unaffected.

The demand functions in each country for good 1 are therefore also unaffected by the tax. Hence the profit maximising price in each country and the consumption of good 1 in each country are also unaffected by the tax; the expressions in (9) and (10) continue to hold. In turn, the pre-tax value of monopoly profit is unaffected by the tax. The post-tax monopoly profit generated by producing in the home country is therefore

$$\pi^M = (1-t)\left\{\frac{1}{4\beta}\left\{(a-g)^2 + n(a-s-g)^2\right\} - F\right\} \quad (21)$$

This is a proportion  $(1-t)$  of the value of monopoly profit in the absence of tax.

Conditional on the monopoly producing in the home country, then, compared with the no tax case, labour supply is unchanged, and the wage and the two domestic prices are also unchanged. Domestic consumption of good 1 is unchanged. The only impact of the tax is therefore to reduce the domestic individual's income from her share of the ownership of the monopolist. This is offset by paying the whole tax revenue raised from the monopolist to the domestic individual as a lump sum. Her utility will therefore increase as long as  $\varphi < 1$  - that is, her share of the ownership of the monopoly is less than 100%. The change in consumption of good 2 and in utility is

$$dc_2 = dU = (1-\varphi)T^M = (1-\varphi)t\left\{\frac{1}{4\beta}\left\{(a-g)^2 + n(a-s-g)^2\right\} - F\right\} \quad (22)$$

However, the introduction of the tax may clearly affect the location decision of the monopoly. If no tax is payable in the foreign country, the difference in post-tax profit in the two locations becomes

$$\pi^M - \hat{\pi}^M = \frac{(1-t-n)}{4\beta} \left\{ (a-g)^2 - (a-s-g)^2 \right\} - t \left\{ \frac{(1+n)(a-s-g)^2}{4\beta} - F \right\}. \quad (23)$$

The second term can be interpreted as the tax rate multiplied by the pre-tax profit which would be earned if the monopoly were hypothetically located in a third country and faced transport costs at rate  $s$  on selling in both the domestic market and the foreign market. To interpret this condition, suppose first that this hypothetical pre-tax profit were zero: that is  $4\beta F = (1+n)(a-s-g)^2$ . In this case, the condition for producing in the home country is that  $n < 1-t$ . That is, the tax would induce the monopoly to switch location from the home country to the foreign country if  $1-t < n < 1$ .<sup>4</sup> However, if the hypothetical profit from producing in a third country were positive, so that  $4\beta F < (1+n)(a-s-g)^2$ , then the monopoly would be induced to switch to the foreign country for still lower values of  $n$ .

As shown above, conditional on the monopoly continuing to locate in the home country, the utility of the domestic individual rises, since part of the tax is borne by non-residents. However, if the tax induces the firm to switch location from the home country to the foreign country, then domestic utility will fall. Values of  $n$  which will induce a change in location are all lower than 1. And expression (19) indicates that for  $n < 1$ , utility in the absence of tax is higher from domestic production than from foreign production. Adding tax if production takes place at home does not affect this ranking.

These conclusions are summarised in:

---

<sup>4</sup> The reason for focusing on this case will become apparent in the next subsection.

### Proposition 1: the source-based cash flow tax

- (a) *There is a range of values of  $n$  for which the tax will induce the monopoly to switch production from the home country to the foreign country. This range is  $1 - t < n < 1$  in the special case in which  $4\beta F = (1 + n)(a - s - g)^2$ . However, for lower values of  $F$ , production will switch also for lower values of  $n$ .*
- (b) *If the monopoly locates in the home country irrespective of the tax, then the utility of the representative domestic individual rises. There are no changes in relative prices, and the only impact of the tax is introduce a levy on the owners of the monopolist. Paying the tax back as a lump sum more than reimburses the domestic owner, as long as her share of ownership is less than 100%.*
- (c) *If the location decision is affected, the utility of the representative individual falls, as the price of good 1 rises because of transport costs arising from foreign production. In this case, there is no tax revenue since production takes place abroad.*

### 2.3 A “full” destination-based cash flow tax

The second tax we investigate is a tax levied on domestic sales (including imports) less all costs used to generate those sales, wherever those costs are generated. Exports are not taxed; but the costs of producing exports are not relieved either. Again we assume there is no tax in the foreign country. Hence the home country tax liability in the competitive sector is:

$$T^C = t\{(p - w)c_2\}. \quad (24)$$

The tax liability of the monopoly depends on the location of production. The two possibilities are:

$$T^M = t\{(q - g)c_1\} \quad \text{and} \quad \hat{T}^M = t\{(\hat{q} - s - g)\hat{c}_1\}. \quad (25)$$

Note that this formulation does not include a separate tax on the value of the imported intermediate good,  $K$ . In principle, under a “full” destination-based tax, tax should be levied



on the value of this import less the cost of producing it. However, we assume that the cost is  $rK$ , so that the tax base is zero. We discuss this further in Section 3.5. This formulation also ignores the monopolist's fixed cost. Assume for the moment that the fixed cost receives no tax relief, but that the post-tax profit remains positive irrespective of the location chosen. We return to this at the end of this subsection.

In the competitive sector, post-tax profit becomes

$$\pi^C = x + pc_2 - wL_2 - T^C = (1-w)x_2 + (1-t)(p-w)c_2 = 0 \quad (26)$$

Free entry to reduce profit to zero still implies that  $p = w = 1$ . In turn, this implies that no tax is raised from this sector. It also leaves the demand function for good 1 unaffected.

If the monopoly produces in the home country, its post-tax profit is

$$\pi^M = (1-t)(q-g)c_1 + (q^* - s - g)c_1^* - F. \quad (27)$$

If it produces in the foreign country, its post-tax profit is:

$$\hat{\pi}^M = (1-t)(\hat{q} - s - g)\hat{c}_1 + (\hat{q}^* - g)\hat{c}_1^* - F. \quad (28)$$

Conditional on not changing the location of production, choosing  $c_1$  and  $c_1^*$  to maximise  $\pi^M$  in (27) or choosing  $\hat{c}_1$  and  $\hat{c}_1^*$  to maximise  $\hat{\pi}^M$  in (28) leaves all prices and consumption of good 1 unchanged by the introduction of the tax. This is because production for sales in the home country is always taxed under a cash flow tax (which does not affect the scale of activities), while production for sales in the foreign country is not taxed at all. The use of labour and capital is therefore also unaffected.

Post-tax monopoly profit in the two cases can therefore be written as:

$$\pi^M = \frac{1}{4\beta} \left\{ (1-t)(a-g)^2 + n(a-s-g)^2 \right\} - F \quad (29)$$

and

$$\hat{\pi}^M = \frac{1}{4\beta} \left\{ (1-t)(a-s-g)^2 + n(a-g)^2 \right\} - F. \quad (30)$$

Hence, conditional on location, pre-tax monopoly profit is unchanged. Post-tax monopoly profit falls by the full amount of the tax, implying that the full incidence of the tax is on the owners of the monopoly.

Overall, then, conditional on location, like the source-based tax, the only impact of the tax is to reduce the domestic individual's income from her share of the ownership of the monopolist. If the tax is paid to the domestic individual as a lump sum, then once again, her utility will increase as long as  $\varphi < 1$  - that is, her share of the ownership is less than 100%.

Conditional on locating at home, the change in consumption of good 2, and hence the change in utility, is therefore:

$$dU = (1-\varphi)T^M = (1-\varphi) \frac{t(a-g)^2}{4\beta}. \quad (31)$$

And conditional on locating abroad, the change in consumption of good 2 and utility is

$$d\hat{U} = (1-\varphi)\hat{T}^M = (1-\varphi) \frac{t(a-s-g)^2}{4\beta}. \quad (32)$$

Given transport costs, it is clear that the tax is higher if production takes place at home. This is because the profit generated by home sales is higher in this case, since transport costs are avoided, and part of the incidence of transport costs is borne by the producer. This suggests

that the tax may result in a switch in the location of production. To see this, compare the post-tax profit of the monopoly in each location in the presence of this tax:

$$\pi^M - \hat{\pi}^M = \frac{(1-t-n)}{4\beta} \left\{ (a-g)^2 - (a-s-g)^2 \right\} \quad (33)$$

That is, the monopolist would now choose to locate at home if  $n < 1-t$ . In the region  $1-t < n < 1$ , the tax would induce the monopoly to produce in the foreign country rather than at home. In this region in the absence of tax, the large home market makes production in the home country more profitable. But this advantage is outweighed by the tax difference, up to the point at which  $n = 1-t$ . For the location decision, then, the tax has the same effect as simply reducing the size of the home market by a proportion  $t$ .

Compared with the source-based cash flow tax described above, then, this tax has the same effect on the location decision in the special case in which  $4\beta^F = (1+n)(a-s-g)^2$ . This can be interpreted as a break-even condition for the monopolist if it had to locate in a third country and face transport costs of  $s$  per unit on exports to both the home country and the foreign country. If the monopolist is more profitable than this, then the “full” destination-based cash flow tax affects its location decision over a smaller range of values of  $n$  than does the source-based cash flow tax.

The impact of the location choice on utility is more complex than in the case of the source-based tax because tax is levied in this case even if production takes place abroad. As with the source-based tax, then conditional on the monopoly continuing to produce in the home country, the utility of the domestic individual increases, as shown above. However, this is now also the case, conditional on the monopoly continuing to produce in the foreign country. This is because in either case, consumer prices are unchanged, but there is some benefit derived from taxing the non-resident owners of the monopolist.

However, for values of  $n$  over which the firm switches location from the home country to the foreign country, it is necessary to compare the utility of the domestic individual if the firm locates at home in the absence of the tax with the case in which the firm locates abroad

in the presence of the tax. This comparison consists of two parts. The first is the additional benefit derived from the tax, conditional on the monopolist locating abroad. The second is the loss in utility in the absence of tax arising because of the switch in location from home to abroad. Combining these two elements, the overall effect of the tax on utility is positive if

$$t > \left\{ \frac{(a-g)^2 - (a-s-g)^2}{(a-s-g)^2} \right\} \frac{(1+2\varphi(1-n))}{2(1-\varphi)} \quad (34)$$

The right hand side of this expression is positive over the range of values of  $n$  for which this is of interest, that is  $n < 1$ . Hence the tax can still generate an increase in utility even if it induces the firm to switch location abroad, as long as the tax rate can be set high enough, thereby capturing enough of the monopoly profit accruing to non-residents. As  $\varphi$  increases, then the value of  $t$  for which utility is higher must also increase. For a high enough value of  $\varphi$  then the value of  $t$  which generates higher utility must exceed 100%.

We summarise these results as follows:

**Proposition 2: the “full” destination-based cash flow tax**

- (a) *The tax will induce the monopoly to switch production from the home country to the foreign country if  $1-t < n < 1$ . Outside of this range, the location decision is unaffected.*
- (b) *If the location decision is unaffected, then the utility of the representative domestic individual rises. There are no changes in relative prices, and the only impact of the tax is introduce a levy on the owners of the monopolist. Paying the tax back as a lump sum more than reimburses the domestic owner, as long as her share of ownership is less than 100%.*
- (c) *If the location decision is affected, the impact of the tax on utility is ambiguous. The tax improves utility if the tax rate can be set high enough.*

One feature of this tax has so far been ignored: the treatment of the fixed cost.<sup>5</sup> This raises important issues for the design of such a tax. In principle, the fixed cost should be

---

<sup>5</sup> This discussion is relevant to more general cost structures – in fact, any structure other than constant returns to scale.

deductible to the extent that it represents expenditure necessary for production contributing to domestic sales, but not to foreign sales. Of course, though, by its very nature, any such split in a truly fixed cost would be arbitrary.

There are several possible ways of dealing with such a cost. The first, as has been followed here, is not to allow it to be deductible. An alternative is to give full relief. In either of these cases, there would be no effect on the firm's location decision as long as the same policy was followed irrespective of whether production took place at home or abroad. For example, giving relief would amount to a lump sum payment to the firm of  $tF$ . If this payment were independent of the location decision, it would clearly have no impact on it. A third possibility would be to give relief only if the fixed cost was incurred at home – that is, only if production took place at home. Relative to the two previous cases, this would make it more likely that the firm would locate in the home country, since it would receive the lump sum payment of  $tF$  only if it did so.

None of these three possibilities would affect profit maximising prices or output. However, a fourth possibility would. It seems natural to allocate the fixed cost to domestic and foreign sales on the basis of their value. That is, irrespective of location, a deduction would be allowed of  $qc_1F / (qc_1 + q^*c_1^*)$ . This is a type of formula apportionment. However, since the deduction depends on the value of sales, the firm would take the value of this deduction into account in determining its profit maximising price in each location. In this case, then, the deduction would no longer be a lump sum – and because of transport costs it would also not be independent of the location of production.

#### **2.4 A “VAT-type” destination-based cash flow tax**

We now analyse a cash flow tax which has elements of both a source base and a destination base. Specifically, only domestic sales are taxable: exports are not taxed in the home country. However, and asymmetrically, all costs incurred in the domestic jurisdiction are tax deductible, whether they are incurred to produce output for domestic or for foreign markets. All imports are taxed at the same rate, whether imports of final goods or intermediate goods.

Thus revenues are taxed on a destination basis; costs are treated on a source basis. Yet this is a familiar tax base: it is closely related to the standard destination-based VAT which now operates in a large number of countries around the world (see Ebrill et al, 2001, for a review of VAT); the only important difference from the destination-based VAT is that we allow wage costs to be tax deductible.

The tax liabilities in the two sectors are as follows:

$$\begin{aligned} T^C &= t\{pc_2 - w(x_2 + c_2)\}; \\ T^M &= t\{gc_1 - g(c_1 + c_1^*) - F\} + tr(c_1 + c_1^*) + tF; \quad \hat{T}^M = t\hat{q}c_1. \end{aligned} \quad (35)$$

Note that in the case in which production is at home, imported inputs (here capital and the input paid for by the fixed cost) are taxed as imports (this is the  $tr(c_1 + c_1^*) + tF$  term).

However, this is effectively offset by tax relief when the output is sold (incorporated in the  $t\{g(c_1 + c_1^*) - F\}$  term).

Introducing this tax in the perfectly competitive sector, post-tax profit becomes

$$\pi^C = [1 - (1-t)w]x_2 + (1-t)[p - w]c_2 = 0 \quad (36)$$

Free entry to reduce profit to zero implies now that

$$p = w = \frac{1}{1-t}. \quad (37)$$

Given that part of the output of this sector is exported, the tax levied is negative:

$$T^C = t[p c_2 - w L_2] = -\frac{t x_2}{1-t} < 0. \quad (38)$$

Note, however, that although this may look like a subsidy to exports, this is not in fact the case: the price of exports is unaffected by the tax - indeed, it is assumed to be fixed on world markets.

Labour supply is unaffected, since the relative wage rate (in terms of the consumer price of good 2) is unaffected. However, the wage rate and the demand curve for good 1 are affected. That is, in place of (3), we now have

$$c_1 = \frac{a - q/(1-t)}{\beta} \Rightarrow q = \frac{a - \beta c_1}{1-t} \quad (39)$$

These expressions hold irrespective of the location chosen by the monopoly. Assuming no tax in the foreign country, the demand function in (6) continues to hold.

Introducing the tax in (35), if the monopoly produces in the home country, then its post-tax profit becomes:

$$\begin{aligned} \pi^M &= (1-t)(q - w - r)c_1 + (q^* - s - (1-t)(w + r))c_1^* - F - tr(c_1 + c_1^*) \\ &= (a - \beta c_1 - 1 - r)c_1 + \left( a - \frac{\beta c_1^*}{n} - s - 1 - r \right) c_1^* - F \end{aligned} \quad (40)$$

Note that the tax terms drops out of the second expression here, implying that the optimal choice of sales in each country is unaffected by the tax.<sup>6</sup> This reflects the fact that the domestic price of this good rises by the same factor  $1/(1-t)$  as the other domestic price and the wage rate:

$$q = \frac{a + g}{2(1-t)} \quad (41)$$

where  $g=1+r$  - that is, the original marginal cost in the absence of tax. The price of this good in the foreign market is also unaffected by the tax.

---

<sup>6</sup> The second line in (40) is identical to (8), given that  $g = 1 + r$  in the absence of tax.

Conditional on production taking place in the foreign country, then assuming that there is no foreign tax, monopoly profit in this case is

$$\hat{\pi}^M = [(1-t)\hat{q} - s - g]\hat{c}_1 + (\hat{q}^* - g)\hat{c}_1^* - F. \quad (42)$$

Profit maximisation again leaves consumption unchanged from the no tax case; but again the domestic price is raised by a factor  $1/(1-t)$  and there is no effect on relative prices in the domestic economy.

Given that – irrespective of the location of production – the tax does not affect the consumption in either country of good 1, it is clear from the expressions for post-tax monopoly profit in (40) and (42) that this too is unaffected. That is, the monopolist raises the price of good 1 at home; but since all prices (and wages) have risen by the same proportion, there is no effect on sales. The extra revenue generated by the higher price exactly offsets the tax liability. Thus, the tax is wholly passed on to the domestic consumer in the form of higher prices. Use of labour and capital is unaffected. Since the tax does not affect the post-tax profit of the monopolist – conditional on locating in either country – then the tax does not affect location decisions.

The tax revenue raised from the monopoly is:

$$T^M = \frac{t}{1-t} \left\{ (q'-1)c_1 - c_1^* \right\} \quad (43)$$

if production takes place in the home country, and

$$\hat{T}^M = t\hat{q}\hat{c}_1 = \frac{t}{1-t} \hat{q}'\hat{c}_1 \quad (44)$$

if production takes place in the foreign country, where the prime indicates the prices in the absence of tax.



If production takes place in the home country, then  $x_2 = (1-l) - c_2 - [c_1 + c_1^*]$ , while if it takes place in the foreign country,  $x_2 = (1-l) - c_2$ . Substituting these values into the expression for tax in the competitive sector (38), and combining with the relevant expressions for monopoly profit in (43) and (44) implies that, in both cases, the total tax levied from the two sectors combined can be written as

$$T = T^M + T^C = \frac{t}{1-t} \{q'c_1 - (1-l) - c_2\}. \quad (45)$$

Paying this as a lump sum to the domestic individual leaves the budget constraint identical to the case of no tax. Using this budget constraint implies that the total tax levied can, in both cases, be written as:

$$T = T^M + T^C = \frac{t}{1-t} \{E + \varphi\pi^M\}. \quad (46)$$

Thus, this tax is equivalent to a lump sum tax on exogenous income from abroad ( $E$ ) and the share of the monopolist's profits that are consumed in the domestic jurisdiction ( $\varphi M$ ). The tax levied depends on the location of production only to the extent that the profit earned by the monopoly,  $\pi^M$ , may depend on location. However, as long as the tax is paid to the domestic individual as a lump sum, there is no impact on utility.

The properties of this tax are summarised in Proposition 3:

**Proposition 3: the “VAT-type” destination-based cash flow tax**

- (a) *The tax has no impact on the location decision of the monopolist.*
- (b) *Paying the tax back as a lump sum to the domestic individual leaves her utility unaffected: the tax is, in effect, a lump sum tax on consumption out of the non-wage income of the individual.*

## 2.5 A comparison of the three taxes

The source-based tax raises utility only if the home country is large enough not to induce the monopoly to produce in the foreign country - specifically for values of  $n$  large enough for (23) to hold. In this case, the benefits of locating near the larger market outweigh the tax costs. When the home country is only a “little larger” than the foreign country, introducing the source-based tax will induce the monopoly to produce abroad. This unambiguously reduces home country welfare. If the home country is smaller than the foreign country, then the monopoly will always produce abroad, in which case no tax is collected in the home country.

The impact of the “full” destination-based tax is in some ways similar. The monopoly will be induced to produce abroad if the home country is only a “little larger” than the foreign country – although the range of values of  $n$  for which this is true is probably lower. Within this range, though, it is still possible for home country utility to rise. Further, outside this range, the home country utility always rises, since benefit is derived from taxing the foreign owners of the monopoly, without distorting the location decision.

The incidence of both of these taxes are on the owners of the monopoly. By contrast, the incidence of the “VAT-type” destination-based tax is on consumption out of non-wage income by the domestic individual. Monopoly profits are taxed only to the extent that they are owned by residents of, and consumed in, the domestic jurisdiction. This is a pure lump sum tax which does not affect the location decision, and when paid to the domestic individual leaves home country utility unaffected.

A further difference between these three cash flow taxes concerns the incentives that they produce for firms to limit their tax liabilities by manipulating transfer prices. Suppose that the monopolist we have considered imports capital owned by its parent company located in the rest of the world. Given that its tax charge under the source-based tax is

$$T^M = t \left\{ (q - g)c_1 + (q^* - s - g)c_1^* - F \right\}. \quad (47)$$

if it locates in the home country, this can be reduced if the firm can successfully exaggerate the true cost of its capital  $r$ , which is a component of  $g$ . This would tend to reduce any impact of the source-based cash flow tax on the firm's location decision, but also reduce any gain to the welfare of the domestic individual in the case where the monopolist continues to locate in the home country.

This incentive does not exist under the “full” destination-based cash flow tax. In this case the tax charges are

$$T^M = t\{(q - g)c_1\} \quad (48)$$

if the monopolist locates in the home country, and

$$\hat{T}^M = t\{(\hat{q} - s - g)\hat{c}_1\} \quad (49)$$

if the monopolist locates in the foreign country. However, in these expressions, the tax charge on the value of the imported capital is assumed to be zero – due to the assumption that the cost of producing the good is equal to  $r$ . Suppose that this cost could be observed by the domestic tax authorities. Then exaggerating the value of the import would incur a tax equal to the over-pricing. This would be exactly offset by the reduction in the tax on the affiliate, shown in (48) and (49).

However, there remains an incentive for the monopolist to manipulate prices under this tax. That is, it has an incentive to exaggerate the cost of producing the capital. Suppose it could successfully claim that the cost was  $r' > r$ . Then it could also value the imported good at  $r'$  without incurring a tax charge on the export. Ultimately, this would imply a higher value of  $g$  and hence a lower tax on the affiliate.

In contrast, however, incentives to manipulate transfer prices or costs are absent under the “VAT-type” destination-based cash flow tax. In this case the tax charges are

$$T^M = t\{qc_1 - w(c_1 + c_1^*)\} \quad \text{and} \quad \hat{T}^M = t\hat{q}\hat{c}_1, \quad (50)$$

which do not depend on the cost of imported inputs in either case. For the case of home production, there is a tax on the full value of the capital import, which is not offset by the cost of producing the good. However, this tax is exactly offset by the corresponding reduction in the tax on the profit of the affiliate.

Similar considerations are also important for royalty payments. Suppose instead that the intermediate good consisted of some intellectual property or other intangible asset provided by the parent company. The payment for this –  $rK$  – would then be a royalty payment. Under the source-based cash flow tax (as under most other forms of source-based corporation tax), the royalty payment would be deductible from tax. Of course, in this case,  $r$  may depend on the profit earned by the affiliate. That is, the multinational could treat anything up to the whole of the affiliate’s profit as arising due to the intellectual property of the firm, and charge an appropriate royalty payment. (In this case the affiliate would presumably maximise profits without taking account of the royalty charge). In this extreme case, the source-based cash flow tax would not raise any revenue.

Under the “VAT-type” tax, there are two possible treatments of royalty payments to the parent company. First, the import of the intangible asset is taxed, but the cost (ie. the royalty payment) is deductible against the cash flow tax. Second, the import of the intangible asset is not taxed, but in that case, the royalty payment would not be deductible against the cash flow tax. In either case, the royalty payment nets out and does not affect the overall tax liability.

Under the “full” destination-based tax, the same procedure would be followed, with the sole difference being that the cost of producing the intangible asset (incurred elsewhere) could be set against the tax on the value of the imported good. Hence the royalty payment itself

would again not affect the tax liability; however, as noted above, there would be an incentive to exaggerate the cost of producing the intangible asset.

Finally, it is straightforward to use the model above to demonstrate that there are equivalences between the combination of:

- i) the source-based cash flow tax and a tax on domestic payroll costs levied at the same rate, and an origin-based VAT; and
- ii) the “VAT-type” destination-based cash flow tax and a tax on domestic payroll costs levied at the same rate, and a destination-based VAT.

It follows that the origin-based and destination-based VATs are not equivalent in their effects on location decisions of mobile, rent-earning producers. This is consistent with the breakdown of this equivalence in the presence of mobile factors of production that has been noted by, for example, Lockwood et al (1995).

### **3 CONCLUSIONS**

We have analysed the effects and incidence of three different cash flow taxes in a small open economy setting in which firms make a location decision and earn economic rents that are only location-specific to a limited extent.

In this context, the “VAT-type” destination-based cash flow tax inherits the lump sum property of the cash flow tax in a closed economy: it is neutral with respect to production, investment *and* location decisions; and has no effect on the utility of domestic individuals if the tax revenue raised is repaid to them as a lump sum transfer. This tax is incident on economic rents to the extent that these are consumed in the domestic jurisdiction. Given the neutrality with respect to location decisions, such a tax would not be subject to competitive pressures.

Both the source-based and the “full” destination-based cash flow taxes are incident on non-resident owners of firms that generate economic rents. The source-based tax is incident on economic rents associated with production in the domestic jurisdiction, regardless of where the output is sold; whilst the “full” destination-based tax is incident on economic rents associated with output sold in the domestic jurisdiction, regardless of where this output is produced. Clearly the source-based tax can be avoided by locating production abroad, and location decisions will be distorted if the tax charged is too high compared to the locational advantage of the domestic jurisdiction. More subtly, the tax charge under the “full” destination-based tax can also be reduced by locating abroad in the presence of transport costs. Again the non-resident owners of such firms may be induced to relocate production abroad if the tax charge is too high, although in this case the region in which location decisions are distorted is likely to be smaller.

These two taxes also have effects on domestic welfare in the open economy setting. Conditional on production remaining located in the home country, both taxes raise domestic welfare. Given location, neither tax affects production or investment decisions, but both raise tax revenue from non-resident owners of rent-earning firms. Conditional on production remaining located in the foreign country, the “full” destination-based cash flow tax again raises domestic welfare by taxing non-resident owners, whilst the source-based tax is irrelevant. In the case where these taxes induce producers to relocate abroad, the source-based tax unambiguously reduces domestic welfare, whilst the “full” destination-based tax may increase or decrease domestic welfare depending on whether the tax rate can be set high enough.

## REFERENCES

- Avi-Yonah, R., (2000) "Globalization, Tax Competition, and the Fiscal Crisis of the Welfare State", *Harvard Law Review*, 113, 1573-1676.
- Bradford, D. (2000) "Blueprint for International Tax Reform", *Brooklyn Journal of International Law*.
- De Mooij, R.A. and S. Ederveen (2001) "Taxation and foreign direct investment: a synthesis of empirical research", presented at OCFEB conference, The Hague, October 2001.
- Devereux, M.P. and R. Griffith (2001) "The impact of corporate taxation on the location of capital: a review", forthcoming, *Swedish Economic Policy Review*.
- Ebrill, L., M. Keen, J-P. Bodin and V. Summers (2001) Value-Added Tax: Principles and Practice, Washington D.C.: International Monetary Fund.
- Gordon, R.H. (1986) "Taxation of investment and savings in a world economy", *American Economic Review*, 76, 1086-1102.
- Grubert, H. and T. S. Newlon (1997) "Taxing Consumption in a Global Economy", Washington D.C.: American Enterprise Institute.
- Haufler, A. and G. Schjelderup (2000) "Corporate tax systems and cross country profit shifting", *Oxford Economic Papers*, 52, 306-25.
- Haufler, A. and I. Wooton (1999) "Country size and tax competition for foreign direct investment", *Journal of Public Economics*, 71, 121-39.
- Hines, J. R. (1999), 'Lessons from behavioural responses to international taxation', *National Tax Journal*, June, 305-22.
- Horstmann, I.J., and J.R. Markusen (1992) "Endogenous Market Structure and International Trade", *Journal of International Economics*, 32, 109-129.
- Lockwood, B., D. de Meza and G. Myles (1994) "When are origin and destination regimes equivalent?", *International Tax and Public Finance*, 1, 5-24.
- Markusen, J.R. (1995), "Incorporating the Multinational Enterprise into the Theory of International Trade," *Journal of Economic Perspectives*, 9, 169-189.
- Meade, J. (1978) The Structure and Reform of Direct Taxation, London: Allen and Unwin.
- Mintz, J. and D. Chen (2001), "Will the corporation tax wither?", C.D. Howe Institute.
- Zodrow, G. and P. Mieszkowski (1986) "Pigou, Tiebout, property taxation and the underprovision of local public goods", *Journal of Urban Economics*, 19, 356-70.