THE EFFECTS OF DOMESTIC TAXES
ON FOREIGN PRIVATE INVESTMENT

by

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1. Introduction

Foreign investors weigh the effects on their total after-tax profits of allocating the capital available to them among different countries. The tax policies of countries receiving capital (the hosts) are therefore an important influence on this allocation. Such a host affects its own benefits from foreign investments by taxing the profits they generate.

From the perspective of an individual LDC, the opportunity cost of foreign investors is the marginal return they earn on investments outside this LDC. In determining a country's optimal taxation of foreign investment, a useful distinction is between situations where the host can affect this opportunity cost and those where it cannot. This chapter begins with the theory of tax policy when the host can affect the opportunity cost of foreign investors. Few LDC's, if any, are likely to be in this situation, however, and the main focus is on a fixed opportunity cost.

In the simplest case, a fixed opportunity cost implies that a host should neither tax nor subsidize foreign investment. Various important exceptions to this rule exist, however, and are developed in subsequent sections. Among the issues discussed are the effects of: tax policies abroad, especially the distinction between deductions and credits for taxes paid to LDC's; the option of consolidating tax paid abroad versus reporting on a host-by-host basis; deferral of taxes owed to the investor's home country; transfer pricing by the investor; separate accounting versus formula apportionment; and constraints imposed by investors' fears of expropriation. A final section raises some issues in the implementation of tax policies and investment incentives. Corden (1974, ch. 12) and Shoup (1974) are two excellent earlier surveys that this chapter seeks to complement.
2. The Large Host

Trade theorists have done considerable work on international factor mobility when the return required by foreign investors depends positively on the quantity of foreign capital they provide. In this case, the host can act as a monopsonist, choosing the quantity-return combination it most prefers via a tax on foreign capital, Corden (1974). I describe this classical case for the taxation of foreign capital to show that it is not relevant to the LDCs.

It is not always stated why the return paid to foreign investors depends on the quantity of capital they provide. Instead, an upward sloping supply curve of foreign capital is often posited as an assumption. To the extent that a reason is given, however, it is usually that transferring capital from abroad makes it more scarce there, raises its marginal product and therefore increases the opportunity cost of foreign investors.¹

If, in addition, the host has monopoly power in trade, optimal policy is to choose jointly a tariff and a capital tax. In Gehrels (1971) analysis, a host country that also imports the capital-intensive good improves the terms on which it obtains foreign capital along with its terms of trade when it raises its trade duty. Similarly for such a country, the optimal restriction of foreign capital is made greater by the fact that the host's terms of trade are simultaneously improved. While it is true that the average LDC is both capital poor and an importer of capital-intensive goods, no LDC is large enough to affect its terms of trade and the terms on which it imports capital.

Since the typical LDC is hardly large enough to affect appreciably the stock of capital abroad, the monopsonist justification for taxation of foreign capital seems largely irrelevant to the type of host under discussion.
In the following sections, I will consider only cases where the opportunity cost of investors is fixed and instead examine reasons other than the classical one for taxing foreign capital.
3. No Taxation of Foreign Capital

If the opportunity cost of investors is fixed, it is often argued that the host should not tax foreign capital. Such a conclusion depends, however, on a very particular set of assumptions. The two most important for practical purposes are (1) that foreign taxes on capital are zero and (2) that the returns that foreign investors receive can be specified in advance by a binding agreement. Corden (1974) lists a number of additional assumptions.

Under these assumptions, any tax on foreign capital will be borne entirely by the host, and, in addition, there will be a deadweight loss consequent on the diminished use of foreign capital. This case is useful as a benchmark for the models of subsequent sections. Figure 1 makes this argument for an industry with no domestically-owned capital. Domestic labor is available in a fixed amount, L, and co-operates with foreign capital, $K_F$, to produce a single good sold at a fixed price. The fixed return to capital abroad is $\bar{r}$. The curve $AA'$ is the marginal product of capital curve.

A tax $(t)$ on profits raises the return gross of taxes required by investors to $\frac{\bar{r}}{1-t}$, capital is reduced from $K^*$ to $K_t$ and national income falls from ABC to AB'C' plus the revenue B'BTC', for a net loss of C'TC. If revenue must be raised, a tax on labor income, ABC, should be used since labor is supplied in a fixed quantity. Even if the quantity of labor fell in response to a tax, say because there is a labor-leisure trade-off, a labor-income tax would still be preferred to a capital tax even though there would be some deadweight loss. While labor may not be supplied perfectly inelastically, the assumption of a fixed supply price of capital means that capital is supplied infinitely elastically.
marginal product of capital

Figure 1

A Case Where Foreign Capital Should not be Taxed
Even under these assumptions, an exception to the rule that profits should not be taxed arises if the government provides services for which it cannot otherwise charge. In this case, it will in general be appropriate to tax foreign capital to ensure that firms' decisions reflect the costs of these services. But the user charge should fall exclusively on profits only if the government-provided services are used in fixed proportion to capital.
4. Foreign Tax Rules and LDC Taxation of Foreign Firms Under Separate Accounting

How other countries tax potential multinational investors in an LDC critically affects how that LDC should treat these firms. In this section, I will be discussing variants of the so-called separate account system currently employed by most OECD home countries, and by most LDC hosts. For tax purposes, every multinational firm has a country of residence, its home country. This home country may tax the worldwide profits of the firm, after taking into account taxes paid abroad. Or, it may only tax profits arising from the firm's activities in the home country. Regardless of the home-country choice, the essence of separate accounting is that the LDC host responds only to activities of the firms that are defined as taking place in the host.

How multinational firms choose their country of residence in response to tax codes is an important topic, of potential interest especially to OECD policy makers. But the actions of an individual LDC will probably have little effect on any firm's choice between different potential OECD homes, and it is unlikely that LDC's are potential candidates for the status of home-country. I have, however, come across no theoretical treatment of the endogenous choice of home country, and for this and the preceding reasons will take the residence of the investor as exogenous.

The most frequently discussed alternative to a separate-accounting-with-residence system of taxation is formula apportionment, which I examine in more detail in section 5. Under this option, host countries tax the proportion of world profits that is attributed to the firm's activities in the host based on various indices. By contrast to separate accounting, a change in the firm's profitability abroad, all other things equal, can affect its tax obligation to the host.
The firm acts to maximize its world profits ($\pi_w$) net of all taxes paid to the home and host countries. Initially, I assume that the firm's only choice relevant to this goal is the allocation of its fixed capital stock ($K$) between production in the LDC host ($K_f$) and at home ($K_h$). Each unit of capital invested at home earns a fixed before-tax return of $\tilde{r}$ and an after-tax return of $(1 - \theta)\tilde{r}$ where $\theta$ is the home country's corporate income tax rate.

One important factor influencing the optimal tax treatment of foreign firms is whether the home country treats taxes levied abroad as a deduction from income earned abroad or as a credit against the tax it assesses on this income.²

The deduction provision means that the home country taxes income earned abroad net of taxes paid abroad. Under the credit option, tax on income earned abroad is calculated without reference to taxes paid abroad, and then taxes paid abroad are subtracted from these taxes due, up to the whole amount of taxes calculated in the first step. An analysis of these two situations leads to the following rules for profits taxation by the LDC:

**Rule 1:** If the home country treats foreign taxes as a deduction, the host should not tax the foreign firm.

**Rule 2:** If the home country treats foreign taxes as a credit against taxes on foreign income, the host should tax foreign firms at rate $\theta$, the foreign corporate-income tax rate.

A sketch of a proof for these rules is as follows: in the case of a tax deduction, the foreign firm will see its foreign operations ($K_f$) as contributing $\pi_f$ to its world profits over and above what they would be if it invested only at home at rate $(1 - \theta)\tilde{r}$:

\[
\pi_f = (1 - \theta)(1 - t)[pF(K_f, L) - wL] - (1 - \theta)\tilde{r}K_f
\]
where $L$ is the amount of domestic labor employed at wage $w$, $t$ is the corporate income tax rate in the host, and $(1-t)[pF-wL]$ is income subject to home taxes. The price of output is $p$, and output is produced using the production function $F()$. Taking the derivative of $\pi_f$ with respect to $K_f$ yields:

\[(4.2) \quad (1 - \theta)(1 - t)pF_K - (1 - \theta)\bar{r} = 0\]

so that the foreign firm sets $(1 - t)pF_K = \bar{r}$. Any increase in $t$ will decrease $K_f$ raising $pF_K$ above the before-tax rate abroad. The incidence of the tax will be borne entirely by the host.

On the other hand, if the home country allows a credit for taxes paid abroad up to the amount due on that income if no foreign taxes were levied, then

\[(4.3) \quad \pi_f = (1 - \theta - t + \min(t, \theta))[(pF(K_f, L) - wL) - (1 - \theta)\bar{r}K_f].\]

The firm's first-order condition is

\[(4.4) \quad [1 - \theta - t + \min(t, \theta)]pF_K - (1 - \theta)\bar{r} = 0.\]

So long as $t \leq \theta$, $t$ has no effect on the firm's decision on $K_f$ since $\min(t, \theta) = t$. Above $\theta$, increases in $t$ lead to a fall in $K_f$ as in (4.2) and so a $t > \theta$ should not be adopted. But to tax at less than $\theta$ only transfers tax revenue from the host to the home country. Note also that with $t = \theta$, $pF_K = \bar{r}$ as in the tax-deduction model with $t = 0$; the country does, however, gain revenue.

The host can, however, do better than Rule 2 by driving the marginal-value product of capital, $pF_K$, below $\bar{r}$ by subsidizing foreign capital if this allowed by the home country. In this case, it turns out that the country's opportunity cost of capital is $(1-\theta)\bar{r}$ rather than $\bar{r}$. Consider the projects described in Table 1. All are assumed to use an equal amount of capital, and the home country tax rate is $\theta = 0.5$. 
<table>
<thead>
<tr>
<th></th>
<th>Home Project</th>
<th>Host Project No Subsidy</th>
<th>Host Project With Subsidy</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) output</td>
<td>10</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>(2) host subsidy</td>
<td>-</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>(3) host tax on (1) + (2)</td>
<td>-</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>(4) tax credit = \text{min}{t,0}(1)+(2))</td>
<td>-</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>(5) home tax = 8[(1)+(2)]</td>
<td>5</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>(6) net income to firm = (1)+(2)-(3)+(4)-(5)</td>
<td>5</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>(7) net income to host if project done = (3) - (2)</td>
<td>-</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>(8) host project done after comparison to home project</td>
<td>-</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Since the home project pays 5, the host project will not be undertaken without a subsidy, and the host receives no income. With a subsidy, however, the firm can be provided with its opportunity-cost income of 5 and the host can at least realize a tax income of 3 over the subsidy. In fact, it is worthwhile to the host to subsidize any project that provides output of more than 5 units. The general rule is

**Rule 3:** If the home country treats foreign taxes as a credit, the host should tax the profits of foreign investors at rate $\theta$ and subsidize them at rate $s = \theta/(1 - \theta)$. The marginal value product of capital will then be $(1 - \theta)\bar{r}$, the after-tax return to capital abroad.

In this case, $\pi_f$ will be

\[ (4.5) \quad \pi_2 = [1 - \theta - t + \min(t, \theta)](1 + s)[pF(K_f, L) - wL] - (1 - \theta)\bar{r}K_f \]

The intuition behind Rule 3 is that by both taxing and subsidizing profits, the host need not be constrained to share in the distortion that the home country has imposed. Instead the host can profitably undertake any projects that give a return equal to the opportunity cost of capital to the firm, $(1 - \theta)\bar{r}$. On the other hand, from a viewpoint of global efficiency, hosts should be forbidden to use such subsidy schemes, since they result in different marginal products of capital in the home and host countries.

This strategy presupposes that the home country is willing to allow a tax credit based on the gross tax, rather than on the tax net of subsidies. In fact, several OECD countries have had programs allowing LDC hosts to forego a profits tax while allowing their firms to take a tax credit for the amount that would have been paid (Lent, 1966). This provision can correspond exactly to the tax-subsidy scheme described above. For the example of Table 1, it would mean a host tax of 5 with a remission of 2 and a home country tax credit
of 5. Since Rule 3 applies to the marginal product it can be restated as tax
at rate \( \theta \) but then remit this tax entirely to the investor who nonetheless
receives a full home country credit. Programs that allow tax credits for
remitted taxes are, however, not general, and many OECD governments may con-
sider only the tax paid net of the subsidy as eligible for a tax credit.

If such a tax-subsidy scheme were disallowed by the home country,
various sub-optimal strategies are available to the host. It may be possible
to subsidize the output of the firm rather than its profits. In this case
\( \pi_f \) is given by

\[
(4.6) \quad \pi_f = [1 - \theta - t + \min (t, \theta)] [(1 + s)pF(K_f, L) - WL] - (1 - \theta)\tau K_f.
\]

The subsidy then applies equally to all other factors the firm hires, in this
case labor. There is consequently a distortion of decision-making relative
to (4.5), a distortion that increases with the elasticity of supply of these
other factors. For this reason, if the host is restricted to an output subsidy,
the optimal one will attract less capital than the optimal profits subsidy.

A third, even less direct policy is to protect the firm with a tariff.\(^3\)
In this case the definition of investor profit is the same as (4.6), with
\( s = \tau \), the tariff rate. Relative to a subsidy that is equivalent from the
firm's viewpoint, a tariff discourages domestic consumption, resulting in a
deadweight loss to consumers. Thus tariff protection is inferior to a production
subsidy which is in turn inferior to a profits subsidy. The optimal tariff
will always be less than the optimal production subsidy. Nonetheless, if a
production subsidy is ruled out by the tax codes of home countries, while tariffs
are clearly not, some protection is justified.\(^4\) This result contrasts sharply
with the conclusions of trade and investment models that ignore host corporate
taxes and tax credits. In these models, tariff-induced inflows of capital make
the country worse off.\(^5\)
There a number of secondary considerations that may affect LDC taxation of foreign investors. Some of these factors suggest a tax below the foreign rate even in the presence of foreign tax credits while others argue for a rate above this one. These factors include: most favoured nation (MFN) rules, effects on domestic savings, foreign tax deferral, transfer pricing, foreign tax consolidation and taxation of rents.

It may not be possible to tax investors from different countries differently. The motivation for such a policy of differentiation comes from the fact that home countries themselves differ in the tax policies each has adopted, for instance with regard to allowing credits or deductions on taxes paid abroad (Kopits, 1976). If the host were constrained to treat investors equally regardless of their home countries, and some investors from each country were present in equilibrium, then it would be optimal to tax at a rate between the highest and lowest that would be optimal if discrimination by origin were possible. But the MFN principle is not well established in the area of foreign taxation so this constraint may not be important in practice (Muten, 1983).

Another form of discrimination in taxation is between foreign investors and domestic investors in the host country. The preceding models ignore domestic capital. But if domestic saving behavior depends on the after-tax return on capital, this response will influence the optimal taxation of foreign investors if all capital must be taxed in the same way. In general, the optimal tax may be above or below the rates indicated by the preceding models. But it may be possible to tax foreign investors differentially, say via a withholding tax, in which case these considerations are not relevant.6

Most home countries only tax profits earned abroad when these earnings are repatriated (Muten, 1983). To the extent that foreign investors value this option of tax deferral, host countries that tax foreign investors' profits as they accrue rather than at the time of repatriation will reduce the incentive to invest. This is true even when taxation at the home-country tax rate would pose no disincentive because there is a foreign tax credit.
For neutrality to prevail, taxation by the host not only cannot exceed the home tax rate, but must be imposed at the same time.⁷

The discussion has so far assumed that taxes above rate ₀ can be imposed, although I have argued that it is sub-optimal to do so. The foreign investor may, however, be able to use transfer pricing to prevent a country from successfully collecting revenues. For instance, a firm may import an input from its production facilities abroad and the host country may not be able to control the price that is used in intra-firm transfers of the input, and therefore the income that is paid abroad. If there is no host-country tariff on the input, then the investor can set the transfer price sufficiently high to ensure that it pays no more tax than the home-country assesses. If there is a foreign tax credit, it may be especially difficult to deter this practice by controlling the transfer price since the firm need only set this price sufficiently high to absorb the difference between the host and home tax rates. Tariffs on the input will undermine the investor's ability to avoid paying taxes since a high transfer price will subject the investor to high tariff charges.⁸ On the other hand, licensing arrangements and service contracts with the home-country component of the multinational firm can be particularly good channels for transferring profits abroad.

An exception to the desirability (and possibility) of taxing above the home-country rate can occur when the firm invests in more than one host. In this case whether the firm is able to and chooses to consolidate its worldwide income in reporting to the home-country tax authorities is crucial. The alternative method of reporting is on a host-by-host basis.

As Jenkins and Wright (1975) point out, consolidation allows the use of excess tax credits generated by one host as an offset against home-country taxes due on income from hosts with tax rates above the home-country's rate.
On the other hand unconsolidated reporting has the advantage that a loss in one host (A) can be deducted from taxable income generated in the home-country itself even if profits are made in a second host (B). These profits in B, taxed by B without regard to the losses in A, may already be protected from home-country taxation by tax credits generated by B-taxation. Consolidation with the losses from A would then only generate unusable excess tax credits as the consolidated income falls relative to income from B without affecting taxes paid to B or generating the tax deduction against home-country income allowed under unconsolidated reporting.

Jenkins and Wright (1975, pp. 2-3) report that consolidation is generally practiced by manufacturing firms. Petroleum companies, however, have found it beneficial to adopt unconsolidated reporting when high exploration and other initial costs generate losses at the beginning of operations. Subsequent dispersion of these companies' investments into high tax countries has tended to move them to adopt consolidated reporting. Such a conversion is generally irreversible for any parent corporation.

If the firm consolidates, and if other hosts tax below the home-country rate, then the firm will be short of tax credits for the income generated in these hosts. In this case, other LDC's can tax above the home-country rate (to the point where the shortage of tax credits is exhausted) without affecting the firm's investment decisions. Such low-tax LDC hosts may exist, as mentioned above, if tax policy cannot discriminate among investors by home-country and if these LDC's get a relatively large amount of their investments from home countries with low tax rates or without foreign tax credit provisions in their tax codes.

So far, I have assumed that there are no rents generated by a firm's investment activities. If there are it may be possible to tax them away
without affecting the firm's incentives to invest. Particular instances are mineral investments where the deposits are richer than the marginal deposits being mined. In this case, the country will want to ensure that it appropriates these rents either through royalties or a corporate income tax that taxes away these rents without deterring investments in mining capacity. One such tax would be a 100% tax on cash-flow that allows all investment costs as well as labor costs to be deducted in the year incurred with a loss carry-forward provision (that includes a payment of a return on losses carried-forward). The host tax on rents is likely to exceed the home tax due on this income. To the extent that a tax on rents can qualify as an income tax under the home-country tax code, and the firm can use these credits to shelter income earned elsewhere, the return required by the firm on its investment in extraction can be driven below even \( (1-0)^\ell \). This type of tax has been suggested by Garnaut and Clunies-Ross (1974). But as Jenkins (1974) points out, it presupposes that the host can stop transfer pricing that diminishes the rents subject to taxation if the firm cannot use the tax credits. Further, the firm must be given an incentive to produce efficiently, since under these rules it has little reason to minimize costs. While I raise these issues, a comprehensive discussion of taxation of resource rents, including mechanisms for auctioning resource concessions, is beyond the scope of this paper.
5. The Formula Apportionment Alternative

An alternative to separate accounting in defining the tax base is the formula apportionment system. Many U.S. states have adopted this type of system in assessing their corporate tax, see McClure (1974). Under this system, the tax authority claims the right to tax a share of the worldwide profits of any company doing business in its jurisdiction. The share subject to taxation can depend on the firm's capital, wage bill or sales located in the jurisdiction relative to the worldwide values of these variables. For instance, in the so-called three-factor formula with equal weights, the firm's tax liability in the jth jurisdiction, \( T_j \), would be

\[
(5.1) \quad T_j = \frac{t_j}{3} \left( \frac{K_j}{K_W} + \frac{E_j}{E_W} + \frac{S_j}{S_W} \right) \pi_W
\]

where the variables subscripted by \( W \) refer to the worldwide values of capital, wage bill, sales and profits, respectively, and \( t_j \) is the jth authority's tax rate. Such a three-factor tax is really a hybrid since it depends not just on the value of profits, or even capital.

One advantage of formula apportionment is its elimination of opportunities to avoid tax payment through transfer pricing. On the other hand, tax authorities in any jurisdiction will find difficulties in verifying the world components of the formula. But these administrative considerations are not the only ones relevant to the choice between separate accounting and formula apportionment. As Worron and Wilson (1983) show, the two systems raise different amounts of revenue, given the level of deadweight loss. In this section, I follow their analysis. A minor change is that I allow the firm to invest at the fixed opportunity cost of capital in the home country as well as to borrow at it. Unless otherwise indicated, there is one small host which considers its own benefits (in terms of revenue) and costs (in terms of deadweight loss)
from adopting either a formula apportionment or a separate accounting system.
In either case, the (single, large) home country taxes foreign source income and
allows a foreign tax credit as in the preceding section.

As Gordon and Wilson show, the three-factor model is extremely difficult
to analyze. Important aspects of formula apportionment can, however, be
indicated by a model where capital is the only factor in the apportionment
formula. The host defines the tax base to be

\[ \pi_w = pF(K_f, L) - wL + \bar{r}(K_w - K_f) \]

Total taxes paid by the investor to the host are

\[ T_e = t_a \frac{K_f}{K_w} \pi_w, \]

where \( t_a \) is the host's rate on the apportioned profits. The investor maximizes income
from investments in the host and home countries net of taxes and factor payments:

\[ \pi_f = pF(K_f, L) - wL + \bar{r}(K_w - K_f) - T_a - \theta \bar{r}(K_w - K_f) - (1 - \theta) \bar{r} K_w, \]

The next-to-last term accounts for home-country taxes on the assumption that

\[ T_a > \theta [pF(K_f, L) - wL] \]

so that the firm has excess tax credits. (If the firm is short of tax credits,
the method by which \( T_a \) is raised would be of no interest). The last term
represents the cost of capital.

The firm maximizes (5.4) with respect to \( K_f, K_w \) and \( L \) to yield

\[ \frac{\partial \pi_f}{\partial L} = (1 - \frac{t_a K_f}{K_w}) (pF_L - w) = 0 \]

so that there is no distortion in labor use and
\[ (5.6b) \quad \frac{3\pi_F}{\partial K_F} = pF_K - (1 - \theta)\bar{r} - t_K(pF_K - \bar{r}) - t_{a} \frac{\pi_W}{K_W} = 0 \]

where \( t_K = t_{a} \frac{K}{K_W} \), the capital-weighted average formula- apportionment tax rate. Finally,

\[ (5.6c) \quad \frac{3\pi_F}{\partial L_W} = t_K \frac{\pi_W}{K_W^2} + t_K \frac{\bar{r}_K}{K_W} = 0. \]

Substituting for \( \pi_W/K_W \) from (5.6c) into (5.6b) and re-arranging yields

\[ (5.6d) \quad pF_K = \left( \frac{1 - \theta + t_{a} - t_K}{1 - t_K} \right) \bar{r}. \]

while from (5.3) total tax revenue is

\[ (5.7) \quad T_a = t_{a} K_F \bar{r}. \]

Compare this to the case of separate accounting with a host tax of \( t_s > \theta \) on profits earned in the host, as defined in eq. (4.3), so that

\[ (5.8) \quad pF_K = \left( \frac{1 - \theta}{1 - t_s} \right) \bar{r}. \]

and revenue, \( T_s \), is

\[ (5.9) \quad T_s = t_s \left( \frac{1 - \theta}{1 - t_s} \right) \bar{r}. \]

Now consider imposing taxes \( t_{a} \) and \( t_s \) such that \( pF_K \) and therefore \( K_F \) and the distortion are all the same. Using the equality of the right hand sides of (5.6d) and (5.8), and the inequalities (5.5) and \( t_s > \theta \), it can be proved that

\[ (5.10) \quad T_a < T_s. \]
For an equal distortion, revenue under apportionment using a single capital factor is less than revenue under separate accounting. To put it another way, for a given amount of revenue, the deadweight loss experienced by the host under separate accounting is less than under apportionment when the host is the only alternative investment location to a tax-credit home country. In a multi-host world, this result on revenue for a given deadweight loss holds for the jth host if \( t_{aj} > t_K \), where \( t_K \equiv \Sigma (K_j t_j)/K_w \). Conversely, if the LDC has \( t_{aj} < t_K \), it gains more revenue under apportionment. As Gordon and Wilson argue, this property tends to make the system unstable as the authorities with \( t_a > t_K \) switch to separate accounting to raise their revenue given deadweight loss, lowering \( t_K \) and causing more defections as other authorities find their \( t_a \) exceeds the new, lower \( t_K \). This aspect of apportionment must, however, be weighed with the administrative properties of these systems mentioned at the beginning of this section in deciding on a definition of the tax base. And, other formulae for apportionment must be investigated to understand how these results generalize.
6. Country Risk

Section 4 drew attention to a somewhat surprising result: Optimal policy for an LDC is to subsidize foreign investors. If this policy were feasible and implemented, capital would be more abundant in the LDCs in the sense of having a lower marginal product than in the capital-exporting countries although its ownership would be concentrated in the developed countries. These unrealistic conclusions suggest that influences constraining the international movement of capital have been neglected. Factors likely operate to prevent the international distribution of capital implied by the subsidy rule, and they may undermine the validity of these subsidy schemes.

One very important factor that has been omitted so far is often called country risk by market participants. This term denotes their fear that sovereign governments will renege on contracts with foreign investors, or expropriate direct investments, or repudiate international loans, and, in general, will prevent investors from realizing returns on their investments that justify the initial decision to invest. Concerns by foreign direct investors on this score seem well founded. For a large sample of LDCs, Williams (1975) estimates that about 20 percent of the value of foreign investments carried into or made from 1956 to 1972 was expropriated without compensation during this period.

Table 2 reproduces data on a country by country basis from the Williams study. It illustrates that there has been a great variation in investors' experience in different LDCs. Some countries have expropriated most or all foreign investments; others have expropriated more selectively. There has also been great variation in the compensation paid.
Table 2

The coefficient of nationalization

<table>
<thead>
<tr>
<th>Country</th>
<th>Foreign Investment stock, end '72 $m (S)</th>
<th>Assets nationalised $m (A)</th>
<th>( \frac{A}{A+S} )%</th>
<th>Compensation paid $m (C)</th>
<th>( \frac{C}{A} )%</th>
<th>( \frac{A-C}{A} )%</th>
</tr>
</thead>
<tbody>
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<td>Algeria</td>
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Total            | 31,928                                 | 10,065                      | 41.3                     | 4,171                    | 41.3           | -                   |


Note: Figures to nearest $0.1 m where data are available - totals to nearest $1 m.
Of course, outright, uncompensated expropriation is not the only type of action hosts can take that adversely affects foreign investors. Among other threats to foreign investors are changes in: taxes, tariffs on inputs, rules for remitting profits, indigenization of ownership, and domestic content laws. Modeling the motivations of hosts is difficult, and several complementary paradigms are necessary. On the one hand, investors may suffer losses consequent on revolutions or other large-scale upheavals. In these cases, there is probably little any individual investor can do to affect the risks faced, and in Eaton and Gersovitz (1983) these risks were therefore termed exogenous.

But there are other situations when country risk may be the outcome of rational choice by a host that weighs costs and benefits of taking hostile actions against foreign investors. While the benefits are the obvious gains from not having to share the project's proceeds, the costs are less clear. If hosts are influenced by costs, however, the nature and extent of the sanctions that investors can use to deter hostile acts critically determine their willingness to invest abroad. These sanctions are likely to be quite indirect because international property law hardly exists, and so international enforcement of contracts is severely circumscribed. They include loss of access to: capital from abroad in the future, trade in goods and services, skilled manpower and technology, or inputs especially where manufacturing firms produce differentiated products. These and other aspects of the strategic interactions between hosts and investors are discussed in Eaton and Gersovitz (1981, 1983 and 1984) and Gersovitz (1983). The important feature of these models is that country risk is endogenous.
A capital-importing government may wish to make a binding promise to foreign investors to forego hostile actions with the goal of attracting investments. But binding promises are not generally feasible since there is no international forum to enforce this type of contract. Once the investments have occurred, the strategy of allowing a return to investors may be time inconsistent (Kydland and Prescott, 1977). It may be optimal for a government to renege on its promise. Rational investors anticipating this situation will invest less than otherwise or possibly not at all depending on the availability and force of penalties just described.

The wide variation in circumstances makes it impossible to present a general model of these phenomena. One useful illustration of the interaction between the considerations of the last section and country risk can, however, be developed using the model of Eaton and Gersovitz (1984). This is basically a static one-period model with the following sequence of behavior: first foreigners invest, then hosts decide on expropriation, next production takes place and finally investors receive their returns which depend on the host's previous decision on expropriation. Despite its static nature the model illustrates some important considerations; Eaton and Gersovitz (1981 and 1983) present some explicitly dynamic models.

Assume that output can be produced with a constant returns to scale production function using capital, $K_f$, skilled manpower, $H$, and unskilled labor, $L$. The first two factors are entirely provided by the firm, the last is domestically supplied. Skilled manpower earns a constant return of $v$. Continuing the discussion of section four, $\pi_f$ is given by

$$\pi_f = [1 - \theta - t + \min(t, \theta)] (1 + s) [pF(K_f, H, L)$$
$$- vH - wL] - (1 - \theta) \bar{r} K_f.$$  

Firms choose $H$ so that

$$pF_H = v.$$
Further, if investors are perfect competitors, the host can choose $s$ so that for any level of $K_f$, $\pi_f = 0$. The relationship implied by (5.1) and (5.2) between host income from labor and taxes net of subsidies, $Y$, and $K_f$, given an $s$ such that $\pi_f = 0$, is illustrated in Figure 2 by the curve II. This locus is in effect the relation examined in the last section, and as stated in Rule 3, $Y$ reaches a maximum at $K_f^*$ when $s = \delta/(1 - \delta)$.

So far, the model has neglected country risk. Eaton and Gersovitz (1984) assume that if the investor is expropriated, $H$ is withdrawn and cannot be replaced while $K_f$ is left behind in the possession of the host. All returns from the now-impaired project accrue to the host, so that host income after expropriation, $Y^E$, is

\begin{equation}
Y^E = F(K_f, 0, L).
\end{equation}

Host income is increasing in $K_f$. This relation is illustrated in Figure 2 by the EE curve.

For any given $K_f$, the rational host chooses expropriation if $Y$, as determined by (5.1) and (5.2) is less than $Y^E$. Rational investors recognize this decision rule and never invest beyond $\hat{K}_f$ in Figure 2, the point where $Y = Y^E$. Depending on technology, the EE curve may cut the II curve to the left of $K_f^*$, and investment is constrained to $\hat{K}_f$. Or, the intersection may be to the right of $K_f^*$, with $K_f^*$ and $s = \delta/(1 - \delta)$ chosen since these levels maximize host welfare.

For purposes of this chapter, the important observation is that for $K_f < K_f^*$, $s < \delta/(1 - \delta)$. In fact, $\hat{K}_f$ may be such that a negative subsidy, $s < 0$, is required to make $\pi_f = 0$ for $K = \hat{K}_f$.

**Rule 4:** Country risk may not only make a positive subsidy undesirable, but may require total taxes on foreign profit at a rate above $\delta$.

The case of a negative subsidy arises if the threat of expropriation makes it impossible to attract enough investment to drive the marginal product of capital below $\bar{r}$, let alone down to $(1 - \delta) \bar{r}$. The country
Figure 2

Equilibrium of Investor and Host with Country Risk
should at least ensure that it pays no more for capital than $\bar{r}$, the opportunity cost of capital abroad, and it can do so by taxing foreign investors' profits. Otherwise, investors would earn rents that they do not require to invest but that provoke the host to expropriate.

Indeed, to forego this tax and allow $\pi_f > 0$ is to attract even less capital because the gains to the host from expropriation will be increased. This result can be seen as follows: Assume $\pi_f = \pi_0 > 0$.

Define $I_0$, $\bar{I}_0$ as the locus of points in Figure 2 such that $\pi_f = \pi_0$.

For any given $K_f$, this locus must lie below the II curve, and therefore intersects the EE curve to the left of $\bar{K}_f$. These points are made in more detail in Eaton and Gersovitz (1984) in a model without home country tax credits.

In the preceding discussion it is known with certainty whether the host will expropriate or not. Rational investors therefore only invest up to the point where the host would choose expropriation, and acts of expropriation would never occur. But in models with uncertainty, rational investors may invest when the probability of expropriation is positive. They do so in the expectation that if expropriation does not occur they will earn enough profits to compensate for the risk of expropriation. For instance, as in Eaton and Gersovitz (1984, section VI), the host may have some endowment of skilled manpower $\bar{H}$, say $\bar{H}$, that is a random variable only realized after the investment is made. For high values of $\bar{H}$, the host expropriates as it can then operate the foreign capital relatively successfully.

In this model, risk-neutral competitive investors invest until expected profits, including the loss from expropriation, are driven to zero. There is therefore no need to impose a tax to achieve zero (expected) profits as in the certainty model. The probability of expropriation fills this role of the tax. But even in the absence of foreign tax credits, it is still
optimal for the host to tax investors. This result follows if each investor views the probability of expropriation as given with respect to the size of its own particular investment although it recognizes that this probability depends on aggregate foreign investment. In this case, there is an externality that leads to overinvestment, something that can be corrected by a tax. With a foreign tax credit, however, it may be desirable to tax and subsidize investors rather than only to tax them.\textsuperscript{10} It is unfortunately not easy to quantify the model to provide guidance in specific situations.
7. Attracting Foreign Investment: Tax Holidays

Many countries have various programs that seek to attract foreign investments. The provisions of these programs are frequently different from the annual profits subsidy at a constant rate that was discussed in section 4. One popular device is a tax holiday: Either new firms or the profits from new investments are exempt from taxes for a number of years, after which taxes are paid at the same rate as other firms. Tax holidays have a number of shortcomings from the host's point of view, and are probably not desirable relative to an annual subsidy at a constant rate.

First, such schemes may be less likely to be treated by home countries as a tax that can be used by the firm as a credit, plus a subsidy. Tax holidays may therefore result in a loss of tax revenue without a compensating increase in investment since the investor finds the tax liability to the home country rising in an offsetting manner.

Second, firms may dissolve after the tax holiday ends, selling their capital to new firms if these are eligible for a tax holiday based on the purchase of used plant and equipment. Thus, the total subsidy may be larger than expected as the same equipment is passed on from one firm to another. Bond (1981) provides some evidence on this phenomenon in Puerto Rico. He further suggests that if firms cannot resell their equipment, they may choose to invest in equipment that depreciates more rapidly than is optimal. In this way, they are able to exit soon after the tax holiday expires. Usher (1977, p. 136) argues that tax holidays will bias investors against projects with long gestation periods, creating a further inefficiency.

Usher (1977, p. 133) also notes that firms may transfer price between the project eligible for a holiday and other activities. By shifting profits from these activities, it can avoid taxes on them. This problem also applies to the
subsidization at a constant annual rate of profits from individual projects. Once again, the extent of the subsidy may be much larger than is apparent initially, underlining a general problem in discriminating between old and new projects.
8. Conclusions

The taxation of foreign capital is no simple matter. Optimal policy depends on

(1) Whether host countries are large in the sense of affecting the opportunity cost of investors.

(2) Whether home countries allow tax credits or tax deductions for taxes paid to hosts.

(3) Whether the investor reports to the home country on a consolidated or an unconsolidated basis.

(4) Whether home countries calculate taxes paid to hosts as gross or net of profits or production subsidies paid by hosts.

(5) The size of inefficiencies caused by production subsidies or tariffs that are used when profits subsidies are not allowed by home country tax codes.

(6) The scope for tax avoidance through transfer pricing.

(7) The extent to which firms value the opportunities for tax deferral by retaining earnings in the host.

(8) Whether foreign and domestic firms must be taxed at the same rate, and, if so, the elasticity of domestic savings.

(9) Whether the investor has the potential to earn rents.

(10) The importance of country risk.

These factors likely differ by industry and by home country of the investors. Thus the rules adopted should optimally vary in these ways as well. But this implies a complicated tax code that will be difficult to administer and leaves latitude for discretion, and ultimately corruption. Further, any discrimination among investors that depends on their country of origin
violates most favored nation principles. Finally I note some important topics for future research: the determinants of the choice of home country by the investor, the value to the investor of deferral, the role of international differences in depreciation rules and in inflation, and the role of country risk.
1. Feldstein and Hartman (1979) analyze tax credit and deduction rules under exactly this assumption. But they also assume that the host takes as given the home-country tax policy. This combination of assumptions seems somewhat inconsistent in that the host is large relative to the total capital stock but not relative to the home-country tax authority.

2. Hamada (1965) discusses how international tax agreements can emerge from strategic behavior by host and home countries.

3. Batra and Ramachandran (1980) discuss a model of trade and investment in the presence of tax credits and tariffs, but they do not discuss optimal tax/tariff policy. See also Khandker (1981) for correction of their model.

4. With a tariff at rate \( \tau \), the firm maximizes (4.6) with \( s = \tau \). Let the international price be \( p \) and the domestic price be \( \hat{p} = (1 + \tau) p \), so that demand is \( Q(\hat{p}) \), a function of the tariff-inclusive price. Then the host's goal is to choose \( t \) and \( \tau \) to maximize social welfare, \( SW \), given by

\[
(4.7) \quad SW = \int_0^{Q^{-1}(0)} Q(x) dx + \tau \cdot p [Q(\hat{p}) - F(K_e, L)] + wL + \tau [\hat{p} F(K_e, L) - wL].
\]

The first term in (4.7) is consumer's surplus, the second is the tariff revenue, the third is labor income and the fourth is income from the corporate income tax. Maximizing (4.7) with respect to \( \tau \) and \( t \), and using the first-order conditions from maximizing (4.6) with respect to \( K_e \) and \( L \) yields \( \tau = 0 \) and

\[
(4.8) \quad \tau \eta \hat{p} + (t + t \tau - \tau) \frac{F'_K F_F}{F'_K F_{KK}} = 0,
\]
where $\beta = Q/F$, the ratio of consumption to domestic production and $\eta = -Q^2P/Q$, the elasticity of demand. For $F = K^\alpha_f L^{1-\alpha}$, $F F_K / (F F_{K_k}) = \alpha^2 / (\alpha - 1)$, and

$$
(4.9) \quad \tau^* = \frac{\tau \alpha^2}{(1 - \alpha)\eta \beta + (1 - \tau)\alpha^2}
$$

Since $d\tau / d\beta < 0$, and $\beta \geq 1$, $\tau^* \leq \tau \alpha^2 / [(1 - \alpha)\eta + (1 - \tau)\alpha^2]$, the value of $\tau$ from (4.9) for $\beta = 1$. Taking $\alpha = 0.4$, $\theta = t = 0.5$ and $\eta = 1.0$, yields $\tau^* \leq 0.118$. Thus, the optimal second-best tariff that substitutes for the first-best profits subsidy, $s = \theta / (1 - \theta) = 1.0$, is likely to be relatively low.

5. See Brecher and Diaz (1977), Brecher and Findlay (1983) and Yabuuchi (1982).

6. Horst (1980 and 1982) and Dutton (1982) discuss some aspects of the simultaneous taxation of foreign and domestic capital. Horst's perspective is, however, primarily one of world welfare maximization.

7. Horst (1977) discusses deferral provisions from the viewpoint of the home-country. In this model the firm is assumed to defer a fixed proportion of its profits in the host country, and maximizes world profits without regard to whether they are deferred or not. I am not aware of any work that endogenously determines the proportion of profits a firm would wish to defer and how much this proportion is affected by host tax policy. The analogy to the retained earnings/dividend question, one that has not been resolved, is apparent. It is therefore difficult to suggest what the disincentives from taxing on an accrual basis will be.


10. In this note, I sketch the results alluded to in the text on the assumption, for reasons of space, that the reader is fully familiar with section VI of Eaton and Gersovitz (1984). In the notation of this chapter, the modifications to the Eaton-Gersovitz model needed to prove these assertions are as follows: Let $\bar{H}(x)$ be the host's endowment of $H$, with $\bar{H} > 0$ and $x$ a uniform random variable distributed between 0 and 1. Ignore the possibility that $\bar{H}(1)$ is so high as to lead to the export of $H$ by an expropriating host. The host's income in case of expropriation, $Y^E(x)$, is

$$Y^E(x) = G(K_F, \bar{H}(x), L) = F(K_F, \bar{H}(x), L).$$

Income if expropriation does not occur, $Y^N(x)$, when there is a foreign tax at rate $\theta$, a foreign tax credit and a domestic tax $t = \theta$, and a subsidy at rate $s$ is

$$Y^N(x) = F(K_F, H, L) - (1 + s)F_KK_F - v(H - \bar{H}) + t(1 + s)F_KK_F$$

with $H$ chosen so that $F_H = v$. The EE curve of Eaton and Gersovitz is given by $Y^E(x) = Y^N(x)$ which determines a value of $x$, $x^*$, for a given $K_F$ such that $x > x^*$ implies expropriation. The II curve is given by

$$(1 + s)x^*F_K = \bar{r}.$$

Simultaneous solution of the EE and II curves determines $x^*$ and $K_F$ in equilibrium. The host's expected income is

$$EY = \int_0^{x^*} Y^N(x) \, dx + \int_{x^*}^1 Y^E(x) \, dx.$$
By totally differentiating the EE and II curves and using the property that the absolute value of the slope of the II curve must exceed that of the EE curve in equilibrium, it is easily shown that \( \frac{dEY}{ds} < 0 \) for \( t = 0 \) and \( s = 0 \), i.e. when there is no foreign tax (or alternatively, no foreign tax credit). But for \( t > 0 \), \( \frac{dEY}{ds} \) can be positive for \( s = 0 \).
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