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**TAXATION AND TECHNOLOGY
TRANSFER: KEY ISSUES**

CHAPTER 2



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Chapter II

Formulating a tax policy to promote technology imports

1. General considerations

Formulating a tax policy regarding the importation of technology involves balancing conflicting objectives. On the one hand, countries wish to facilitate the acquisition of technology; on the other, they wish to derive, in the form of tax revenue, a fair share of the profits that accrue to the foreign owner of that technology by virtue of the transfer. To what extent is the importing country able to tax the various transactions involved in TOT without deterring such transfers altogether?

The importing country's regular tax system may include features that have a particular (negative) effect on TOT. Making exceptions to the normal tax rules in order to promote TOT may create undesirable distortions and undermine the integrity of the tax system in general, as well as giving rise to difficult issues of classification and interpretation and perhaps providing opportunities for tax avoidance. Exceptions and derogations have costs; to what extent does the promotion of TOT justify those costs?

An important consideration is that, for most developing countries, TOT occurs predominantly in the context of FDI. While FDI does not necessarily result in TOT, relatively little TOT takes place outside the foreign investment context. Consequently, the host-country tax regime, as it applies to FDI, is of vital importance to TOT.

It seems appropriate, therefore, to begin with a brief examination of the taxation of FDI generally. Are there aspects of the regular tax system that constitute particular obstacles to TOT and that may thus require modification? And is there a case for providing especially favourable tax treatment (i.e. incentives) in order to promote TOT?

2. Taxation of foreign direct investment

(a) The relevance of taxation in FDI decisions

To what extent does taxation affect FDI decisions? That question has been the subject of a vast number of studies over the past 30 years or so, and the answers have differed widely (Ruding, 1992; OECD, 2002a). As a broad generalization, it seems that tax considerations play little part in the initial decision to invest abroad, may play a more important role in locational decisions, are more important for some types of investment than for others, and are growing in importance.

As the findings of many studies indicate, tax levels and rates in potential host countries generally only come into consideration once the decision to invest abroad has been made. They are a relevant, though rarely a major, factor in deciding where a particular investment should be located. To quote from one recent review of studies extending back over almost 50 years:

“In general, these surveys confirm the conclusions...that if tax policy matters, then it is not the most influential factor in the site selection of transnationals.... Most econometric studies tend to confirm the results of surveys: that investors are mostly influenced in their

decisions by market and political factors and that tax policy appears to have little effect on the location of FDI” (Morisset and Pirnia, 2001).

Some studies also conclude that the importance of host-country taxation varies considerably according to the type of investment: in particular, there are significant differences between market-oriented and export-oriented investment. Market-oriented FDI seems to be relatively little affected by considerations of taxation except, perhaps, where the host-country tax is unusually burdensome. By contrast, export-oriented FDI is far more sensitive to the host-country tax burden (Reuber, 1973; Mintz and Tsiopoulos, 1992). There is also evidence that the importance of taxation may vary according to the type of industry or activity concerned (Wilson, 1993). The differences seem to reflect the relative mobility of the investment and the range of possible locations.

Whereas most studies prior to 1990 concluded that taxation was an insignificant or at most a relatively minor factor in FDI decisions, the most recent studies have found a more marked relationship between taxation and FDI flows (Grubert and Mutti, 2000; OECD, 2002a). As barriers to FDI are eliminated, remaining obstacles assume an increased importance. Taxation becomes a factor in FDI decisions, other factors being equal: today, many of those other factors are more equal than they were even 10 years ago (Clark, 2000).

(b) Which taxes are important?

Just as some types of FDI are more influenced by tax considerations than are others, so some types of taxation are more likely than others to influence investment decisions. There is little or no evidence to suggest that the overall level of taxation in a country has much impact on either inward or outward FDI. If one examines those countries that are most successful in attracting FDI, in relation to their market size, some would be considered relatively low-tax countries, others high-tax countries, and still others in between. This seems to suggest that, to the extent that taxation is relevant, the tax “mix” is more important to investors than the overall level.

Not surprisingly, the CIT has received the greatest attention and has been the focus of most of the empirical studies, since it most directly affects the amount of profit that is available for distribution. The most successful countries (in attracting FDI) tend to have low to moderate rates of CIT, with reasonable provisions governing deductions, depreciation and loss relief (OECD, 2002a).

Although the CIT is widely recognized as the most important tax, from the point of view of prospective foreign investors, it is far from being the only tax consideration. The Ruding Committee (Ruding, 1992) found that withholding taxes on dividends, interest and royalties were also an important factor for a substantial proportion of investors. Among other taxes, individual income tax and social security contributions are normally a minor consideration, except to the extent that they have an unusually large impact on labour costs: however, such taxes may have a major impact on the employment of expatriate staff. Consumption taxes, such as the VAT, are largely irrelevant to FDI decisions, since they are passed on to consumers rather than borne by producing enterprises. By contrast, import taxes and customs duties are often important: high duties and taxes on the import of machinery and other capital goods increase the initial cost of investment and may constitute a disincentive to FDI.

(c) Investment incentives

According to conventional wisdom, tax incentives for foreign investment are not recommended (UNCTC, 1992; UNCTAD, 1996; Holland and Vann, 1998; OECD, 2002a). Tax incentives are bad in theory and bad in practice. They are bad in theory principally because they cause distortions: investment decisions are made that would not have been made without the inducement of special tax concessions. They are bad in practice because they are both ineffective and inefficient. They are ineffective in that tax considerations are only rarely a major determinant in FDI decisions; they are inefficient because their cost, in terms of tax revenue forgone, often far exceeds any benefits they may produce. They are also inequitable (since they benefit some investors but not others), are difficult to administer and are open to abuse.

The conventional wisdom is supported by much of the empirical evidence, the weight of which suggests that tax incentives are a decisive factor in probably no more than about 20 percent of FDI decisions, though that proportion undoubtedly varies widely from one country to another and from one type of investment to another. To the extent that tax considerations do play a part in investment decisions, it is commonly claimed that the general features of the host-country tax system are more important to potential investors than are special incentives (UNCTC, 1992: 49; OECD, 1995).¹⁹ However, there is also substantial evidence that tax incentives are an important factor in some types of investment decisions.

Careful targeting of investment incentives can increase their effectiveness and reduce their inefficiency. The appropriateness (or otherwise) of targeting tax incentives to promote technology transfer is considered in section 4 of this chapter.

3. Tax obstacles to the importation of technology

All of the tax provisions reviewed already could be said to constitute obstacles to TOT in that they increase the cost of the transfer or reduce the rate of return. Most of those provisions are standard features of modern tax systems and are not major deterrents. Sometimes, however, taxes are imposed at unusually high rates, or in a way that is especially unfavourable to TOT. Countries wishing to promote the importation of technology may consequently want to review their tax laws to see whether there are provisions that present special obstacles and that could be removed or at least reduced. They might also consider whether any of the regular provisions can be modified in order to provide special incentives to promote TOT.²⁰

Special obstacles might take any of the following forms:

- excessive import duties
- taxation of capital contributions
- restrictions on deductions
- high withholding taxes
- excessive taxation of expatriate employees

¹⁹ Margalioth suggests that developing countries can best attract FDI by offering zero or very low rates of CIT. Such a policy can, however, have a very high cost in terms of tax revenue forgone.

²⁰ This question is discussed in section 5 of this chapter.

- absence of tax treaties

(a) Import duties

Import duties often serve a dual function – to raise revenue and to protect domestic products that compete with the imported product. Where TOT is an objective, the latter should normally not be a consideration, since there is usually no domestic alternative. If import duties are relatively high, as they often are in developing countries, consideration could be given to reducing them, or providing for exemptions, in the case of high-technology imports.

(b) Taxation of capital contributions

In most countries, the contribution of assets, tangible or intangible, to the capital of a company has few, if any, tax consequences. However, some countries treat it as a taxable event (IFA, 1997: 39). In India, for example, the sale of technology may be subject to a capital gains tax (sometimes at rates as high as 55 per cent) if the sale or receipt takes place in India. Similarly, in Spain, the sale of technology can give rise to a taxable gain if the transfer includes rights that are exercisable in Spain, though where the technology is exchanged for shares, there are rules allowing the gain to be deferred until the shares are disposed of.

A number of other countries impose restrictions on the contribution of assets to a company's capital. In Argentina, such a contribution is permitted but must be approved by a special agency established to monitor and register all technology transfer agreements,²¹ and there are general restrictions on non-cash contributions to share companies. In Taiwan Province of China, patents and know-how may be contributed as equity capital, but subject to conditions, and may not exceed 20 per cent of the total equity contribution.

(c) Restrictions on deductions

The reason for restricting in-kind contributions of equity, especially of intangibles, seems to derive from the fear that such assets may be overvalued, thus allowing excessive profits to be extracted from the country. If so, the fear seems largely unjustified, since dividends can only be paid out of actual (after-tax) profits, so that the value placed on the company's capital is largely irrelevant.²² A more realistic fear is that royalty payments for intellectual property or equipment rentals will be unreasonably inflated, since those payments are normally made out of pre-tax income.

One response is to restrict the amount that may be deducted in respect of such payments. In Brazil, for example, payments for technology must be approved by the relevant agency, and the maximum deduction for patent royalties may not exceed 5 per cent of the sales income from products manufactured under the patent. Somewhat similar restrictions apply to payments of technical assistance fees.

Arbitrary restrictions of this nature create distortions and are probably quite easy to circumvent. Their only justification would seem to be that they are a rather rough-and-ready

21 A similar rule applies in Brazil.

22 That is so, at any rate, in the case of contributions to a wholly owned subsidiary. In the case of contributions to a joint venture, the danger is that an overvaluation of assets contributed in kind will be to the detriment of the other (local) venture partner.

substitute for transfer pricing procedures that might be beyond the capacity of the host-country tax authorities to administer.

(d) Withholding taxes

High rates of withholding tax, especially on royalty payments, constitute an obvious deterrent to TOT. Latin American countries in particular tend to impose unusually high rates of withholding tax – 25 per cent in Brazil, 33 per cent in Argentina and as much as 42 per cent in Colombia. Other countries have statutory rates that are almost as high,²³ but those rates are usually reduced by tax treaties (often to 10 per cent or less).

Another problem is that withholding tax is normally levied on the gross amount of the payment. As a result, if the costs incurred in developing the technology are taken into account, the effective rate of tax can in some cases exceed 100 per cent of the actual profit. In countries where withholding rates are high, it may actually be advantageous (to the transferor) to be considered to be carrying on business in the host country, for in that case only the net profit is taxed.

Various arguments can be advanced in favour of high withholding taxes. First, it is claimed that royalty payments are often inflated and are used to extract excessive profits from the host country: high withholding taxes simply claw back some of those profits.²⁴ Second, the taxation of the gross amount of the payment is justified on the grounds that the transferred technology is usually not entirely new and that the costs of development will normally have already been written off in the exporting country (or will continue to be written off there). Third, it is claimed that the royalty payments will usually be taxed in the exporting country, with a credit allowed for host-country tax, so that high withholding taxes merely allocate the total tax revenue between the two countries, without acting as a deterrent to the TOT.

The above arguments are not entirely convincing. High withholding rates penalize not only those cases where excessive royalties are being charged but also those where the royalty is entirely reasonable. They are therefore a very inadequate substitute for proper transfer pricing procedures. High withholding taxes may well not be fully creditable in the exporting country, especially where the net taxable profit is substantially less than the amount of the gross payment. And in order to obtain the same net rate of return, the exporter (ECo) may well charge a higher royalty, to compensate for the excessive withholding tax, than it would if the withholding tax were levied at a more reasonable rate. The cost to the ICo would thus be increased, as would be the amount that the ICo would be able to deduct in computing its own taxable income. The effect would be that the tax collected from the ECo, as a result of a high withholding rate, would be at least partly offset by a reduction in the tax collected from the ICo.

(e) Taxation of expatriate employees

23 The Indian withholding tax rate on royalties is 30 per cent, as is that of the United States. France has a rate of 33 per cent.

24 In other words, it is an alternative to disallowing deductions, discussed in (c) above.

When expatriates do not become resident in the country to which they are sent, then they are taxed only on the portion of their income that has a source in that country. Usually that means only income derived from employment performed in the country. They may even escape tax on that income by virtue of a tax treaty: for example, if they are present in the country for less than 183 days and their salary is paid by their original employer, it is usually exempted from host-country tax by virtue of treaty provisions based on Article 15 of the OECD Model. However, if employees do become resident in the host country, whether temporarily or ordinarily, they will be potentially liable to personal income tax there on their worldwide income.

Where expatriates are subject to tax in the host country – whether as resident or as non-residents – this can give rise to a number of problems. Usually expatriates receive a remuneration package comprising elements such as the following:

- increased salary as a reward for taking on new responsibilities
- cost-of-living supplement
- various fringe benefits (accommodation, company car, removal expenses, school fees for children, home vacations, medical insurance, continued membership in pension plans and social security schemes)

The result may be a very heavy tax burden in the host country, owing to:

- taxation at a high marginal tax rate
- taxation of fringe benefits
- inability to deduct expenses
- liability to pay social security contributions

For example, in many developing countries, expatriate salaries are much larger than local salaries and are taxed at the top marginal rate of personal income tax. For example, in India, the top marginal rate of personal income tax applies to all income in excess of about \$5,000²⁵ per year. Living costs are frequently very high for expatriates (owing, for example, to the lack of suitable housing), and if the usual fringe benefits are taxed, that will substantially increase the total tax burden. Again, social security contributions are quite substantial in some countries, even though expatriates rarely derive any benefit from those contributions. Usually they continue to contribute to home-country social security schemes and pension funds, and such contributions may not be deductible in the host country. All of the above add considerably to the cost of employing expatriates, and, though unlikely to actually deter TOT, may well lead to less effective methods of transfer. A number of countries provide various types of relief, which are discussed in section 4 below.

(f) Removing tax obstacles to technology importation

One of the most important effects of tax treaties, in the context of the present study, is that they usually reduce the rates of withholding tax on dividends, interest, and especially royalties and technical fees. Tax rates of 30 per cent or more are often reduced to 10 per cent or less. (In Denmark, for example, the “standard” rate of 30 per cent is reduced to an average of 8 per cent: in France, which has entered into tax treaties with more than 100 countries, the

²⁵ All references in this study to "\$" are to US dollars.

“standard” rate of 33.3 per cent is often reduced to 5 per cent or is not imposed at all.)²⁶ Other common features of tax treaties include the restricted definition of “permanent establishment”, which may make it easier for technology to be transferred without the transferor being considered to be carrying on business in the importing country and being taxed accordingly.

Tax treaties have other advantages and are sometimes a significant factor in foreign investment decisions. Countries wishing to attract foreign investment, and TOT are consequently advised to attempt to negotiate treaties with the major technology-exporting countries.

However, it is important to understand that would-be technology-importing countries need not wait until they have negotiated a comprehensive network of tax treaties in order to remove impediments to technology transfer. There is nothing to prevent them, for example, from unilaterally adopting a reasonable definition of “permanent establishment”, and reasonable rates of withholding tax on royalties.²⁷ Hong Kong (China), which because of its particular status in international law has (until very recently) been unable to enter into tax treaties, levies a withholding tax at a mere 1.65 percent on royalties paid to non-residents. Developing countries that seek to acquire technology would be advised to tailor their tax rules to complement the tax rules of exporting countries (Lee, 1999) and to adopt the standard, internationally recognized jurisdictional rules, definitions, and classifications that are applicable to income derived from TOT. The costs of doing so (in terms of tax revenue forgone) are likely to be negligible, and the benefits (in terms of increased investment and increased TOT) could be substantial.

4. Tax incentives to promote inward technology transfer

One of the most important questions facing policy makers, especially in developing countries, is whether they should rely entirely on an investor-friendly tax system, with reasonable tax rates and based on internationally accepted principles, to attract foreign investment and TOT or should in addition offer special tax incentives²⁸ aimed at particular types of investment or activity. As was previously noted, special incentives are generally not recommended and cannot be considered an adequate substitute for a satisfactory general tax system. Nevertheless, many critics of the use of tax incentives accept that there may be a case for them in order to promote activities such as R&D, if only as a way of countering market imperfections. One recent study of incentives identifies as a key policy issue the encouragement of development-oriented incentives on the part of both host and home countries (UNCTAD, 2004).

A recent OECD report puts the argument in favour of incentives for R&D thus: "Because private R&D rapidly becomes a public good, firms are prevented from recouping all the benefits of their investments. Asymmetric information and imperfect competition are other

26 In consequence, the “standard” rate is very much the rare exception rather than the rule.

27 The argument that high standard rates give a country a stronger negotiating position is not at all convincing (Easson, 2000).

28 The term “tax incentive” is used here in the sense of a statutorily favourable deviation from the general “benchmark” tax system. See Easson (2004), Chapter 1; Zee, Stotsky and Ley (2002), p.14.

market flaws that lead to gaps in R&D expenditures. Market incentives alone are insufficient to produce an adequate supply of R&D, making it crucial for governments to stimulate private R&D spending. As with any investment decision, R&D is not undertaken by firms unless there is an opportunity for profit. By changing the relative costs of research investments, through subsidies, taxes, trade or other policies, governments can influence the generation of research and knowledge for economic growth” (OECD, 2002b). Similar arguments might be advanced to support tax incentives for some other modes of TOT.

(a) Cost-effectiveness of tax incentives

A major objection to the use of tax incentives is that they are rarely cost-effective. Tax incentives have an obvious cost in the form of the amount of tax that would have been paid but for the existence of the incentive. They also have less direct costs in the form of administrative costs and of tax avoidance facilitated by their existence, and non-fiscal costs arising from the distortions that they create. Estimating those costs is extremely difficult, but available evidence indicates that they may be substantial. For example, a study of investment incentives granted in the United States and Western Europe between 1983 and 1995 found the cost (of the incentive) to vary from \$13,000 to over \$250,000 for each new job created, with the cost rising steadily over that period.²⁹

The benefits produced by tax incentives are perhaps even more difficult to quantify. There may be a fiscal benefit, if the incentive attracts investment that would otherwise not have been made, and of the new investor pays some tax (i.e. is not granted a complete, indefinite exemption). However, the principal objectives of tax incentives are not fiscal: the main perceived benefits sought from investment incentives in general, and incentives for TOT in particular, include job creation, improved efficiency of domestic industries, increased foreign exchange earnings and export competitiveness. It is virtually impossible to place a monetary value on such benefits.

One thing does seem clear, however: the cost-effectiveness of tax incentives depends largely on the degree of *incremental* activity or investment that the incentives succeed in stimulating. To the extent that the activity or investment would have occurred in any event, the incentive represents a waste of government revenue.

Many studies have been made of the cost-effectiveness of tax incentives to promote R&D, though the studies have concentrated on the effects in developed countries, and it may well be that the effects would be different in less-developed countries.³⁰ According to the OECD report previously quoted,

“Fiscal incentives to business R&D can incur substantial costs to governments, raising concerns about their effectiveness in increasing private research efforts as well as opportunities for tax avoidance or evasion. Many studies show a correlation between R&D tax incentives and increases in private research spending within individual countries. Although it is difficult to relate heightened R&D intensity directly to fiscal measures, it appears that, on average, tax incentives can increase private research spending by an amount equal to the loss

29 UNCTAD, 1996: 29–30.

30 Again, one would expect wages and availability of skilled labour to be the most important factors.

in tax revenue. An examination of panel data on tax changes and R&D spending in nine OECD countries over a nineteen-year period (1979–97) found that a 10% decrease in the cost of R&D through tax incentives stimulated just over a 1% increase in the level of R&D in the short-run and just under a 10% rise in R&D in the long-run.”³¹

The debate as to whether tax incentives can be a cost-effective instrument to promote investment, R&D and other forms of TOT will continue for years, with various studies reaching different conclusions. What can be predicted is that governments will continue to use tax incentives to pursue those objectives. It is also clear that the cost-effectiveness of tax incentives can be improved by careful targeting and design.

(b) Targeting tax incentives

If tax incentives are to be used, an initial issue that confronts policy makers is to decide *which* enterprises or activities should qualify. Countries, especially developing countries, attempt to promote the importation of technology by targeting tax incentives in a number of ways. In Asia, for example, China, Malaysia, Singapore and Viet Nam have an extensive range of tax incentives intended to promote TOT (Brown, 1990; Duyen, 2001; Kasipillai, 2003; Lee and Lan, 2002; Liu, 1998; Liu and Cheng, 2002; Ng, 2000; Tsoi and Pang, 1999; Wong and Gan, 2001).

Incentives are designed to:

- Attract investment in technologically advanced sectors
- Promote the importation of technologically advanced equipment
- Promote the employment of skilled technicians
- Promote job training of local workers
- Promote R&D
- Promote linkages.

In recent years it has been common to target incentives at technologically advanced sectors. Investment in electronics and other high-technology industries is widely seen as especially desirable for providing employment, boosting exports and modernizing the economy. According to one article, no fewer than 89 locations around the world now call themselves “Silicon” something – Silicon Bayou, Bog, Fen, Glen, Orchard and Prairie have been established as rivals to the original Silicon Valley (Miller, 2000). Almost all of them offer generous tax incentives to high-tech investors.

Competition has been especially strong in South and East Asia. Following are some examples:

- In 1999, the Government of the Philippines announced a 12-year tax holiday for projects that will produce raw materials for the electronics industry, the specific target being wafer fabrication projects
- In 2000, China, India, Singapore and Thailand announced new incentives for technology-intensive investments and projects especially for the electronics industry.

31 OECD (2002b), para. 33. A Canadian study found that each dollar of tax revenue forgone through tax incentives generated \$1.38 in additional business research spending and concluded that incremental incentives are cost-effective in stimulating additional R&D (Canada, Department of Finance, 1998).

- In 2001, Malaysia and Thailand announced incentives for foreign investors in the silicon wafer fabricator industry. Similarly, China announced plans to establish a semiconductor industry with special tax holidays, and Viet Nam introduced new incentives for the software industry.
- In 2003, China introduced new tax incentives for the high-tech industry and the Republic of Korea announced 10 years of tax breaks to foreign investors in high-technology cultural industries. Further, Thailand announced new tax incentives for investment projects in information and communication technology industries.
- In 2004, the Government of Thailand instructed the Board of Investment to improve the investment incentives it extends to high-tech companies: tax exemption privileges for up to eight years were announced for hard disk drive makers.

An alternative approach that is sometimes adopted is to confer tax privileges on investments that meet one or more of a number of listed criteria. Several countries have developed the concept of “pioneer” industries. Qualifying industries receive preferential tax treatment, usually in the form of generous tax holidays. For example:

- In Singapore, pioneer status is granted to new manufacturing and service investments that introduce technology and/or skills substantially ahead of the average level prevailing in the local industry. Normally only projects involving products that are not already manufactured in Singapore will qualify.
- In Malaysia, the list of qualifying activities includes R&D and technical or vocational training. In the case of pioneer status, a 100 per cent exemption from profits tax is given for a five-year period.³²
- In Mauritius, pioneer status is granted only to enterprises whose activities involve technology and skills above the average existing in Mauritius and which are likely to enhance technological development.
- In Nigeria, pioneer status may be conferred (*inter alia*) where the investment undertakes substantial employee training and is considered beneficial to the country’s economy and the public interest.

Attempting to promote TOT by favouring high-tech industries has its limitations, since many conventional industries use advanced technologies whose introduction could be equally (or perhaps more) beneficial to the host country. Incentives are frequently given for the acquisition of technologically advanced equipment, both by foreign investors and by domestic firms. For example:

- China offers an enterprise using advanced technology and equipment an additional tax holiday of three years, at half the normal CIT rate, after the expiry of any other tax holiday for the enterprise it is eligible. The enterprise must introduce newly developed products and must have a TOT agreement in its joint venture contract, and the imported machinery and equipment must be superior to Chinese-produced machinery in terms of performance and efficiency. Further, the importation (by domestic and foreign-invested enterprises) of equipment may be exempted from customs duty and VAT if it is for use in one of the projects listed in the “encouraged category.” A recent reform also exempted software and integrated circuit companies

³² Most pioneer companies receive only a 70 per cent exemption.

from customs duty and import VAT for all "self-use" equipment and accompanying technology (including software), parts and accessories.

- Romania offers all investors exemptions from customs duty on the importation of technology and equipment used for new investment.
- In Serbia, accelerated depreciation (at 25 per cent above the normal rate) may be claimed for investment in computers or in assets used in environmental protection or energy conservation, for science, research and personnel training, and for a number of other purposes.
- In Taiwan Province of China, new rules introduced in 2003 allow companies in "scientific industries" an exemption from customs duty and business tax on their imported equipment, if such equipment is not available in the domestic market.

This type of approach requires an actual transfer of technologically advanced equipment, rather than simply favouring high-tech industries (some of which often assemble imported components using cheap labour). Nevertheless, it is not without drawbacks. In the case of foreign investment, the equipment remains the property of the investor and is often retained under the control of foreign technicians, so that there is no real transfer of *technology*. Tax concessions of this nature may also be an invitation for the "gold-plating" of investments, leading to the use of unnecessarily expensive equipment and to the less efficient choice of machinery (Holland and Vann, 1998). They may also require a determination of whether the equipment in question really is "advanced" – something that tax authorities are rarely qualified to judge.

As was noted in Section 3 above, the application of normal tax principles to expatriate managers and technical staff can often impose a cost and may deter the employment of those individuals who are best able to impart their expertise to local staff. It is consequently not uncommon for countries – both developed and developing – to adopt special rules giving preferential tax treatment to such persons. For example:

- The Republic of Korea recently introduced a package of tax incentives designed to attract investment by high-tech business, including exemption from personal income tax for foreign engineers.
- Mauritius offers incentives to attract foreign and domestic investors to the information and communication technology sector. The incentives include a 50 per cent income tax reduction for expatriate employees, duty-free status for their personal effects coming to Mauritius, accelerated procedures for visas and work permits, and the availability of work permits for spouses.
- Singapore permits a double deduction in respect of fees paid and other benefits granted to approved consultants engaged to research and develop new financial products and activities. Double deduction is also allowed for qualifying expenses incurred in relocating or recruiting employees from outside Singapore.
- In Thailand, expatriate employees are allowed to pay personal income tax at a flat 15 per cent rate for two years instead of at the usual progressive rates (which rise to 37 per cent).
- Viet Nam taxes foreign "experts" working in the country under a rate schedule different from the one that applies to domestic workers, with a higher income tax threshold and a lower maximum rate.

Among developed countries, the Netherlands and Sweden have recently introduced new tax concessions for expatriate employees. The Swedish provisions, for example, apply to “experts, researchers or other key employees when working temporarily in Sweden” and allow a 25 per cent deduction from salary (to compensate for increased living expenses) and a 25 per cent reduction in social security charges.

One reason for encouraging the importation of foreign experts is the expectation that they will pass on their skills to local employees. A more proactive approach is to provide incentives to firms – especially foreign investors – that provide training for their local staff. That is done in a number of sectors (often in conjunction with R&D incentives) in several countries. For example, the Philippines, Puerto Rico and Singapore all allow the double deduction of training expenses, and Taiwan Province of China grants a tax credit, to be set against profits tax, for such expenditures.

Another way of transferring technical knowledge and skills to local personnel is to send them abroad to study. Malaysia allows its firms (whether domestically or foreign owned) to claim a double deduction for expenditure on R&D activities undertaken abroad, *including* the training of Malaysian staff.

Incentives for carrying out R&D activities are common in both technology-importing and technology-exporting countries (and are considered further in Chapter III of this study). Among developing countries,

- China grants a R&D “super deduction” (of 150 per cent) for incremental R&D expenditure. A variety of other tax privileges are granted to specially established R&D centres.
- India allows a “super deduction” (of 125 per cent) of certain scientific research expenses and for R&D-related capital expenditures.
- Malaysia grants a five-year tax holiday for approved research companies or institutions, and a double deduction of research expenditure may be claimed in some circumstances.
- Mexico allows a tax credit of 30 per cent on total R&D expenses and on investments in R&D of technology.
- Nigeria grants a 20 per cent additional investment allowance for qualifying capital expenditure for companies engaged in R&D activities.
- As an alternative to “pioneer” privileges, Singapore grants an investment allowance (an additional deduction over and above the normal capital allowance claimable) of up to 100 per cent of the fixed capital expenditure incurred for R&D projects. A double deduction may be claimed for current R&D expenses.
- Turkey allows R&D expenses to be deductible at 1.4 times the original expense amount.

As was already noted, tax incentives for R&D are widely used in developed as well as developing countries. As the OECD report on tax incentives for research and development emphasizes, “Clarity, consistency and predictability are essential to assist enterprises in making R&D investment decisions partly on the basis of tax incentives.... Permanence in R&D tax relief allows corporate planning over the longer-term; evaluations show that R&D tax incentives are more effective when provided over a longer period. Overly complex

schemes – or those which change frequently – will act as a deterrent to R&D investments” (2002b).

A difficult issue is whether tax incentives should be based on the total volume of R&D expenditure or granted only for incremental expenditure (i.e. the increase over the previous year’s level). Volume-based schemes tend to be simpler for both companies and governments, though they also tend to be more expensive.³³ A further concern related to R&D tax incentives is the possibility for tax evasion or avoidance by companies – for example, when a tax credit or other privilege is claimed for non-R&D spending.³⁴

It is generally easier for a country to facilitate and promote the importation of technology than it is to secure the *transfer* of technology. The local subsidiary of a foreign company may import sophisticated machinery and use advanced patents and processes, yet little or none of this technology may be transferred in any meaningful way to the inhabitants of the host country. Genuine TOT is likely to take place only if linkages are established between the foreign investor and domestic firms.³⁵

Some countries have attempted to promote such linkages by means of tax incentives, usually by making tax privileges conditional on the use of local labour or materials. However, such provisions, by giving preference to the use of local raw materials or components, act as a form of barrier to imports and might well be held to be contrary to the GATT/WTO rules. In particular, the TRIMs Agreement prohibits a variety of measures aimed at restricting imports or promoting domestic production. The illustrative list includes measures that impose domestic content or trade-balancing requirements. Thus a Brazilian proposal to make tax incentives to automobile manufacturers conditional on the use of a specified minimum of local content (and on exporting part of their production) was debated at the WTO.

(c) Choosing the appropriate incentive

Formulating an incentives policy involves two basic decisions – which enterprises or activities should receive tax advantages (targeting), and what form those tax advantages should take (design). Tax incentives, as the term implies, operate through the tax system and confer benefits in the form of reductions in the tax that would otherwise be payable. Following are the most commonly employed forms of incentive:

- reduced rates of corporate income tax for particular activities or types of enterprise
- tax holidays (reduction of or exemption from tax for a limited duration)
- investment credits or allowances for investment in capital assets
- accelerated depreciation of capital assets

33 The OECD report (para. 41) suggests that they are likely to give windfall profits to companies that would have conducted R&D in any event. However, that can also be the case with incentives targeted to incremental expenditure. Both approaches can cause enterprises to distort their behaviour in order to maximize access to tax credits.

34 There is a substantial literature on the Canadian experience with R&D incentives and the types of problems and abuses that these can give rise to: see Gunz, Macnaughton and Wensley (1995).

35 On the creation of such linkages generally, see UNCTAD (2001).

- deduction rules that permit an amount greater than actual cost to be claimed
- deductions or credits for reinvested profits
- reduced rates of withholding tax on remittances to the home country
- reduced personal income tax and/or social security contributions for executives and employees
- exemption from, or reduction of, VAT or other forms of sales taxation
- property tax reductions
- reduced import taxes and duties.

Most of these forms of incentive can be, and are, used to promote TOT, though some are clearly more suitable than others. Although much has been written on the subject of investment incentives, relatively little attention has been paid to the question of how to match the particular type of incentive to the chosen objective or target, and the widespread use of tax holidays suggests that sufficient thought is rarely given to the actual design of investment incentives.

Those who advise on investment incentive policies generally regard tax holidays as the least meritorious of all forms of incentive (Bergsman, 1999; Tanzi and Zee, 2000). Tax holidays may be reasonably effective in attracting mobile, quick-profit investment, but otherwise are an extremely crude instrument and are ill suited to achievement of most of the objectives for which they are granted. In particular, tax holidays to promote TOT make little sense, although they are often employed with that objective.

As was suggested above, granting tax holidays to investors in the high-tech sectors does not necessarily result in any significant degree of TOT. Tax holidays for firms that utilize technologically advanced equipment may induce the investor to adopt inappropriate technology in order to secure tax privileges, and the rewards (in terms of tax spared) may be out of all proportion to the cost of the technology introduced. In addition, tax holidays are notoriously prone to manipulation and provide opportunities for tax avoidance and abuse (McLure, 1999).

More appropriate would be an exemption from customs duty on importation of technologically advanced equipment, or an investment allowance based on the actual value of such equipment. Similarly, enhanced deductions for current expenditures, such as software purchases, training costs, and R&D expenditures, have the advantage of being related to actual expenditure and linked to performance.

Another suitable form of incentive might be the imposition of reduced or zero rates of non-resident withholding tax on technology-related payments. For example:

- In China, withholding tax is frequently waived or reduced on royalties received by a non-resident enterprise: royalties paid in respect of the use of advanced technology are exempt, and reduced rates apply to royalties derived from scientific research.
- Malaysia grants exemption from withholding tax for “approved royalties” that are certified as payable for the purpose of promoting industrial development.
- In Singapore, exemption from withholding tax may be granted in the case of royalty payments to non-residents made for any purpose that will promote or enhance economic or technological development.

An objection to this form of incentive, however, is that it may well be nullified by a corresponding increase of tax in the home country, unless a tax-sparing credit³⁶ is available.

A relatively recent phenomenon has been the establishment of special “parks” or “zones” reserved for high-tech investment, and usually enjoying substantial tax benefits in addition to various other inducements of a non-fiscal nature. The objective is to provide an attractive location for technological activities by both domestic and foreign-invested firms and, by concentrating such activities in a single location, to utilize scarce resources to the best advantage and stimulate spin-offs. Frequently, the “park” is located close to, or actually contains, a university or other research establishment.

In general, technology-importing countries could design their tax rules to facilitate the acquisition of desired technologies into target sectors. For example, reduction or elimination of import duties and withholding taxes for technology products or services, especially those required to perform R&D activities or technology upgrading in line with their development strategies, may facilitate TOT. Similarly, careful targeting of incentives could promote FDI inflows as well as TOT to the desired industrial sectors.

³⁶ Discussed in Chapter III.3(c) below.