Tax Incentives for Foreign Direct Investment: Empirical Evidence on Effects and Alternative Policy Options

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ABSTRACT

Policy decisions over the setting of host country corporate tax burdens involve a balancing of competing objectives. On the one hand, revenue requirements may call for taxation at significant rates of domestic source income earned by non-resident investors. On the other hand, if host country taxation is set too high, inflows of foreign capital to productivity gains and economic growth may be discouraged. A key question then is how sensitive is foreign direct investment to host country corporate tax burdens? A related question is how to achieve a target overall (effective) host country tax rate: should the basic corporate income tax rate be the main instrument, or should greater reliance be placed on special investment tax credits and deductions?

This paper reviews empirical evidence on the impact of corporate tax burdens on cross-border direct investment decisions. As background, the paper first reviews the main categories of host country corporate tax incentives. This is followed by a brief discussion of possible interactions of host and home country tax systems in shaping host country tax burdens and investment and financing behaviour implications under alternative foreign tax credit position assumptions.

Recent empirical work suggests increased sensitivity over time of both real and financial business activities to host country taxation. With many forms of tax planning centred around statutory corporate income tax rate differences across jurisdictions, it is argued that empirical results provide qualified support for reliance on an attractive statutory corporate income tax rate, over special investment tax credits and deductions, as a means to encourage inflows of foreign investment capital.

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INTRODUCTION

In many if not most countries, concerns are often voiced over disappointing rates of productivity growth. These concerns are heightened by almost daily references to the importance of innovation in virtually all aspects of business to enable productivity gains and increased market shares. These pressures encourage policy makers to continually review their tax rules to ensure that they are internationally competitive. The ability to offer a tax system that attracts foreign capital is viewed as a critical component of a national strategy to secure high standards of living. Multinational enterprises (MNEs) generate higher than average profits, invest significantly in research and development (R & D), and offer well-paying employment opportunities.

At the same time, the corporate tax system performs an important withholding function, collecting revenues on domestic source income earned by non-residents that would otherwise escape the tax net. The desire to tax such income, while not discouraging foreign investors, raises critical questions about the response of direct investment flows to taxation and the appropriate setting of the various tax parameters that collectively determine the host country tax burden, taking into account different behavioural and tax revenue effects.

This paper considers empirical evidence, mostly drawn from the US experience, on the impact of business taxation on inbound foreign direct investment (FDI) and outbound direct investment abroad (DIA), and behavioural and revenue implications of alternative means of delivering tax relief. The paper begins with a review of non-tax considerations important to FDI decisions and then describes possible tax incentive instruments. It also reviews the two basic approaches to the taxation of foreign income from direct investment, given the need to address home country taxation when assessing the impact of host country tax incentives. There follows a summary of results from early and recent empirical literature examining the sensitivity of direct investment to host and home country taxation. The more recent evidence supports earlier findings of significant tax effects, and finds that the sensitivity of FDI to taxation is increasing over time. The discussion then focuses on the importance of analyzing the interaction of host and home country taxation in determining not only real investment responses—that is, tax effects on the purchase of new or existing plant, property, and equipment—but also likely firm-level financial and repatriation policy responses. In addition, possible coordinated actions by OECD countries in response to “harmful tax competition” are discussed. The concluding section of the paper briefly summarizes and assesses the main findings, notes limitations in drawing from existing empirical work, and suggests avenues for future work.

NON-TAX FACTORS, TAX INCENTIVES, AND CHANNELS OF INFLUENCE

While recent empirical work suggests that the influence of taxation on FDI location decisions is significant and growing in manufacturing and other business activities—
particularly in the area of mobile financial and other service activities—in most cases FDI decisions are driven primarily by considerations other than taxation. This section of the paper therefore begins by identifying important non-tax factors. Next, possible tax incentive instruments are listed and briefly reviewed. To provide additional background information, there is a discussion of the two basic approaches of OECD countries to the taxation of foreign source active business income (exemption versus tax deferral with a foreign tax credit), given the possibility that home country taxation may influence host country tax incentives. Also reviewed is the Hartman-Sinn result that home country taxation of repatriated earnings of foreign affiliates may not influence FDI financed at the margin by retained earnings. This result finds qualified support in the empirical literature and carries implications for the efficacy of certain host country tax incentives.

The Importance of Non-Tax Factors

Insight into the non-tax determinants of FDI behaviour can be gained from both case study and empirical analysis. Case studies tend to emphasize the importance of political stability and stability in the macroeconomic environment as critical components of a successful framework to encourage FDI. Clearly, political instability or the threat of political instability can be the single largest deterrent to FDI, since it renders all areas of public policy uncertain. In the macroeconomic context, instability in exchange rates and price levels also increases uncertainty and the perceived risk of FDI, tending to discourage investment flows. This effect on FDI emphasizes the importance of sound short-term and long-term fiscal policies.

Other important factors identified in case-study analysis include the host country legal and regulatory framework. FDI can be inhibited if commercial and other laws and regulations are incompatible with the operation of foreign-owned companies. Important areas include the protection of property rights, the ability to repatriate profits, and a free market for currency exchange. It is important that rules and related administrative procedures be transparent to minimize uncertainties in business planning.

Access to inputs and infrastructure are also key non-tax considerations emphasized in both case studies and empirical work. FDI will be discouraged if required factors of production cannot be accessed at a competitive cost. A related factor is the size of the market. FDI will be encouraged by the existence of a large potential market where consumer demand for certain goods has been largely unfilled to date.

Where tax treatment is identified in case studies as a major issue, transparency of the tax law and administrative certainty are often ranked ahead of tax

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relief. Uncertainty over the tax consequences of FDI increases the perception of risk and thus discourages capital flows. This factor is particularly important for long-term, capital-intensive investments that most governments are eager to attract. In addition, case-study analysis reveals that the ability of taxation to influence FDI decisions varies across business activities, with financing and other head-office activities being among the most strongly affected.2

Existing empirical studies of the determinants of FDI generally reflect a focus on industrial organization interests or tax incentives, but not both. Industrial organization approaches—while acknowledging the possible role of taxation—in explaining FDI emphasize the roles of tariffs and non-tariff barriers, and their removal; location-specific advantages (those related to marketing and distribution) and the internalization of transactions of MNEs with suppliers and purchasers; the importance of the exploitation of ownership-specific assets (such as intangibles); and difficulties in appropriating rents through (arm’s-length) licensing of products and processes to third parties.3

Corporate-Level Tax Incentives for FDI

Host countries may provide tax relief in a number of ways. Alternative corporate tax incentive measures include

- tax holidays,
- reductions in the statutory corporate income tax rate,
- enhanced/accelerated writeoffs for capital expenditures,
- general or targeted investment tax credits, and
- reductions in dividend withholding tax rates, and/or the provision/extension of integration relief.4

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4 Other possibilities include reductions in source country withholding tax rates on interest and royalty income. The effects of adjustments to these rates are addressed below under the heading “Empirical Studies of the Impact of Taxation on FDI and DIA.”

(2000), Vol. 48, No. 4 / no 4
The incentives listed above can be categorized according to the mechanism or channel through which they influence the benefits and costs of additional investment:

- incentives that reduce the corporate income tax rate on profits derived from investment;
- incentives that reduce the after-tax cost to business of purchasing new capital (through accelerated or enhanced tax deductions, and tax credits); and
- incentives that reduce the after-tax cost of raising funds to finance the purchase of new capital.

The framework described below provides a useful paradigm for considering these tax incentives and their channels of influence. It is followed by a review of the most commonly employed corporate-level tax incentives.

A Framework for Considering the Channels of Influence of Corporate Tax Incentives

Consider the following categories of tax incentives directed at income from capital: (1) those that reduce the statutory (or nominal or “headline”) corporate tax rate on profits; (2) those that reduce the cost of purchasing new capital; and (3) those that reduce the cost of financing. These categories can be usefully placed in context by considering the following equilibrium condition that describes, under certain stylized assumptions, the investment incentives of market-value-maximizing managers of a firm in a competitive market. In theory, competitive firms will undertake investment in capital only up to the point where the marginal benefit from the last unit of capital installed just equals its marginal cost. This equilibrium condition can be expressed as follows:

\[
\frac{\Delta Y}{\Delta K}(1 - u) = (r + d)(1 - A)
\]

or equivalently,

\[
\frac{\Delta Y}{\Delta K} = (r + d)(1 - A)/(1 - u).
\]

In this expression, the term \(\Delta Y/\Delta K\) represents the increase in gross revenues \(Y\) accompanying a (one currency) unit increase in the representative firm’s (or industry’s) capital stock, denoted by \(K\). With diminishing returns to installed capital at the margin, the value of \(\Delta Y/\Delta K\) falls as the capital stock increases. Revenues from investment at the margin are subject to the statutory corporate income tax rate, denoted by \(u\). The left-hand side of (1) measures the after-tax marginal benefit from an additional unit of investment.

The after-tax marginal cost is measured on the right-hand side of (1). This cost is the product of two terms. The term \((1 - A)\) gives the after-tax purchase price of one additional unit of capital, where \(A\) measures the present value of tax incentives tied to the purchase of a unit of capital. Such assistance would include, for example, investment tax credits and tax depreciation allowances. The higher the investment tax credit rate, or the rate of tax depreciation allowance, the larger \(A\) is. The term \((r + d)\) is the sum of the real rate of return required by investors on their capital investment, denoted by \(r\), and the rate of economic depreciation of the capital owing to wear-and-tear and technological obsolescence, denoted by \(d\). On the last currency unit of capital installed, acquired at an after-tax price of \((1 - A)\)
currency units, the firm faces financing charges of \( r(1 - A) \) and in each period must replace worn-out capital at an after-tax cost of \( d(1 - A) \).

This framework is useful for considering the channels through which various tax incentives may operate to encourage investment behaviour. First, reducing the statutory corporate income tax rate (or eliminating taxation, as under a tax holiday) will increase the after-tax revenues from investment at the margin, and as a result will tend to lead to a higher equilibrium capital stock. A reduction in the corporate tax rate, however, also lowers the present value of deductible depreciation allowances, thereby lowering \( A \). A reduction in the corporate tax rate also increases the after-tax cost of debt finance by reducing the value of interest deductions, and thus also acts to lower \( A \). Therefore, a priori, the impact on investment incentives of a reduction in the corporate income tax rate is ambiguous. However, generally the first-noted effect will dominate, and investment incentives will be increased by a reduction in the corporate tax rate.

Second, introducing or enriching a system of investment tax credits increases the value of \( A \), and thus tends to encourage investment at the margin. Similarly, increasing the rate at which capital can be depreciated for tax purposes (for example, through accelerated depreciation, or immediate and full expensing of capital costs) increases \( A \) and thereby investment incentives. Depending on the rate and design of the investment tax credit and capital cost allowance (that is, tax depreciation) regime, the term \((1 - A)\) may well be negative, indicating that the tax system on balance acts to encourage rather than discourage investment relative to the no-tax case.

Third, government policy can potentially influence the firm’s pre-corporate tax cost of finance (\( r \)). As already noted, the cost of finance, which generally is some weighted average of equity and debt finance, will tend to increase if the statutory corporate income tax rate is reduced. In some cases, the cost of equity finance may be a function of personal tax parameters, including the degree of double taxation relief (corporate and personal tax integration). In particular, in certain financing and arbitrage situations, reductions in shareholder-level dividend tax rates and capital gains tax rates may lower the cost of funds to the firm, and through this channel encourage investment.

The framework can cover the cross-border investment case where there is possibly non-resident withholding tax and home country tax on payments of dividends and/or interest to foreign (parent) investors (which can be modelled through their impact on the cost of finance \( r \)).

**Tax Holidays**

A common form of tax incentive used primarily by developing countries to attract FDI is a tax holiday. Under a tax holiday, qualifying “newly established

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firms” are not required to pay corporate income tax for a specified time period (for example, five years), in order to encourage investment. Targeting rules are required to define “newly established firm,” qualifying activities/sectors, and the starting period of the tax holiday. The provisions may exempt firms from other tax liabilities as well. At the same time, tax holidays deny firms certain tax deductions (such as depreciation costs and interest expense) over the holiday period or indefinitely, and thus tend to offset, at least in part, inducement effects.

Tax holidays are viewed as a simple incentive with a relatively low compliance burden (for example, there is no need to calculate income tax over the holiday period). This aspect tends to make this form of incentive attractive, particularly in countries that are just establishing a corporate tax system. Provisions may impose certain tax-related obligations (such as withholding personal tax from wages or filing income tax returns). For long-term investment projects, investors will often be required to keep records of capital expenditures and other items before and during the holiday period, in order to be able to comply with the tax system following the holiday.

A tax holiday may be targeted at new firms in a specific region and/or industry sector. Sectoral targeting may offer positive “spillover” benefits including the transfer of skills and knowledge to domestic firms/workers (for example, in the telecommunications sector). Targeting by sector or activity raises problems of how to treat firms engaged in a targeted sector/activity, and in other sectors/activities that do not qualify. One option is to deny the holiday in the latter cases (strict targeting). Another option is to grant the holiday provided that a high percentage (for example, 75 percent or more) of the assets of the company are employed in the targeted area, and to restrict holiday benefits to income from the targeted sector/activity. Regional targeting may support regional development and income distribution policy goals. Investor groups also may be targeted, as in the case of incentives targeted exclusively at foreign investors. It is often maintained that targeting foreign investors can provide access to external capital, skills, and contacts, while including domestic investors can encourage domestic entrepreneurs to enter new fields.

Tax holidays are most attractive to firms in sectors where profits are generated in early years of operation (for example, firms in trade, short-term construction, and service sectors). However, where a tax holiday is necessary to attract such mobile sectors, there exists the threat that business will exit following the holiday. Tax holidays are generally least attractive to firms in sectors requiring long-term capital commitments. Loss carryover provisions may be required, with or without a tax holiday. From the host country perspective, tax holidays tend to be particularly problematic, in terms of revenue loss, where

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6 A simple formula approach should be used to determine the proportion of profits to qualify for the holiday. The proportion could be on the basis of some overall figure such as wages and salaries of employed, total revenues, or assets.
significant business already exists in targeted activities, given the incentive to create “new” businesses from old (existing) ones.

**Reductions in the Statutory Corporate Tax Rate**

A common form of tax incentive to encourage FDI, used by developing and developed countries alike, is a reduced statutory corporate income tax rate on qualifying income. The rate reduction may be broad-based, applicable to all domestic and foreign source income, or it may be targeted at income from specific activities, or from specific sources (such as foreign source income), or at income earned by non-resident investors alone (forms of “ring fencing”), or some combination of these. As with a tax holiday, difficult definitional, administrative, and compliance issues arise where the low rate is targeted at income from a subset of activities or investors. If the reduced rate applies only to profits from a targeted activity, then careful legislative drafting, regulations, and administration are generally required to clarify eligibility and limit leakage. The rate reduction may be introduced as either a temporary or a permanent measure, and generally is more attractive to foreign investors the longer the period during which they can expect to benefit from it.

As emphasized later in this paper, tax incentives for FDI delivered by way of a reduced statutory tax rate tend not only to encourage real investment, but also to discourage financial structures and repatriation behaviour aimed at eroding the host country tax revenue base.

**Special Investment Allowances and Investment Tax Credits**

Another channel through which FDI incentives may be altered is via special tax provisions that lower the effective price of acquiring capital. Two main types of incentive can be distinguished in this category:

1) investment allowances, which are special/enhanced deductions against (that is, reducing) taxable income; and

2) investment tax credits, which are special deductions against corporate income tax otherwise payable.

Both investment allowances and investment tax credits are earned as a fixed percentage of qualifying investment expenditures. However, because the investment allowance is deducted against the tax base, its value to the investing firm depends, among other things, on the value of the corporate income tax rate applicable to the tax base; the higher (lower) the tax rate, the higher (lower) the amount of tax relief on a given amount of investment allowance claimed. In contrast, variations in the corporate tax rate do not affect the value of investment tax credits.  

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7 The setting of the corporate income tax rate can indirectly influence the value of investment tax credits to the extent that the claiming of investment tax credits earned is constrained by the amount of corporate tax (which is itself a function of the corporate tax rate).
Investment Allowances

Under an investment allowance, firms are provided with faster or more generous writeoffs for qualifying capital costs. Two types of investment allowance can be distinguished:

1) With accelerated depreciation, firms are allowed to write off capital costs over a shorter time period than that dictated by the capital’s useful economic life, which generally is accounting basis for depreciating capital costs. While this treatment does not alter the total amount of capital cost to be depreciated, it increases the present value of the claims by shifting them forward, closer to the time of the investment. The present value of claims is obviously the greatest where the full cost of the capital asset can be deducted in the year the expenditure is made.

2) With an enhanced deduction, firms are allowed to claim total deductions for the costs of qualifying capital that exceed the (market) price at which it is acquired. Depending on the rate at which these (inflated) costs can be depreciated, this may generate a stream of deductions that exceed, in present value, the corresponding acquisition costs.8

Investment Tax Credits

Investment tax credits may be flat or incremental. A flat investment tax credit is earned as a fixed percentage of investment expenditures incurred in a year on qualifying (targeted) capital. In contrast, an incremental investment tax credit is earned as a fixed percentage of qualifying investment expenditures in a year in excess of some base, which is typically a moving-average base (for example, the average investment expenditure by the taxpayer over the previous three years). The intent behind the incremental tax credit is to improve the targeting of the relief to incremental expenditures that would not have occurred in the absence of the tax relief. This targeting is not ensured, however, since investors may have planned to increase their investment expenditures beyond levels in prior years in any event.

Theory predicts that upfront tax incentives earned on investment expenditures, including investment tax credits (and accelerated depreciation if limited to new capital expenditures), should provide the biggest “bang-for-the-buck.” Indeed, the main argument for using these forms of investment subsidy, as opposed to a reduced corporate income tax rate, is that subsidies to the cost of purchasing capital benefit only new investment; therefore, a larger reduction in the effective tax rate on investment can be achieved at a lower revenue cost.9

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8 Note that the second investment allowance scheme can be combined with the first, giving accelerated deductions on an enhanced (inflated) cost base.

9 This reasoning does not apply as strongly where a corporate income tax rate cut is targeted at new investment alone. However, in practice, this targeting is very difficult to sustain, since existing firms attempt to recharacterize their business activities to qualify for the tax relief.
Rate cuts benefit existing or “old” capital, not just “new” capital, providing existing capital holders with a windfall gain, because the reduction in the corporate tax rate increases the present value of the future stream of earnings from existing capital, and thus causes its share value to rise.\(^{10}\) Moreover, upfront tax incentives can help address cash flow problems (liquidity constraints) that may inhibit capital investment. (This latter consideration tends to apply mainly to small businesses and therefore may not be an overriding issue in the context of FDI by medium- to large-scale MNEs.)

Furthermore, investment tax credits should have the most stimulative impact when targeted at short-lived assets, rather than long-lived assets of the same productivity. This follows from the fact that the present value of the stream of tax payments on revenues from a short-lived asset is smaller than in the case of a longer-lived asset. Therefore, an investment tax credit at a flat, fixed rate offsets a larger percentage of the tax revenues imposed on the stream of earnings from a short-lived asset. Viewed differently, short-lived assets are replaced more frequently than long-lived assets, and consequently, the investment tax credit is earned more frequently.

**Financing Tax Incentives**

There are generally three broad classes of financing tax incentives (that is, tax incentives used to reduce the cost to business of raising investment funds):

1) Upfront tax incentives (tax deductions or credits) that provide shareholders with tax relief on the cost (that is, the dollar amount) of their equity investments in (or loans to) targeted activities.

2) Downstream tax incentives (tax deductions or credits) that provide shareholders with tax relief on the return (that is, dividends or capital gains) from their investments in targeted activities.

3) Flowthrough tax incentives that allow businesses to transfer unused tax deductions or tax credits earned on qualifying expenditures to investors, to be used to offset shareholder-level rather than business-level taxation. This form of incentive is generally applied to situations where businesses are expected to be non-taxable for a number of years and thus have no immediate use for tax preferences.

In the context of foreign direct investors, financing tax incentives generally fall under category 2. Possible relief measures include a reduction or the elimination of non-resident withholding tax on dividend income, and the extension

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\(^{10}\) It is also important to recognize that an investment tax credit, which denies relief to existing capital, will impose a windfall loss to (that is, a reduction in share values for) existing capital holders (for the same reason that the value or price of any other asset declines, ceteris paribus, if the purchase price of a new unit falls).
either in full or in part of integration relief (that is, relief in respect of corporate-level tax on distributed income) in systems that provide imputation or dividend tax credit relief to domestic shareholders. Whether or not measures relieving dividend taxation affect investment generally will depend on the source of financing. In particular, under one view of dividend taxation, such relief will operate to lower the cost of funds to the firm only if new share issues are the marginal source of finance. The foreign tax credit position of foreign direct investors subject to “worldwide” taxation, the existence or not of a “tax-sparing” agreement with investor countries, and the tax treatment of the “marginal shareholder” may also be important factors, as noted below.

Tax incentives for FDI sometimes require 100 percent foreign ownership. In other cases, incentives are provided to foreign investors if their aggregate equity interest in a domestic investment is something less (such as 50 percent). In these cases, a question that arises is whether or not to provide domestic shareholders with the same special tax relief. Where tax incentives are structured at the corporate level (such as tax holidays, a preferential corporate tax rate, accelerated or enhanced depreciation allowances, investment tax credits), the benefits generally accrue to domestic and foreign investors (unless some countermeasures are taken). In order to provide domestic shareholders with an added incentive to form a joint venture with foreign investors, financing tax incentives targeted at the domestic investor group might be considered.11

Approaches to Taxing Foreign Source Income

In order to assess the overall tax treatment of FDI and the likely effects of host country tax relief, it is necessary to look beyond the host (source) country where the activity takes place. It is also necessary to consider the tax treatment in the home country of the foreign investor (the country of residence of the parent company or its financing affiliate), since there are often home country tax consequences that can offset host country tax relief.

Countries generally follow one of two approaches in their treatment of foreign source income earned on FDI.12 Under the “territorial” or “source-based” approach, foreign source income is generally treated as tax-exempt. Therefore, in determining the overall level of corporate tax imposed on income from FDI, one need not consider home country taxation. In other words, for investors resident in exemption countries, only host country taxation matters.

11 Financing incentives may also be targeted at non-resident portfolio investors. See Organisation for Economic Co-operation and Development, Taxation of Cross-Border Portfolio Investment: Mutual Funds and Possible Tax Distortions (Paris: OECD, 1999), for a discussion of relevant portfolio shareholder tax considerations and the impact of tax relief in international direct (non-intermediated) and intermediated (collective investment fund) investment structures.

12 In many countries, special accrual tax rules apply to foreign portfolio (passive) investment income.
The other basic approach is the “worldwide” approach that adopts the residence principle of taxation. Countries with residence-based tax systems (such as the United States, the United Kingdom, and Japan) tax resident investors on their worldwide income, which includes foreign source income. Under gross-up and foreign tax credit provisions, the home country taxes foreign income (measured gross of foreign tax) when it is repatriated, but provides a tax credit for creditable foreign income tax paid to avoid double taxation of that income. However, the foreign tax credit that may be claimed is typically limited to an amount not exceeding the amount of home country tax levied on the gross income. Withholding taxes are considered to be income taxes, despite being levied on a gross basis, and are therefore creditable taxes. This system effectively provides the host (source) country the first opportunity to tax subsidiary earnings but then taxes distributed income at home country tax rates, while providing a foreign tax credit up to the amount of the home country tax.

In principle, companies subject to tax under a worldwide system face a similar tax burden on their foreign source income as on their domestic source income. However, if the host country effective corporate tax rate exceeds the home country tax rate—or more generally, if the firm is in an “excess foreign tax credit” position, with foreign tax credits offsetting domestic tax on foreign source income—the tax burden at the margin is dependent on the host country tax provisions alone, as under a source-based system.

Table 1 considers various forms of foreign source income, possible types of source country taxation, and those types that are generally creditable. It also shows possible home country tax treatment. The focus is on the treatment of income from a foreign subsidiary, particularly foreign direct dividends.

Where a foreign direct investor is subject to tax under a worldwide system, the introduction of a tax incentive for FDI that lowers host country income tax may—depending on the investor’s foreign tax credit position—simply lower the foreign tax credit dollar for dollar and increase tax revenues in the home country dollar for dollar, without reducing the combined amount of host and home country income tax imposed on income generated in the host country. In other words, the tax incentive may have no impact on the final tax burden on the investor (and thus no impact on investment incentives) and may simply result in a transfer of tax revenues from the host country treasury to the home country treasury.

There are several qualifications relevant to considering the implications of home country tax as regards possible offsetting effects to host country tax incentives. First, MNEs are often in a position to avoid additional home country tax (if any) on low-tax foreign source income using various tax-planning techniques. One common technique is the mixing of high-tax and low-tax foreign source income for foreign tax credit purposes, using the excess foreign tax credits on high-tax income to offset home country tax on low-tax foreign source income. Another is the use of financing affiliates in exemption countries. Second, a number of OECD countries have entered into tax-sparing agreements with
developing countries with the explicit intent of preserving host country tax incentives. Third, subsidiary profits are typically not subject to home country taxation until the year in which the earnings are distributed. Thus, possible home country taxation of foreign source dividends may be deferred by postponing distributions of foreign (host country) income.

The ability to defer home country tax on foreign source income may encourage MNEs to favour low-tax jurisdictions. However, as first pointed out by Hartman in the cross-border investment context, the ability to defer dividend taxation (home country corporate income tax plus host country withholding tax) may have no impact on decisions involving cross-border investment financed by retained earnings. The insight is an extension of the tax-capitalization hypothesis first addressed in the context of domestic investment by Hartman and others that dividend taxation, while capitalized in (reducing) share prices, does

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<td>Interest</td>
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<td>CIT, BPT</td>
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<td>Credit system (accrual)</td>
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Note: CIT = corporate income tax. WT = withholding tax. BPT = branch profits tax (branch equivalent of WT).

not alter retentions-financed investment behaviour. Hartman’s findings consider FDI in a “mature” subsidiary, where investment is financed at the margin by retained earnings and dividends are determined as a residual. Given the assumption that dividends equal after-corporate-tax profits less retentions, Hartman’s model also predicts that dividend repatriation decisions are invariant to the setting of repatriation tax rates and the ability to defer these taxes.

This finding essentially rests on the assumption that repatriation tax on dividends is unavoidable. In this sense, after-corporate-tax earnings are “trapped” in the firm. Where dividend repatriation tax cannot be avoided, the tax reduces by the same amount the opportunity cost of reinvesting after-corporate-tax earnings (determined by the after-tax return on an alternative [next-ranked] investment, financed by distributed subsidiary earnings immediately subject to repatriation tax) and the return on reinvestment. In other words, the present value of the repatriation tax imposed on the eventual distribution of earnings on reinvestment is the same as the current period repatriation tax on an immediate distribution. As a result, the tax does not influence the subsidiary’s decision to reinvest the funds or repatriate them to its parent.

The Hartman result is subject to a number of qualifications. First, it applies to investment financed at the margin by retained earnings. Higher repatriation tax rates would be expected to reduce FDI financed at the margin by new share issues. Second, as pointed out by Altshuler, Newlon, and Randolph, the result assumes that the repatriation tax rate is constant. If the tax rate varies over time, this generates incentives for the repatriation of relatively more subsidiary profits when the tax cost is low (relative to the expected future cost). Third, the result is sensitive to the assumption that the host and home country have similar tax bases. Leechor and Mintz show that if a host country offers accelerated depreciation, for example, attracting FDI, home country tax effects are introduced since the additional investment may lower the foreign tax credit that can be claimed to shelter income from previous investment. Fourth, as emphasized by Grubert, dividends are not the only repatriation channel. Operating surplus may be paid out in other forms, including interest, royalties, management fees, and other deductible charges. As discussed later in this paper, Grubert’s empirical

15 Supra footnote 13.
work finds that while retained earnings are invariant to repatriation tax rates (confirming Hartman’s model), dividend distributions are not, and depend not only on their own repatriation tax rate, but also on the tax price of interest and royalty payments.

**EMPIRICAL STUDIES OF THE IMPACT OF TAXATION ON FDI AND DIA**

This section of the paper reviews empirical findings on the impact of taxation on cross-border direct investment in real (physical) and intangible capital. These studies are grouped as follows:

- findings in the literature up to 1990 that rely primarily on time series data on US FDI;
- work that uses revised FDI data and addresses general equilibrium effects, recognized as important yet typically ignored in most works;
- more recent results derived using US data on (outbound) DIA; and
- empirical analyses of host and home country tax considerations thought to influence R & D location decisions of US MNEs.

**Early Results Focusing on (Inbound) US FDI**

Empirical studies of the effect of taxation on FDI were pioneered by Hartman19 in 1984, using data compiled by the US Bureau of Economic Analysis (BEA). Virtually all of the subsequent studies over the remaining decade focused on replicating and refining his approach using updates and improvements to the BEA data. Indeed, given the difficulty in obtaining required data to permit work in this area, most of the evidence to date continues to be based on the US experience. That experience is highly relevant in the Canadian context, since Canada is a major recipient of US investment capital.

**Hartman’s Seminal Work**

Hartman estimates the following equation for FDI (denoted by $I^*$) over the period 1965-1979:

\[
\ln(I^*) = a_0 + a_1 \ln(r(1-t)) + a_2 \ln(r^o(1-t)) + a_3 \ln((1-t^o)/(1-t))
\]

where $r(1-t)$ measures the after-corporate-tax rate of return on inbound FDI (determined as retentions plus distributions, interest, and branch profits, with the surplus measured net of US corporate and property tax), divided by the end of prior-year FDI stock; $r^o(1-t)$ measures the overall after-corporate-tax rate of return on US capital stock (domestic plus foreign-owned); $t$ denotes the average US corporate tax rate (assumed to be equal for foreign and domestic firms), and

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denotes the average US corporate and personal tax rate on income from capital. Variables enter the equation in natural logs (ln) to facilitate elasticity computations.20

The equation is estimated separately for FDI financed by retained earnings and FDI financed by new transfers of funds (new share issues plus loans from parents). The equation simply relates FDI flows to two after-tax rate of return variables plus a relative tax term. The after-tax rate of return variables (backward-looking, average tax rates) are meant to proxy prospective rates of return on new FDI; the second term is introduced to help explain FDI in the form of acquisitions of existing assets, as opposed to expansions to existing foreign-owned operations or the establishment of a new US subsidiary or branch. The relative tax term is introduced to allow for the possibility that tax changes that apply to US investors alone may affect FDI through their impact on asset prices. (For example, an increase in the effective tax rate on US investors \([r^e]\) alone that reduces equity shares, while the tax rate on foreign investors is unchanged, would be expected to increase FDI.)

Hartman’s results find that the coefficients in the estimating equation have the expected signs \((a_1>0, a_2>0, a_3<0)\) and are statistically significant, though the fit (explanatory power) is much better when the equation is used to explain investment financed by retained earnings, as opposed to new capital. This result is consistent with the “tax capitalization” view that home country taxation influences (and thus should be taken into account when estimating) FDI financed by new equity, but not FDI financed by retentions.

**Replication and Extension by Boskin and Gale, Newlon, and Slemrod**

Hartman’s 1984 paper sparked the interest of a number of other researchers. Boskin and Gale21 re-estimate Hartman’s model over a longer time-frame (1956-1984) using revised average tax rate and after-tax rate of return estimates provided by Feldstein and Jun.22 They also test alternative functional forms to the investment equation and find that estimated elasticities (sensitivity) of FDI to the after-tax rate of return variables are roughly similar, albeit slightly lower than what Hartman found. Newlon23 discovers that the variable measuring the after-tax rate of return on FDI used in the preceding works by Hartman and Boskin and Gale was

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20 Ibid.
miscalculated from the original BEA data. Using a corrected after-tax rate of return series, Newlon finds that the estimated coefficients are unstable and sensitive to the time period considered. When considering the years 1965-1973, he finds that the investment equation explaining transfers of funds fits better than the one explaining retained earnings, reversing the earlier findings. When the interval is changed to 1956-1984, the equation explaining transfers of funds performs poorly, and no estimated coefficient is found to be significant.

Neither Hartman’s 1984 work, nor the refinements to it by Boskin and Gale, Newlon, and later Young incorporate US withholding tax rates or foreign home country taxes. The exclusion of repatriation tax considerations from the analysis is potentially problematic, particularly in the case of FDI financed by new transfers from foreign parents. Slemrod addresses this concern by disaggregating FDI data over the sample period 1960-1987 and calculating two separate US inbound investment series—one for investors from Canada, France, the Netherlands, and (the former) West Germany, all treated as exemption countries; and another for Italy, Japan, and the United Kingdom, which tax foreign (US) source income under a foreign tax credit system. His primary goal is to go beyond earlier investigations to address the question of home country tax influences.

First, however, Slemrod (like his predecessors) tests US host country tax effects. Unlike earlier researchers, rather than using US average rate of return variables, Slemrod uses a measure of the marginal corporate income tax rate on fixed investment in the United States calculated by Auerbach and Hines, introducing into the investment equation both current period and lagged values (under a “time to build” argument). In a break from earlier studies, Slemrod introduces as explanatory variables (1) the unemployment rate in the United States, to capture business cycle effects on FDI; (2) the ratio of the aggregate gross domestic product (GDP) of the seven investing (home) countries to US (host) country GDP, to capture the effects of changes in the relative size of the US economy; and (3) the real exchange rate of the US dollar against a GDP-weighted average of the currencies of the seven investing countries, to capture the effect of changes in relative production costs in the United States. Slemrod adds a dummy variable equal to the number of years elapsed between data observation years and the benchmark survey year to account for the possible drift in the extrapolated data from true FDI values. Note that the BEA follows the procedure of extrapolating benchmark data (collected periodically, in 1959, 1974, and 1980) forward to non-


benchmark years, using sample data from quarterly surveys. Benchmark data, however, generally are not extrapolated backward as a check of forward extrapolations of earlier years.

Slemrod takes the “tax capitalization” view that the repatriations tax rate on distributed earnings, if stable, should not influence FDI financed by retained earnings. Where, however, a subsidiary’s desired investment exceeds its retained earnings, and new share issues (parent company transfers of funds) are the marginal source of funds, the tax due on repatriation of earnings would be expected to matter. (As noted above, the neutrality result for a “mature” firm facing a use-of-funds tradeoff between retaining and distributing earnings arises because the repatriation tax reduces the present value of the returns on internal investment by the same amount as it reduces the opportunity cost of distributing the funds and investing them in an alternative investment.)

Slemrod’s empirical tests of host country taxation of FDI into the United States offer mixed results. The regression coefficients show, as expected, a negative relationship between FDI financed by new fund transfers and the US marginal effective tax rate (METR). The relevant (summed) tax coefficients are negative for all seven countries and significantly different from zero in four cases (though not for the FDI equation explaining investment from Canada). However, the regressions for inbound FDI financed by retained earnings show no clear host tax effect emerging. Furthermore, the regressions generally do not find more significant host country tax effects for investors from exemption countries. This result is somewhat surprising given that host country tax effects can be fully offset under certain conditions by home countries that operate foreign tax credit systems.

As noted above, Slemrod’s main objective is to test for home country tax effects. In his regressions, he introduces four new explanatory variables in each of the six FDI equations (for all capital-exporting countries except the Netherlands, where the requisite data were not available): a current-period and two lagged values of a home country METR incorporating corporate and personal taxation, and a tax difference term measuring the gap between the host US and home country statutory corporate income tax rates.

Several propositions are tested. Slemrod argues that, in theory, FDI from exemption countries should be positively related to home country taxation under the assumption that home country investment possibilities represent the opportunity cost of investing in the United States. He finds no empirical support for this proposition, since in no exemption country is the home country’s tax rate found to be positively related to FDI. However, as pointed out by Hartman in his commentary on Slemrod’s article,27 there is no clear reason to expect this positive relationship. If parent company internal cash flow is an important source of

financing for US subsidiary investment, then high home country taxation, by reducing after-tax cash flow, may reduce US investment. Moreover, it is not clear in the context of US investment by a parent resident in a given (exemption or foreign tax credit) foreign country (such as Canada) that the relevant comparison will be between the US tax rate and the foreign (home country) marginal tax rate. The relevant comparison for a Canadian parent considering expanding capacity in its US or UK affiliate might be between the US and the UK tax rates, for example.

Slemrod also tests whether FDI financed by new fund transfers from parents in foreign tax credit countries has a less positive or negative relation to home country taxation. Under the Hartman model, new fund transfers should be discouraged by higher repatriation tax rates. Thus, while higher home country taxation on domestic investment would tend to encourage FDI, higher home country tax on foreign source income of parents in a deficit of foreign tax credit position should operate to reduce and perhaps reverse this substitution effect. The results do not show that the effect of home country taxation is less positive (more negative) for foreign tax credit countries compared to exemption countries.

The results do, however, tend to confirm the proposition that FDI financed by retentions should be invariant or positively related (through a substitution effect) to home country taxation. Also, the transfer of funds FDI equation for West Germany and Italy shows a significant negative coefficient on the statutory tax rate difference term, supporting the proposition that a relatively higher US tax rate should encourage higher borrowing in, and thus reduced transfers to, the host country.

Slemrod suggests that the failure of the empirical work to support expected differences in FDI responses between exemption and foreign tax credit countries may be explained by data problems, including difficulties in the measurement of METR statistics. Data problems as well as a misspecified investment model may also explain the finding of a negative, statistically significant coefficient on the home country tax rate that disappears when the home country tax rate is introduced in the case of West Germany and Japan. Slemrod notes the possibility that tax planning to avoid home country taxation may go far in explaining the lack of importance of home country tax effects, and may suggest that host country tax effects dominate FDI decisions.

**Problems with Early Empirical Studies**

The early results are somewhat discouraging to researchers eager to understand the relationship between taxation and FDI. However, the lack of clear answers from these and other early studies to the basic question of how taxation and therefore how tax relief affects FDI may be explained by a number of factors. Two factors considered below are (1) the use of simple, reduced-form estimating equations that may not adequately capture the appropriate investment model, and (2) problems with the data. The concluding section of the paper will return
to a consideration of these and additional factors to bear in mind when interpreting both the earlier and more recent empirical results.

**Lack of a Well-Developed Model Explaining FDI**

Arguably, the research relies on overly simple investment equations. Most of the research has centred on reduced-form relationships between capital flows and measures of after-tax rates of return or effective tax rates on capital income. In these models, potentially important non-tax determinants of FDI are not explicitly modelled. However, it is not obvious how to incorporate elements that industrial organization research considers important to explaining FDI flows—including the choice of FDI over exporting in order to exploit ownership-specific assets (such as intangibles), and to capture location-specific advantages (related to sourcing or marketing). Also, as noted above, the earlier studies—with the exception of Slemrod’s—do not incorporate US withholding tax rates, foreign home country taxes, or rates of return on non-US investments, and this omission may be problematic.

**Data Problems**

All of the early studies of the effects of taxation on FDI rely on BEA data on investment flows. Reliance on these data is problematic on a number of counts.

First, the FDI data exclude debt capital raised locally or in third countries other than the home country. (FDI includes retained earnings and transfers of funds—new equity transfers plus debt capital loaned by the foreign direct investor.) Thus, the investment figures exclude important and possibly fluctuating components of FDI, and may therefore bias empirical findings.

Second, as noted above, the surplus measure in the numerator of the after-corporate-tax rate of return variable in Hartman’s investment equation includes undistributed (retained) and distributed earnings. This can introduce a spurious correlation in the equation between the explanatory variable and the flow of FDI financed by retentions. Indeed, Newlon shows that in instances where a firm retains its income in full for investment purposes (as, for example, would be expected if its desired investment exceeded its after-tax earnings), or where a fixed positive dividend payout rule is followed, a direct association would be observed between the after-corporate-tax rate of return variable and retentions-financed FDI, thus rendering problematic any observed empirical relationship between the left-hand side retentions-based FDI variable and the right-hand side after-tax rate of return explanatory variable. 28

Third, the early BEA data do not distinguish between acquisitions of existing business capital, on the one hand, and investment in new productive capital, on the other, where the latter includes not only expansions to existing capacity but

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28 Supra footnote 23.
also the creation of new investment projects. This has a number of implications. As emphasized by Auerbach and Hassett,\textsuperscript{29} a distinct set of tax considerations is raised in the case of acquisitions FDI, which is ignored by FDI models such as Slemrod’s, since those models rely on corporate METRs that incorporate tax treatment applicable to the acquisition of new as opposed to existing productive capital.

Moreover, the theory underlying the construct of METR statistics assumes a smooth, continuous capital demand function and the absence of economic rents. However, new FDI projects will often involve large discrete, discontinuous adjustments to the aggregate capital stock and generate economic rents from the exploitation of some firm-specific advantages. Consequently, the assumptions underlying the METRs used to explain FDI flows may not be appropriate.

Fourth, the FDI figures are not true measures of real capital investment in the host country, in that they include purchases of financial claims that could include securities giving ownership to foreign capital—that is, capital situated outside the given host jurisdiction.

Fifth, there are breaks in the time series on US inbound FDI regarding the identity of the home country providing the investment funds. The 1974 benchmark data shifted from a definition that in some cases used the “ultimate beneficial owner” approach, which looked through an ownership chain, to one that consistently looked to the “first foreign entity in the ownership chain.” This problem flags the difficulty in determining the relevant set of tax rates applicable to investment returns.

**Results Focusing on General Equilibrium Effects**

Most studies of the tax effects on FDI involve a partial equilibrium analysis. These approaches are incomplete, since they miss potentially important impacts of taxation on interest rates, exchange rates, and various other market prices and returns. Swenson\textsuperscript{30} emphasizes the importance of general equilibrium effects and in her work, using newly generated BEA data, focuses on the effects of tax changes on pre-corporate tax rates of return. Her analysis draws on the work of Scholes and Wolfson,\textsuperscript{31} which is critical of partial equilibrium approaches that assume fixed pre-tax returns. In practice, pre-tax rates of return and asset prices adjust to tax shocks that alter the relative attractiveness of various assets.

\textsuperscript{29} A. Auerbach and K. Hassett, “Taxation and Foreign Direct Investment in the United States: A Reconsideration of the Evidence,” in Giovannini, Hubbard, and Slemrod, supra footnote 2, 119-47. Auerbach and Hassett discuss different capital gains tax and tax depreciation (basis step-up) implications of acquisitions FDI, which depend on whether corporate stock or corporate assets are acquired.


For example, if the tax rate were increased on a particular class of capital asset (such as capital employed in a given sector or capital held by a given investor group), the relative price of the asset would fall. The decline would reflect reduced after-tax returns on the stream of future pre-tax earnings at the existing level of the capital stock and along an adjustment path to a revised steady-state value. At the same time, demand for more lightly taxed assets would increase and cause their relative price to jump. A declining stock of highly taxed capital would cause pre-tax rates of return on that capital to rise (assuming declining marginal productivity of capital) and push up its asset price. Similarly, the relative price of the more lightly taxed assets would fall from their higher post-tax reform value as the stock of this class of capital expanded. These adjustments restore the equality of after-corporate-tax returns across assets. However, the equalized after-corporate-tax rates of return do not translate into equalized after-shareholder-tax rates of return, given the heterogeneity of shareholder-level tax rates across investors.

This point is seized by Swenson, who recognizes that the provisions of the US Tax Reform Act of 1986 would have been differentially felt not only across industries, but also between domestic and foreign investors. The 1986 US tax reform increased the domestic corporate average tax rate (ATR), largely as a result of the introduction of more restrictive depreciation provisions. The increase in domestic corporate ATRs, which varied across industries, directly affected US investors. However, for foreign investors resident in countries with worldwide taxation systems and relatively high corporate income tax rates (that is, rates in excess of the US rate), the increase in the US corporate ATR would be largely absorbed, being offset by a higher foreign tax credit in the home country. In other words, increased US taxation of US source income earned by these foreign investors would result in a transfer of revenues from the foreign (home country) treasury to the US (host country) treasury, with the applicable tax rate for these investors being the home country tax rate both before and after US tax reform.

Increased taxation for US domestic investors, versus largely unchanged taxation for a set of foreign investors, suggests possibly important general equilibrium effects. Scholes and Wolfson predict that one would observe increased inward FDI following the 1986 US tax reform. The increased foreign investor interest would follow lower asset prices (and thus higher rates of return) accompanying the switch by US investors out of assets subject after reform to higher taxation.32

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32 As a corollary, these linkages predict that tax shocks that encourage domestic investment by domestic investors may reduce inbound FDI by certain investors. The relevant shareholder group would be foreign investors resident in countries with worldwide taxation systems and relatively high home country tax rates that determine the combined host and home country tax rate on the foreign source income. Note that where the host country tax rate is higher than the home country tax rate, or where the FDI is structured through a holding company in a
Swenson tests these predictions by observing the effects of US tax reform in 1981, 1982, 1984, and 1986. She notes that the 1986 reform caused a reversal in reductions to corporate tax burdens, and its effects applied differentially across a sample of 18 industries. FDI is measured using flow acquisitions and establishment data compiled by the BEA in response to criticism of its earlier FDI series, which did not separate purchases of physical and financial assets. Two sets of regression equations are estimated. The first pools together foreign investors subject to worldwide taxation and investors taxed under a territorial system, with a focus on exploiting cross-industry differences in US corporate ATRs over the period 1979-1991. Investor pooling is required to test for cross-industry effects given that the industry data do not distinguish foreign investor classes. The following equation is estimated to test the proposition that FDI by industry (indexed by \( j \)) is positively related to the domestic corporate ATR in that industry, denoted by \( \text{ATR}_j \).

\[
\ln FDI_{jt} = \alpha + \beta \ln(\text{ATR}_{jt}) + \gamma \ln EX_t + \Sigma \delta_i + \lambda_t T + \varepsilon_{jt}
\]

The ATR is measured as US corporate income tax paid divided by US corporate (book) income.\(^{33}\) Given that the proposed tax effects apply only to foreign investors resident in countries with worldwide taxation systems, while the data pool foreign direct investors in both worldwide and exemption groups, the elasticity variable \( \beta \) would tend to underestimate the response of the worldwide taxation system investor group. Also included as explanatory variables are the (trade-weighted) US exchange rate \( (EX) \), industry dummies \( (\delta) \), and a time trend \( (T) \).\(^{34}\) The industry-level results tend to confirm the prediction; the tax elasticity variable \( \beta \) is found to be positive (a value of 1.13) and statistically significant.\(^{35}\)

A second set of regressions provides a direct test of the effects of cross-country variation in tax methods. The Scholes and Wolfson theory predicts that US FDI would remain unchanged or fall in response to an increase in the US ATR.

\(^{33}\) The ATRs, provided by the private sector research group Tax Analysts, are derived using individual firm data aggregated to the industry level.

\(^{34}\) Froot and Stein, supra footnote 3, argue that FDI should increase when the US dollar depreciates (that is, there should be a negative correlation between FDI and the exchange rate \( EX \)) since this reduces the foreign currency cost of US assets. While a depreciating dollar also reduces the foreign currency value of expected profits, asymmetric information (for example, investor uncertainty over managerial behaviour) may explain why these two effects do not cancel. Another explanation is that investors may anticipate US dollar appreciation following a (perceived to be temporary) decline in the dollar’s value.

\(^{35}\) Swenson, supra footnote 30, tests the investment equation for lagged tax effects, including both current-year and prior-year ATR variables. The lagged ATR variable has a small positive but statistically insignificant coefficient, which she explains by noting the importance of mergers and acquisitions activity in the FDI data and the likely immediate capitalization (in asset prices) of tax effects influencing existing (as opposed to newly acquired) capital assets.
for investors resident in countries with territorial systems including Canada, Germany, France, and the Netherlands. In contrast, FDI would be expected to increase for investors resident in Britain or Japan, both countries with worldwide taxation systems. The results tend to support the theory. The elasticity parameter measuring the response to increased US ATRs of investors subject to worldwide taxation is positive and significant, while that for investors taxed on a territorial basis, while found to be positive, is much smaller and insignificant in most investment equation specifications. As in the industry-level tests, the parameter on the exchange rate variable is found to be negative and significant, indicating that US dollar depreciation encourages FDI.

**Recent Results Focusing on (Outbound) US DIA**

A second branch of empirical work focuses on US DIA. Most of the recent empirical literature on the effects of taxation on cross-border direct investment has in fact focused on DIA, rather than FDI. Before discussion of this recent work, it is useful to briefly review the early DIA results.

Early time-series assessments of the effects of host country taxation on US outbound investment include Hartman, Boskin and Gale, and Newlon, who, as noted previously, undertook much of the early empirical work focusing on tax impacts on (inbound) FDI. The outbound DIA literature begins with Hartman, who examines the relationship between aggregate US DIA and after-tax rates of return in foreign host countries and in the United States over the sample period 1965-1979. As in his work of US inbound FDI, Hartman runs separate regressions for DIA financed out of retained foreign affiliate earnings and DIA financed out of new fund transfers from US parents. The retained earnings equation performs relatively well. The coefficient on the foreign after-tax rate of return variable (measured as net income from DIA divided by the end-of-prior-year DIA position) is positive and statistically significant, and the domestic US after-tax rate of return variable (measured as the overall US economy-wide pre-tax rate of return times 1 minus the total corporate plus personal US effective tax rate) shows an expected negative coefficient. In contrast, the new fund transfers equation performs poorly.

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36 The US domestic corporate ATR variable used in the investment equations is constructed by weighting the industry ATRs according to the industry contribution to aggregate US FDI in 1979.
37 Supra footnote 14.
38 Supra footnote 21.
39 Supra footnote 23.
40 Domestic tax policy can potentially affect DIA through the following two channels: by determining the home country tax rate (and thus the after-tax rate of return on a given pre-tax return) on domestic source income; and by determining the home country tax rate on foreign source income. The modelling approaches of Hartman, supra footnote 14, Boskin and Gale, supra footnote 21, and Newlon, supra footnote 23, all adopt or assume (without testing) the
Boskin and Gale and Newlon extend Hartman’s findings using a longer sample period, revised BEA data, and alternative functional forms for the investment equation (DIA expressed in rates, as a percentage of GDP, and in level form). Their results are similar to and tend to confirm Hartman’s findings that foreign taxation affects DIA and that domestic tax policy can have a significant impact on DIA as well. The elasticity estimates of Boskin and Gale are somewhat smaller for the response of DIA to a change in US after-tax rates of return on domestic investment. In particular, the coefficient on the US after-tax rate of return variable shows an elasticity of roughly \(-0.2\) (implying that a 10 percent increase in the US after-tax rate of return would result in a 2 percent decline in DIA), while the foreign after-tax rate of return has an elasticity of roughly 1.2.

These early investigations, which find significant positive effects of foreign (host country) after-tax rates of return and negative effects of domestic (home country) after-tax rates of return (using investment equations analogous to the one noted above in Hartman’s 1984 work), generally suffer from the modelling and data measurement problems identified with the early FDI studies.

**Recent Results Using Updated BEA Data**

More recent studies of the effects of taxation on direct investment flows focusing on US DIA have exploited both time-series and cross-sectional data. Given that DIA is subject to multiple host country tax regimes, allowing for variation in host country data both across countries and over time, empirical analyses of DIA are generally better suited to identifying host country tax effects.

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41 Supra footnote 19.
42 On the other hand, empirical analyses of (inbound) FDI are generally better suited to identifying home country tax effects. However, gathering consistent data on relevant home country taxation, taking financing structures into account, is a relatively more difficult task.
Grubert and Mutti\textsuperscript{43} and Hines and Rice\textsuperscript{44} take advantage of cross-sectional data prepared by the BEA in its 1982 benchmark study on US DIA. The disaggregation of US DIA into various host country recipients improves prospects for the identification of host country tax effects, as noted above. In addition, the data provide balance sheet information of US-owned property, plant, and equipment (P P & E) in 1982. In contrast to empirical work relying on financial flows investment data, studies focusing on P P & E enable a more targeted approach to the assessment of tax effects on real investment capital.\textsuperscript{45}

Grubert and Mutti analyze the distribution of the P P & E capital of manufacturing affiliates across 33 host countries by regressing the log of the end of previous-year net P P & E stock on two average tax rate measures. The first regression using a natural log of 1 minus the ATR gives a constant tax elasticity of 1.5 based on data on all manufacturing affiliates of US parents, and a value of 2 for majority-owned manufacturing foreign affiliates. However, the coefficients are not found to be statistically significant. The second specification using the inverse of the tax rate produces a highly significant tax coefficient ($-0.11$) giving the estimated elasticity of P P & E with respect to host country tax rates. This estimate suggests that halving the host country ATR from 20 to 10 percent would increase the stock of US DIA in the host country by 5.5 percent.

Hines and Rice use a larger data set than Grubert and Mutti, considering all majority-owned non-bank affiliates of non-bank US parents, and thus drawing into the sample a total of 73 host countries. The inclusion of affiliates in all industries (not just manufacturing) and more host countries than in the study by Grubert and Mutti, including 41 tax havens with little physical capital, may explain Hines and Rice’s finding of a greater tax response. They report a statistically significant coefficient on their ATR variable of $-3.3$. This estimate suggests that at the mean ATR of 31 percent, a 1 percent increase in after-tax returns generates a 2.3 percent increase in the P P & E stock of US affiliates.

**Recent Findings Using US Treasury Data**

One of the most recent analyses of the effects of host country taxation on the investment location decision of US multinationals is the 1998 study by Altshuler,


\textsuperscript{45} The P P & E data are not, however, without difficulties. First, the asset measures are based on historical book values, rather than current price or market values. Second, the end-of-year depreciable assets reported by foreign affiliates resident in a given host jurisdiction may not be located in that jurisdiction. This problem is particularly important in the case of holding company and financial foreign affiliates located in tax havens.

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Grubert, and Newlon. They use information from the US Treasury corporate files giving balance sheet and income statement data for two years (1984 and 1992), for 58 host countries. The use of two years of data permits a test of whether US DIA has become more responsive to host country taxation over time, and also allows for a control over unmeasured host country fixed effects. As with the studies by Grubert and Mutti and Hines and Rice, the focus is on the effect of host country taxation on locational choice, not on the choice of investing at home or abroad.

The main host country tax explanatory variable used in the investment equation is the natural log of 1 minus an averaged ATR variable. The ATR variable, based on subsidiary-level (controlled foreign company) data aggregated up to the country level, is derived by dividing total host country income taxes paid by a total earnings and profits measure meant to capture net economic income (as opposed to taxable income as defined by host country or US tax rules). To smooth out business cycle effects, current-period ATRs are averaged with ATRs of the previous two even years. To control for non-tax factors that may affect locational decisions, the authors also include as explanatory variables the natural log of host country GDP, the natural log of host country population, regional dummies, and a trade regime variable to control for the degree of openness of the host country economy.

The basic investment equation used by Altshuler, Grubert, and Newlon is as follows (see the appendix to this paper for a derivation):

\[
\ln K_{j92} - \ln K_{j84} = c + \beta_{92} \{\ln(1 - ATR_{j92}) - \ln(1 - ATR_{j84})\} + \beta_{\text{diff}} \ln(1 - ATR_{j84}) + \gamma (Z_{j92} - Z_{j84}) + \lambda \text{TRADE}_j (\ln(1 - ATR_{j92}) - \ln(1 - ATR_{j84})) + v_j
\]

(\text{where } \beta_{\text{diff}} = \beta_{92} - \beta_{84}).

The main empirical results can be summarized as follows. The estimate for \(\beta_{92}\) measuring the tax elasticity for 1992 is positive at 2.8 and statistically significant. Note that the tax elasticity gives the percentage change in the end of prior-year DIA stock (depreciable assets plus inventories) resulting from a 1 percent increase in the after-tax rate of return (measured by 1 minus the ATR for 1992). The implied estimate for \(\beta_{84}\) (given by the difference between \(\beta_{92}\) estimated at 2.77 and \(\beta_{\text{diff}}\) at 1.24) is 1.5, which is also found to be statistically significant.

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47 The definition of reported earnings and profits set by the US Internal Revenue Code closely matches book income.

48 The trade regime variable developed by the World Bank (1987), which ranges from 0 (most open) to 3 (most restrictive), is based on observations of (1) the host country’s effective rate of protection, (2) its use of direct controls (for example, quotas), (3) its use of exports, and (4) the degree of overvaluation of its exchange rate.
Finally, the authors experiment with alternative investment equation specifications (for example, lagged ATRs are tested, and the ATR variables are tested in linear form as in the Hines and Rice study) and find that the tax coefficients remain positive and statistically different from zero at the five percent confidence level or higher. At the mean tax rates for 1984 and 1992, the coefficients under the linear investment equation specification imply that a 1 percent increase in the ATR in a country would on average increase the real capital stock by 1.7 percent in 1984 and 3.2 percent in 1992.

The results of this recent work indicate that the location of real capital by manufacturing firms is sensitive to taxation and has become more so over time.49 The authors point out that this finding is consistent with the increasing international mobility of manufacturing capital and globalization of production, and with earlier empirical work finding significant tax effects.50

Empirical Analyses of Tax Effects On R & D Location Decisions
As noted in the introduction, policy makers are typically eager to attract FDI in order to enhance domestic productivity, particularly R & D-intensive FDI. Recent empirical work indicates that high host country taxation can frustrate this goal in a number of ways. Most obviously, a high statutory corporate income tax rate can discourage host country R & D by taxing away economic profit (rents) earned on R & D. However, other international tax implications may be identified.

First, by contributing to excess foreign tax credit problems, high host country taxation can potentially discourage FDI by increasing the after-tax cost of a parent company’s home country R & D program. In the context of US MNEs, it can do so by constraining the tax deductibility of home country R & D expenses, thus increasing the cost of home country R & D programs. Second, and again by contributing to excess foreign tax credits, high host country taxation can discourage host country R & D by reducing the amount of US tax on royalties charged on the alternative of technology exports to the affiliate by its US parent. These issues are addressed below. Also discussed is recent empirical work that suggests that by setting a high withholding tax on cross-border royalty payments,

49 The authors also run separate single-year cross-sectional equations. The estimated coefficient on the log of 1 minus the ATR for 1992 (measured as the average of ATRs for 1992, 1990, and 1988) is positive and statistically significant at 2.7. This estimate is referred to as the “open regime” elasticity estimate (where the TRADE variable takes on a value of zero). On the other hand, the estimated tax coefficient in the 1984 tax equation is found to be positive but not statistically significant. The trade regime variable is found to be highly significant and negative. This result indicates reductions in DIA accompanying increased trade restrictions.

50 As the authors note, the finding of increased tax sensitivity is also consistent with an increase in the number of US parents in an excess foreign tax credit position following the 1986 Tax Reform Act (in which case host country taxes are not fully offset by home country foreign tax credits).
a host country can encourage host country R & D by reducing the after-tax return on technology exports. However, this finding appears questionable, for reasons noted below.

Consider first the impediment to accessing foreign technology that turns on the US expense allocation rules for R & D, which recognize the fungible (non-rivalrous) nature of R & D. These rules, which are akin to the US interest allocation rules, require that US R & D expenses be allocated against foreign source income in relation to the proportion of a US MNE’s total sales and assets that are located abroad. This portion cannot be expensed when high host country tax eliminates US tax on foreign source profit. Thus, high host country taxation can operate to constrain a US parent’s R & D program by increasing its after-tax cost. Empirical work by Hines51 in 1993 finds that, following the introduction of the US R & D expense allocation rules, US MNEs with large pools of excess foreign tax credits and significant foreign sales exhibited slower R & D expenditure growth than other firms. The finding that US firms with affiliates in high-tax countries tend to be less R & D intensive than firms with affiliates in low-tax countries carries a number of implications. One is reduced access to and reduced spillover benefits from foreign R & D.

At the same time, excess foreign tax credits generated by high host country taxation can reduce host country R & D activities. In deciding where to undertake R & D, a US MNE can choose between undertaking the R & D at home and undertaking it abroad through a foreign affiliate. If the R & D is done at home and the R & D results are licensed out to a foreign affiliate, the royalties earned on the R & D may be earned tax-free by mixing income in the general limitations basket, so as to shelter royalties with excess foreign tax credits earned on foreign dividend income. Thus, high host country taxation can operate to encourage R & D undertaken at home by the parent rather than abroad. Empirical work by Hines52 in 1994 finds evidence of the incentive of US MNEs to undertake R & D at home rather than abroad, tied to the non-taxation of royalty income mixed with highly taxed dividend income.

Given these considerations as regards the impact of a high statutory corporate income tax rate, consider next the effects of host country withholding taxes on

51 James R. Hines Jr., “On the Sensitivity of R & D to Delicate Tax Changes: The Behavior of US Multinationals in the 1980s,” in Giovannini, Hubbard, and Slemrod, supra footnote 2, 149-87. Hines analyzes two samples of firms (those that are engaged in mergers and those that are not) and their R & D behaviour after the introduction in 1986 of the rules requiring an allocation of R & D against foreign income. Firms are differentiated on the basis of those that are constrained by the R & D expense allocation rules and those that are not, so that Hines can estimate the sensitivity of R & D to its after-tax cost.

royalty income. Hines in 1995 tests the sensitivity of host country R & D to host country withholding tax using 1989 BEA benchmark survey data on foreign affiliates of US parents in 43 foreign host countries. Royalty payments measured as a percentage of total sales are regressed on a measure of the host country tax rate on royalties. Hines finds that a higher host country royalty withholding tax rate is associated with reduced royalty payments to parents. This result leads him to conclude that generally the foreign affiliate R & D is a substitute for, rather than a complement to, parent company R & D. The policy implication is that the level of R & D undertaken by host country affiliates of US MNEs can be increased by increasing the host country royalty withholding tax rate. However, other evidence suggests that this inference is questionable, since royalty payments are a noisy (imprecise) and weak indicator of R & D activity.

First, as Hines himself points out, royalty payments may be manipulated to strip taxable profit out of high-tax jurisdictions. Second, as confirmed in empirical work by Grubert, interest and other payments substitute for royalties as alternative means to repatriate earnings in response to high royalty withholding tax rates. This effect further weakens the link between royalty payments and R & D activity. Third, host country R & D incentives may depend not only on the royalty withholding tax rate, but also on the statutory corporate tax rate and R & D deductions and tax credits in the host and home countries and other competing jurisdictions, which are ignored in the model. Thus, it is difficult to draw policy inferences from simple empirical findings of a negative relationship between royalty payments and royalty withholding tax rates.

IDENTIFYING FURTHER INTERACTIONS OF HOST AND HOME COUNTRY TAX SYSTEMS

The main branch of empirical work analyzing the effects of income tax on cross-border direct investment incentives emphasizes the importance of host country taxation and the stimulative effect of lowering host country tax burdens. However, by relying for the most part on reduced-form investment equations with (backward-looking) average tax rates or average rates of return as explanatory variables, the frameworks generally are silent on the choice of the mix of corporate tax instruments to effect a given reduction in the host country corporate tax burden.

Some guidance is offered by a related branch of empirical literature that highlights the different effects on the host country corporate tax base of alternative tax relief measures. This work draws out a number of host and home

54 Supra footnote 18.
55 See James R. Hines Jr., “Lessons from Behavioral Responses to International Taxation” (1999), 52 National Tax Journal 305-22, for an excellent review of the literature on tax-avoidance and R & D effects.
country tax considerations and their interactions that may help shape the choice of incentive strategies—reduction of the statutory corporate income tax rate versus generous tax deductions and credits—to achieve a given target reduction in the corporate tax burden.

This part of the paper reviews empirical work that addresses implications of alternative tax reforms on the financial and repatriation policies of MNEs. It considers the interdependency of tax systems in the context of “harmful tax competition” and recent developments in this area.

Financial Policy Considerations

A firm’s financial structure is typically influenced, in some cases significantly, by the tax regime of the host country. Empirical results at the aggregate level tend to confirm the central role played by the host country statutory corporate income tax rate in influencing chosen debt:equity ratios. In particular, a high statutory corporate tax rate encourages borrowing in the host country; and, as discussed below, increased borrowing tends to erode the corporate tax base. Thus, generous tax deductions and tax credits that are “financed” by a high statutory tax rate put pressure on the tax base and heighten the need for effective design and (typically expensive) administration of thin capitalization and other tax base protection rules.

Work by Hines and Hubbard, for example, reveals a positive correlation between host country statutory corporate income tax rates and interest payments by US affiliates to their parents. Altshuler and Grubert, using firm-level balance sheet data on US controlled foreign corporations (CFCs), show that the decision to finance affiliates with debt versus equity is strongly influenced by the host country statutory tax rate, and that high rates attract higher debt:equity ratios. Further evidence is provided by Grubert, who finds that host country statutory corporate tax rates have a positive and significant effect on the interest payments of foreign affiliates to their US parents.

Thus, the empirical evidence supports predictions that high statutory corporate income tax rates create incentives for earnings stripping by way of deductible interest payments.

At the same time, a high statutory corporate tax rate may frustrate the desired financial policy of foreign parent companies, and lead to a higher cost of funds, and thus indirectly discourage investment in the host country. In recognition of


58 Supra footnote 18.
the fungible nature of debt capital, US MNEs are required by law to allocate a portion of their interest expense against foreign source income on the basis of the ratio of foreign assets to domestic assets. High host country tax rates, by contributing to an excess foreign tax credit situation, can increase the cost of parent company debt by reducing the deductible portion of interest expense. Where a parent firm is constrained in its ability to respond to a high after-tax cost of borrowing by increasing affiliate borrowing (for example, where it is constrained by host country thin capitalization rules), high host country taxation may operate to reduce host country investment incentives on account of the cost of capital effect. A number of recent empirical studies show that US firms that are particularly affected by the US interest allocation rules have responded in predictable ways—namely, searching for lower-cost sources of funds and slowing their FDI growth.

Froot and Hines, 59 for example, consider a sample of 416 US MNEs and find that following the introduction of the US interest allocation rules, firms with excess foreign tax credits and significant foreign assets borrowed significantly less and expanded their FDI at a slower rate, relative to other firms. The impact of high host country taxation on the cost of capital and FDI incentives of foreign parents is, however, hard to establish. Collins and Shackelford 60 show that US firms have considerable scope to substitute away from domestic debt in response to the interest allocation rules. They find that firms most likely to be affected by the rules (firms with relatively high percentages of foreign assets) issued more preferred stock following the 1986 tax change than did other firms. Froot and Hines also report that corporations caught by the 1986 provision responded by relying more on capital leases (since the borrowing component of the lease escaped the coverage of the rules). Similarly, Altshuler and Mintz 61 find that firms facing high interest expense costs on domestic debt after the introduction of the interest allocation rules were more likely to borrow abroad through their foreign affiliates. This finding signals an additional channel through which high host country taxation, by contributing to excess foreign tax credits that tend to increase the cost of foreign parent debt, can contribute to host country base erosion.

**Repatriation Policy Considerations**

Affiliates of MNEs may choose among alternative means to repatriate their operating income. Unlike dividends, earnings distribution by way of royalties, interest, and management fees decreases the host country corporate income tax.

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base. While earlier empirical work focuses almost exclusively on dividend repatriation tax effects, more recent work emphasizes the interrelationship among the various means of flowing out operating income to parent companies. Not only own-tax price effects, but also cross-tax price effects are shown to be important in understanding repatriation behaviour.

Reductions in the host country statutory corporate income tax rate increase the tax cost of using not only interest, but also royalties and management fees, for paying out a given amount of subsidiary earnings, and thus discourage their use. This implies that host country tax reform that reduces the corporate tax burden by relying on reduction of the statutory corporate tax rate, rather than enhanced deductions or tax credits, serves to protect the corporate tax base by affecting repatriation behaviour. The following discussion considers recent evidence on the importance of statutory corporate income and withholding tax rates in explaining the repatriation behaviour of Canadian and other foreign manufacturing affiliates of US parent companies.

The most comprehensive analysis of this issue is found in recent work by Grubert.62 His analysis extends earlier studies of repatriation tax rates for various payment types, including Grubert and Mutti,63 Altshuler and Newlon,64 and Altshuler, Newlon, and Randolph,65 which focuses mainly on dividend behaviour. Repatriation tax rates are shown to differ between excess foreign tax credit and deficit of foreign tax credit (excess limitation) cases. In the excess foreign tax credit case, the repatriation rate for dividends depends on the host country withholding tax rate, while for deductible payments, withholding tax rates and the host statutory corporate income tax rate factor in. In the deficit of foreign tax credit case, withholding tax considerations net out and home country income taxation matters. Relief for host country tax on distributed income depends on the host country average income tax rate, while the tax price for deductible payments depends negatively on the host country statutory tax rate.

Grubert’s modelling approach is appealing in that, unlike earlier studies, it analyzes simultaneously royalties, interest, dividends, and retained earnings. Both own-tax and cross-tax price effects are analyzed in a system of equations that examines separately each of these forms of earnings repatriation.66 In addition to

63 Supra footnote 43.
65 Supra footnote 16.
66 The tax prices (repatriation tax rates) for each of the repatriation channels depend on whether an excess foreign tax credit or deficit of foreign tax credit position applies. That position can
repatriation taxes, Grubert introduces as explanatory variables parent R & D and advertising, normalized by parent sales, to capture the effect of intangibles provided to foreign subsidiaries by US parents, and a broad earnings measure to control for the profit effects (that is, to isolate the effects of tax prices on the repatriation of a given amount of pre-tax earnings). The cross-sectional sample (1990 data) includes roughly 3,500 CFCs of US parents in the mining, petroleum, and manufacturing industries, which account for most US R & D (and royalty receipts).

Some of the main results of Grubert’s work can be summarized as follows. Coefficients on the own-tax prices for dividend payments are found to be negative and statistically significant. Higher dividend withholding tax rates and a higher home country tax rate relative to the host country corporate ATR discourage earnings distribution. Retained earnings, however, are shown to be invariant to dividend repatriation tax rates, a finding consistent with the Hartman model. As regards cross-tax price effects, the response of dividends to the withholding tax rate on royalties is found to be positive and significant. Firms generally react to a high royalty tax price by substituting toward dividend distribution. The substitutability of dividends and interest is unclear, since the coefficient on the interest withholding tax rate is statistically insignificant. The host country statutory corporate tax rate has a negative significant effect. This indicates that firms switch away from dividends to deductible forms of earnings repatriation as the host country statutory rate increases.

The interest equation shows a negative and statistically significant interest payment response to its own-tax price—higher interest withholding tax rates discourage interest payments. Higher royalty withholding tax rates and higher dividend change over time. Additionally, the foreign tax credit position is an endogenous result of a firm’s financing and repatriation decisions (for example, transfers of intangibles to an affiliate and large royalty receipts reduce the probability of an excess foreign tax credit position). These observations lead Grubert to include both the excess credit tax price and the deficit credit tax price as independent variables. Also, the interest and royalty withholding tax rates (and the host country statutory corporate income tax rate) are entered separately in each equation, capturing the repatriation tax rates for these payments in the excess foreign tax credit case equal to (wI – tS) and (wR – tS) respectively, as well as in the deficit of foreign tax credit case where the home country tax rate tUS is fixed at its 1990 value and the repatriation tax rate for both payments is (tUS – tS).

The profits (operating surplus) measure is gross of interest and royalty payments. This approach recognizes the endogenous nature of book profits, which incorporate the effects of repatriation decisions. Grubert, supra footnote 18, points out that in the model of Altshuler, Newlon, and Randolph, supra footnote 16, which uses a net profits measure (E & P), the coefficient on the E & P variable confounds repatriation substitution effects (influencing E & P) and dividend income effects (the income elasticity of dividends.)

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68 Supra footnote 19. While the empirical results find that retentions are invariant to dividend repatriation tax rates (that is, financial but not real behavioural responses are indicated), the model is silent on the influence of repatriation tax rates on (capital investment financed by) new share issues.
withholding tax rates are associated with higher interest payments. This result indicates that interest payments are to a degree substitutable with royalties and dividends as channels for earnings distribution. The host country statutory corporate tax rate is found to have a positive significant effect. This indicates that firms switch toward interest as a form of earnings repatriation as the host country statutory tax rate increases, a finding consistent with the dividends equation.

As with the interest and dividend equations, estimation of the royalty equation finds statistically significant and negative own-tax price effects. Higher royalty withholding tax rates discourage the use of royalties. Also, a higher interest withholding tax rate is associated with increased royalties, a result consistent with the substitutability of interest and royalties indicated by the interest equation. However, a higher dividend withholding rate is associated with reduced royalties, contrary to what the substitution effect would predict.

Furthermore, royalties are found to decrease, rather than increase, with a higher host country statutory corporate tax rate. These results suggest that dividends and royalty payments are complementary, and that for some companies income effects may dominate substitution effects. US parents face incentives to shift profits, including income from intangible capital, to countries with low statutory income tax rates by licensing new products/processes through affiliates located in those countries and by commodity (transfer) pricing. For countries with high statutory corporate rates, the effects are the opposite—incentives to shift profit out rather than in through commodity pricing and greater reliance on interest expense as a means of repatriating subsidiary earnings.

Possible International Coordination Limiting Use of Tax Havens

Recent developments at the international level have at least two important implications as regards the question of the appropriate design of tax policy to attract FDI. In early 1996, the OECD Council of Ministers instructed the organization to develop measures to combat harmful tax practices. The project led to the adoption

69 While the coefficients on the royalty tax price (the royalty withholding tax rate) and the dividend tax price in the deficit of foreign tax credit case (the home country statutory tax rate less the host country corporate ATR, grossed up by 1 minus the host country corporate ATR) are both found to be statistically significant, the coefficient on the dividend tax price in the excess foreign tax credit case (the withholding tax rate on dividends) is found to be of borderline statistical significance. Similarly, in the royalty equation, the coefficient on the interest withholding tax rate, while positive, is of borderline statistical significance.

70 Following the OECD initiative, the European Union (EU) embarked on a similar code of conduct project dealing with unfair tax competition in the field of direct business taxation, with a mandate to complete a report by the end of 1999. Like the OECD report, the code takes into account transparency, levels of economic activity, ring fencing, and transfer-pricing practices in assessing whether tax competition is harmful. However, in contrast to the OECD project, the focus is not limited to tax competition in the areas of financial and other service
by the OECD Council in April 1998 of a report and guidelines on the issue. The report, *Harmful Tax Competition: An Emerging Global Issue*,71 while not legally binding, sets out conditions—agreed to by all OECD member countries, with reservations by Switzerland and Luxembourg—characterizing when tax competition for mobile business activities in the area of financial and other services may be harmful and what counteracting measures may be applied.

The criteria for identifying a harmful tax practice are given in the OECD report. The essential focus is on the existence or not of transparency and exchange of information, which, of course, are critical to the ability of countries to exercise their laws governing the taxation of foreign source income of resident taxpayers. The criteria used to identify harmful tax practices also look to ring-fencing provisions—that is, provisions that (1) target tax relief to non-residents alone (either explicitly, or in practice because the “offshore” sector is predominant in the economy, or the tax relief is targeted at investment without substantial activities), and/or (2), where there is a substantial domestic economy, target tax relief away from domestic source income.72

The work on harmful tax practices is being advanced by the OECD’s Forum on Harmful Tax Practices, which is made up of representatives of the 29 OECD member countries under the supervision of the OECD Committee on Fiscal Affairs. The forum’s mandate is first to prepare a list of tax havens to be presented to ministers in June 2000, and then to coordinate counteracting measures by OECD countries against jurisdictions that choose not to work toward the elimination of their harmful tax practices. Possible counteracting measures include

- the denial of deductions for payments made in transactions involving jurisdictions with harmful tax practices;
- the imposition of withholding taxes on payments made to jurisdictions with harmful tax practices;
- the termination/prohibition of tax treaties with tax havens,73 and
- non-tax measures.

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72 In general, the criteria used to identify a harmful tax practice include no/nominal (low) effective taxation and one or more of the following: (1) lack of effective exchange of information, (2) lack of transparency, and (3) ring fencing.

73 For the purpose of the OECD report, supra footnote 71, a “tax haven” is understood to be a jurisdiction that engages in harmful tax practices under the criteria noted in footnote 72, and

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It is important to emphasize that the OECD project does not attempt in any way to limit national discretion over the choice of statutory/effective tax rates. Countries should be free to set their tax policies, including tax levels, tax rates, and the tax mix, to finance desired levels of public expenditure. Indeed, the project supports national sovereignty by promoting best practices in the tax area that allow a country to enforce its own tax laws. The focus is on eliminating predatory regimes that allow taxpayers to avoid home country tax, while enjoying the benefits of home country public services paid for by other taxpayers. The project sets out to eliminate not lower tax rates, but rather the concealment of information about income flows.

The OECD project on harmful tax competition carries with it a number of implications. First, and most obviously, it clarifies OECD member country views on what constitutes legitimate versus harmful tax incentive relief designed to attract FDI in the area of financial and other service activities. The main relevant criteria are noted above.

Second, if successful, the project will increase the exposure of high-tax jurisdictions to the discouraging effects of high taxation on FDI. Consider, for example, the fact that currently US parents with affiliates in relatively high-tax jurisdictions are able to reduce the burden of those taxes through the use of tax havens and worldwide averaging. Taxable income can be stripped out of high-tax host countries using deductible (for example, interest or royalty) payments and routed to a tax haven where the income is subject to no or nominal taxation. Under worldwide averaging, US parents are able to mix in the “general” income basket for US foreign tax credit purposes high-tax dividend income received directly from high-tax jurisdictions and low-tax foreign source income received from tax haven affiliates. In this way, excess foreign tax credits earned on income from high-tax jurisdictions can be used to offset US tax on low-tax foreign source income. The opportunities for such tax avoidance will be curtailed if efforts, including the OECD project on harmful tax practices, are successful in negotiating an international agreement aimed against the use of tax havens. In that event, it is likely that the real investment deterrent effects posed by a high corporate tax rate will be felt even more strongly in the future than they are today.

The preceding discussion emphasizes the importance of considering the range of implications of alternative tax reform proposals intended to encourage FDI. The discussion focuses for the most part on interaction with the US tax system, which is obviously important in the Canadian context, but a broader set of host and home country interactions must be addressed.74

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74 Indeed, the design features of host and home country tax systems may interact in less visible, but nevertheless important, ways in influencing FDI incentives. One example concerns the

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ASSESSMENT OF FINDINGS AND LIMITATIONS
Empirical work using improved data measuring FDI offers convincing evidence that host country taxation does indeed affect investment flows. Moreover, recent work finds host country taxation to be an increasingly important factor in locational decisions. This relationship is not surprising given the gradual pervasive reductions over time in non-tax barriers to FDI flows, including the abolition of investment and currency controls, and the resulting globalization of production.

A precise estimate of the FDI response to a given amount of tax relief cannot, however, be made with a high degree of certainty—even in the context of the United States, the host country on which most of the analytical work has focused—given that a number of theoretical and empirical issues remain unresolved. In other words, the empirical results to date are suggestive, but more work needs to be done to improve and verify the accuracy of elasticity estimates. This last section of the paper reviews two of the main “problem areas” requiring further investigation to determine their importance in our understanding of the impact of taxation on FDI.

Limitations of ATR Models
Most empirical models on FDI and DIA have tended to rely on corporate ATRs as the main explanatory variable. However, backward-looking (historic) ATRs may be imprecise indicators of the tax burden on prospective FDI. At best, last year’s corporate tax as a percentage of last year’s corporate profit may provide a useful indicator of the tax burden on FDI by way of mergers and acquisitions. But such measures may not provide an accurate measure of the tax burden on expansions to existing capacity and to new “greenfield” investment projects.

Differential tax burdens on “old” versus “new” capital arise because the existing capital stock in the corporate sector consists of a mix of financial and non-financial assets of varying types, vintages, and tax attributes acquired in the past. Corporate tax owing in the current period on income derived from the existing capital stock will depend on the particular mix of assets held; thus, so too will the amount of corporate income tax payable per unit of profit generated. Therefore,
historic ATRs measured by expressing corporate tax liabilities as a percentage of economic profit will differ from the effective corporate tax rate on FDI at the margin to the extent that the prospective investment (or more precisely, a weighted average of prospective investments) consists of a different asset mix subject to varying tax treatment, including particular tax subsidies. Tax depreciation rates vary across capital asset classes, certain types of income may be drawn into the tax base at different inclusion rates, different rules will typically apply to income earned on domestic versus foreign source income, and so on.

One of the most important factors is the tax treatment of losses. Most tax systems allow businesses to carry non-capital (business) losses forward to offset tax payable in future years, in recognition of the fact that the tax year (that is, a 12-month assessment period) is an artificial construct. In any given year, the existing stock of losses carried forward from prior years and available to offset current-period taxable income will depend on, among other factors, the timing of that year over the economic (business) cycle. Loss carryforward pools would be relatively large following a downturn in the economy. Therefore, the tax burden on existing capital measured in a year when relatively large loss carryforwards are claimed (that is, in a year when corporate tax payments are relatively low) may provide an underestimate of the tax burden on newly acquired capital.

A similar consideration is that systems that provide investment tax credits often allow unused credits to be carried forward to offset tax in future years. R & D tax credits, for example, are often earned by firms that have not yet taken a product to market, and so have no current tax liabilities on profits against which to claim a credit. Tax credit carryforwards may be introduced to ensure a stimulative effect. Patterns of tax credit carryover claims, like loss claims, will depend on business cycle effects, which tend to expand and contract profits and tax base. Therefore, in the presence of carryforward provisions, a tax burden measure based on current-period corporate tax payable may be a misleading indicator of the tax burden on new capital.

The above-noted factors arise when tax policy is held constant over time. Differences in tax burdens on old versus new capital tend to be even more

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75 Certain countries also allow businesses to carry losses back to offset tax in previous years. Carryback relief is in general more advantageous than carryforward relief unless losses may be carried forward with interest (owing to the time value of money).

76 Another consideration is that corporate tax assessed on realized net capital gains, while possibly relevant to the tax burden on existing corporate assets, may not be relevant to assessing the tax burden on new capital at the margin. An adjustment to market interest (discount) rates or expectations over future earnings of existing capital, causing an adjustment in asset prices with capital gain or loss effects, will affect current-period tax liabilities on dispositions of capital where such gains/losses are drawn into tax. The potential impact of capital gains taxation on current FDI may differ significantly from that captured by ATRs influenced by capital gains/losses on current dispositions of previously acquired capital.
pronounced where tax policy changes over time, as it often does. Consider, for example, the implications of a reform that replaces accelerated depreciation schedules with rates that more closely reflect economic depreciation. The tax-reducing effects of the old depreciation regime would tend to underestimate the tax burden on new investment. The tax burden measurement for income derived from depreciable capital purchased in prior years, written off for tax purposes at rates that differ markedly from depreciation rates applied to capital purchased in the current period, would not be representative of the tax burden on new investment.77

In short, ATRs have both attractive and problematic properties. They are attractive in that they incorporate the net effect of a multitude of tax provisions as well as the effects of tax planning, and thus stand in contrast to “q-type” investment models,78 which use oversimplifying assumptions as regards both taxation and firm financial policy. However, the fact that the income tax liability of a corporation, or a group of corporations, in a given year is an amalgam of tax considerations relevant to income generated on existing capital stock—which may differ, for a variety of reasons, from tax considerations relevant to a prospective investment—means that corporate tax liabilities measured in a prior year (or even in the current year) relative to (adjusted) financial profit may be a highly misleading indicator of the tax burden on prospective FDI. The importance of this consideration must be weighed into an assessment of the empirical results.

Incorporating Non-Tax Considerations

For the most part, the frameworks that have been used to date to explain FDI behaviour have largely ignored industrial organization considerations known to be important—indeed, in many cases, to be overriding—determinants of FDI. While some attempts have been made, as noted above, to incorporate macro-variables thought important to explaining FDI flows, in virtually all of the public finance empirical work in this area, too much is left unexplained. To the extent that omitted

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77 In most tax systems, tax depreciation (or depletion) rates applicable to capital acquired in prior years continue to apply to depreciated capital stocks even when new depreciation rates are introduced. This practice avoids unanticipated capital gains/losses on existing capital following the introduction of new tax treatment.

78 A small number of FDI studies have relied on so-called q-models of investment, based on the user cost of capital approach (see, for example, Swenson, supra footnote 30, and J. Cummins, K. Hassett, and G. Hubbard, “Tax Reforms and Investment: A Cross-Country Comparison” (1996), 62 Journal of Public Economics 237-73. These frameworks, while intuitively appealing, suffer from a number of theoretical shortcomings and have not been very successful in estimating investment behaviour in the domestic (let alone the international) context; in particular, estimated coefficients imply unreasonably slow adjustment costs. (See R.S. Chirinko, “Business Fixed Investment Spending: A Critical Survey of Modeling Strategies, Empirical Results, and Policy Implications” (1993), vol. 31, no. 4 Journal of Economic Literature 1875-1911.)
variables are correlated with the income or tax variables appearing as explanatory variables, reliance on the parameter/elasticity estimates is problematic.

In fact, two diverse approaches are observed in the empirical literature on FDI. On the one hand, industrial organization analysis focuses on determinants of internal versus external transaction incentives, tariffs, and non-tariff barriers. While it recognizes the possible role of taxation, it typically ignores this factor in applied work. On the other hand, public finance approaches tend to focus exclusively on tax effects and rely on aggregate data, typically ignoring non-tax considerations. In part, the focus away from industrial organization issues is forced on the exercise when aggregate data are used since (as emphasized by Porter) the importance of various business considerations tends to differ across business activities.

The importance of taking a disaggregate approach is made clear when one simply eyeballs data on flows of financial services-related FDI and its attraction to low-tax (for example, tax haven) jurisdictions. Clearly, different business activities differ in their geographic mobility—that is, in their ability to relocate at little differential business (non-tax) cost. The more mobile the activity, the greater the impact of tax incentives. Thus, a disaggregate approach paying closer attention to non-tax factors is required to more precisely measure tax incentive effects and their variability across different business activities.

APPENDIX  INVESTMENT EQUATION OF ALTSHULER, GRUBERT, AND NEWLON (1998)

The basic investment equation used by Altshuler, Grubert, and Newlon to explain US DIA into the host countries indexed by \( j \) is as follows:

\[
\ln K_{jt} = \alpha_t + \beta_t \ln(1 - ATR_{jt}) + \gamma Z_{jt} + \lambda \text{TRADE}_j \ln(1 - ATR_{jt}) + \varepsilon_{jt}
\]

Under this specification, the investment equations for the two years of data (1992, 1994) are

\[
\ln K_{j92} = \alpha_{92} + \beta_{92} \ln(1 - ATR_{j92}) + \gamma Z_{j92} + \lambda \text{TRADE}_j \ln(1 - ATR_{j92}) + \varepsilon_{92}
\]

and

\[
\ln K_{j84} = \alpha_{84} + \beta_{84} \ln(1 - ATR_{j84}) + \gamma Z_{j84} + \lambda \text{TRADE}_j \ln(1 - ATR_{j84}) + \varepsilon_{84}.
\]

Differencing these equations gives

\[
(\ln K_{j92} - \ln K_{j84}) = c + \beta_{92} \ln(1 - ATR_{j92}) - \beta_{84} \ln(1 - ATR_{j84}) + \gamma (Z_{j92} - Z_{j84}) + \lambda \text{TRADE}_j (\ln(1 - ATR_{j92}) - \ln(1 - ATR_{j84})) + \nu_j.
\]

80 Supra footnote 46.
Rearranging terms gives the following estimated investment equation shown in the text following footnote 48):

\[
\ln(K_{j92} - K_{j84}) = c + \beta_{92}(\ln(1 - ATR_{j92}) - \ln(1 - ATR_{j84}))
+ \beta_{\text{diff}} \ln(1 - ATR_{j84}) + \gamma(Z_{j92} - Z_{j84})
+ \lambda \text{TRADE}_j \ln(1 - ATR_{j92}) - \ln(1 - ATR_{j84})) + \nu_j
\]

where \(\beta_{\text{diff}} = \beta_{92} - \beta_{84}\).