The Impact of Tax on Foreign Direct Investment: Empirical Evidence and the Implications for Tax Integration Schemes

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Abstract

We estimate the impact of taxation on foreign direct investment (FDI) flows, using data on flows between seven countries for 1984 through 1989, and a sophisticated measure of the cost of capital. We find that the choice between domestic investment and total outward FDI is not significantly affected by taxation but that taxation does affect the location of outward FDI. These results are used to examine the impact of tax integration systems. Giving a tax credit to foreign shareholders may induce a large increase in inward FDI from "exemption" countries but not from "partial-credit" countries. For the United States, the total effect would be small.

Key words: foreign direct investment, taxation

1. Introduction

In recent years there has been renewed interest in the integration of personal and corporate taxes. Several OECD countries have either introduced some form of integration or have modified their system. The Ruding Committee of the European Commission (1992) discussed the possible harmonisation of such systems within the European Community and the U.S. Treasury (1992a, 1992b) has publicly discussed introducing such a scheme in the United States.

At the same time there has been a growing awareness that tax policy cannot be made adequately if the international implications of tax reforms are ignored. The rapid growth of both foreign portfolio investment and foreign direct investment (FDI) during the 1980s and early 1990s are an indication of the increasing internationalisation of savings and investment.

This paper combines these two themes to address two related questions. First, to what extent are FDI flows between countries affected by taxation? The existing empirical literature on this issue almost exclusively uses time-series aggregate data on inward FDI to the United States. Partly because of the problems of using these data, we address the question using a broader data set that includes FDI flows between seven major trading countries over the

period 1984 to 1989. We also distinguish two distinct subquestions. First, is tax a significant determinant of the choice between domestic investment and total FDI? Second, for a given level of total FDI, is tax a significant determinant of the allocation of that FDI to competing locations?

These questions are particularly relevant to the other question analyzed in this paper: what impact does the integration of personal and corporate taxes have on inward and outward FDI flows and on other savings and investment flows? In addressing this question, we neglect debt finance and the possibility that it may be favored over equity finance by the tax system. Although this may be one reason why integration schemes have been introduced, we concentrate instead on the incentives to invest in corporations in the form of equity rather than debt.

Before addressing the empirical question of the impact of taxation on FDI flows, we begin in Section 2 by considering conceptual issues involved with integration systems. In particular, we ask: if capital were perfectly mobile between countries, what does theory suggest would be the effects of introducing integration on domestic saving and investment, and on inward and outward portfolio investment and FDI? What differences would alternative systems of integration make? Part of the aim of this section is to analyze the generality of an existing result in the literature, from Boadway and Bruce (1992), that introducing an integration system would have no effect on domestic investment. A further aim is to make more precise the issues that we address in the empirical section.

Section 3 then presents the empirical analysis of FDI flows between France, Germany, Italy, Japan, Netherlands, the United Kingdom and the United States, for the period 1984 to 1989. The main aim of this section is to estimate the impact of taxation on these flows, controlling for other important factors, such as labor costs and economic proximity. Taxation is measured by its effect on the required pretax rate of return or cost of capital. The measure used is relatively sophisticated in that it takes account of the main elements of the tax system where the investment takes place and the country of residence of the investing corporation.

Section 4 uses the analysis in the previous two sections to estimate the impact of integration schemes on outward and inward FDI flows. The results of Section 3 suggest that taxation is not a significant determinant of the allocation of total investment between domestic and foreign locations. This implies that distinguishing in integration schemes between income derived from domestic and foreign locations would have little impact on FDI flows.

However, the Section 3 results do suggest that the allocation of total outward FDI between alternative locations is affected by taxation. In Section 4, we use these results to simulate the impact on inward FDI of a hypothetical reform to the US tax system. Section 5 briefly concludes.

2. Conceptual issues

The vast majority of the literature on the integration of personal and corporate taxes has examined the case of a closed economy. While this is not the focus of the current paper, we briefly consider this case, since it serves as a useful introduction to the case of an open economy.

Consider an investment financed by issuing new equity. On the assumption that profit is paid to shareholders in the form of a dividend, there are two layers of taxation on such profit: at the corporate level and the personal level. The combined taxation will tend to depress the posttax rate of return earned by savers at the same time as raising the pretax rate of return required on investment. The net effect will be to depress savings and investment.[1]

A tax integration scheme gives a tax credit against these two levels of tax. There exist numerous schemes for giving such a credit;[2] however, all have the consequence that the total effective tax rate on income earned in the corporate sector is reduced. Introducing integration in a closed economy would therefore reduce the disincentive to save and invest: as a result, for a given set of shareholder preferences, domestic savings and investment are likely to be higher with an integration scheme than without one.

This analysis must be modified when considering an open economy. Indeed, Boadway and Bruce (1992) argue that in a small open economy, introducing integration would have no effect on the level of domestic investment. Instead, any additional savings would be channeled abroad. However, we show below that this conclusion depends on how the marginal domestic investment is determined. Under some assumptions, the closed economy result that domestic investment may be stimulated by introducing integration reappears.

To clarify the issues, we consider a general model of an open economy. The model is as simple as possible, while attempting to capture the most important aspects of domestic and international flows of saving and investment. We do not allow explicitly for risk, nor do we model conditions under which each agent simultaneously avoids a corner solution.[3] The main intention of the analysis is to highlight the importance of alternative marginal conditions in determining the likely changes in savings and investment flows which might arise from a tax reform. We also show how the impact of such a tax reform would depend on the precise form of the integration system.

2.1. The basic model

Consider three agents: domestic corporations, domestic investors and foreign investors. There may be a large number of each type of agent, but we assume that within each type, all agents are identical. Each type of investor is assumed to have at least two investment opportunities. They will only accept both opportunities if the posttax rates of return at the margin are the same.[4] We first consider the position in which there is no integration of personal and corporate taxes.

Domestic investors can purchase two assets: equity of domestic corporations and some alternative asset. For simplicity, we assume that the alternative is a bond traded on the "world" market. In the first case, they receive a prepersonal (postcorporate) tax rate of return of r_D on which they pay tax at rate t. In the second case, they receive the "world" rate of return, r_w, on which they pay tax at rate t_w. Collectively, they are assumed to be too insignificant to affect r_w. Domestic investors would therefore invest in both assets only if

$$r_D(1 - t) = r_w(1 - t_w). \qquad (1)$$

Foreign investors have the same investment opportunities as domestic investors but face different tax rates: t_f on investment in the domestic corporation and t_x on investment in the world market. They invest in both assets only if

$$r_D(1 - t_f) = r_w(1 - t_x). \tag{2}$$

Domestic corporations have three investment opportunities: domestic investment, FDI, and bonds on the world market. The production functions for domestic investment and FDI are assumed to be concave, while domestic corporations are also too small to affect r_w. At the margin, they earn a pretax rate of return p_D on domestic investment, which is taxed at the domestic corporation tax rate u, and a pretax rate of return p_x on FDI, which is taxed at the corporate level at home and abroad at a total tax rate of u_x. Returns from the world market are taxed in the company at rate u_w. Domestic corporations exercise all three opportunities only if

$$(1 - u)p_D = (1 - u_x)p_x = r_w(1 - u_w). \tag{3}$$

Since r_w appears in each expression, (1), (2), and (3) can only hold simultaneously by a fortuitous combination of tax rates. We therefore investigate separately the three cases in which each of them holds. We label these cases A, B, and C.

2.1.1. Case A: Marginal shareholders domestic.
First, we consider the case in which (1) holds—that is, domestic investors equate the posttax rates of return from the two investments, the domestic corporation and the world market. In the absence of some feature of international investment that we do not model (such as diversification of risk or transactions costs) or a fortuitous combination of tax rates, this implies that foreign investors invest in only one asset: we assume for simplicity that it is the world market. In effect, domestic investors are the marginal shareholders and they determine the required rate of return from domestic corporations, r_D. If condition (1) holds, domestic corporations do not invest in the world market, since its marginal shareholders earn a higher posttax return from investing directly in the world market themselves.[5] However, domestic corporations invest in both domestic investment and FDI, equating the postcorporation tax rates of return from these two sources. Domestic investors therefore effectively save in three different forms. Combining (1) and the first two parts of (3) implies

$$r_w(1 - t_w) = p_D(1 - u)(1 - t) = p_X(1 - t). \tag{4}$$

2.1.2. Case B: Marginal shareholders foreign.
Second, we consider the case in which (2) holds—that is, foreign investors equate the posttax return from each asset. In this case, domestic investors invest in only one asset: we assume for simplicity that it is the domestic corporation. The position of domestic corporations is the same as in Case A, except that r_D is now determined by different marginal shareholders. In this case,[6]

$$r_w(1 - t_X) = p_D(1 - u)(1 - t_f) = p_X(1 - u_x)(1 - t_f). \tag{5}$$

2.1.3. Case C: Marginal posttax return determined by domestic corporations.
Finally, we consider the case in which domestic corporations can earn a higher posttax rate of return from the world market than can individual domestic shareholders. This implies that the minimum postcorporation tax rate of return earned by the corporation from its real investment must be equal to the rate it earns on the world market. That is, (3) holds, but (1) and (2) do not hold. Domestic investors are assumed to invest only in the domestic corporation; foreign investors are assumed to invest only in the world market.[7]

2.2. Introducing integration of corporate and personal taxes

The conditions (4), (5), and (3) define the three variants of the basic model, for cases A, B, and C respectively. In each case we now consider three possible tax reforms, each introducing integration between personal and corporate taxes.

1. The first system we consider is that in which a tax credit at rate d is applied to all income of domestic investors derived from the domestic corporation, with the effect that the posttax return from such investment is grossed up at a rate $1 - d$. Foreign investors do not receive any tax credit. This system was proposed by the U.S. Treasury (1992b) in December 1992. It is also the system analyzed by Boadway and Bruce (1992).
2. The second system is that proposed by the U.S. Treasury (1992a) in January 1992—that is, the tax credit should only be given to domestic shareholders and should only apply to income from domestic investment. Most existing integration systems are designed in this way, although in practice stacking rules can often mean that credit can be claimed for all dividends paid to domestic shareholders on the grounds that dividends are assumed to be paid first out of domestic source income.[8]
3. The third system we consider is the opposite extreme, in which the tax credit is given to all shareholders and applies to all sources of income of the domestic corporation.[9]

2.2.1. Case A: Marginal shareholders domestic.
For reforms (1) and (3) above, the no arbitrage condition (4) must be modified to take account of the tax credit on two of the three forms of saving effectively undertaken by the domestic shareholders: domestic investment and FDI. Since the tax credit at rate d is applied both forms of investment undertaken by the domestic corporation, condition (4) becomes

$$r_w(1 - t_w) = \frac{p_D(1 - u)(1 - t)}{(1 - d)} = \frac{p_x(1 - u_x)(1 - t)}{(1 - d)}. \tag{4a}$$

For reform (2) however, the tax credit, and hence the grossing up factor, is applied only to domestic investment, so that condition (4) becomes

$$r_w(1 - t_w) = \frac{p_D(1 - u)(1 - t)}{(1 - d)} = p_x(1 - u_x)(1 - t). \tag{4b}$$

For all of these reforms, domestic investors would switch their funds away from the world market into the domestic corporation. These additional funds would be used by the domestic

corporation to increase any investment subject to the tax credit, driving down the pretax rate of return. For reforms (1) and (3), and this would include FDI as well as domestic investment, so that both p_D and p_x fall until equation (4a) holds. For reform (2), it would only include domestic investment, so that only p_D falls. As long as domestic investors have sufficient funds to switch from the world market, there would be no effect on domestic savings.[10]

2.2.2. Case B: Marginal shareholders foreign.

Reforms (1) and (2) have no effect on condition (5). Giving a tax credit to domestic investors would raise their posttax rate of return, which may induce additional domestic saving. This additional saving would be used to purchase existing equity from foreign shareholders of the domestic corporation, who in turn would invest the proceeds in the world market. As long as the additional saving did not exceed the original inward investment by foreign shareholders, however, the rate of return required from the domestic corporation would be unchanged and there would be no additional domestic investment or FDI.

For reform (3), however, when the tax credit is given to foreign investors, condition (5) becomes

$$r_w(1 - t_x) = \frac{p_D(1 - u)(1 - t_f)}{(1 - d)} = \frac{p_x(1 - u_x)(1 - t_f)}{(1 - d)}. \tag{5a}$$

In this case, giving the tax credit to foreign shareholders induces them to switch funds away from the world market into the domestic corporation. The corporation uses the extra funds to undertake both domestic investment and FDI, driving down p_D and p_x. Note that when this occurs, the net rate of return received by domestic shareholders is unchanged compared to before the reform: p_D and p_x fall by a factor $(1 - d)$, which is exactly offset by the tax credit also available to domestic shareholders. Hence domestic saving is unchanged.

2.2.3. Case C: Marginal posttax return determined by domestic corporations.

Condition (3) is unaffected by reforms (1) and (3), since all activities of the domestic corporation receive the tax credit. Assuming that domestic investors are the only shareholders, the net return to the shareholders would rise, inducing more domestic saving. This saving would be channelled into the domestic corporation, which would use it solely to invest in the world market, without any effect on domestic investment or FDI.

In reform (2), however, only domestic investment is affected. Condition (3) then becomes

$$r_w(1 - u_w) = \frac{p_D(1 - u)}{(1 - d)} = p_x(1 - u_x). \tag{3a}$$

In this case, the domestic corporation will withdraw funds it has invested in the world market and instead use them for domestic investment. In this case, p_D is again driven down, until (3a) holds. Since the net return to the shareholder is unaffected, there will again be no effect on domestic saving.

The effects of the three tax reforms in the three possible cases are summarized in Table 1. The table illustrates the main point of this analysis; that the impact of introducing an integration scheme depends on how the marginal postcorporation tax return is determined, and how the integration scheme is designed. The Boadway and Bruce (1992) results correspond to Cases B and C for reform (1), where domestic savings rise but all of the increase is channeled abroad. However, it is clear that under alternative conditions, different results can be obtained.

There are then two critical questions for the empirical analysis. First, is it possible to distinguish empirically between the three ways in which the marginal posttax rate of return may be determined? Second, if so, can the size of the impact of taxation be estimated? In the next section we turn to these issues. In Section 4, we address the second question more closely by simulating the impact of a hypothetical tax reform.

Table 1. Implied effects of integration.

	Case A: Marginal Shareholder Domestic	Case B: Marginal Shareholder Foreign	Case C: Marginal Investment by Corporation
Reform 1. Integration credit restricted to domestic shareholders, but applies to all income of domestic corporations			
Domestic savings	No change	Rise	Rise
Domestic investment	Rise	No change	No change
Outward foreign direct investment	Rise	No change	No change
Outward foreign portfolio investment	Fall	N/A	Rise
Inward foreign investment	N/A	Fall	N/A
Reform 2. Integration credit restricted to domestic shareholders and to domestic source income of domestic corporations			
Domestic savings	No change	Rise	No change
Domestic investment	Rise	No change	Rise
Outward foreign direct investment	No change	No change	No change
Outward foreign portfolio investment	Fall	N/A	Fall
Inward foreign investment	N/A	Fall	N/A
Reform 3. Integration credit available to all shareholders and applies to all income of domestic corporations			
Domestic savings	No change	No change	Rise
Domestic investment	Rise	Rise	No change
Outward foreign direct investment	Rise	Rise	No change
Outward foreign portfolio investment	Fall	N/A	Rise
Inward foreign investment	N/A	Rise	N/A

3. Estimating the impact of taxation on FDI

3.1. Empirical approach

Ideally, we would address the first question by constructing a test of whether conditions (1), (2), and (3) held. Most straightforwardly, this could be done by estimating the responsiveness of each of the three agents in the model to changes in the posttax rate of return from different investments. A reallocation of the investment portfolio of one group of agents in response to a change in tax rates would be consistent with their no-arbitrage condition holding.

Unfortunately, we have data only on domestic investment and on flows of FDI between countries. This rules out a direct test of condition (1), since we do not have adequate data on portfolio holdings of domestic investors.

However, these data do permit a test of condition (2) if we are prepared to assume that marginal inward investment flows take the form of inward FDI, rather than portfolio investment. We construct a test by estimating the responsiveness to the required rate of return of the allocation of total outward FDI between alternative locations. To see why this may be regarded as a test of condition (2), consider a foreign multinational which has already determined the level of its total outward FDI. If the multinational equates the posttax rate of return from each alternative location, then the amount of investment in any given location will depend on the effective marginal tax rate faced on such investment. Changes in the tax system in one of the locations will affect the level of inward investment into that location.

The data also permit a test of condition (3). This differs from the previous test only in that we also include domestic investment as one of the possible locations; that is, we do not assume here that the level of total outward FDI has already been determined. Consider then a domestic corporation. If it equates the posttax rate of return from domestic investment and FDI, changes in the tax rate on domestic investment relative to the tax rates on FDI would affect the allocation of total investment between domestic and foreign locations.

The previous empirical literature on the effects of tax on FDI has mainly focused on aggregate flows into the U.S., equivalent to testing condition (2).[11] A series of studies, beginning with Hartman (1984) has indicated some effect of post tax rates of return on gross investment flows. Young (1988) in a similar study using later data, reported similar results for investment through reinvested profits, but very little effect on transfers of funds. Slemrod (1990), noting the endogeneity of retentions and posttax rates of return, separated out the tax effects, and reversed this result, finding that tax affects transfers of funds, but not retentions.

However, these studies are all rendered problematic by the poor quality of the data and by the strong upward trend of FDI over the estimation period. For example, the inclusion of other strongly trended values (in particular the unemployment rate) eliminated the effect of taxes in Slemrod (1990). Slemrod goes further than earlier studies by disaggregating investment flows by residence country in an attempt to distinguish between countries with credit and exemption systems and to include home country tax variables. The disaggregated results generally support the aggregate results, but suggest little role for residence country taxation.

The data used in this study take this approach one stage further. Rather than examinining inward FDI only for one country, we consider all FDI flows between 7 countries over the period 1984–1989. However, these data are available in a consistent way only for transfers of funds, so we do not investigate the distinction between transfers and retained earnings. By using data on total domestic investment we are also able to test condition (3) as well as condition (2).

3.2. Data

Three types of data are used in estimation, and they are discussed briefly in turn.

3.2.1. FDI and domestic investment. Most industrialized countries provide some information on the geographical direction of direct investment flows. Unfortunately, they do not do so on a consistent basis. Definitions and threshold levels vary from country to country, and many countries do not include the reinvested earnings of subsidiaries. Because of these data difficulties, and because this study concentrates on cross-border taxes, we have concentrated on transfers of funds only. This study uses data from Eurostat (1992) on bilateral transfers between each of seven major developed countries: France, Germany, Italy, Japan, Netherlands, the United Kingdom, and the United States. For each year considered (1984 through 1989) we therefore have forty-two FDI flows. Where possible, the data has been harmonized to eliminate differences in definitions; full details of this process are provided in Eurostat (1992). In addition, we use data on gross fixed capital formation by the corporate and quasi corporate sector in each country, taken from national accounts in each country.[12]

Analysis of the raw data on FDI flows reveal two striking features. First, the ratio of outward FDI to GDP has risen sharply over the period 1984–1989 in all of the countries analyzed except Italy. Second, for most countries, the United States was the largest recipient of FDI. For some countries, this effect declined over the 1980s (in France and Germany, for example), but for Japan, the dominance of the United States grew stronger over the period considered. The United Kingdom tended to be the second largest recipient of inward FDI.

3.2.2. Taxation and the cost of capital. Tax is incorporated into the empirical framework through the pretax required rate of return, or cost of capital, on investment in the host country by a company resident in another country. The precise effect of taxation on the cost of capital is complex; this is true even for domestic investment, but is especially so for international investment. Here we used a model developed by Devereux and Pearson (1994) that has already been widely used to analyze the role played by taxation in investment incentives—by, for example, the OECD (1991) and the Ruding Committee (1992).[13]

The model is based on a parent company in the "residence country" undertaking an investment in the "host" country though a wholly owned subsidiary in that country. In principle, the shareholders of the parent company can reside anywhere. The model incorporates most of the important features of the tax code: (1) the corporation tax system of the host country, including depreciation allowances, the statutory tax rate or rates[14] and the valuation of inventories permitted; (2) withholding taxes charged by the host country (or alternatively

tax credits given) on interest and dividend payments repatriated to the parent company; and (3) any additional taxes charged by the residence country on the foreign-source income received. We assume here that personal tax rates of shareholders are zero; however, this does not mean that the impact of integration schemes are ignored. In many cases, zero-rated shareholders can claim the tax credit in the same way as tax-paying shareholders.[15] In the results below, we consider only one form of financing of the subsidiary: both the parent and the subsidiary are financed by new equity.[16] However, the qualitative results are not sensitive to variations in the form of financing.

Although the model for measuring the cost of capital is the most sophisticated available, it cannot be claimed that it captures all of the complexities of the international tax system and FDI. Two issues, in particular, are not addressed. First, the model does not allow for any forms of tax planning—for example, through transfer pricing or repatriating profits as a royalty instead of a dividend.[17] Second, the investment by the subsidiary is assumed to be new capital. We do not consider the likely possibility that FDI takes the form of acquiring foreign subsidiaries, for example: this would raise further complex tax issues.[18]

It is assumed that the parent company requires the same real posttax rate of return in the domestic currency from all its operations. Since we abstract from risk, this is assumed to be the real domestic interest rate, which of course varies over time and between countries. Output from the investment is assumed to be priced in the host country and therefore depends on the host-country inflation rate, which also varies both over time and between countries. We assume static expectations for both the real interest rate and the inflation rate. Finally, we assume that expected movements in the exchange rate reflect differences in the nominal interest rates of the two countries.[19] This implies that in the absence of taxation, the cost of capital is equal to the real interest rate in the host country.

The data indicate that there was a wide dispersion of the costs of capital faced by corporations over the period 1984–1989 but that there was no consistent pattern of any location being favored or not favored over the period. There appears to be a tendency toward some convergence over the period, which may reflect some convergence in taxes as well as economic conditions. There is also some variation across the country of residence of the parent. Costs of capital faced by U.S. and Japanese corporations, for example, tend to be higher than those faced by corporations from other countries.

3.2.3. Other data.

The return that can be generated in each location of course also depends on the economic conditions in that location. We have therefore tested the significance of a number of location-specific variables (all definitions are for period t):[20] host country GDP (GDP_{jt}); two measures of the business cycle in the host country —growth of GDP and the unemployment rate $(UNEMP_{jt})$; the real exchange rate; unit labor costs in the host country (ULC_{jt});[21] and exports from country i to country j (EXP_{ijt}) scaled by residence country GDP (GDP_{it}).

A priori, we would expect a positive effect of GDP on the grounds that it is a proxy for market size.[22] Business cycle measures may have positive or negative effects, depending on whether they proxy demand conditions or spare capacity. Unit labor costs should have a negative relationship with inward FDI: the cheaper the labor, the more attractive the location for inward investment. Exports again have an ambiguous relationship, a priori. If a multinational wishes to sell in a foreign market, FDI is to some extent a substitute for exports. This would suggest a negative relationship between FDI and exports. Alternatively,

exports from country i to country j may be a good proxy for the "economic proximity" of the two countries. For example, exports from the United States to Canada exceed exports from the United States to France because of the proximity of the two countries. The exports term may therefore play a role similar role to distance between the two countries in gravity equations estimated in the trade literature. However, the export term also incorporates economic size and importance in the gravity estimate.[23] This explanation of the exports term suggests a positive relationship between exports and the dependent variable. For these reasons, exports may be endogenous; this is tested below.

Finally, the first model specification also includes total FDI from country i in period t, $TOFDI_{it}$, again scaled by GDP_{it}. The idea behind this variable is to allow for the massive rise in FDI from all the countries considered over the sample period. The first model does not seek to explain this rise, but merely to examine how outward FDI was allocated between countries. Again, in principle this variable is likely to be endogenous.

3.3. The responsiveness of the allocation of total FDI to taxation

In the first model, designed as a test of condition (2), the dependent variable is outward FDI from country i to country j in year t $(OFDI_{ijt})$ as a proportion of GDP of country i (GDP_{it}). The intention is not to explain total outward FDI relative to domestic investment but rather to examine the allocation of outward FDI between alternative locations. We scale by GDP to control for size effects.[24] Given our data set, we have forty-two observations on $OFDI_{ijt}$ for each period from 1984-1989. We use an ad hoc model of the allocation of FDI. There are a number of structural models of investment and portfolio allocation that could have been used in this analysis. However, neither the quantity nor the quality of the data permit a full investigation of a structural model.

In the ad hoc model we have tested a number of econometric specifications. The specification of the model must address a number of issues. The first is the panel aspect of the data, since they consist of forty-two cross-section elements for each year. The standard approach to estimating a model using panel data is to exploit the time series and cross section nature of the data by first differencing the data or taking differences from means over time in order to control for unobservable fixed effects. However, the quality of the data used here is not sufficient to exploit fully this feature. Such manipulations increase the considerable measurement error in the data, biasing down coefficients and increasing standard errors. Instead, we introduce twelve dummy variables; one for each residence country and each host country. While this will not remove all unobservable fixed effects, there is evidence that only relatively minor effects remain.

A second question concerns the dynamics of the model. A priori, the model might include lagged variables because of high adjustment costs in switching the pattern of investment from one year to the next. Lags of variables other than the dependent variable proved not to be significant and are not presented here. The lagged dependent variable raises a further issue: if there were unobservable fixed effects, they would be correlated with the lagged dependent variable, implying that in a levels specification its coefficient would be biased upward. There is some evidence that this occurs.[25] Omitting the lagged dependent variable when it should be included in the true model, however, would induce

serial correlation, as would the presence of fixed effects not captured by the dummy variables. However, we test for the presence of first-order serial correlation and find no evidence of it.

As a further check, we also present the model estimated in first differences. While this raises the standard errors for reasons already mentioned, any significant differences in the estimated coefficients between the levels and first differenced specifications would probably indicate correlation of the variables and unobservable effects, implying that the levels specification would bias the estimated coefficients. In fact, the first two columns of Table 2 demonstrate that there are no such significant differences.

Table 2. Explaining the allocation of total outward FDI between host countries, scaling by residence country GDP.

Dependent variable: $OFDI_{ijt}/GDP_{it}$
Number of observations: columns 1 and 2: 210; columns 3 and 4: 252
Period: columns 1 and 2: 1985–1989; columns 3 and 4; 1984–1989

	1 IV Levels	2 IV 1st Diffs	3 OLS Levels	4 OLS Levels
EXP_{ijt}/GDP_{it}	0.0151* (0.0143)	0.0291* (0.0823)	0.0109 (0.0125)	0.0114 (0.0126)
$CCAP_{ijt}$	–0.0156 (0.0082)	–0.0138 (0.0101)	–0.0167 (0.0073)	—
$tax\ wedge_{ijt}$	—	—	—	–0.0198 (0.0145)
$real\ int\ rate_{it}$	—	—	—	–0.0120 (0.0155)
ULC_{jt}	–0.0049 (0.0022)	–0.0077 (0.0040)	–0.0050 (0.0018)	–0.0051 (0.0019)
$TOFDI_{it}/GDP_{it}$	0.1425* (0.0603)	0.1372* (0.0618)	0.1191 (0.0389)	0.1191 (0.0391)
$DUMMY_i$	yes	no	yes	yes
$DUMMY_j$	yes	no	yes	yes
M1 (M2)[a]	1.64	2.01	1.65	1.65
Sargan[b]	15.0(14)	13.3(8)	—	—
Wald test for dummies[c]	2260.6(12)	—	32.9(12)	74.0(12)
R^2	—	—	0.542	0.542
Instruments for starred variables	X/GDP(1,5)TOFDI/GDP$_{t-1}$	X/GDP(2,5)TOFDI/GDP$_{t-2}$	—	—

Note: All of the formulations above include time dummies. Asymptotic standard errors are reported in parentheses. Standard errors and test statistics are asymptotically robust to heteroscedasticity. Starred variables are treated as endogenous and instrumented. The exports variable is used as an instrument in its GMM form, with the terms in parentheses indicating the latest and most distant lags used. Columns 1 and 2 are estimated on data beginning in 1985 since lags are used for instruments. An additional year is lost due to differencing in column 2.

a. M1 is a test for first order serial correlation in the residuals, asymptotically distributed as $N(0,1)$ under the null of no serial correlation. See Arellano and Bond (1991). A test for second-order serial correlation (M2) is reported where estimation is in first differences.

b. The Sargan statistic is a test of the overidentifying restrictions, asymptotically distributed as $\chi^2(k)$.

c. The Wald test is a test of the joint significance of the residence and host country dummy variables, asymptotically distributed as χ^2, under the null of no significance.

A final econometric issue is the potential endogeneity of EXP_{ijt} and $TOFDI_{it}$. The first two columns of Table 2 instrument these two variables, using lags as instruments.[26] The third column uses OLS; it is clear from a comparison of columns 1 and 3 that instrumenting these variables has very little effect.

The third column of Table 2 is a parsimonious specification of the model that passes all the statistical tests. Several variables were insignificant including the size and growth of GDP and the unemployment rate in the host country and are not presented in the table. As expected, unit labor costs have a negative influence on inward FDI, while total outward FDI is positively correlated with the FDI to each country. Exports from country i to j are positively related to FDI from country i to j, although perhaps because of the two offsetting effects discussed, this term is not significant.

As expected from theory, the cost of capital ($CCAP_{ijt}$) has a negative effect on FDI flows, which is statistically significant. Column 4 splits the cost of capital into its two components, the tax wedge and the residence country real rate of interest. This has little effect on the other variables.

Both parts of the cost of capital have negative signs and are less significant than the aggregate cost of capital. However, the effective tax wedge has a larger coefficient than the cost of capital and is marginally significant.[27]

The relative size and significance of the tax wedge lends support to the view that tax is a significant determinant of the allocation of FDI across alternative locations. This is consistent with condition (2) in Section 2; equalization of posttax rates of return on alternative investments by a foreign investor requires inward FDI to a country to depend on the relevant effective tax rate. In Section 4 of the paper we interpret the size of the coefficient on the tax wedge in the light of the hypothetical reform of introducing integration in the United States.

3.4. The responsiveness of the allocation of total investment to taxation

In Table 3 we estimate a model that we wish to interpret as a test of condition (3)—that is, whether corporations in fact equate posttax rates of return from domestic investment and FDI. The modeling strategy is very similiar to the previous case. The main difference is that we now include additional observations that constitute corporate domestic investment in each country in order to explore the allocation of total investment undertaken by country i both domestically and in each of the other countries.

The scaling factor used in this model is also different from the first model. Here we analyze investment taking place in each location ($OFDI_{ijt}$ signifies domestic investment if $i = j$) as a proportion of total investment undertaken by country i.[28]

Most of the explanatory variables are the same as in Table 2. For the domestic case, exports from i to j are replaced by that part of GDP of i that is not exported. Unit labor costs in the domestic economy and the domestic cost of capital are used for observations on domestic investment. In addition, we now also present results including the unemployment rate in the host country and the ratio of GDP in the host country to total GDP in all of the seven countries, both of which are more significant in this specification.

For a variety of reasons not explained adequately by the explanatory variables, the vast majority of total investment undertaken by each country is domestic. In most cases, the proportion is over 90 percent, compared to a fraction of usually less than 1 percent for

Table 3. Explaining the allocation of total investment between domestic investment and outward investment to each host country, scaling by total domestic and outward investment.

Dependent variable: I_{ijt}/TI_{it}
Number of observations: columns 1 and 2: 245; columns 3 and 4: 294
Period: columns 1 and 2: 1985-1989; columns 3 and 4: 1984-1989

	1 IV Levels	2 IV 1st Diffs	3 OLS Levels	4 OLS Levels
EXP_{ijt}/GDP_{it}	0.1129* (0.0393)	-0.5207* (0.8235)	0.1097 (0.0417)	0.1032 (0.0420)
$CCAP_{ijt}$	-0.0494 (0.0695)	-0.1215 (0.1291)	-0.0462 (0.0610)	—
$tax\ wedge_{ijt}$	—	—	—	-0.0250 (0.0556)
$real\ int\ rate_{it}$	—	—	—	-0.0023 (0.0015)
$UNEMP_{jt}$	0.1336 (0.0881)	0.3435 (0.2491)	0.1227 (0.0757)	0.1616 (0.0846)
ULC_{jt}	-0.0329 (0.0179)	0.0670 (0.0688)	-0.0325 (0.0173)	-0.0360 (0.0179)
$GDP_{jt}/TGDP_t$	0.1418 (0.0540)	-0.5176 (0.3768)	0.1366 (0.0523)	0.1507 (0.0565)
DUMMY = 1 if $i = j$	0.8210 (0.0295)	—	0.8297 (0.0310)	0.8348 (0.0314)
M1 (M2)	1.80	0.32	1.91	1.91
Sargan	12.3(14)	12.1(9)	—	—
R^2	—	—	0.994	0.994
Instruments for starred variables	X/GDP(1,5)	X/GDP(2,5)	—	—

Note: See notes to Table 2. Time dummies, residence and host country dummies were jointly insignificant in each of the formulations above and are therefore excluded in these results. For $i = j$, EXP_{ijt} is defined as $GDP_{it} - TOTAL\ EXPORTS_{it}$.

investment to another country. Similarly, the vast majority of output produced in each country is consumed domestically. The exports term is therefore again used to help capture economic proximity, although in this case it also covers the proximity of the domestic market. In addition, we include a dummy variable that takes the value of 1 for domestic investment and zero for FDI. This specification does not therefore provide a full explanation of the allocation of investment between domestic and foreign markets. However, for the purposes of investigating the effect of taxation on that allocation, there is no reason to suppose that the coefficient on the cost of capital or tax wedge terms are biased by the inclusion of such a dummy variable.

This specification also passes the statistical tests discussed in the context of the first model. There is no evidence of serial correlation nor, from comparing columns 1 and 2, is there evidence that the explanatory variables are correlated with unobservable effects. In this formulation, however, residence-country and host-country dummies are not significant and are therefore dropped. Also, as in Table 2, instrumenting variables that are likely to be endogenous has very little impact on the estimated coefficients or their standard errors.

The coefficient on unit labor costs is of a roughly similar magnitude to Table 2, although less significant.[29] However, the export variable has a much higher coefficient. The unemployment rate has a positive coefficient, suggesting that it is indicating the degree of slack in the economy rather than the level of demand. The dummy variable indicating that the investment is domestic is strongly significant, with a large coefficient.

What is important for the analysis here however, is whether, conditional on the fact that the vast majority of investment is domestic, taxation is nevertheless significant at the margin. Evidence is provided by the coefficient on the cost of capital in column 3 and the tax wedge in column 4. Adjusting for the different scaling factors, the responsiveness of investment flows to the cost of capital is very similar to that found in Table 2. However, in this case, the standard error of the estimate is considerably higher than that in Table 2, so that in no column is the cost of capital statistically significantly different from zero.[30] Moreover, in column 4, where the cost of capital is again split into its two components, the host-country real rate of interest is reasonably significant, but the tax wedge has a very low coefficient and is clearly not significantly different from zero.

The statistical insignificance of the cost of capital and taxation in this specification has at least two possible explanations. First, it could be argued that too much is being expected of the data. The great difference between the proportion of investment taking place domestically and in each other country is mostly explained by the dummy variable and by the export variable. Given measurement errors in the data, it could be argued that it is unlikely that investment flows or the cost of capital are measured accurately enough to help to explain the remaining differences. This explanation is therefore consistent with the possibility of perfect capital mobility both between foreign locations of investment and between foreign and domestic locations, but with such mobility not being demonstrated in the results.

An alternative explanation is that taxation and the cost of capital is not an important factor in the choice between domestic investment and FDI. Although capital that has been allocated abroad may be perfectly mobile between alternative foreign locations, there is not perfect mobility between foreign and domestic locations. Rather there appears to be a two-stage budgeting process. First the allocation of investment between domestic and total outward FDI is decided: here the cost of capital is relatively unimportant. Second, total outward FDI is allocated between alternative locations: here the cost of capital and taxation are important. In principle, this latter explanation seems plausible: if there is perfect capital mobility for real investment, why is such a large part of investment undertaken domestically?

This second interpretation of the results is inconsistent with condition (3) of the conceptual model developed above, where it was assumed that domestic corporations equated the posttax rates of return from all their activities, including domestic investment and FDI. Rather the results suggest that other factors determine the allocation of the corporation's activities between domestic investment and FDI. This has important implications for the effects of introducing a tax integration scheme.

4. Simulating the effects of tax reforms

The crucial part of the simple model developed in Section 2 is how the postcorporation tax rate of return of domestic corporations is determined. We considered three possibilities:

that it is determined by equating the posttax returns on alternative investments available to domestic shareholders, foreign shareholders, or the corporations themselves. Part of the aim of Section 3 was to test which of these no-arbitrage conditions holds in practice.

In the absence of appropriate data, we were unable to test the possibility that the post-corporation tax rate of return is determined by domestic shareholders. However, taken at face value, Table 3 presents evidence inconsistent with the hypothesis that corporations equate the posttax return from domestic investment and FDI. Given the insignificance of the cost of capital in this table, our central estimate is that the balance of domestic invest-ment and FDI would be unaffected by an integration scheme which discriminated between them, for example reform (2) above.

However, Table 2 presents evidence consistent with the hypothesis that foreign investors equate the posttax rate of return from alternative locations. Further, we have an empirical estimate of how FDI from country i to country j would be affected by a change in the tax rate on such investment. This estimate can be used to simulate the impact on inward FDI into country j if it reformed its tax system.

In this section, we follow this approach by simulating the effects on the flow of inward FDI into the United States of reform (3) in Section 2. Specifically, we consider a hypothetical case in which the United States had a full integration system (in which the rate of tax credit is equal to the corporation tax rate) between 1984 and 1989 and in which integration credits were given to non-U.S. shareholders as well as to domestic shareholders. Of course, if the hypothetical integration credit were not given to foreign shareholders, we would not expect any (first-round) impact on inward FDI to the United States. For the purposes of the simulation we assume that foreign shareholders are multinational companies resident in one of the other countries.

We assess the impact on inward investment flows in three stages. First, we estimate the hypothetical cost of capital for inward FDI to the United States if the United States had had a full integration system in place between 1984 and 1989. The difference from the actual cost of capital for inward FDI from each of the other countries is presented in the first column of Table 4.[31] Second, we multiply this difference by the coefficient on the tax wedge in column 4 of in Table 2 to find the predicted effect on inward FDI from each of the other countries as a proportion of GDP_{it}. In doing so, we make the assumption that all other variables in Table 2 would be unaffected by the tax reform, including $TOFDI_{it}$. Finally, adjusting for GDP_{it}, we find the predicted effect on FDI, presented in columns 3 and 4 of Table 4. We neglect second round effects: for example, we ignore the possibility that the posttax required rate of return would change or that there may be a switch from debt finance to equity finance.[32]

Two main points can be noted from the first column of Table 4. First, there would be an important difference in the effect of integration on the cost of capital depending on whether or not the residence country exempts foreign-source dividends from tax. France, Germany and the Netherlands do exempt foreign-source dividends.[33] As a result, the benefit of an integration credit would be kept by the company and the cost of capital falls accordingly. The difference between the actual and hypothetical cost of capital ranges up to 8.8 percent-age points (for the Netherlands in 1984).

However, the situation would be different for countries which tax foreign-source dividends, operating a partial credit scheme.[34] In this case, if the tax rate of the residence country were higher than the combination of the U.S. tax rate and the withholding tax charged by

Table 4. Simulated impact of integration in the United States on inward FDI.

Year	Change in Cost of Capital (%)	FDI to United States ($m)	Predicted Difference in FDI to United States ($m)	Predicted Difference in FDI to United States (%)
FDI from France:				
1984	−4.6%	$ 736	$ 451	61%
1985	−3.8	958	395	41
1986	−3.3	2,240	475	21
1987	−2.5	2,720	435	16
1988	−2.3	2,946	437	15
1989	−2.2	3,977	415	10
FDI from Germany:				
1984	−6.1	1,135	743	65
1985	−5.0	2,374	627	26
1986	−3.6	3,987	642	16
1987	−3.4	4,476	748	17
1988	−2.9	5,195	680	13
1989	−2.3	2,511	551	21
FDI from Italy:				
1984	−1.3	499	110	22
1985	−1.1	258	93	36
1986	−0.8	389	90	23
1987	−0.4	117	54	46
1988	0	343	0	0
1989	0	−1,381	0	0
FDI from Japan:				
1984	−0.2	3,359	57	1.7
1985	−0.2	5,394	51	0.9
1986	−0.2	9,967	59	0.6
1987	0	14,705	0	0
1988	0	21,692	0	0
1989	0	32,549	0	0
FDI from Netherlands:				
1984	−8.8	433	218	50
1985	−7.5	1,059	188	18
1986	−6.0	622	208	33
1987	−5.2	3,349	218	7
1988	−4.3	1,564	195	12
1989	−4.1	3,346	182	5
FDI from the United Kingdom:				
1984	−1.8	5,590	154	3
1985	−2.2	2,824	204	7
1986	−2.1	9,481	230	2.4
1987	−1.5	16,676	207	1.2
1988	−0.8	14,206	139	1.0
1989	−0.8	16,292	129	0.8
Total FDI from all six countries:				
1984	—	11,753	1,732	15
1985	—	12,867	1,557	12
1986	—	26,686	1,705	6
1987	—	42,043	1,663	4.0
1988	—	45,946	1,451	3.2
1989	—	57,294	1,277	2.2

Note: Column 1 shows the difference in the cost of capital if the United States had had a full-integration system in place for the years 1984 to 1989. The integration credit is assumed to be given to foreign shareholders.

the United States, then the return would be effectively taxed at the rate of the residence country. In this case there would be no effect on the total tax bill of the United States offering an integration credit: there would be an increase in the residence country tax bill equal to the credit. In these cases, even this relatively generous form of an integration system would have no effect on the cost of capital: effectively tax revenue would be simply transferred between governments. Where the residence country tax rate were lower than the combined U.S. corporation tax and withholding tax rate, the tax credit would benefit the corporation and the cost of capital would fall, albeit only slightly.

The second main point which can be noted from the first column of Table 4 is that the U.S. tax reform of 1986 had a significant effect on whether integration would impact significantly on the cost of capital. The reduction in the U.S. corporation tax rate from 46 percent up to 1986, 40 percent in 1987, and 34 percent from 1988 had two effects. First, because we assume the introduction of a full integration system, the impact of integration would have been larger pre-1986 than post-1986. This is reflected in the smaller effect of integration for investment from France, Germany, and the Netherlands post-1986 compared to pre-1986. Second, it also reduced the combined U.S. corporate and withholding tax rate (in the absence of integration) relative to the residence country tax rate, thus making it more likely that a country that taxes foreign-source dividends with a partial credit for U.S. tax would actually raise revenue. This implies that there would have been no difference in the cost of capital for investment from Italy and Japan post-1986 and only a very small difference for investment from the United Kingdom.

In the remainder of Table 4, we analyze the implied difference in inward FDI to the United States. Recall from Table 2 that the difference in the cost of capital directly implies a difference in FDI as a proportion of GDP_{it}. Adjusting for GDP_{it}, the implied effects of inward FDI to the U.S. are given in column 3 in millions of U.S. dollars and in column 4 in terms of percentage difference from actual FDI.

For the latest year available, 1989, the results suggest that inward FDI from Germany would have been 21 percent higher, from France 10 percent, from the Netherlands 5 percent, from the United Kingdom 1 percent, with no difference at all from Italy and Japan. These numbers are much lower than those earlier in the sample period. The difference across time reflects partly the U.S. 1986 reforms and partly that FDI flows were larger in 1989 as a proportion of GDP than they were in 1984. Consequently, a tax reform that induced a change in FDI expressed as a proportion of GDP would appear as a smaller percentage change in FDI in 1989 than in 1984.

The last section of the table presents the aggregate difference from all of the other six countries. This section reflects the fact that by far the largest part of inward FDI into the United States comes from Japan and the United Kingdom, both of which operate partial credit systems. For these two countries there is little difference in inward FDI. This means that in aggregate in 1989 inward investment would have been only 2 percent higher had an integration system been in place that gave credits to foreign shareholders. This compares with an average rate of increase in nominal terms of inward FDI to the United States from the other six countries between 1984 and 1989 of 37 percent per year.

5. Conclusions

This paper considers two related issues. One is the general issue of the influence of taxation on FDI flows between countries. This is investigated empirically using data on FDI flows between seven major trading countries between 1984 and 1989. The importance of taxation, through the cost of capital, is investigated in a model that controls for various other influences on FDI. The second, and related, issue is the impact of tax systems that integrate corporate and personal taxes on savings and investment flows, especially inward and outward FDI.

In Section 2, we describe a simple conceptual model that analyzes how savings and investment flows would be affected by the introduction of an integration system. The results depend crucially on how the postcorporation tax return from domestic corporations is determined. Within our simple framework, there are three possibilities: it may be determined by the marginal shareholder—who may be domestic or foreign—or it may be determined by the opportunities available to domestic corporations themselves. A previous result in the literature—that introducing integration will have no effect on domestic investment in an open economy—is shown to depend both on how this posttax rate of return is determined and on the structure of integration system considered.

Section 3 presents the results of attempts to consider empirically two of the three possibilities. Considering the foreign shareholder as a multinational based in another country, we first test whether the allocation of total FDI flows between competing locations by multinationals is sensitive to differences in taxation between the locations. We find evidence that this is the case, which is consistent with the possibility that, in some cases at least, the marginal shareholder is a foreign-based multinational which equates posttax returns from its FDI in alternative locations.

These econometric results are used in Section 4 to simulate how inward FDI flows to the United States would have been different between 1984 and 1989 had the United States operated a full-integration system in which integration credits were given to foreign shareholders. The effects depend crucially on whether the shareholders' home country taxes or exempts dividend flows from the United States: in 1989, for example, it is estimated that inward FDI flows to the United States from exemption countries would have been between 5 percent and 21 percent higher. However, the most important countries for inward FDI to the United States are Japan and the United Kingdom, both of which operate a partial-credit system; the effects of the reform for inward FDI to the United States from these countries are close to zero. In aggregate, we estimate that in 1989 total inward FDI would have been only 2 percent higher had such an integration system been in operation.

The second exercise in Section 3 is to consider whether multinationals respond to differences in tax in comparing domestic and foreign locations for a given level of total investment. Here taxation is generally insignificant. This result may be due to measurement error in the available data, compounded by the very large differences between the size of domestic investment and outward FDI to each other country. However, taken at face value, the result suggests that the allocation of total investment between domestic and foreign locations is not sensitive to taxation. Discriminating between domestic investment and outward FDI in introducing an integration system would therefore have little effect on the choice between these two investment opportunities.

Acknowledgment

Notes

1. That is, savings and investment that take this form: clearly savings and investment might take different forms as a result of such a tax system.
2. OECD (1991) lists seven different types of integration.
3. An earlier version of this paper outlines one possible model in which this holds: details are available from the authors.
4. We rule out short sales of all assets.
5. That is, $r_w(1 - t_w) > r_w(1 - u_w)(1 - t)$. Otherwise, domestic shareholders would invest only in domestic corporations, which in turn would invest in the world market.
6. For the purposes of this discussion, Case B is essentially equivalent to the capital importer case of Boadway and Bruce (1992).
7. That is, $r_w(1 - t_w) < r_w(1 - u_w)(1 - t)$, so that domestic shareholders invest only in domestic corporations, but $r_w(1 - t_x) > r_w(1 - u_w)(1 - t_f)$, so that foreign shareholders invest only in the world market. For the purposes of this discussion, Case C is essentially equivalent to the capital exporter case of Boadway and Bruce (1992).
8. While this is true of the United Kingdom, for example, it is still the case that many U.K. multinationals are in a "surplus ACT" position, in which the distinction between foreign and domestic source income is important for these reasons. For more discussion of this issue, see Higson and Elliot (1993).
9. We do not separately consider the possibility that the integration credit may be available only for domestic investment but available to all shareholders.
10. If they did not have sufficient funds, they would switch all their saving into domestic corporations. Since in this event foreign investors would not be induced to invest in domestic corporations, p_D and p_x would rise as a result of the reform. This may induce additional domestic saving.
11. Several studies have examined other influences on FDI. See, for example, Lunn (1980), Kravis and Lipsey (1982), Culem (1988) and Wheeler and Mody (1992).
12. OECD defines *quasi-corporate* to include large unincorporated businesses such as partnerships. We use data from the corporate and quasi-corporate sectors only on the grounds that this is the main alternative to FDI by domestic investors. We thereby exclude, for example, investment in residential housing, albeit at the cost that the definition of the corporate and quasi-corporate sector may differ between countries.
13. Details of tax legislation in each country over the period considered were taken from various sources, primarily reports prepared for each year by Price Waterhouse and Coopers and Lybrand.
14. Depending on whether there is a two-rate system. Local taxes are also included, based on a typical local tax rate.
15. In the United Kingdom, for example, zero-rated shareholders can claim a tax credit under the imputation system.
16. For domestic investment, we assume that the parent undertakes the investment directly, financed by new equity.
17. See Hines and Hubbard (1990) and Altshuler and Newlon (1993) for empirical evidence on the degree to which U.S. firms use such techniques.
18. See Auerbach and Hassett (1993) for a discussion of this issue.
19. We have experimented with other assumptions, without any qualitative differences in the results.

20. These data were taken from various issues of the following sources: OECD Economic Outlook, OECD National Accounts, and European Economy (published by the European Commission).
21. This variable is based on an index for each country; it does not therefore provide any cross-section variation but only time series variation within each country.
22. Lunn (1980) and Wheeler and Mody (1992) present evidence that market size is an important determinant of FDI.
23. The GDP term may also be a proxy for economic gravity.
24. An alternative approach would be to scale by total outward investment from country i. However, this is problematic since this figure is occasionally negative in the data (implying a net disinvestment).
25. When a dynamic model is estimated in first differences, the coefficient on the lagged dependent variable is significantly different from that estimated in levels, thus casting doubt on the levels estimate.
26. Exports are instrumented using the generalized method of moments technique (see Hansen, 1982). Due to the relative small size of the cross-section, it was not possible to apply the same technique to total FDI. Changing the instrument set had little effect on the results. The Sargan test indicates that, by conventional statistical criteria, the instruments used are not invalid.
27. We also split the tax wedge into two further components: the tax wedge if integration systems in existence during the period were ignored and the difference between that and the actual tax wedge. The results suggest that ignoring integration would not imply very great misspecification of the model. However, this is not surprising: introducing integration for the parent in the residence country does not generally play a very important role in the cross-section variation of costs of capital across alternative locations.
28. Defined to be gross fixed capital formation by the corporate and quasi-corporate sector in country i, plus total outward FDI from country i. Inward flows of portfolio and direct investment are therefore treated as part of the finds available to domestic corporations that can be invested domestically or abroad.
29. Note that to compare the coefficients between tables, it is necessary to take into account the different scaling factors. On average for these data, total investment is 28 percent of GDP; hence the implied elasticities would be equal if the coefficients in Table 3 were around 3.5 times the equivalent coefficients in Table 2.
30. Although it is also the case that its adjusted value is not significantly different from that in Table 2.
31. We assume that withholding taxes remain in place and apply to the sum of the cash dividend and integration tax credit.
32. Grubert and Mutti (1992) investigated these issues in the context of a general equilibrium model. Here we ignore general equilibrium effects in order to concentrate on estimating the elasticities involved in more detail.
33. France exempts 90 percent of foreign source dividends.
34. It should be noted that these schemes generally operate slightly differently to that in the United States. Two important differences are as follows. First, foreign-source income is generally taxed on a source by source basis, implying that income from different sources is not mixed: hence, for example, all dividends paid to U.K. parents by tax-paying U.S. subsidiaries would in principle be subject to the same U.K. tax rate. (It is possible that U.K. parents could mix in their income from different sources in a third subsidiary; this possibility is neglected here as in practice they rarely do so.) Second, in identifying the profits out of which dividends have been paid foreign-source dividends are usually grossed up at the foreign statutory corporate tax rate: there is generally no attempt to adjust this tax rate for differences in computing taxable profits between the residence and host countries.

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