Volume Title: Taxation in the Global Economy

Volume Author/Editor: Assaf Razin and Joel Slemrod, editors

Volume Publisher: University of Chicago Press, 1990

Volume ISBN: 0-226-70591-9

Volume URL: http://www.nber.org/books/razi90-1

Conference Date: February 23-25, 1989

Publication Date: January 1990

Chapter Title: Tax Effects on Foreign Direct Investment in the United States: Evidence from a Cross-Country Comparison

Chapter Author: Joel B. Slemrod

Chapter URL: http://www.nber.org/chapters/c7206

Chapter pages in book: (p. 79 - 122)

3 Tax Effects on Foreign Direct Investment in the United States: Evidence from a Cross-Country Comparison

Joel Slemrod

The magnitude and financing of foreign direct investment (FDI) in the United States, which totaled more than $40 billion in 1987, are potentially influenced by the tax systems of both the United States and the investor's country. Nevertheless, all recent studies of FDI in the United States have investigated only the effect of U.S. taxation. The home country's tax system has been ignored because either the appropriate data are unavailable or, on theoretical grounds, it is deemed to be irrelevant to FDI.

This paper investigates the effect of both U.S. and home country taxation on FDI in the United States. It does this by first extending and updating the standard model of aggregate FDI in the United States and then disaggregating FDI by the country of the investing firm so as to facilitate the study of home country influences, including taxation.

The results of this new empirical approach generally support a negative effect of U.S. effective rates of taxation on total FDI and new transfers of funds, but not on retained earnings. The disaggregated analysis does not, though, provide much support for several propositions about the effect on FDI in the United States of foreign countries' tax rates and systems of taxing foreign-source income.

The paper is organized as follows. Section 3.1 reviews the existing empirical literature, and section 3.2 discusses some of the important issues regarding data on FDI in the United States. The next two sections present the

Joel Slemrod is professor of economics, professor of business economics and public policy, and director of the Office of Tax Policy Research at the University of Michigan, and a research associate at the National Bureau of Economic Research.

The author is grateful to David Hartman, other conference attendees, and the participants at the NBER Summer Institute for valuable comments and suggestions. He also acknowledges the help of Leticia Fernandez and Ken Timbers in providing exceptionally able research assistance and of Julian Alworth for graciously providing critical data.

results of the data analyses—in section 3.3 for aggregate FDI and in section 3.4 separately for each of seven major investing countries. Section 3.5 provides a conclusion.

3.1 Review of the Existing Empirical Literature

It is generally accepted that FDI is primarily an issue of industrial organization. Dunning (1985, 6–7) has argued that FDI by firms of country A in country B is more likely if A's firms (i) possess ownership-specific advantages relative to B's firms in sourcing markets, (ii) find it profitable to use these advantages themselves rather than lease them to B's firms, and (iii) find it profitable to utilize their ownership-specific advantages in B rather than A. A large body of empirical literature has been addressed to testing this theory of international production, usually referred to as the "eclectic" theory. Much of this research has been cross-sectional, relating the extent of foreign investment in a given sector to characteristics of that sector that represent ownership-specific and location-specific comparative advantages. Several examples of this type of analysis are contained in Dunning (1985).

Studies of the effects of taxation on FDI have generally taken the perspective that, whatever its benefits to firms are, they must be balanced against the tax consequences of carrying out FDI. The tax systems of both the firm's home country and potential host countries can affect the incentives concerning FDI as well as how to finance a given pattern of FDI. Theoretical treatments of these questions are presented in Alworth (1988) and Gersovitz (1987). The limited empirical literature on the effect of taxes on multinationals' behavior is summarized in Caves (1982).

Empirical study focusing on the effect of taxation on the time series of FDI in the United States was pioneered by Hartman (1984). Using annual data from 1965 to 1979, he estimated the response of FDI, separately for investment financed by retained earnings and transfers from abroad, to three variables: the after-tax rate of return realized by foreign investors in the United States, the overall after-tax rate of return on capital in the United States, and the tax rate on U.S. capital owned by foreigners relative to the tax rate on U.S. capital owned by U.S. investors. The first two terms are meant to proxy for the prospective return to new FDI, the first term being more appropriate for firms considering expansion of current operations and the second more applicable to the acquisition of existing assets that are not expected to earn extraordinary returns based on production of differentiated products or possession of superior technology. The relative tax term is designed to capture the possibility that tax changes that apply only to U.S. investors will, by affecting the valuation of assets, alter the foreign investor's cost and therefore the return to acquiring the asset.[1]

Hartman does not attempt to measure either an effective withholding tax rate or the foreign income tax rate applied to the aggregate of FDI. He

defends their absence by noting the likelihood that the average values of these tax rates are relatively constant over time. Furthermore, no attempt is made to measure the alternative rate of return available abroad to foreign investors.

Hartman's regression results reveal both a positive association of after-tax rate of return variables with the ratio to U.S. GNP of FDI financed by retained earnings and a negative association of the FDI-GNP ratio with the relative tax rate on foreigners compared to domestic residents. The model does not explain transfers from abroad as well as retained earnings, although coefficients of all three variables have the expected sign and are significantly different from zero. From this research, Hartman concludes that the effect of taxes on FDI, both that implied by reinvestment of earnings and that accomplished by explicit transfer of funds, is quite strong.

Boskin and Gale (1987) reestimate Hartman's equation using the updated tax rate and rate of return series from Feldstein and Jun (1987). Although the estimated elasticities of FDI to the rates of return are somewhat lower, none of the point estimates changes by more than one standard deviation. They also extend the sample forward to 1984, and in some cases backward to 1956, and experiment with a variety of alternative explanatory variables and functional forms. They conclude that, although the results are somewhat sensitive to sample period and specification, the qualitative conclusions of Hartman are fairly robust.

Young (1988) uses revised data on investment, GNP, and rates of return earned by foreigners to estimate similar equations. These changes increase the estimated elasticities with respect to the rate of return realized by foreigners and the relative rate of return. However, the equations for new transfers of funds estimated using the years 1956–84 yield very poor results, suggesting to Young that the simple Hartman model is inadequate for studying foreign direct investment through new funds when applied to the expanded sample period. Relaxing Hartman's assumption of a unitary income elasticity and including the lagged dependent variable as a right-hand-side variable does not substantially alter the conclusions for retained earnings (although the estimated responsiveness is significantly lower), but the tax responsiveness of transfer of new funds still is not supported.

Newlon (1987) reexamines the results of Hartman as well as those of Boskin and Gale. During his attempt at replication, he discovered that the series measuring the rate of return on FDI, used in all earlier papers, had been miscalculated from the original Bureau of Economic Analysis data for the years 1965–73. Using the corrected series, the equation explaining retained earnings does not fit as well, although the equation explaining transfers fits better. In explaining retained earnings, the estimated coefficients on the return to FDI and the tax ratio are slightly larger in absolute value and remain statistically significant, although the estimated coefficient

on the net return in the United States is lower and is no longer statistically significant. For transfers of funds, the estimated coefficient on the return to FDI is much larger and becomes significant, although the estimated coefficient on the net return in the United States becomes smaller and insignificant. When the sample period is extended to range from 1956 to 1984, Newlon's results also differ from those of Hartman and those of Boskin and Gale. In particular, the equation explaining transfer of funds fits poorly, and no estimated coefficient is significant.[2]

It is notable that none of these studies has deviated very far from the approach taken in Hartman's (1984) paper. Although Young (1988) refers to Feldstein's (1982) dictum that, in the absence of a perfectly specified model, many alternative models should be investigated, the empirical research has been extremely one tracked. This is a sufficient reason to explore alternative methodologies. Furthermore, there are several problems with the standard approach that bear further study.

In the previous literature, the disincentive to investment caused by the tax system is implicitly measured by an average tax rate, computed as total taxes paid divided by a measure of profits. However, the incentive to undertake new investment depends on the effective marginal tax rate, which, as is well known, can deviate substantially from an average tax rate concept.

None of the existing studies attempts to estimate the effect of the home country's tax system on FDI in the United States. Of course, collecting the appropriate data is difficult, and perhaps, as Hartman argued, these tax rates have not in fact varied much. The observed stability, though, applies to statutory tax rates and not necessarily to the more appropriate effective marginal tax rates. There is also a theoretical reason to focus attention on the host country tax rate. Hartman (1985) has argued that only the host country's tax system matters for investment coming from subsidiaries' earnings, even when the home country taxes its residents on the basis of worldwide income. This is because the home country's tax equally reduces the parent's return to an investment and the opportunity cost of making an investment (remitting a dividend to the parent).[3] Thus, for any subsidiary whose desired investment exceeds earnings, the tax due on repatriation of earnings does matter. This situation would likely occur for newly formed subsidiaries. In any event, it is worthwhile to investigate empirically the effect of both the home country's rate of taxation and its system of taxing foreign-source income.

The interpretation of the estimated coefficient on the rate of return to FDI variable is also problematic, as stressed by Newlon. This rate of return is defined as the after-tax income from direct investment divided by the stock of direct investment. When the home country has a foreign tax credit with deferral, it is often optimal for the subsidiary to finance investment first by using retained earnings and then, only when these earnings are exhausted, by using funds transferred from the parent firm. This hierarchy of financing implies that, whenever a subsidiary's investment exceeds its retained

earnings, its retained earnings will exactly equal its income. Thus, for these firms, we would expect a direct association between the calculated rate of return (in which after-tax income is the numerator) on FDI and retained earnings, regardless of whether the average rate of return in fact influences decisions concerning new FDI. As Newlon notes, if subsidiaries were following a fixed dividend payout rule (e.g., it pays out a fixed fraction of income), a direct association between income and retained earnings would also be observed. This argument may also apply to subsidiaries of firms residing in countries that employ territorial systems of taxation, thus rendering problematic any observed empirical association between FDI out of retained earnings and realized rate of return.

3.2 Data Issues

3.2.1 Definition of FDI

FDI, as measured by the Bureau of Economic Analysis (BEA), consists of earnings retained by subsidiaries and branches of foreign parents and transfers of funds from the foreign parents to the U.S. firms, including both debt and equity transfers. Thus, FDI does not correspond directly to any measure of real investment, as it excludes investment financed by funds raised locally (or in third countries) by the U.S. firm and includes purchases of existing assets by foreigners. It is more accurately thought of as a measure of financial flows rather than of real investment. Unfortunately, no data exist on real investment made by foreign branches and subsidiaries. Note also that the data do not distinguish between branches and subsidiaries, even though in general the tax treatment by the home country of the two forms of organization is different. Finally, only in this decade has the data on transfers of funds been disaggregated into debt and equity transfers, rendering multivariate analysis impossible at this time.

3.2.2 Drift from Benchmark Years

The data on FDI in the United States is based on benchmark surveys conducted by the BEA in 1959, 1974, and 1980. For nonbenchmark years, estimates for all series except equity and intercompany account inflows were constructed by extrapolating the benchmark data based on sample data from quarterly surveys. The 1959 benchmark data were extrapolated backward to construct estimates for 1950–58 and were extrapolated forward to construct estimates for 1960–73. The 1974 benchmark data were used to derive estimates for 1974–79, and the 1980 benchmark data were used for estimates of 1980 and thereafter. Reported equity and intercompany account flows are taken directly from the quarterly sample with extrapolation, owing to the unreliable relation between the reported and the unreported data.

Note that, except for 1959, the benchmark data are *not* used to revise the data based on the quarterly survey for earlier years. This procedure gives rise to the suspicion that data for nonbenchmark years misestimate true FDI. This suspicion has been confirmed for 1974 because the BEA has compared estimates based on the 1974 benchmark survey with estimates based on an extrapolation from the 1959 benchmark. For equity and intercompany account flows, the extrapolated total is $2.50 billion compared to $3.70 billion from the 1974 benchmark, an underestimate of more than one-third. In contrast, for reinvested earnings the extrapolated figure is $1.13 billion, actually higher than the benchmark figure of $1.07 billion. The discrepancy between the two estimates varies widely by country and by industry, however.

Other important changes in concept and definition were introduced with the 1974 benchmark survey. The minimum ownership criterion in the definition of FDI was decreased from 25 to 10 percent, a change that in 1974 accounted for $1.2 billion of the $25.1 billion total FDI position in the United States. Also in 1974 began major changes in the treatment of unrealized capital gains and losses, the classification of incorporated insurance affiliates, and the coverage of reverse equity ownership (U.S. affiliates' equity ownership in their foreign parents). Finally, starting in 1974, FDI was classified by the country of foreign parent—the first foreign person in the ownership chain of the U.S. affiliate. Before 1974, estimates for some affiliates were classified by the "ultimate beneficial owner," which is the person in the ownership chain, beginning with the foreign parent, that is not owned more than 50 percent by another person. This change in classification apparently affected several large affiliates, with the result that the geographic distribution of the estimates was significantly affected.

Some of the earlier studies of FDI ignored these data definition issues, while others included a dummy variable to differentiate pre- and postbenchmark periods. However, none of the studies directly addressed the apparent problem that, the further away from a benchmark year, the greater the survey-based numbers misreport actual FDI. To account for this tendency, in much of what follows I utilize a dummy variable whose value is the difference between the data year and the benchmark year from which the reported data are estimated. Thus, this variable has a value of zero in the benchmark years 1959, 1974, and 1980 and a positive value in all other years since 1960 (when the benchmark data are extrapolated forward). It takes on a maximum value of fourteen in 1973, when the benchmark data are extrapolated fourteen years forward. This procedure allows for a constant amount of drift between benchmarks of the reported FDI data. In addition, I consider a dummy variable for the period beginning in 1974 to account for the one-time changes in concepts, definitions, and classification of FDI by country that occurred in that year.

3.3 Total FDI in the United States

3.3.1 Trends

Figure 3.1 shows the behavior of FDI in the United States, as a ratio to U.S. GNP, for the period 1953–87. It also breaks this ratio down into two components—retained earnings and new transfers of funds, both as a ratio to U.S. GNP.

As figure 3.1 shows, the ratio of FDI to GNP shows no clear trend until approximately 1972, when it began to grow quickly. By 1974, FDI amounted to 0.32 percent of GNP, or more than four times as high as the average percentage in the two decades from 1953 to 1972. A second surge of FDI began in 1978, pushing the ratio to a record 0.83 percent in 1981 and an average of 0.48 percent from 1982 to 1984, or five times higher than the 1953–72 average and two and a half times the 1977 ratio. In 1987, FDI in the United States totaled nearly $42.0 billion, or 0.94 percent of the GNP of $4.49 trillion. Both the total FDI and the ratio to GNP in 1987 were all-time highs.

One striking aspect of FDI is the decline within the last decade in the relative importance of retained earnings compared to new transfers of funds. Through 1980, retained earnings represented a large, stable component of total FDI, composing 37.0 percent of the total. In 1977, the contribution of retained earnings relative to new transfers began to fall, and, by 1981, it began to decline in absolute terms as well. In the period 1981–87, retained earnings composed only 1.4 percent of total FDI.

Is the rapid growth of FDI in the United States since 1972 part of a worldwide trend, or does it instead represent a relative shift of FDI to the United States from other locations? Figures 3.2 and 3.3 help answer that

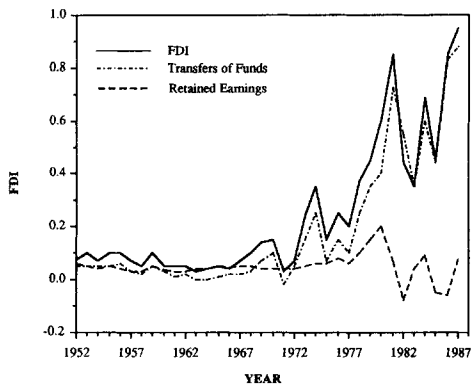

Fig. 3.1 Total FDI, retained earnings and transfers as a percentage of U.S. GNP, 1953–87

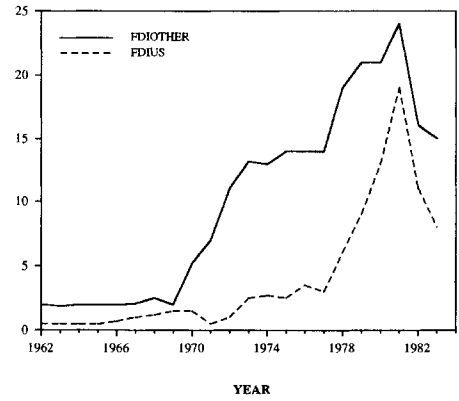

Fig. 3.2 FDI to the United States and to the rest of the world from seven countries ($billions), 1962–83

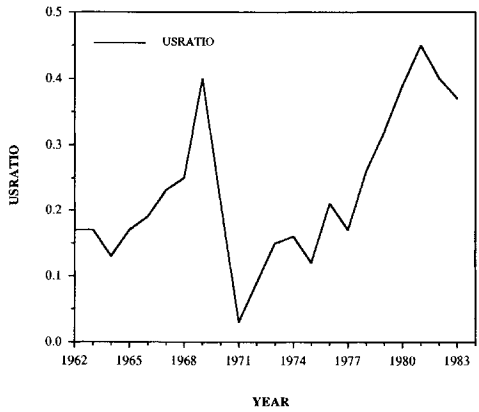

Fig. 3.3 FDI in the United States as a fraction of worldwide FDI of seven countries, 1962–83

question. Figure 3.2 shows that outward FDI from seven major investing nations to countries other than the United States was flat until 1969, when a large boom lasting until 1973 occurred, followed by relative stability and another surge from 1978 through 1981.[4] According to figure 3.3, FDI in the United States as a fraction of the seven countries' worldwide FDI reached 40.5 percent in 1969, fell sharply until 1971, and then rose steadily until an all-time high of 43.7 percent was reached in 1981. It has remained at a high level since then. Apparently, the strong growth of FDI in the United States starting in 1972 does indeed represent an increase in the relative strength of the United States as a location of FDI.

Table 3.1 **Regression Results for FDI Financed by Retained Earnings, 1956–84**

Independent Variables				
τ			−.0068	.223
			(.0846)	(.141)
t		.493		
		(.608)		
t^1		−.494		
		(.835)		
r		.800	.788	
		(.105)	(.094)	
r^1		−.120	.062	
		(.302)	(.158)	
$r(1 - t)$	.766			
	(.094)			
$r^1(1 - t)$	.048			
	(.193)			
$(1 - t^1)/(1 - t)$	−.154			
	(.263)			
Intercept	2.602	2.486	2.71	.780
	(.510)	(.574)	(.422)	(.152)
Durbin-Watson statistic	1.82	2.04	1.92	1.47
$\bar{R}^2$	.734	.731	.731	.050

Note: Dependent variable is the logarithm of [(1000 × RE/GNP) + 1.23]. Column 1 corresponds to eq. 2 of table II.2b in Newlon (1987). All independent variables are in logarithms. Standard errors in parentheses.

3.3.2 Analysis

Replication of Earlier Findings

As is ritual in this literature, I begin the analysis by trying to reproduce the aggregate time-series results of a predecessor in the literature, in this case Newlon (1987). In a break from precedent, I am able to reproduce his main results to three significant digits. These results are reported in the first column of tables 3.1 and 3.2. As discussed in section 3.1, they suggest a strong positive association between the after-tax return on FDI—denoted $r(1 - t)$—and FDI financed by retained earnings, but not for new transfers of funds. The relative tax rate—denoted $(1 - t^1)/(1 - t)$—variable and the overall rate of return—denoted $r^1(1 - t)$—have no significant effect on either component of FDI.[5]

Because of my uneasiness about the economic implications of a statistical association between the components of FDI and the measured average after-tax of return to capital, I next separate out as explanatory variables the average pretax rate of return earned by foreigners (r), the average pretax rate of return earned on all capital in the United States (r^1), and the two average

Table 3.2 **Regression Results for FDI Financed by Transfers of Funds, 1956–84**

Independent Variables				
τ			−.683	−.826
			(.123)	(.183)
t		−2.790		
		(.874)		
t^1		1.788		
		(1.202)		
r		.167	.367	
		(.152)	(.137)	
r^1		−1.112	−1.46	
		(.434)	(.231)	
$r(1 - t)$	−.070			
	(.283)			
$r^1(1 - t)$	−.319			
	(.582)			
$(1 - t^1)/1 - t)$	−1.011			
	(.793)			
Intercept	−.485	−2.429	−2.07	.195
	(1.541)	(.827)	(.617)	(.197)
Durbin-Watson statistic	.34	1.67	1.80	.68
$\bar{R}^2$	.104	.794	.788	.407

Note: Dependent variable is the logarithm of [(1000 × TR/GNP) + 1.676]. Column 1 corresponds to eq. 4 of table II.2b in Newlon (1987). All independent variables are in logarithms. Standard errors in parentheses.

tax rate terms (t for the tax rate on foreigners, t^1 for the total tax rate including taxes paid by U.S. residents at the personal level).[6] The results are reported in the second column of tables 3.1 and 3.2. While the pretax return to FDI retains a positive association with the ratio of retained earnings to GNP, neither tax term is significantly different than zero. However, this is not the case for transfers of funds. In this case, the average tax rate faced by foreigners does have a statistically significant negative coefficient, and, as suggested by the theory, the total tax rate faced by a U.S. investor has a positive coefficient.

Note that these results concerning the tax rate variables reverse the conclusions of Hartman (1984), who concluded that the behavior of retained earnings was consistent with expectations but that the estimated response of transfers of new funds did not conform to expectations. I attribute his first finding to the inevitable relation between retained earnings and a measure of rate of return whose numerator is highly correlated with retained earnings.

I next replace the two measures of average tax rate by a measure of the marginal effective corporate tax rate on fixed investment (τ) in the United

States, as calculated by Auerbach and Hines (1988). This is arguably a better measure of the expected tax burden on a prospective new investment. These results, shown in column 3 of tables 3.1 and 3.2, suggest that the U.S. marginal tax rate has had a significant effect on transfer of funds but not on retained earnings.[7] The coefficient on the tax rate corresponds to a tax elasticity of transfers of −1.40, when evaluated at the average transfers to GNP ratio over the period.[8]

None of the previous work reports the results of equations explaining total FDI in the United States; rather, it considers only its component parts (retained earnings and transfer of funds). Table 3.3 reports the results of repeating the regressions of tables 3.1 and 3.2 for total FDI. These results strongly support the negative association of total FDI with U.S. taxation. The elasticity of response is −1.16, slightly less than that estimated for transfers alone.

In column 4 of tables 3.1–3.3, I present the results of the simplest possible formulation of this model, with only the effective marginal tax rate on new investment included as an explanatory variable. The principal reason for eliminating the rate of return variables is to investigate whether the estimated negative tax effect may be related to the definitional relation

Table 3.3 Regression Results for Total FDI, 1956–84

Independent Variables				
τ			−1.161	−1.281
			(.240)	(.326)
t		−5.646		
		(1.696)		
t^1		4.476		
		(2.332)		
r		.641	1.082	
		(.294)	(.266)	
r^1		−1.632	−2.666	
		(.843)	(.449)	
$r(1-t)$	.278			
	(.498)			
$r^1(1-t)$	−.477			
	(1.024)			
$(1-t^1)/(1-t)$	−2.157			
	(1.396)			
Intercept	−1.215	−4.079	−4.18	−.978
	(2.712)	(1.603)	(1.198)	(.367)
Durbin-Watson statistic	.46	1.67	1.80	.60
$\bar{R}^2$	.183	.772	.765	.332

Note: Dependent variable is the logarithm of (1000 × FDI/GNP). All independent variables are in logarithms. Standard errors in parentheses.

between the dependent variable and these measures. The results do not indicate that this problem is a real one. The tax variable still has no significant association with retained earnings, but it does have a statistically significant negative association with transfers and total FDI.

New Specifications

In this section, the robustness of the finding that both new transfers of funds and total FDI, but not retained earnings, have a significant negative association with the effective rate of U.S. capital income taxation is tested against the kinds of specification changes suggested earlier. These changes are discussed below.

Linear Specification. The simple association between either total FDI or transfers and the effective tax rate survives the replacement of the logarithmic specification with a linear one. For both transfers and total FDI, the estimated tax rate coefficient implies an elasticity similar to what is obtained in the logarithmic specification; in both cases, the estimated tax coefficient is insignificantly different from zero in explaining retained earnings.

Although there is no theoretical reason for preferring one specification to the other, because of the presence of negative dependent variables the logarithmic specification necessitates the addition to the unlogged value of an arbitrary constant. This procedure clouds the comparison of estimated coefficients across equations, which becomes important below when home country disaggregation is done.

Including Other Explanatory Variables. The vector of explanatory variables is expanded to consider potential nontax influences on FDI. In particular, I include the following.[9]

RGDP: the ratio of total GDP of the seven major investing countries to U.S. GDP, where the foreign GDPs are valued at the purchasing power parity exchange rates calculated by Summers and Heston (1988). This variable is meant to capture the effect of the changing relative size of the principal investing countries compared to the United States.

USUNEMP: the unemployment rate of prime-age males in the United States. This variable is meant to capture potential business cycle effects on FDI.

REXC: the real exchange rate of the U.S. dollar against a GDP weighted average of the seven major investing countries' currencies. Dunning (1985) and Pugel (1985) have suggested that a low dollar reduces comparative production costs in the United States, thus providing an incentive to FDI.

DRIFT: a dummy variable equal to the number of years elapsed since the previous benchmark survey of FDI conducted by the BEA.[10]

Lagged Tax Rate Terms. Because of the time it takes to implement an investment decision, there may be a lag between changes in the effective tax rate and the effect on FDI. To allow for this possibility, not only the concurrent tax rate but also the tax rate lagged one year and two years are included as explanatory variables.[11] This procedure limits the length of the lag but imposes no structure on the time pattern of the lagged response of investment.

The results of estimating this specification are presented in the first column of table 3.4. Of the nontax explanatory variables, the estimated coefficients on USUNEMP, RGDP, and DRIFT are not significantly different than zero. The estimated coefficient on the real rate of exchange variable,

Table 3.4 **Further Regression Results for FDI**

	Sample Period and Dependent Variable				
Independent Variables	1960–87, FDI/GNP	1969–87, FDI/GNP	1960–87, RE/GNP	1960–87, TR/GNP	1960–87, FDIMF/GNP
τ	−7.11	8.81	1.40	−8.51	.660
	(7.22)	(11.35)	(1.87)	(7.08)	(1.96)
τ_{-1}	4.28	9.47	−.199	4.48	−.53
	(8.35)	(9.23)	(2.16)	(8.17)	(2.27)
τ_{-2}	−10.25	10.82	.689	−10.94	−2.27
	(6.25)	(10.87)	(1.61)	(6.11)	(1.70)
RGDP	−1.36	15.78	.551	−1.91	−3.37
	(6.63)	(20.29)	(1.71)	(6.48)	(1.80)
USUNEMP	10.24	−183.0	−14.95	25.19	13.07
	(40.32)	(77.92)	(10.41)	(39.42)	(10.94)
FUNEMP		440.61			
		(177.41)			
REXC	−6.21	−4.31	−1.49	−4.72	−2.83
	(3.30)	(3.77)	(.851)	(3.22)	(.894)
DRIFT	−.036	−.135	−.050	.014	.0412
	(.114)	(.148)	(.029)	(.111)	(.0309)
Intercept	16.18	−23.70	2.00	14.18	7.77
	(9.66)	(31.33)	(2.50)	(9.45)	(2.62)
$\tau + \tau_{-1} + \tau_{-2}$	−13.08	29.10	1.89	−14.98	−2.14
	(3.46)	(18.72)	(.89)	(3.38)	(.939)
Durbin-Watson statistic	1.30	1.29	1.87	1.24	1.39
$\bar{R}^2$	.677	.717	.455	.696	.558
Mean of dependent variable	2.85	3.91	0.54	2.31	.61

Note: FDI is measured in millions of dollars, and GNP is measured in billions of dollars, so the dependent variable is 1,000 times the actual value of FDI divided by GNP. Standard errors in parentheses.

REXC, is negative and significant, suggesting that a low dollar may in fact have stimulated FDI in the United States.[12] Though not significant, the DRIFT parameter has the expected negative sign, suggesting that FDI may be increasingly underestimated as the time elapsed since the previous benchmark survey increases.

Of the tax rate variables, both the current value and the value lagged two years have a significant negative coefficient. There is substantial multicollinearity among the three tax variables, however. The *t*-statistic on the estimated sum of -13.3 of the three tax coefficients is -3.67, indicating that it is different than zero at a 95 percent level of confidence. The tax rate elasticity is -1.57 when evaluated at mean values for the entire period.

That this result is not robust to all reasonable specification changes is suggested by the results shown in the second column of table 3.4. When a weighted average of the seven investing countries' unemployment rate is included (denoted FUNEMP), it is highly positively related to FDI, and the tax coefficients now sum to a positive rather than a negative number.[13] Thus, a competing alternative explanation for the time series of FDI is that it has been propelled by deteriorating economic conditions in the home countries.[14] In order to focus on the possible tax influences on FDI, the analyses that follow do not include the foreign unemployment rate variable.

The third and fourth columns of table 3.4 display the results of disaggregating FDI into retained earnings (RE) and transfers of funds (TR). The conclusion drawn from tables 3.1 and 3.2 still holds—that transfers are associated with taxes negatively but that for retained earnings no negative association is apparent.[15] Finally, in the equation shown in the fifth column of table 3.4, the dependent variable is FDI from manufacturing for four countries—Canada, Japan, the Netherlands, and the United Kingdom. The negative association with U.S. effective tax rates is still evident, although the estimated elasticity of response is about three-fifths of what it was for total FDI.

3.4 FDI in the United States by Investing Country

3.4.1 Motivation and Theory of Cross-Country Comparisons

Most countries choose one of two basic options for taxing the income earned abroad by its domestic residents. Under a residence-based (or "worldwide") system, the capital-exporting country taxes its residents' income wherever it is earned. To avoid double taxation, these countries as a rule allow their residents (individuals and corporations) to credit foreign taxes paid against the domestic tax owed on the foreign income. The credit is limited to the tax due under the home country's tax rules. Any home country tax liability in excess of the tax paid to foreign governments, sometimes

termed the "repatriation tax," is generally deferred until dividends are remitted to the parent company. Under a source-based (also known as a "territorial" or "exemption") system, foreign-source income is exempt from home country taxation. Furthermore, no credit is given for taxes paid to foreign governments. Which principle applies for a given country may depend on the form that the investment income takes (e.g., dividend, interest, capital gains), the location of the investment (e.g., treaty vs. nontreaty countries), and the extent of ownership and control exercised by the domestic owner.

The effect of a host country's tax structure on inward foreign investment depends on the tax system of the capital-exporting country. For example, when the country of capital export has an exemption tax system, the effective corporate-level rate of tax on FDI is equal to the tax rate imposed by the host country. Therefore, differences among host country effective tax rates would be expected to have an effect on the location decision of investment from exemption countries. The effect of differences in host countries' tax structures would be expected to have less influence on foreign investment from countries that have worldwide tax systems with a foreign tax credit. In a simple case without deferral, unless the host country's tax rate is higher than the home country's tax rate, the effective tax rate on FDI becomes the home country's, regardless of the tax system of the host country. The effective tax rate is more complicated when there is deferral, multicountry investment, and differing definitions of taxable income in different countries. Nevertheless, for firms based in foreign tax credit countries, the effect of the host country's tax system is filtered through the tax system of the home country and may be substantially mitigated.

Of the major countries that make FDI in the United States, some operate exemption systems, while others operate a worldwide system with foreign tax credit. This fortuitous divergence of approach invites an investigation of whether the system of taxing foreign-source income is a factor in the responsiveness of FDI to host and home country taxation. In what follows, I examine the time series of FDI in the United States emanating from seven countries and investigate whether these time series are consistent with several propositions about the effect on FDI of tax rates and systems of taxing foreign-source income.

3.4.2 Trends

Figures 3.4a–3.10a and 3.4b–3.10b present the time series of FDI for each of seven major investing countries, in 3.4a–3.10a as a ratio of U.S. GNP and in 3.4b–3.10b as a ratio of total FDI in the United States by these seven countries. The figures generally show rapid growth in FDI beginning in the early 1970s. They also show the rise in the relative prominence of Japan, whose FDI was negligible in the 1960s but by 1985 represented nearly 20 percent of total FDI in the United States, and the relative decline

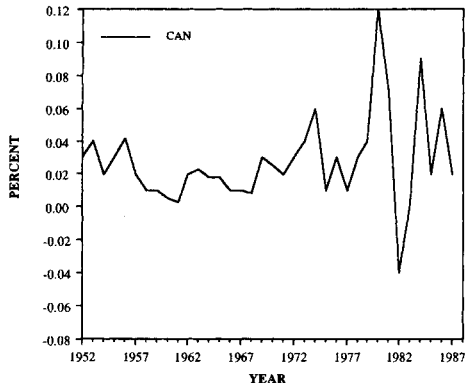

Fig. 3.4a FDI from Canada as a percentage of U.S. GNP

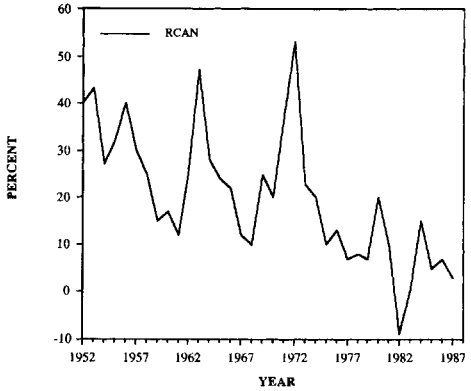

Fig. 3.4b FDI from Canada as a percentage of total FDI in the United States

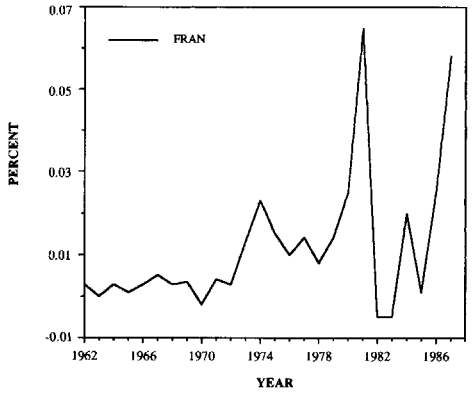

Fig. 3.5a FDI from France as a percentage of U.S. GNP

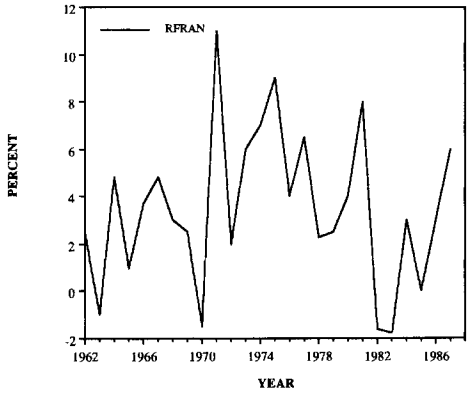

Fig. 3.5b FDI from France as a percentage of total FDI in the United States

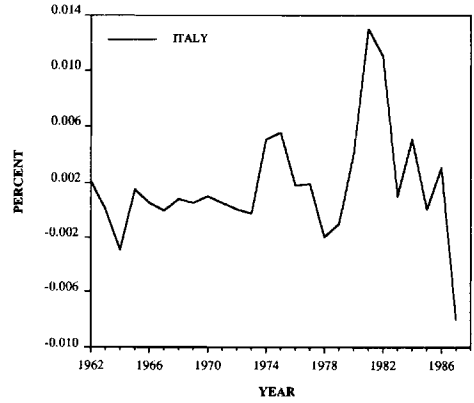

Fig. 3.6a FDI from Italy as a percentage of U.S. GNP

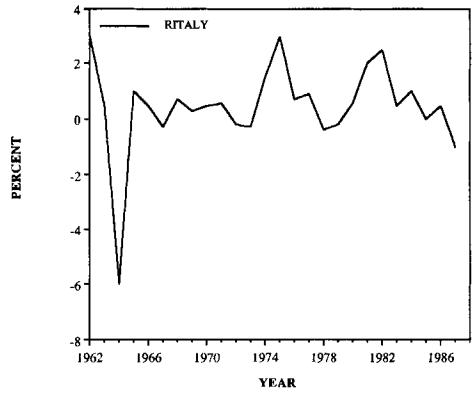

Fig. 3.6b FDI from Italy as a percentage of Total FDI in the United States

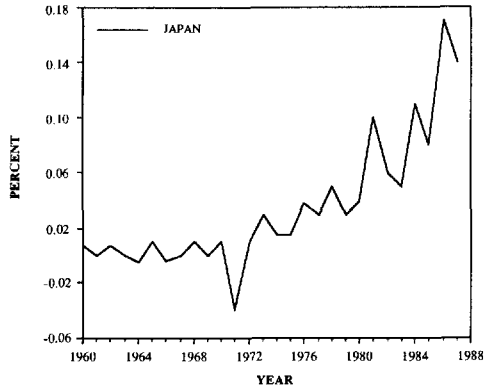

Fig. 3.7a FDI from Japan as a percentage of U.S. GNP

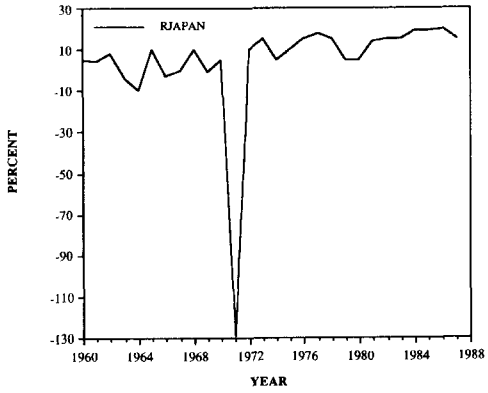

Fig. 3.7b FDI from Japan as a percentage of total FDI in the United States

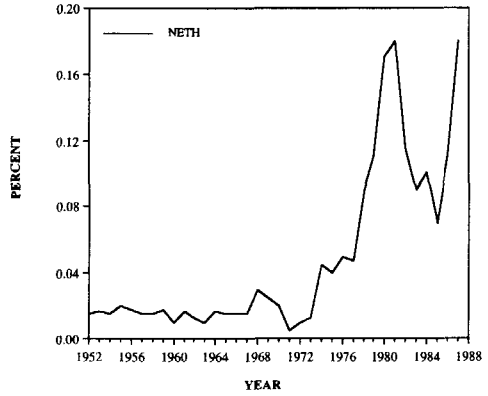

Fig. 3.8a FDI from the Netherlands as a percentage of U.S. GNP

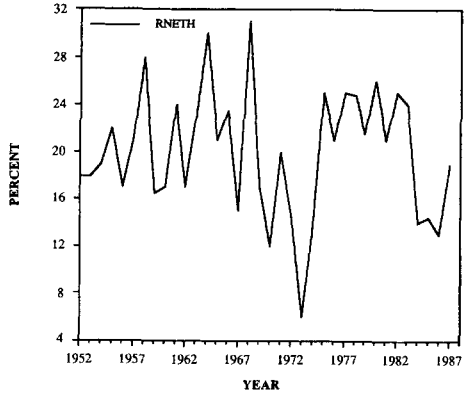

Fig. 3.8b FDI from the Netherlands as a percentage of total FDI in the United States

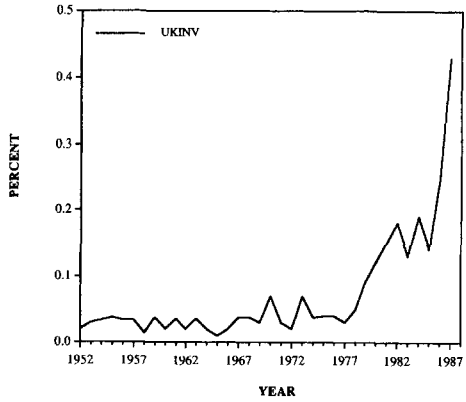

Fig. 3.9a FDI from the United Kingdom as a percentage of U.S. GNP

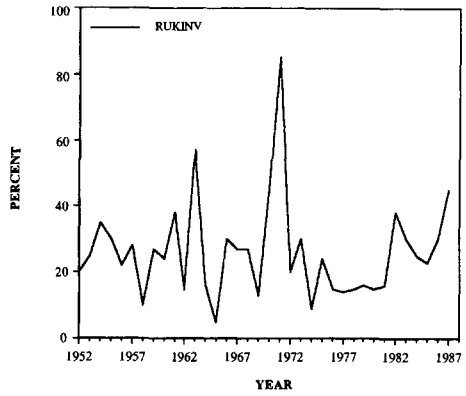

Fig. 3.9b FDI from the United Kingdom as a percentage of total FDI in the United States

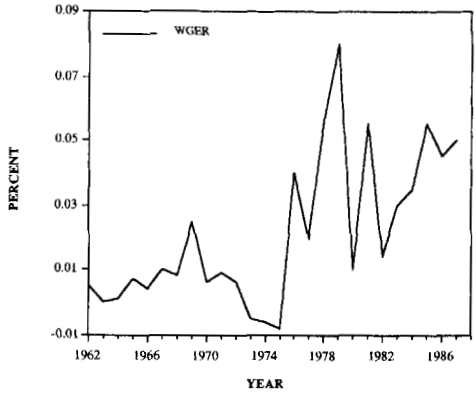

Fig. 3.10a FDI from West Germany as a percentage of U.S. GNP

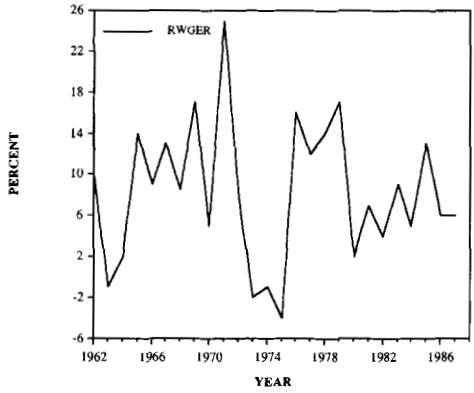

Fig. 3.10b FDI from West Germany as a percentage of total FDI in the United States

of FDI from Canada, which in the 1960s represented about 30 percent of FDI in the United States but by the 1980s composed significantly less than 10 percent of total FDI. The largest investors for most of this period have been Canada, the Netherlands, and the United Kingdom, challenged in the 1980s by Japan.

Another message that the figures convey is that FDI, while generally (i.e., except for Canada and Italy) growing as a fraction of U.S. GNP since the early 1970s, has followed somewhat different paths in the seven countries. Therefore, no single story is likely to be sufficient to explain the behavior of FDI from each of these countries.

3.4.3 Analysis

As discussed in section 3.4.1, analysis of the FDI data disaggregated by the residence of the investing firms can shed further light on the effect of the

host and home countries' tax systems on the magnitude and location of FDI. Two empirical strategies are followed. In the first, separate FDI equations similar to those of table 3.4 are estimated for each of the seven major investing countries. The differences in responsiveness in taxation are then related to the investing country's system of taxing foreign income. In particular, the response of countries with exemption systems is compared to countries with worldwide tax systems and a foreign tax credit. In the second approach, country-specific FDI equations are estimated utilizing time-series data on the statutory corporate tax rates and the effective tax rates on new investment in the home country. These results are then examined for insights into several propositions relating to the effect of taxes on FDI.

Tables 3.5–3.7 present the first set of results for country-specific FDI regressions. Ordinary least squares (OLS) is used in each case.[16] Table 3.5 contains the equations for retained earnings, table 3.6 contains equations explaining transfer of funds, and table 3.7 is concerned with total FDI, each expressed as a ratio to U.S. GNP. The explanatory variables used are identical to those used in the equations of table 3.4, except that the overall GDP ratio and overall real exchange rate are replaced by country-specific variables.

The countries are grouped by their system of taxing income from FDI in the United States. In the first group are countries that effectively exempt such income from domestic taxation—Canada, France, the Netherlands, and West Germany.[17] For these countries' firms, it is the U.S. tax rate, unfiltered by home country tax rules, that affects the attractiveness of FDI in the United States compared to alternative investment locations and compared to no investment at all.

The second group of countries—Italy, Japan, and the United Kingdom—operate a foreign tax credit system with deferral for subsidiaries. U.S. tax is due on the income as earned. When income is repatriated to the home country, the grossed-up earnings are subject to home country taxation, but taxes paid to the U.S. government are credited against tax liability, as long as this liability does not exceed the home country liability on this income.

What the effective total tax rate on investment is in this situation has been the subject of some controversy. In the absence of deferral (and assuming that both home and host country use the same definition of income), the home country tax rate applies unless the host country tax rate exceeds the home country rate, in which case the host country rate applies. With deferral, Hartman (1985) has argued that the host country tax rate is the effective tax rate on investments that are financed by retained earnings, and the above reasoning applies to investments financed by new transfers of funds.

This brief look at received wisdom suggests the following propositions.

1. FDI from exemption countries should be at least as sensitive to U.S. tax rates as FDI from foreign tax credit countries.

Table 3.5 **Regression Equations Explaining Retained Earnings, by Investing Country**

	Country and Sample Period						
	"Exemption" Countries				Foreign Tax Credit Countries		
Independent Variables	Canada, 1960–87	France, 1962–87	Netherlands, 1960–87	West Germany, 1962–87	Italy, 1962–87	Japan, 1960–87	United Kingdom, 1960–87
τ	.692	.180	−.168	−.010	.053	−.229	.479
	(.555)	(.133)	(.829)	(.331)	(.049)	(.378)	(.266)
τ_{-1}	−.324	.0076	.947	−.109	.022	−.239	−.479
	(.635)	(.142)	(.913)	(.353)	(.053)	(.437)	(.313)
τ_{-2}	.478	−.0053	−.452	−.189	−.0013	.132	.084
	(.517)	(.106)	(.675)	(.260)	(.040)	(.334)	(.273)
RGDP	8.72	.162	−36.04	5.35	.116	1.764	.200
	(3.85)	(.594)	(25.89)	(2.30)	(.374)	(.778)	(2.38)
USUNEMP	−5.55	−1.28	−1.34	−3.21	−.229	−2.18	1.34
	(2.57)	(.789)	(3.99)	(1.74)	(.275)	(2.16)	(1.17)
REXC	.307	−.026	−.283	.095	−.000047	.0010	−.535
	(.528)	(.0086)	(.122)	(.045)	(.000019)	(.0006)	(.156)
DRIFT	−.0127	−.0012	−.017	−.0015	−.00045	−.0069	.0034
	(.0076)	(.0019)	(.012)	(.0044)	(.00065)	(.0064)	(.0043)
Intercept	−1.07	.124	2.76	−1.09	.0164	−.517	.401
	(.96)	(.115)	(1.30)	(.50)	(.0567)	(.337)	(.379)
$\tau + \tau_{-1} + \tau_{-2}$	.846	.183	.327	−.398	.074	−.336	−.0012
	(.361)	(.068)	(.526)	(.244)	(.027)	(.192)	(.172)
Durbin-Watson statistic	2.08	1.05	1.44	1.87	1.25	1.26	1.95
$\bar{R}^2$	.479	.759	.304	.099	.543	.240	.390
Mean of dependent variable	.0547	−.00561	.212	.0114	−.00885	.0677	.160

Note: See notes to table 3.4.

Table 3.6 **Regression Equations Explaining Transfers of Funds, by Investing Country**

	Country and Sample Period						
	"Exemption" Countries				Foreign Tax Credit Countries		
Independent Variables	Canada, 1960–87	France, 1962–87	Netherlands, 1960–87	West Germany, 1962–87	Italy, 1962–87	Japan, 1960–87	United Kingdom, 1960–87
τ	−.857	−.931	−.108	−1.93	−.219	−1.59	.186
	(1.14)	(.818)	(1.32)	(.960)	(.165)	(1.17)	(2.53)
τ_{-1}	.389	.561	.577	2.17	.126	.633	−1.69
	(1.31)	(.874)	(1.45)	(1.02)	(.178)	(1.351)	(2.98)
τ_{-2}	−.0164	−.613	−1.099	−1.57	.0287	−1.47	−2.79
	(1.065)	(.650)	(1.071)	(.756)	(.132)	(1.03)	(2.59)
RGDP	17.7	.940	−68.8	−3.72	2.53	−4.90	−.879
	(7.94)	(3.65)	(41.1)	(6.67)	(1.25)	(2.41)	(22.6)
USUNEMP	−4.90	−1.35	11.02	−1.55	−.113	5.80	13.5
	(5.28)	(4.84)	(6.33)	(5.06)	(.917)	(6.67)	11.1
REXC	1.48	−.070	−.472	−.229	.000176	−.00476	−2.79
	(1.09)	(.053)	(.194)	(.129)	(.0000655)	(.00186)	(.148)
DRIFT	−.00882	−.0018	.00992	.00265	−.00340	.0136	.0630
	(.0157)	(.0119)	(.0191)	(.0128)	(.00216)	(.0198)	(.0409)
Intercept	−2.67	.765	4.55	2.11	−.477	3.70	3.17
	(1.98)	(.709)	(2.07)	(1.45)	(.189)	(1.04)	(3.60)
$\tau + \tau_{-1} + \tau_{-2}$	−.485	−.984	−.629	−1.33	−.0640	−2.43	−4.30
	(.744)	(.416)	(.834)	(.651)	(.0888)	(.593)	(1.63)
Durbin-Watson statistic	2.07	1.20	1.30	1.32	2.09	1.76	1.12
$\bar{R}^2$	.238	.197	.608	.421	.446	.695	.600
Mean of dependent variable	.227	.113	.369	.192	.0233	.263	.597

Note: See notes to table 3.4.

Table 3.7 **Regression Equations Explaining Total FDI, by Investing Country**

	Country and Sample Period						
	"Exemption" Countries				Foreign Tax Credit Countries		
Independent Variables	Canada, 1960–87	France, 1962–87	Netherlands, 1960–87	West Germany, 1962–87	Italy, 1962–87	Japan, 1960–87	United Kingdom, 1960–87
τ	−.165	−.751	−.276	−2.03	−.166	−1.82	.666
	(1.33)	(.783)	(1.49)	(.965)	(.163)	(1.15)	(2.64)
τ_{-1}	.0646	.568	1.52	2.06	.148	.394	−.225
	(1.52)	(.834)	(1.64)	(1.03)	(.176)	(1.33)	(3.11)
τ_{-2}	.462	−.618	−1.55	−1.76	.0274	−1.34	−2.71
	(1.24)	(.621)	(1.21)	(.759)	(.130)	(1.02)	(2.71)
RGDP	26.4	1.10	−105	1.63	2.65	−3.13	−.679
	(9.24)	(3.49)	(46.4)	(6.70)	(1.23)	(2.37)	(23.6)
USUNEMP	−10.4	−2.63	9.67	−4.75	−.341	3.63	14.8
	(6.15)	(4.63)	(7.16)	(5.08)	(.905)	(6.56)	11.6)
REXC	1.78	−.0960	−.755	−.134	.000128	−.00373	−3.32
	(1.26)	(.0503)	(.219)	(.130)	(.0000647)	(.00183)	(1.55)
DRIFT	−.0215	−.00299	−.0068	.00119	−.00385	−.00688	.0664
	(.0183)	(.0114)	(.0215)	(.0128)	(.00214)	(.0195)	(.0428)
Intercept	−3.75	.888	7.32	1.03	−.461	3.18	3.57
	(2.31)	(.678)	(2.33)	(1.46)	(.187)	(1.02)	(3.76)
$\tau + \tau_{-1} + \tau_{-2}$	.361	−.801	−.302	−1.72	.0101	−2.76	−4.30
	(.865)	(.398)	(.943)	(.654)	(.0877)	(.583)	(1.71)
Durbin-Watson statistic	2.02	2.04	1.22	1.60	2.10	1.84	1.09
$\bar{R}^2$	.135	.182	.673	.375	.360	.745	.606
Mean of dependent variable	.282	.112	.581	.203	.0144	.331	.757

Note: See notes to table 3.4.

2. The greater sensitivity of FDI from exemption countries for U.S. tax rates should be most apparent in the behavior of new transfers of funds.

The results shown in table 3.6 offer strong corroboration for the negative association of U.S. tax rates and FDI financed by transfers of funds. The summed tax coefficient is negative for all seven countries and significantly different from zero in four of these cases. The estimated tax effect on retained earnings, shown in table 3.5, ranges from significant positive to significant negative, with no clear trend emerging. For total FDI (shown in table 3.7), the tax effect is significantly negative for four of seven countries. The tax effect in these four countries sums to more than the tax effect shown in the first column of table 3.4.

The regression analyses do not support propositions 1 and 2 strongly. The four countries that have a significant tax effect on transfers and total FDI are evenly divided between exemption countries (Netherlands and West Germany) and foreign tax credit countries (Japan and the United Kingdom). The association of tax rates with retained earnings also has no obvious pattern according to the tax system.

Table 3.8 displays the results of repeating the regressions explaining total FDI for manufacturing investment only. These data are fully available for only four of the seven countries—Canada, Japan, the Netherlands, and the United Kingdom. The summed tax effect for Japan and the United Kingdom remains negative and significantly different from zero. The magnitude of the estimated effect shrinks substantially in the case of Japan, reducing the elasticity from -2.90 to -2.25. The estimated elasticity for the United Kingdom stays about the same as for total FDI. For Canada and the Netherlands, the summed tax effect is, as for total FDI, not significantly different from zero.

3.4.4 The Effect of Home Country Taxation on FDI in the United States

The rate of home country taxation may influence FDI in the United States through at least two different avenues. First, it affects the after-tax return to investment in the home country, which is presumably an alternative to FDI. For this reason, we would expect the home country tax rate to be positively associated with FDI in the United States.

A second avenue of influence applies only to home countries that operate a foreign tax credit system, not countries that operate an exemption system. Ignoring deferral, and assuming that the multinational operates only in at most the home country and the United States, the effective tax rate on income from FDI is the maximum of the U.S. rate and the home country rate.[18] When the home country rate exceeds the U.S. rate, it is the effective tax rate on both home country investment and FDI, and so its level does not affect the relative after-tax returns of the alternative investments, although it does depress the return of all investment alternatives. In a more general situation, when there is deferral and multicountry operation, the home

Table 3.8 **Regression Equations Explaining Total FDI in Manufacturing, by Investing Country**

	Country and Sample Period			
	"Exemption" Countries		Foreign Tax Credit Countries	
Independent Variables	Canada, 1960–87	Netherlands, 1960–87	Japan, 1960–87	United Kingdom, 1960–87
τ	.129	.356	.105	.462
	(.477)	(.874)	(.312)	(1.15)
τ_{-1}	.0419	−.232	−.231	−.723
	(.546)	(1.01)	(.343)	(1.36)
τ_{-2}	−.674	−.173	−.207	−1.21
	(.444)	(.773)	(.254)	(1.18)
RGDP	9.57	−1.19	−10.3	.0639
	(3.31)	(1.80)	(9.73)	(10.31)
USUNEMP	−2.84	2.71	.192	2.26
	(2.20)	(4.99)	(1.50)	(5.07)
REXC	.542	−.00171	−.0687	−1.69
	(.453)	(.00139)	(.0459)	(.675)
DRIFT	−.00707	.00322	.000990	.0301
	(.00656)	(.0148)	(.00451)	(.0187)
Intercept	−1.21	1.02	.839	1.65
	(.827)	(.779)	(.489)	(1.64)
$\tau + \tau_{-1} + \tau_{-2}$	.103	−.369	−.33	−1.47
	(.310)	(.444)	(.198)	(.744)
Durbin-Watson statistic	2.14	1.96	1.46	.711
$\bar{R}^2$	.197	.169	.452	.466
Mean of dependent variable	.160	.152	.0514	.267

Note: See notes to table 3.4.

country tax rate will increase the effective tax rate on FDI, though by less than it increases the tax rate on investment in the home country. Recall, however, Hartman's demonstration that, for investment out of retained earnings, only the host country's tax rate is relevant.

This review of the effects of home country taxation on FDI suggests the following propositions.

3. FDI from exemption countries should be positively related to the rate of home country taxation.

4. FDI financed by new transfers of funds from foreign tax credit countries should have a less clearly positive, or even negative, relation to home country taxation.

5. Retained earnings from foreign tax credit countries should be unaffected by, or positively related to, home country taxation.

Statutory tax rates have an influence on multinationals' decisions, independent of their effect operating through the effective tax rates on investment. A multinational has an incentive to do its borrowing through

firms operating in a country with relatively high statutory rates, so as to maximize the tax benefits of the interest deductions. This would imply a negative relation between the volume of transfers and the difference between the U.S. statutory rate and the home country statutory rate. A multinational also has an incentive to set transfer prices so as to show lower income in countries with relatively high statutory rates. Holding other policies constant, this also implies a negative relation between reported retained earnings and the difference between the U.S. statutory rate and the home statutory rate. These effects should be stronger for exemption countries compared to foreign tax credit countries. They should also depend only on current statutory tax rates, with no lagged effect as in the case of investment incentives. The following proposition summarizes these incentives.

6. Both retained earnings and transfers of funds should be negatively related to the current difference between the U.S. statutory corporate rate and the home country statutory corporate rate, with the effect stronger for exemption countries.

Tables 3.9–3.11 present the results of adding four variables to each country-specific regression equation: (i) the effective corporate-level tax rate on new investment in the home country, including the current rate and two lags; and (ii) the difference between the U.S. statutory corporate tax rate and the home country statutory corporate tax rate. Note that these tax rate series are not available for the Netherlands and that therefore regression results for only six countries are presented.

The results do not provide much support for propositions 3–5. According to table 3.11, in no exemption country is the home country's tax rate positively related to FDI. Table 3.10 reveals that the effect of home country taxation on transfers is not obviously more negative for foreign tax credit countries compared to exemption countries. Table 3.9 does suggest that retained earnings are, as proposed, not usually affected by home country taxation in foreign tax credit countries. Proposition 6 fares slightly better, with a significant coefficient of the expected negative sign on the difference in statutory rates occurring for West Germany and Italy (for transfers of funds and total FDI) and no case of a significant positive sign occurring. Note also that the estimated negative effect of U.S. taxation on total FDI for West Germany and Japan disappears when the home country tax rates are included, although a negative effect of U.S. taxes on Canadian investment appears when it did not in the absence of home country tax rates.

There are several possible explanations for the lack of a clear difference in the tax responsiveness of FDI from exemption and foreign tax credit countries. One is that the data are simply not good enough to pick up the differences in behavior that do in fact exist. In particular, the effective tax rate series have well-known problems as accurate measures of the disincentives to invest. Alternatively, it may be that the ability of firms from

Table 3.9 **Regression Equations Explaining Retained Earnings Using Home Country Tax Rates, by Investing Country**

	Country and Sample Period					
	"Exemption" Countries			Foreign Tax Credit Countries		
Independent Variables	Canada, 1965–86	France, 1962–87	West Germany, 1962–87	Italy, 1962–87	Japan, 1972–87	United Kingdom, 1962–87
τ	.873	.223	−.0421	.0296	.239	.478
	(1.00)	(.166)	(.315)	(.0550)	(1.58)	(.326)
τ_{-1}	−.242	−.0230	.119	.0227	−.135	−.530
	(.874)	(.154)	(.333)	(.0525)	(.983)	(.402)
τ_{-2}	−.205	−.0527	−1.04	.0542	.788	−.0263
	(.795)	(.122)	(.442)	(.0546)	(1.09)	(.422)
T	−.00594	.0577	2.37	−.106	−6.17	.00948
	(.916)	(.114)	(1.14)	(.0612)	(8.59)	(.294)
T_{-1}	.291	.0793	−.658	−.0403	7.09	.0686
	(.632)	(.102)	(.804)	(.0729)	(8.06)	(.262)
T_{-2}	−.560	.0195	.433	.0761	4.73	.166
	(.693)	(.138)	(.865)	(.0533)	(6.51)	(.303)

DIFSTAT	−2.07	.464	1.72	−.0907	.419	−.0274
	(3.11)	(.373)	(1.03)	(.102)	(2.58)	(.535)
RGDP	16.6	−.0211	−1.32	.720	6.03	−.864
	(9.85)	(.937)	(3.87)	(.632)	(10.5)	(3.62)
USUNEMP	−5.66	−1.07	−.301	−.427	−13.3	1.31
	(4.85)	(.833)	(1.96)	(.394)	(9.93)	(1.48)
REXC	.323	−.0281	−.0191	−.0000549	.00181	−.439
	(.740)	(.0101)	(.0707)	(.0000206)	(.00165)	(.235)
DRIFT	−.00396	.0000356	.0115	−.00150	−.0230	.00629
	(.0183)	(.00253)	(.00641)	(.00160)	(.0244)	(.00735)
Intercept	−1.74	.0904	−.624	−.0225	−3.06	.497
	(1.43)	(.154)	(.644)	(.0652)	(2.40)	(.587)
$\tau + \tau_{-1} + \tau_{-2}$	.836	.148	−.963	.107	.891	−.779
	(1.12)	(.0855)	(.427)	(.0302)	(1.59)	(.254)
$T + T_{-1} + T_{-2}$	−.263	.157	2.15	−.0704	5.65	.244
	(1.68)	(.207)	(.897)	(.0610)	(6.57)	(.280)
Durbin-Watson statistic	2.46	1.25	1.69	1.52	1.10	2.03
$\bar{R}^2$	.361	.737	.273	.573	−.145	.219
Mean of dependent variable	.0469	−.00561	.0114	−.00885	.105	.162

Note: See notes to table 3.4.

Table 3.10 **Regression Equations Explaining Transfers of Funds Using Home Country Tax Data, by Investing Country**

	Country and Sample Period					
	"Exemption" Countries			Foreign Tax Credit Countries		
Independent Variables	Canada, 1965–86	France, 1962–87	West Germany, 1962–87	Italy, 1962–87	Japan, 1972–87	United Kingdom, 1962–87
τ	−1.70	−1.42	−1.63	−.369	.667	−.179
	(1.70)	(1.05)	(.897)	(.187)	(4.50)	(2.13)
τ_{-1}	−.170	.863	1.93	.140	−.239	−3.61
	(1.48)	(.965)	(.949)	(.179)	(2.81)	(2.62)
τ_{-2}	−.235	−.520	1.39	.221	−.0543	.105
	(1.35)	(.769)	(1.26)	(.186)	(3.12)	(2.75)
T	.246	.253	−6.76	−.389	16.6	1.15
	(1.56)	(.716)	(3.25)	(.208)	(24.6)	(1.91)
T_{-1}	2.24	−.0640	−1.64	.123	−17.2	2.69
	(1.07)	(.639)	(2.29)	(.248)	(23.0)	(1.71)
T_{-2}	.707	−.816	4.79	−.0671	16.1	1.55
	(1.18)	(.866)	(2.47)	(.181)	(18.6)	(1.98)

DIFSTAT	−5.82	−2.17	−7.58	−.562	5.41	2.02
	(5.28)	(2.35)	(2.95)	(.347)	(7.39)	(3.49)
RGDP	40.1	−.286	11.7	5.58	−32.1	−37.9
	(16.7)	(5.89)	(11.0)	(2.15)	(30.1)	(23.6)
USUNEMP	−11.0	−1.98	−9.87	−1.56	26.7	13.0
	(8.24)	(5.55)	(5.60)	(1.34)	(28.4)	(9.64)
REXC	1.64	−.0910	.261	.000159	−.0104	−3.08
	(1.26)	(.0635)	(.201)	(.0000701)	(.00472)	(1.53)
DRIFT	−.00938	−.00668	−.0351	−.0108	.0196	.0526
	(.310)	(.0159)	(.0183)	(.00544)	(.0697)	(.0479)
Intercept	−4.79	1.49	−1.43	−.638	9.37	8.59
	(2.43)	(.969)	(1.84)	(.222)	(6.86)	(3.83)
$\tau + \tau_{-1} + \tau_{-2}$	−1.95	−1.08	1.69	−.00784	.374	−3.69
	(1.27)	(.537)	(1.22)	(.103)	(4.55)	(1.66)
$T + T_{-1} + T_{-2}$	3.19	−.627	−3.61	−.333	15.5	5.39
	(2.86)	(1.30)	(2.56)	(.208)	(18.8)	(1.82)
Durbin-Watson statistic	2.09	1.96	2.28	2.44	1.76	1.78
$\bar{R}^2$	.304	.0818	.549	.463	.512	.760
Mean of dependent variable	.269	.113	.192	.0233	.491	.637

Note: See notes to table 3.4

Table 3.11 **Regression Equations Explaining Total FDI Using Home Country Tax Data, by Investing Country**

	Country and Sample Period					
	"Exemption" Countries			Foreign Tax Credit Countries		
Independent Variables	Canada, 1965–86	France, 1962–87	West Germany, 1962–87	Italy, 1962–87	Japan, 1972–87	United Kingdom, 1962–87
τ	−.829	−1.20	−1.67	−.339	.906	.299
	(2.10)	(1.01)	(.982)	(.172)	(3.88)	(2.28)
τ_{-1}	−.259	.840	2.05	.163	−.374	−4.14
	(1.83)	(.928)	(1.04)	(.164)	(2.42)	(2.82)
τ_{-2}	−.0302	−.572	.349	.275	.733	.0784
	(1.66)	(.740)	(1.38)	(.171)	(2.69)	(2.96)
T	.252	.311	−4.39	−.495	10.5	1.16
	(1.92)	(.689)	(3.55)	(.191)	(21.1)	(2.06)
T_{-1}	2.53	.0153	−2.30	.0828	−10.2	2.76
	(1.32)	(.614)	(2.51)	(.228)	(19.8)	(1.84)
T_{-2}	.147	−.797	5.22	.00902	20.8	1.72
	(1.45)	(.833)	(2.70)	(.166)	(16.0)	(2.12)

DIFSTAT	−7.88	−1.70	−5.86	−.653	5.83	1.75
	(6.52)	(2.26)	(3.23)	(.318)	(6.36)	(3.75)
RGDP	56.8	−.307	10.4	6.30	−26.0	−38.7
	(20.6)	(5.67)	(12.1)	(1.97)	(25.9)	(25.4)
USUNEMP	−16.6	−3.06	−10.2	−1.99	13.3	14.3
	(10.2)	(5.34)	(6.13)	(1.23)	(24.4)	(10.4)
REXC	1.97	−.119	.242	.000105	−.00863	−3.52
	(1.55)	(.0611)	(.220)	(.0000643)	(.00406)	(1.64)
DRIFT	−.0133	−.0664	−.0235	−.0123	−.00340	.0588
	(.0383)	(.0153)	(.0200)	(.00499)	(.0600)	(.0515)
Intercept	−6.53	1.58	−2.05	−.660	6.31	9.09
	(2.99)	(.932)	(2.01)	(.203)	(5.90)	(4.11)
$\tau + \tau_{-1} + \tau_{-2}$	−1.12	−.931	.723	.0987	1.27	−3.77
	(.716)	(.517)	(1.33)	(.0942)	(3.92)	(1.78)
$T + T_{-1} + T_{-2}$	2.93	−.470	−1.47	−.403	21.1	5.63
Durbin-Watson statistic	(3.53)	(1.25)	(2.80)	(1.90)	(16.2)	(1.96)
	2.34	1.96	2.16	2.43	2.36	1.71
$\bar{R}^2$	.593	.0547	.422	.464	.661	.750
Mean of dependent variable	.0316	.112	.203	.0144	.596	.799

Note: See notes to table 3.4.

foreign tax credit countries to defer indefinitely home country taxation and to engage in sophisticated financial transactions renders insignificant the effective rate of home country taxation. If the latter hypothesis is true, then the U.S. tax rate is the important source of investment disincentives for all capital-importing countries, regardless of their system of alleviating international double taxation.

3.5 Conclusions

This research was undertaken in order to shed light on the role of both U.S. and investing country tax systems on FDI in the United States. Two distinct approaches were attempted. In the first, the standard empirical model relating total FDI in the United States to U.S. taxation was respecified to (i) eliminate the spurious bias caused by relating retained earnings to a measure of rate of return that would be behaviorally related to retained earnings, (ii) use a measure of the marginal effective rate of tax on new investment rather than an observed average or statutory tax rate, (iii) hold constant the influence of nontax variables on FDI, and (iv) take account of the data collection process, which introduces increasing underestimation of FDI as the time elapsed from the previous benchmark survey of FDI increases. The results of this new empirical approach generally support a negative effect of U.S. effective rates of taxation on total FDI and transfers of funds, but not on retained earnings. There is, however, at least one very successful alternative explanation of FDI in the United States—that it is propelled by stagnation in the home country, as measured by its unemployment rate of prime-age males—that precludes the association of U.S. tax rates with FDI.

In the second approach, I examined the time series of FDI in the United States disaggregated by the seven major investing countries. This disaggregation allows a detailed examination of the effect on FDI in the United States of the rates of home country taxation and the home country's system of taxing foreign-source income (i.e., exemption vs. worldwide taxation with a foreign tax credit). The results of these country analyses generally corroborate the aggregate analysis of the effect of U.S. taxes on FDI. However, they do not generally support several propositions about the different tax sensitivity of FDI from countries that exempt foreign-source income from domestic taxation compared to countries that tax worldwide income and offer a foreign tax credit to mitigate double taxation. The inability to support these propositions may be due to the difficulties in accurately measuring home country effective tax rates, or they may indicate that, because of deferral and the availability of sophisticated financial strategies, the home country tax rate and its system of alleviating international double taxation is not an important determinant of FDI.

Appendix
Data Definitions and Sources

1. *Foreign Direct Investment.* Taken from several issues of the *Survey of Current Business*. The most recent citation is August 1988: "Foreign Direct Investment in the United States: Detail for Position and Balance of Payment Flows," tables 12–19.

2. *U.S. Marginal Effective Corporate Tax Rates* (τ). Auerbach and Hines (1988, table 1, col. 1). The 1987 tax rate is obtained by multiplying their 1986 figure by the ratio of the post-tax-reform and pre-tax-reform effective tax rates on capital in Fullerton and Karayannis (1987, tables IV.5 and IV.6, col. 3).

3. *Foreign Marginal Effective Tax Rates* (T). For France, Italy, the United Kingdom, and West Germany, these are calculated from separate series on the effective tax rate equipment and structures provided by Julian Alworth. The overall effective tax rate is equal to

$$[a_E t_E/(1 - t_E) + a_S t_S/(1 - t_S)] / [a_E/(1 - t_E) + a_S/(1 - t_S)],$$

where t_E and t_S are the effective tax rates on equipment and structures, respectively, and a_E and a_S are the fraction of the capital stock in equipment and structures, respectively. This formula is taken from King and Fullerton (1984). The value of a_E is set to be 0.585 and a_S to 0.415. This corresponds to the fraction of capital stock in equipment and structures, respectively, in manufacturing found by King and Fullerton for both the United Kingdom and West Germany, the only two European countries they investigate.

For Japan, the tax rate series is taken from Tajika and Yui (1988, table 3, col. 4). These calculations include the effect of personal taxes. However, the personal tax parameters are either small in magnitude (the capital gains tax is zero) or unimportant (the tax on dividends is presumed to affect only the cost of capital financed by new share issues, which constitutes only 3.6 percent of total finance). The values for 1985–87 are set equal to the 1984 rate.

For Canada, the tax rate series up to 1981 is from Boadway, Bruce, and Mintz (1987, table 3.3, col. 10). Comparable values for 1982–87 were provided by Jack Mintz.

4. *U.S. and Foreign Statutory Corporate Tax Rates.* U.S. rate taken from Pechman (1987, table A-8). Foreign rates taken from same sources as above. U.S. rate is federal only.

5. *Relative GDP (RGDP).* Up to 1985, real GDP for each country is calculated by multiplying real GDP per capita in current international prices

by the population. The real GDP per capita and population measures are taken from the supplement in diskette to Summers and Heston (1988). Real GDP for 1986 for each country is calculated as the 1985 GDP calculated as above multiplied by one plus the rate of real growth as reported in the Organization for Economic Co-operation and Development's (OECD) *Main Economic Indicators* ([October 1988], 37–41). 1987 real GDP is calculated in a similar manner.

6. *U.S. Unemployment Rate (USUNEMP).* U.S. unemployment rate for males twenty years and over taken from *Economic Report of the President* (1988, table B-39).

7. *Foreign Unemployment Rate (FUNEMP).* For each country, it is the unemployment rate for males ages twenty-five to fifty-four taken from the OECD's *Labour Force Statistics* ([1966–86], 472–501; and various back issues). The overall foreign unemployment rate is a weighted average of these rates, using 1975 real GDPs as the weights.

8. *Real Exchange Rate (REXC).* For each country, it is the product of the nominal exchange rate (foreign currency/U.S.$) and the ratio of GDP deflators (U.S. GDP deflator/foreign GDP deflator). 1987 nominal exchange rates taken from the OECD's *Main Economic Indicators* ([October 1988], 30). 1987 GDP deflators are calculated using the percentage change in GDP deflators from 1986 to 1987 in the OECD's *Quarterly National Accounts* (first quarter 1988). The 1987 GDP deflator for the Netherlands was calculated using the percentage change in the CPI from the OECD's *Main Economic Indicators* ([October 1988], 140). GDP deflators up to 1986 are from the OECD's *National Accounts, Main Aggregates* ([1960–86], chart 31, pp. 138–39). Nominal exchange rates up to 1986 are taken from the same source (chart 2, pp. 150–51).

The overall real exchange rate is calculated by setting real exchange rates in 1975 levels to one and then weighting the change from 1975 real exchange rate levels by their respective shares of real GDP in 1975.

Notes

1. Hartman argues that, because the variable measuring the rate of return to domestic capital is based on replacement costs, it will not capture these valuation effects.

2. Newlon also estimates variants of Hartman's original model with several additional variables, including a quadratic time trend, dummy variables for the years when data revisions were made, and a definition of the return to direct

investment that includes the fees and royalties that accrue to the parent from its foreign subsidiary. Most of these changes do not alter the qualitative results reported earlier.

3. If, however, the home country's tax system is expected to change, then there is an incentive to time repatriations appropriately.

4. The seven countries, whose direct investment in the United States will be analyzed in more detail below, are Canada, France, Italy, Japan, the Netherlands, the United Kingdom, and West Germany.

5. There are several reasons for the striking differences between Hartman's results and the results reported in the first column of tables 3.1 and 3.2. First, all the data have been corrected and updated. That procedure itself renders the coefficient on $r^1(1 - t)$ in the retained earnings equation to be insignificantly different from zero. Second, Hartman deals with the presence of a negative retained earnings value by adding a positive constant to the *numerator* of the dependent variable. Because the denominator (GNP) is growing with time, this is tantamount to adding a gradually declining value. Following Newlon, I add a constant to the left-hand-side variable before taking the logarithm. This reduces the absolute value of most coefficients and renders $r^1(1 - t)$ insignificant in the transfers equation. Finally, the regressions of tables 3.1 and 3.2 extend the sample period back from 1965 to 1956 and forward from 1979 to 1984. The latter eliminates the significance of $r(1 - t)$ in the transfer equation and the combination of the two renders $(1 - t^1)/(1 - t)$ insignificant in both equations.

6. As Hartman (1984) notes, no separate estimate of the pretax rate of return to FDI is available. The value used for r is obtained by assuming that the average rate of corporate and property tax faced by foreigners in the United States (t) is the same as that faced by U.S. residents and solving for r using the known value of $r(1 - t)$.

7. The conclusion does not depend on the log-linear specification. A linear version of these regressions yields the same conclusion.

8. The tax elasticity is equal to $\hat{\beta}[(\bar{y} + k)/\bar{y}]$, where $\hat{\beta}$ is the estimated tax rate coefficient, $\bar{y}$ is the average ratio of transfers to U.S. GNP, and k is the constant added to this ratio before taking the logarithm.

9. See the data appendix for the definition and source of all the variables used in the analyses.

10. Other potential influences on FDI, for which I was unable to obtain reasonable indices, include the extent of current and expected U.S. tariff and nontariff barriers to imports and the degree of quantitative restrictions, such as exchange controls, on outward FDI.

11. Of course this argument also applies to the other influences on FDI. One promising direction for future work is the investigation of more general lag structures.

12. It has been argued that the strong dollar of the early 1980s was in part caused by tax incentives given to investment at that time. This suggests that an instrumental variables estimation technique may be appropriate.

13. Because of data availability, the sample period for this regression begins in 1969 rather than 1960. This is not, however, the source of the difference in results because a version of the regression without FUNEMP that begins in 1969 also shows a significant negative tax effect.

14. Another variable whose inclusion eliminates the tax effect is the dummy variable for the post-1974 era, justified above because the BEA definition of FDI was changed in 1974. Apparently, much of the estimated tax effect reflects the simple fact that the post-1974 era is characterized by high FDI and low taxes, relative to the pre-1974 era.

15. In fact, the sum of the tax coefficients has a positive sign that is significantly different from zero.

16. I also experimented with the method of seemingly unrelated regressions to estimate the seven equations as a system. Because the results were very similar to those obtained using OLS, they are not reported here.

17. By statute, Canada and West Germany operate foreign tax credit systems. However, both countries exempt from domestic taxation business-related income earned within the borders of its treaty partners, including the United States.

18. The home country effective tax rates technically apply to domestically located investment. If the tax law discriminates investment by location (as the U.S. tax law does), then the series on effective tax rates may not accurately capture the tax law's effect on foreign-source income. For example, French and Japanese corporations engaged in foreign investment are entitled to deduct from taxable income certain special reserves. Other details of the home country's tax system may also be important, particularly the degree of corporate and personal tax integration. For example, although by treaty dividends from U.S. subsidiaries to West German parent corporations are untaxed by the West German government, if and when exempt foreign-source income is distributed to shareholders by the parent, it is taxed differently than dividends from earnings on domestic-source income.

References

Alworth, Julian. 1988. *The financial decisions of multinationals.* Oxford: Blackwell.

Auerbach, Alan, and James Hines. 1988. Investment tax incentives and frequent tax reforms. *American Economic Review* 78 (2): 211–16.

Boadway, Robin, Neil Bruce, and Jack Mintz. The economic impact of capital income taxes in Canada. In *Taxes on capital income in Canada: Analysis and Policy.* Canadian Tax Paper, no. 80. Toronto: Canadian Tax Foundation.

Boskin, Michael J., and William G. Gale. 1987. New results on the effects of tax policy on the international location of investment. In *The effects of taxation on capital accumulation,* ed. Martin Feldstein. Chicago: University of Chicago Press.

Caves, Richard. 1982. *Multinational enterprise and economic analysis.* Cambridge: Cambridge University Press.

Dunning, John H., ed. 1985. *Multinational enterprises, economic structure and international competitiveness.* Clichester: Wiley.

Economic Report of the President. 1988. Washington, D.C.: U.S. Government Printing Office, February.

Feldstein, Martin S. 1982. Inflation, tax rules and investment: Some econometric evidence. *Econometrica* 50 (4): 825–62.

Feldstein, Martin S., and Joosung Jun. 1987. The effect of tax rules on nonresidential fixed investment: Some preliminary evidence from the 1980s. In *The effects of taxation on capital accumulation,* ed. Martin Feldstein, 101–62. Chicago: University of Chicago Press.

Fullerton, Don, and Marios Karayannis. 1987. The taxation of income from capital in the United States, 1980–1986. NBER Working Paper no. 2478. Cambridge, Mass.: National Bureau of Economic Research, December.

Gersovitz, Mark. 1987. The effects of domestic taxes on foreign private investment. In *The theory of taxation for developing countries,* ed. David Newbery and Nicholas Stern. New York: Oxford University Press.

Hartman, David G. 1984. Tax policy and foreign direct investment in the United States. *National Tax Journal* 37 (4): 475–88.

_____. 1985. Tax policy and foreign direct investment. *Journal of Public Economics* 26: 107–21.

King, Mervyn A., and Don Fullerton, eds. 1984. *The taxation of income from capital.* Chicago: University of Chicago Press.

Newlon, Timothy Scott. 1987. "Tax policy and the multinational firm's financial policy and investment decisions." Ph.D. diss., Princeton University.

Organization for Economic Co-operation and Development. 1987. *International investment and multinational enterprises, recent trends in international direct investment.* Paris.

Organization for Economic Co-operation and Development. Department of Economics and Statistics. 1984. *Balance of payments of OECD countries, 1963–1982.* Paris.

Pechman, Joseph. 1987. *Federal tax policy.* Washington, D.C.: Brookings.

Pugel, Thomas. 1985. The United States. In *Multinational enterprises, economic structure and international competitiveness,* ed. John H. Dunning. Clichester: Wiley.

Summers, Robert, and Alan Heston. 1988. A new set of international comparisons of real product and prices for 130 countries, 1950–1985. *Review of Income and Wealth* 34 (1): 1–25.

Tajika, Eiji, and Yuji Yui. 1988. Cost of capital and effective tax rate: A comparison of U.S. and Japanese manufacturing industries. *Hitotsubashi Journal of Economics* 29 (2): 181–200.

U.S. Department of Commerce. Bureau of Economic Analysis. 1988. Foreign direct investment in the United States: Detail for position and balance of payment flows, 1987. *Survey of Current Business* 68 (8).

Young, Kan H. 1988. The effects of taxes and rates of return on foreign direct investment in the United States. *National Tax Journal* 41 (1): 109–21.

Comment David G. Hartman

As Joel Slemrod points out, recent empirical work on foreign direct investment has been narrowly focused, making subtle changes to aggregate annual regressions. It is a reflection of the dearth of information, certainly not the elegance of the empirical work in Hartman (1984), that succeeding research has been so single tracked. With so many similar exercises now reported, the question that has to arise is whether a small and suspect information base has been used and reused beyond the limits of statistical validity.

In this paper, Slemrod pursues "two distinct approaches" for enhancing our knowledge of tax effects on foreign investment. It is his second approach that breaks with tradition, by looking at investment in the United States by home country, and truly advances the level of debate, it is to be hoped for good. But, first, Slemrod goes back over some familiar territory, extending and updating the standard model in several ways.

David G. Hartman is Group Vice President and Chief International Economist with DRI/McGraw-Hill and a research affiliate of the National Bureau of Economic Research.

His first objective is to eliminate the spurious correlation between retained earnings investment and the rate of return, which could result from the inclusion of retained earnings as part of the total return calculation. He tests for possible bias by estimating separate coefficients for taxes, $\ln(t)$, and gross rates of return, $\ln(r)$, finding that the tax effect is not confirmed.

With less than half of earnings typically reinvested in aggregate (and with reinvestment ratios quite variable), it is not generally true that investment exhausted earnings, creating an artificial rather than behavioral relation between rate of return and investment. Nevertheless, doubts should at least be raised about spurious correlation due to measurement errors in earnings. So I concur completely with Slemrod's emphasis on the problem, which I highlighted in my original paper and in my comments on Boskin and Gale. But I wish he had followed my procedure of separating of $\ln[r(1 - t)]$ into $\ln(r)$ and $\ln(1 - t)$, which had strongly confirmed the coefficient of the combination variable (using then-available data, over a shorter interval). As it stands, we cannot tell if Slemrod's results differ because of the shift in functional form or because the relation I identified was not robust across data revisions and time intervals. With the surge in international investment in the 1980s, and particularly in highly leveraged corporate acquisitions, it would be unremarkable if previous relations no longer held.

Another disturbing aspect of Slemrod's proposed remedy is that it does not really address the problem. By all logic, the spurious correlation would exist between retained earnings and the after-tax return, $r(1 - t)$, so testing whether t matters on its own cannot distinguish between a spurious and a causal relation.

Two procedures that might help were pursued in my 1984 paper: to instrument $r(1 - t)$ by its value lagged a year and to see if there is a rate of return effect on the dividend payout ratio (which, of course, has the offending earnings figure in both numerator and denominator).

Slemrod's second objective is to replace average tax rate measures by marginal rate measures. The reader tends to accept without question a statement that marginal rates are better, but in this case I am not sure. Probably more often than not, the direct investment decision of the 1980s is whether to buy a U.S. company, or at least whether to buy an existing U.S. plant, in which case the average tax rate could well be more relevant.[1] Even leaving acquisitions aside, foreign direct investment is far less likely than domestic investment to be "purely marginal" since it will frequently involve the development of an entire operation rather than an addition to capital alone. All that having been said, the use of the Auerbach-Hines tax terms confirms the previous conclusions.

Finally, Slemrod seeks to confirm prior results by including a variety of alternative explanatory variables. While one can always criticize such efforts, I think we too seldom employ eclectic tests of robustness.

What does concern me is that, from this point on, Slemrod abandons the model of foreign investment as a function of rates of return. Once again, the

potential for spurious correlation between investment and the rate of return is Slemrod's concern, but it is far from clear what theory of investment is implied by a specification that keeps only the tax rate and then adds alternative variables. For instance, a model could be advanced to relate the relative growth rates of GNP to investment. But the results from table 3.4 are based on equations including levels of GNP.

Of even more concern than the lack of a well-specified model is the possibility that the tax rate itself might be cyclically sensitive. If so, the tax parameter could tend to proxy for the gross rate of return to investment, and all interpretations of its coefficient would be suspect.

In general, annual time-series analysis puts a premium on testing clean and parsimonious alternative specifications. Adding variables without clear theoretical justification can test robustness, but annual time series are so highly correlated that some added variable is almost bound to reduce the significance of the tax effect.

So I am not as disturbed as Slemrod that a foreign unemployment variable is highly (positively) related to direct investment in the United States to the extent of reversing estimated tax effects. As far as we can tell from the paper, the result emerges only in equations without rate of return variables. If unemployment is serving as a proxy for the return to investment, it is probably a poor one. Could it serve as a proxy for the after-tax return just as well as a proxy for the gross return? If so, the lack of an independent tax effect is not disturbing. On the other hand, unemployment as a measure of labor market conditions and not a proxy for general business conditions would surely have the opposite sign. So I would not be quick to conclude that this is an "alternative explanation." It may simply be that too many experiments are being conducted on the limited and crude information base available.

I find Slemrod's other additions more significant. His result that the dollar matters is new, interesting, and plausible. The attempt to correct for the nonlinkage of data around benchmark survey years is even more useful. Indeed, I found the fact that inclusion of a dummy variable for the post-1974 era eliminates the tax effect to be the most interesting result of the first half of the paper.[2] The discussion, relegated to a note, is certainly sobering. Nonetheless, I believe that Slemrod's conclusion that the estimated tax effects are arising solely from the recent investment surge in a low-tax environment is too harsh. Significant results such as those in my 1984 paper were produced in a period before both phenomena.

The test of any extension of similar work is what conclusions were supported or rejected. Slemrod generally finds tax effects that seem fairly robust, but he finds them in direct investment by funds transfers and not in retained earnings investment. These results are interesting in reversing many of the prior conclusions, while supporting others. Slemrod has taken considerable care to find the sources of divergence between his results and

prior work, a procedure that is all too seldom followed in this field. The conclusions here are, thus, highly useful, particularly in pointing out where earlier results were not robust.

When Slemrod turns to the disaggregation by home country, he uses the formulation that includes the "other explanatory variables" but not any gross rate of return measures. My previous comments thus apply to the remainder of the paper.

That said, I think that this effort is headed in a very positive direction and that Slemrod is in many cases too tough on himself, in that he presented a difficult set of propositions for testing.

For example, he first looks at U.S. tax effects on foreign investment, hoping to see distinctions in the responsiveness of investment from "exemption countries" and "tax credit countries." All the tax effects on direct investment involving transfers of funds are of the correct sign, and four of seven are significant. Despite the fact that there is not an obvious pattern of greater significance in "exemption countries," and despite the perverse results for retained earnings investment, I find these results encouraging. There are a variety of reasons for expecting a lack of sharp results in the disaggregation by home country.

One problem is simply the identity of the home country. As Slemrod points out, the 1974 benchmark shifted from a definition that included some "ultimate beneficial owners" to a consistent "first foreign entity in the ownership chain" standard. That definitional change produced a break in each time series, sometimes with large consequences for the country identification of investors. Furthermore, it highlighted the difficulty of defining the national identity of and relating to national tax parameters the behavior of entities that are fundamentally global.

Disaggregation also emphasizes the effect of singular events in the data. For instance, one of the more striking patterns is that of Japan, shown in figure 3.7b. The extreme 1971 Japanese retreat from the United States was entirely accounted for by a $487 million disinvestment by "other industries" after a history of investment never exceeding double digits. This episode, which has all the earmarks of a single large transaction, is far from unusual in the foreign investment data. These events merely contribute to a pattern in the aggregate data but can easily overwhelm all else in disaggregated analysis. Especially in an era of large acquisitions, we are faced with very "noisy" disaggregated data.

A related point is that the industry composition of investment varies by country. In estimating tax effects, it is critical that the relevant tax parameters be identified. But, if various NBER tax projects have taught one lesson above all, it is that the variation in effective tax rates across industries may overwhelm the variations through time or across countries. Investments involving the countries analyzed by Slemrod certainly have very different sectoral compositions. For total direct investment as of 1987, manufacturing

led with 35 percent, followed by trade (18 percent), petroleum (14 percent), and real estate (9 percent). Japan, by contrast, had nearly three-quarters of its U.S. investment in the trade sector as recently as 1983. The recent surge in real estate raised its share to 13 percent in 1987, with trade falling to less than half. While only about 16 percent of Japan's investment is in U.S. manufacturing, that sector accounts for about 90 percent of France's investment. The Netherlands and the United Kingdom are far more focused on petroleum investments than the average. In general, average U.S. tax rates would be expected to have varying degrees of relevance to investments by different countries. This is particularly true in light of the special U.S. tax treatment of real estate and petroleum.

In summary, the data by country are very noisy; also, it is hard to identify the relevant "home" country; and, even then, the extent to which the measured tax rates are relevant varies. For these reasons, it is no surprise that the strength of estimated tax effects cannot easily be related to the home country's treatment of foreign-source income. To me, the real surprise is the success in identifying consistent U.S. tax effects on investment by transfer of funds.

Slemrod then goes on explicitly to include measures of home country taxes; there is little confirmation of the hypotheses he wants to test. Again, the lack of significance could have been anticipated. Still relevant here are all the concerns about the singular events that dominate the data, the national identity of firms, and the industry composition of investment (the relevance of the measured tax rates is questionable for both the United States and the host country this time). A related issue is the standard against which U.S. investments are judged by a global firm. The relevant tax comparison for a U.K. subsidiary of a Dutch firm thinking of investing in the United States might be between Canada and the United States (rather than the United Kingdom and the United States as measured here). Obviously, the situations can be highly complex, but the number of parameters estimated here has already exceeded what one can probably expect from the data.

Perhaps most important, the sign of the home country tax parameter is indeterminate from economic theory. Under a foreign tax credit system, as Slemrod points out, higher home country taxes tend to favor U.S. investment over home country investment but tend to discourage both. But, even in the case of an exemption system, the case is far from clear. Recent investment research has established a theoretical role for internal cash flow, legitimizing what have long been highly robust empirical models. In such a model, foreign investment would be negatively affected by even those home country taxes that do not directly apply to operations abroad. Not only is the sign of the tax effect indeterminate, but it depends in part on each country's financial structure and on the "average firm's" situation.

So, for a wide variety of theoretical and practical reasons, it is not surprising that a crisp set of conclusions about home country tax effects fails

to emerge. It is probably enough that the U.S. tax effects identified earlier generally hold up in the presence of home country tax parameters.

Like most prepared conference comments, these accentuate the negative and are more critical than my overall opinion of Slemrod's efforts. He is moving this area of research in a very positive direction, despite the monumental data problems that he has confronted. There is still much to be done—I think, for example, that there is hope for analysis by industry by country, despite the data being even noisier. In any case, researching foreign investment and especially the effects of tax policy is a dirty job (not for the purist), but I hope that Slemrod and others keep doing it.

Notes

1. *Survey of Current Business* reports (e.g., May 1988, 50–58) imply that annual U.S. acquisitions have typically been between 50 and 100 percent as large as total direct investment in the 1980s. The figures are not directly comparable since acquisitions financed by U.S. debt would not count as direct investment.

2. The dummy variable reflects the new benchmark and associated definitional changes in the calculation of direct investment. As Commerce noted in comparing the 1974 figures under both definitions, the changes were very significant. Under the new definitions, the 1974 direct investment stock was 21 percent higher, while direct investment income was 29 percent lower