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DOMESTIC TAX POLICY AND FOREIGN INVESTMENT: SOME EVIDENCE

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ABSTRACT

Investment abroad has come to play a major role in the total investment undertaken by U.S. firms. Despite this development, very little attention has been paid to the impacts of domestic tax policy on foreign investment.

One reason has been the presumption that, since changes in domestic tax rules ordinarily also apply to foreign-source income, policy changes should affect foreign and domestic investment similarly. However, the fact that the tax on foreign-source income is deferred until the income is repatriated represents a crucial difference in the treatment of foreign and domestic income. So long as the U.S. tax is deferred, the effective U.S. tax rate on foreign-source income can be shown to be irrelevant to a firm's optimal foreign reinvestment decision. Foreign investment is now largely accomplished by firms reinvesting earnings abroad, so the reinvestment decision is of primary importance. Thus, a decrease in the effective U.S. tax rate which applies to both domestic and foreign investment income can be thought of as a cut in the tax on domestic investment income, which is encouraging to domestic investment (perhaps at the expense of foreign investment), combined with a cut in the tax on foreign investment income, which has no effect on the optimal foreign reinvestment decision. Consequently, the impacts on foreign and domestic investment of an apparently neutral policy could be very different.

Another reason that the response of foreign investment has been neglected in domestic policy discussions is the lack of evidence on the magnitude of that response. This paper utilizes the theory just described to confirm that foreign investment is influenced negatively and quite strongly by the after-tax rate of return to domestic investment. A further test, in which a "gross domestic rate of return" term and a "domestic tax" term are included separately, produces coefficients virtually equal in absolute value, confirming that the net domestic rate of return is the appropriate variable. The results indicate that a tax incentive which has been found to raise net domestic investment by a dollar reduces net foreign investment by at least twenty cents. This conclusion is further reinforced by results from a forward-looking (Tobin's q) model.

While these results do not point to the primary outcome of a domestic policy change being a domestic-foreign reallocation of the capital stock, they indicate that a significant reallocation does take place. With open economy tax analysis still in its infancy, the question of how this evidence alters the usual conclusions is largely an open one.

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"Domestic Tax Policy and Foreign Investment: Some Evidence"

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The rate of investment in the United States has recently become the focus of unprecedented concern. Feldstein (1981), for example, demonstrates that net fixed nonresidential investment as a fraction of GNP dropped by nearly forty percent between the late 1960's and the late 1970's. He has also argued that much of the investment decline can be attributed to tax laws and, in particular, to the interaction of tax laws with the high rates of inflation experienced in the 1970's.[1] Recent initiatives to alter the tax treatment of capital income have been based, at least in part, on a desire to increase the rate of capital formation.

At the same time that increasing the rate of domestic investment has become an objective of tax policy, foreign investment by U.S.-based firms has come to play a major role in the total business investment undertaken. Indeed, foreign investment as a fraction of GNP grew at nearly the same rate as domestic investment fell over the most recent decade.

In the theoretical public finance literature, serious attention is for the first time being devoted to the possible inadequacies of the closed-economy models of taxation on which our predictions of tax effects are based. For example, Goulder, Shoven, and Whalley (forthcoming) have recently demonstrated that savings and investment incentives can produce outcomes that differ greatly depending on the elasticities of international investment with respect to rates of return at home and abroad. Unfortunately, there is virtually no evidence on

which to base an assumption about these crucial parameters.

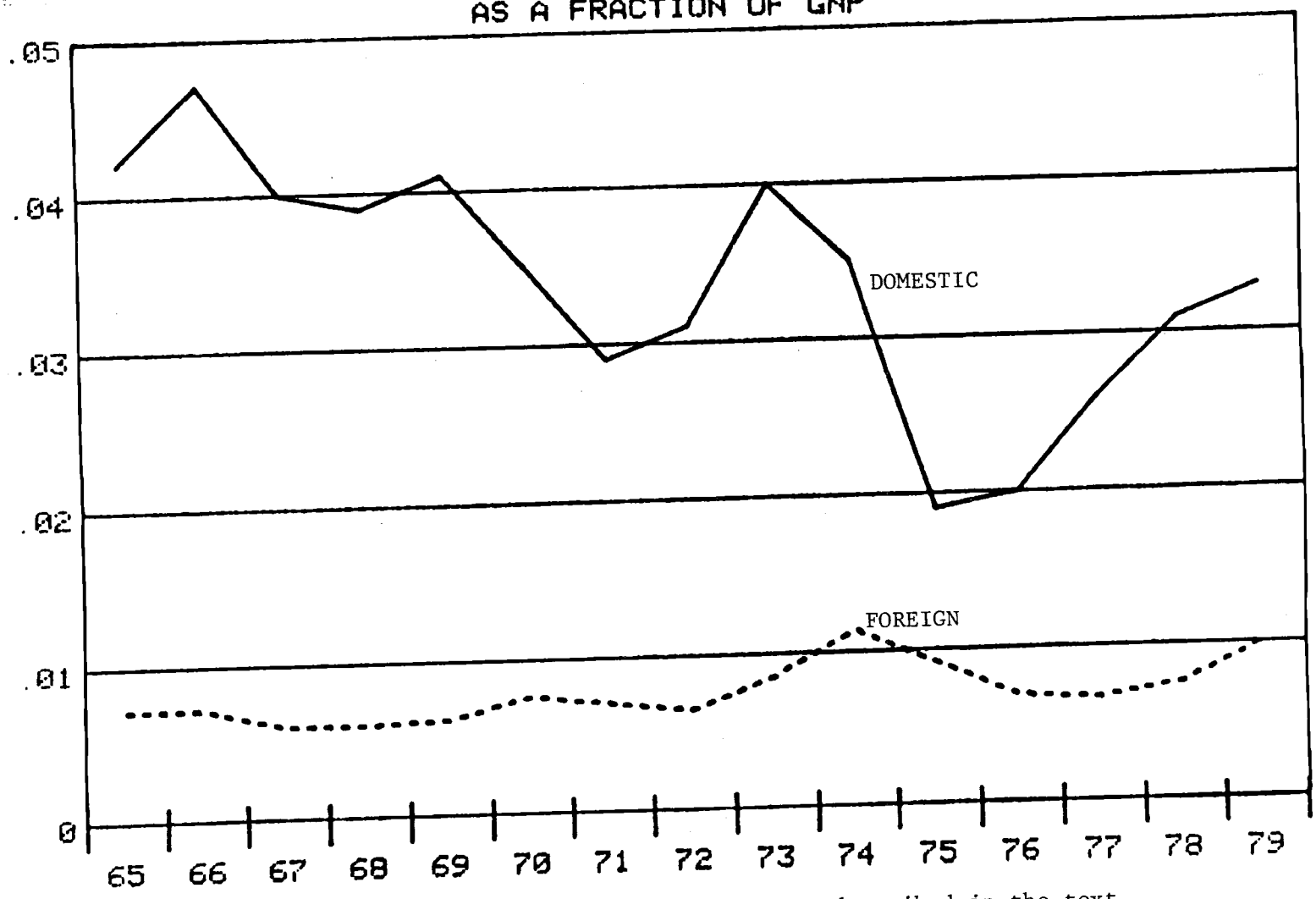
In fact, even the size of U.S. foreign investment relative to domestic investment has often been poorly understood. It is argued here that, because figures on foreign investment should be compared to net domestic investment, investment abroad by U.S. firms has reached levels approximately as high as half of the domestic counterpart in recent years. With foreign investment of this magnitude, it is at least plausible that the closed economy models of taxation would lead to inaccurate conclusions, regarding the impacts of investment and savings policies on total investment.

This paper examines the importance of the response in U.S. foreign direct investment to changes in domestic tax policy.[2] First, a brief review of the recent pattern of direct investment and of the literature on its determinants will be presented. In Section II, a simple theory of foreign investment is developed. Evidence from the past fifteen years is then used to both strongly confirm the implications of the theory and to indicate the existence of highly significant domestic policy effects on foreign investment. In the conclusion, the importance of these results for domestic policy analysis is considered.

I. Foreign Investment and Existing Evidence on Its Determinants

As noted in the introduction, investment abroad has come to occupy a major position in the total investment undertaken by U.S. firms. As Figure 1 illustrates, increases in foreign investment coupled with domestic investment declines have resulted in foreign investment between about one-third and one-half as large as net domestic fixed investment. Indeed, foreign direct investment as a fraction of GNP increased between the late 1960's and the late 1970's

FIGURE 1
DOMESTIC AND FOREIGN INVESTMENT
AS A FRACTION OF GNP



NOTES: Investment figures are net of depreciation, as described in the text.

The net foreign investment figure for 1974 was adjusted to remove the influence of a major oil divestiture, as discussed in footnote 18.

by over 45 percent, while the comparable domestic measure fell by nearly 40 percent. It should be noted that foreign direct investment is a figure most accurately compared to net domestic investment, since one component of foreign investment, earnings reinvested abroad, is net of depreciation allowances.[3]

The fact that foreign direct investment is by nature a net figure helps explain why the situation depicted in Figure 1 diverges so significantly from the popular perception of the relative size of foreign to domestic investment. Goldsbrough (1979), for example, illustrates the relative importance of direct investment by reporting that it is less than five percent as large as gross domestic fixed capital formation.[4]

These figures demonstrating the importance of foreign investment might also seem surprising in light of the important and widely-cited conclusion of Feldstein and Horioka (1980) that domestic savings and domestic investment are very closely linked; that is, most of the world appears to be best characterized as consisting of economies nearly closed to net international investment flows. One explanation is that the previous result was based on a study of a cross-section of countries, so the U.S., as only one observation, does not necessarily exhibit such a savings-investment relationship. More importantly, net business fixed investment represents only a small fraction of total gross national investment. So, while investment abroad is a large part of the net investment undertaken by U.S. firms, it may not appear significant as a fraction of total national savings or investment.

The existence of sizable foreign investment flows does not, of course, hold any implication for the role of rates of return (and, hence, tax rates) in determining investment flows. In fact, efforts to relate the level of

foreign investment to rates of return at home and abroad have met with a striking lack of success.[5] Hufbauer (1975) was led to the conclusion that there is no "observable connection between MNC expansion, cost of capital at home, and average earnings on investment abroad. The behavior of MNCs might have rather little to do with the classical theory of foreign investment." As a result, studies of direct investment have often resorted to explaining U.S. investment abroad based on investment levels in the U.S. (Herring and Willett (1972) and Kohlhagen (1977)), on GNP in the host countries (Scaperlanda and Mauer (1973)), or on total investment levels in the host countries (Snoy (1975)).

Notable exceptions to the ad hoc nature of much of the work on foreign investment are the Jorgenson-type neoclassical investment models, which have been estimated for foreign investment by, for example, Stevens (1972), Kwack (1972), and Goldsbrough (1979). While these models provide good explanations of foreign investment, it can be argued that the encouraging results are mainly attributable to the numerator of the "optimal capital stock" term (output of foreign subsidiaries), rather than the denominator (the cost of capital) which is of primary interest for policy analysis. In fact, none of these models incorporates tax effects in the cost of capital measure, but it would be straightforward to replace the cost of capital term by the tax-adjusted cost of capital, as Kopits (1972) has done in his study of dividend remittances. One could also test the separate significance of the tax-adjusted cost of capital term and the output term.

There are more serious questions about the applicability of the neoclassical investment model, however. One important aspect of the model is that there is no connection between the domestic and foreign investment deci-

sions of the firm. That is, the foreign subsidiary is implicitly viewed as a perfect competitor, even with the domestic parent firm. With foreign production and domestic production often representing alternative means of serving the same markets, this characterization leaves a good deal to be desired.

Looked at in a slightly different way, the neoclassical closed-economy investment model is used to determine the combination of factors optimally used to produce a given output. The foreign investment decision, by contrast to the closed-economy investment decision, primarily concerns the location of production. Taking the location of production (the level of foreign subsidiary output) as given in a model of foreign investment neglects the most interesting aspect of the problem.

As we shall see in Section III, the recent evidence suggests that a simple economic model which meets these objections can be used to successfully explain annual movements in direct investment and to test for the effects of taxes. A crucial element in that success is the careful theoretical specification of the influence of tax policy. The next section is devoted to a discussion of the determinants of foreign investment and, in particular, the influence of taxes.

II. Taxes and Foreign Investment

Our analysis of foreign investment begins with the familiar proposition of classical foreign investment theory that firms tend to invest more abroad as the rate of return available abroad rises and as that available at home declines. This simple specification is best thought of as the product of a disequilibrium model of investment, in which a firm's decision to invest at home or abroad is a function of the differential return available abroad.[6] It

raises, however, a fundamental question about the nature of the substitutability of foreign for home investment. In particular, the classical theory appears to neglect the possibility of expansion both at home and abroad up to the point at which the marginal return to capital equals the marginal (debt) cost, in which case the firm's domestic rate of return would be irrelevant in its foreign investment decision.

As was noted in the previous section, foreign and domestic production are often alternative methods of serving the same market, so the notion of substitutability among different locations of production is well established. A fully consistent story can be told of a firm deciding between foreign and domestic investments, either of which would tend to drive both rates of return down toward the cost of funds, on the basis of such factors as taxes and local wages which are reflected in current measured rates of return.

A further reason for foreign investment to compete with domestic investments can be introduced by appealing to either externally- or internally-imposed financial constraints on the firm. The existence of external financial constraints has been the subject of a lengthy debate which will not be repeated here. Clearly, if a firm's decision to transfer capital to a foreign subsidiary cannot be accompanied by increased borrowing to finance the previous level of domestic operations, there is a foreign-domestic tradeoff. Similarly, a firm might impose a target debt-equity ratio on itself as an internal control mechanism for requiring managers to justify their plans.[7] Thus, the theory that foreign investment is a function of alternative rates of return can be justified on a number of grounds.

Even granting the classical model a solid theoretical foundation, it

is frequently asserted that any measure of available returns neglects such important determinants of expected return as to be empirically useless. Such factors as the desire of innovative, oligopolistic firms to exploit their particular advantages in production or distribution, and the presence of impediments to international trade, no doubt play a major role in explaining the existence of multinational firms, as does the quest for stability through vertical integration.[8] However, unless we include in our study a period in which firms are discovering and exploiting major new opportunities abroad, the factors which explain the existence of multinational firms may not so strongly cause year-to-year variations in foreign investment. Rather, as is shown in the next section, measured rates of return can account for a great deal of the fluctuation in investment over recent years.

The complexity of the tax treatment of foreign source income makes necessary a careful specification of the net-of-tax rate of return to which foreign investment would be expected to respond. The governments of host countries have the first opportunity to tax the returns produced in their jurisdictions. The rate of return net of the foreign corporate income tax can be written as:

$$r^*_{nfi} = r^*(1 - t^*) \qquad (1)$$

where r^* is the gross rate of return earned abroad[9] and t^* is the effective rate of host country taxation. Foreign countries often collect another tax (a "withholding tax") at a time dividends are paid to the parent company. The return, after total foreign taxes, on a one-period investment with income repatriated to the parent firm can, therefore, be written as:

$$r^*_{nft} = r^*(1 - t^*)(1 - t^*_w) \tag{2}$$

The U.S., in turn collects on foreign source income a tax at the regular corporate rate, but allows a credit for taxes paid to the foreign government (up to the level of the U.S. tax liability). The U.S. tax is ordinarily collected only upon repatriation of profits to the U.S. parent. Thus, the parent firm can receive a net-of-tax rate of return from an investment abroad of:

$$\begin{aligned} r^*_n &= r^*(1 - t), \quad \text{if } t \geq t^* + t^*_w - t^*t^*_w \\ &= r^*(1 - t^*)(1 - t^*_w), \text{ otherwise} \end{aligned} \tag{3}$$

where t is the effective U.S. tax rate on foreign-source income, prior to the credit.[10]

Obviously the effective tax rate on foreign source income is affected, in all except the "excess credits" case, by the firm's decision of whether to repatriate earnings. The question of how to characterize this feature of the tax system in a tractable model of the foreign investment decision has plagued researchers. Horst (1977) takes the approach of weighting the tax liabilities by the fraction of foreign-source income typically paid out, to derive an after-tax return:

$$\begin{aligned} r^*_{np} &= r^*[1 - (1 - p)t^* - pt], \quad \text{if } t \geq t^* + t^*_w - t^*t^*_w \\ &= r^*[1 - t^* - pt_w(1 - t^*)], \quad \text{otherwise} \end{aligned} \tag{4}$$

where p is the foreign subsidiary payout ratio.

The specification is deceptively simple, however. First, the dividend payout ratio is chosen by the firm and, in general, will depend on the tax rates, so the temptation to interpret an average of tax rates weighted by an observable payout ratio as the appropriate influence over marginal investment decisions should be avoided.[11] Also, expression (4) is appropriate only if a firm which is making a marginal investment will continue to pay out the current fraction p of its earnings over the live of the investment. Finally, r_{np} is derived by assuming that direct investment abroad is accomplished by an explicit transfer of funds from the parent to the subsidiary, rather than the implicit transfer implied by a retention of earnings by a foreign subsidiary.

In fact, Hartman (1981) argues that U.S. foreign direct investment now typically is accomplished by foreign subsidiaries retaining earnings. Furthermore, the nature of the U.S. tax system provides a strong incentive for foreign subsidiaries to be self-financing to the greatest extent possible. That is, the present value of tax liabilities is reduced, without any corresponding change in financial characteristics of the firm, if a foreign subsidiary retains its earnings, rather than paying dividends to its parent while receiving from the parent additional explicit direct investment (whether in the form of debt or equity). The reason for this strong result is that U.S. taxes are due only upon the repatriation of earnings. Thus, it is not surprising that dividend payments are discouraged, unless a net financial transfer from the subsidiary to the parent is desired. This proposition is not completely general in the complex universe of interacting tax systems, as is clear from an example considered by Alworth (1981). If a host country provides so high a level of dividend relief to foreign-owned subsidiaries that the firm's total current tax burden declines

with higher repatriation rates, a firm will tend to accelerate rather than defer its dividend payments to its parent. As a general proposition, however, the logic underlying expression (4) -- that a U.S. firm undertaking a transfer of funds abroad is receiving dividends at rate p which is expected to continue over the life of the investment -- is open to question.

The importance of this insight rests in its implications for the financing of a marginal investment. Based on this theory, the marginal direct investment comes at the expense to the parent firm of a repatriated dollar, up to the point of subsidiary profits being exhausted. For total investments larger than available earnings, the marginal investment is financed by an explicit transfer from the parent.

A. Retained Earnings

Consider, first, the subsidiary deciding whether to reinvest for one period or to repatriate a dollar of after-foreign-income tax earnings. Repatriation gives the parent $\frac{(1-t)}{(1-t^*)}$ dollars to invest at, say, a net domestic rate of return r_n, or, at the end of the period, $\frac{(1-t)}{(1-t^*)}(1 + r_n)$. Reinvestment produces $1 + r^*(1 - t^*)$ of foreign earnings or, upon repatriation to the parent at the end of the period, $\frac{(1-t)}{(1-t^*)}(1 + r^*(1 - t^*))$.[12] That is, a firm can pay the U.S. tax, thereafter earning a rate of return r_n, or can defer the U.S. tax but later pay the same rate on the original dollar plus the rate of return that dollar earns in the interim. Thus, the present value of tax payments to the U.S. on a dollar of foreign-source income, when discounted at $r^*(1-t^*)$, are equal in the two cases. Therefore, the relevant net foreign rate of return to be compared to the opportunity cost (r_n) of investing abroad is the after-foreign-income-tax rate of return. As discussed in more detail by Hartman

(1981), this argument is not crucially dependent on the one-period nature of this example, as long as repatriation of earnings from abroad is expected to occur eventually.[13]

This result highlights the crucial role of deferral, in cases of the U.S. tax rate on foreign-source income exceeding the foreign tax rate. If deferral were not available, a higher U.S. tax would obviously represent a disincentive to reinvestment abroad. The conventional analysis of the tax system, including deferral, which relies on some weighted average formula similar to equation (4), still incorporates a disincentive effect of higher U.S. taxes on foreign-source income.[14] As we have seen, once both the current and future tax liabilities relevant to the repatriation decision have been taken into account, the U.S. tax on foreign source income is neutral with respect to the reinvestment decision. Of course, the U.S. tax is entirely irrelevant when the foreign tax rate exceeds the U.S. tax rate on foreign-source income. Thus, within our general model foreign investment accomplished by retaining foreign earnings abroad can be described by:

$$I^*_{re} = I^*_{re}(r_n, r^*(1 - t^*)) \qquad (5)$$

This general neutrality of the U.S. tax treatment of foreign source income has important implications for the country's mix of domestic and foreign investment, since the U.S. tax law treats domestic and foreign investment income similarly, except for the deferral of foreign-source income and depreciation provisions to be discussed below. That is, while an increase in the general rate of corporate income taxation decreases the alternative rate of return r_n, it has no effect on $r^*(1 - t^*)$ and, hence, it tends to encourage foreign reinvestment

of earnings. The extent of this encouragement is the topic of Section III.

B. Transfers of Funds

The tax effects on the foreign investment accomplished by a transfer of funds from parent to subsidiary are less straightforward, depending on anticipated paths of investment in the future. Take, first, the case of a U.S. tax higher than the corresponding-foreign tax. We know from the discussion above that after an investment project begins to generate earnings, the rate of return on reinvestment, appropriate for comparison with the domestic r_n, is the after-foreign-income tax rate of return. Thus, we can view an investment abroad as earning a present value of $r_1^*(1 - t)$ in the first period, but also gaining a firm access to the higher return $r_+^*(1 - t^*)$ on earnings reinvested, because of the deferral of the U.S. tax. The future reinvestment opportunities will, as a consequence, affect current decisions. Suppose, for example, that r^* is expected to be so low in the future that only a one-period investment is contemplated. Then, the relevant effective tax rate on foreign-source income is t, since there is no deferral advantage. On the other hand, if repatriation of earnings will be deferred indefinitely, the value of reinvesting at the higher return may come to dominate the decision, in which case the firm's decision takes on the character of the reinvestment decision discussed above. So, the relevant tax rate on foreign source income is between t^* and t, with the exact value depending on the set of future investment opportunities.[15] Of course, if the foreign tax exceeds the U.S. tax, some combination of the foreign corporate income tax and the foreign withholding tax is the important parameter. Thus for a new investment, we can write the general expression:

$$I_t^* = I_t^*(r_n, r^*, r^*t, r^*t^*, r^*t_w^*(1 - t^*)) \qquad (6)$$

where the I_t^* function is specific to the particular firm being considered. It could well be highly unstable in aggregate form.

III. Domestic Taxes and Reinvestment Abroad

Fortunately, since reinvestment of foreign source income accounts for nearly ninety percent of U.S. direct investment abroad, the theory of this source of direct investment, given by equation (5), is by far the more straightforward. In order to facilitate comparison with Feldstein's results on tax impacts on domestic investment as a fraction of GNP, a simple linear relationship is chosen for estimation:

$$\frac{I_{re}^*}{Y} = \alpha + \beta_1 r_n + \beta_2 r^*(1 - t^*) \qquad (7)$$

where Y is U.S. GNP.[16] In measuring real net rates of return, it is important to correct for the tax laws' mismeasurement of profits and to take account of all the taxes paid. Data on r_n are taken from Feldstein (forthcoming), where considerable attention has been paid to the accurate measurement of depreciation and to the taxes paid by corporations, shareholders, and creditors in the U.S. By contrast, only the taxes paid currently by the foreign subsidiary to the foreign government are relevant in the construction of $r^*(1 - t^*)$, so, aside from the mismeasurement of profits under a myriad of foreign tax systems, the foreign variable is directly observable.[17]

The use of reported after-tax earnings is problematic, but information on depreciation and inventory accounting is not available, so no adjustment can be made. Measurement errors in $r^*(1 - t^*)$ will be systematically related to measurement errors in $\frac{I_{re}^*}{Y}$, so we can anticipate the estimate $\hat{\beta}_2$ being

biased. A bias will, in general, occur in our estimate $\hat{\beta}_1$ as well, but, as we will see, these problems do not appear to be serious.

When (7) is estimated using annual date for the 15 years 1965-1979, we obtain:[18]

$$\frac{I^*_{re}}{Y} = \underset{(.000489)}{.003736} - \underset{(.00798)}{.0671}\, r_n + \underset{(.00447)}{.412}\, r^*(1-t^*) - \underset{(.000489)}{.00186}\, D74 \qquad (8)$$

$\bar{R}^2 = .937$
D.W. = 2.15
SER = .000405

(standard errors in parentheses)

These results imply that the simple model of foreign direct investment developed in the previous section provides for successful explanation. Of particular interest, here, is the highly significant negative estimated impact of the domestic real net rate of return. Even more significant is the rate of return to U.S. investment abroad, although, as mentioned above, it is constructed in such a way as to introduce spurious correlation with I^*_{re}.

Equation (8) has very important implications for the impact of domestic tax policy on foreign investment. Before exploring these implications, further tests are performed to confirm the result. First, since r_n can be thought of as $r(1 - t_{us})$, where t_{us} is the effective tax rate on domestic income, the variable can be split into a "gross rate of return" term r and a "tax" term rt_{us}. This produces the result:

$$\frac{I^*_{re}}{Y} = \underset{(.001758)}{.003681} - \underset{(.0138)}{.0674}\, r + \underset{(.0420)}{.0684}\, rt_{us} + \underset{(.00476)}{.0411}\, r^*(1-t^*) - \underset{(.000637)}{.00188}\, D74 \qquad (9)$$

$\bar{R}^2 = .931$
D.W. = 2.15
SER = .000424

As expected due to the corrlation of r with rt_{us}, it is difficult to estimate precisely the separate tax effect. However, the similarity of the r and rt_{us} coefficients certainly supports the hypothesis that $r(1 - t_{us})$ is the appropriate variable.[19]

As noted above, these results cannot be taken too seriously without addressing the issue of bias caused by the measurement error in the real after-foreign-tax rate of return $r^*(1 - t^*)$, and its correlation with the measurement error in foreign investment. Since it is the domestic variables on which we will place major emphasis, it is reassuring that the correlation of r_n and $r^*(1 - t^*)$ is only -.03.

To confirm that the potential bias is small, equation (8) was reestimated using instrumental variables. The real after-foreign-tax rate of return $r^*(1 - t^*)$ was instrumented using variables expected to be related to worldwide real capital returns but not the measurement error in $r^*(1 - t^*)$. Specifically, current and lagged employment, industrial production, and the real GNP of the seven most significant host countries were weighted by their share of U.S. foreign investment.[20] While these variables explained only 81.1 percent of the variation in $r^*(1 - t^*)$, in the first stage regression, the following results emerged:

$$\frac{I^*_{re}}{Y} = \underset{(.000517)}{.003796} - \underset{(.0080)}{.0674}\, r_n + \underset{(.0049)}{.0404}\, r^*(1-t^*) - \underset{(.00049)}{.00185}\, D74 \qquad (10)$$

$$\bar{R}^2 = .937$$
$$D.W. = 2.13$$
$$SER = .000405$$

$$\frac{I^*_{re}}{Y} = \underset{(.001760)}{.003696} - \underset{(.0139)}{.0681}\, r + \underset{(.0423)}{.0701}\, rt_{us} + \underset{(.0052)}{.0403}\, r^*(1-t^*) - \underset{(.00064)}{.00187}\, D74 \quad (11)$$

$$\bar{R}^2 = .931$$
$$D.W. = 2.12$$
$$SER = .000425$$

These instrumental variables estimates are virtually identical to the ordinary least squares results reported as equations (8) and (9), implying that we can have a great deal of confidence in the estimated domestic tax impacts. Taken together, the empirical results have the important implication that a tax change which makes domestic investment more attractive will significantly reduce foreign investment. Furthermore, they are supportive of the theory developed in Section II, with respect to the impact of a change in the tax rate applied to all corporate income.

While the tax rate on domestic income, t_{us}, differs from the U.S. tax rate on foreign source income, t (for example, foreign subsidiaries are not allowed to use accelerated depreciation and do not receive the investment tax credit), annual fluctuations in the two series, which result largely from the inflation-induced mismeasurement of taxable profits, are undoubtedly highly correlated. The fact that the r and rt_{us} coefficients are virtually identical in absolute value would, thus, seem to be very strong evidence that t does not affect foreign investment. As noted above, a specification including a separate t_{us} variable serves to reinforce our conclusion. The weight of the evidence, therefore, strongly supports the basic proposition that even an apparently non-discriminatory tax change is far from neutral in its effects on the domestic-foreign investment decision.

These results can be placed in perspective by reference to the

Feldstein conclusions. His estimated coefficient of r_n's impact on domestic investment as a fraction of GNP for the 1954-1978 period is .459.[21] When his equation was re-run for the 1965-1979 period, incorporating the major revisions to the net domestic investment figures performed in early 1981, the coefficient was reduced to .3442, with a standard error of .072. Thus, a change in tax policy affecting domestic investment has an opposing effect on foreign investment (by retained earnings) approximately twenty percent as large. How the analysis of domestic policy changes might be affected by this factor will be considered later, but first we turn to the estimation of tax effects on "immature" foreign operations, i.e., those not generating sufficient earnings to finance their investments.

IV. Domestic Taxes and "New" Direct Investment

Compared to reinvested earnings, the explanation of capital transfers to foreign affiliates presents serious difficulties of both a conceptual and an empirical nature. One obvious problem is the complexity and ambiguity of the possible tax effects discussed above. The unavailability of tax data also requires unattractive compromises. Furthermore, it is unclear whether the return on the existing stock of U.S. capital abroad has much relevance to firms which are primarily involved in the beginning phases of new investments. Taken together, these factors are not encouraging to empirical work, so it is not surprising that the results are not as significant as those in the case of reinvestment.

The most obvious problems encountered in estimating the tax effects included in equation (6) is the lack of reliable data on the effective foreign corporate tax rate t^*, the foreign withholding rate t_w^*, and the effective

U.S. tax rate on foreign-source income t. While one could construct average effective tax rates from tax return information, only the rates on repatriated earnings are reported and there is little reason to believe such information is representative. Consequently, instead of estimating the appropriate equation (6), we are forced to use an equation like (11):

$$\frac{I_T^*}{Y} = \alpha + \beta_1 r_n + \beta_2 r^*(1 - t^*) + \beta_3 t_{us} r^*(1 - t^*) \qquad (11)$$

The estimates produced by this equation could be meaningful if two conditions are met. First, if, as argued above, t_{us}, the effective U.S. tax rate on domestic income, is highly correlated through time with the effective U.S. tax rate on foreign source income, t, it can be used as a proxy for unobservable t as shown. Also, if variations through time in $r^*(1 - t^*)$ primarily result from variations in r^*, equation (11) may provide an unbiased estimate of the effect of domestic taxes, though, of course, no information about the effect of t^*.

Unfortunately, all of these problems appear to cause the noise in the regression to overwhelm the signal, as shown by the result (12).

$$\frac{I_T^*}{Y} = \underset{(.001439)}{.003444} + \underset{(.0444)}{.0178 r_n} + \underset{(.1011)}{.0254 r^*(1-t^*)} - \underset{(.1399)}{.0536 t_{us} r^*(1-t^*)} - \underset{(.00192)}{.000424\ D74} \qquad (12)$$

$$\bar{R}^2 = .532$$
$$DW = 1.83$$
$$SER = .000765$$

While the equation implies the expected positive response to the foreign rate of return and negative response to the tax parameter, the estimated coefficients are so insignificant as to be nearly meaningless. The instrumental variables

estimation procedure (equation (13)) produces the anticipated sign for the r_n coefficient as well, the coefficients are again so imprecisely estimated as not to be usefull for analysis.

$$\frac{I_T^*}{Y} = \underset{(.004068)}{.006066} - \underset{(.1406)}{.0752 r_n} + \underset{(.3312)}{.2456 r^*(1-t^*)} - \underset{(.4636)}{.3625 t_{us} r^*(1-t^*)} - \underset{(.00597)}{.00417\ D74} \quad (13)$$

$$\bar{R}^2 = .302$$
$$DW = 1.85$$
$$SER = .000935$$

Thus, we must conclude that based on the available information, one can say very little about the domestic tax effects on the foreign investment of firms with relatively new operations abroad.

V. Further Confirmation of the Results

One could legitimately argue that a model describing foreign investment as a function of current alternative rates of return neglects important components of the anticipated return to investments made today. Similar concerns with respect to domestic investment have led to increased use of models based on Tobin's "q" theory of investment. By relating investment to the ratio ("q") of the stock market valuation of existing assets to the replacement costs of those assets, this theory incorporates anticipated future rate-of-return changes which are reflected in current market values.

This "forward-looking" approach to investment has a great deal to recommend it. Unfortunately, no direct application to foreign investment is possible, since the market does not provide a separate valuation of domestic and foreign assets owned by a U.S. multinational firm. Rather, we have available a

variety of estimates of "q" which are largely, but not, of course, totally, representative of domestic capital and no estimate of the corresponding "q*." It is worth noting that domestic investment models of the "q" type are subject to the criticism that the desirability of domestic and foreign investment are confounded in the "q" measure.

In order to confirm our results from Section III that the increased attractiveness of domestic investment tends to reduce foreign investment, we ignore the problem and estimate a model in which $\frac{I^*_{re}}{Y}$ is a function of only "q" and a variable removing 1974 from consideration, as above. Using the "q" measure reported in Summers (1981) produces equation (14).

$$\frac{I^*_{re}}{Y} = \underset{(.001107)}{.007509} - \underset{(.001054)}{.003770}\ q + \underset{(.0009714)}{.0009867}\ D74 \qquad (14)$$

$\overline{R^2}$ = .5234
DW = 1.78
SER = .0009120
Interval: 1965-1978

While this model does not produce the precise explanation of foreign investment we obtained with the rate of returns equations, the "q" coefficient is highly significant and of the expected negative sign, and the $\overline{R^2}$ is similar to the values given in similar domestic investment equations. Summers also presents data which allow us to construct a tax-adjusted value q', which takes into account the effects of accelerated depreciation and the investment tax credit on investment incentives. Reestimation using q' produces:

$$\frac{I^*_{re}}{Y} = \underset{(.000679)}{.005853} - \underset{(.001319)}{.004608}\ q' + \underset{(.000983)}{.001002}\ D74 \qquad (15)$$

$$\bar{R}^2 = .5114$$
$$DW = 1.74$$
$$SER = .0009232$$

That is, the tax-adjusted "q" provides a slightly worse explanation. More worrisome is the fact that the residual for 1973 is so large as to account for over seventy percent of the total residual variance. It is obvious from the data that our exclusion of any information on the attractiveness of investment abroad has prevented these equations from explaining the large investment increase in 1973, which $r^*(1 - t^*)$ was able to explain in the Section III regressions. Since an outlier like 1973 can so drastically affect the results, equations (14) and (15) were re-run excluding 1973 information by use of a second dummy variable.

$$\frac{I^*_{re}}{Y} = \underset{(.000578)}{.007323} - \underset{(.000550)}{.003795}\ q + \underset{(.000495)}{.002732}\ D73 - \underset{(.000508)}{.001918}\ D74 \qquad (16)$$

$$\bar{R}^2 = .8704$$
$$D.W. = 2.38$$
$$SER = .0004755$$

$$\frac{I^*_{re}}{Y} = \underset{(.000335)}{.005696} - \underset{(.000649)}{.004733}\ q' + \underset{(.000473)}{.002816}\ D73 - \underset{(.000485)}{.001198}\ D74 \qquad (17)$$

$$\bar{R}^2 = .8818$$
$$D.W. = 2.53$$
$$SER = .0004542$$

This time, the tax-adjusted variable performs slightly better. Otherwise, the

coefficients of the "q" variables are virtually identical to the previous set. Clearly, the significant results were not an artifact of the one outlier.

Using this very different model of investment has tended to confirm our previous conclusions: that the attractiveness of domestic investment has a significant negative impact on the level of foreign investment. The results regarding domestic tax effects are not nearly so strong as in the previous model, but Summers found the results on domestic investment to be mixed as well. Summer's parameter estimates were unstable, but our coefficients are between about ten percent and fifty percent as large in absolute value as his estimated effects on domestic investment (and, of course, the opposite sign). In conclusion, the "q" model of investment, despite its obvious shortcoming of allowing no measurement of a "q" for investment abroad, has added evidence in favor of our previous results.

IV. Implications and Conclusions

The evidence presented in this paper points to U.S. multinational firms being strongly influenced in their decisions to reinvest earnings abroad by the after-tax rate of return abroad compared to that available in the U.S. With reinvestment of earnings now being the predominant form of U.S. foreign direct investment and with foreign direct investment representing a sizable part of the total investment of U.S. firms, the impact on the relative return to foreign investment should, it would seem, be an important factor in evaluating proposed tax changes.

In particular, the theoretical model argues that changes in the tax treatment of corporate earnings, even when these changes apply to both domestic and foreign source income, can have effects on the incentive to invest abroad

versus at home. This surprising result follows because the tax on foreign source income is deferred until income is repatriated. Thus the tax is best thought of as a tax on dividends and, as such, can be shown to have no effect on the foreign subsidiary's optimal reinvestment decision. Changes in the tax treatment of domestic income, on the other hand, do change the relative attractiveness of investing at home, and so, can affect foreign investment if there is substitutability. Since most provisions of the U.S. tax law apply to income wherever earned, tax policy changes often appear to affect foreign and domestic investment incentives similarly, but, according to this theory, can be far from neutral.

The empirical evidence supports the conclusions of the model and indicates that domestic tax policy has powerful effects on decisions to invest abroad at the expense, in the aggregate, of investment at home. We estimate that an effective tax rate change which would increase domestic investment by one dollar would, at the same time, cut U.S. investment abroad by at least twenty cents (taking into account only the estimated impact on the reinvestment decision).

How this conclusion might influence the support for investment incentives clearly depends on the reasons that increased capital formation is favored. For instance, if concern over labor productivity or the "overall strength of the economy" make increasing the level of domestic productive assets one's goal, the considerations raised here would be of little importance. Of course, one who did not accept the evidence that total investment responds to tax policy might still favor the shift toward domestic investment implied by our estimated tax effects.

On the other hand, many view increased capital formation as a way to promote "international competitiveness," and might argue that operating abroad tends to promote exports, so that any decline in foreign investment would be counterproductive. This position is, of course, controversial, as some evidence points to foreign investment substituting for exports.

Those who support investment incentives on economic welfare grounds might find their case altered by the recognition of international investment effects. Since the welfare argument centers on the discouragement to investment produced by the tax wedge between private and social returns, the finding that the total investment effect is exaggerated by at least one-fourth by looking at only domestic investment might be thought to weaken the argument. However, such a conclusion neglects the issue of sectoral misallocation of capital. As has been noted by P. Musgrave (1969), the foreign tax credit produces an unfavorable allocation of capital, from the standpoint of "national welfare," because the nation receives only the after-foreign-tax return to capital invested abroad while receiving the gross return to capital invested at home. The multinational firm, responding to after-tax rates of return, is encouraged to invest abroad even when the national return at home exceeds that abroad. That argument is much strengthened by our conclusion that the firm's reinvestment decision is based on a comparison of the after-foreign-tax foreign return with the after-tax domestic return. Any policy, such as a tax cut, which results in domestic investment at the expense of foreign investment, by helping correct this misallocation of capital, produces a welfare gain in addition to the gain from any increase in total investment. Furthermore, one might be concerned about worldwide economic welfare. As we have shown, the effective tax rate on foreign

source income, as viewed from the perspective of a reinvesting subsidiary, is given by the host country tax alone. Thus, if the home country effective tax rate is brought closer to the host tax rate, worldwide economic efficiency gains should follow, as capital is reallocated toward its most productive use.

The results reported here, while confirming the importance of domestic tax effects on international investment, are only a beginning. For example, the investment in the U.S. by foreign firms has been completely ignored. While that investment is also growing rapidly in importance, the specification of tax incentives provided by each foreign country's treatment of foreign source income and the availability of data present more difficult problems than those confronted in this paper.

Footnotes

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[1]See Feldstein (forthcoming). This work has generated much controversy. See, for example, Fair (1981).

[2]Foreign direct investment, as distinguished from portfolio investment, takes place in a foreign operation over which the U.S. parent firm has control.

[3]For several reasons, foreign direct investment figures cannot be thought of as the precise equivalent of the domestic investment numbers. One difference is that the net domestic investment figures cited by Feldstein are obtained by subtracting from gross investment a depreciation figure adjusted for such factors as inflation to approximate as closely as possible economic depreciation. Given the different currencies in which some foreign subsidiaries' books are kept as well as the variety of depreciation practices prevailing in different areas, the Commerce Department makes no attempt to similarly adjust the book depreciation figures used in computing foreign investment.

In addition, foreign direct investment is most accurately thought of as a financial transaction: an implicit or explicit supply of parent firm funds to a foreign affiliate. To the extent that additional funds are borrowed abroad or supplied by foreign "minority" owners, our figures understate the

investment undertaken abroad under the control of U.S. firms. On the other hand, foreign direct investment does not necessarily mean purchase of real assets and, so, may overstate the foreign equivalent of domestic net fixed investment. However, the tendency of foreign financing to be short-term (Robbins and Stobaugh (1973, Ch. 4)) and the incentive to minimize exchange risk by financing current assets, but not fixed assets, through foreign short-term borrowing (Robbins and Stobaugh (1972)), both imply that foreign direct investment may be an adequate indicator of net fixed investment abroad.

The estimates of Kopits (1980) provide dramatic confirmation of this theory. The elasticity of the stock of foreign direct investment with respect to total subsidiary assets is almost identically one (1.014), while the corresponding derivative (.351) is very close to the typical share of plant and equipment in total subsidiary assets (.40). Kopits' estimated $\frac{\Delta \text{ direct investment}}{\Delta \text{ total subsidiary assets}}$ of .351 (estimated with a 1966 cross section of countries) is virtually identical to the value, .36, of $\frac{\Delta \text{ fixed investment in subsidiaries}}{\Delta \text{ total subsidiary assets}}$ implied by the time series (1958-65) estimates of Robbins and Stobaugh (1972). Thus, even though data limitations force us to follow the usual practice of using foreign direct investment figures as if they represented net fixed investment (See Goldsbrough (1979)), there is ample evidence to support this procedure.

[4]A careful reading of Goldsbrough reveals a precise treatment of the "net versus gross" problem in the remainder of the paper.

[5]A survey of the relevant empirical work can be found in Hufbauer (1975). Frisch (1981) provides some evidence that rates of return influence the distribution of investment across foreign countries, but whether relative rates of

return influence the total amount of foreign investment is an open question.

[6]The existence of differential risk patterns across countries, providing opportunities for diversification which individuals may not be able to pursue except through the operations of multinational firms, casts doubt on the stronger proposition that the firm's desired capital stock in each region would be at the level required to equalize marginal returns. Recognition of the risk factor suggests its inclusion in the model of the foreign investment decision. However, risk serves to complicate the analysis, without holding potential for measurement in the present context, and so, it is ignored here. As will be clear from Section III, this amounts to assuming that the riskiness of anticipated returns on foreign investment as a whole is unrelated to the mean return over time.

[7]The author owes this observation to Stewart Myers.

[8]For discussions of these aspects of foreign investment, see Caves (1971) and Vernon (1977, Ch. 3 and 4).

[9]For simplicity, we will consider the two-country case here.

[10]It should be noted that, while the statutory tax rate on domestic income equals that on foreign-source income, some provisions of the law, such as allowable depreciation, do differ. Therefore t should not necessarily be thought of as the effective tax rate applied to domestic income, although the two rates might be highly correlated over time.

[11]Horst explicitly examines the dependence of p on tax parameters in his

1977 paper, but is forced to utilize an observed value to weight tax rates in his calculations.

[12]A firm with an excess of foreign tax credits faces alternatives of $(1 - t_w^*)(1 + r_n)$ versus $(1 - t_w^*)(1 + r^*(1 - t^*))$.

[13]The one exception to this fairly general proposition is the case of a subsidiary which, according to the rates-of-return test just described, would repartriate earnings but which also anticipates more profitable opportunities in the "near future." Just as it is not optimal for a subsidiary to repatriate earnings and receive capital transfers simultaneously, an optimal strategy would not involve repatriating earnings and receiving capital transfers very soon thereafter. Thus, a firm might be willing to reinvest abroad over the short run even when the investment does not produce an acceptable one-period after-foreign income-tax rate of return when compared to the opportunity cost. That is, the conclusion is even more at odds with the conventional wisdom, which sets higher standards for reinvestment, than is our basic result. Since this lock-in effect is the product of a very special pattern of expected future returns and of the time period over which r^* is measured, it is not very interesting conceptually and is ignored in the remaining analysis.

[14]A notable exception is the work of Kopits (1972, 1980), who focuses on the repatriation decision, arguing that higher deferrable U.S. taxes on foreign source income increase the "cost of repatriation" and, hence, encourage reinvestment.

[15]These results are derived more explicitly in Hartman (1981).

[16]While $\frac{I^*_{re}}{Y}$ is not an obvious choice as a dependent variable, the analysis was repeated for deflated I^*_{re} and for I^*_{re} as a fraction of the direct investment stock, with no important effect on the results.

[17]$r^*(1 - t^*)$ is "reinvested earnings" (I^*_{re}) plus "income from interest, dividends, and earnings of unincorporated affiliates" (both from "Balance of Payments" tables in U.S. Department of Commerce, Bureau of Economic Analysis, Survey of Current Business, selected issues), divided by "direct investment position" (from Survey of Current Business, August, 1980, Table 11, and previous issues). It is adjusted for anticipated inflation by subtracting the new-issue long-term corporate bond rate, courtesy of Data Resources, Inc. The results are similar with other estimates of expected inflation.

[18]D74 is a dummy variable for 1974 to represent both "speculative activity" and, more importantly, a $7 billion plus-fall in the direct investment stock caused by the acquisition, by Middle Eastern countries, of oil company assets (see Goldsbrough (1979)).

[19]At the expense of comparability with the Feldstein results for domestic investment, the basis model was also estimated in logs with $\ln(r)$ and $\ln(1-t)$ having separate coefficients. The coefficients did not differ significantly and the coefficient of $\ln(1-t)$ was statistically significant, at the .05 level.

[20]All of these data were taken from International Financial Statistics published by the International Monetary Fund, various issues.

[21]Feldstein lags r_n in his equation. Since foreign direct investment is

measured as the financial transaction, rather than the resulting real capital investment, the use of lagged values seems less appropriate here. Nevertheless, when equation (8) was run with lagged returns, the r_n coefficient was a very similar .0608 and still statistically significant.

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