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TAX POLICY AND FOREIGN DIRECT INVESTMENT IN THE UNITED STATES

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Abstract

This paper provides some evidence on one aspect of international investment, the impacts of domestic tax policy on foreign direct investment in the United States. The possible impacts, which are discussed in the first section, are complex. For example, an investment incentive which applies to both domestic and foreign investors would be expected to result in an increased foreign investment in the U.S. On the other hand, a savings incentive, which has no direct impact on foreign investors, would nevertheless tend to increase domestic investors' demand for capital assets, thereby driving down the returns expected by foreign investors and possibly resulting in significant decreases in foreign investment. Because of measurement difficulties, we are only partly successful in obtaining precise estimates of this sort of impact. However, the results we do obtain suggest that foreign investment in the U.S. is strongly affected, in the manner predicted, by changes in domestic tax policy.

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Tax Policy and Foreign Direct Investment in the United States

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I. Introduction.

Tax policy toward international investment is an issue which has occupied the attention of U.S. policymakers for many years. Until recently, direct investment involving the United States was characterized by U.S. multinational firms investing abroad. Thus, it is not surprising that, at the same time that so much attention was being paid to U.S. tax policy toward foreign-source income, very little attention was given to the impacts of domestic tax policy on investment by foreigners in the United States. More recently, however, foreign firms' investment in the United States has come to play a much more important role in total U.S. capital formation. For instance, in 1979, net direct investment by foreigners in their U.S. affiliates reached 11.9 billion dollars, or approximately fifteen percent of total net plant and equipment expenditures in the United States.[1]

One recent paper (Goulder, Shoven, and Whalley (1982)) has illustrated the potential importance of foreign direct investment inflows for the outcomes of tax policy. That paper demonstrated, using simulation analysis, that if foreign investment is highly elastic, its impacts could come to dominate other effects of tax changes on economic welfare. The reason is that the presence of capital income taxes implies that the U.S. government shares in any returns to capital generated by increases in foreigners' investments in the U.S.

While this theoretical work implies that the elasticity of international capital flows with respect to rates of return is a very important parameter in determining tax effects, almost no information is available concerning

this crucial elasticity. In a previous empirical paper (Hartman (1981b)) it was shown that domestic investment incentives, in addition to increasing total investment by U.S. firms, tend to attract investment by these investors which otherwise would have gone abroad. However, there has, as of yet, been no empirical work on the responsiveness of foreigners' investments in the United States to changes in domestic tax parameters.

Obtaining some evidence on the magnitude of this response is especially important at this time. Current tax policy in the United States appears to be guided in a very important way by concerns with the rate of capital formation. Thus, the 1981 tax reform was designed to put major emphasis on increasing both the rate of savings and the rate of investment. In policy discussions, and in fact in much of the economics literature on taxes and capital formation, savings incentives and investment incentives are treated as alternative methods of achieving the same result.[2]

Once the presence of international capital movements is recognized, however, savings incentives and investment incentives can assume very different roles. Domestic investment incentives, for example, can result in large increases in domestic investment by foreigners and by domestic firms, at the expense of investment abroad, even if major increases in savings do not occur. On the other hand, savings incentives could result in increased investment both at home and abroad, thus causing domestic investment to increase by less than the increase in savings.

This paper provides some evidence on one aspect of international investment, the impacts of domestic tax policy on foreign direct investment in the United States. The possible impacts, which are discussed in the first sec-

tion, are complex. For example, an investment incentive which applies to both domestic and foreign investors would be expected to result in an increased foreign investment in the U.S. On the other hand, a savings incentive, which has no direct impact on foreign investors, would nevertheless tend to increase domestic investors' demand for capital assets, thereby driving down the returns expected by foreign investors and possibly resulting in significant decreases in foreign investment. Because of measurement difficulties, we must be modest about the precision of our estimates of these impacts. However, the results we do obtain suggest that foreign investment in the U.S. is strongly affected, in the manner predicted, by changes in domestic tax policy.

II. Domestic Tax Effects on Foreign Investment Inflows

Our analysis of the effects of domestic tax policy on foreign investment will involve testing the traditional proposition that foreign investors base their decisions on where to make capital investments on the real after-tax rates of return available on alternative investments. In a simplified aggregate model, we should use after-tax rates of return on foreigners' investments abroad and in the U.S. to explain the level of foreign investment in the United States.[3] The complexity of each country's tax system, and, in particular, the complexity of the interaction among tax systems, make this comparison far from straightforward.

Because of the empirical orientation of this paper, we intend to sketch only briefly the theory which underlies the response of foreign investors to domestic taxes, with a goal of empirical implementation in an aggregate time series model. Those interested in a more rigorous development of these ideas should consult Hartman (1981a). In taxing the income earned in the U.S. by

foreign investors, the U.S. government has the first opportunity and imposes its corporate taxes on the firms' returns just as it would on a domestic investor's income. When the income from these investments is actually repatriated as a dividend to the foreign investor, an additional tax, called a "withholding tax" is also typically collected. Then, the home government of the investor gets an opportunity to tax the proceeds. In order to avoid the double taxation which otherwise would be implied by the collection of the investor's home country tax, the home nations typically either exclude foreign source income from taxation completely or give the firm a credit for the U.S. taxes paid.

The effective rate of taxation, to which a foreign investor should respond in making its U.S. investment decisions, is, therefore, a complicated concept. In particular, the question of how a firm should view the deferred taxes (the U.S. withholding tax as well as any residual home country tax) has often been resolved in empirical studies by simply averaging the applicable tax rates, with weights depending on the fraction of earnings ordinarily repatriated.

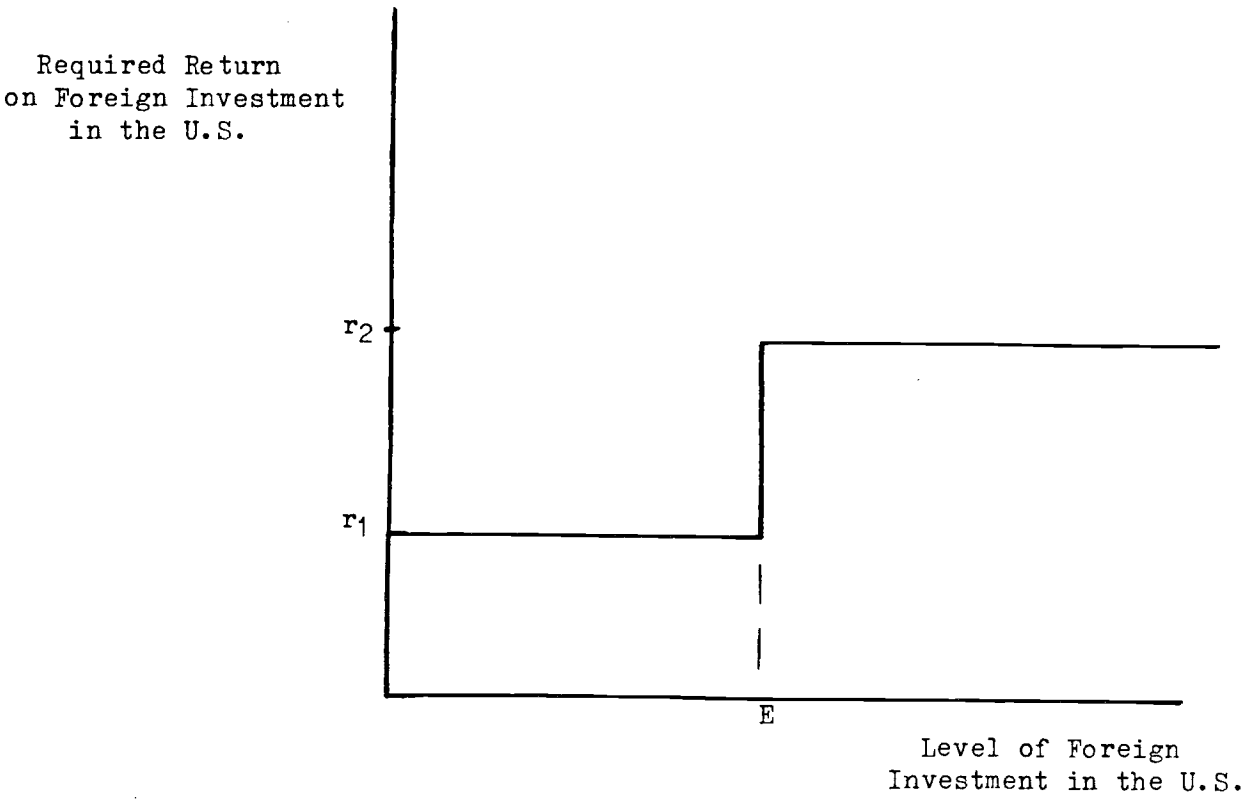
In the recent theoretical paper referred to above, we noted that the repatriation of earnings to the foreign parent firm, while the foreign parent firm is at the same time investing further in the U.S. by an explicit transfer of funds, results in no change in the net financial position of either the parent firm or the U.S. subsidiary, except that any taxes which are levied on repatriated earnings are paid currently rather than being deferred into the future. Thus, it is optimal for the U.S subsidiary to obtain explicit transfers of funds from the parent only if its planned investment in the U.S. is sufficient to totally exhaust its current U.S. earnings. That is, one would not expect to observe foreign parent firms making new investments in the U.S. while

at the same time receiving dividend payments from their U.S. affiliates. Thus, the weighted average rule for calculating effective tax rates would appear to have a fatal shortcoming. Rather, we can depict the required return on investment in the U.S. by foreign firms as shown in Figure 1, where E represents the earnings available within the U.S. subsidiary for investment, and r_2 exceeds r_1 for reasons to which we will now turn.

Suppose, first, that the firm is in the position of making a marginal investment which would involve retaining earnings, rather than repatriating them to the foreign parent. The general nature of the effective tax rate which influences this decision can be most simply investigated by recognizing that the present value of the liability coming from deferrable taxes is not affected by the decision to defer them. That is, the present values of the taxes due on one dollar, if repatriated today, or on one dollar plus all of the earnings that that dollar generates in the intervening period, if repatriation occurs later, are equal. The reason that deferral provides an advantage is that the further earnings generated from a reinvested dollar do not accrue any additional real tax liability as a result of withholding taxes and host country income taxes. Thus, in deciding whether to reinvest earnings or repatriate earnings, an optimizing firm should think of the effective tax rate on additional U.S. capital income as arising only from the standard U.S. income tax. So, the appropriate net-of-tax return on U.S. investment, to be compared to the net-of-tax return available abroad, should be calculated ignoring withholding taxes imposed by the U.S. and any additional tax liability imposed on dividend payments by the foreign government.[4]

On the other hand, the firm transferring funds to a U.S. subsidiary

Figure 1


Required Return
on Foreign Investment
in the U.S.
r_2
r_1
E
Level of Foreign
Investment in the U.S.

does not have an accumulated foreign tax liability on those funds, and should consider the fact that when it repatriates the resulting earnings it will face additional withholding and foreign income taxes. The calculation of the after-tax rate of return in this case is highly complex, depending upon the planned timing of future repatriations. For example, if repatriation is expected to occur at a very far distant point, the importance of that future tax liability diminishes. Obviously, the future plans of the firm determine the value of r_2 in Figure 1. Unfortunately, even setting the difficult conceptual issues aside, problems of measurement will prevent us from constructing an effective withholding tax rate and foreign income tax rate to be applied to the aggregate of foreign investment in the U.S. At the same time, it does not seem too unreasonable to assume, given the aggregate nature of our analysis, that the average values of these tax rates might be relatively constant over time. If so, ignoring these taxes in the empirical analysis will not present any problems.

The reason for this very striking difference in the incentive effects of taxes due upon repatriation in these two cases is intuitive. Since the deferred taxes act more as levies on transfers of funds out of the United States, rather than as taxes on the earnings of capital, they would be expected to have very different effects depending on whether the funds are already in the U.S. or whether a firm is contemplating transferring funds to the U.S. When the funds are already in the hands of the domestic subsidiary, a tax on transferring funds back to the parent firm becomes an unavoidable cost, and does not influence the firm's optimal investment decision. On the other hand, the same tax is avoidable if the funds are not already located in the U.S., and, there-

fore, serves to some extent as an investment disincentive.

As noted above, we will be forced to ignore these deferrable taxes in the empirical work in any event. A good argument can be made that this should cause no difficulty; but it is still important to consider investment of retained earnings separately from investment of new funds transferred from the parent, since these marginal investment decisions are conceptually distinct.

One other conceptual distinction is particularly important in the case of the United States. Foreign investment in the U.S. can take the form either of new capital expenditures by foreign investors or of purchase of existing assets. Both of these forms of investment appear to be very important in the U.S. case and, reliable data do not exist to separate the two forms. It is nevertheless important to maintain a logical distinction between these two forms of investment is in considering how to measure real after-tax rates of return on assets in the United States. For firms expanding the operations of existing subsidiaries by making new capital investments, the current rate of return to foreign-owned assets in the United States would be expected to provide a better measure of the anticipated rate of return to new assets than some rate of return measured for the economy as a whole. Specifically, the foreign firm might possess some advantage in its product, technology, or management which has allowed it to earn a current rate of return higher than that generally prevailing in the economy. This higher rate of return will be an inducement to further investment. Conversely, the measured rate of return most applicable to a firm which is buying existing assets would seem to be the overall rate of return to assets in the U.S. In fact, in the empirical analysis to follow, both a general net real rate of return and a foreign-investor-specific rate of return

will be allowed to influence foreign investment.

More importantly, when a firm is considering purchase of existing assets, its decisions will be influenced by the valuation placed on those existing assets by U.S. domestic investors. As a result, a change in domestic tax policy, such as an inducement to savings, which changes the attractiveness of assets without necessarily changing the current measured net real rate of return to the capital can influence foreign investors' decisions.

III. The Evidence.

The theory developed in the proceeding section leads to an estimating equation such as equation (1).

$$(1) \qquad \ln\left(\frac{I_{re}}{Y}\right) = a_0 + a_1 \ln(r^*(1-t^*)) + a_2 \ln(r(1-t^*)) + a_3 \ln\left(\frac{(1-t')}{(1-t^*)}\right)$$

As we noted in Section II, the marginal investment decisions of firms which are reinvesting earnings at the margin could be affected differently (by taxes) from the marginal investment decisions being made by firms which are transferring funds from abroad at the margin. Thus, equation (1) will have coefficients which are particular to retained earnings investment (I_{re}). An equation with the same variables will be used to explain "transfer" investment (I_t). In our estimation, retained earnings investment will be taken as a fraction of U.S. GNP. This is done to allow for better comparison with previous results on domestic investment, although the alternative of using investment deflated by the GNP deflator produces virtually identical (though marginally more significant) results.

In this equation, $r^*(1-t^*)$ is the after-tax rate of return actually

realized by foreign investors in the U.S. As pointed out above, this rate of return is most appropriate for firms which are considering expansion of current operations (which may or may not be earning rates of return comparable to those in the rest of the U.S. economy). Since an increase in the rate of return earned in the U.S. tends to increase investment, we would expect a_1 to be positive.

The second term in equation (1), $r(1-t^*)$ is the overall gross rate of return on capital in the United States, reduced by the U.S. tax rate paid on current income by a foreign investor. This variable measures a similar concept to that measured by $r^*(1-t^*)$, except that it may be more applicable to firms which are acquiring existing assets on which they do not expect to earn extraordinary returns based on production of differentiated products or possession of superior technology. We would, of course, anticipate that the coefficient of this alternative measure of the U.S. rate of return, a_2, would also take on a positive sign.

The final term in equation (1), $\frac{(1-t)}{(1-t^*)}$, measures the tax rate on U.S. capital owned by foreigners (t^*), relative to the tax rate on U.S. capital owned by U.S. investors, (t), or equivalently, the net-of-tax rate of return received by domestic investors relative to that received by foreigners, on the same investment. t is appropriately measured to include all taxes on capital; in particular, it includes taxes paid by the final recipients of the capital income. This ratio, therefore, measures the attractiveness of a U.S. investment to a domestic investor, relative to its attractiveness to a foreign investor. By including this term, we hope to capture the valuation effect discussed in the previous section: the tax change which causes an investment to become more

attractive to a domestic investor but causes no change in the effective tax rate faced by a foreign investor tends, in the short run, to increase the foreigners' cost of acquiring that investment and, thus, tends to reduce foreign investment.[5] Therefore, we would expect a_3 to be negative.

In addition to the limitations of our analysis caused by lack of data and discussed in the previous section, there is one further notable omission from equation (1). That is, we have no measure of the alternative rate of return available abroad to those contemplating foreign investment in the U.S. While one could construct a measure of the after-tax real rate of return available in a particular country to a particular investor who is resident of a particular second country, the complexity and uncertainty involved in attempting to construct an aggregate (marginal) measure seems unlikely to produce any useable results. Rather than make any attempt in this direction, we have chosen to accept the left-out variable problem. However, it seems unlikely that even the ideal aggregate rate of return would show sufficient variability over time to be very important if it were measurable. Furthermore, as long as the variations in the alternative rate of return are not highly correlated with variations in those factors included in equation (1), no bias will be produced in the estimates of the coefficients of equation (1) by having left it out. If anything, one would anticipate that real after-tax rates of return to capital across countries would be positively correlated. Therefore, since we would expect the coefficient of the alternative rate of return variable to be negative, any bias produced in the coefficients a_1 and a_2 should be in the direction of making them less significant. In addition, we will conduct some further experiments, estimating directly the tax effects embodied in equation

(1). This should provide useful information, since the variations in U.S. tax rates seem even less likely to be correlated with events occurring abroad.

A. Retained Earnings Results

Investment of retained earnings is highly important, accounting for well over forty percent of total foreign investment over the period of observation. We should anticipate getting our best results for the retained earnings equation, since the measured rate of return will best reflect the experience of "mature" subsidiaries which are likely to use reinvested earnings as their marginal source of capital.[6]

Estimating equation (1) using annual time series data for the 15 year period (1965-1979), produces the result given by equation (2).[7]

$$(2)\quad \ln\left(\frac{I_{re}}{Y}\right) = \underset{(.679)}{-6.573} + \underset{(.118)}{1.436}\ \ln(r^*(1-t^*)) + \underset{(.376)}{1.232}\ \ln(r(1-t^*)) - \underset{(.415)}{1.720}\ \ln\left(\frac{(1-t')}{(1-t^*)}\right)$$

(standard errors in parentheses)

$\overline{R}^2 = .940$
DW = 1.67
SER = .096

This result demonstrates that the very simple model of the foreign investment decision we have presented above provides for a fairly good explanation of variations in retained earnings investment. In addition, despite the measurement problems discussed above, the three factors we have isolated as being important in our theoretical discussion are all shown by equation (2) to be highly significant explainers of retained earnings investment.

In particular, each of the two real after tax rate of return variables, the measure specific to foreign investors and the measure for the U.S. economy as a whole, contributes significantly. This result seems to indicate the importance of both "traditional foreign investment" (the exploitation by foreign firms of firm-specific advantages in production) and what might be called "large portfolio investment" (the purchase of sufficiently large shares of existing operations to be classified as foreign direct investment, but without anticipation of extraordinary rates of return) in the recent U.S. experience. Alternatively, it could simply be the case that both rates of return contain some information on a given investment's potential.

Furthermore, the significance of the relative tax term indicates that a decline in the tax rate faced by an individual U. S. saver, relative to the tax rate faced by a foreign investor tends to cause a decrease in the level of foreign investment. Thus, all of our ex ante hypotheses concerning the impact of tax policy on foreign direct investment are strongly confirmed by the results just presented.

As mentioned in footnote 5, the potential for correlation of measurement errors in $r^*(1-t^*)$ and I_{re} cannot be dismissed. Instrumental variables estimation, the usual prescription for such a problem, strongly confirms the substantive conclusions of the previous result. Despite the fact that $r^*(1-t^*)$ was instrumented by its one-year lagged value, and that the correlation between the return and its lagged value have a correlation of only .78, the result is very similar to that given by equation (2):

$$(3)\quad \ln\left(\frac{I_{re}}{Y}\right) = \underset{(.768)}{-6.864} + \underset{(.178)}{1.589}\ \ln(r^*(\hat{1-t^*})) + \underset{(.479)}{1.548}\ \ln(r(1-t^*)) - \underset{(.509)}{2.020}\ \ln\left(\frac{(1-t')}{(1-t^*)}\right)$$

$$\overline{R2} = .931$$
$$DW = 1.84$$
$$SER = .103$$

To further explore the magnitude of the errors-in-variables problem, an equation was estimated using the reinvestment ratio, (I_{re} divided by foreign investor's U.S. earnings (E)) as the dependent variable. Since it is the errors in earnings, which are incorporated in both I_{re} and $r^*(1-t^*)$, the behavior of an equation explaining $\frac{I_{re}}{E}$ should be unsatisfactory if the results shown above are purely the product of bias. However, the coefficients obtained are entirely consistent with those in equation (2).

$$(4)\quad \ln\left(\frac{I_{re}}{E}\right) = \underset{(.679)}{2.386} + \underset{(.087)}{.275}\ \ln(r^*(1-t^*)) + \underset{(.277)}{1.045}\ \ln(r(1-t^*)) - \underset{(.306)}{1.602}\ \ln\left(\frac{(1-t')}{(1-t^*)}\right)$$

$$\overline{R2} = .750$$
$$DW = 2.26$$
$$SER = .071$$

Since the impacts of U.S. taxes are the prime concern of this paper, it is useful to provide additional confirmation that it is really net of tax rates of return to which foreign investors are responding. This is done, as is shown in equation (5) by estimating separately, whenever possible, the effects of the various tax parameters.

$$(5)\quad \ln\left(\frac{I_{re}}{Y}\right) = \underset{(.894)}{-6.559} + \underset{(.149)}{1.434}\ \ln(r^*(1-t^*)) + \underset{(.407)}{1.230}\ \ln(r) - \underset{(.516)}{1.727}\ \ln(1-t') + \underset{(1.488)}{2.984}\ \ln(1-t^*)$$

$$\overline{R^2} = .934$$
$$DW = 1.67$$
$$SER = .102$$

It should again be noted that observations of $r^*(1-t^*)$ are obtained without any independent estimation of t^*. Thus, in order not to introduce error into this variable, we leave $r^*(1-t^*)$ intact. By contrast, r and t^* are estimated independently, so the gross rate of return to capital in the U.S. and the tax rate facing foreign investors in the U.S. are included separately to test specifically for the tax effects.

This equation strongly confirms that after-tax rates of return are the appropriate variable, with all of the coefficients in the equation (3) being significant. In addition, it should be noted that the coefficient of $\ln(1-t^*)$ is virtually identical to the coefficients which were implied by the original functional form. That is, the coefficient of $\ln(1-t^*)$ is nearly equal to the coefficient of $\ln(r)$ minus that of $\ln(1-t')$.[8]

With the estimated impacts of taxes on retained earnings investment therefore strongly confirmed, it remains to explore the empirical significance of these impacts for the level of foreign investment in the U.S. First, however, we turn to the estimation of the relationship between tax rates and the other half of foreign investment, that accomplished by means of funds transferred from abroad (I_t).

B. Results on Transfers from Abroad

As noted above, the theory dictates inclusion of a measure of the

additional foreign tax liability which would be due upon the date of repatriation of earnings from these investments. However, time series information required to construct such a variable is not available. In addition, it is plausible to believe that over our 15-year time period the average tax rate in the rest of the world did not change significantly. Thus, we proceed to estimate an equation of the form of equation (1) for investment accomplished by funds transfers. The result is given by equation (6).

$$(6)\quad \ln\left(\frac{I_t}{Y}\right) = \underset{(1.635)}{-8.535} + \underset{(.284)}{.552}\ \ln(r^*(1-t^*)) + \underset{(.905)}{1.674}\ \ln(r(1-t^*)) - \underset{(.998)}{2.329}\ \ln\left(\frac{(1-t')}{(1-t^*)}\right)$$

$$\bar{R}^2 = .286$$
$$DW = 1.92$$
$$SER = .590$$

It should be immediately noted that our model does not explain I_t nearly as well as it explains I_{re}. This should not be surprising, given the variety of motivations which could lie behind foreign investment in newer operations (those which are not yet generated sufficient funds to finance further investment). In particular, we can again appeal to the traditional factors used to explain foreign investment, such as differentiation in products, technology, and management, which, for newer investors, would not be well captured by any of the variables in our model. Despite these reservations, however, it should be noted that all three coefficients are significant at the .05 level in a one-tail test. Again, the notion that taxes affect foreign investment is confirmed. Furthermore, the pattern of coefficients, relative to those found in the case of I_{re} is just the one that would be anticipated. Namely, the coefficient of $\ln(r^*(1-t^*))$ is a good deal lower, reflecting the fact that existing foreign

investment does not provide as good a guide to the returns anticipated on "new investment." The $\ln(r(1-t^*))$ coefficient, by contrast, is larger than in the previous case, reflecting that "new investments" may be anticipated to yield an amount more closely related to the overall yield in the economy; this conclusion is reinforced by the fact that the $\ln\frac{(1-t)}{(1-t^*)}$ coefficient is larger in absolute value than that found in the previous case.

As in the previous case, we seek to confirm these conclusions by reestimating the equation with tax effects estimated separately. The results, shown in equation (7), do not add much confidence to the previous result.

$$(7)\quad \ln\left(\frac{I_t}{Y}\right) = \underset{(1.971)}{-10.185} + \underset{(.329)}{.808}\ln(r^*(1-t^*)) + \underset{(.898)}{1.989}\ln(r) - \underset{(1.138)}{1.480}\ln(1-t') + \underset{(3.282)}{.202}\ln(1-t^*)$$

$$\bar{R}^2 = .341$$
$$DW = 1.99$$
$$SER = .495$$

In particular, the coefficients of $\ln(1-t)$ and $\ln(1-t^*)$ are not significant in this case. Particularly at odds with our expectations the coefficient of $\ln(1-t^*)$, which would be anticipated to equal approximately the coefficient of $\ln(r)$ minus that of $\ln(1-t)$ or about 3.469. The failure of these tax variables to perform more significantly in the equation is better understood when it is recognized that the correlation between t and t^* equals .95. While this correlation was not sufficiently high to make the results unreliable in an equation which fit as well as the I_{re} equation (equation (2)), it is sufficiently high to destroy any confidence in separate coefficients estimated in an equation fitting no better than equation (7). While the coefficients of equation (7) do not add further confirmation of (6),

neither do they provide evidence which rejects the hypothesis that the functional forms should be as in equation (6). Thus, we would view equation (6) as confirming the theory we have advanced about the effects of taxes on foreign investment.

In general, the estimated effects of taxes on foreign investment, both that accomplished by reinvestment of earnings and that accomplished by explicit transfers of funds, are found to be quite strong. The results indicate that a change in U.S. tax policy which tends to diminish the tax rate faced by foreigners (for example, a decrease in foreign or state corporate income taxes), provides strong encouragement to increase foreign investment in the U.S. At the same time, a change in U.S. tax policy which increases the attractiveness of U.S. capital investment to domestic savers (for example, a decrease in the tax rate on interest or dividends received or on capital gains), tends to provide a strong discincentive to foreign investment, by raising the domestic valuation of domestic assets. The amount by which foreign investment would be expected to respond to specific changes in tax policy will be explored in the next section. First, further experiments, designed to rule out some possibilities that these results are spurious, will be described.

It has already been noted that making some crude attempts to adjust for mismeasurement in capital consumption allowances and inventory valuations which go into determining the reported value of $r^*(1-t^*)$ have virtually no effect on the results. Similarly, the use of instrumental variables estimations to overcome problems of measurement error in $r^*(1-t^*)$ do not alter the conclusion. Another matter of some concern in a simple time series analysis such as this is the possibility that our regression results are a product of

explaining variables having a strong trend by other strongly trending variables. Casual observation of values of the variables included in our regressions tends to discount this possibility. However, in order to be more certain of our results, all of the regressions (2) - (7) were rerun including first a linear trend and then a logarithmic trend. In no case were any of these trend variables significant and in no case did they alter in any way our basic conclusions.

Finally, several other events which occurred during this period might have been important to those contemplating foreign investment in the U.S. Not including those other variables introduces the possibility of bias in the coefficients which are of interest. So, several alternative specifications were tried in both the I_{re} and the I_t equations. In 1974, a Middle Eastern oil producing nation made a large investment in a U.S. firm, to acquire assets located in its country. This investment was originally recorded as a foreign direct investment in the United States, but was thereafter removed from the statistics. Since 1974 was by all accounts an unusual year in international economic affairs, the equations were all rerun including a dummy variable to remove the 1974 observation from consideration. This variable was clearly insignificant in all cases and did not produce any significant change in any other parameter. Also occurring during our period of observation were dislocations in international financial markets during the period of fixed exchange rates and in the change to floating exchange rates. Speculative flows of capital between nations in anticipation of parity changes could have shown up in the foreign investment figures. Thus, we have included in the model a variable suggested by Kohlhagen (1977) to reflect speculation in the capital market. Again, this variable did not achieve significance, and produced no important

changes in other coefficients. Thus, through all of these alterations to the basic model, the results have been shown to be highly robust.

III. The Impacts of Tax Changes.

We now turn to simulation experiments involving basic changes in the tax parameters t and t^*. First, t, the capital tax facing foreigners investing in the U.S. (federal corporate tax, state and local corporate tax, and state and local property tax) is reduced by ten percentage points to determine the impact on foreign investment. A ten percentage point decrease in t would, according to the Feldstein, Poterba, and Dicks-Mireaux figures used in this paper, amount to: a) a cut by about one third of the effective rate of federal corporate tax, b) approximately a complete removal of the state and local property tax, or c) about double the impact of removing state and local corporate taxes. Such a change would have, according to our model, increased reinvestment of earnings by affiliated subsidiaries by about .98 billion dollars in 1979, or just over one quarter. Similarly, explicit transfers of capital from abroad would have increased by about .95 billion dollars or about sixteen percent. It turns out, therefore, that a ten percentage point tax reduction, which translates into a decline in the total rate of tax collection on foreign source income of 20.9 percent produces, through all of the mechanisms we have described, an aggregate increase of about 20.39 percent in the annual total net direct investment undertaken by foreigners in the United States. Thus, one would expect to observe a slight decrease in the amount of U.S. taxes collected on foreign source income, if such a tax cut were implemented, everything else equal.

As an example of a tax cut which induces Americans to find capital investment more attractive, while foreigners see no similar incentive, suppose

that the tax on interest income was completely eliminated. This, according to Feldstein, Poterba, and Dicks-Mireaux, would amount to an eight percentage point cut in the total taxation of corporate capital income in the United States. According to our model, such a cut would produce approximately a 1.2 billion dollar decrease in investment through reinvested earnings, coupled with a decline of 3.13 billion dollars in capital directly transferred from abroad. These figures, it should be noted, are much larger than those resulting from a change in the corporate income tax, because of the asymmetric effects on foreign and domestic investors.

In general, the reader must be cautioned against taking these results as anything other than illustrative. The models on which they are based are very simple ones, which describe a yearly flow of net investment. While this methodology is comparable to that used for similar purposes in the domestic literature (see, for example, Feldstein (forthcoming)), it is not particularly well suited to describing the eventual outcome of the changes in policy, after all adjustments take place. The conclusions, though, are highly suggestive.

IV. Conclusions

It has long been recognized that if international flows of capital are highly elastic, the welfare consequences of domestic tax policy could be quite different from those derived from a closed economy model. Recent work by Goulder, Shoven, and Whalley (1982) has highlighted the potential significance of these effects. While there are general equilibrium effects to consider, one is not, in general, badly mislead by thinking of these effects as arising because, when foreigners invest in the United States, the United States government collects a fraction of the rate of return to the capital in the form of tax

revenue. Preliminary figures for the year 1980 indicate that foreign investors earned approximately 9.3 billion after-tax dollars on investments in the United States. Thus, among federal, state, and local governments, around 9 billion dollars in tax collections in that year must have been attributable to capital provided by foreigners. Given the modest levels of welfare gain usually attributed to proposed changes in tax policy in a closed economy model, it is not implausible that welfare gains or losses attributable to resulting changes in foreign direct investment, could loom very large in one's welfare calculations. The evidence presented in this paper suggests that the welfare effects arising from the change in foreign direct investment could be small, since the increase in annual foreign investment almost exactly balances the decline in tax revenue produced by the decline in the tax rate. Our result is, therefore, intermediate between: 1) the situation in which foreign investment is not at all responsive to taxes, in which case a welfare loss of perhaps one billion dollars would be generated by a ten percentage point cut in the effective corporate tax rate (an amount which foreign parent firms would receive as a windfall) and 2) the alternative situation in which a ten percentage point cut in the corporate income tax rate would generate a massive inflow of capital, which would produce very large welfare gains. Similarly, our results are indicative that an improved incentive to savings in the U.S. can be expected to produce, at least temporarily, a decline in foreign investment, which tends to produce an economic welfare loss for the economy. By our estimates, this savings incentive effect on foreign investment could be quite large, implying that any welfare gains anticipated by conventional models need to be weighed against welfare losses arising from the foreign sector, which could potentially amount to several billion dollars.

While all these welfare calculations are highly preliminary in nature, what seems to be unambiguous in our results is that foreign investment does respond significantly to domestic tax policy. Recent changes in U.S. domestic tax policy include both incentives to increase investment operating on the corporate income tax side and incentives for savings operating on the individual side. By most accounts, the tax rate cuts for individuals, aside from that affecting the top bracket of taxpayers, are modest at best. On the other hand, the investment incentives embodied in the new accelerated depreciation provisions seem to represent drastic changes in the tax treatment of corporate income. Thus, unless top bracket taxpayers act to very significantly bid up the prices of existing assets in the short run, one would anticipate major increases in foreign direct investment in the United States over the coming years, relative to what would have happened without the tax changes.

FOOTNOTES

1. Foreign direct investment, as distinguished from portfolio investment, takes place in a domestic operation over which the foreign parent firm has control. For several reasons, foreign direct investment figures cannot be thought of as the precise equivalent of net domestic investment numbers. One difference is that the net domestic investment figures are obtained by subtracting from gross investment a depreciation figure adjusted to approximate as closely as possible economic depreciation. The Commerce Department collects no data which would allow it to adjust the book depreciation figures used in computing net foreign investment, and only the roughest adjustments to be discussed below can be made.

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 U.S. affiliate. To the extent that additional funds are borrowed in the U.S. or supplied by "minority" owners, these figures understate the investment undertaken in the U.S. which is under the control of foreigners. On the other hand, foreign direct investment does not necessarily mean purchase of real assets and, so, may overstate the foreign-owned equivalent of domestic net fixed investment. However, the tendency of local financing to be short-term (Robbins and Stobaugh (1973), Chapter 4) and the incentive to minimize exchange risk by financing current assets, but not fixed assets, through short term local borrowing (Robbins and Stobaugh (1972)), both imply that foreign direct investment in the U.S. may be an adequate indicator of the net fixed investment figure. Confirmation that this approximation holds very closely in the case of investment undertaken abroad by U.S. firms can be found in Hartman (1981b). 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, for example, Goldsborough (1979)), there is some evidence to support this procedure.

2. See, for example, Summers (1981) and Bradford (1981).

3. Further justification for the theory sketched here can be found in Hartman (1981b).

4. For a discussion of the limited exceptions to this simple rule, see Hartman (1981b).

5. Because the rate of return to domestic capital is based on replacement costs, these valuation changes are not captured by $r(1-t^*)$.

6. In fact, there is the possibility that the performance of this equation will be deceptively good, reflecting a specification error. As the data description in footnote 6 indicates, any measurement error in earnings will be introduced as error not only in the dependent variable, retained earnings, but also in our measure of the domestic rate of return on foreign assets. That is, there could be a spurious correlation between an independent variable and the residual. It turns out that instrumental variables estimates (instrumenting $r^*(1-t^*)$ by its lagged value) do not differ in any important way from the ordinary least squares estimates reported here.

7. The sources for data are as follows: $r^*(1-t^*)$ is "reinvested earnings" 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 "Foreign Direct Investment in the United States," Survey of Current Business, selected issues). No separate estimate of t^* is available from the source which provides information on $r^*(1-t^*)$. In constructing the other variables, r, t^* (equal to the sum of the rates of corporate income tax imposed at all jurisdictions plus property taxes), and t (the total effective tax rate including t^* and tax rates facing savers) are all taken from Feldstein, Poterba, and Dicks-Mireaux (1981). Thus, we are recognizing that the effective tax rates facing domestic investors and those imposed on foreign investors subject to the same taxes are equal. Note that the measure of t^* inherent in $r^*(1-t^*)$ and the measure of t^* used to construct $r(1-t^*)$ are independent.

It should also be noted that the concepts measured by $r(1-t^*)$ and $r^*(1-t^*)$ are somewhat different in their treatment of firm debt. While r includes the return to the entire debt portion of the firms' capital, $r^*(1-t^*)$ includes the debt return only to the extent that the debt is foreign-owned.

8. As further confirmation of our results, rates of return were adjusted in a crude fashion for mismeasurement of real depreciation and inventory profits (using the percentage impacts on domestic firm's earnings of these adjustment, as reported by the U.S. Department of Commerce, Bureau of Economic Analysis in the Survey of Current Business, various isues). This adjustment made no perceptible difference in parameter estimates.

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