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TAXATION AND THE LOCATION OF U.S. INVESTMENT ABROAD

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ABSTRACT

Tax policy toward the overseas income of U.S. firms is an important issue since foreign investment accounts for a sizable fraction of total investment by U.S. firms. At present there is no consensus on the degree to which U.S. firms respond to tax incentives when making international investment decisions. This paper seeks to shed light on this issue.

Because the tax systems of (at least) two countries are involved, the specification of tax incentives is far from trivial. For example, U.S. treatment is based on the foreign tax credit mechanism. In its purest form, this mechanism would insure that the net tax rate on all income of U.S. firms would be equal to the U.S. rate, rendering the tax rates in the host countries irrelevant.

In fact, actual U.S. tax practice is far removed from an idealized foreign tax credit mechanism. For instance, the U.S. tax is not collected until income is repatriated from abroad; section I points out that deferral changes the incentive effects in fundamental ways. Foreign income tax rates definitely do matter in theory; in fact, they may be of overriding importance.

The remainder of the paper seeks to test these theoretical considerations. First, we describe the cross-section data that were collected for this purpose. Then, we report the result that U.S. firms respond to net rates of return in general and to properly specified tax rates in particular.

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Tax policy toward the overseas income of U.S. firms is a complicated issue, and its effects are not well understood. These effects may be important, however, since foreign investment accounts for a sizable fraction of total investment by U.S. firms. Many basic questions remain to be answered in this field; for example, there is no consensus on the degree to which U.S. firms respond to tax incentives when making international investment decisions. This paper seeks to shed light on this issue.

The first step is to specify the tax incentives as correctly as possible. Because the tax systems of (at least) two countries are involved in each investment decision, this step is far from trivial. For example, U.S. treatment is based on the foreign tax credit mechanism. In its purest form, this mechanism would insure that the net tax rate on all income of U.S. firms would be equal to the U.S. rate, no matter where the investment takes place; this pure system would obviously make the tax rates in the host countries irrelevant.

In fact, actual U.S. tax practice is far removed from an idealized foreign tax credit mechanism. A major departure is that U.S. tax is not collected until income is repatriated from abroad to the U.S. parent firm; this feature is referred to as "deferral." Section I points out that deferral changes the incentive effects in fundamental ways. Foreign income tax rates definitely do turn out to matter; in fact, they may be of overriding importance.

The remainder of the paper seeks to test the theoretical considerations laid out in Section I. Specifically, it measures the impact of U.S. and foreign taxes on the distribution of overseas investment by U.S. firms. Section II describes the cross-section data that were constructed for this purpose. Section III presents the results. We find that U.S. firms respond to net rates of return in general and to properly specified tax rates in particular. There is a brief concluding section.

I. Incentives of U.S. and Foreign Taxes

The basic point of this section is very simple -- investment decisions are determined by the after tax rates of return that are available. However, the complexity of taxes impinging on the international investment decisions of U.S. firms makes the application of this point far from trivial. In order to concentrate on the empirical evidence, we will discuss only briefly the tax situations and their effects on investment decisions. For a more rigorous development of these ideas, see Hartman (1981a).

The host country governments have the first opportunity to tax the income earned within their borders by U.S. investors. Typically, this income is subjected to the same corporate income tax that the local firms pay. The rate of return after the country's foreign income tax, r^*_{nfi}, is therefore given by equation (1).

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

When the income from these investments is actually repatriated to the U.S. parent, an additional tax, called a "withholding tax" may be levied by the host government. Designating this withholding tax by t^*_w, the rate of return net of all foreign taxes is given by r^*_{nf} in equation (2).

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

When these dividends are received by the U.S. parent firm, the U.S. government may tax them. In order to avoid the double taxation which otherwise would be implied by the collection of U.S. tax, the United States gives a credit for the foreign taxes paid, up to the rate of the U.S. tax which would be due. Thus, on a repatriated dollar of earnings, the net of total tax rate of return can be indicated by r^*_n in equation (3).

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

The effective rate of taxation, to which a U.S. investor should respond in making its foreign investment decisions, is, therefore, a complicated concept. In particular, the tax rate depends on the firms's repatriation decisions, as well as its location of investment decisions. At each point in time, the firm earns an after-tax rate of r^*_{nfi} on each dollar it retains abroad, and r^*_n on each dollar it repatriates. What rate, or combination of rates, should enter into the firm's investment decisions? This issue has often been resolved in empirical studies by simply taking a weighted average of the applicable tax rates as shown in equation (4).

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

where p is the fraction of earnings ordinarily repatriated. That is, the effective rate of return is taken to be a weighted average of r^*_{nfi} and r^*_n.

The Hartman (1981a) paper points out problems with this formulation. Consider a parent firm receiving dividends from a foreign subsidiary while at the same time expanding its investment abroad with an explicit transfer of funds. This action is clearly suboptimal; there is no change in the net financial position of either parent or subsidiary, yet extra taxes (withholding taxes and/or a net tax payment to the U.S.) will have to be paid on the dividends. By refraining from repatriation while expanding abroad, the firm can defer these taxes. When the desired level of overseas investment is less than overseas earnings, then repatriation should occur. It is clear that no firm should simply repatriate a constant fraction "p" of its overseas earnings each period. Therefore, the weighted average rule seems seriously deficient.

Rather, the required rate of return on foreign investments will vary, as shown in Figure 1. Investments up to E, the level that may be financed out of the foreign subsidiary's earnings, should earn r_1, with higher levels of investment required to earn r_2. We now turn to the relationships between r_1 and r_2.

Suppose, first, that the firm is in the position of making a marginal investment which would involve retaining earnings

versus repatriating them to the U.S. parent. In this case, it is important to realize that the present value of 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 the earnings that that dollar generated in the intervening period, if repatriation occurs later, are equal. The decision whether to reinvest or repatriate should be invariant with respect to the deferrable taxes. Thus, in deciding whether to reinvest earnings or to repatriate them, an optimizing firm should consider only the taxes arising from the standard foreign income tax rate. The appropriate net rate of return of foreign investment, to be compared across foreign countries and to be compared with rates of return available in the U.S., should be calculated ignoring withholding taxes imposed by the foreign countries and any residual tax liability imposed on dividend payments by the U.S. government. The appropriate net rate of return for use in this comparison is thus r^*_{nfi}.

On the other hand, the firm transferring funds abroad does not have an accumulated withholding or U.S. tax liability on those funds, and should consider the fact that when it repatriates the resulting earnings it may face additional withholding taxes and U.S. 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 distant

time, the importance of that future tax liability diminishes, and r_2 approaches r_1. If for some reason the firm expects to repatriate exactly p of its earnings in every future period, the formula given by equation (4) would be exactly correct. Obviously, then, the future plans of the firm determine the value of r_2 in Figure 1.

If investment occurs as a result of a marginal decision between retaining and repatriating earnings, multinational firms should compare (across countries) the net-of-foreign-income-tax rates of return across countries: the r^*_{nfi}'s. On the other hand, if the investment is to take place through transfers of earnings from the parent firm, the appropriate net-of-tax rate of return is some combination of r^*_{nfi} and r^*_n, with expected future repatriation patterns determining the weights. For example, if all earnings will be immediately repatriated, only the rate net of all taxes, r^*_n, is relevant. In that case, deviations across countries in the rate of corporate income taxation should have an impact on the location of U.S. foreign direct investment only if they exceed the U.S. rate.

Our empirical analysis tries to distinguish between the two polar cases. One is the situation in which the effect of the rate of return abroad and of the foreign corporate income tax are such that $r^*(1-t^*)$ is the appropriate variable. The other is that deviations in t^* across countries would play no role. In addition, it is possible to test, using a "typical"

dividend repatriation ratio, whether firms respond to a net-of-tax rate of return given by the traditional weighted average formula.

The incentive effects of taxes due upon repatriation differ strikingly in the two polar cases; the reason why is intuitive. The deferred taxes act more as levies on the transfer of funds back to the United States, rather than as taxes on the earnings of capital abroad. Therefore, they would be expected to have very different effects depending on whether the funds are already located abroad, or whether a firm is contemplating transferring funds from the United States. When the funds are already in the hands of the foreign 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 abroad, and is, therefore, to some extent an investment disincentive. In the next section, we turn to the measurement of these alternative concepts of the net rate of return and to the investigation of their impact on the location of foreign direct investment.

II. The Data

As part of its annual corporation income tax return, each U.S. multinational firm files an "information return," form

2952, for each of its "controlled foreign corporations."[2] Assets, earnings and profits, taxes paid, a summary of intra-firm transactions, and other figures are reported for every foreign subsidiary. The U.S. Treasury Department has recently made this information available for the years 1968 and 1972. To preserve confidentiality, the data must be aggregated across firms.

The data used in this study are a modified form of the information published in IRS (1979).[3] The main difference is that our data are tabulated in a way which is more convenient for our purposes. Table 1 lists the industry and country groups by which the dataset in this study is cross-tabulated. Of the 240 possible observations, 17 were suppressed for confidentiality reasons. Another 27 observations exhibited negative rates of return. Since these cases presumably are out of equilibrium, and would create problems for some of our functional forms, they are also dropped. Although the resulting dataset is far from ideal, it is a considerable improvement over previously available sources. Previous empirical analyses have usually used one of two types of data.

2/ A subsidiary is a "controlled foreign corporation" if the U.S. firm owns 50 percent or more of the stock. See, I.R.S., U.S. Corporations and Their Controlled Foreign Corporations (1979), pp. 202-203.

3/ We are grateful to the Treasury Department, Office of International Tax Affairs, for making this dataset available to us. Particularly helpful were Thomas Horst, Jim Nunns, George Carlson, and Joe Parker.

The first is information drawn from a small sample of firms. Not only are questions raised by the small sample sizes, but also many crucial variables, including those needed to calculate rate of return, are typically missing.[4] The other approach relies on the U.S. national income accounts. The problem here is that very little information is available by country. Calculation of country-specific variables such as tax rates is then difficult.[5] The Treasury's data are drawn from a large number of firms and contain some measure of each of the key variables. Further, they are presented by both industry of the firms and country of the subsidiaries. Thus, a wide range of economic and statutory situations is covered.

Assets and Investment

The first variable to be drawn from this dataset is assets of the foreign subsidiaries. Since assets in both 1968 and 1972 are available, net investment over the intervening four-year period may be computed; this variable is used in the dependent variable of each of the regressions discussed below.

The firms are required to use U.S. tax concepts when reporting on their foreign subsidiaries, except that accelerated depreciation may not be taken. In particular, assets are

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4/ Examples include Snoy (1975) and Stevens (1969). Other works are surveyed in Hufbauer (1975), Kopits (1976), and Ragazzi (1978).

5/ Examples are Prachowny (1972), Kwack (1972), Boatwright and Renton (1975), Ladenson (1972), Hartman (1981b). See also the surveys mentioned in the preceeding note.

based on historic costs. Although it is not possible to correct the resulting mismeasurements directly, industry dummy variables will be included in our empirical work to control for possible differences in their severity by industry. Since the firms' tax accounts are typically kept in U.S. dollars, the extent of mismeasurements will probably not vary substantially by country. Firms have the option, however, to keep their records in any currency they choose, and convert to U.S. dollars as the final step in their reporting.[6] Since it is not known what method each firm used, it is not possible to correct the mismeasurements by country. For this reason, among others, each equation is also run with country dummies.

The measurement problem due to differing inflation rates should be less serious for a flow variable such as investment than for a stock variable such as assets. The reason is that exchange rates tend to offset the inflation rate differentials, leaving only the U.S. rate of inflation. And, in a cross-section analysis, this common factor is not a serious problem. However, less than completely flexible exchange rates were prevalent during our period. Therefore, we cannot be certain that the tendency of inflation rates to be fully offset by exchange rate movements serves to eliminate this problem. If not, the implicit assumption made here that all investment flows are consistently measured in nominal U.S. dollars may not be valid.

6/ McDaniel and Ault (1977), p. 22.

Rates of Return

The dataset contains information on the earnings and profits of the foreign subsidiaries. Dividing these numbers by the asset figures yields rates of return. Since income taxes paid by the subsidiaries are also available, both gross of tax and net of tax rates of return may be computed.

Interest payments by the subsidiaries are part of the returns to assets and should be included in the calculation. The information about intra-firm financial flows contained in the dataset allows us to include interest paid by the subsidiaries to the parents. No information is given, however, about debt or interest payments to unrelated parties. This omission may not be a serious problem, since foreign subsidiaries of U.S. firms typically had low and similar debt-equity ratios during this period.[7]

In the next section, we will test whether rates of return in 1968 influenced changes in assets between 1968 and 1972. Only 1968 rates of return will be used, in order to avoid a simultaneity problem. In any one year, levels of assets and rates of return are of course determined simultaneously. But net rate of return opportunities in one year are likely to cause adjustments that begin that year and extend into the future.

7/ A Commerce Department survey indicates that total interest payments by the subsidiaries, including payments to parents, accounted for only 14.6 percent of net income before taxes plus interest in 1966. See U.S. Department of Commerce (1972), pp. 173, 174, and 177.

Two assumptions are necessary for this disequilibrium analysis to be appropriate. First is that levels of assets do not adjust instantaneously to net rates of return. If they did, then changes induced by the rates of return in 1968 would happen in that year, and none of the changes occurring from then to 1972 would be related to them. Since the subject of the analysis is long-term investment in manufacturing, this assumption does not seem troubling.

Secondly, it is necessary that differences in net rates of return in 1968 represent real divergences from equilibrium. It is possible that they exist to compensate for risks or other factors. Or, they may be caused by random or very short-lived phenomena, and are recognized as such by the firms. In either case, they would not cause adjustments to capital stocks. What we hope to capture in our rate of return variables are recent changes in tax rates, factor costs, relative prices, and other real economic forces which would influence investment decisions. However, the disparities in net rate of return in 1968 that do not represent departures from equilibrium bias the coefficients toward zero, since they represent a typical "errors in variables" problem.

Taxes Paid

Our data also include income taxes paid to foreign governments. In addition, a measure of "withholding taxes" on intra-firm dividends, interest, and royalties is available. Table 2 presents effective tax rates, defined as foreign income

and withholding taxes divided by earnings and profits.[8] The tax rates show considerable variation, by industry and by country. For example, tax rates for the electrical equipment industry varied between 20 percent and 60 percent in 1972; for fabricated metal products from under 10 percent to 54 percent; and for scientific instruments from 30 percent to over 90 percent. It is plausible, therefore, that tax disparities are large enough to affect the firms' decisions.

This wide range of tax situations is the principle virtue of this set of data. Some observers, looking at more highly aggregated data, have concluded that international tax disparities are not large enough to be important.[9] Table 3 further illustrates the problem. The first two columns show the basic statutory corporate income tax rates.[10] The last two columns display effective corporate income tax rates computed from our data. Even the effective tax rates show much less variation than was apparent in the industry-country cross-

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8/ Cells containing firms with both positive and negative profits would pose a problem for this table. The cell would show positive taxes, since the firms with losses would not ordinarily receive rebates, while profitable firms would pay tax. Total profits could be negative; hence, a spurious negative tax rate could result. Therefore, only subsidiaries with positive earnings and profits were included when Table 2 was computed.

9/ "But there are numerous reasons for assuming that the influence of (taxes) is slight. The long-term investor ... is bound to weight a few percentage points in an existing tax rate as an economic factor of only trivial significance." Vernon (1977), p. 127.

10/ Statutory tax rates are from Kyrouz (1975).

section. Thirteen out of 16 numbers in each column are in the 35 percent to 55 percent range. It is important, therefore, to look at more detailed information than just country-wide averages when judging the extent to which tax rates differ.

The tax rates differ more when disaggregated by industry as well as country because provisions of the tax law other than the basic statutory rate affect industries differently. For example, capital-intensive industries are especially affected by accelerated depreciation and other capital cost recovery incentives. Industries utilizing short-lived equipment benefit more from investment tax credit schemes. Furthermore, some countries select certain industries for encouragement, giving them special tax relief. These types of provisions differ substantially across countries. Therefore, two countries with identical statutory rates, and even with the same effective rates overall, could have very different rates on individual industries. Substantial incentives could then exist which would affect firms' location decisions.

It would be interesting to analyze the various corporate tax structures in order to isolate the disparities in the effective tax rates. A two-step analysis is called for. First, the main statutory provisions of each country would be identified and summarized. Second, characteristics of each industry that govern how the statutory provisions affect it would be summarized. Capital intensity, average life of the capital, and use of intra-firm debt and equity are examples of

such characteristics. In effect, a stylized representation of typical operations in each industry would be constructed. Then, each stylized summary of the industries' operations could be subjected to summaries of the countries tax statutes. The result would be true marginal tax rates on each type of project in each country.

This analysis would undoubtedly yield useful insights on the disparities in the taxation of U.S. multinationals abroad. In addition, the resulting tax rates might be better suited to the empirical analysis than the effective tax rates used here, for reasons outlined in the next paragraph. The procedure is beyond the scope of this study. Particularly the first step, summarizing the various sets of tax provisions, would be a major undertaking. Rather, we use our estimates of foreign taxes paid, and leave consideration of statutory provisions for future research.

The most obvious type of statutory provision affecting investment incentives is the treatment of investment expenditures themselves. Examples include investment tax credits or grants and the acceleration of allowable depreciation. These provisions imply that investment in any one year reduces taxes paid, and thus effective tax rates, in that year. Attempting to explain investment in one year with tax rates calculated from that year's tax returns would lead to simultaneity bias. This study uses effective tax rates from one year, 1968, to explain investment that took place over the next four years, so the strict simultaneity problem is avoided.

A related problem arises, however, if investment contains a strong autoregressive element. Then investment from 1968 to 1972 would be a function of investment that took place in 1968. Attempting to explain investment between 1968 and 1972 with 1968 tax rates would then lead to bias if 1968 investment were not also included. The straightforward solution, inclusion of 1968 investment in the analysis, is impossible here because the necessary data are unavailable. A measure of tax rates based on statutory provisions would avoid this problem, since they would presumably not be a function of contemporaneous investment by U.S. firms.

To summarize, the basic measures of tax incentives used in this study are average, effective foreign tax rates. As is discussed in the previous section, residual U.S. tax liabilities arising from the foreign tax credit mechanism and from foreign withholding taxes may or may not have further effects on the firms' decisions. It is clear that, if subsidiaries pay dividends, these taxes will, in general, have to be paid. It is not clear, however, whether the vast majority of U.S. firms should be expected to respond to these extra liabilities.

To examine this question, the empirical analysis considers a measure of the extra taxes on foreign source income due to the repatriation of earnings. It is calculated from the data on intra-firm financial flows and foreign taxes paid. First, withholding tax rates, as modified by existing treaties, are applied to the flows. Second, a measure of tax due to the

U.S. is computed. Specifically, for each industry-country cell, intra-firm interest and royalty payments are subjected to the U.S. corporate tax rate in 1968 of 48 percent, as are "grossed up" dividends defined by a "typical" payout rate. The share of foreign taxes attributable to distributed profits are then subtracted. The result, if nonnegative, is the measure of extra taxes owed to the U.S. Negative values are set to zero.[11]

This procedure is, admittedly, only a simple representation of the foreign tax credit mechanism. It neglects many complexities in actual tax practice.[12] For example, issues raised by the "overall limitation method" are ignored.[13] In most instances, U.S. firms add up financial flows from taxes paid by all their subsidiaries before applying the foreign tax credit mechanism. The calculations done here, since they treat each industry-country cell independently, are closer in spirit to the "per country method," under which firms would compute U.S. tax for each country separately. The two methods can yield different results when some subsidiaries of a given firm are subject to high foreign taxes, and others to low ones. Thus, the simple representation of U.S. taxes used in

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11/ The model for these calculations is the concise summary of the foreign tax credit mechanism contained in pp. 152-154 of I.R.S., (1979).

12/ For descriptions of the U.S. foreign tax mechanism, see McDaniel and Ault (1977) and Hufbauer and Foster (1976).

13/ See Horst (1979) for a detailed treatment of this issue.

this study will not exactly represent the marginal liability faced by some firms. Since we have insufficient data to calculate an "overall method" tax parameter, it is reassuring that the differences appear small.[14]

III. The Evidence

The data just described allow for a series of simple tests of tax effects on the location of U.S. investment abroad. As noted in the previous section, investment over the 1968-72 period across industries and countries is to be explained based on the corresponding net rate of return in 1968. We first test three alternative models in which investment is taken as a function, in turn, of: a) the gross rate of return, b) the rate of return, net of currently paid foreign taxes, and c) the rate of return, net of all taxes (including foreign withholding taxes and U.S. taxes on a typical fraction of earnings repatriated).

The results are shown in the first three lines of Table 4. The dependent variable is the growth rate of investment over the four-year period. Comparing line 1 to either of the next two lines shows that taxes definitely do play a major role in the firms' location of investment decisions. The net rate

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14/ Frisch (1981) reconsiders this problem using much the same data. It is a simulation study of taxes on foreign source income and, in constructing the simulation model, builds in a simple approximation of ownership across countries. The difference between "overall" and "per-country" methods is computed, and is found to be small in practice.

of return variables can explain a significant, although not overwhelming, portion of variation in foreign direct investment by industry and country. The coefficients of lines 2 and 3 imply that an increase in net rate of return by one percentage point is associated with approximately a 12 percent increase in assets in that industry and country.

The theory sketched out in Section I leads one to expect that currently paid foreign taxes would be of overriding concern to most U.S. firms. Comparing lines 2 and 3 appears to confirm this expectation. The rate of return with only current taxes netted out performs better, as can be seen by comparing R^2 or the standard error of the estimate.

The next three specifications are designed to examine the role of taxes more closely. In the simplest case, a net rate of return variable equals $r^*(1-t^*)$. This variable may be separated into two linear components, r^* and r^*t^*. The former is of course gross rate of return, and the latter may be calculated as the ratio of tax payments to assets. Placing both in a regression allows a further test of the hypothesis that firms respond to net rate of return incentives; if so, the former component should have a positive coefficient, and the latter an equal one with opposite sign.

Line 4 of Table 4 presents the results of decomposing the net rate of return variable used in line 2. Both coefficients are highly significant and have the expected sign. It is clear that firms respond to both gross rate of return and tax incentives in the manner expected.

The coefficients are clearly not identically equal in absolute value. However, the difference between them may not be statistically significant. Line 2 is a restricted form of line 4; comparing the sum of squared residuals allows the implicit restriction to be tested. The proper F-statistic for doing so is reported at the end of line 4.[15] The hypothesis that the net rate of return specification (as in line 2) is the correct one is not rejected at the 1 percent level, although it is at the 5 percent level. Inclusion of industry and country effects is discussed below. Industry effects do not change the story, but when country intercepts are included, the coefficients of the tax variables are significantly larger (in absolute value) than the coefficient of gross rate of return. In summary, the evidence is mixed on whether the net rate of return specification is preferred.

The alternative conclusion seems to be that tax disincentives are more powerful than are gross rate of return incentives. Recall that the errors-in-variables problem discussed above will bias the coefficients toward zero; this effect may well be more significant for the gross rate of return variable. More generally, there may be more noise in this variable, since statutory provisions help determine the tax variables. Perhaps the conclusion from this line of tests

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15/ In parentheses underneath are degrees of freedom. Critical values are, for the 1% level, $F(1,200)=6.63$ and $F(2,200)=4.61$. For the 5% level, $F(1,200)=3.84$ and $F(2,200)=3.00$.

should be that both gross rate of return and taxes affect decisions as expected, but that precise comparison of relative magnitudes must await further research.

Lines 5 and 6 of Table 4 consider the deferrable taxes. Line 5, which splits out the measure of all taxes, is inferior to line 4, which includes current taxes only. More striking evidence about the relative importance of these two types of taxes is provided in line 6. Here, currently paid taxes and deferrable taxes, both as a ratio to assets, are entered separately. The deferrable tax variable is insignificant and has the wrong sign. As predicted by the discussion in Section I, taxes occasioned by the firms' repatriation decisions seem to be irrelevant for their investment decisions.

The final group of specifications in Table 4 allow for different intercepts for industry and country groups. Each of the first six specifications in Table 4 was rerun with these intercepts. To save space, only the most complete specifications (as in line 6) are displayed; the results for the other specifications are similar.

Industry groups differ in many characteristics that may affect the rate of overseas investment, such as average firm size, labor intensity of production and use of advanced technology.[16] In addition, the extent to which historic cost

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16/ Any of which may be only partly captured in the gross rate of return. For a discussion of these issues, see Caves (1971) and Horst (1972). Continuing work by Frisch is analyzing the role of technology in more detail.

data mismeasure assets is expected to vary by industry. Countries may differ in non-tax government interferences, the extent to which exchange rate movements cause measurement errors, and risk.[17] In sum, each set of dummy variables may be expected to be strongly related to rates of investment. This fact is borne out by the increases in R^2 when they are included. It is clear that much work remains to be done in identifying the determinants of foreign investment by U.S. firms. The intercepts for the specifications in lines (7) and (8) are presented in Table 5.

The crucial question for the present study is, how sensitive are the conclusions about net rate of return to these dummy variables? The answer is, not very. Inclusion of the industry dummies has particularly small effects on the rate of return and tax coefficients.

When country dummies are included, there is more of a change, but the basic conclusions are left intact. The coefficient of gross rate of return becomes slightly larger. The measure of currently payable taxes shows more of a change; it becomes more negative. As is discussed above, the tax coefficients now become significantly different (in absolute value) from the ones for gross rate of return. Finally, the measure of deferrable taxes is still insignificantly different from zero, but now shows the sign predicted by theory in the last line.

17/ Continuing work by Hartman is looking at the effects of risk, in a portfolio allocation framework.

In sum, these results indicate that U.S. firms respond to properly specified net rate of return incentives. It is possible that the results are sensitive to the functional form chosen for Table 4. All variables (except intercepts, of course) are computed by dividing some quantity by assets in 1968. Random errors in assets could be causing some sort of spurious correlation, therefore. Although this possibility would not seem to explain the significant negative coefficients on the tax variables, it is worth investigating.

Accordingly, a different functional form was tried; Table 6 presents the results. The dependent variable is log of assets in 1972. Log of 1968 assets is added as an independent variable, to control for starting points. Net profits, gross profits, and tax payments, all in log form, are the other independent variables; the same types of intercepts are also used.

The basic conclusions are unaffected, although significance levels are now lower on lines 1 through 3, which use net rates of return. In lines 4 through 9, which display the more complete specifications, both gross earnings and currently payable taxes show the same signs as before and are significant at the 1 percent level. Deferrable taxes show a negative sign, and are never significantly difficult from zero. As before, these results are not sensitive to the inclusion of dummy variables. Table 7 presents the intercepts for each industry and each country, from the specifications in lines (7) and (8), respectively.

IV. Conclusions

This paper describes the results of an empirical investigation into the determinants of the location of U.S. investment abroad. Because our data come from an industry-country crosstabulation, we observe substantial variation not only in rates of return but also in effective tax rates. This variation has been obscured in previous cross-section studies.

We have been able, given this new body of information, to confirm that a significant part, though far from a majority, of the pattern in foreign direct investment across industries and countries can be accounted for by net rate of return incentives. Furthermore, the gross rate of return and the currently payable tax variable have been shown to be significant when introduced separately, confirming the importance of tax effects. Our results indicate that a one percentage point increase in the net rate of return caused by a decline in the effective local corporate tax rate increases investment in that country by more than 30 percent over a four-year period. Changes in the net rate of return caused by factors other than taxes may have smaller impacts.

Finally, our results suggest that "deferrable" taxes - local withholding taxes as well as U.S. taxes net of foreign tax credits - are not important determinants of the location of investment. This finding is consistent with the discussion of tax incentives laid out in this paper and more fully in a previous paper by Hartman.

Figure 1

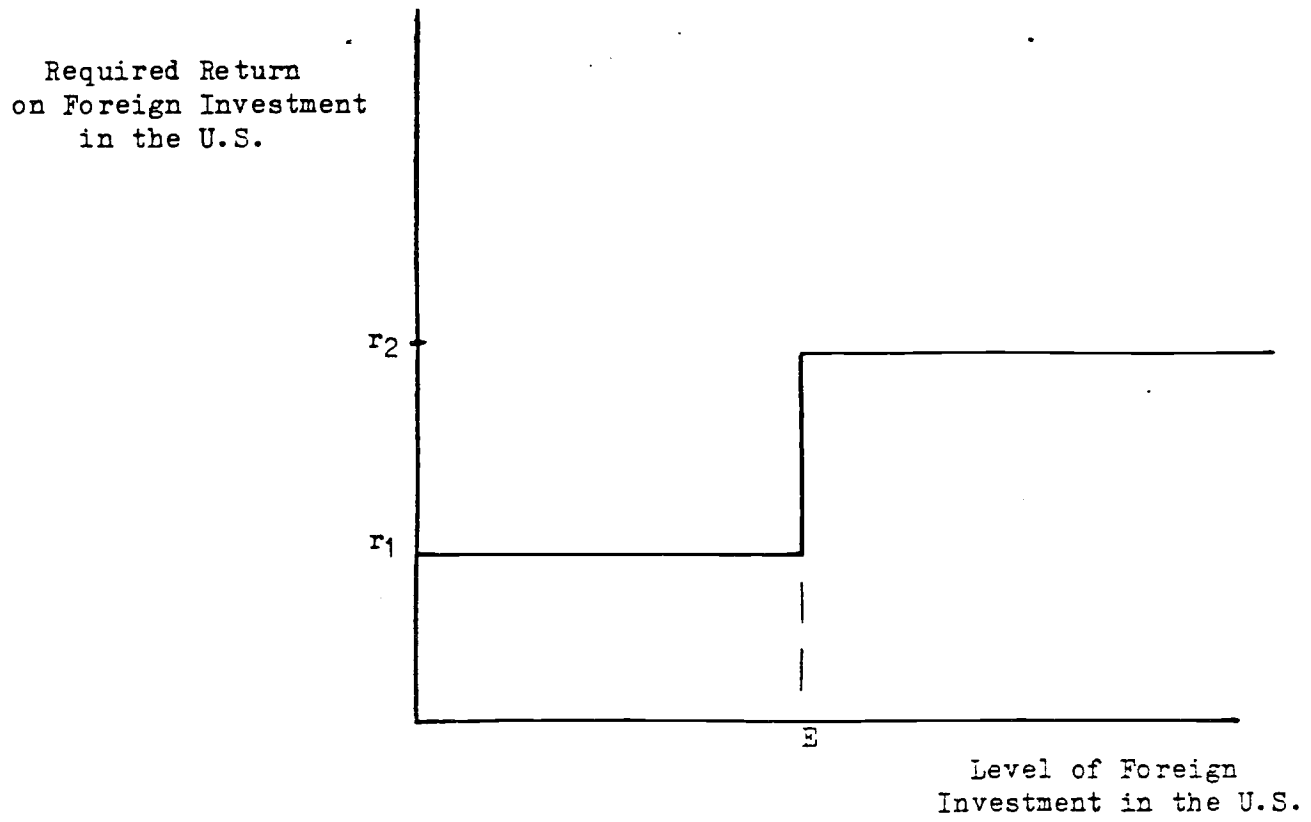
Required Return
on Foreign Investment
in the U.S.
r_2
r_1
E
Level of Foreign
Investment in the U.S.

Table 1

Industry Groups and Countries

A. Industry Groups

1. Food and kindred products ('FOOD').
2. Textile and apparel products ('TEXTIL').
3. Lumber and paper products ('LUMBER').
4. Printing and publishing ('PRINT').
5. Chemicals and allied products ('CHEM').
6. Rubber and miscellaneous plastics products 'RUBBER'.
7. Stone, clay, and glass products ('STONE').
8. Primary metal industries ('PRIM').
9. Fabricated metal industries ('PRIM').
10. Machinery, except electrical ('MACH').
11. Electrical machinery ''ELEC').
12. Motor vehicles and equipment ('MOTOR').
13. Transportation equipment, except motor vehicles ('TRANSP')
14. Scientific instruments, photographic equipment, watches, and clocks ('SCIENT').
15. Other, including tobacco, furniture, leather, and miscellaneous products ('OTHER').

B. Countries

1. Canada
2. Mexico
3. Argentina ('ARGENT')
4. Brazil
5. Venezuela ('VENEZ')
6. Belgium ('BELG')
7. France
8. Italy
9. Netherlands ('NETHER')
10. West Germany ('GERM')
11. Spain
12. Switzerland ('SWITZ')
13. United Kingdom ('U.K.')
14. South Africa ('S.AFR')
15. Japan
16. Australia ('AUSTR')

Table 2

Effective Foreign Tax Rates in 1968

	FOOD	TEXTIL	LUMBER	PRINT	CHEM	RUBBER	STONE	PRIM	FABRIC	MACH	ELEC	MOTOR	TRANSP	SCIENT	OTHER
CANADA	0.5269	0.4699	0.4550	0.5313	0.5177	0.4713	0.3955	0.2909	0.4914	0.5242	0.4192	0.4785	0.5370	0.6239	0.3912
MEXICO	0.7181	0.4416	0.4785	0.2993	0.5377	0.4916	0.5362	0.4595	0.4955	0.4926	0.5571	0.4975	0.4332	0.4977	0.4397
ARGENT	0.3599	.	.	.	0.3200	0.4740	0.3704	0.3741	0.2620	0.4814	0.2080	0.2225	0.1581	0.2587	0.3146
BRAZIL	0.3313	0.1823	0.3323	.	0.3253	0.4170	0.7327	0.3436	0.4278	0.3105	0.3781	0.3673	0.5355	0.4177	0.4102
VENEZ	0.3884	0.3811	.	.	0.3532	0.4019	.	0.2984	0.0842	0.4331	0.5696	0.6367	0.3318	0.4267	0.3449
BELG	0.3058	0.2929	0.3492	0.3640	0.3557	0.3340	0.3665	0.3819	0.3444	0.3768	0.3755	0.4193	.	0.3284	0.3268
FRANCE	0.4139	0.2400	0.4998	0.4735	0.4627	0.1212	0.4353	0.4997	0.4845	0.5295	0.5120	0.8204	0.5160	0.4725	0.5044
ITALY	0.4937	0.2460	0.2286	0.4027	0.3948	0.0673	0.3296	0.4642	0.4286	0.5642	0.4384	0.4879	.	0.4056	0.5380
NETHER	0.4367	.	0.4209	0.1577	0.4410	0.4264	0.0000	0.3691	0.3947	0.4520	0.3512	0.4677	0.3727	0.3755	.
GERM	0.4812	0.4106	0.5200	0.4212	0.3980	0.1116	0.5021	0.1892	0.3633	0.5331	0.3943	0.5124	0.4571	0.4098	0.3095
SPAIN	0.2849	.	.	.	0.3050	.	.	.	.	0.4743	0.4707	.	0.3379	0.2647	0.3907
SWITZ	0.3389	0.1401	0.2403	0.3531	0.2464	0.2537	0.2247	0.3083	0.1599	0.2312	0.1653	0.1534	0.2101	0.2034	0.2371
U.K.	0.4572	0.4513	0.4756	0.4271	0.4902	0.4640	0.4089	0.3942	0.4339	0.5228	0.4338	0.3951	0.5836	0.5018	0.4670
S.AFR	0.3342	.	0.3888	.	0.4218	0.4204	.	0.4318	0.4919	0.4081	0.3244	0.3102	.	0.3399	0.3104
JAPAN	0.4915	.	.	0.5751	0.4493	.	.	0.0122	.	0.4265	0.4925	0.4133	.	0.4424	0.0947
AUSTR	0.2566	0.3445	0.5659	0.2879	0.5414	0.4288	0.4805	0.4067	0.5446	0.5571	0.4037	0.4473	0.4765	0.4895	0.4539

Table 3

Income Tax Rates by Country

		Statutory Tax Rate	Effective Tax Rate		
		1968	1973/4	1968	1972
1.	Canada	50.0	48.0	47.5	46.8
2.	Mexico	42.0	42.0	49.2	50.9
3.	Argentina	33.0	42.9	31.7	40.7
4.	Brazil	30.0	30.3	39.4	31.4
5.	Venezuela	50.0	50.0	38.8	40.2
6.	Belgium	38.5	42.0	35.7	38.1
7.	France	50.0	50.0	46.6	39.7
8.	Italy	43.0	43.8	40.3	42.5
9.	Netherlands	46.0	48.0	35.9	39.5
10.	Germany	52.5	52.6	40.7	42.6
11.	Spain	42.8	32.8	36.4	27.3
12.	Switzerland	7.2	8.8	23.1	29.6
13.	United Kingdom	45.0	50.0	46.0	41.6
14.	South Africa	36.7	43.0	38.0	44.1
15.	Japan	35.0	36.75	37.8	40.8
16.	Australia	45.0	47.5	44.6	41.9

Table 4

Dependent Variable: Investment Growth Rate
(Standard Errors in Parenthesis)

	Rates of Return			Ratios to Assets			Intercept or Type of Dummies	R^2	$\hat{s}^2$	F Statistic on Restriction
	Net of Current Foreign Taxes	Net of Current and Deferrable Taxes	Gross	Current Foreign Taxes	Deferrable Taxes	Current and Deferrable Taxes				
1.			4.91 (2.81)				0.84 (0.33)	.016	5.41	
2.	12.05 (4.26)						0.61 (0.31)	.040	5.28	
3.		12.33 (4.69)					0.68 (0.30)	.034	5.31	
4.			19.90 (5.32)	-38.16 (11.61)			0.91 (0.32)	.068	5.15	5.823 (1,193)
5.			20.02 (6.28)			-33.67 (12.55)	0.94 (0.33)	.051	5.24	3.352 (1,193)
6.			16.44 (6.45)	-33.93 (12.45)	32.09 (33.82)		0.86 (0.33)	.072	5.15	3.892 (2,192)
7.			18.56 (6.65)	-33.31 (13.06)	29.08 (37.77)		Industry	.175	4.94	2.936 (2,178)
8.			22.64 (6.66)	-50.30 (12.94)	4.56 (34.18)		Country	.290	4.28	6.435 (2,177)
9.			26.95 (6.74)	-52.99 (13.35)	-22.90 (37.38)		Both	.402	3.92	5.038 (2,163)

Table 5

Intercepts from Table 4

A. Industry Groups (Line 7)

	Industry	Intercept	(Standard Error)
1.	Food	0.69	(0.66)
2.	Textile, apparel	0.93	(0.71)
3.	Lumber, paper	1.11	(0.80)
4.	Printing, publishing	-0.76	(1.07)
5.	Chemicals	0.06	(0.64)
6.	Rubber	0.02	(0.74)
7.	Stone, clay, glass	-0.23	(0.67)
8.	Primary metal	1.65	(0.64)
9.	Fabricated metal	0.17	(0.65)
10.	Machinery, except electrical	0.60	(0.73)
11.	Electrical machinery	0.94	(0.69)
12.	Motor vehicles	0.25	(0.64)
13.	Other transportation equipment	2.58	(0.69)
14.	Scientific equipment	-0.02	(0.69)
15.	Other	1.26	(0.67)

B. Countries (Line 8)

	Country	Intercept	(Standard Error)
1.	Canada	0.53	(0.59)
2.	Mexico	0.79	(0.65)
3.	Argentina	-0.11	(0.69)
4.	Brazil	0.64	(0.63)
5.	Venezuela	-0.20	(0.61)
6.	Belgium	1.15	(0.67)
7.	France	1.24	(0.67)
8.	Italy	2.63	(0.61)
9.	Netherlands	2.87	(0.68)
10.	Germany	1.67	(0.64)
11.	Spain	1.00	(0.89)
12.	Switzerland	0.11	(0.61)
13.	United Kingdom	0.96	(0.59)
14.	South Africa	-0.25	(0.77)
15.	Japan	4.37	(0.86)
16.	Australia	1.38	(0.66)

Table 7

Intercepts from Table 6

A. Industry Groups (Line 7)

	Industry	Intercept	(Standard Error)
1.	Food	2.15	(0.73)
2.	Textile, apparel	2.04	(0.70)
3.	Lumber, paper	2.21	(0.67)
4.	Printing, publishing	1.75	(0.68)
5.	Chemicals	2.15	(0.75)
6.	Rubber	1.96	(0.72)
7.	Stone, clay, glass	1.72	(0.69)
8.	Primary metal	2.19	(0.71)
9.	Fabricated metal	1.81	(0.72)
10.	Machinery, except electrical	2.41	(0.73)
11.	Electrical machinery	2.36	(0.73)
12.	Motor vehicles	1.95	(0.77)
13.	Other transportation equipment	2.18	(0.69)
14.	Scientific equipment	1.89	(0.70)
15.	Other	2.03	(0.69)

B. Countries (Line 8)

	Country	Intercept	(Standard Error)
1.	Canada	1.61	(0.64)
2.	Mexico	1.47	(0.59)
3.	Argentina	1.18	(0.59)
4.	Brazil	1.73	(0.58)
5.	Venezuela	1.08	(0.59)
6.	Belgium	1.74	(0.59)
7.	France	1.79	(0.61)
8.	Italy	1.88	(0.61)
9.	Netherlands	2.32	(0.57)
10.	Germany	1.98	(0.59)
11.	Spain	1.79	(0.58)
12.	Switzerland	1.47	(0.60)
13.	United Kingdom	1.69	(0.62)
14.	South Africa	1.18	(0.57)
15.	Japan	2.09	(0.58)
16.	Australia	1.80	(0.61)

Table 6

Dependent Variable: Log of Assets in 1972
(Standard Errors in Parenthesis)

	Log of Assets in 1968	Log of Earnings			Log of Taxes			Intercept or Type of Dummies	R^2	$\hat{s}^2$
		Net of Current Foreign Taxes	Net of Current and Deferrable Taxes	Gross	Current Foreign Taxes	Deferrable Taxes	Current and Deferrable Taxes			
1.	.797 (.073)			.098 (.069)				2.56 (0.47)	.842	.322
2.	.816 (.060)	.080 (.056)						2.54 (0.47)	.842	.322
3.	.829 (.057)		.067 (.052)					2.52 (0.47)	.842	.322
4.	.838 (.072)			.342 (.103)	-.260 (.083)			1.88 (0.51)	.850	.307
5.	.838 (.076)			.301 (.136)			-.233 (.135)	2.13 (0.53)	.845	.318
6.	.845 (.074)			.388 (.135)	-.280 (.091)	-.033 (.062)		1.73 (0.58)	.850	.309
7.	.833 (.081)			.426 (.139)	-.293 (.094)	-.079 (.067)		Industry	.868	.294
8.	.874 (.070)			.399 (.123)	-.322 (.085)	-.033 (.058)		Country	.901	.221
9.	.725 (.082)			.436 (.121)	-.320 (.083)	-.068 (.062)		Both	.923	.187

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