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# Lessons from Behavioral Responses to International Taxation

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## ABSTRACT

This paper considers the impact of international taxation on patterns of foreign direct investment and on the extent of international tax avoidance activity. Recent evidence indicates that taxation significantly influences the location of foreign direct investment, corporate borrowing, transfer pricing, dividend and royalty payments, and R&D performance. Reactions to worldwide tax rate differences, as well as to changes in international tax rules, provide important information concerning the extent to which taxpayers respond to incentives. The generally high degree of responsiveness in turn carries implications for the design of domestic as well as international tax policy.

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## 1. Introduction.

The evolution of American economic policy mirrors the increasing openness of the world economy. Economic well-being in the United States is affected by the performance of foreign economies and the economic policies of foreign governments. Attention to foreign considerations is increasingly evident in the formulation of tax policy. Recent U.S. tax changes reflect the importance of global competition and devote considerable effort to revising provisions that concern the taxation of foreign income.[1]

The international dimensions of tax policy have for years been something of a sideline area for tax specialists. In part this was due to the (perceived) complexity of the tax laws and regulations that apply to international transactions, and in part due to quantitative unimportance of international transactions in the U.S. economy.

The purpose of this paper is to review the state of empirical evidence on the behavioral impact of international tax rules. Careful consideration of some of this literature is likely to dispel longstanding concerns over the unimportance and intractability of international tax provisions, while illustrating ways in which international and domestic tax policies can be coordinated. There are two noteworthy implications of recent empirical evidence. The first is the size and importance of the effects of international tax rules on behavior, particularly on the activities of multinational corporations. The second is the applicability of lessons learned from behavioral responses to international tax rules in designing domestic tax policy.

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[1] For example, the official explanation of the provisions of the Tax Reform Act of 1986 (U.S. Congress, 1987) devotes 276 pages, or 21 percent of its total length, to the Act's foreign provisions. More recently, the Joint Committee on Taxation offers its analysis of other countries' experiences with value-added taxation as a guide to the formation of U.S. policy (U.S. Congress, 1991, pp. 321-333).

## 2. International taxation for beginners.[2]

The taxation of international transactions differs from the taxation of domestic economic activity primarily due to the complications that stem from the taxation of the same income by multiple governments. In the absence of some kind of corrective mechanism, the efficiency costs of multiple taxation are potentially quite severe, since national tax rates are high enough to eliminate, or at least greatly discourage, most international business activity if applied two or more times to the same income.

### *2.1 The foreign tax credit.*

Almost all countries tax income generated by economic activity that takes place within their borders. In addition, many countries – including the United States – tax the foreign incomes of their residents. In order to prevent double taxation of the foreign income of Americans, U.S. law permits taxpayers to claim foreign tax credits for income taxes (and related taxes) paid to foreign governments.[3] These foreign tax credits are used to offset U.S. tax liabilities that would otherwise be due on foreign-source income. The U.S. corporate tax rate is currently 35 percent, so an American corporation that earns $100 in a foreign country with a 10 percent tax rate pays taxes of $10 to the foreign government and $25 to the U.S. government, since its U.S. corporate tax liability of $35 (35 percent of $100) is reduced to $25 by the foreign tax credit of $10.

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[2] Some parts of this brief description of international tax rules are excerpted from Hines (1991, 1997) and Hines and Hubbard (1995).

[3] The United States is not alone in taxing the worldwide income of its residents while permitting them to claim foreign tax credits. Other countries with such systems include Greece, Italy, Japan, Norway, and the United Kingdom. Under U.S. law, taxpayers may claim foreign tax credits for taxes paid by foreign firms of which they own at least 10 percent, and only those taxes that qualify as income taxes are creditable.

*2.2 Tax deferral.*

Americans are permitted to defer any U.S. tax liabilities on certain unrepatriated foreign profits until they receive such profits in the form of dividends.[4] This deferral is available only on the active business profits of American-owned foreign affiliates that are separately incorporated as subsidiaries in foreign countries. The profits of unincorporated foreign businesses, such as those of American-owned branch banks in other countries, are taxed immediately by the United States.

To illustrate deferral, consider the case of a subsidiary of an American company that earns $500 in a foreign country with a 20 percent tax rate. This subsidiary pays taxes of $100 to the foreign country (20 percent of $500), and might remit $100 in dividends to its parent U.S. company, using the remaining $300 ($500 - $100 of taxes - $100 of dividends) to reinvest in its own, foreign, operations. The American parent firm must then pay U.S. taxes on the $100 of dividends it receives (and is eligible to claim a foreign tax credit for the foreign income taxes its subsidiary paid on the $100).[5] But the American firm is not required to pay U.S. taxes on any part of the $300 that the subsidiary earns abroad and does not remit to its parent company. If, however, the subsidiary were to pay a dividend of $300 the following year, the firm would then be required to pay U.S. tax (after proper allowance for foreign tax credits) on that amount.

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[4] Deferral of home-country taxation of the unrepatriated profits of foreign subsidiaries is a common feature of systems that tax foreign incomes. Other countries that permit this kind of deferral include Canada, Denmark, France, Germany, Japan, Norway, Pakistan, and the United Kingdom.

[5] In this example, the parent firm is eligible to claim a foreign tax credit of $25, representing the product of foreign taxes paid by its subsidiary and the subsidiary's ratio of dividends to after-tax profits [$100 x ($100/$400) = $25].

U.S. tax law contains provisions designed to prevent American firms from delaying the repatriation of lightly-taxed foreign earnings. These tax provisions apply to controlled foreign corporations, which are foreign corporations owned at least 50 percent by American individuals or corporations who hold stakes of at least 10 percent each. Under the Subpart F provisions of U.S. law, some foreign income of controlled foreign corporations is "deemed distributed," and therefore immediately taxable by the United States, even if not repatriated as dividend payments to American parent firms.[6]

*2.3 Excess foreign tax credits.*

Since the foreign tax credit is intended to alleviate international double taxation, and not to reduce U.S. tax liabilities on profits earned *within* the United States, the foreign tax credit is limited to U.S. tax liability on foreign-source income. For example, an American firm with $200 of foreign income that faces a U.S. tax rate of 35 percent has a foreign tax credit limit of $70 (35 percent of $200). If the firm pays foreign income taxes of less than $70, then the firm would be entitled to claim foreign tax credits for all of its foreign taxes paid. If, however, the firm pays $90 of foreign taxes, then it would be permitted to claim no more than $70 of foreign tax credits.

Taxpayers whose foreign tax payments exceed the foreign tax credit limit are said to have "excess foreign tax credits;" the excess foreign tax credits represent the portion of their foreign tax payments that exceed the U.S. tax liabilities generated by their foreign

[6] Subpart F income consists of income from passive investments (such as interest and dividends received from investments in securities), foreign base company income (that arises from using a foreign affiliate as a conduit for certain types of international transactions), income that is invested in United States property, money used offshore to insure risks in the United States, and money used to pay bribes to foreign government officials. American firms with foreign subsidiaries that earn profits through most types of active business operations, and that subsequently reinvest those profits in active lines of business, are not

incomes. Taxpayers whose foreign tax payments are smaller than their foreign tax credit limits are said to have "deficit foreign tax credits." American law permits taxpayers to use excess foreign tax credits in one year to reduce their U.S. tax obligations on foreign source income in either of the two previous years or in any of the following five years.[7]

In practice, the calculation of the foreign tax credit limit entails certain additional complications, notable among which is that total worldwide foreign income is used to calculate the foreign tax credit limit. This method of calculating the foreign tax credit limit is known as "worldwide averaging." A taxpayer has excess foreign tax credits if the sum of worldwide foreign income tax payments exceeds this limit.[8]

## 3. Empirical lessons from international taxation.

International tax rules and the tax laws of other countries have the potential to influence a wide range of corporate and individual behavior, including, most directly, the location and scope of international business activity, but also including domestic operations that are connected to foreign operations through various international tax

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subject to the Subpart F rules, and are therefore able to defer U.S. tax liability on their foreign profits until they choose to remit dividends at a later date.

[7] Foreign tax credits are not adjusted for inflation, so are generally the most valuable if claimed as soon as possible. Barring unusual circumstances, firms apply their foreign tax credits against future years only when unable to apply them against either of the previous two years. The most common reason why firms do not apply excess foreign tax credits against either of the previous two years is that they already have excess foreign tax credits in *those* years.

Firms paying the corporate alternative minimum tax (AMT) are subject to the same rules, with the added restriction that the combination of net operating loss deductions and foreign tax credits cannot reduce AMT liabilities by more than 90%. It is noteworthy that, since the AMT rate is only 20%, firms subject to the AMT are considerably more likely to have excess foreign tax credits than are firms that pay the regular corporate tax.

[8] Not all countries that grant foreign tax credits use worldwide averaging. For example, while Japan uses worldwide averaging, the United Kingdom instead requires its firms to calculate foreign tax credits on an activity-by-activity basis. The United States once required firms to calculate separate foreign tax credit limits for each country to which taxes were paid; the current system of worldwide averaging was introduced in the mid-1970s.

provisions.[9] A sizable and growing literature is devoted to measuring behavioral responses to international tax rules.[10] In so doing, this literature identifies behavioral patterns that are important to understanding the responses to domestic taxation as well. These patterns include investment behavior as well as various financial and organizational practices used to avoid taxes.

*3.1 Investment.*

Cross-border investment by controlling entities has acquired a special name, foreign direct investment, and an associated acronym, FDI. What defines such investment is not only that owners reside in a different country than the site of investment, but also that ownership is of a controlling form, typically defined as 10 percent or more of total ownership in the local investing entity.[11]

Tax policies are obviously capable of affecting the volume and location of FDI, since, all other considerations equal, higher tax rates reduce after-tax returns, thereby reducing incentives to commit investment funds. Of course, all other considerations are seldom equal. Countries differ not only in their tax policies, but also in their commercial and regulatory policies, the characteristics of their labor markets, the nature of

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[9] There are numerous indirect ways in which international taxation affects domestic economies, such as by influencing the nature and extent of competition from imports and from foreign multinational firms. This paper follows virtually all of the literature in focusing on the direct effects of international tax rules, since indirect effects are extremely difficult to identify with available data.

[10] See Hines (1997) for further elaboration and critical analysis of many of the studies surveyed in this section.

[11] FDI consists of changes in the ownership claims of controlling foreign investors. For example, an American parent firm that establishes a wholly-owned foreign affiliate with $100 million of equity and $50 million of loans from the parent company thereby creates $150 million of FDI. In order for foreign investment to count as FDI, the American investor must own at least 10 percent of the foreign affiliate. FDI is the sum of parent fund transfers and American owners' shares of their foreign affiliates' reinvested earnings, minus any repatriations to American owners. Prior to 1974, the United States reported FDI only for investments in which American owners held at least 25 percent ownership shares. Reported FDI typically represents book values.

competition in product markets, the cost and local availability of intermediate supplies, proximity to final markets, and a host of other attributes that influence the desirability of an investment location. The importance of these other considerations suggests to observers such as Vernon (1977) and Markusen (1995) that any effect of taxes on FDI will be unnoticeable in practice. The most reliable FDI studies indicate, however, the existence of statistically significant and quantitatively important tax effects. These findings are important not only because they demonstrate the ability of the data to identify tax effects against a background of many other variables affecting FDI, but also because there are at least two additional reasons why one might anticipate not finding an important empirical relationship between taxes and FDI. The first is that firms may be able to use creative financing and other methods so effectively that they costlessly avoid all taxes on their international income. The second is that governments imposing high tax rates may indirectly compensate firms with difficult-to-measure investment incentives such as worker training and infrastructure of FDI.

### *3.1.1 Evidence.*

The empirical literature on the effect of taxes on FDI considers almost exclusively U.S. data, either the distribution of U.S. direct investment abroad, or the FDI patterns of foreigners who invest in the United States.[12] The simple explanation for this focus is not only that the United States is the world's largest economy, but also that the United States collects and distributes much more, and higher-quality, data on FDI activities than does any other country.

[12] Devereux and Freeman (1995) and Hines (1998) are recent exceptions.

The available evidence of the effect of taxation on FDI comes in two forms. The first is time-series estimation of the responsiveness of FDI to annual variation in after-tax rates of return. Implicit in this estimation is a q-style investment model in which contemporaneous average after-tax rates of return serve as proxies for returns to marginal FDI. Studies of this type consistently report a positive correlation between levels of FDI and after-tax rates of return at industry and country levels.[13] The implied elasticity of FDI with respect to after-tax returns is generally close to unity, which translates into a tax elasticity of investment of roughly -0.6. The estimated elasticity is similar whether the investment in question is American direct investment abroad or FDI by foreigners in the United States.

Much of this literature is highly aggregate, evaluating, for example, the correlation between annual movements in after-tax rates of return earned by FDI in the United States and annual changes in FDI flows to the United States. Aggregate FDI data distinguish investment financed by retained earnings of foreign affiliates from FDI financed by transfers of parent funds (debt plus equity). Studies that estimate separate (and independent) equations for these two sources of FDI typically find that FDI financed by retained earnings is more strongly influenced by host country tax rates.[14]

It can be difficult to interpret such evidence. One possibility is that the estimated -0.6 elasticity represents the effect of investors responding to incentives. Another possibility is that foreign affiliates habitually reinvest their retained earnings without

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[13] See, for example, Hartman (1984), Boskin and Gale (1987), Newlon (1987), Young (1988), Slemrod (1990), and Swenson (1994).

[14] For example, Hartman (1984) reports elasticities with respect to after-tax returns of 1.4 for FDI financed by retained earnings and 0.5 for FDI financed by transfers of parent funds. Similarly, Young (1988) reports elasticities with respect to after-tax returns of 1.89 for FDI financed by retained earnings and close to zero for FDI financed by transfers of parent funds. Boskin and Gale (1987) likewise obtain results that are very similar to Hartman's.

regard to after-tax returns. Reinvested earnings then appear as FDI, so that FDI and after-tax rates of return become correlated. A third, and related, possibility is that the observed effect of after-tax rates of return on FDI is purely statistical, stemming from the fact that FDI is measured as fund transfers plus foreign profits minus repatriations. This construction implies that any independent measurement error in foreign after-tax profits is by construction correlated with measured FDI. More generally, the primary limitation of aggregate time-series studies is that they are identified by yearly variation in taxes or profitability that may be correlated with important omitted variables. As a result, it becomes very difficult to distinguish the effects of taxation from the effects of other variables that are correlated with tax rates.

Two of the time-series studies exploit cross-sectional differences that offer the potential for greater explanatory power. Slemrod (1990) distinguishes FDI in the United States by the tax regime in the country of origin. Investors from countries (of which Slemrod analyzes data for Japan and the United Kingdom) with tax systems similar to that used by the United States receive foreign tax credits for taxes paid to the United States. Investors from certain other countries (of which Slemrod analyzes data for Australia, Canada, France, Germany, and the Netherlands) are more or less exempt from home-country taxation of any profits earned in the United States. Consequently, investors from France and Germany have stronger incentives to invest in the United States during low-tax years than do investors from Japan and the United Kingdom, since Japanese and British investors are eligible to claim tax credits for any U.S. taxes they pay. In his analysis of data covering 1962-1987, Slemrod finds no clear empirical pattern indicating that investors from countries that exempt U.S. profits from home-country

taxation are more sensitive to tax changes than are investors from countries granting foreign tax credits. This evidence suggests either that home-country tax regimes do not influence FDI, or that time series variation in tax rates is inadequate to identify tax effects that are nonetheless present.

Swenson (1994) considers the tax determinants of industry-level FDI in the United States over the 1979-1991 period. U.S. tax changes often affect industries to differing degrees, based largely on the assets in which they invest; this was particularly true of tax legislation enacted in 1981 and 1986. Swenson finds that industries in which the (U.S.) after-tax cost of capital rose the most after passage of the U.S. Tax Reform Act of 1986 were those in which foreign investors concentrated their FDI in the post-1986 period. This is consistent with the tax incentives of foreign investors from countries granting foreign tax credits, since such investors are the least affected by U.S. tax provisions – but it is also possible that foreign investors chose to concentrate in such industries for any of a number of non-tax reasons. Auerbach and Hassett (1993) lend credence to the latter interpretation with their finding that investors from countries granting foreign tax credits were no more likely than were other foreign investors to concentrate their FDI in tax-disadvantaged industries after 1986.

Other studies of investment location are exclusively cross-sectional in nature, exploiting the very large differences in corporate tax rates around the world to identify the effects of taxes on FDI. Grubert and Mutti (1991) and Hines and Rice (1994) estimate the effect of national tax rates on the cross-sectional distribution of aggregate American-owned property, plant and equipment (PPE) in 1982. PPE differs from FDI in that PPE represents (the book value of) real productive assets held by American-owned

affiliates, while FDI equals the book value of ownership claims of controlling foreign investors.[15] Grubert and Mutti analyze the distribution of PPE in manufacturing affiliates in 33 countries, reporting a –0.1 elasticity with respect to local tax rates. That is, controlling for other observable determinants of FDI, ten percent differences in local tax rates are associated with one percent differences in amounts of local PPE ownership in 1982. Hines and Rice consider the distribution of PPE in all affiliates in 73 countries, reporting a much larger –1 elasticity of PPE ownership with respect to tax rates. Altshuler et al. (1998) compare the tax sensitivity of PPE ownership in 58 countries in 1984 to that in 1992, reporting estimated tax elasticities that rise (in absolute value) from –1.5 in 1984 to –2.8 in 1992.

Harris (1993) uses firm-level data to consider the effect of the Tax Reform Act of 1986 on direct investment abroad by American companies. One of the consequences of the 1986 Act was to level the playing field between equipment and structures by removing many of the benefits previously enjoyed by taxpayers investing in equipment located in the United States. Harris finds that American firms with higher equipment/structures ratios invested abroad more heavily after 1986, suggesting that the tax change encouraged them to substitute foreign for domestic investment. This evidence is no more than suggestive, however, since unobserved firm characteristics that are

[15] The distinction between FDI and PPE ownership of foreign affiliates is perhaps best illustrated by an example. Consider two American-controlled foreign affiliates, each with $100 million of assets entirely invested in PPE. One affiliate is 100 percent owned by its American parent, while the other is 60 percent owned by the parent company and 40 percent owned by investors in its host country. Both affiliates account for $100 million of PPE. Establishing the first affiliate with $100 million of debt and equity from the parent company represents $100 million of outbound FDI from the United States, while establishing the second with parent funds represents $60 million of FDI. If half of the affiliate financing represented funds borrowed from local banks, then establishing the affiliates would represent $50 million and $30 million of FDI respectively. To the degree that the affiliates' assets were not entirely invested in PPE, then the PPE figures could change without any corresponding change in FDI.

correlated with high equipment/structures ratios could also be responsible for greater outbound FDI after 1986.

A number of cross-sectional studies consider the effects of subnational taxes on the geographic pattern of FDI within the United States.[16] Foreign investors must pay state corporate income taxes, at rates that vary from zero to close to 15 percent. Coughlin et al. (1991) estimate the determinants of new plant location by foreign investors during 1981-1983, reporting insignificant effects of local tax rates after controlling for other variables. Ondrich and Wasylenko (1993) analyze a larger sample of new plant establishments over a longer time span (1978-1987), finding significant effects of state tax rates on the location of new plants. Ondrich and Wasylenko fit a model of the probability of locating plants in each state; their estimates imply an elasticity of the number of new plants with respect to state tax rates equal to –0.6. Swenson (1998) estimates separate regressions for differing types of transactions (such as the establishment of new plants, plant expansions, mergers and acquisitions, and joint ventures) undertaken by foreign investors in the United States. The results indicate that tax effects vary with transaction type: high state tax rates are negatively correlated with the establishment of new plants and with plant expansions, while they are positively correlated with acquisitions by foreign investors.

[16] There is also a small literature analyzing the effects of Puerto Rico's special tax status. Prior to legislative changes enacted in 1993, mainland American firms were effectively exempt from U.S. corporate tax on profits earned in Puerto Rico, though they were subject to Puerto Rican tax. Bond (1981) identifies significant effects of expiring Puerto Rican tax holidays on decisions of mainland firms to exit the garment industry over the 1949-1972 period. Grubert and Slemrod (1998) find that mainland firms with attributes associated with intangible assets – such as high R&D and advertising intensities – are the most likely to invest in Puerto Rico. Grubert and Slemrod note that this pattern may reflect the ability of firms with intangible assets to shift profits into their affiliates in low-tax jurisdictions, thereby increasing the attractiveness of locating investment in Puerto Rico.

One of the difficulties facing all cross-sectional studies of FDI location is the inevitable omission of many important determinants of FDI that may be correlated with tax rates and therefore bias the estimation of tax elasticities. This consideration makes it attractive to use empirical specifications that include locational fixed effects, but then the question becomes how it is possible simultaneously to identify the impact of tax differences on investment.

Hines (1996) incorporates state fixed effects in comparing the distributions of FDI within the United States of investors whose home governments grant foreign tax credits for federal and state income taxes with those whose home governments do not tax income earned in the United States. The inclusion of fixed effects implicitly controls for hard-to-measure state attributes (such as those that make Silicon Valley or midtown Manhattan "special"), as long as the effect of these attributes does not vary systematically between investors from countries with differing home-country tax regimes. Tax effects are identified by comparing, for example, the extent to which investments from Germany (which exempts from tax foreign-source income earned in the United States) tend to be located in lower-tax states than are investments from the United Kingdom (which provides foreign tax credits for state income taxes paid). The evidence indicates that one percent state tax rate differences in 1987 are associated with ten percent differences in amounts of manufacturing PPE owned by investors from countries with differing home-country taxation of foreign-source income, and three percent differences in numbers of affiliates owned. Taken as a structural relationship, the estimates imply a tax elasticity of investment equal to –0.6. It is worth bearing in mind, however, that this estimate reflects

the effect of taxation on the identity of ownership of capital as well as on the volume of investment.

### *3.1.2 Implications.*

The econometric work of the last fifteen years provides ample evidence of the sensitivity of the level and location of FDI to its tax treatment. Indeed, given the pervasiveness of this finding, this research is perhaps too focussed on an earlier question – do tax policies influence FDI? – and not enough on more subtle variants such as the role of tax policy in affecting the form that FDI takes, the possible importance of tax policy credibility and enforcement, and the relationship between tax and non-tax determinants of FDI.

The estimated responsiveness of FDI to its tax treatment carries obvious implications for international tax policy, since a tax elasticity of –0.6 (which is the finding of much of the literature) implies that high tax rates may generate tax revenue at the cost of considerable loss of foreign investment. The associated cost to residents of countries with high tax rates typically becomes more pronounced to the extent that the tax elasticity of FDI exceeds 0.6 in absolute value. Convincing evidence of a large response elasticity of FDI with respect to tax rates may, therefore, contribute to tendencies of governments to "race to the bottom" with competitive tax reductions for footloose FDI.

Evidence of the responsiveness of FDI to its tax treatment also carries useful implications for the formation of domestic tax policy. There are three senses in which FDI information is useful for this purpose, the first stemming from the linkage between domestic and foreign tax policies. International tax treaties typically provide for national

treatment of foreign subsidiaries, meaning, in part, that the corporate profits of foreign investors will be taxed at the same rates as are profits earned by domestic corporations. National treatment is intended to precommit host governments not to expropriate foreign investments, but in the process it constrains governments to select uniform profit tax rates for both domestic and foreign businesses located in their countries. For countries receiving significant amounts of FDI, the relative desirability of alternative corporate tax rates thereby depends on their impact on foreign as well as domestic investment.

The second sense in which FDI information is relevant to domestic taxation stems from the ability of multinational firms to relocate their operations abroad in response to high rates of home taxation. Harris (1993) documents such reactions in the years after 1986, and Stevens and Lipsey (1992) also offer firm-level evidence of substitutability between foreign and domestic investment. Hines (1991) and Collins and Shackelford (1995) analyze more dramatic reactions to high tax rates in which firms relocate their corporate homes to countries with more attractive tax climates. They estimate the tax savings available to firms that move from countries (such as the United States) with worldwide tax systems to countries that exempt foreign earnings from taxation. It is striking that, in spite of the appeal of low tax rates, very few multinational firms actually relocate their corporate homes to tax havens. In part, this reflects the tax and regulatory costs of doing so, but in part it also reflects the unwillingness of governments to impose excessively heavy tax burdens that encourage widespread departures.

The third, and least obvious, application of FDI research to domestic policy formation is the information it reveals concerning the behavior of domestic investors. Empirical researchers have encountered considerable difficulties in identifying the effect

of business taxation on domestic investment, due in part to the infrequency of major tax changes and in part to the general equilibrium nature of the changes introduced by tax reforms.[17] The ability to exploit the considerable country-level tax rate variation makes the world economy an attractive laboratory with which to investigate the tax responsiveness of investment. The relevance of FDI evidence to domestic investment is an unresolved issue, but the large estimated tax elasticities of FDI very likely imply that the much smaller tax effects obtained from traditional multiplier-accelerator models and tax-adjusted q specifications of domestic investment equations reflect the well-known limitations of these approaches. While some of the difference in estimated elasticities may well be attributable to the greater opportunities available to multinational firms in selecting among substitute locations for investment, it is also true that multinational firms undertake most domestic investment, so foreign alternatives are relevant to their actions. Furthermore, FDI patterns within the United States offer new and useful evidence concerning the effect of state taxes on the location of business activity.

### *3.2 Tax avoidance.*

International investors often have at their disposal numerous alternative methods of structuring and financing their investments, arranging transactions between related parties located in different countries, and returning profits to investors. These alternatives have important tax implications, and there is considerable evidence that tax considerations strongly influence the choices that firms make.

#### *3.2.1 Evidence.*

[17] See Chirinko (1993) for a survey of this literature.

Sophisticated international tax avoidance typically entails reallocating taxable income from countries with high tax rates to countries with low tax rates, and may also include changing the timing of income recognition for tax purposes. Many of these methods are quite legal, and closely resemble those used by domestic taxpayers. Dramatic examples of international tax avoidance that qualify as evasion – such as knowingly underreporting income to tax authorities, or filing false documents – are thought to be uncommon among large corporate taxpayers, though possibly more common among individual taxpayers. Very little is known about the determinants or magnitude of international tax evasion, since the self-reported data that serve as the basis of analysis not surprisingly reveal nothing about it.

The financing of foreign affiliates presents straightforward opportunities for international tax avoidance. If an American parent company finances its investment in a foreign subsidiary with equity funds, then its foreign profits are taxable in the host country and no taxes are owed the U.S. government until the profits are repatriated to the United States. The alternative of financing the foreign subsidiary with debt from the parent company generates interest deductions for the subsidiary that reduce its taxable income, and generates taxable interest receipts for the parent company.

Simple tax considerations therefore often make it attractive to use debt to finance foreign affiliates in high-tax countries and to use equity to finance affiliates in low-tax countries.[18] The evidence is broadly consistent with these incentives. Hines and Hubbard (1990) find that the average foreign tax rate paid by subsidiaries remitting nonzero interest to their American parent firms in 1984 exceeds the average foreign tax

rate paid by subsidiaries with no interest payments, while the reverse pattern holds for dividend payments. Grubert (1998) estimates separate equations for dividend, interest, and royalty payments by 3467 foreign subsidiaries to their parent American companies (and other members of controlled groups) in 1990, finding that high corporate tax rates in countries in which American subsidiaries are located are correlated with higher interest payments and lower dividend payout rates.

Firms face certain tax and regulatory limits on their abilities to select among alternative methods of financing their foreign and domestic operations. Some host countries (including the United States!) limit the extent to which interest payments to foreign parent companies can be used to reduce the taxable incomes of local affiliates. Cross-border payments of interest, dividends and royalties are commonly subject to special withholding taxes that can be reduced by the terms of bilateral tax treaties. And, in the years since 1986, American companies with foreign operations have not been permitted to deduct all of their domestic interest expenses in calculating their U.S. tax liabilities. Instead, firms may deduct a fraction of their U.S.-incurred interest expenses in determining taxable U.S. income, with the remainder of their interest expenses used to reduce any U.S. tax liabilities on *foreign*-source income. In practical terms, what this means is that, in the years after 1986, American multinational companies with excess foreign tax credits receive only partial interest deductions for their domestic borrowing expenses, the fraction being a function of the ratio of foreign to total assets. American multinational firms with deficit foreign tax credits receive the full benefits of interest deductions for domestic borrowing, since any interest expenses allocated against their

[18] Hines (1994) identifies exceptions to this rule that stem from the benefits of limiting equity finance in affiliates located in countries with very low tax rates in anticipation of reinvesting all of their after-tax

foreign-source incomes nevertheless reduce U.S. tax liabilities that they would otherwise incur.

Collins and Shackelford (1992) examine financial responses to the introduction of the interest-allocation rules by considering changes in preferred stock issuances by multinational firms after 1986. Preferred stock is a natural substitute for debt, but U.S. law does not treat payments to holders of preferred stock as interest, making such payments nondeductible and also not subject to allocation to foreign source under the terms of the Tax Reform Act of 1986. Collins and Shackelford find that, among the Fortune 100, firms with higher ratios of foreign to domestic assets – for whom higher fractions of interest expense are allocated against foreign income – are more likely than others to issue preferred stock after 1986. Since these issuances coincide with changing tax incentives, they are likely to represent reactions to changing tax rules, but this does not rule out the possibility that at least some of these large multinational firms may have issued preferred stock for reasons unrelated to tax considerations in the years after 1986.

Altshuler and Mintz (1995) examine confidential information provided by eight American multinational firms, finding a high correlation between tax costs imposed by interest allocation and propensities to borrow abroad after 1986. Since foreign and domestic borrowing are substitutes, this correlation is consistent with the results reported by Collins and Shackelford, and suggests that firms respond to higher domestic borrowing costs by actively pursuing financial substitutes.

Froot and Hines (1995) analyze a sample of 416 large American multinationals, finding that firms most adversely affected by the 1986 tax change do the least borrowing (as a fraction of assets) after 1986. They distinguish firms with foreign operations

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profits over long periods.

located in high-tax countries from firms with foreign operations located in low-tax countries, since the interest allocation rules make post-1986 borrowing more expensive for the first group and not the second. In the absence of changing tax incentives, there is no particular reason to expect firms in these two groups to exhibit differing borrowing patterns around 1986. The estimates imply that firms with excess foreign tax credits and half of their assets abroad borrow five percent less annually than do firms with unchanged borrowing costs after 1986. Affected firms also exhibit slower rates of accumulation of plant and equipment after 1986, and are more likely than other firms to lease plant and equipment after 1986.

Contractual arrangements between related parties located in countries with different tax rates offer numerous possibilities for sophisticated (and unsophisticated) tax avoidance. It is widely suspected that firms adjust transfer prices used in within-firm transactions with the goal of reducing their total tax obligations. Multinational firms typically can benefit by reducing prices charged by affiliates in high-tax countries for items and services provided to affiliates in low-tax countries. OECD governments require firms to use transfer prices that would be paid by unrelated parties, but enforcement is difficult, particularly when pricing issues concern unique items such as patent rights. Given the looseness of the resulting legal restrictions, it is entirely possible for firms to adjust transfer prices in a tax-sensitive fashion without even violating any laws.

The evidence of tax-motivated transfer pricing comes in several forms. Grubert and Mutti (1991) and Hines and Rice (1994) analyze the aggregate reported profitabilities of U.S affiliates in different foreign locations in 1982. Grubert and Mutti examine

profit/equity and profit/sales ratios of U.S.-owned manufacturing affiliates in 29 countries, while Hines and Rice regress the profitability of all U.S.-owned affiliates in 59 countries against capital and labor inputs and local productivities. Grubert and Mutti report that high taxes reduce the reported after-tax profitability of local operations; Hines and Rice find considerably larger effects (one percent tax rate differences are associated with 2.3 percent differences in *before*-tax profitability) in their data. While it is possible that high tax rates are correlated with other locational attributes that depress the profitability of foreign investment, competitive conditions typically imply that after-tax rates of return should be equal in the absence of tax-motivated income-shifting. The fact that before-tax profitability is negatively correlated with local tax rates is strongly suggestive of active tax avoidance.

The reported low profit rates of foreign-owned firms in the United States over the last 20 years is a source of concern to observers who suspect foreign investors of transferring profits earned in the United States to low-tax jurisdictions offshore. Grubert et al. (1993) use firm-level tax return data to compare the tax liabilities of foreign-owned firms in the United States with the tax liabilities of otherwise-similar American-owned firms in 1987. They report that approximately 50 percent of the difference in the reported U.S. tax obligations of foreign and domestic firms is explainable on the basis of observable characteristics such as firm sizes and ages. The other 50 percent may reflect the use of aggressive transfer pricing by those foreign investors with stronger incentives than American firms to shift taxable income out of the United States, though it may also simply capture the effect of important omitted variables.

Harris et al. (1993) report that the U.S. tax liabilities of American firms with tax haven affiliates are significantly lower than those of otherwise-similar American firms over the 1984-1988 period, which may be indirect evidence of aggressive transfer-pricing by firms with tax haven affiliates. As Grubert and Slemrod (1998) observe, it is difficult to attach a structural interpretation to this pattern, since firms endogenously select the locations of their foreign affiliates; nevertheless, this evidence suggests an important role for tax havens in facilitating international tax avoidance. Collins et al. (1998) analyze a pooled sample of U.S. multinationals over 1984-1992, finding a similar pattern of greater reported foreign profitability (normalized by foreign sales) among firms facing foreign tax rates below the U.S. rate. The reduction in the U.S. statutory corporate tax rate from 46 percent in 1986 to 34 percent in 1988 offers another method of identifying propensities to shift reported profits internationally. Klassen et al. (1993) find that American multinationals report returns on equity in the United States that rose by 10 percent over this time period relative to reported equity returns in their foreign operations. The very limited nature of publicly available data on even the location of foreign operations makes it difficult, however, to discern the extent to which this change is attributable to changing economic conditions in the United States and abroad.

Patterns of reported profitability are consistent with other indicators of aggressive tax-avoidance behavior, such as the use of royalties to remit profits from abroad and to generate tax deductions in host countries. Hines (1995) finds that royalty payments from foreign affiliates of American companies in 1989 exhibit a –0.4 elasticity with respect to the tax cost of paying royalties, and Grubert (1998) also reports significant effects of tax rates on royalty payments by American affiliates in 1990. Clausing (1998) finds that

reported trade patterns between American parent companies and their foreign affiliates, and those between foreign affiliates located in different countries, are consistent with transfer-pricing incentives. Controlling for various affiliate characteristics, including their trade balances with unaffiliated foreigners, Clausing finds that ten percent higher local tax rates are associated with 4.4 percent higher parent company trade surpluses with their local affiliates. This pattern is suggestive of pricing practices that move taxable profits out of high-tax jurisdictions.

Multinational firms can adjust the timing of their dividend repatriations from foreign subsidiaries to reduce the associated tax liabilities, and there is considerable evidence that they do. Hines and Hubbard (1990) examine tax return information for more than 10,000 foreign subsidiaries of American firms in 1984, finding that only 16 percent paid positive dividends to their parent companies in that year. Foreign subsidiaries were more likely to pay dividends to parent companies if the associated tax costs were low and if parent companies also paid sizable dividends to their common shareholders. Altshuler and Newlon (1993) report similar findings in their analysis of tax return data for 1986, while Altshuler et al. (1995) find transitory tax costs to have much larger effects on dividend payments than do permanent tax costs in their panel of American-owned foreign subsidiaries in 1980, 1982, 1984, and 1986. This estimated difference between the effects of transitory and permanent tax costs is consistent with Hartman's (1985) insight that, while transitory tax costs should affect the timing of dividend repatriations, permanent costs should not, since permanent costs must be paid ultimately and are not reduced by deferral. It remains an open question, however, to what extent permanent tax costs can be accurately identified in a six-year panel.

The form of a business organization can affect its tax obligation, thereby creating incentives for tax avoidance through the endogenous selection of organizational forms. The U.S. Tax Reform Act of 1986 introduced an important distinction between the tax treatment of income received from majority-owned foreign affiliates of American companies and income received from foreign joint ventures owned 50 percent or less by Americans. After 1986, Americans were required to calculate separate foreign tax credit limits for dividends received from each minority-owned joint venture. This change greatly reduces the attractiveness of joint ventures, particularly those in low-tax foreign countries. Desai and Hines (forthcoming) report that American participation in international joint ventures fell sharply after 1986, in spite of rising joint venture activity by non-American multinational firms. The drop in American joint venture activity is most pronounced in low-tax countries, which is consistent with changing tax incentives, and for which there is no obvious non-tax explanation. Moreover, joint ventures in low-tax countries use more debt and pay greater royalties to their American parents after 1986, reflecting their incentives to economize on dividend payments.

The location and intensity of R&D activity also appears to reflect tax avoidance incentives. The U.S. Tax Reform Act of 1986 removed the full deductibility of the U.S. R&D expenses of American multinationals, replacing it with a system very similar to that introduced for interest expenses. Hines (1993) compares changes in the growth rate of R&D spending from 1984-1989 by two groups in a sample of 116 multinational companies: firms with excess foreign tax credits, for whom the tax cost of performing R&D rose after 1986, and firms with deficit foreign tax credits, for whom the tax cost of R&D did not change. What distinguishes firms in these two groups is average foreign tax

rates, which are more or less randomly distributed (in the sense of being uncorrelated with R&D spending in the years before 1986). R&D spending levels of firms in the first group grew more slowly than those of firms in the second group, the implied elasticity of demand for R&D lying between –0.8 and –1.8 in alternative specifications of the R&D demand equation.

International differences in royalty withholding taxes offer evidence of the substitutability of R&D in different locations. Higher royalty taxes raise the cost of imported technology, which in turn stimulates local R&D if imported technology and local R&D are substitutes, and discourages local R&D if they are complements. Hines (1995) finds that American-owned foreign affiliates are more R&D-intensive if located in countries that impose high withholding taxes on royalty payments, and similarly, that foreign firms investing in the United States are more R&D-intensive if they are subject to higher royalty withholding tax rates. These results suggest that imported technology and locally produced technology are substitutes, and that multinational firms respond to tax rate differences by undertaking such substitution.

*3.2.2 Implications.*

International tax avoidance is evidently a successful activity. The reported profitability of multinational firms is inversely related to local tax rates, a relationship that is at least partly the consequence of tax-motivated use of debt financing, the pricing of intrafirm transfers, royalty payments, and other methods.

It is important not to lose sight of the fact that, in spite of the demonstrated ability of multinational firms to arrange their affairs to avoid taxes, these large corporations

nevertheless pay enormous sums in taxes each year. Tax avoidance appears to be limited by available opportunities and the enforcement activities of governments. Far from removing incentives to locate FDI in low-tax locations, the ability to use sophisticated tax avoidance techniques probably enhances the attractiveness of tax haven locations for FDI, since the return to clever tax-avoiding activity is a function of the amount of income that can be reasonably rerouted. From an empirical and econometric standpoint, it is very difficult to distinguish different motivations for investing in countries with low tax rates. It is nonetheless noteworthy that Hines and Rice (1994) and Grubert and Slemrod (1998) find that models in which income-shifting is an important motivation for investing in low-tax countries fit the data very well. These results suggest that the ability to shift the location of reported income influences the incentives to undertake FDI, and that levels of FDI affect the extent to which firms can shift the location of reported income.

The ability to tax domestic economic activity in an open economy is significantly affected by opportunities for international tax avoidance. Countries that limit the deductibility of interest payments may reduce domestic investment and encourage their firms to raise funds through foreign affiliates. Countries that fail to offer attractive tax treatment to R&D expenditures may find their firms moving R&D activities abroad. And countries imposing business taxes at very high rates may find sizable portions of their tax bases shifted outside of their own taxing jurisdictions.

Evidence of international tax avoidance offers important lessons for the design of domestic taxation even in the absence of substitutability between domestic and foreign activity. As in the case of FDI research, responses to the incentives created by international tax rules enlighten aspects of behavior that might be difficult to discern

otherwise. For example, the willingness of certain multinational firms to reduce their borrowing and look for substitute sources of funds when debt became more expensive after 1986 suggests that the tax deductibility of interest expenses greatly encourages corporate borrowing. Extrapolating somewhat from the behavior of multinational firms, the estimates imply that removing tax deductibility would reduce the outstanding stock of corporate debt by 50 percent over five years. The greater than unit elastic demand for R&D exhibited in reactions to the 1986 tax reform implies that the Research and Experimentation Credit (for R&D performed in the United States) generates more than $1 of private sector R&D for every $1 of credit. And the effect of international tax rules on the organizational form of foreign business activity suggests that the differential domestic taxation of corporate and unincorporated businesses may significantly reduce the rate at which new businesses are incorporated.

## 4. Conclusion.

There is by now extensive quantitative evidence that international taxation influences the volume and location of foreign direct investment, and is responsible for a wide range of tax avoidance activity. This evidence is consistent with anecdotal accounts of the behavior of multinational firms, and inconsistent with some prior speculation over the factors influencing the location of multinational activity.

The observed responsiveness of multinational activity to its taxation carries direct implications for the formation of international tax policy, and indirect, but no less important, implications for the formation of domestic tax policy. The international mobility of economic activity now looms over any attempt to tax domestic income-

producing activity too heavily. Indeed, the importance of this consideration raises the very real question of whether there any longer exists such a thing as purely domestic tax policy. And to whatever degree that domestic considerations guide policy, the ability to evaluate the impact of alternative foreign tax systems on the behavior of internationally-mobile taxpayers provides information that is potentially very useful in the design of new tax policies.

The available international evidence implies that investment location and tax avoidance activity are more responsive to tax rate differences than is typically implied by domestic evidence. Taking the international evidence at face value, it follows that governments seeking a combination of adequate tax revenue and efficient economic performance are well advised to impose low taxes on mobile factors such as FDI. Policies that encourage international investors to report income locally rather than shifting reported income to offshore locations are also valuable in this environment. Examples of such policies include maintaining tax rates slightly below those of major trading partners, and offering attractive home-country taxation of income flows (such as interest and royalties) that are deductible in foreign jurisdictions. To the extent that governments value the economic spillovers that may accompany locally-performed R&D, light taxation of royalty receipts from foreign sources and higher taxes on cross-border royalty payments are indicated.

Of course, it is also possible to expend greater resources on tax collection and auditing, and to change international tax provisions to aid the enforcement of arm's-length pricing rules and other regulations that apply to multinational firms. These options are not, of course, inconsistent with the tax policy changes just mentioned, and indeed

might run in tandem with them. In an environment in which economic resources are very mobile, however, stiff enforcement by itself is unlikely to generate much tax revenue, since greater enforcement is much like a tax that drives the tax base elsewhere.

From the standpoint of domestic tax policy, the international evidence suggests that demand for R&D, plant and equipment, and other productive factors is considerably more responsive to taxation than previously suspected. Among the many implications of this evidence is the high likelihood that states offering attractive tax climates will be able to draw business activity away from other parts of the United States. Over time, states that actively seek new businesses will be more successful than those that do not, and their example may spur a round of competitive tax reductions at the state level. These reductions need not reduce overall tax burdens on business, since the federal government can offset them with higher national tax rates, but doing so requires attention to, and anticipation of, subnational developments. For more specialized investments such as R&D, the international evidence indicates that initiatives such as the Research and Experimentation Credit encourage significant amounts of R&D for every dollar of tax credit. How large the credit should be depends, of course, on how much value to attach to locally performed private-sector R&D, and on this point there is considerable controversy.

The ability to look across countries and firms with widely differing tax situations makes it possible to learn a great deal about the responsiveness of economic activity to its tax treatment. In spite of the available evidence of the behavioral effects of taxation, much of the analysis still dwells on relatively rudimentary questions, such as whether or not tax incentives matter, paying much less attention to important but subtle issues such

as the ways in which tax and non-tax incentives interact, the general equilibrium impact of tax policy changes, and the importance of commitments to future tax policies. There is a bright future for research in the international tax area, not only because there are many unanswered questions, and a worldwide laboratory to use in answering them, but also because the formation of domestic as well as international tax policy turns on the answers.

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