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TAX POLICY AND THE ACTIVITIES
OF MULTINATIONAL CORPORATIONS

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ABSTRACT

This paper reviews quantitative studies of the impact of international tax rules on the financial and real behavior of multinational firms. The evidence, much of it recent, indicates that taxation significantly influences foreign direct investment, corporate borrowing, transfer pricing, dividend and royalty payments, R&D activity, exports, bribe payments, and location choices. While taxes appear to influence a wide range of activity, the literature does not offer many subtle tests designed to distinguish different theories of the effects of taxation on multinational firms. The paper evaluates the reliability of existing evidence and its implications for the design of international tax policy.

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1. Introduction.

It is an uncommon American presidential election in which at least one of the major party candidates does not promise to overhaul the tax system if elected (or re-elected). The hardness of this campaign issue suggests three nonexclusive possibilities: (i) that the electorate has an insatiable thirst for tax reform rhetoric; (ii) that Congress has a chronic inability to draft popular tax laws; or (iii) that evolving economic conditions necessitate frequent tax changes.

The changing position of the United States in the world economy is consistent with the third of these possibilities (which is not to rule out the first two). The basic structure of federal income taxation was in place long before the American economy acquired the kind of international position it has in the last few decades; as a consequence, international considerations are afterthoughts in its design. This aspect of tax policy is slowly changing. Recent U.S. legislation devotes considerable effort to modifying the foreign provisions of U.S. tax law.¹ International tax issues attract popular attention as well; it is noteworthy that as obscure (from the standpoint of the general public) and technical an issue as the transfer pricing practices of foreign investors in the United States became a major topic of discussion during the 1992 presidential election campaign. Unfortunately, not all of the public discussion reflects the latest thinking and evidence on the economic behavior of firms subject to international taxation.

This paper examines quantitative studies of the impact of international tax rules on the

¹The Joint Committee on Taxation (JCT) of the U.S. Congress provides elaborate explanations of major U.S. tax legislation. One way to gauge the significance of individual items in large tax bills is to measure the attention they receive in the accompanying JCT explanation. Of 1,341 pages explaining the revenue provisions of the Tax Reform Act of 1986 (U.S. Congress, 1987), 276 pages, or 21% of the total, are devoted to its foreign provisions. While the primary purpose of the 1986 Act was to reform domestic taxation, Congress apparently felt that it had extensive unfinished business in the foreign tax area as well.

financial and real behavior of multinational firms.² The evidence, much of it recent, indicates that taxation significantly influences the financing of multinational corporations and their allocation of factors and products around the world. As a consequence, foreign tax rules can be expected to affect the performance of foreign economies; these tax rules also affect the U.S. domestic economy, doing so through at least three channels. The first channel of influence reflects the interdependence of operations within U.S. firms: a firm's foreign and domestic activities affect each other through productivity spillovers and by competing for resources. The second way in which foreign tax rules affect the American economy is by influencing the level and composition of foreign-owned business activity in the United States. The third effect is more subtle, stemming from the way that the United States taxes foreign income together with domestic income, thereby often indirectly modifying the incentives firms have to undertake domestic activities.

It is useful to distinguish the sources of increased U.S. attention to international tax issues in order to identify the role that quantitative analysis can play in enlightening the development of U.S. tax policy. The growing recognition of the importance of foreign direct investment (FDI) in the lives of modern economies is clearly one factor. The importance of FDI, in turn, implies that tax policies that once made sense may no longer do so, since resources appear to be more internationally

²International tax rules affect returns to many other activities such as worker migration and the allocation of financial investments by individuals. This paper does not consider those issues in the interest of concentrating on multinational corporations. Of course, it is not possible to separate completely the effects of tax policies on firms and individuals, since individuals own firms and may also work for them. See, for example, Gordon and Jun (1993), who analyze the way that taxes influence substitution between individual ownership of foreign equity and direct investment by multinational corporations.

American multinational corporations typically perform many more international transactions than do American individuals. Individual Americans report \$29 billion of foreign-source income for 1991 (Redmiles, 1994), while American corporations report \$90 billion of foreign-source income for 1990 (Nutter, 1994). Even if individuals are more likely than corporations to underreport their foreign incomes, these figures reveal a large difference between the magnitudes of the foreign activities of American individuals and corporations, a difference that would be much larger still if measured by value added rather than income.

mobile than ever before. Furthermore, the magnitude of FDI suggests that the penalties for mistaken or inefficient international tax rules are far greater than they were in the past.

The tax policies of other countries also contribute to the U.S. attention to its own international tax policy. Together with the expanding role of FDI, foreign tax changes put pressure on the United States to make its own tax environment competitive with those available in other locations. Other countries typically pay greater attention than does the United States to the international consequences of tax policies, and, while the United States traditionally felt little inspiration to respond to the tax policies of other countries, the U.S. attitude appears to be changing.³

The complexity of international tax rules may also contribute to the perceived desirability of reform. Not that simplicity *per se* is thought to be a critical attribute; many of the recent U.S. reforms complicate rather than simplify the tax treatment of international transactions. Instead, the complexity of the U.S. system of taxing international income serves to convince observers that the tax system may have undesirable and previously-unknown effects that could be removed through reform. Due in part to their complexity, the economic implications of the international provisions of U.S. tax law were for many years probably the least-studied of any of the major parts of the Internal Revenue Code. But these issues have attracted considerably more attention in recent years.

Section 2 of the paper describes general features of U.S. and foreign taxation of international business transactions. Section 3 considers the impact of U.S. and foreign taxation on levels and patterns of foreign direct investment. Section 4 examines the impact of tax laws on corporate financing. Section 5 evaluates the ability of international taxation to stimulate or discourage specific business activities, including R&D, technology transfer, and bribery of government officials.

³For example, the JCT offers its analysis of other countries' recent experiences with value-added taxes (U.S. Congress, 1991, 321-333) as a guide to the formation of U.S. policy.

Section 6 considers implications of the quantitative evidence.

2. The Tax System.⁴

Throughout the world, governments tax economic activity that occurs within their boundaries, typically including any income earned locally by foreign firms and individuals. In addition, some countries (including the United States) attempt to tax the foreign incomes of their residents. Since international transactions typically entail income-generating activity in more than one country, it is necessary for tax systems to identify in which countries income is attributed for tax purposes, and (in many cases) to distinguish various types of income, deductions, and credits for purposes of calculating tax liabilities. This section outlines some of the important features of U.S. taxation of foreign income, both to illustrate worldwide taxation and to provide some background for the empirical studies reviewed in sections 3-5.

The United States taxes income on a residence basis, meaning that American corporations and individuals owe taxes to the U.S. government on all of their worldwide income, whether earned in the United States or earned outside the United States. In order to avoid subjecting American multinationals to double taxation, U.S. law permits firms to claim foreign tax credits for income taxes (and related taxes) paid to foreign governments.⁵ The U.S. corporate tax rate is currently 35 percent. Under the foreign tax credit system, a U.S. corporation that earns \$100 in a foreign country with a 15 percent tax rate pays a tax of \$15 to the foreign government and \$20 to the

⁴Some parts of this brief description of international tax rules are excerpted from Hines and Hubbard (1995).

⁵The U.S. government is not alone in taxing the worldwide income of its resident companies while permitting firms to claim foreign tax credits. Other countries with such systems include Greece, Italy, Japan, Norway, and the United Kingdom. Under U.S. law, firms may claim foreign tax credits for taxes paid by foreign affiliates of which they own at least 10 percent, and only those taxes that qualify as income taxes are creditable.

U.S. government, since its U.S. corporate tax liability of \$35 (35 percent of \$100) is reduced to \$20 by the foreign tax credit of \$15.

Deferral of U.S. taxation

Under U.S. law, Americans must pay tax to the U.S. government on their worldwide incomes, with the exception that a certain category of foreign income is temporarily excluded from U.S. taxation. The excluded category is the unrepatriated portion of the profits earned by foreign subsidiaries; taxpayers are permitted to defer any U.S. tax liabilities on those profits until they are paid as dividends to the United States.⁶ 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 U.S.-owned branch banks in other countries, are taxed immediately by the United States.

To illustrate deferral, consider the case of a U.S.-owned subsidiary that earns \$500 in a foreign country with a 10 percent tax rate. This subsidiary pays taxes of \$50 to the foreign country (10 percent of \$500), and might remit \$100 in dividends to its parent U.S. company, using the remaining \$350 (\$500 - \$50 of taxes - \$100 of dividends) to reinvest in its own, foreign, operations. The U.S. 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).⁷ But the U.S. firm is not required to pay U.S. taxes on any part of the \$350 that the subsidiary earns abroad and does not remit to its parent U.S. company. If, however, the subsidiary were to pay a dividend of

⁶Deferral 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.

⁷If the parent firm does not have excess foreign tax credits (on which more shortly), it is eligible to claim a foreign tax credit of \$11.11, representing the product of foreign taxes paid by its subsidiary and the subsidiary's ratio of dividends to after-tax profits [$\$50 \times (\$100/\$450) = \11.11].

\$350 the following year, the firm would then be required to pay U.S. tax (after proper allowance for foreign tax credits) on that amount.

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 U.S. corporations holding 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. This 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 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.

Excess foreign tax credits

The U.S. government permits American firms to claim foreign tax credits, doing so with the understanding that this policy reduces the tax revenue collected by the United States on any given amount of foreign-source income. The foreign tax credit is intended to reduce the problems created by international double taxation, since, in the absence of some kind of correction, the combined tax burdens of host-country and home-country taxation might effectively prohibit most international business transactions. Consequently, the U.S. government attempts to design the foreign

tax credit in a way that prevents American firms from using foreign tax credits to reduce U.S. tax liabilities that arise from profits earned *within* the United States.

The government imposes limits on the foreign tax credits that U.S. firms can claim; a firm's foreign tax credit limit equals the U.S. tax liability generated by the firm's foreign-source income. For example, with a U.S. tax rate of 35 percent, an American firm with \$200 of foreign income faces 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 \$95 of foreign taxes, it would be permitted to claim no more than \$70 of foreign tax credits.

Firms described by this second case, in which 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 exceeds the U.S. tax liabilities generated by their foreign incomes. Firms described by the first case, in which foreign tax payments are smaller than the foreign tax credit limit, are said to have "deficit foreign tax credits." Under American law, firms can, under some circumstances, use excess foreign tax credits in one year to reduce their tax obligations for other years. Firms are allowed to apply any excess foreign tax credits against their US tax obligations in the two previous years or in any of the following five years.⁸

In practice, the calculation of the foreign tax credit limit entails many complications

⁸Foreign 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.

not reviewed here. There is one major feature of the calculation that should, however, be noted: U.S. law requires firms to use all of their worldwide foreign income to calculate the foreign tax credit limit. Firms then have excess foreign tax credits if the sum of their worldwide foreign income tax payments exceed this limit.⁹ This procedure is known as "worldwide averaging."

3. The Impact of Taxation on Foreign Direct Investment.

There is a great deal of interest in, and concern about, the possible impact of tax policy on FDI. High tax rates are naturally thought to discourage foreign investment, though there is some controversy over this point. Older time-series studies indicate a very great responsiveness of FDI to tax differences, though the infrequency of major tax changes and the correlation of tax changes with movements in important omitted variables may make this evidence inconclusive. Recent research is more cross-sectional in nature than earlier studies, and offers more convincing evidence of a smaller but important and statistically significant effect of taxation on the location and volume of investment.

Before examining the existing evidence on the impact of taxation on FDI, it is worth considering why this issue receives the kind of attention that it does. Clearly, if all other considerations are held constant, international investors would prefer to avoid taxes than to pay them, so there must exist some situations in which tax differences significantly influence investment. The question driving empirical work is the extent to which these situations arise in practice. International investments are influenced by a host of considerations of which taxes are just one. The complexity of international investment planning, given the uncertainty firms face in forecasting future economic and

⁹Not 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 used to require 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.

political conditions, convinces some observers (such as Vernon, 1977) that tax differences are too small to have anything other than trivial effects on investment location. Alternatively, if multinational firms can costlessly structure their finances to relocate taxable income, tax rates would not influence investment because firms would pay little or no taxes in jurisdictions with high rates. A third possibility is that governments imposing high tax rates indirectly compensate firms with difficult-to-measure investment incentives such as worker training and infrastructure. These possibilities make it difficult to predict the responsiveness of FDI to taxation, though this responsiveness is measurable with available information.

American direct investment abroad

Most models of the investment process imply that capital is attracted to activities and locations in which it earns the greatest after-tax returns. A number of empirical studies report positive correlations between investment levels and after-tax returns to foreign direct investment.¹⁰ The idea underlying these studies is to use the correlations to infer the effect of taxation on foreign direct investment; this is a legitimate inference under the assumption that higher tax rates reduce after-tax rates of return. These inferences are subject to some well-known limitations, however, since rates of return are endogenous to investment levels and are likely to be influenced by omitted variables that also influence investment.

Table 1 summarizes a small literature that examines the effect of taxation on U.S. direct investment abroad. Hartman (1981) estimates the responsiveness of aggregate U.S. direct

¹⁰FDI is often used as a measure of foreign investment, but it is noteworthy that changes in FDI need not correspond to new investment in plant, equipment, or inventories. U.S. direct investment abroad is the (annual) change in the value of American claims on foreign businesses owned significantly by Americans. If an American company that owns 90% of a foreign subsidiary spends \$1 million to increase its ownership share to 92%, then the \$1 million is treated as FDI. An otherwise-similar transaction that increases an American firm's ownership share from 2% to 4% is not treated as FDI. See also note 11.

investment abroad over the 1965-1979 period to after-tax rates of return available in foreign countries and in the United States. This study distinguishes investment financed out of retained foreign earnings from investment financed out of new transfers of funds from the United States. For investment financed out of retained earnings, Hartman reports the expected positive effect of foreign after-tax rates of return (investment elasticity of 1.4) and negative effect of domestic U.S. after-tax rates of return (investment elasticity of -0.66). Investment financed by transfers of funds does not exhibit a consistent correlation with after-tax returns.

Studies by Boskin and Gale (1987) and Newlon (1987) extend and update Hartman's findings, confirming that the patterns identified by Hartman are present over longer periods of time and are robust to definitional changes in the underlying data. The time-series evidence seems to indicate strongly that years in which U.S. direct investment abroad is most profitable are those in which Americans invest the most abroad through retained foreign earnings. It is difficult to say whether this relationship represents the effect of investors responding to incentives, rule-of-thumb behavior in which firms finance their foreign affiliates with fixed fractions of after-tax profits, or the effects of omitted variables. Alternatively, this correlation could be a purely statistical phenomenon stemming from the fact that FDI is measured as fund transfers plus foreign profits minus repatriations, implying that any independent measurement error in foreign after-tax profits is by construction correlated with measured direct investment abroad. More generally, the primary limitation of aggregate time-series studies is that they are identified by yearly variations in taxes or profitability that may be correlated with any of a number of omitted nontax factors.

Frisch and Hartman (1983) investigate the impact of host-country taxation on the cross-sectional distribution of subsidiary assets in 1972, as reported in tax returns. Frisch and Hartman pool aggregate data for 15 industries in 16 countries, reporting an elasticity of -0.26 with respect to local tax rates. While many variables of potential importance are also omitted from these

regressions, the cross-sectional strategy they embody is more robust than are time-series models to measurement error and to minor specification issues (such as the choice of lag length). In pooling their data, Frisch and Hartman treat different industries as separate, and therefore independent, observations, however, which is difficult to justify and suggests that their estimated standard errors may be too small.

Grubert and Mutti (1991) and Hines and Rice (1994) estimate the effect of national tax rates on the cross-sectional distribution of aggregate U.S.-owned property, plant and equipment (PPE) in 1982. These studies use a somewhat different concept of capital ownership than does the Frisch/Hartman study, since PPE in American-controlled foreign affiliates is not the same thing as gross American-owned assets; of the two, PPE probably more closely corresponds to capital that enters production functions and for which derived demand is a function of tax rates. Grubert and Mutti analyze the distribution of PPE in manufacturing affiliates in 33 countries, reporting a -0.11 elasticity of PPE with respect to local tax rates. Hines and Rice consider the distribution of PPE in all affiliates in 73 countries, reporting that 1% lower tax rates (such as the difference between tax rates of 37% and 36%) are associated with 3% greater PPE; this corresponds to an elasticity of about -1. The much higher elasticity reported by Hines and Rice reflects differences in industrial coverage (Hines and Rice examine the determinants of investment in all industries while Grubert and Mutti consider only manufacturing investment) as well as their inclusion of data from U.S. operations in many more countries - particularly tax havens - than those analyzed by Grubert and Mutti.

Two studies analyze firm-level information on the impact of taxation on U.S. direct investment abroad. Harris (1993) investigates whether companies whose costs of capital in the United States rose most dramatically after passage of the Tax Reform Act of 1986 respond by investing more abroad. The Tax Reform Act of 1986 removed the investment tax credit and accelerated depreciation for investments within the United States, expanded the coverage of the alternative minimum tax, and

made other changes; Harris finds that firms concentrating their investment in equipment (which was particularly hard hit by the Act) respond by expanding their investment abroad. Cummins and Hubbard (1995) estimate investment equations for foreign subsidiaries of U.S. firms under two alternative scenarios, one in which it is assumed that firms simply ignore taxes, and a second in which it is assumed that firms incorporate taxation in their decisionmaking (and therefore reduce investment in response to higher tax rates). They report that the data fit the second specification better than the first, suggesting that taxes influence direct investment by affiliates.

Further evidence on the effect of taxation on direct investment abroad is provided by the experience of Puerto Rico. Under U.S. law (section 936 of the Internal Revenue Code), American companies investing in Puerto Rico and other U.S. possessions (such as Guam and American Samoa) treat their U.S. possession income as foreign income on which U.S. federal income tax can be avoided altogether by the use of foreign tax credits. This very favorable tax treatment is intended to encourage local economic development, and to provide a tax base for Puerto Rican authorities. The government of Puerto Rico taxes local business profits, but frequently attempts to attract new investment by offering firms tax holidays of roughly 12 years during which no local taxes are due. Bond (1981) finds the tax holiday to be an important determinant of business activity among the firms in the garment industry he studies: exit from the industry closely coincides with expiration of a firm's holiday from Puerto Rican taxes. Grubert and Slemrod (1994) analyze the factors that determine whether or not an American firm has a Puerto Rican affiliate. The favorable tax treatment of income earned in Puerto Rico gives firms incentives to shift profits from operations in the mainland United States to affiliates located in Puerto Rico. (The theory and practice of such income-shifting is discussed in section 4 below.) Grubert and Slemrod argue that firms whose domestic assets are largely intangible (the product of activities such as research and development or advertising) will find it easier than other firms to shift profits to Puerto Rico, and should therefore have the greatest

demand for Puerto Rican affiliates. Tax return data are consistent with this prediction.

Foreign direct investment in the United States

Empirical investigations of foreign direct investment into the United States closely parallel those of U.S. direct investment abroad, both in approach and in the type of results they report. There is, however, an important distinction between the two types of studies beyond the obvious difference in their coverage. U.S. direct investment abroad is subject to a single home-country tax regime and multiple host-country tax regimes; foreign direct investment in the United States is subject to multiple home-country tax regimes and a single U.S. federal tax system. Consequently, studies of U.S. direct investment abroad are generally more capable of identifying the effect of host-country taxes on FDI, and those of foreign direct investment in the United States more capable of identifying the effect of home-country taxes on FDI.

Table 2 summarizes a number of the studies of FDI in the United States. Hartman (1984), Boskin and Gale (1987), Newlon (1987) and Young (1988) all estimate time-series equations of aggregate foreign investment in the United States. Hartman and Boskin and Gale report that FDI financed by retained earnings is positively correlated with after-tax rates of return available in the United States; Newlon and Young confirm that FDI financed by retained earnings responds negatively to U.S. tax rates. These studies examine slightly differing periods, use similar but not identical econometric specifications, and employ BEA data that are periodically revised and which may warrant the special treatment afforded them by Newlon and by Slemrod (1990);¹¹ but their empirical

¹¹The BEA data on which these FDI studies are based are produced by the Bureau of Economic Analysis (BEA) of the U.S. Department of Commerce as part of its effort to construct the national income and product accounts. FDI is one of the most difficult economic variables to measure in practice, which is why the BEA conducts periodic benchmark surveys of U.S. direct investment abroad and foreign direct investment in the United States in order to correct cumulative errors in its annual measurement of FDI. Furthermore, the definition of FDI changes over time (prior to 1974, BEA defined FDI in the United States to be investment by an entity in which a foreigner owns at least a 25% stake; starting in 1974, the

conclusions are very similar: the relevant behavioral elasticities do not differ greatly from unity. Of course, these findings are subject to the same limitations as are those of the studies of U.S. direct investment abroad.

Slemrod (1990) extends the time-series approach by distinguishing FDI in the United States by the tax regime of its country of origin. Foreign firms investing in the United States fall into two broad categories. The first category includes investors from countries (of which Slemrod considers Australia, Canada, France, Germany, and the Netherlands) that do not tax - or tax very lightly - the American profits of their resident multinationals. The second category includes investors from countries (of which Slemrod considers Japan and the United Kingdom) that do tax the American profits of their firms, but provide foreign tax credits for the federal and state income taxes these firms pay. To investors from Canada and Germany, U.S. corporate income taxes represent costs of doing business; to investors from Japan and the United Kingdom, corporate income taxes also represent costs, but these costs are - at least in part - compensated by their own government's provision of foreign tax credits. Consequently, investors from Canada and Germany have stronger incentives to avoid locating their businesses in the United States during periods of high tax rates than do investors from Japan and the United Kingdom, even if the businesses are otherwise identical. Slemrod does not find consistent timing differences between the two groups of investors that correspond to the incentives created by their home-country tax regimes. He does, however, report that higher U.S. taxes appear to discourage FDI financed by transfers of new funds.

Auerbach and Hassett (1993) and Swenson (1994) examine the correlation between the industrial and asset compositions of foreign-owned businesses in the United States and incentives created by the interaction of host-country and home-country tax systems. The starting point for these

required foreign ownership share is only 10%). Newlon and Slemrod correct some inconsistencies in the historical BEA series, and add dummy variables and time trends around years of data revisions to remove mechanical patterns created by revisions.

studies is the observation of Scholes and Wolfson (1992) that the U.S. tax changes introduced by the Tax Reform Act of 1986 - in particular the removal of the investment tax credit and accelerated depreciation - raised the attractiveness of U.S. assets to foreigners whose home countries tax the foreign profits of their resident multinationals while providing foreign tax credits for taxes paid to foreign governments. For American investors, the inability to claim investment tax credits or to take accelerated depreciation in the years after 1986 greatly reduced the after-tax returns to new investments, while for foreign investors from Japan or the United Kingdom, the loss of tax advantages after 1986 is less consequential, since their higher U.S. tax liabilities in many cases generate offsetting credits against home-country taxes. Consequently, one might expect to observe a shift in the ownership of assets located in the United States away from Americans and toward certain foreigners; on this basis, Scholes and Wolfson hypothesize that the Tax Reform Act of 1986 is responsible for the FDI influx of the late 1980s.

Swenson (1994) analyzes aggregate FDI in 18 industries over the years 1979-1991. Her time-series estimates suggest that the higher U.S. after-tax cost of capital after 1986 is correlated with greater foreign investment, which conforms to the predictions of Scholes and Wolfson. Other studies report evidence that is not consistent with the Scholes-Wolfson hypothesis. Auerbach and Hassett (1993) find that, in acquiring American firms, investors from foreign tax credit countries do not exhibit preferences for equipment-intensive firms or industries, as would be predicted by the Scholes-Wolfson hypothesis; and they go on to describe other inconsistencies between the implications of the Scholes-Wolfson model and aggregate behavior of foreign investors after 1986. Collins et al. (1995) report that the relative tax advantages realized by British and Japanese acquirers are small relative to acquisition purchase prices in the period after 1986. As they note, however, FDI is influenced by expected tax considerations, which differ from realized tax considerations if subsidiaries have unanticipated negative profitability. Willard (1994) argues that the removal of accelerated

depreciation in the United States should discourage rather than encourage FDI from foreign tax credit countries. She notes that their tax systems typically contain provisions that automatically adjust home-country taxation of foreign profits to host-country tax bases, implying that the removal of accelerated depreciation raises home country taxation of foreign income. Willard offers evidence that investors from foreign tax credit countries were, in fact, the least inclined to expand their American operations after 1986.

Several studies examine the extent to which taxation influences the geographic distribution of foreign-owned business activity within the United States. Coughlin et al. (1991) estimate the determinants of new manufacturing plant location over the 1981-1983 period, reporting that state corporate income tax rates do not have significant effects on plant location after controlling for other state characteristics. Ondrich and Wasylenko (1993) examine new plant location over a longer period of time (1978-1987), finding instead that state corporate tax rates do influence the sites chosen by foreign investors. The effects of state corporate tax rates are difficult to identify, however, since states do not choose their fiscal policies randomly. Omitted variables that influence investment may also be correlated with state corporate tax rates, since wealthy states with particularly active business sectors (such as California or New York) are the most likely to impose high tax rates to finance their public sectors.

Hines (forthcoming) addresses the omitted variable problem by comparing the inter-state distribution of foreign investments in the United States from foreign tax credit countries with the distribution of investments from other countries. If omitted variables (such as those that make Manhattan a desirable investment location) have the same impact on German investors as they do on British investors, then these effects can be captured by state fixed effects, permitting one to test whether the fact that British investors receive home-country credits for taxes paid while German investors do not means that British investors are more willing than Germans to locate their

investments in high-tax American states. There is a significant difference: 1% state tax rate differences are associated with 10% differences between foreign tax credit and exemption investors in amounts of manufacturing capital owned in 1987, and 3% differences in numbers of firms owned. The estimates imply an elasticity of capital ownership with respect to state taxes of approximately -0.6, which is consistent with some of the more recent studies of the effect of state taxes on the location of domestic American businesses.¹²

Evaluation of FDI research

The bulk of the literature surveyed in this section addresses a quite straightforward, almost rudimentary, question: to what extent does taxation influence foreign direct investment? The answer that emerges in a variety of contexts and from a variety of approaches is that, in spite of all the other economic and political considerations that are clearly very important, taxation exerts a significant effect on the magnitude and location of FDI. While it is somewhat unscientific to summarize the results of so many different studies in a single number, they appear to be generally consistent with a unit elasticity of investment with respect to after-tax returns.

In spite of their mutual consistency, there are several unsatisfying elements in existing studies of the effect of taxation on FDI. One is the general disregard most studies have for the complex ways in which multinational firms are organized and financed. Authors of FDI studies are aware of these omissions, but data limitations along with a desire to answer the very basic question of whether taxation influences FDI motivates the specifications used in practice. Financing alternatives influence investment not only by affecting the cost of capital but also by changing the timing and form that investments take. As a consequence, small differences between countries in the ease with which firms can borrow in local debt markets can have dramatic consequences for measured FDI,

¹²See, for example, Bartik (1985) and Papke (1991).

completely independently of the taxation of these transactions. These issues are considered further in section 4.

A second limitation of the methods used to evaluate the effects of taxation on FDI stems from the way in which tax regimes are described by the small number of parameters used in most studies. The resulting imprecision can be responsible for misleading inferences about incentives created by tax policies. One such tax-specification issue receiving recent attention is that of tax base definitional differences between countries. Hines (1988) observes that accelerated depreciation, or other, similar, investment incentives, can raise the cost of new FDI by firms with ongoing operations by reducing the foreign tax credits they can apply against home-country tax liabilities on inframarginal dividend repatriations. Leechor and Mintz (1993), Hines (1994a), and Mintz and Tsiopoulos (1994) analyze the importance of this consideration to effective tax rates in practice. Other important - but often omitted - tax features include the treatment of foreign income under the U.S. Alternative Minimum Tax, analyzed by Lyon and Silverstein (1995).

Another limitation of existing FDI studies is that their very general econometric specifications do not easily provide tests of theoretical predictions of subtle economic responses to incentives created by - in particular - home-country taxation. One example of such an economic response is the time profile of investment by parent firms that stand to benefit from deferral of home-country taxation of their foreign subsidiaries' profits. If significant home-country tax liabilities are triggered by dividend repatriations, then firms undertaking new investments are encouraged to undercapitalize their subsidiaries initially in order to preserve profitable opportunities for future reinvestment of profits. This incentive is strongest in countries with low tax rates. As a consequence, American firms may undercapitalize their initial investments in countries with low tax rates, even though they plan to accumulate quickly and maintain large steady-state capital stocks in those countries. These incentives, which are analyzed by Newlon (1987), Sinn (1993) and Hines

(1994a), may generate behavior that *appears*, in aggregate FDI estimation, to imply that low tax rates do not influence investment - while in fact the opposite is the case.

The fourth and perhaps most important limitation of existing FDI studies is their general inability to incorporate the general equilibrium effects of taxation. When governments change tax policies they affect not only the after-tax returns earned by firms but also equilibrium product prices, interest rates, wages, and exchange rates. The considerable difficulty of incorporating such considerations in empirical analyses does not itself justify their exclusion, particularly when drawing policy conclusions from existing research.

One general equilibrium consideration is the potential substitutability between different business operations. The magnitude and even the direction of the effect of foreign tax rates on levels of American investment may depend on this consideration. If American-owned affiliates compete little with local businesses, then high tax rates should discourage U.S. investment by raising associated tax costs. If, instead, U.S. affiliates compete strongly with local firms or with affiliates of multinationals headquartered in exemption countries, then high local tax rates offer American companies - that can claim tax credits for foreign taxes - competitive advantages over their fully taxed rivals. The FDI evidence is generally consistent with the first of these possibilities, but the data have not been subjected to subtle tests that might fully distinguish them.

Similar issues arise in drawing implications for the effects of tax policies on local business activity. If the relatively high California tax rate discourages German investment more than it does British investment, it does not necessarily follow that the high tax rate reduces total foreign investment in California, since British investors might simply replace German investors on a one-for-one (or better!) basis. Such an outcome might be unlikely on prior grounds, but cannot be dismissed without further investigation.

A different type of general equilibrium consideration is one of the substitutability or

complementarity of foreign and domestic business activities. The operating assumption of many policy activists (such as McIntyre, 1989) is that foreign and domestic factors of production are substitutes. There exists the alternative possibility that lower foreign tax rates stimulate domestic investment by encouraging the accumulation of foreign capital and thereby enhancing the profitability of domestic operations. The negative effect of after-tax rates of return in the United States on outbound FDI in the time series estimates is consistent with mild substitutability between foreign and domestic capital. Feldstein (1995) reports more direct evidence in his cross-sectional analysis of the performance of OECD economies over the 1970-1989 period. He finds that direct investment abroad reduces domestic investment levels, while foreign direct investment increases domestic investment. The coefficient estimates imply that, in spite of the considerable extent to which the foreign operations of American multinational firms are financed by local borrowing, each dollar of foreign investment reduces the domestic capital stock by between \$0.20 and \$0.40. Devereux and Freeman (1995) come to a different conclusion in their study of bilateral flows of investment funds between seven OECD countries from 1984-1989, in which they find no evidence of tax-induced substitution between domestic and foreign investment.

The firm-level evidence reported by Lipsey (1995) and Stevens and Lipsey (1992) offers a similarly mixed picture of the interdependence of foreign and domestic operations. Lipsey provides evidence of a mild positive relationship between production by overseas affiliates of U.S. firms and employment levels in the United States. But Stevens and Lipsey find that greater demand for output by foreign affiliates of U.S. firms is associated with reduced investment in the United States. Of course, the joint determination of foreign and domestic operations makes this type of evidence difficult to interpret. Harris's (1993) firm-level study of reactions to the 1986 U.S. tax change offers sharper identification and is also consistent with substitutability between foreign and domestic operations.

New methods of analyzing foreign and domestic operations may be necessary to obtain consistent indicators of the degree of complementarity or substitutability between them. There are many reasons why this is a difficult issue to resolve, not the least of which is that the own-price elasticities of foreign (and domestic!) investment are still imprecisely measured. In addition, economic changes that influence demands for foreign and domestic assets typically also influence their costs. In the absence of a complete general equilibrium model, it is impossible to predict with certainty the impact of tax changes on capital demand throughout a multinational firm. The available FDI evidence is suggestive, and further evidence is provided by studies of the ways in which multinational firms are financed.

4. The Impact of Taxation on the Financing of Multinational Firms.

Multinational firms have considerable discretion in arranging their own financing, and tax policy influences the choices they make. This is hardly surprising in the light of the FDI evidence, since financing is likely to be more responsive to taxation than is investment - which appears to respond sharply to tax incentives. In fact, the real and financial operations of firms are closely connected, and the tax consequences of this connection carry important implications for policy, as will be apparent shortly.

Taxation influences several aspects of financial policy that warrant at least somewhat separate treatment. The first is leveraging; the second is what, for lack of a better phrase, can be called transfer pricing policy; the third is dividend payout policy; and there are other issues as well. These are considered in turn.

Use of debt finance

Multinational firms finance their foreign affiliates with debt and equity provided by

parent firms, other foreign affiliates, and unrelated parties. Tax systems treat these financing alternatives quite differently, which is important to firms, and often even more important to governments that tax them.

To illustrate the tax consequences of financing decisions, consider the difference between financing the foreign subsidiary of a U.S. firm with equity from the parent and financing the same subsidiary with debt from the parent. If the subsidiary is financed with equity, then its 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. If, instead, the subsidiary is financed with debt, then interest paid by the subsidiary is taxable foreign-source income of the American parent, while the interest is usually deductible in host countries. In addition, host-country governments often impose withholding taxes on cross-border interest, dividend, and royalty payments. Firms from foreign tax credit countries are eligible to claim foreign tax credits for withholding tax payments, and withholding tax rates are often reduced by the terms of bilateral tax treaties.

Simple tax considerations appear to make debt the preferred form of finance in high-tax countries and equity that in low-tax countries. The financing of U.S. multinationals is at least partly consistent with this implication. 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; the reverse pattern holds for dividend payments. Grubert (1995) estimates separate equations for dividend, interest, and royalty payments by 2,200 foreign subsidiaries of U.S. firms in 1990, finding that high statutory corporate tax rates and low interest withholding tax rates are correlated with greater interest payments (normalized by subsidiary assets). The opposite pattern holds for dividend payments.

If the formal distinction between related-party debt and equity is immaterial to multinational firms, then a simple tax arbitrage explanation is difficult to reconcile with the observed

simultaneous use of both debt and equity to finance many foreign affiliates of U.S. firms. Various legal restrictions imposed by host governments, including "thin-capitalization" rules that limit allowable debt/equity ratios, may be responsible for some of the observed behavior. There are other explanations as well. Hines (1994a) notes that firms have incentives to underinvest in subsidiaries located in low-tax countries in order to provide opportunities to reinvest subsequent profits, thereby deferring home-country taxes that would be triggered by repatriation. This underinvestment raises the marginal productivity of debt-financed investment by the same subsidiaries. As a consequence, tax-avoiding behavior can, over some ranges, carry the paradoxical implication that lower tax rates are associated with greater use of debt finance. More generally, the model implies that the relationship between tax rates and subsidiary leverage should be quadratic, which is what Hines (1994a) finds in aggregate tax return data for 57 countries in 1984.

The financial policies of parent firms and those of their foreign subsidiaries are connected in many ways, including through the tax treatment of interest payments and interest receipts. American firms with foreign income are generally not permitted to deduct all of their interest costs in the United States against their U.S. taxable incomes.¹³ Instead, U.S. law requires firms to allocate their interest expenses between domestic and foreign income based on the relative sizes of domestic and foreign assets. The intention of the law is to retain full deductibility of interest expenses against taxable U.S. income, but only for that part of interest expense generating income that is subject to U.S. taxation. From the standpoint of taxpaying firms, the law's distinction between domestic and foreign deductions is potentially quite important, since if interest expense is deemed to be domestic, then it is deductible against the taxpayer's U.S. taxable income, while if it is deemed to be foreign, then the interest expense reduces foreign taxable income *for the purposes of U.S. income*

¹³See Froot and Hines (1995) for a more extensive description of the tax rules governing interest expenses and receipts by multinational firms, from which the following is drawn.

taxation only. Foreign governments do not use U.S. methods of calculating interest deductions, and generally do not permit U.S. firms to reduce their taxable incomes in foreign countries on the basis of interest expenses incurred in the United States. Consequently, interest expenses allocated against foreign income are valuable to a U.S. firm only if it has deficit foreign tax credits. If a firm does have deficit foreign tax credits, then some of its foreign income is subject to U.S. tax, and any additional dollar of interest expense allocated against foreign income reduces the firm's U.S. taxable income by a dollar.

The Tax Reform Act of 1986 is responsible for the current U.S. tax treatment of interest expenses; pre-1986 U.S. law affords opportunities for adeptly-structured American multinational firms to deduct all of their domestic interest expenses against their U.S. taxable incomes. The top of Table 3 summarizes three studies of the impact of the 1986 change in the deductibility of interest expenses. Collins and Shackelford (1992) examine preferred stock issuances. Since firms can structure preferred stock dividends to mimic interest payments on debt, preferred stock is a natural substitute for debt among firms whose after-tax costs of using debt rise due to a tax change. 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 are other firms to issue preferred stock after 1986.

Altshuler and Mintz (1995) report evidence of firms using different substitutes for domestic debt in response to the 1986 tax change. Their study of eight American multinational firms finds a high correlation between tax costs imposed by interest expense allocation and propensities to borrow abroad after 1986. These results are quite consistent with those reported by Collins and Shackelford, since both suggest that firms for whom the 1986 tax change made domestic borrowing more expensive react by expanding their uses of substitutes for domestic debt. These findings do not indicate the extent to which domestic borrowing responds to the tax change, and leave open the

possibility that substitution between domestic debt and other alternatives is so complete that the tax change had little impact on costs of capital.

Froot and Hines (1995) find that firms most affected by the 1986 tax change do the least borrowing (as a fraction of assets) after 1986. The behavior of their sample of 416 U.S. multinationals implies that firms with excess foreign tax credits and half of their assets abroad borrow 5% less annually than do firms with unchanged borrowing costs after 1986. Affected firms also accumulate plant and equipment at 3% slower relative annual rates after 1986. These firms may not actually reduce their *use* of capital after 1986, since Froot and Hines also find evidence of increased plant and equipment leasing by firms affected by the interest allocation changes. Lease payments are fully deductible against U.S. taxes, so leasing rather than owning capital is an attractive option for firms that are unable to deduct all of their interest expenses. Unless leased capital substitutes perfectly for capital owned and used by the same firms - which is unlikely, given the moral hazard problem associated with lease contracts - the use of leases by firms subject to interest allocation and their unwillingness to accumulate plant and equipment after 1986 together indicate that the interest-allocation rules raise the capital costs of affected firms.

Transfer pricing

Ordinary business operations of multinational firms typically entail numerous transactions between entities located in different countries but within the same controlled group. The prices attached to these transactions are known as "transfer prices," about which there need be nothing nefarious in spite of their unwholesome reputation. Of course, there are numerous situations in which firms have incentives to adjust transfer prices in order to reduce their tax liabilities or avoid capital controls. Multinational firms typically can reduce their total tax liabilities by lowering the prices charged by their affiliates in high-tax countries for items sold to affiliates in low-tax countries.

Governments are aware of these incentives, and attempt to prevent firms from adjusting transfer prices to avoid taxes. This effort is complicated, however, by the existence of many situations in which appropriate transfer prices are difficult to identify. The standard used by most countries, particularly OECD members, is that appropriate transfer prices equal the prices that would have been paid in transactions between unrelated parties. The difficult valuation cases arise when outside markets for comparable goods do not exist - which is often the case, since valuable items, such as patent rights, can have unique attributes that make them costly to trade in markets subject to problems of asymmetric information. The problem of valuing such goods for tax purposes is generally thought not to have a single answer. In part as a concession to this ambiguity, the U.S. tax regulations provide three alternative methods to use in valuing intangible goods for which market prices are unavailable.

The ambiguity of appropriate standards, in combination with the usual problems of tax enforcement, make it difficult for governments to prevent firms from adjusting transfer prices to reduce their tax liabilities at least to a moderate extent. Table 4 describes several studies of the magnitude of tax-induced transfer price adjustment. All but the first of the studies listed in the table use indirect indicators of the behavior of U.S. multinationals. Lall (1973) is the exception: he identifies the incentives created by Colombian tax and regulatory policies, and confirms, on the basis of Colombian audits of pharmaceutical firms, that multinationals respond to the incentives by overinvoicing exports to their Colombian affiliates.¹⁴

Jenkins and Wright (1975) examine the distribution of the profitabilities of foreign affiliates of U.S. oil companies in 1966 and 1970, finding that affiliates are considerably more profitable if located in countries with low tax rates. Their aggregate calculations suggest that U.S.

¹⁴Similar evidence appears in the occasional studies (such as Wheeler, 1988) of the (high) profit rates of individual tax haven affiliates of American multinational companies.

firms avoid 2/3 of the taxes that they would otherwise pay to oil-consuming countries in those years. Bernard and Weiner (1990) also consider the behavior of U.S. oil companies, in their case comparing oil transaction prices to spot market prices of comparable petroleum products. Bernard and Weiner do not find evidence of transfer prices that systematically deviate from spot prices in the direction implied by tax-avoiding behavior.

Kopits (1976) analyzes royalty payments by foreign subsidiaries of U.S. firms to their American parents in 1968. He finds that royalty payments as fractions of sales are negatively correlated with differences between the tax costs associated with paying royalties and those associated with paying dividends, which he interprets as evidence that firms manipulate royalty rates in order to reduce their tax liabilities. Kopits reports a royalty elasticity of -0.56 with respect to this tax difference on the basis of the aggregate behavior of U.S. firms in 12 industries in 14 developed countries. There are some minor statistical problems with this study, including its treatment of the many missing or zero observations on country-industry cells,¹⁵ and its inclusion of different industries as independent observations. But Hines (1995a) reports a similar elasticity (-0.40) in his investigation of royalty payments by U.S. affiliates in 41 countries in 1989, and Grubert (1995) also finds significant effects of withholding and statutory tax rates on the propensities of 2,200 U.S.-owned subsidiaries to pay royalties in 1990.

The fact that royalty payments are negatively correlated with associated tax liabilities need not imply that firms illegally manipulate their transfer prices to reduce tax liabilities. Estimated royalty equations by necessity omit many important characteristics of the royalty-paying operations of U.S. multinationals, leaving open the possibility that the estimates simply reflect that royalty-intensive operations are attracted to locations in which associated tax burdens are lower. Furthermore, a

¹⁵Kopits uses OLS to analyze the 52 nonzero royalty observations out of the set of $14 \times 12 = 168$ country-industry cells.

negative correlation between taxes and transfer prices may imply that firms simply select more favorable transfer prices within the (rather broad) acceptable range created by current regulations. Of course, it is also possible that royalty payments are extensively used to avoid taxes.

Grubert and Mutti (1991) and Hines and Rice (1994) analyze the aggregate 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 after-tax profitability of local operations, while Hines and Rice find considerably larger effects (1% tax rate differences are associated with 2.3% differences in *before-tax* profitability) in their data.

One of the more interesting transfer-pricing issues from the standpoint of American policymakers is the extent to which firms adjust transfer prices to raise or lower the profits they report earning in the United States. There are periodic media reports of meager U.S. tax payments by foreign-owned firms in the United States, typically accompanied by the suggestion that these firms use aggressive transfer pricing to reduce their U.S. tax obligations. This issue received considerable attention during the 1992 presidential election campaign, in spite of the complicating factor that, since the home-country tax rates of foreign investors in the United States typically exceed the 1992 U.S. corporate tax rate of 34%, foreign investors often face incentives to *overreport* U.S. profits at the expense of profits in their home countries.

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% of the variation in reported U.S. tax obligations can be explained by observable variables such as firm sizes and ages. This information does not firmly resolve this issue, since the remaining 50% may represent either the impact of other omitted

variables or the particular proclivities of foreign investors to adjust transfer prices to avoid U.S. taxes. Even if observable variables could explain little of the difference between the profitabilities of foreign-owned and American-owned businesses in the United States, it would be difficult, on the basis of the profitability data, to reject the hypothesis that foreign investors in the 1980s made unwise business decisions, or else undertook investments that they did not anticipate would pay off over the short term - in neither case making recourse to a transfer-pricing explanation. There is a separate issue about whether the behavior of American-owned firms is an appropriate benchmark for foreign-owned firms, since American-owned multinational firms might also use transfer pricing to adjust the profits they report earning in the United States.

Harris et al. (1993) examine firm-level evidence of the transfer-pricing practices of a pooled sample of American multinationals over the period 1984-1988. They find the U.S. tax liabilities of American firms with tax haven affiliates to be significantly lower than those of otherwise-similar U.S. firms, which they take to be indirect evidence of aggressive transfer-pricing by firms with tax haven affiliates. As they note, however, variable omissions make it impossible to rule out other, more benign, explanations for this pattern. And it is probably incorrect to attach structural interpretations to variables indicating ownership of tax haven affiliates, since firms endogenously select the locations of their foreign operations.¹⁶ Collins et al. (1996) 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 with foreign tax rates below the U.S. rate. This result is consistent with those of Harris et al., and Collins et al. present additional evidence on stock market valuations that conforms to their profitability results. Klassen et al. (1993) consider the responses of

¹⁶The magnitudes of the estimated tax haven dummy variables are perhaps too large to possibly correspond to the effects of transfer-pricing alone, as Mutti (1993) notes. Also, the pooling of multiple annual observations of the same firms (over the 1984-1988 period) may not be appropriate, as Harris et al. acknowledge.

American multinational firms to the U.S. corporate tax rate reductions after 1986. They find that, during the period around 1986, reported returns on equity in the United States rose by 10% relative to those reported by the foreign operations of the same companies. Klassen et al. note that, since the U.S. statutory corporate tax rate fell after 1986 relative to the tax rates of other countries, firms had incentives to adjust (or unadjust) their transfer prices to augment the reported relative profitability of their American operations.

Dividend payments

Foreign subsidiaries with after-tax profits can reinvest the profits abroad or use them to pay dividends to their parent companies; tax differences may influence this choice. Table 5 summarizes the recent evidence on the impact of taxation on dividend payments by American multinational firms. The phraseology is potentially confusing, since profit remittances from foreign subsidiaries to their parent companies are called "dividend payments," as are the payments that the parent companies make to their shareholders. The literature summarized in Table 5 investigates correlations between propensities to pay dividends from foreign subsidiaries to parent firms and the tax costs of doing so. There are two important features of dividend payments by U.S.-owned foreign subsidiaries to their American parent firms. The first is that such payments are generally optional, since firms have the alternative of reinvesting after-tax profits in their foreign operations. The second feature is that U.S. taxation of foreign profits earned by separately-incorporated affiliates is generally deferred until profits are repatriated as dividends.

Kopits (1972) examines country-level aggregate tax return data on dividend payments from U.S.-owned foreign subsidiaries to their American parents in 1962. He reports that subsidiaries located in countries that heavily tax undistributed profits are the most likely to remit dividends to their American parents; the elasticity of dividend repatriation with respect to the tax cost of retaining

earnings in subsidiaries is approximately -0.4. Mutti (1981) uses tax return micro-data to analyze dividend payments from foreign subsidiaries located in 11 different countries in 1972 to their American parents. Mutti reports that 1% higher U.S. taxation of repatriated dividends is associated with 0.75% fewer dividends paid that year.

Mutti's study offers valuable subsidiary-level evidence to complement the country-level study by Kopits, but is limited by two aspects of the dividend repatriation process. The first limitation is statistical, stemming from the nature of dividend payout behavior: most subsidiaries pay zero dividends to their parent firms each year. Hines and Hubbard (1990) report that 84% of the active U.S.-controlled foreign subsidiaries paid zero dividends to their American parents in 1984; Altshuler et al. (1995) report similar findings for 1980, 1982, and 1986. This behavior is probably rational in light of the incentives firms have to reduce their tax liabilities through selective repatriations, but from a statistical standpoint, since dividend payments are so often zero, OLS estimation of dividend payout rates (as in Mutti's study) is inappropriate.

The second limitation of Mutti's analysis concerns its implicit model of the dividend process. Multinational firms with deficit foreign tax credits have no particular incentive to delay repatriating profits earned by their subsidiaries located in low-tax foreign jurisdictions, in spite of the immediate U.S. tax liability that accompanies repatriation. The reason, as Hartman (1985) notes, is that the repatriation tax is unavoidable: deferral delays payment of the repatriation tax, but since the tax is proportional to the amount repatriated, deferral reduces the present value of the tax only if it also reduces the present value of repatriations - in which case it would reduce the present value of after-tax receipts by the parent. Firms that maximize after-tax profits do so by maximizing the present value of repatriations, which is the same rule that profit-maximizing firms would follow in the absence of repatriation taxes. Consequently, repatriation taxes - if unavoidable and proportional to receipts - should not influence repatriations. On the other hand, transitory conditions of parent

companies - such as excess foreign tax credits that are expected to be temporary - affect the cost of current dividend repatriations from subsidiaries located in certain countries. Mutti's study omits information on the foreign tax credit status of parent companies.

Hines and Hubbard analyze the repatriation behavior of a sample of all large U.S. multinationals filing tax returns for 1984. Their study finds three notable patterns in the data. The first is the infrequency with which subsidiaries remit dividends to their parents (only 16% did so in 1984), which is suggestive either of considerable heterogeneity among subsidiaries or of very active tax planning. The second pattern is that a subsidiary is more likely to remit dividends to its parent if the combined effect of its own tax situation and its parent's tax situation makes the cost of repatriation low. The results imply that 1% differences in the tax cost of repatriation are associated with 4% differences in dividend payout rates. The third pattern reported by Hines and Hubbard is that payments of dividends from subsidiaries to parent firms are correlated with propensities of the U.S. parents to pay dividends to their common shareholders in the United States. Since both types of dividend payments - those from foreign subsidiaries to American parents, and those from American parents to their shareholders - are determined simultaneously, it is difficult to attribute causality, but the evidence suggests that foreign subsidiaries may serve as sources of cash with which to pay domestic dividends.

Altshuler and Newlon (1993) estimate a similar model of the dividend-payment behavior of U.S. multinationals in 1986. They use tax return data that differs in two ways from the 1984 information that Hines and Hubbard use: first, the coverage is limited to a smaller number of (the largest) subsidiaries, and second, Altshuler and Newlon use detailed country-specific information to measure more precisely the tax costs of dividend repatriations. The results are qualitatively similar to those Hines and Hubbard report for 1984, though the estimated elasticity of dividend payments with respect to the tax cost is half as large.

Altshuler et al. (1995) analyze dividend payments by an unbalanced panel of subsidiaries over the years 1980, 1982, 1984, and 1986. Their goal is to distinguish the effects of permanent and transitory differences in the tax costs associated with dividend repatriations, since Hartman's (1985) theory predicts that only transitory tax costs should influence dividend payments. Altshuler et al. define a subsidiary's permanent tax cost of repatriation to be the component of tax cost that is predictable either by the average tax cost for subsidiaries in its country or by the country's statutory withholding tax rate on dividends. On the basis of this breakdown, it appears that higher transitory tax costs discourage dividend payments while permanent tax costs do not, which is consistent with Hartman's view of the dividend process and also consistent with the tax-timing interpretation of the dividend results reported by Hines and Hubbard and Altshuler and Newlon. These results offer valuable information even though it may not be possible to identify completely the distinction between permanent and transitory tax costs in such a short panel and without using firm fixed effects (Gentry, 1995).

Hines (1996) analyzes the determinants of corporate dividend payments to shareholders in an effort to extend Hines and Hubbard's finding of a correlation between dividends received from foreign subsidiaries and dividends paid to shareholders. Hines reports that foreign profits (whether or not repatriated) not only influence dividend payments to shareholders, but do so with triple the impact of domestic profits. The finding that \$1 of foreign profits has the same effect on dividends as does \$3 of domestic profits appears in annual cross sections of 500 large U.S. multinationals, in panel estimates of dividend payments by 300 firms in the mid-1980s, and in aggregate time-series estimates of U.S. dividend payments over the period 1950-1986. This result suggests that firms may feel it necessary to offer the market credible signals of their reported foreign profits, which they do by paying dividends; if so, then it further implies that the tax costs of foreign operations include the additional personal tax liabilities triggered by dividends used to signal foreign

profits. Hines's estimates imply that the foreign activities of American firms generate as much U.S. tax revenue through the personal income taxation of dividends received as they do through corporate taxation of foreign-source income.

Evaluation

The evidence indicates that the financial behavior of multinational corporations is quite sensitive to tax considerations, though not completely determined by them. Since much of the literature concentrates on identifying the effects of tax provisions on capital structure, transfer pricing, and dividend payments, it is worth bearing in mind that considerations other than tax avoidance also appear to influence multinational firms' financial activities. Measured elasticities, while large, seldom approach the infinite values implied by simple tax-arbitrage models. Important nontax considerations in financing multinational operations include political and regulatory climates, incentive structures within firms, needs for flexibility in deploying cash to different locations, and relations with creditors and shareholders. The interactions between tax and nontax factors that influence financial policy are likely to have important consequences in some cases, though they receive relatively little explicit attention.¹⁷ In some instances it may be less valuable to test the standard hypothesis that taxes influence financial behavior than to test the alternative hypothesis that *only* taxes influence financial behavior. While neither is generally correct, deviations from tax arbitrage positions reflect nontax considerations of considerable interest.

Evidence of the impact of taxation on financial behavior has four features that should influence, and possibly broaden, its interpretation. The first feature is that much of the evidence is indirect. Studies of parent loans to foreign subsidiaries use interest payments as proxies; transfer pricing studies usually examine reported profitability and tax obligations instead of transfer prices;

¹⁷Exceptions include Wilson (1993) and Cummins et al. (1995).

and studies of dividend payments analyze dividend receipts of American parent companies (which may not own 100% of their foreign affiliates). While there is nothing necessarily wrong with drawing inferences from indirect indicators, there is always the possibility that other considerations influence the observed patterns.

The second feature of the financial evidence is that interpretations of the data typically rely to a significant degree on fine distinctions in timing. Under U.S. law, excess foreign tax credits can be carried backward two years or forward five, making the tax consequences of observed distinctions between excess and deficit foreign tax credit positions potentially very subtle. In addition, some financial responses to tax differences may take time to develop, since financial contracts (such as bonds) often have long horizons; as a consequence, estimated short-run elasticities may miss longer-run effects.

The third feature of the financial evidence is the incompleteness of available data. Multinational firms are heterogeneous in numerous unobserved ways, making it impossible to isolate the effects of taxation from other variables that are correlated with tax rates. Since subsidiaries are not randomly assigned to different countries or industries or parent companies, their tax situations are likely to be endogenous to other operating conditions and to their parent companies' tax situations. This unobserved heterogeneity need not invalidate many of the measurements of financial responsiveness to taxation, but does suggest that observed differences in financial policies reflect these endogenously chosen characteristics as well as financial policies.

The fourth feature of the financial evidence is the close connection between financing and investment decisions that makes it difficult, if not impossible, to distinguish them completely. New investments require financing, and, at the other end of the life cycle, mature subsidiaries must either invest their after-tax profits or repatriate them as dividends. Furthermore, the ability to use advantageous financing - such as favorable transfer pricing - enhances the desirability of locating

investments in certain countries.¹⁸ As a result, tax considerations influence financing and investment decisions in tandem, and a complete analysis treats them as joint decisions.

5. The Impact of Taxation on Specific Activities.

International tax provisions influence numerous activities of multinational firms other than FDI or financing. These activities include R&D, export activity, foreign bribery and other prohibited actions, and the choice of home country by tax-avoiding firms. They are considered in turn.

Research and Development

Multinational firms frequently undertake research and development (R&D) in one country in the hope of generating revenue in many countries. As with interest expenses, governments then face the problem of deciding whether all or part of a multinational firm's expenditures on R&D represent deductible expenses in the location in which incurred.

The U.S. tax treatment of the R&D expenses of multinational firms mirrors its treatment of their interest expenses. Over the period 1981-1986, multinational firms could deduct all of their U.S. R&D expenses against their U.S. taxable incomes; since 1986, a portion must be allocated against foreign income. The fraction allocated against foreign income is a function of the firm's ratio of foreign to domestic sales (or, in some cases, assets). As a consequence, in the years after 1986, the tax cost of performing R&D in the United States is a complicated function of a firm's foreign tax credit status and the fraction of its sales and assets located abroad.

¹⁸The ability to adjust (within limits) transfer prices will generally make American firms more willing than they would be otherwise to invest in very low tax and very high tax locations. For an elaboration of this point, see Hines and Rice (1994), Grubert and Slemrod (1994), and Gordon and MacKie-Mason (1995).

Hines (1993) uses firm-specific changes after 1986 in tax costs of undertaking R&D in the United States to estimate the responsiveness of R&D spending to its aftertax cost. The study analyzes two samples of large firms over the 1984-1989 period: (i) a sample of 40 firms that experience no merger activity between 1984-1989, and (ii) a sample of 116 firms that includes those with minor merger activity. In both samples, the R&D expenditures of firms with significant foreign sales and excess foreign tax credits grow systematically more slowly after 1986 than do the R&D expenditures of other firms. The implied price elasticity of R&D is -1.8 in the 40-firm sample and -0.8 in the 116-firm sample; given the omission of variables to control for merger effects in the larger sample, the true elasticity is probably closer to -1.8 than to -0.8. An own-price elasticity of R&D in that range is much larger than those reported by earlier studies, but is consistent with Hall's (1993) firm-level study of responses to incentives created by the Research and Experimentation Tax Credit. Hines (1994b) argues that such a large elasticity is also consistent with pre- and post-1986 trends in the fraction of R&D that American firms perform abroad.

One of the issues of interest both to capital importing countries and to capital exporting countries is the question of whether imported technology is a complement or a substitute for technology produced by local R&D. Hines (1995a) investigates this question by estimating the effect on R&D of royalty withholding taxes. Since foreign subsidiaries are required to pay royalties to their parent companies for imported technology, higher royalty taxes - even if partly avoided by adept transfer pricing - raise the cost of technology imports. Higher costs of imported technology stimulate local R&D if the two are substitutes, and discourage R&D if they are complements. Cross-sectional estimates of R&D intensities of the foreign operations of U.S. firms in 43 countries in 1989 indicate a cross-elasticity of 0.16, suggesting that R&D and imported technology are substitutes. Cross-sectional estimates of the R&D activities of foreign-owned firms in the United States in 1987 indicate a somewhat larger cross-elasticity, 0.30, which also suggests that imported technology and

locally produced technology are substitutes.

Export activity

The taxation of export earnings raises many of the same issues as does the taxation of royalties or other foreign-source income, with the difference that governments are so often eager to subsidize export activity that there are specific GATT prohibitions against doing so. The U.S. tax system nevertheless offers American exporters the choice of two favorable treatments of export income: tax deferral by routing exports through Foreign Sales Corporations, or treatment of a portion (typically 50%) of export profits as foreign-source income. For firms with excess foreign tax credits, any export profits treated as foreign-source income are effectively untaxed, making the second option quite attractive. Kemsley (1995) compares changes in ratios of U.S. exports to foreign sales by a panel of U.S. multinationals over the 1985-1992 period, finding that firms moving into excess foreign tax credit positions are more likely than others to substitute exports for foreign production. His estimates imply that the ability to treat export profits as foreign-source income raises exports by \$70 million for a typical firm with excess foreign tax credits.

Prohibited activities

International tax policy occasionally is used to promote foreign policy or other government goals, often accompanied by debate about the ability of tax policy to induce behavior that furthers noneconomic objectives. One example is provided by the U.S. Tax Reform Act of 1976, which, together with the Foreign Corrupt Practices Act of 1977, imposes tax and criminal penalties on American firms and individuals caught paying bribes to foreign government officials. Hines (1995b) finds that the business activities of American firms in bribe-prone foreign countries fell sharply after these acts took effect in 1977. In a cross-section of 41 countries, local bribery

propensities are negatively correlated with post-1977 growth rates of U.S. FDI, capital/labor ratios of American-owned affiliates, U.S. joint venture activity, and U.S. aircraft exports. This reduction in American business activity corresponds to a much higher post-1977 cost of doing business in countries in which official bribery is common, implying that the U.S. tax and criminal legislation significantly influences the practices of American firms.¹⁹

Choice of home country

U.S. taxation of the repatriated foreign earnings of American corporations makes it more expensive for a firm with foreign earnings to be incorporated in the United States than for the same firm to be incorporated in certain other countries (such as the Netherlands Antilles) that exempt foreign earnings from taxation. The ease with which multinational firms can relocate between countries carries with it the potential to undermine governments' abilities to tax them. Hines (1991) documents the case of one firm, McDermott, Inc., that changed its site of incorporation from the United States to Panama in 1982 in order to avoid U.S. taxation of its foreign-source income. Collins and Shackelford (1995) measure the relative tax costs of residence in four different home countries, finding that American multinational firms would face lower tax liabilities if resident in Canada, but higher tax liabilities if resident in Japan or the United Kingdom. Various tax costs associated with reincorporating - particularly the taxes due on any previously-unrealized capital gains - prevent international movement from becoming common, though a small number of firms may find it in their interest to relocate. Startup firms owned by Americans could incorporate in tax havens in the hope of someday earning significant untaxed foreign profits, but the U.S. tax treatment of accumulated

¹⁹American firms are also subject to tax and criminal penalties for participating in international boycotts (such as the Arab countries' boycott of Israel). Redmiles (1992) offers evidence that American firms refuse most boycott requests, which again suggests the ability of U.S. policy to restrict the foreign behavior of U.S. multinationals.

earnings and personal holding companies limit severely the attractiveness of this option.

Consequently, in spite of their potential mobility, tax laws constrain corporations sufficiently that there is little reason to anticipate an imminent demise of the U.S. corporate tax base.

Evaluation

There are numerous specific U.S. tax provisions that appear to influence the activities of American firms. These include the tax treatment of R&D expenses, export profits, and royalty income received from abroad, the tax penalties for foreign bribery and foreign boycott participation, and the tax costs triggered by corporate relocation. In some cases the tax provisions have the effect Congress intends, as when, for example, the foreign-sourcing rules encourage exports by American multinationals. (This is a provision that may, from the standpoint of its drafters, work too well, in that it provides export incentives that differ sharply *between* firms.) In other cases, the tax provisions have undesired effects, as is probably true of the 1986 reform that raises the tax costs of R&D performed by firms with excess foreign tax credits. Still others lie between these extremes: Congress sought to eradicate foreign bribery by American firms with its legislation in the 1970s, but did so in the hope that American business activity would not be thereby adversely affected.

The evidence of strong behavioral response is subject to most of the same limitations as is the FDI and financial evidence, stemming from the omission of important variables, the time-sensitive nature of its interpretation, and the need to include simultaneously FDI and financial considerations. Furthermore, measured behavioral responses typically represent *reported* responses, and the transfer-pricing evidence suggests that behavior may deviate from reports in ways that are correlated with tax incentives. It would be helpful to incorporate endogenous reporting to distinguish real from apparent effects of taxation on specific activities.

It would also be helpful to consider the general-equilibrium effects of specific

international tax provisions, which empirical studies enlighten but do not address directly. Tax changes that influence the costs of R&D by half of the firms in an economy will, in general, change the average prices of R&D, other factor inputs, and final products. Panel studies omit these effects in order to focus on firm-specific differences, thereby producing estimates that cannot be used without appropriate modification to gauge the effect of tax policies on aggregate behavior.

Many of the activities affected by specific international tax provisions - such as investment or R&D - also receive special domestic tax treatment. The response elasticities of multinational firms to international tax provisions may offer valuable, if indirect, evidence of the impact of purely domestic tax provisions. Similarly, research on the effects of domestic taxation provides information that is relevant to international behavior but is seldom incorporated in studies of international taxation. The activities of multinational firms influence each other jointly; given the limited available information with which to analyze the effects of taxation, this interdependence can be used to advantage by applying evidence and lessons drawn from one set of activities to others.

6. Implications.

One clear implication of the quantitative evidence is that the investment, financing, and other activities of multinational corporations are quite sensitive to their tax treatment. This sensitivity carries numerous implications for tax policy, including the standard incentive for governments to compete with each other to offer firms ever-lower tax rates to attract activities that are believed to be beneficial to their economies. An alternative to tax competition is to form supra-national agreements to harmonize tax rates and tax bases; but such attempts are notoriously ineffective and quickly abandoned.

There is another approach to designing international tax policy in an environment dominated by very mobile multinational operations. Some governments impose tax rules that

sufficiently constrain the activities of firms that it becomes possible to apply moderate levels of taxation without driving economic activity abroad. This is the method used by the United States and other large OECD countries. It entails many costs, not the least of which are the compliance and enforcement burdens borne by firms and governments who must apply a very large and cumbersome set of rules and regulations.²⁰ Complex structures of taxes and incentives inevitably contain sections that embody mistaken reasoning and lead to inefficient outcomes, particularly if the tax treatment of financial and real activity is not properly coordinated. The strategy of using tax rules to discourage tax avoidance can be successful, but since it is often necessary for governments to observe tactics before developing remedies, this method inevitably leads to policies that are somewhat behind the latest practices used to avoid taxation.

The responsiveness of governments to the behavior of taxpayers is in part responsible for the tax reforms that make it possible to measure the impact of taxation. Some of the evidence that comes from tax reforms suggests that governments can use the responsiveness of multinational firms to further their own objectives in ways that might otherwise be more difficult or costly. As an example, countries eager to encourage local R&D can do so both through purely domestic policies (such as local credits) and through policies designed to change the relative attractiveness of locating R&D elsewhere. Similarly, governments influence local investment in plant and equipment directly through its tax treatment and indirectly through the tax treatment of foreign activities that may substitute or complement domestic investment. Governments that choose to do so can also use tax policies to pursue various noneconomic objectives.

International mobility also affects the revenue consequences of tax policies. The ability of American firms to adjust transfer prices (within limits) may enhance U.S. tax collections,

²⁰Blumenthal and Slemrod (1995) provide estimates of the costs of complying with the foreign provisions of U.S. tax law.

since many foreign tax rates currently exceed the U.S. rate, and firms have incentives to report their profits in the United States. In addition, U.S. multinationals that transfer reported profits from subsidiaries located in high-tax foreign countries to those located in low-tax foreign countries reduce their own foreign tax liabilities *and* reduce the foreign tax credits they are eligible to apply against their U.S. tax liabilities. In reducing foreign tax credits claimed by American firms, transfer pricing augments U.S. tax revenue.

Existing empirical studies offer consistent evidence that multinational firms respond to international tax incentives. Unfortunately, these studies generally do not provide enough information to test subtle distinctions between different theories of the effect of taxation on multinational firms. The somewhat rudimentary state of the literature reflects the recency of much of the quantitative work on international tax issues as well as the incompleteness of the theory of multinational firms and foreign direct investment. Since almost all of the available evidence implies that response elasticities are large, the efficiency costs associated with misguided tax policies are also likely to be large. Consequently, reliable and sophisticated quantitative information has the potential to enlighten tax policy development in a way that significantly enhances the efficiency of resource allocation. Current studies of the effect of tax policy on the activities of multinational corporations suggest promising directions for the next generation of empirical work.

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Table 1
Studies of investment patterns: U.S. direct investment abroad.

Study	Method/(Data)	Estimates
Hartman (1981)	Time series, aggregate US investment financed by retained earnings, 1965-79. (BEA annual; 15 years.)	1.4 elasticity with respect to after-tax earnings, and -0.66 elasticity with respect to domestic after-tax returns.
Bond (1981)	Responses to Puerto Rican tax holidays, SIC 2342, 1949-72. (Labor Dept. survey; 152 firms.)	Significant effect of losing tax holiday on firm's decision to exit the industry.
Frisch/Hartman (1983)	Cross section, US investment aggregated by 15 industries, 1972. (SOI aggregates, 16 countries.)	-0.26 elasticity of subsidiary assets to local tax rates.
Boskin/Gale (1987)	Time series estimates of aggregate FDI out of the US, 1965-84 (BEA annual; 20 years.)	1.2 elasticity with respect to after-tax return for FDI financed by retained earnings.
Newlon (1987)	Time series estimates of aggregate FDI out of the US, 1953-84 (Corrected BEA data; 32 years.)	US and foreign after-tax returns influence FDI financed by retained earnings.
Grubert/Mutti (1991)	Capital demand by US affiliates in cross section, manufacturing only, 1982. (BEA benchmark; 33 countries.)	-0.11 elasticity of capital demand with respect to local tax rate.
Harris (1993)	Foreign investment as fraction of total investment by US multinationals, 1984-90. (Compustat; 36 firms.)	Firms with higher cost of capital in US after 1986 shift investment significantly toward foreign countries.
Hines/Rice (1994)	Capital demand by US affiliates in cross-section, 1982. (BEA benchmark; 73 countries.)	1% higher tax rates reduce capital demand by 3%.
Grubert/Slemrod (1994)	Demand for affiliates located in Puerto Rico. (Tax data; 4,099 firms.)	Firms with greater intangible assets more likely to have Puerto Rican affiliates.
Cummins/Hubbard (1995)	Investment Euler equations for unbalanced panel of foreign subsidiaries of US firms, 1980-91. (Compustat; 1,047 firms.)	1% higher after-tax cost of capital reduces annual investment by 1-2%.

Table 2
Studies of investment patterns: Foreign direct investment in the United States.

Study	Method/(Data)	Estimates
Hartman (1984)	Time series estimates of aggregate FDI into the US, 1965-79. (BEA annual data; 15 years.)	FDI financed by retained earnings responds negatively to higher US taxes.
Boskin/Gale (1987)	Time series estimates of aggregate FDI into the US, 1956-84. (BEA annual data; 29 years.)	-1.7 elasticity with respect to relative tax rates for FDI financed by retained earnings.
Newlon (1987)	Time series estimates of aggregate FDI into the US, 1956-84. (Corrected BEA data; 29 years.)	1.1 elasticity with respect to after-tax return for FDI financed by retained earnings.
Young (1988)	Time series estimates of aggregate FDI into the US, 1953-84. (Revised BEA data; 32 years.)	1.7 elasticity with respect to after-tax return for FDI financed by retained earnings.
Slemrod (1990)	Estimates of aggregate FDI into the US distinguished by investing country, 1962-87. (Adjusted BEA data; 7 countries.)	Higher US taxes significantly reduce FDI financed by new fund transfers; no effect of home country repatriation taxes
Auerbach/Hassett (1993)	Cross sectional estimates of capital composition of US firms acquired by foreigners, 1980-90. (Compustat; 243 acquired firms.)	Acquirers eligible to claim FTCs exhibit no shift of demand toward equipment-intensive firms after 1986.
Swenson (1994)	Time series estimates of tax effects on new investments by industry, 1979-91. (BEA data; 18 industries.)	1.13 elasticity of investment with respect to tax changes around 1986.
Coughlin et al. (1991)	Location of new manufacturing plants within the US, 1981-83. (Commerce survey; 736 plants.)	Insignificant tax effects.
Ondrich/Wasylenko (1993)	Location of new plants within the US, 1978-87. (Commerce survey; 1,184 plants.)	-0.57 elasticity of location probability with respect to state corporate tax rates.
Hines (forthcoming)	Location of FDI within the US, distinguishing investments by tax regime of investing country, 1987. (BEA benchmark; 7 countries.)	1% higher state tax rates reduce investment by 10%.

Table 3
Studies evaluating effects of specific incentives/penalties.

Issue/Study	Method/(Data)	Estimates
<i>Debt Finance:</i>		
Collins/Shackelford (1992)	Preferred stock issuances by US multinationals subject to interest allocation (Fortune 100), 1982-89. (Compustat plus 10-Ks; 100 firms.)	Significant effect of foreign assets on proclivity to issue preferred stock after 1986.
Altshuler/Mintz (1995)	Location of borrowing by US multinationals subject to interest allocation, 1988-92. (Survey responses from 8 firms.)	1.7 elasticity of foreign indebtedness to interest allocation rate.
Froot/Hines (1995)	Borrowing and investment by US multinationals subject to interest allocation, 1986-91. (Compustat; 416 firms.)	50% interest allocation reduces annual debt accumulation by 5% and capital accumulation by 3%.
Hines (1994a)	Loans by US parent firms to foreign subsidiaries, 1984. (Aggregate tax data; 57 countries.)	Nonlinear effect of tax rates on parent loans to subsidiaries; strongest at low tax rates.
<i>R&D:</i>		
Hines (1993)	R&D by US multinationals subject to expense allocation, 1984-89. (Compustat; 116 firms.)	0.8-1.8 elasticity of R&D to after-tax cost (as affected by cost allocation).
Hines (1995a)	R&D by US and foreign firms subject to withholding taxes on royalties; 1987 and 1989. (BEA benchmarks; 43 countries.)	0.1-0.3 cross elasticity of R&D with respect to royalty withholding taxes.
<i>Exports:</i>		
Kemsley (1995)	Exports as a fraction of total foreign sales by US multinationals, 1985-92. (Compustat; 544 firms.)	Foreign-sourcing of export earnings generates additional \$70 million of exports for firms with excess FTCs.
<i>Bribery:</i>		
Hines (1995b)	Location of aggregate US business activity after tax and criminal penalties imposed on bribe payments, 1977-1982. (BEA benchmark; 41 countries.)	Reduced US activity in corrupt countries equivalent to 6% annual declines in GDP.

Table 4
Transfer pricing studies.

Study	Method/(Data)	Estimates
Lall (1973)	Pharmaceutical imports in Colombia. (Government audits; 14 firms.)	Significant underinvoicing of imports in response to taxes and capital controls.
Jenkins/Wright (1975)	Profit rates of US oil affiliates, aggregate, 1966 and 1970. (BEA data; 10 country groups.)	Tax payments by US firms to oil-consuming countries only 1/3 of predicted.
Kopits (1976)	Royalties paid by US subsidiaries in developed countries, aggregated by country-industry, 1968. (SOI data; 14 countries.)	1% higher tax rate on royalties relative to dividends reduces royalties by 0.56%.
Bernard/Weiner (1990)	Differences between 3rd party prices and within-firm transfer prices for oil, 1973-84. (EIA transaction data; 77 country-year observations.)	No significant effect of tax rates on price differences.
Grubert/Mutti (1991)	Profit/equity and profit/sales ratios for US manufacturing affiliates, 1982. (BEA benchmark; 29 countries.)	1% higher tax rates reduce after-tax profit/equity by 0.26%.
Harris et al. (1993)	US tax liabilities of American multinationals with tax haven affiliates, 1984-88. (Compustat; 469 firms.)	Significant dummy variables indicate firms with haven affiliates have lower domestic tax liabilities.
Grubert et al. (1993)	US tax liabilities of foreign-owned affiliates in the United States, 1987. (Tax returns; 600 foreign firms.)	Observable variables explain only half of profit disparities between foreign-owned and US-owned firms in US.
Klassen et al. (1993)	Return on equity in US and 6 foreign regions, 1984-90. (Compustat; 191 firms.)	10% higher US pre-tax profitability of multinationals after 1986 tax reduction.
Hines/Rice (1994)	Profitability of US affiliates, controlling for capital and labor inputs, 1982. (BEA benchmark; 59 countries.)	1% higher tax rates reduce profitability by 2%.

Table 5
Studies of dividend payments.

Study	Method/(Data)	Estimates
Kopits (1972)	Dividends from foreign subsidiaries to US parents, 1962. (SOI cross-section; 18 countries.)	-0.4 elasticity of dividends to host-country tax rate.
Mutti (1981)	Dividends from foreign subsidiaries to US parents, OLS, 11 countries, 1972. (Tax returns; 4,446 firms.)	1% higher US tax rate on repatriated dividends reduces dividends by 0.75%.
Hines/Hubbard (1990)	Dividends from foreign subsidiaries to US parents, Tobit, 1984. (Tax returns; 10,606 firms.)	1% higher tax cost of dividend repatriation reduces dividends by 4%.
Altshuler/Newlon (1993)	Dividends from foreign subsidiaries to US parents, Tobit, 1986. (Tax returns; 3,116 firms.)	1% higher tax cost of dividend repatriation reduces dividends by 1.5%.
Altshuler et al. (1995)	Dividends from foreign subsidiaries to US parents, unbalanced panel, 1980-86. (Tax returns; 22,906 firms.)	1% higher <i>transitory</i> cost of repatriation reduces dividends by 0.3%; no effect of higher <i>permanent</i> tax costs.
Hines (1996)	Dividends from US multinationals to shareholders, 1984-1989. (Compustat; 505 firms. Also aggregate time series; 37 years.)	Foreign profits have three times the effect of domestic profits on payouts to shareholders.