NBER WORKING PAPER SERIES

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Working Paper 8440
http://www.nber.org/papers/w8440

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
August 2001

We thank Yuming Zou for excellent research assistance, and Steve Bond, Mark Robson, and participants at the World Tax Competition Conference for helpful comments. Financial support from the Lois and Bruce Zenkel Research Fund at the University of Michigan and the Division of Research at Harvard Business School is gratefully acknowledged. The views expressed herein are those of the authors and not necessarily those of the National Bureau of Economic Research.

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NBER Working Paper No. 8440
August 2001
JEL No. H87, H25, F23

ABSTRACT

While governments have multiple tax instruments available to them, studies of the effect of tax policy on the locational decisions of multinationals typically focus exclusively on host country corporate income tax rates and their interaction with home country tax rules. This paper examines the impact of indirect (non-income) taxes on the location and character of foreign direct investment by American multinational firms. Indirect tax burdens significantly exceed foreign income tax obligations for these firms and appear to influence strongly their behavior. The influence of indirect taxes is shown to be partly attributable to the inability of American investors to claim foreign tax credits for indirect tax payments. Estimates imply that 10 percent higher indirect tax rates are associated with 9.2 percent lower reported income of American affiliates and 8.6 percent lower capital/labor ratios. These estimates carry implications for efficient tradeoffs between direct and indirect taxation in raising revenue while attracting mobile capital.

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1. Introduction.

Governments have at their disposal several different tax instruments that can be used singly or in concert to finance their activities. These tax alternatives include personal and corporate income taxes, sales taxes, value added taxes, property taxes, excise taxes, and numerous others. It is not uncommon for a single government to elect to use many or all of these alternatives simultaneously. The likely impact on a country's ability to attract investment and stimulate economic activity typically ranks highly among the criteria used in making choices over these tax instruments.

There is by now extensive evidence that high tax rates discourage foreign direct investment (FDI), thereby offering support for the working hypothesis of many governments that maintain low corporate tax rates in order to encourage investment. Empirical studies of the effect of taxation on FDI typically consider the impact of differences in corporate income tax rates. This literature has considerably less to say about the effect of taxes other than corporate taxes, even though, from a theoretical standpoint, all types of taxes have the potential to reduce FDI. For example, high personal income tax rates may be reflected at least in part in high pretax wages, which in turn discourage FDI if labor and capital are complementary. Similarly, high rates of property taxation may reduce the demand for FDI by as much as high rates of income taxes. The role of non-income taxes may be particularly important for FDI as governments of many countries (including the United States) permit multinational firms to claim foreign tax credits for corporate income taxes paid to foreign governments, but do not extend this privilege to taxes other than income taxes. As a result, taxes for which firms are ineligible to claim credits may have the strongest impact on firm decision-making, including decisions of where and how much to invest.

The purpose of this paper is to investigate the effect of the multiple tax instruments that comprise a host country tax system on the magnitude and characteristics of foreign investment activity by American multinational firms. In particular, the empirical work focuses on the differential impacts of corporate income taxes and other taxes, such as personal income taxes, property taxes, and value added taxes. The analysis uses data collected by the Bureau of Economic Analysis of the U.S. Department of Commerce on the activities of American multinational firms in 1982, 1989, and 1994, the most recent years for which such comprehensive Benchmark data are available. The high degree of correlation between corporate income tax rates and other tax rates suggests that previous work may have conflated the effects of these distinct tax instruments. Since the foreign indirect tax obligations of American multinational firms are roughly three times their direct tax obligations, there is obvious scope for indirect taxes to influence their behavior.

The results confirm that high tax rates discourage business activity by American multinational firms, but suggest that there are important effects of all types of taxes, including taxes other than corporate income taxes. Since Americans are ineligible to claim tax credits against home-country tax liabilities for anything other than foreign income taxes, it stands to reason that other taxes such as labor income taxes and property taxes might have the potential to discourage business activity. The results indicate that indirect business taxes influence the location of profit-generating business activity, with an impact that is particularly noticeable on the capital/labor ratios used in offshore operations. In addition, the paper provides evidence that indirect tax rates affect the location of profits even controlling for the use of productive inputs.

The magnitude and impact of indirect taxation on the activities of foreign investors carries potentially important implications for the dynamics of tax competition. Countries that are eager to protect their tax bases, possibly at the expense of others, have incentives to select direct and

indirect tax rates that reflect this goal. Given that large capital exporters such as the United States provide explicit tax relief for direct taxes through foreign tax credits, the scope for competition on indirect taxes may be much greater – and all the more likely in the absence of bilateral treaties or multilateral conventions on indirect taxation. Consequently, one of the objectives in studying the behavioral impact of indirect taxation is to anticipate possible pressure points for international tax competition.

Section 2 of the paper describes the tax systems used by the United States and other countries, and reviews the findings of earlier research on the effect of taxation on investment and other activities of multinational firms. Section 3 presents a model of firm behavior and characterizes its implications for American firms investing abroad in countries with multiple taxes. Section 3 also describes the BEA data used to analyze the activities of American multinational firms. Section 4 presents the results of estimating the determinants of capital/labor ratios and profit location. Section 5 is the conclusion.

2. International income taxation in perspective.[1]

It is useful to review existing systems of taxing international income in order to interpret the incentives facing American firms investing in foreign countries using multiple tax instruments. This summary of international tax rules provides not only a basis for the analysis that follows in sections 3 and 4, but also serves as a framework with which to interpret the studies reviewed in section 2.2.

2.1. International tax practice.

[1] Some parts of this brief description of international tax rules and evidence of behavioral responses to international taxation are excerpted from Hines (1991, 1997, 1999) and Hines and Hubbard (1995).

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

2.1.1 The foreign tax credit.

Almost all countries tax income generated by economic activity that takes place within their borders. In addition, many countries – including the United States – tax the foreign incomes of their residents. In order to prevent double taxation of the foreign income of Americans, U.S. law permits taxpayers to claim foreign tax credits for income taxes paid to foreign governments.[2] These foreign tax credits are used to offset U.S. tax liabilities that would otherwise be due on foreign-source income. The U.S. corporate tax rate is currently 35 percent, so an American corporation that earns $100 in a foreign country with a 10 percent tax rate pays taxes of $10 to the foreign government and $25 to the U.S. government, since its U.S. corporate tax liability of $35 (35 percent of $100) is reduced to $25 by the foreign tax credit of $10.

2.1.2 Tax deferral.

Americans are permitted to defer any U.S. tax liabilities on certain unrepatriated foreign profits until they receive such profits in the form of dividends.[3] This deferral is available only on

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

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

the active business profits of American-owned foreign affiliates that are separately incorporated as subsidiaries in foreign countries. The profits of unincorporated foreign businesses, such as those of American-owned branch banks in other countries, are taxed immediately by the United States.

To illustrate deferral, consider the case of a subsidiary of an American company that earns $500 in a foreign country with a 20 percent tax rate. This subsidiary pays taxes of $100 to the foreign country (20 percent of $500), and might remit $100 in dividends to its parent U.S. company, using the remaining $300 ($500 - $100 of taxes - $100 of dividends) to reinvest in its own foreign operations. The American parent firm must then pay U.S. taxes on the $100 of dividends it receives (and is eligible to claim a foreign tax credit for the foreign income taxes its subsidiary paid on the $100).[4] But the American firm is not required to pay U.S. taxes on any part of the $300 that the subsidiary earns abroad and does not remit to its parent company. If, however, the subsidiary were to pay a dividend of $300 the following year, the firm would then be required to pay U.S. tax (after proper allowance for foreign tax credits) on that amount.

U.S. tax law contains provisions designed to prevent American firms from delaying the repatriation of lightly-taxed foreign earnings. These tax provisions apply to controlled foreign corporations, which are foreign corporations owned at least 50 percent by American individuals or corporations who hold stakes of at least 10 percent each. Under the Subpart F provisions of U.S. law, some foreign income of controlled foreign corporations is "deemed distributed," and therefore immediately taxable by the United States, even if not repatriated as dividend payments to American parent firms.[5]

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

2.1.3 Excess foreign tax credits.

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

Taxpayers whose foreign tax payments exceed the foreign tax credit limit are said to have "excess foreign tax credits;" the excess foreign tax credits represent the portion of their foreign tax payments that exceed the U.S. tax liabilities generated by their foreign incomes. Taxpayers whose foreign tax payments are smaller than their foreign tax credit limits are said to have "deficit foreign tax credits." American law permits taxpayers to use excess foreign tax credits in one year to reduce their U.S. tax obligations on foreign source income in either of the two previous years or in any of the following five years.[6]

In practice, the calculation of the foreign tax credit limit entails certain additional complications, notable among which is that total worldwide foreign income is used to calculate the foreign tax credit limit. This method of calculating the foreign tax credit limit is known as

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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.

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

Firms paying the corporate alternative minimum tax (AMT) are subject to the same rules, with the added restriction that the combination of net operating loss deductions and foreign tax credits cannot reduce AMT liabilities

"worldwide averaging." A taxpayer has excess foreign tax credits if the sum of worldwide foreign income tax payments exceeds this limit.[7]

2.2. Empirical lessons from international taxation.

International tax rules and the tax laws of other countries have the potential to influence a wide range of corporate and individual behavior, including, most directly, the location and scope of international business activity. A sizable literature is devoted to measuring behavioral responses to international tax rules.[8] This literature focuses on the impact of corporate tax rates on investment behavior as well as various financial and organizational practices used to avoid taxes.

2.2.1 Investment.

Tax policies are obviously capable of affecting the volume and location of FDI,[9] since, all other considerations equal, higher tax rates reduce after-tax returns, thereby reducing incentives to commit investment funds. Of course, all other considerations are seldom equal. Countries differ not only in their tax policies, but also in their commercial and regulatory policies, the characteristics of their labor markets, the nature of competition in product markets, the cost and local availability of intermediate supplies, proximity to final markets, and a host of other attributes

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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.

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

[8] See Hines (1997, 1999) for further elaboration and critical analysis of many of the studies surveyed in this section.

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

that influence the desirability of an investment location. Furthermore, the various tax and regulatory policies that are relevant to foreign investors may be correlated with non-tax features of economies that independently affect FDI levels. Consequently, it is necessary to interpret evidence of the effect of taxation with considerable caution.

The empirical literature on the effect of taxes on FDI considers almost exclusively U.S. data, either the distribution of U.S. direct investment abroad, or the FDI patterns of foreigners who invest in the United States.[10] The simple explanation for this focus is not only that the United States is the world's largest economy, but also that the United States collects and distributes much more, and higher-quality, data on FDI activities than does any other country.

The available evidence of the effect of taxation on FDI comes in two forms. The first is time-series estimation of the responsiveness of FDI to annual variation in after-tax rates of return. Implicit in this estimation is a q-style investment model in which contemporaneous average after-tax rates of return serve as proxies for returns to marginal FDI. Studies of this type consistently report a positive correlation between levels of FDI and after-tax rates of return at industry and country levels.[11] The implied elasticity of FDI with respect to after-tax returns is generally close to unity, which translates into a tax elasticity of investment of roughly -0.6. The estimated elasticity is similar whether the investment in question is American direct investment abroad or FDI by foreigners in the United States.

The primary limitation of aggregate time-series studies is that they are identified by yearly variation in taxes or profitability that may be correlated with important omitted variables. As a

[10] Devereux and Freeman (1995) and Hines (2001) are recent exceptions.
[11] See, for example, Hartman (1984), Boskin and Gale (1987), Newlon (1987), Young (1988), Slemrod (1990), and Swenson (1994).

result, it becomes very difficult to distinguish the effects of taxation from the effects of other variables that are correlated with tax rates.

Two of the time-series studies exploit cross-sectional differences that offer the potential for greater explanatory power. Slemrod (1990) distinguishes FDI in the United States by the tax regime in the country of origin. Investors from countries (of which Slemrod analyzes data for Japan and the United Kingdom) with tax systems similar to that used by the United States receive foreign tax credits for taxes paid to the United States. Investors from certain other countries (of which Slemrod analyzes data for Australia, Canada, France, Germany, and the Netherlands) are more or less exempt from home-country taxation of any profits earned in the United States. Consequently, investors from France and Germany have stronger incentives to invest in the United States during low-tax years than do investors from Japan and the United Kingdom, since Japanese and British investors are eligible to claim tax credits for any U.S. taxes they pay. In his analysis of data covering 1962-1987, Slemrod finds no clear empirical pattern indicating that investors from countries that exempt U.S. profits from home-country taxation are more sensitive to tax changes than are investors from countries granting foreign tax credits. This evidence suggests either that home-country tax regimes do not influence FDI, or that time series variation in tax rates is inadequate to identify tax effects that are nonetheless present.

Swenson (1994) considers the tax determinants of industry-level FDI in the United States over the 1979-1991 period. U.S. tax changes often affect industries to differing degrees, based largely on the assets in which they invest; this was particularly true of tax legislation enacted in 1981 and 1986. Swenson finds that industries in which the (U.S.) after-tax cost of capital rose the most after passage of the U.S. Tax Reform Act of 1986 were those in which foreign investors concentrated their FDI in the post-1986 period. This is consistent with the tax incentives of foreign

investors from countries granting foreign tax credits, since such investors are the least affected by U.S. tax provisions – but it is also possible that foreign investors chose to concentrate in such industries for any of a number of non-tax reasons. Auerbach and Hassett (1993) lend credence to the latter interpretation with their finding that investors from countries granting foreign tax credits were no more likely than were other foreign investors to concentrate their FDI in tax-disadvantaged industries after 1986.

Other studies of investment location are exclusively cross-sectional in nature, exploiting the very large differences in corporate tax rates around the world to identify the effects of taxes on FDI. Grubert and Mutti (1991) and Hines and Rice (1994) estimate the effect of national tax rates on the cross-sectional distribution of aggregate American-owned property, plant and equipment (PPE) in 1982. PPE differs from FDI in that PPE represents (the book value of) real productive assets held by American-owned affiliates, while FDI equals the book value of ownership claims of controlling foreign investors.[12] Grubert and Mutti analyze the distribution of PPE in manufacturing affiliates in 33 countries, reporting a –0.1 elasticity with respect to local tax rates. That is, controlling for other observable determinants of FDI, ten percent differences in local tax rates are associated with one percent differences in amounts of local PPE ownership in 1982. Hines and Rice consider the distribution of PPE in all affiliates in 73 countries, reporting a much larger –1.0 elasticity of PPE ownership with respect to tax rates. Altshuler et al. (2001) compare

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

the tax sensitivity of PPE ownership in 58 countries in 1984 to that in 1992, reporting estimated tax elasticities that increase from –1.5 in 1984 to –2.8 in 1992.

One of the difficulties facing all cross-sectional studies of FDI location is the inevitable omission of many important determinants of FDI that may be correlated with tax rates and therefore bias the estimation of tax elasticities. Hines (1996) incorporates state fixed effects in comparing the distributions of FDI within the United States of investors whose home governments grant foreign tax credits for federal and state income taxes with those whose home governments do not tax income earned in the United States. The inclusion of fixed effects implicitly controls for hard-to-measure state attributes, as long as the effect of these attributes does not vary systematically between investors from countries with differing home-country tax regimes. Tax effects are identified by comparing, for example, the extent to which investments from Germany (which exempts from tax foreign-source income earned in the United States) tend to be located in lower-tax states than are investments from the United Kingdom (which provides foreign tax credits for state income taxes paid). The evidence indicates that one percent state tax rate differences in 1987 are associated with ten percent differences in amounts of manufacturing PPE owned by investors from countries with differing home-country taxation of foreign-source income, and three percent differences in numbers of affiliates owned. Taken as a structural relationship, the estimates imply a tax elasticity of investment equal to –0.6. It is worth bearing in mind, however, that this estimate reflects the effect of taxation on the identity of ownership of capital as well as on the volume of investment.[13]

2.2.2. International tax avoidance.

[13] Swenson (2001a) estimates separate regressions for differing types of transactions (such as the establishment of new plants, plant expansions, mergers and acquisitions, and joint ventures) undertaken by foreign investors in the United States, finding tax effects to differ between transaction type.

One of the important issues in considering the impact of taxation on international investment patterns is the ability of multinational firms to adjust the reported location of their taxable profits. To the extent that FDI can facilitate the advantageous relocation of profits, then firms will have incentives to tailor their international investment strategies with such relocation in mind. Of course this is not a simple process, nor are its implications necessarily straightforward. Firms that are able to use international transactions to avoid the bulk of their tax obligations are in turn unlikely to avoid high-tax investment locations. Hence any complete analysis of the impact of taxation on the operations of multinational firms must necessarily consider the ability and evident willingness of multinational firms to undertake activities to avoid international tax obligations.

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

Simple tax considerations therefore often make it attractive to use debt to finance foreign affiliates in high-tax countries and to use equity to finance affiliates in low-tax countries.[14] The evidence is broadly consistent with these incentives. Hines and Hubbard (1990) find that the average foreign tax rate paid by subsidiaries remitting nonzero interest to their American parent firms in 1984 exceeds the average foreign tax rate paid by subsidiaries with no interest payments, while the reverse pattern holds for dividend payments. Grubert (1998) estimates separate

equations for dividend, interest, and royalty payments by 3,467 foreign subsidiaries to their parent American companies (and other members of controlled groups) in 1990, finding that high corporate tax rates in countries in which American subsidiaries are located are correlated with higher interest payments and lower dividend payout rates.

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

The evidence of tax-motivated transfer pricing comes in several forms. Grubert and Mutti (1991) and Hines and Rice (1994) analyze the aggregate reported profitabilities of U.S affiliates in different foreign locations in 1982. Grubert and Mutti examine profit/equity and profit/sales ratios of U.S.-owned manufacturing affiliates in 29 countries, while Hines and Rice regress the profitability of all U.S.-owned affiliates in 59 countries against capital and labor inputs and local productivities. Grubert and Mutti report that high taxes reduce the reported after-tax profitability of local operations; Hines and Rice find considerably larger effects (one percent tax rate differences are associated with 2.3 percent differences in *before*-tax profitability) in their data. While it is possible that high tax rates are correlated with other locational attributes that depress the

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

profitability of foreign investment, competitive conditions typically imply that after-tax rates of return should be equal in the absence of tax-motivated income-shifting. The fact that before-tax profitability is negatively correlated with local tax rates is strongly suggestive of active tax avoidance. Similarly, the reported low profit rates of foreign-owned firms in the United States over the last 20 years is a source of concern to observers who suspect foreign investors of transferring profits earned in the United States to low-tax jurisdictions offshore.[15]

Patterns of reported profitability are consistent with other indicators of aggressive tax-avoidance behavior, such as the use of royalties to remit profits from abroad and to generate tax deductions in host countries. Hines (1995) finds that royalty payments from foreign affiliates of American companies in 1989 exhibit a –0.4 elasticity with respect to the tax cost of paying royalties, and Grubert (1998) also reports significant effects of tax rates on royalty payments by American affiliates in 1990. Clausing (2001) finds that reported trade patterns between American parent companies and their foreign affiliates, and those between foreign affiliates located in different countries, are consistent with transfer-pricing incentives. Controlling for various affiliate characteristics, including their trade balances with unaffiliated foreigners, Clausing finds that ten percent higher local tax rates are associated with 4.4 percent higher parent company trade surpluses with their local affiliates. This pattern is suggestive of pricing practices that move taxable profits out of high-tax jurisdictions.[16]

This literature has developed strong evidence that multinational firms are highly responsive to international income tax rate differences, undertaking investments in low-tax locations and using

[15] Grubert et al. (1993) use firm-level tax return data to compare the tax liabilities of foreign-owned firms in the United States with the tax liabilities of otherwise-similar American-owned firms in 1987. They report that approximately 50 percent of the difference in the reported U.S. tax obligations of foreign and domestic firms is explainable on the basis of observable characteristics such as firm sizes and ages. The other 50 percent may reflect the use of aggressive transfer pricing by those foreign investors with stronger incentives than American firms to shift taxable income out of the United States, though it may also simply capture the effect of important omitted variables.

various methods at their disposal to avoid tax obligations on their existing investments. One noteworthy feature of this evidence is its almost exclusive focus on differences in corporate income tax rates. Whether and to what extent taxes other than corporate profit taxes influence the activities of multinational firms represent, by comparison, almost entirely open questions.

The relative importance of these alternative questions can be illuminated by the relative magnitudes of foreign income taxes and non-income taxes paid by U.S. firms that operate abroad. Figure 1 provides the ratio of non-income taxes to foreign income taxes paid by American multinational firms from 1982 to 1994. For overall investment as well as within manufacturing, non-income taxes are large relative to income taxes and increasing in importance over the last two decades. The relative importance of non-income taxes in tax competition dynamics is also highlighted in Slemrod (1995) and documented in Desai (1999). Since non-income taxes are typically non-creditable, the relative incentive to use non-creditable versus creditable taxes can be a function of the tax-credit status of multinational firms in large capital-exporting countries such as the United States.

3. Behavioral implications of multiple taxes.

American multinational firms are typically subject to several different types of taxation in foreign countries; in addition, they must also pay taxes to the U.S. government on any profit repatriations. In order to identify the behavioral implications of these multiple taxes, it is useful to consider the incentives facing a firm for which after-tax profits (π_i) in country *i* are given by:

$$\pi_i \equiv \left[(1-t_{1i})p_i Q_i(K_i, L_i) - t_{2i}K_i - w_i L_i\right](1-\tau_i). \quad (1)$$

[16] Swenson (2001b) finds a similar pattern in the reported prices of goods imported into the United States, in which

In expression (1), the term t_{1i} is country *i*'s tax rate on gross output (such as a sales tax or value added tax), t_{2i} is country *i*'s property tax rate on industrial capital, and τ_i is the combined host country and home country profit tax. The firm produces output in country *i* with production function $Q_i(K_i, L_i)$, in which K_i is the firm's capital in country *i*, and L_i its labor input. The production function is assumed to be strictly concave and twice continuously differentiable. As a gesture toward simplifying the analysis, capital is assumed not to depreciate. The firm sells its output in country *i* at an average price of p_i, and hires labor at a wage of w_i; since (by assumption) capital does not depreciate, the firm is not entitled to claim depreciation allowances for capital investment. Firms are assumed to finance their foreign investment with parent equity rather than local or related party debt.

3.1. Income shifting.

As the literature on profit-shifting and transfer-pricing indicates, multinational firms have access to various methods of reallocating tax obligations between jurisdictions. Some of these methods entail the use of tax-motivated financial transactions between related parties, while others may consist of selecting the location of high-value-added foreign production activities. Expression (1) indicates what a firm's after-tax income would be if it were not to avail itself of any of these opportunities. If, instead, the firm were to attempt to reallocate profits between jurisdictions, then its after-tax profits might become:

$$(2) \qquad \tilde{\pi}_i \equiv \left[(1-t_{1i})\, p_i Q_i(K_i, L_i) + (1-at_{1i})\psi_i - c(\psi_i, p_i Q_i) - t_{2i}K_i - w_i L_i\right](1-\tau_i),$$

high unit tariff rates appear to be associated with unusually low prices.

in which $\tilde{\pi}_i$ is reported profits, ψ_i is the volume of additional income (positive or negative) allocated to jurisdiction *i*, and $c(\psi_i, p_i Q_i)$ is the cost of engaging in such income-reallocation. The term $(1 - at_{1i})$ that multiplies ψ_i in (2) reflects that a fraction *a* of income shifted into jurisdiction *i* is subject to gross output taxation. Hence, to the extent that destination-based gross output taxation operates seamlessly, and profit-shifting takes the form of over- or under-invoicing transactions between related parties located in different countries, then *a* might be very small or even zero. To the extent that countries impose gross output-based taxes, or fail to adhere perfectly to the destination basis of destination-based taxes (as when, for example, taxpayers receive credits and refunds only after significant delays), then *a* will take a value somewhere between zero and unity.

The cost of income reallocation is captured by the term $c(\psi_i, p_i Q_i)$. It is commonly assumed (e.g., Hines and Rice, 1994; Grubert and Slemrod, 1998) that this function is increasing (and convex) in the absolute magnitude of ψ_i and decreasing in the absolute magnitude of $p_i Q_i$. This assumption corresponds to the notion that the cost of engaging in a given volume of income shifting is smaller for firms with vast amounts of income. A convenient specification of the $c(\cdot)$ function is:

$$c(\psi_i, p_i Q_i) = \frac{f}{2} \frac{(\psi_i)^2}{p_i Q_i}. \tag{3}$$

The specification (2) of the firm's adjusted profit function imposes that the costs captured by the $c(\cdot)$ function are tax-deductible, which is sensible to the degree that they include top management time and energy, lawyer fees, forgone output, and other expenses that firms deduct from profit taxes.

The ability to reallocate taxable income between jurisdictions carries implications not only for the pattern of reported income but also for factor demands in different jurisdictions. Since the optimal choices of K_i, L_i, and ψ_i can be evaluated in any order, consider the optimal selection of ψ_i, taking K_i and L_i as given. Since profit-shifting cannot generate aggregate net revenue, it follows that the firm's optimization problem is to choose ψ_i to maximize (2), subject to (3) and the constraint that:

$$\sum_{i=1}^{n} \psi_i \leq 0 \,. \tag{4}$$

The first-order condition for this maximization problem is:

$$\left[1 - at_{1i} - \frac{f\psi_i}{p_i Q_i}\right](1-\tau_i) = \lambda \,, \tag{5}$$

in which $\lambda > 0$ is the lagrange multiplier corresponding to the constraint (4). Equation (5) then implies:

$$\psi_i = p_i Q_i \left[\frac{(1-at_{1i})(1-\tau_i) - \lambda}{f(1-\tau_i)}\right] \equiv p_i Q_i \nu_i \,, \tag{6}$$

which in turn carries the implication that firm i's pretax income, denoted μ_i, is given by $[p_i Q_i + \psi_i - c(\psi_i, p_i Q_i) - w_i L_i]$, or:

(7a) $$\mu_i = p_i Q_i \left[1 + \frac{1 - a^2 t_{1i}^2}{2f} + \frac{\lambda a t_{1i}}{f(1-\tau_i)} - \frac{\lambda^2}{2f(1-\tau_i)^2} \right] - w_i L_i \equiv p_i Q_i [1 + \theta_i] - w_i L_i .$$

Taking labor input to be roughly (for the purpose of this calculation only) a constant share (α) of gross output, as it is with a Cobb-Douglas production function, (7a) becomes:

(7b) $$\mu_i = p_i Q_i [1 + \theta_i - \alpha].$$

In order to evaluate the impact of tax rates on income allocation, it is convenient to take logs of both sides of (7b), which yields:

(8) $$\ln(\mu_i) \cong \ln(p_i Q_i) + \theta_i - \alpha .$$

The first term on the right side of (8) can be expanded to be a function of productive inputs (capital and labor compensation) as well as economy-wide productivity indicators such as GDP. The second term on the right side of (8) reflects the impact of income reallocation, and is a function of local direct and indirect tax rates, as well as the cost of income reallocation.

3.2. Factor demands.

Factor demands can be conveniently analyzed by combining (2), (6), and (7a), so that the firm's after-tax profits in jurisdiction i can be rewritten as:

(9) $$\tilde{\pi}_i \equiv \left[p_i Q_i\left(K_i, L_i\right)\left[1+\theta_i - t_{1i}\left(1+a v_i\right)\right] - t_{2i} K_i - w_i L_i\right]\left(1-\tau_i\right).$$

Firms choose inputs K_i and L_i to maximize firm value (V), which reflects the difference between profits and the carrying cost of capital; this difference is given by:

(10) $$V \equiv \sum_{i=1}^{n} \tilde{\pi}_i - \varphi\left(\sum_{i=1}^{n} K_i\right),$$

in which $\varphi > 0$ is the opportunity cost of employing a unit of capital abroad. The first-order conditions characterizing factor inputs that maximize *V* are:

(11) $$\frac{\partial Q_i\left(K_i, L_i\right)}{\partial L_i} = \frac{w_i}{p_i\left[1+\theta_i - t_{1i}\left(1+a v_i\right)\right]}$$

and

(12) $$\frac{\partial Q_i\left(K_i, L_i\right)}{\partial K_i} = \frac{\left[\frac{\varphi}{\left(1-\tau_i\right)} + t_{2i}\right]}{p_i\left[1+\theta_i - t_{1i}\left(1+a v_i\right)\right]}$$

It follows from equation (11) and the usual properties of production functions that higher wages or higher output tax rates raise required marginal revenue products of labor and thereby depress labor demand. The profit tax rate does not appear explicitly in the first-order condition for labor demand as written in (11). Depending on the substitutability of capital and labor, profit taxation can

influence K_i and thereby affect the demand for labor by changing the marginal product on the left side of (11). In addition, profit taxation has the potential to influence p_i.

Demand for FDI is captured by (12), which indicates that higher profit tax rates, higher output or property tax rates, and lower values of p_i all reduce capital demand. The terms containing p_i appearing in the denominators of the right side of (12) are noteworthy in this respect, since product prices are very plausibly functions of local profit and other tax rates. Consider, for example, the case in which a multinational firm sells all of its output in local markets, and local production is depressed by high tax rates. Then p_i will be an increasing function of local tax rates, and the net effect of taxation on labor and capital demand is of uncertain sign.

The ability of American firms to claim tax credits for foreign income tax payments influences the implications of (11) and (12). In the case in which an American firm has deficit foreign tax credits and does not benefit from deferral of home country taxes, its effective foreign profit tax liability is given by the U.S. tax rate, and τ_i is the same for all foreign locations. As a result, local profit tax rates should not influence factor demands – except insofar as they affect p_i, which case higher profit tax rates will be associated with greater demand for labor and capital. In the population of all American investors, some firms have excess foreign tax credits and others have deficit foreign tax credits, so the net implication of higher profit tax rates is in principle unclear. It is, however, clear that there was an important change after 1986, when the steep reduction in the U.S. statutory corporate tax rate suddenly greatly increased the number of American companies with excess foreign tax credits.[17] An implication of this change is that local tax rates should become more important to factor demands after 1986.

One of the difficulties of interpreting estimated factor demand equations is that of removing the effect of correlated omitted variables. In particular, countries that are attractive

locations for FDI may also choose to subject such investment to taxation at high rates. One empirical specification that removes the most obvious form of such endogeneity is a regression of capital/labor ratios on tax rates. This specification offers the advantage of identifying the impact of taxation on one aspect of capital demand (capital-labor substitutability) in a way that is not a simple function of the general attractiveness of an investment location. The implications of the model for capital-labor ratios are apparent from considering the ratios of both sides of equation (11) and equation (12):

$$\frac{\partial Q_i / \partial L_i}{\partial Q_i / \partial K_i} = \frac{w_i \left(1 - \tau_i\right)}{\left[\varphi + t_{2i}\left(1 - \tau_i\right)\right]}. \tag{13}$$

Equation (13) then serves as the basis of the factor demand estimation described in section 4 and presented in Tables 4, 5, and 7.

3.3. Total income.

Firms should demand fewer productive factors in high-tax jurisdictions (all other considerations equal), and thereby generate less income than they would if the same jurisdictions instead had low tax rates. The same firms also have incentives to tailor their financial and nonfinancial practices to reduce still further the income attributed to their affiliates located in high-tax jurisdictions. Both of these considerations therefore imply that the reported income of American affiliates, not controlling for levels of productive inputs, should be a declining function of local tax rates.

[17] See the evidence reported by Grubert, Randolph, and Rousslang (1996).

From the standpoint of host governments, the responsiveness of taxable income to local tax rates carries with it the implication that there might be direct and indirect tax rates in the (0, 1) interval at which tax revenue from foreign investors is maximized. While governments might reasonably not want to impose such taxes – since governments have more than tax revenue in their objective functions, and, in particular, might strive to encourage economic activity – it is revealing to consider the levels of revenue-maximizing tax rates.[18] In particular, it is interesting to evaluate whether revenue-maximizing tax rates have fallen over time in response to (possibly) greater tax competition, and whether small economies have the lowest revenue-maximizing rates.

Let *B* denote the tax base to which an indirect tax (denoted *t*) is applied, and let *B(1-t)* be the tax base to which the direct tax (at rate τ) is applied. Total tax revenue (ρ) is then:

$$\rho = Bt + B(1-t)\tau \tag{14}$$

Taking derivatives of (14) with respect to *t* and τ yields:

$$\frac{\partial \rho}{\partial t} = B(1-\tau) + \frac{\partial B}{\partial t}\left[t + \tau(1-t)\right] \tag{15a}$$

$$\frac{\partial \rho}{\partial \tau} = B(1-t) + \frac{\partial B}{\partial \tau}\left[t + \tau(1-t)\right] \tag{15b}$$

Setting these derivatives equal to zero to solve for the revenue maximizing tax rates (denoted *t** and τ^*) yields the conditions:

[18] The numerous other considerations in selecting tax revenue-maximizing rates include the frequent requirement that all foreign and domestic investors receive equal tax treatment, and the possibility that domestic residents bear the ultimate incidence of taxes imposed on foreign investors.

(16a) $$t^* = \frac{-1}{\left(\frac{1}{B}\frac{\partial B}{\partial t}\right)} - \frac{\tau}{(1-\tau)}$$

(16b) $$\tau^* = \frac{-1}{\left(\frac{1}{B}\frac{\partial B}{\partial \tau}\right)} - \frac{t}{(1-t)}.$$

Expressions (16a) and (16b), together with empirical estimation of semi-elasticities of the tax base with respect to tax rates, provide simple benchmarks against which actual tax rates can be evaluated.

3.4. Data.[19]

The Bureau of Economic Analysis (BEA) provides data on the financial and operating characteristics of U.S. firms operating abroad through periodic benchmark and annual surveys of the activities of U.S. firms operating abroad. These surveys ask reporters to file detailed financial and operating items for each affiliate and information on the value of transactions between U.S. parents and their foreign affiliates. The International Investment and Trade in Services Survey Act governs the collection of the data and the Act ensures that "use of an individual company's data for tax, investigative, or regulatory purposes is prohibited." Willful noncompliance with the Act can result in penalties of to $10,000 or a prison term of one year. As a result of these assurances and penalties, BEA believes that coverage is close to complete and levels of accuracy are high.

[19] This data description draws on Desai and Hines (1999) and Desai, Foley and Hines (2001).

The three most recent benchmark surveys conducted in 1982, 1989, and 1994 (BEA (1985, 1992, 1997)) report data on country and industry bases including details on income statements, balance sheets, employment patterns and parent affiliate transactions. BEA reports aggregate figures of countries in which there is substantial U.S. investment; to protect the confidentiality of survey respondents, BEA suppresses information for countries in which one or two firms represent large fractions of total U.S. investment. U.S. direct investment abroad is defined as the direct or indirect ownership or control by a single U.S. legal entity of at least ten percent of the voting securities of an incorporated foreign business enterprise or the equivalent interest in an unincorporated foreign business enterprise.

The BEA reports aggregate tax payments by country for both foreign income taxes as well as indirect business taxes. Since U.S. firms pay corporate taxes to foreign host countries but on occasion receive special treatment in the form of tax holidays and other local tax concessions, it is necessary to calculate income tax rates specifically available to American investors. Following Hines and Rice (1994) and Desai and Hines (1999), the income tax rates used equal the smaller of the statutory corporate tax rate and the average tax rate paid by American firms in a given year. The average tax rate is calculated as the ratio of foreign income taxes paid by local affiliates of American firms to their local pre-tax income. American firms are also specifically asked to report taxes other than income and payroll taxes. In the surveys distributed by the BEA, these other taxes are defines as sales, value-added, consumption, excise, property, import and export duties, license fees, fines and all taxes other than income and payroll taxes.

In the following analysis, the corporate income tax rate described above is referred to as the direct tax rate and the ratio of indirect business taxes to the sum of local pre-tax income and indirect business taxes is referred to as the indirect tax rate. In order to consider seperately the

potential effects of output taxes, value-added taxes obtained from the University of Michigan World Tax Database are also employed. Table 1 provides descriptive statistics for the relevant variables for 1982, 1989 and 1994.

4. Results and interpretation.

This section presents estimated regression coefficients for equations explaining the aggregate profitability of American affiliates conditional on factor inputs, aggregate factor demands, and total taxable incomes. Since the results indicate the importance of taxes other than corporate income taxes, it is useful to start by considering the extent to which taxes of different kinds are correlated.

4.1. Tax rates.

Tax rates facing American multinational firms exhibit strong positive cross-sectional correlations, meaning that countries with high corporate tax rates are also likely to have high value-added tax rates, high individual tax rates, and high rates of other taxes. This correlation may reflect differing national revenue needs, or perhaps the working of tax competition in which some countries are more subject to competitive pressures (on all their tax rates) than are others. The high degree of correlation also means that it can be difficult to identify the behavioral impact of one tax against another.

Table 2 presents tax rate correlations for 1994, the last year for which it is possible to obtain detailed information from a benchmark survey. The "direct tax rate" in 1994 is defined as the ratio of income taxes paid by all American affiliates to the sum of aggregate 1994 after-tax income of these affiliates plus income taxes paid. Consequently, the "direct tax rate" can be

interpreted as an average corporate tax rate faced by American firms. Since this is potentially a noisy variable, its value is restricted to lie in the (0, 1) interval, and to equal the statutory corporate tax rate whenever the statutory rate is below the measured average corporate tax rate. The "indirect tax rate" in 1994 is the ratio of non-income and non-payroll taxes paid by all American affiliates to the sum of aggregate 1994 pre-tax income of these affiliates plus income taxes paid and non-income taxes and non-payroll taxes. The "statutory corporate tax rate" is the top marginal corporate tax rate, and the "statutory individual tax rate" is the top marginal individual income tax rate. The "withholding tax rate" is the ratio of withholding taxes on distributed earnings paid by all American affiliates in 1994 to total distributed earnings of those affiliates. The "value-added tax rate" is the statutory value-added tax rate on typical consumed goods.

Table 2 indicates that every one of these tax rates exhibits a positive correlation with all of the others. Notably, direct tax rates have a greater than 0.5 correlation with indirect tax rates and with statutory corporate tax rates, while indirect tax rates also have a greater than 0.5 correlation with value-added tax rates. The statutory individual tax rate has a greater than 0.5 correlation with both the statutory corporate tax rate and the value-added tax rate. The high degree of correlation between the statutory rates is not only suggestive of competitive tax-setting pressures, but also offers reassurance that the high correlation of measured direct and indirect tax rates reflect something other than statistical artifacts.

An important feature of indirect tax rates is their magnitude compared to more commonly-studied direct tax rates. Table 1 reports that indirect tax rates exceed direct tax rates for all three years of the sample, which in turn implies a significant revenue difference between these two tax types, since the indirect tax base typically exceeds the direct tax base. Indeed, Figure 1 plots the ratio of total indirect tax payments by U.S. majority-owned foreign affiliates to direct tax payments

by the same affiliates for every year between 1982 and 1994. This ratio exceeds 1.5 for every year of the sample, and in the 1990s (after a wave of direct tax reductions around the world) began to exceed three.

4.2. Profit location.

Tables 3a, 3b, and 3c offer estimates of variants of the profit location equation (8), in which the log of pretax income is regressed against its determinants: labor inputs, capital inputs, local GDP, and direct and indirect tax rates. The data used to estimate these equations consist of country-year observations of the activity of all U.S. majority-owned affiliates. These equations are consistent with simple Cobb-Douglas specifications of aggregate production functions, in which local GDP is included as a productivity scaling factor. Table 3a reports results for 1982, Table 3b reports results for 1989, and Table 3c reports results for 1994. The first three columns of each table report regressions in which the dependent variable is the log of the sum of after-tax income and profit taxes; columns 4-7 of the same tables report regressions in which the dependent variable is the sum of after-tax income, profit taxes, and non-income and non-payroll taxes.

Higher tax rates are associated with lower pretax income in almost every specification. The results reported in first three columns of Tables 3a – 3c are consistent with the specifications and results reported by Hines and Rice (1994), who estimate similar equations for 1982, and who find that higher direct tax rates are associated with reduced pre-tax income. Since direct and indirect tax rates are positively correlated, and higher indirect tax rates reduce pre-tax income as defined in columns 1-3 of Tables 3a – 3c, it follows that high direct tax rates might be correlated with low pretax income simply through the effect of indirect tax rates. It is in part to guard against this possibility that the regressions reported in columns 2 and 3 are re-run with a dependent

variable that adds back indirect tax payments; these regressions are reported in columns 4 and 5 of Tables 3a – 3c. While the estimated direct tax rate coefficients in the regressions reported in columns 4 and 5 indeed turn out to be smaller than the corresponding tax coefficients reported in columns 2 and 3, they remain large and significant.

The impact of including indirect tax rates in the pretax profit location estimation is apparent from considering the 1989 results reported in Table 3b. The specification reported in column 8 of Table 3b indicates that, controlling for levels of productive inputs, higher indirect tax rates have negative and significant effects on reported pretax income: an indirect tax rate difference of 10 percent is associated with a 9.2 percent difference in reported income. While direct tax rates are estimated to have larger effects in this and other regressions, these estimates are often imprecise when the (highly correlated) indirect tax rates are included in the same equations. The estimated effect of a direct tax rate difference of 10 percent in the regression reported in column 7 is an 18.2 percent difference in reported income, but this estimate has a large standard error.

The available information is sufficient to use changes between 1982 and 1989, and again between 1989 and 1994, to estimate the profit reporting regressions in first differences. Doing so offers the benefit of controlling for time-invariant location-specific factors that affect reported profitability. Columns 1-3 of both panels of Table 7 report estimated coefficients from such first difference specifications. The results from the 1982-1989 first difference are quite similar to those from the 1989 cross-section reported in Table 3a. The regression reported in column 3 of the left panel of Table 7 indicates that a ten percent indirect tax rate change between 1982 and 1989 was associated with a 7.4 percent change in reported profitability, controlling for productive inputs. The same regression indicates that a 10 percent direct tax rate change was associated with a 12.3 percent change in reported profitability, though a large standard error is associated with this

estimate. Columns 1-3 of the right panel of Table 7 indicate that indirect tax changes between 1989 and 1994 had smaller effects on reported profitability than they did over the 1982-1989 time period, while direct tax changes had much larger effects. Ten percent indirect tax changes between 1989 and 1994 are associated with 3.7 percent changes in reported profitability, while ten percent direct tax changes are associated with 29.3 percent profitability differences.

4.3. Factor demands.

Taxation of different kinds has the potential to discourage FDI and to distort the mix of factors that firms demand. Equation (13) illustrates that capital/labor ratios are positively affected by wage rates, and negatively affected by income taxes and property taxes. One of the difficulties with implementing (13) empirically is that labor does not come in identifiable homogenous units; as a result, employee compensation rather than employment is used in the denominator of the capital/labor ratio in an effort to adjust for human capital. The results of estimating variants of (13) are presented in Table 4.

The estimates reported in Table 4 indicate that capital/labor ratios are decreasing functions of wage rates, which is sensible when it is recalled that labor is measured as total employee compensation.[20] The estimated effects of direct tax rates on capital/labor ratios in 1982 are small and not statistically significant, while the effects of indirect tax rates are considerably larger and are significant in the quadratic specification reported in column 4. A similar pattern appears in 1989, with the difference that estimated coefficients on direct tax rates are not uniformly negative. In the regression reported in column 3 of the 1989 results in Table 4, a ten percent higher indirect tax rate is associated with an 8.6 percent lower capital/labor ratio, presumably reflecting the

[20] Data on wage rates are available only for production workers in manufacturing, which are no doubt correlated, albeit imperfectly, with wage rates paid by all majority-owned American affiliates.

property tax and related components of indirect taxation. The same regression reports a positive and insignificant effect of higher direct tax rates on capital/labor ratios.

These results suggest that factor demands are influenced by indirect tax rates, and indeed, offer stronger evidence that indirect tax rates affect factor demands than they do evidence that direct tax rates affect factor demands. While there is ample other evidence in the literature of the impact of direct taxation on the demand for FDI, the ability of indirect taxation to influence factor demands should not be minimized, particularly since American investors are ineligible to claim foreign tax credits for indirect taxes paid. As a check on the reliability of the factor demand results, and the interpretation of indirect tax rates as reflecting at least in part the impact of property and property-like taxes, the equations reported in Table 4 were re-run using statutory value-added tax rates in place of indirect tax rates.

The results are reported in Table 5. Since, as indicated in equation 13, value-added taxes should not influence capital/labor ratios, it follows that the results of these new specifications should look markedly different from those reported in Table 4. And the results reported in Table 5 in fact do differ greatly from the results of estimating the same equations using indirect tax rates in place of value-added taxes. Estimated coefficients on value-added tax rates are positive (though insignificant) in the linear specification (column 2) in each of the three cross-sections, while direct tax rates are estimated to have insignificant negative effects in 1982 and 1989. Due to data limitations there are fewer observations in the regressions reported in Table 5 than there are in those reported in Table 4; nevertheless, the specifications are so otherwise similar that their differences offer evidence in favor of the previous interpretation of the results reported in Table 4.

4.4. Total income.

Total income earned by American affiliates is a function of factor demands and profit allocation behavior. Table 6 offers estimates of the determinants of total pre-tax income in which only log(GDP) and tax rates are used as regressors (in various combinations), since the goal is to endogenize factor demands and thereby reveal the choices made by governments in selecting their tax rates.

The results reported in Table 6 indicate that high direct tax rates discourage income production in all three cross-sections, and that, in 1982 and 1989, high indirect tax rates likewise discourage income production. The coefficients reported in column 3 of the 1982 panel of Table 6 indicate that ten percent higher indirect tax rates are associated with 8.4 percent lower income production, while ten percent higher direct tax rates are associated with 13.3 percent lower income production (thought the latter effect is estimated with considerable imprecision). The estimated effect of indirect taxation is similar in 1989, though the estimated impact of direct taxation is much larger: ten percent differences in direct taxation are associated with 55.8 percent income differences. Neither direct nor indirect tax rates significantly affect reported profits in 1994. Equations 16a and 16b, the coefficients in columns 1 and 2 of the 1989 panel, and the mean tax rates for 1989 can be combined to find the revenue-maximizing direct and indirect tax rates for 1989. These rates, -35 percent for direct tax rates and 33 percent for indirect tax rates, suggest that income tax subsidies in combination with hefty indirect taxes would raise maximal revenues from U.S. firms. Such a combination of income tax subsidies and indirect taxes reflects the prevalence of excess credit firms amongst U.S. firms in 1989.

These results can be mapped to a dynamic of direct and indirect tax competition from 1982 through 1994. The coefficients imply that the revenue-maximizing direct tax rate fell considerably between 1982 and 1989 while the revenue-maximizing indirect tax rate also fell, but by

considerably less. The larger relative decline in the revenue-maximizing direct tax rate is consistent with the importance of the distinction between creditable and non-creditable taxes in influencing how U.S. multinationals firms respond to taxation. The rapid increase in the share of U.S. firms with excess foreign tax credits would increase their sensitivity to creditable (income) taxes relative to noncreditable (non-income) taxes. These changed sensitivities, and the corresponding revenue-maximizing rates, change the incentives for tax competition over different tax instruments.

Column 4 in each of the panels of Table 6 report the results of specifications that include interactions between tax rates and log(GDP), in order to check whether the responsiveness of income to tax rates (and therefore also the revenue-maximizing tax rates) varies with economy size. The results confirm that economic size dampens the responsiveness of pretax income to tax rates. The reduced responsiveness to tax rates in larger countries likely reflects the immobility of specific factors (such as local markets or local resources) in large countries or the efficiency with which tax revenue is deployed in those countries. The estimates in column 4 for 1989 can be combined with equations 16a and 16b to derive the revenue-maximizing tax rates for particular countries. For the country with the median GDP in the sample for 1989, Egypt, the coefficients in column 4 for 1989 along with Egypt's tax parameters imply a revenue-maximizing direct tax rate of 24 percent and a revenue-maximizing indirect tax rate of 152 percent.[21]

Table 7 reports the results of first-difference estimates of the determinants of the location of total income. Columns 4-6 of the left panel of Table 7 report estimated coefficients from regressions in which the dependent variable is the growth rate of affiliate income between 1982 and 1989; columns 4-6 of the right panel report estimates in which the dependent variable is the

[21] The 24% figure, for example, was calculated as $-\frac{1}{-7.88+0.88\times \text{Log GDP}_{\text{Egypt}}}-\frac{\text{Indirect Tax Rate}_{\text{Egypt}}}{\text{1-Indirect Tax Rate}_{\text{Egypt}}}$.

growth of affiliate income between 1989 and 1994. The results are broadly consistent with those reported in Table 6. In the 1989-1994 regression reported in column 6, a ten percent change in the indirect tax rate is associated with a 7.5 percent change in reported income, while a ten percent change in the direct tax rate is associated with a 25.4 percent change in reported income.

5. Conclusion.

This paper offers evidence that taxes other than income taxes significantly influence the pattern of income production by multinational firms by altering their investment and transfer pricing incentives. The high degree of correlation between income and non-income tax rates suggests that the body of empirical work exclusively emphasizing income taxes may have inadvertently obscured the role of non-income taxes. Since American taxpayers can claim tax credits for income taxes paid to foreign governments, but are unable to claim similar tax credits for indirect taxes paid to foreign governments, it follows that foreign indirect taxes have much greater potential to influence their behavior.

Governments that are concerned about the potential for competing jurisdictions to lure economic activity and about indirect tax receipts may already be competing on non-income taxes and are likely to be increasingly aware of relative indirect tax burdens in their own and other jurisdictions. While a race to the bottom dynamic on indirect taxation has not been demonstrated, there is, however, considerable evidence to suggest that multinational firms respond to indirect tax rate differences. Since indirect tax burdens greatly exceed direct tax burdens, there is ample scope for downward competitive dynamics as governments respond to greater international mobility of productive factors.

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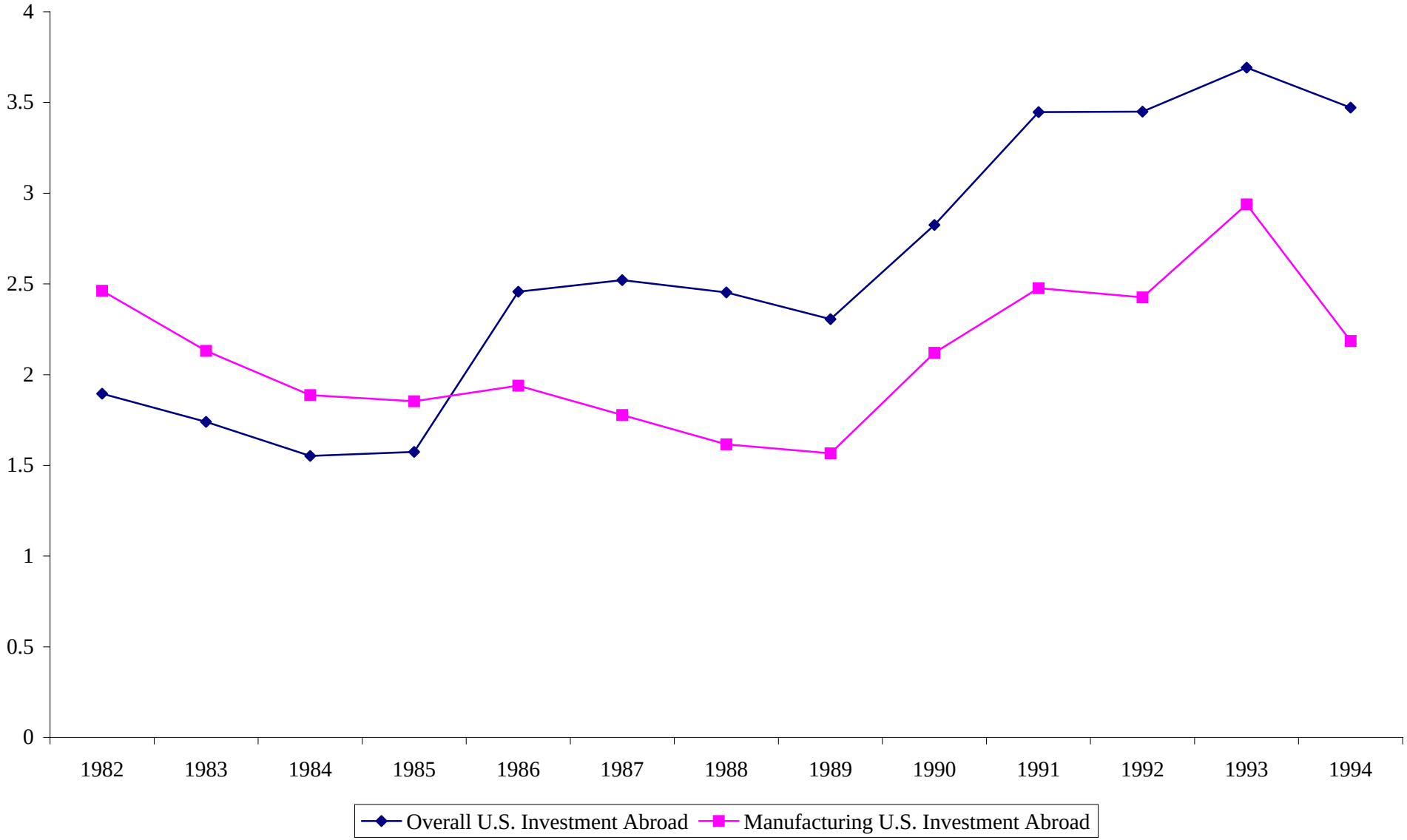
Figure 1: The Ratio of Non-Income and Non-Payroll Taxes to Foreign Income Taxes, 1982-1994



Note: The figure provides the ratio of non-income and non-payroll taxes to foreign income taxes from 1982 to 1994 for all U.S. multinationals and for the manufacturing sector.

Table 1
Descriptive Statistics for Sample

	Mean	Median	Std. Dev.	No. Obs.
Log of Pre-Direct Tax Income, 1982	6.0976	6.3570	1.4922	46
Log of Pre-All Tax Income, 1982	6.6426	6.5985	1.6406	44
Log of Net PP&E, 1982	6.7992	6.7397	1.5052	54
Log of Employee Compensation, 1982	6.0254	5.7120	1.6446	54
Log of Average Wage Rate, 1982	1.5495	1.7047	0.7466	50
Log of GDP, 1982	3.9223	4.2380	1.7304	60
Log of Ratio of Net PP&E to Employee Compensation, 1982	0.7738	0.7184	0.7440	54
Direct Tax Rate, 1982	0.3507	0.4000	0.1511	59
Indirect Tax Rate, 1982	0.5057	0.5388	0.3541	44
VAT Tax Rate, 1982	0.1015	0.1000	0.0830	29
Log of Pre-Direct Tax Income, 1989	6.4598	6.3279	1.6459	53
Log of Pre-All Tax Income, 1989	7.1259	7.0255	1.5109	49
Log of Net PP&E, 1989	6.8590	6.5861	1.6789	58
Log of Employee Compensation, 1989	6.0195	5.8051	1.8842	54
Log of Average Wage Rate, 1989	1.6653	1.5271	0.9094	58
Log of GDP, 1989	4.4077	4.6579	1.7359	59
Log of Ratio of Net PP&E to Employee Compensation, 1989	0.8395	0.6756	0.9073	58
Direct Tax Rate, 1989	0.2794	0.3000	0.1486	60
Indirect Tax Rate, 1989	0.3444	0.3370	0.2943	50
VAT Tax Rate, 1989	0.1022	0.1000	0.0775	41
Log of Pre-Direct Tax Income, 1994	6.5866	6.4427	1.5309	58
Log of Pre-All Tax Income, 1994	7.2158	7.0510	1.4992	55
Log of Net PP&E, 1994	7.4023	7.1910	1.6327	58
Log of Employee Compensation, 1994	6.5019	6.3918	1.8137	58
Log of Average Wage Rate, 1994	1.9712	2.0082	0.9189	57
Log of GDP, 1994	4.7812	4.9954	1.7526	59
Log of Ratio of Net PP&E to Employee Compensation, 1994	0.9004	0.7775	0.7966	58
Direct Tax Rate, 1994	0.2431	0.2672	0.1480	59
Indirect Tax Rate, 1994	0.3709	0.3515	0.2593	55
VAT Tax Rate, 1994	0.1217	0.1400	0.0727	48

Note: For each year, "Log of Pre-Direct Tax Income" is the logarithm of the sum of net income and foreign income taxes; "Log Pre-All Tax Income" is the logarithm of the sum of net income, foreign income taxes, and non-income and non-payroll taxes; "Log of Net PP&E" is the logarithm of net property, plant and equipment; "Log of Employee Compensation" is the logarithm of employee compensation; "Log of Average Wage Rate" is the logarithm of the average wage for a production worker in the manufacturing sector; "Log of GDP" is the logarithm of gross domestic product as reported in the Penn World Tables (1982 and 1989) and by the EIU (1994); "Log of Ratio of Net PP&E to Employee Compensation" is the logarithm of the ratio of net property, plant and equipment to employee compensation; "Direct Tax Rate" is the ratio of foreign income taxes to the sum of net income and foreign income taxes; "Indirect Tax Rate" is the ratio of non-income and non-payroll taxes to the sum of net income, foreign income taxes, and non-income and non-payroll taxes; "VAT Tax Rate" is the value-added tax rate as reported in the University of Michigan World Tax Database.

Table 2
Correlation Matrix for Country Tax Rates, 1994

	Direct Tax Rate	Indirect Tax Rate	Statutory Corporate Tax Rate	Statutory Individual Tax Rate	Withholding Tax Rate
Indirect Tax Rate	0.5365	1.0000			
	0.0002	na			
	55	55			
Statutory Corporate Tax Rate	0.5387	0.1578	1.0000		
	0.0000	0.2544	na		
	57	54	57		
Statutory Individual Tax Rate	0.1668	0.3483	0.5684	1.0000	
	0.2106	0.0099	0.0000	na	
	58	54	57	57	
Withholding Tax Rate	0.3066	0.2323	0.3167	0.2117	1.0000
	0.0341	0.1161	0.0301	0.1468	na
	48	47	47	48	48
Value-Added Tax Rate	0.2536	0.5152	0.1513	0.5009	0.1343
	0.0820	0.0003	0.3047	0.0003	0.4027
	48	45	48	48	41

Note: For each pair, the first cell is the correlation coefficient, the second cell is the level of significance for that correlation coefficient, and the third cell is the number of pairs. "Direct Tax Rate" is the ratio of foreign income taxes to the sum of net income and foreign income taxes. "Indirect Tax Rate" is the ratio of non-income and non-payroll taxes to the sum of net income, foreign income taxes, and non-income and non-payroll taxes. "Statutory Corporate Tax Rate" is the top marginal corporate rate as reported in the University of Michigan World Tax Database. "Statutory Individual Tax Rate" is the top marginal individual rate as reported in the University of Michigan World Tax Database. "Withholding Tax Rate" is the ratio of withholding tax payments to distributed direct earnings. "VAT Tax Rate" is the value-added tax rate as reported in the University of Michigan World Tax Database.

Table 3a
The Location of Pretax Profits and Direct and Indirect Tax Rates, 1982

Dependent Variable: Log of Pre-Direct Tax or Pre-All Tax Income

	Log of Pre-Direct Tax Income			Log of Pre-All Tax Income					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Constant	1.3170	1.6871	2.2637	1.5298	1.9579	1.6305	1.5778	1.6971	2.0994
	(0.8815)	(0.8454)	(0.7124)	(0.9080)	(0.9685)	(0.9756)	(1.0532)	(0.9582)	(1.0159)
Log of Employee Compensation	0.0822	0.0185	0.0272	0.1385	0.1196	0.2893	0.2534	0.2325	0.1351
	(0.2878)	(0.2882)	(0.3085)	(0.1716)	(0.1738)	(0.1651)	(0.1832)	(0.1630)	(0.1765)
Log of Net PP&E	0.7768	0.7949	0.8189	0.6664	0.6783	0.5182	0.5485	0.5687	0.6451
	(0.2621)	(0.2556)	(0.2797)	(0.1805)	(0.1773)	(0.2039)	(0.2324)	(0.1940)	(0.1958)
Log GDP	-0.2571	-0.0543	-0.0200	0.0925	0.1230	0.0264	0.0209	0.0898	0.1145
	(0.1433)	(0.1635)	(0.1488)	(0.1290)	(0.1376)	(0.1143)	(0.1202)	(0.1310)	(0.1468)
Direct Tax Rate		-2.8568	-12.0265	-1.9252	-6.8273			-1.2778	-7.0749
		(1.1482)	(4.7173)	(0.9691)	(4.7623)			(0.9121)	(5.0286)
Direct Tax Rate Squared			15.8832		8.3664				9.9265
			(7.1792)		(7.3871)				(7.6983)
Indirect Tax Rate						-0.7592	-0.3921	-0.5515	0.2373
						(0.3859)	(1.1449)	(0.4049)	(1.0563)
Indirect Tax Rate Squared							-0.2598		-0.5814
							(0.6761)		(0.6356)
R-Squared	0.5794	0.6270	0.6861	0.7546	0.7692	0.7576	0.7585	0.7664	0.7867
No. of Obs.	46	46	46	44	44	44	44	44	44

Note: In columns 1, 2, and 3, the dependent variable is the logarithm of the sum of net income and foreign income taxes. In columns 4 through 9, the dependent variable is the logarithm of the sum of net income, foreign income taxes and non-income and non-payroll taxes. "Log of Net PP&E" is the logarithm of net property, plant and equipment. "Log of Employee Compensation" is the logarithm of employee compensation. "Log of GDP" is the logarithm of gross domestic product as reported in the Penn World Tables. "Direct Tax Rate" is the ratio of foreign income taxes to the sum of net income and foreign income taxes. "Indirect Tax Rate" is the ratio of non-income and non-payroll taxes to the sum of net income, foreign income taxes, and non-income and non-payroll taxes. Heteroskedasticity-consistent standard errors are presented in parentheses.

Table 3b
The Location of Pretax Profits and Direct and Indirect Tax Rates, 1989

Dependent Variable: Log of Pre-Direct Tax or Pre-All Tax Income

	Log of Pre-Direct Tax Income			Log of Pre-All Tax Income					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Constant	1.2191	2.0081	2.0752	2.4900	2.6825	2.4701	2.6467	2.6776	2.8364
	(0.7902)	(0.7770)	(0.7661)	(0.7547)	(0.7579)	(0.7520)	(0.7617)	0.7761	(0.7701)
Log of Employee Compensation	0.0517	-0.0068	-0.0122	0.2624	0.2272	0.4411	0.5524	0.3715	0.4380
	(0.1771)	(0.1819)	(0.1807)	(0.1758)	(0.1776)	(0.1601)	(0.1756)	(0.1684)	(0.2165)
Log of Net PP&E	0.8822	0.7552	0.8361	0.5142	0.5415	0.4328	0.3460	0.4150	0.3760
	(0.1784)	(0.1785)	(0.1877)	(0.1717)	(0.1709)	(0.1859)	(0.1939)	(0.1806)	(0.2205)
Log GDP	-0.2755	0.1033	0.0872	0.0009	0.0676	-0.1690	-0.1502	-0.0027	0.0149
	(0.1163)	(0.1399)	(0.1547)	(0.2105)	(0.2190)	(0.1533)	(0.1473)	(0.2055)	(0.1974)
Direct Tax Rate		-4.5990	-11.5453	-2.5526	-7.9546			-1.8234	-3.9003
		(1.3619)	(4.3539)	(1.3420)	(4.2433)			(1.3354)	(4.7202)
Direct Tax Rate Squared			14.5299		10.8599				4.5269
			(7.7192)		(8.0467)				(9.2903)
Indirect Tax Rate						-1.1289	-3.0160	-0.9171	-2.2765
						(0.4332)	(1.2589)	(0.3943)	(1.5104)
Indirect Tax Rate Squared							1.6963		1.3080
							(0.9597)		(1.0839)
R-Squared	0.6262	0.7024	0.7276	0.7016	0.7165	0.7095	0.7252	0.7203	0.7343
No. of Obs.	53	53	53	49	49	49	49	49	49

Note: In columns 1, 2, and 3, the dependent variable is the logarithm of the sum of net income and foreign income taxes. In columns 4 through 9, the dependent variable is the logarithm of the sum of net income, foreign income taxes and non-income and non-payroll taxes. "Log of Net PP&E" is the logarithm of net property, plant and equipment. "Log of Employee Compensation" is the logarithm of employee compensation. "Log of GDP" is the logarithm of gross domestic product as reported in the Penn World Tables. "Direct Tax Rate" is the ratio of foreign income taxes to the sum of net income and foreign income taxes. "Indirect Tax Rate" is the ratio of non-income and non-payroll taxes to the sum of net income, foreign income taxes, and non-income and non-payroll taxes. Heteroskedasticity-consistent standard errors are presented in parentheses.

Table 3c
The Location of Pretax Profits and Direct and Indirect Tax Rates, 1994

Dependent Variable: Log of Pre-Direct Tax or Pre-All Tax Income

	Log of Pre-Direct Tax Income			Log of Pre-All Tax Income					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Constant	1.3506	1.5205	1.3992	1.6435	1.7820	1.6288	1.5292	1.6172	1.5949
	(0.6770)	(0.6069)	(0.5328)	(0.5187)	(0.5331)	(0.5276)	(0.4960)	(0.5163)	(0.4782)
Log of Employee Compensation	0.4562	0.4042	0.2982	0.5491	0.5538	0.5952	0.5698	0.5312	0.4609
	(0.1453)	(0.1512)	(0.1547)	(0.1388)	(0.1289)	(0.1328)	(0.1242)	(0.1375)	(0.1281)
Log of Net PP&E	0.5479	0.5652	0.7166	0.4329	0.4779	0.4034	0.4778	0.4492	0.6018
	(0.1616)	(0.1573)	(0.1393)	(0.1417)	(0.1368)	(0.1364)	(0.1255)	(0.1366)	(0.1225)
Log GDP	-0.3745	-0.2726	-0.1243	-0.2084	-0.2032	-0.2704	-0.2333	-0.2065	-0.1665
	(0.0956)	(0.1242)	(0.1296)	(0.0882)	(0.0828)	(0.0819)	(0.0757)	(0.0907)	(0.0950)
Direct Tax Rate		-1.8731	-11.0059	-1.2881	-9.0644			-1.4563	-9.6463
		(1.6435)	(2.5435)	(0.8121)	(2.8593)			(0.9360)	(3.5058)
Direct Tax Rate Squared			15.0167		18.3473				18.0955
			(3.1810)		(6.0589)				(6.8525)
Indirect Tax Rate						-0.1768	-3.7263	0.1389	-2.1850
						(0.3274)	(1.1308)	(0.3489)	(1.3592)
Indirect Tax Rate Squared							4.4150		3.2190
							(1.4161)		(1.4983)
R-Squared	0.6809	0.7032	0.8024	0.8172	0.8446	0.8110	0.8373	0.8176	0.8660
No. of Obs.	58	58	58	55	55	55	55	55	55

Note: In columns 1, 2, and 3, the dependent variable is the logarithm of the sum of net income and foreign income taxes. In columns 4 through 9, the dependent variable is the logarithm of the sum of net income, foreign income taxes and non-income and non-payroll taxes. "Log of Net PP&E" is the logarithm of net property, plant and equipment. "Log of Employee Compensation" is the logarithm of employee compensation. "Log of GDP" is the logarithm of gross domestic product as reported in the Penn World Tables. "Direct Tax Rate" is the ratio of foreign income taxes to the sum of net income and foreign income taxes. "Indirect Tax Rate" is the ratio of non-income and non-payroll taxes to the sum of net income, foreign income taxes, and non-income and non-payroll taxes. Heteroskedasticity-consistent standard errors are presented in parentheses.

Table 4
Capital/Labor Ratios and Direct and Indirect Tax Rates, 1982, 1989 and 1994

Dependent Variable: Log of Ratio of Net PP&E to Employee Compensation

	1982				1989				1994			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Constant	1.37793	1.5009	1.4695	1.6329	1.6468	1.8850	1.8280	1.5867	1.6417	1.4763	1.4725	1.2105
	(0.2290)	(0.2379)	(0.2094)	(0.3374)	(0.2151)	(0.2601)	(0.2300)	(0.2973)	(0.2511)	(0.3122)	(0.3795)	(0.5161)
Log Average	-0.3993	-0.3901	-0.3412	-0.2895	-0.4871	-0.4880	-0.4290	-0.3702	-0.3839	-0.3956	-0.3221	-0.3361
Wage Rate	(0.1369)	(0.1451)	(0.1364)	(0.1552)	(0.1110)	(0.1144)	(0.1113)	(0.1112)	(0.1007)	(0.0973)	(0.0964)	(0.0908)
Direct Tax Rate		-0.4033	0.3064	0.6392		-0.8589	0.3448	4.5889		0.7783	1.5824	4.9684
		(0.5329)	(0.6414)	(2.9581)		(0.7668)	(0.7220)	(2.5437)		(0.6699)	(1.0400)	(4.3989)
Direct Tax Rate				-0.1609				-9.1674				-8.0138
Squared				(5.0639)				(4.8338)				(8.1526)
Indirect Tax Rate			-0.5426	-2.0519			-0.8556	-1.9260			-0.9339	-0.3045
			(0.3815)	(0.7508)			(0.3807)	(0.6154)			(0.3736)	(1.7237)
Indirect Tax Rate				1.1206				0.9975				-0.8821
Squared				(0.3920)				(0.4478)				(1.6378)
R-Squared	0.1564	0.1619	0.2893	0.4095	0.2360	0.2545	0.4262	0.4957	0.1970	0.2161	0.3240	0.3554
No. of Obs.	50	49	42	42	58	58	50	50	57	57	54	54

Note: In the three panels labelled 1982, 1989, and 1994, the dependent variable is the log of the ratio of net property, plant and equipment to employee compensation in the respective year. "Log of Average Wage Rate" is the logarithm of the average wage for a production worker in the manufacturing sector. "Direct Tax Rate" is the ratio of foreign income taxes to the sum of net income and foreign income taxes. "Indirect Tax Rate" is the ratio of non-income and non-payroll taxes to the sum of net income, foreign income taxes, and non-income and non-payroll taxes. Heteroskedasticity-consistent standard errors are presented in parentheses.

Table 5
Capital/Labor Ratios and VAT Tax Rates, 1982, 1989 and 1994

Dependent Variable: Log of Ratio of Net PP&E to Employee Compensation

	1982			1989			1994		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Constant	1.6318	1.752	2.1546	2.2442	2.2640	2.0724	1.8644	1.8250	1.4344
	(0.5327)	(0.5976)	(0.6776)	(0.2975)	(0.3139)	(0.3151)	(0.2739)	(0.2883)	(0.4521)
Log Average	-0.5212	-0.6969	-0.7389	-0.6258	-0.7262	-0.7200	-0.5213	-0.5692	-0.4960
Wage Rate	(0.3068)	(0.3045)	(0.3106)	(0.1343)	(0.1990)	(0.1882)	(0.0852)	(0.0805)	(0.0957)
Direct Tax Rate	-0.2733	-1.0897	-3.6842	-1.3343	-1.6151	2.4158	0.4092	0.1172	3.5077
	(0.6963)	(0.9048)	(4.2842)	(0.9679)	(1.2435)	(2.9911)	(0.8039)	(0.7603)	(3.2210)
Direct Tax Rate			4.9687			-8.4544			-8.9861
Squared			(7.5030)			(7.5321)			(7.5628)
VAT Tax Rate		4.1315	-2.6171		2.2455	-2.0194		1.6526	5.2485
		(2.6309)	(8.0751)		(2.9584)	(7.2038)		(1.3032)	(4.4600)
VAT Tax Rate			33.7131			18.2180			-19.1819
Squared			(36.0733)			(27.8948)			(19.9154)
R-Squared	0.1479	0.2544	0.3002	0.3751	0.3961	0.4147	0.3485	0.3650	0.3938
No. of Obs.	26	26	26	41	41	41	46	46	46

Note: In the three panels labelled 1982, 1989, and 1994, the dependent variable is the log of the ratio of net property, plant and equipment to employee compensation in the respective year. "Log of Average Wage Rate" is the logarithm of the average wage for a production worker in the manufacturing sector. "Direct Tax Rate" is the ratio of foreign income taxes to the sum of net income and foreign income taxes. "VAT Tax Rate" is the value-added tax rate as reported in the University of Michigan World Tax Database.

Table 6
Pre-All Tax Income and Direct and Indirect Tax Rates, 1982, 1989 and 1994

Dependent Variable: Log of Pre-All Tax Income

	1982				1989				1994			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Constant	4.9871	4.9212	5.0416	5.9887	4.9061	4.9985	4.9697	6.6973	5.2282	5.1738	5.1443	6.8569
	(0.5302)	(0.5157)	(0.5222)	(0.5944)	(0.4901)	(0.5337)	(0.4902)	(0.4747)	(0.6197)	(0.6426)	(0.6500)	(0.7152)
Log GDP	0.6149	0.5714	0.6281	0.2347	0.8510	0.5962	0.8678	0.3076	0.5675	0.4048	0.5605	0.0971
	(0.1369)	(0.1356)	(0.1368)	(0.2670)	(0.1208)	(0.1100)	(0.1173)	(0.1733)	(0.2106)	(0.1385)	(0.2123)	(0.2618)
Direct Tax Rate	-2.2608		-1.3302	1.7345	-6.0901		-5.5827	-7.8758	-3.4246		-4.3974	-5.3985
	(1.0706)		(1.0586)	(4.3455)	(1.4148)		(1.4696)	(3.5404)	(2.7007)		(2.7273)	(6.4225)
Indirect Tax Rate		-1.0279	-0.8380	-5.5803		-1.3872	-0.7350	-6.1886		0.1520	0.6910	-4.5669
		(0.4430)	(0.4024)	(2.2267)		(0.4973)	(0.3423)	(2.1696)		(0.7115)	(0.9279)	(2.7408)
Interaction of Direct Tax Rate and Log GDP				-0.3906				0.8792				0.4260
				(1.0986)				(0.7647)				(1.3655)
Interaction of Indirect Tax Rate and Log GDP				1.1514				1.2290				1.1610
				(0.5111)				(0.4494)				(0.5640)
R-Squared	0.3615	0.3824	0.3924	0.4622	0.5090	0.3881	0.5228	0.6569	0.2695	0.2186	0.2878	0.4298
No. of Obs.	44	44	44	44	49	49	49	49	55	55	55	55

Note: In the three panels labelled 1982, 1989, and 1994, the dependent variable is the log of pre-all tax income defined as the sum of net income, foreign income taxes, and non-income and non-payroll taxes. "Log GDP" is the logarithm of the gross domestic product in the respective year. "Direct Tax Rate" is the ratio of foreign income taxes to the sum of net income and foreign income taxes. "Indirect Tax Rate" is the ratio of non-income and non-payroll taxes to the sum of net income, foreign income taxes, and non-income and non-payroll taxes. Heteroskedasticity-consistent standard errors are presented in parentheses.

Table 7
Changes in Pre-All Tax Income and Direct and Indirect Tax Rates, 1982-1989 and 1989-1994

	Dependent Variable: Pre-All Tax Income Growth, 1982-1989						Dependent Variable: Pre-All Tax Income Growth, 1989-1994					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-0.1990	-0.0519	-0.1097	-0.6802	-0.5627	-0.6231	-0.5731	-0.3454	-0.5223	-0.2607	-0.0520	-0.1862
	(0.3083)	(0.2712)	(0.2829)	(0.2972)	(0.2829)	(0.3031)	(0.0878)	(0.0920)	(0.0880)	(0.1419)	(0.1039)	(0.1317)
GDP growth rate	0.8317	0.5875	0.5881	2.1907	2.0455	2.0466	1.2296	0.8932	1.1400	1.2866	0.8742	1.0959
	(0.6718)	(0.6848)	(0.6782)	(0.5113)	(0.5062)	(0.5011)	(0.2342)	(0.2238)	(0.2298)	(0.3967)	(0.3248)	(0.3840)
Net PPE growth rate	0.1083	0.2631	0.1963				0.7704	0.7384	0.7466			
	(0.3599)	(0.3179)	(0.3352)				(0.1737)	(0.2360)	(0.1736)			
Employee Comp. growth rate	0.4639	0.3570	0.4160				-0.1348	-0.1825	-0.1408			
	(0.3180)	(0.2342)	(0.2662)				(0.1385)	(0.1660)	(0.1281)			
Change in Direct Tax Rate	-2.2464		-1.2279	-2.0084		-1.1771	-3.1585		-2.9308	-2.9770		-2.5414
	(0.5886)		(0.8556)	(0.7720)		(1.2419)	(0.6873)		(0.6407)	(1.0785)		(1.1093)
Change in Indirect Tax Rate		-1.0143	-0.7369		-0.8718	-0.6082		-0.6730	-0.3709		-0.9897	-0.7504
		(0.2097)	(0.3501)		(0.2868)	(0.4706)		(0.3397)	(0.3329)		(0.3674)	(0.3676)
R-Squared	0.5909	0.6186	0.6416	0.4096	0.4233	0.4450	0.6581	0.5460	0.6699	0.3428	0.2990	0.3937
No. of Obs.	40	40	40	40	40	40	47	47	47	47	47	47

Note: In the left and right panel, the dependent variable is the growth rate in pre-all tax income from 1982 to 1989 and from 1989 to 1994, respectively. "GDP growth rate" is the percentage change in gross domestic product from 1982 to 1989 and from 1989 to 1994. "Net PPE growth rate" is the percentage change in Net PP&E from 1982 to 1989 and from 1989 to 1994. "Employee Compensation growth rate" is the percentage change in employee compensation from 1982 to 1989 and from 1989 to 1994. "Change in Direct Tax Rate" is the change in the ratio of foreign income taxes to the sum of net income and foreign income taxes from 1982 to 1989 and from 1989 to 1994. "Change in Indirect Tax Rate" is the change in the ratio of non-income and non-payroll taxes to the sum of net income, foreign income taxes, and non-income and non-payroll taxes from 1982 to 1989 and from 1989 to 1994.