

Foreign Direct Investment in a World of Multiple Taxes

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ABSTRACT

While governments have access to multiple tax instruments, studies of the effect of tax policy on the location of multinational investment 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 foreign direct investment by American multinational firms, using confidential affiliate-level data that permit the introduction of controls for parent companies and host countries. Indirect tax burdens significantly exceed foreign income tax obligations for these firms and appear to influence strongly their behavior. Estimates imply that 10 percent higher indirect tax rates are associated with 1.3 percent lower assets, 3.1 percent lower property plant and equipment, and 1.6 percent smaller trade surpluses with parent companies. Corporate income tax rate differences have comparable effects. The estimated combined effects of indirect and income taxes are similar to earlier estimates of investment responses to income taxes, which raises the possibility that some of the effects commonly attributed to income taxes also reflect the impact of indirect taxes.

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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.¹ For example, high personal income tax rates may be partly reflected 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 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 excise taxes, property taxes, and value added taxes. The analysis uses confidential, affiliate-level data collected by the Bureau of Economic Analysis (BEA) of the U.S.

¹ For descriptive evidence on the magnitude of indirect business taxes in the United States and selected OECD countries, see Christensen, Cline and Neubig (2001).

Department of Commerce on the activities of American multinational firms. The high degree of correlation between corporate income tax rates and other tax rates suggests that previous studies may have conflated the effects of these distinct tax instruments. Since the foreign indirect tax obligations of American multinational firms are more than two 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. The results indicate that high rates of indirect business taxation reduce investment in foreign affiliates and encourage firms to adopt production methods that economize on local capital inputs. As predicted by theory, indirect tax rate differences affect the location of productive activity – as measured by asset location, property, plant and equipment location, and intrafirm trade surpluses – to the same degree as do corporate income tax rate differences. In particular, estimates imply that 10 percent higher indirect tax rates are associated with affiliates that have 1.3 percent lower assets, 3.1 percent lower property plant and equipment, and 1.6 percent lower trade surpluses with their American parent companies. The estimated combined effects of indirect and income taxes are similar to earlier estimates of investment responses to income taxes, which raises the possibility that some of the effects commonly attributed to income taxes also reflect the impact of indirect taxes.

The affiliate-level data used in this paper permit the inclusion of parent company fixed effects in estimating the impact of tax differences. Tax effects then reflect the distribution of investment between affiliates of the same company that happen to be located in countries with differing tax rates. The advantage of using such a method is that doing so implicitly controls for any attributes, including parent industry and overall financial health, that are common to affiliates of the same parent. Additionally, since indirect tax rates vary considerably by industry within countries, the affiliate level data permit the calculation of industry-country specific tax rates and allow for analysis with country fixed effects. Unfortunately, the use of these data to explore the impact of indirect taxes comes at some cost related to the narrowness of the definition of indirect taxes. While income taxes are precisely defined in these data, indirect taxes represent a

combination of different obligations,² so the estimated effects of indirect taxes reflect the averaged impact of several types of taxes.

The magnitude of indirect taxation, and its impact 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 system used by the United States, 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 effects of direct and indirect taxes on the scope of multinational activity. Section 5 is the conclusion.

2. *International income taxation in perspective.*³

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 data analysis in section 4 but also offers a framework with which to interpret the studies reviewed in section 2.2.

2.1. *International tax practice.*

² The Data Appendix reports the exact question multinational firms are asked in quantifying their indirect tax exposure.

³ Some parts of this brief description of international tax rules and evidence of behavioral responses to international taxation are excerpted from Hines (1999) and Gordon and Hines (forthcoming).

Almost all countries tax income generated by economic activity that takes place within their borders. In addition, many countries – including the United States – tax the foreign incomes of their residents. In order to prevent double taxation of the foreign income of Americans, U.S. law permits taxpayers to claim foreign tax credits for income taxes (and related taxes) paid to foreign governments. 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.

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. This deferral is available only on the active business profits of American-owned foreign affiliates that are separately incorporated as subsidiaries in foreign countries. The profits of unincorporated foreign businesses, such as those of American-owned branch banks in other countries, are taxed immediately by the United States. Deferral is further limited by the Subpart F provisions of U.S. law, under which some income of American subsidiaries is “deemed distributed,” and therefore immediately taxable by the United States, even if not repatriated as dividend payments to American parent firms.

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. 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. 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.

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

“worldwide averaging.” A taxpayer has excess foreign tax credits if the sum of worldwide foreign income tax payments exceeds this limit.

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. This literature 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.⁴ 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 more high 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. Studies of this type consistently report a positive correlation between levels of FDI and after-tax rates of return at industry and country levels.⁵ 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.

Two of the time-series studies also exploit cross-sectional differences. Slemrod (1990) distinguishes FDI in the United States by the tax regime in the country of origin, finding no clear empirical pattern indicating that investors from countries that exempt U.S. profits from home-country taxation are more sensitive to U.S. tax changes than are investors from countries granting foreign tax credits. Swenson (1994) reports 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, which is consistent with the tax incentives of foreign investors from countries granting foreign tax credits.

⁴ Devereux and Freeman (1995) and Hines (2001) are recent exceptions.

⁵ See, for example, Hartman (1984), Boskin and Gale (1987), Newlon (1987), Young (1988), Slemrod (1990), and Swenson (1994).

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. 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. Hines and Rice consider the distribution of PPE in all affiliates in 73 countries, reporting a much larger -1 elasticity of PPE ownership with respect to tax rates. Altshuler, Grubert and Newlon (2001) compare the tax sensitivity of aggregate PPE ownership in 58 countries in 1984 to that in 1992, reporting estimated tax elasticities that rise (in absolute value) from -1.5 in 1984 to -2.8 in 1992. Hines (2001) compares the distribution of Japanese and American FDI around the world, finding Japanese investment to be concentrated in countries with which Japan has “tax sparing” agreements that reduce home country taxation of foreign income; the estimated FDI impact of “tax sparing” is consistent with the tax elasticity of PPE reported by Hines and Rice. Hines (1996) compares 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. 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, implying a tax elasticity of investment equal to -0.6 .

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 various methods at their disposal to avoid tax obligations on their existing investments.⁶ One noteworthy feature of this evidence is its almost exclusive focus on differences in corporate income

⁶ Empirical studies of the use of financial transactions, transfer prices, and other methods to avoid corporate income taxes include Hines and Hubbard (1990), Grubert and Mutti (1991), Harris, Morck, Slemrod and Yeung (1993), Klassen, Lang and Wolfson (1993), Hines and Rice (1994), Collins, Kemsley and Lang (1998), Grubert (1998), Clausing (2001), and Swenson (2001).

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.⁷

The potential importance of these open questions is apparent from 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 indirect taxes to foreign income taxes paid by American multinational firms from 1982 to 1997. 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.⁸

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 helpful to select a single indirect tax, property taxes, and to consider the incentives facing a firm for which after-tax profits (π_i) in country i are given by:

$$(1) \quad \pi_i \equiv [Q_i(K_i, M_i) - t_i K_i - M_i](1 - \tau_i).$$

In expression (1), the term t_i is country i 's property tax rate on industrial capital, and τ_i is the combined host country and home country profit tax rate. The firm produces output in country i with production function $Q_i(K_i, M_i)$, in which K_i is the firm's capital in country i , and M_i its use of imported inputs from the parent company. The use of other productive inputs, such as labor and materials (other than inputs imported from the parent company) are implicit in the function. The

⁷ One related stream of literature that has drawn attention is the importance of the definitions of corporate tax bases in dictating the efficacy of tax incentives and the nature of tax competition, as in Leechor and Mintz (1993), Hines (1994), and Mintz and Tsiopolous (1994).

⁸ More generally, the importance of non-creditable taxes relative to creditable taxes is implicit in Gordon's (1992) analysis of tax competition that is governed by the actions of a large capital-exporting country that uses a partial credit system.

reason that the production function separately identifies imports from the parent company is that these imports will be important in the empirical work described in section 4.

The firm's 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. Input and output prices are normalized to unity; 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.

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

$$(2) \quad V \equiv \sum_{i=1}^n \pi_i - \lambda \left(\sum_{i=1}^n K_i \right),$$

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

$$(3) \quad \frac{\partial Q_i(K_i, M_i)}{\partial K_i} = t_i + \frac{\lambda}{(1 - \tau_i)} \equiv c_{Ki}$$

and

$$(4) \quad \frac{\partial Q_i(K_i, M_i)}{\partial M_i} = 1 \equiv c_{Mi},$$

in which c_{Ki} designates the user cost of a marginal unit of capital, and c_{Mi} denotes the user cost of a marginal productive input other than capital.

It follows from equation (3) and the usual properties of production functions that higher tax rates raise the user cost of capital and thereby depress capital demand; higher tax rates may also influence import demand. Denoting the own-price elasticity of capital demand in country i by

$\varepsilon_{KK}^i \equiv \frac{\partial K_i}{\partial c_{Ki}} \frac{c_{Ki}}{K_i}$, and the cross-price elasticity of import demand with respect to the price of capital

by $\varepsilon_{MK}^i \equiv \frac{\partial M_i}{\partial c_{Ki}} \frac{c_{Ki}}{M_i}$, the effects of changes in direct and indirect taxes are given by:

$$(5a) \quad \frac{dK_i}{d\tau_i} = \frac{\lambda K_i \varepsilon_{KK}^i}{(1 - \tau_i)^2}$$

$$(5b) \quad \frac{dM_i}{d\tau_i} = \frac{\lambda M_i \varepsilon_{MK}^i}{(1 - \tau_i)^2}$$

$$(6a) \quad \frac{dK_i}{dt_i} = \frac{K_i \varepsilon_{KK}^i}{c_{Ki}}$$

$$(6b) \quad \frac{dM_i}{dt_i} = \frac{M_i \varepsilon_{MK}^i}{c_{Ki}}.$$

Since $\varepsilon_{KK}^i < 0$, it follows from (5a) and (6a) that higher tax rates discourage investment, and that the effects of direct and indirect taxes are of similar magnitude. The effect of taxation on imports from parent companies depends on the sign of ε_{MK}^i , which in turn reflects whether imports are substitutes for, or complements with, affiliate capital.

The ability of American firms to claim tax credits for foreign income tax payments influences the implications of (5a) and (5b). In the case in which an American firm does not have excess 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. In the population of all American investors, some firms have excess foreign tax credits and others do not, so higher profit tax rates should discourage investment by at least some investors.

Affiliates facing high direct or indirect tax rates have incentives to economize on the use of local capital, and one important way to do so is to rely on parent-provided inputs to a greater extent than would otherwise be the case. In order to evaluate the effect of local taxation on the use of

parent-provided inputs, however, it is necessary to control for the fact that transportation and other costs of transacting with parent companies in the United States may vary greatly among affiliates located in different foreign countries. Since these costs are likely also to affect exports from foreign affiliates to their American parent companies, the net trade balance between affiliates and their parent companies offers a ready measure of imported inputs that is not a simple function of trade-related costs.

Suppose that affiliate exports to the parent company are constant fractions of total affiliate output, and that the fraction (approximately) equals the ratio of affiliate imports from the parent to total affiliate output $\left(\frac{M_i}{Q_i}\right)$. Then a change in the indirect tax rate in country i affects the trade surplus (S_i) between affiliate i and its parent company:

$$(7) \quad \frac{dS_i}{dt_i} = \frac{M_i}{Q_i} \frac{dQ_i}{dt_i} - \frac{dM_i}{dt_i}.$$

Equations (3) and (4) imply that:

$$(8) \quad \frac{dQ_i}{dt_i} = \frac{dK_i}{dt_i} c_{Ki} + \frac{dM_i}{dt_i}.$$

If the firm's production function exhibits (approximate) local constant returns to scale, then:

$$(9) \quad Q_i \approx c_{Ki} K_i + M_i.$$

Taken together, (6a) – (9) imply:

$$(10) \quad \frac{dS_i}{dt_i} \approx \frac{M_i K_i}{Q_i} (\varepsilon_{KK}^i - \varepsilon_{MK}^i).$$

Since $\varepsilon_{KK}^i < 0$, equation (10) indicates that higher indirect tax rates are likely to be associated with smaller affiliate intrafirm trade surpluses, which is equivalent to greater net exports from parent companies to their foreign affiliates. While it is possible for $(\varepsilon_{KK}^i - \varepsilon_{MK}^i)$ to be positive, such an outcome requires imported inputs to be complementary with local capital, and the

cross price elasticity of import demand with respect to the price of capital to exceed in absolute magnitude the own-price elasticity of capital demand. Since this would be an extremely unusual situation, the more likely scenario is one in which affiliates react to higher tax rates by relying relatively more heavily on imported inputs.

Although this model treats the indirect tax as a property tax, similar theoretical predictions emerge if the indirect tax takes a number of other forms. For example, if the tax is an origin based excise or value added tax, the predicted effects of indirect taxes on investment and intrafirm trade are comparable to those for property taxes, since the tax base is then output produced by local capital. If, however, indirect taxes are destination based excise or value added taxes that function smoothly, then there is no implication for investment or intrafirm trade. The extent to which value added taxes in practice actually have destination basis is a subject of some dispute. Practitioner commentaries by Christensen, Cline, and Neubig (2001) and Ebrill et al. (2001), among others, indicate that the impact of value added tax administration is commonly to convert what is on paper a destination basis tax into at least partly an origin basis tax. This is achieved by failing to provide tax refunds for exports (or doing so only with enormous delays), failing to enforce border tax collections on imports, and other widespread administrative practices. Given the variety of indirect taxes and administrative experiences, it is reasonable to expect that at least a significant fraction of such value added taxes have some form of origin basis, creating incentives comparable to those of property taxes and analyzed in the model.

3.2. Data and Descriptive Statistics

The empirical work presented in section 4 is based on the most comprehensive available data on the activities of American multinational firms. The BEA annual survey of U.S. Direct Investment Abroad from 1982 through 1997 provides a panel of data on the financial and operating characteristics of U.S. firms operating abroad. The coverage and methods of these surveys is detailed in the data appendix. Table I displays information on the number of affiliates in the sample and descriptive statistics for these affiliates in benchmark years and in the most recent year of the sample. In benchmark years the sample included more than 14,000 affiliates, while 10,838 affiliates comprise the more recent 1997 survey. These affiliates perform substantial operations. In 1997, the median sales for affiliates in the sample was \$49.8 million, median assets was \$40.0

million, and median net property, plant and equipment (PPE) was \$13.5 million. Mean values of sales, assets, and net PPE are substantially larger than median values, indicating the importance of larger affiliates. Since firms primarily engaged in financial services differ substantially from others, all affiliates in such industries are excluded.⁹ One of the implications of this exclusion is that results characterizing asset allocation decisions do not reflect patterns in the data driven by holding companies, since these are classified as financial firms.

The BEA data also include information on foreign income taxes and foreign indirect taxes paid by affiliates. Although income taxes are narrowly defined, indirect taxes contain any type of tax other than income and payroll taxes. The Data Appendix provides the precise wording of the survey question pertaining to indirect taxes, indicating that they include sales, value added, and excise taxes; property taxes; and import and export duties. Figures 1-3 illustrate the magnitude and relative importance of indirect taxes by comparing indirect tax payments to income tax payments across time, across countries, and across industries. Figure 1 plots the ratio of indirect tax payments to income tax payments for all U.S. multinational affiliates and for those affiliates in manufacturing from 1982 to 1997. Throughout the sample period, indirect taxes are much larger than income taxes. This ratio exceeds 1.5 for every year of the sample across all industries and for affiliates in manufacturing. Figure 1 also depicts a significant increase in the relative importance of indirect taxes from the middle of the 1980s through the middle of the 1990s. While indirect taxes diminish in importance during the latter part of the sample, the ratio of indirect taxes to income taxes was 2.4 across all industries and 1.7 for manufacturing affiliates by 1997.

Figure 2 displays the ratio of indirect taxes to income taxes across all industries by country in 1994, the most recent benchmark year for which data are available, and during which the worldwide ratio of indirect taxes to income taxes was 3.5. For some countries, such as the Bahamas, this ratio is very large due to the relative unimportance of income taxes. More generally, however, several large countries that host considerable amounts of U.S. outbound foreign direct investment and impose high income tax burdens nevertheless collect indirect taxes that greatly exceed their income tax collections. In particular, indirect tax rates appear to be particularly high in Europe, as nine of the ten countries with the largest ratios are European. Many countries in

⁹ Specifically, all affiliates primarily operating in ISI codes 600 through 679 are excluded.

Latin America, such as Argentina and Brazil, also have ratios of indirect to income taxes that exceed the worldwide ratio of 3.5.

The country detail in Figure 2 suggests that indirect taxes paid by affiliates are not strictly dominated by value added taxes. The ratio of indirect to income taxes paid is high in countries that make extensive use of value added taxes, such as France and Germany, but this ratio is also greater than one for countries that are much less reliant on value added taxes, such as Japan, Canada, and Australia. The BEA data on outbound direct investment do not, of course, cover the United States, but Christensen, Cline and Neubig (2001) report that indirect tax payments by American businesses in the United States greatly exceed their corporate tax payments. Since the United States does not have a value added tax, this evidence indicates that components of indirect taxes other than value added taxes have the potential to be highly significant.

Figure 3 shows the ratio of the indirect to income tax payments of U.S. affiliates by industry group. Indirect taxes paid exceed direct taxes paid in 9 of the 12 industry groups depicted. There is also substantial variation in the incidence of indirect taxes across industries. The relative burden of indirect taxes is largest in the petroleum sector, where indirect taxes are more than eight times larger than income taxes. While the extreme relative importance of indirect taxes in the petroleum sector is presumably the result of the high excise tax rates often placed on oil and gas, indirect taxes are also particularly high relative to income taxes in the manufacturing of industrial machinery, the manufacturing of transportation equipment, and wholesale trade. Indirect taxes are notably lower than income taxes in financial services and other service industries.

Data on foreign income taxes paid and foreign indirect taxes paid can be used to calculate foreign tax rates. The income tax rate used in the analysis in section 4 is computed following Hines and Rice (1994) and Desai and Hines (1999). Unlike the treatment in these papers, income tax rates are allowed to vary across industries in order to make them comparable to indirect tax rates, which exhibit substantial industry variation. Therefore, the income tax rate is calculated by taking the ratio of the sum of foreign income taxes to the sum of net income and foreign income taxes in each country/industry and year. Affiliate-year observations in which affiliates report negative net income are excluded from this calculation.

The computation of indirect tax rates is less straightforward given the compositional variety embedded in what constitutes indirect taxes as reported by affiliates. As a result of this ambiguity, the analysis uses two distinct denominators for the calculation of indirect tax rates. The primary measure is calculated by taking the ratio of the sum of indirect taxes to the sum of net income and foreign income taxes in each country/industry and year. Affiliate observations in which affiliates report negative net income are excluded from this calculation. This primary method of considering indirect tax rates allows for direct comparison to income tax rates given the common scaling factor. An alternative measure of the indirect tax rate, a measure that appears in the analysis presented in appendix tables, is calculated by taking the ratio of the sum of indirect taxes to the sum of affiliate gross product, a measure of value added, in each country/industry and year. Affiliate-year observations in which affiliates report negative gross product are excluded from this calculation. This alternative construction of the indirect tax rate is most appropriate if indirect taxes take the form of sales or value added taxes.¹⁰

Table I displays median and mean income and indirect tax rates that employ a common scaling factor. Median and mean income tax rates decline substantially over the sample period to approximately 27 percent by 1997 from more than 34 percent in 1982. Unlike income tax rates, indirect tax rates do not decline markedly over the sample period and have a mean rate of 27 percent in 1997. Median indirect tax rates are lower than mean indirect tax rates, indicating that indirect tax rates are more skewed than income tax rates.¹¹

The bottom panel of Table I presents correlations between income tax rates and indirect tax rates by year. Tax rates facing American multinational firms exhibit strong positive cross-sectional correlation indicating that countries with high corporate tax rates are also likely to have high indirect tax rates. The correlation between the two rates is 0.0778 in 1997, and this correlation is highly significant in 1982, 1989, and 1997 and marginally significant in 1994. This correlation

¹⁰ McKenzie, Mintz and Scharf (1997) describe a similar method of calculating effective rates of indirect taxation, and offer an application to taxation in Canadian provinces.

¹¹ Although total indirect taxes paid exceed total income taxes paid, average indirect tax rates calculated using the primary method described in the text are not larger than inferred income tax rates for two reasons. First, affiliates reporting negative net income are dropped from the calculation of both tax rates. Therefore, affiliates that pay large indirect taxes and do not pay income taxes are not considered in the calculation. Second, income and indirect tax rates are constrained to lie between zero and 100 percent. Calculated rates that exceed 100 percent are censored and set equal to 100 percent. Since both ratios have the sum of net income and foreign income taxes in the denominator, income tax rates do not exceed 100 percent by design, but indirect tax rates may.

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 correlation between indirect and income tax burdens suggests that existing studies of the effect of income tax rates may conflate the effect of income taxes and indirect taxes on the investment patterns of multinationals.

4. *Results*

The data on the activities of the affiliates of American firms are used to estimate the extent to which host country taxation, in the form of indirect and income taxes, affects both the volume of investment and the nature of affiliate production as reflected in trade with parent companies. In order to identify these relative sensitivities, fixed effects controlling for parent, country, industry and time-specific attributes are employed along with controls for the size of host economies.

4.1. *Foreign Direct Investment*

Table II presents the results of estimating the effects of indirect and income taxes on asset allocation decisions. The sample consists of observations of the first appearance of any non-financial affiliate subsequent to 1982, so each affiliate appears no more than once in the sample. The dependent variable in these regressions is the natural log of an affiliate's total assets; the independent variables in all the regressions include indirect and income tax rates¹² as well as $\ln(GNP)$, $[\ln(GNP)]^2$, and $[\ln(GNP)]^3$. Estimated coefficients on $\ln(GNP)$, $[\ln(GNP)]^2$, and $[\ln(GNP)]^3$ are not reported, for the reason that they are more or less intuitive (larger economies receive greater volumes of foreign direct investment, though this relationship is generally nonlinear) and not the focus of the study. In the regression reported in column 1 of Table II, the –0.0295 coefficient on the indirect tax rate implies that ten percent lower tax rates are associated with 0.3 percent greater affiliate assets, controlling for three powers of host country GNP, although this coefficient is not statistically significant.¹³

¹² Measured tax rates reflect features of investment activity that differ between countries, though they are unaffected by the volume of investment of individual affiliates, and are therefore appropriate as independent variables in the investment and income allocation equations. Further, measured tax rates closely track statutory tax rates. See Desai, Foley and Hines (2001) for further discussion of tax rate calculations.

¹³ The standard errors presented in Tables II-IV and in the Appendix Tables are clustered at the country/industry/year level.

One difficulty with interpreting the tax rate coefficient reported in column 1 is that the specification does not control for non-GDP determinants of investment, particularly those that vary between companies and over time. Column 2 of Table II reports estimated coefficients from a regression that includes a full set of year dummy variables, parent company dummy variables, and industry dummy variables. As a result, firm-specific considerations and industry-specific considerations implicitly do not affect the estimates reported in column 2. The estimated indirect tax rate effect increases to -0.0417 , implying that 10 percent lower indirect tax rates are associated with 0.4 percent greater assets, but this estimate remains statistically insignificant. The specification in column 3 of Table II substitutes country dummy variables for industry dummy variables, thereby controlling for omitted firm-specific and country-specific considerations. This specification allows for identification of tax effects through the substantial cross-industry variation in indirect tax rates discussed in section 3. The estimated indirect tax effect increases to -0.1281 , implying that 10 percent lower indirect tax rates are associated with 1.3 percent greater assets, and this effect is statistically significant.

The regressions reported in columns 4-6 of Table II provide a parallel set of specifications for considering the role of income tax rates in influencing asset location decisions. In the regression reported in column 4 of Table II, the -0.3208 coefficient on the income tax rate implies that ten percent lower tax rates are associated with 3.2 percent greater affiliate assets, controlling for three powers of host country GNP, and this effect is statistically significant. The inclusion of a full set of year dummy variables, parent company dummy variables, and industry dummy variables in the specification presented in column 5 reduces the magnitude of the coefficient such that ten percent lower income tax rates are associated with 2.4 percent greater affiliate assets. The use of country dummy variables in place of industry dummy variables in column 6 produces a comparable coefficient (-0.2145) that is likewise significant.

The regressions reported in columns 7-9 of Table II jointly consider the effect of indirect and income tax rates on the investment decisions of multinationals. The results on these effects when jointly considered are similar to those estimated when these tax rates are included singly. With no industry, parent or year controls in the regressions, as presented in column 7, the coefficient on the indirect tax rate is statistically insignificant, while the coefficient on the income tax rate suggests that ten percent lower income tax rates are associated with 3.0 percent higher

assets. Similarly, the results presented in column 8, when a full set of year dummy variables, parent company dummy variables, and industry dummy variables are employed (as in columns 2 and 5), provide a statistically insignificant coefficient on the indirect tax rate and a statistically significant relationship between income tax rates and asset location, in which ten percent lower income tax rates are associated with 2.4 percent higher assets. The joint consideration of indirect and income tax rates with a full set of year dummy variables, parent company dummy variables and country dummy variables (instead of industry dummy variables), as presented in column 9 of Table II, yields statistically significant coefficients on both indirect and income tax rates. The coefficients suggest that ten percent lower indirect tax rates are associated with 1.3 percent higher assets and that ten percent lower income tax rates are associated with 2.0 percent higher assets.

The results reported in Table II indicate that American multinational firms locate assets on the basis of firm and country characteristics that, importantly, include local income and indirect tax rates.¹⁴ Given the substantial cross-industry heterogeneity in indirect tax rates, and the obvious importance of omitted country characteristics, the most powerful and convincing identification appears in specifications that contain country fixed effects. Equations (3), (5a) and (6a) together imply that the estimated coefficients on indirect and income taxes should be of similar magnitude, since the effect of a change in τ_i somewhat exceeds that of a change in t_i , but the U.S. foreign tax credit system means that foreign tax rate differences do not translate one-for-one into differences in τ_i . Further evidence of the impact of indirect and income taxes on investment is available from considering the effects of taxation on PPE, which is a subset of assets. The determinants of PPE investment are of independent interest as competition for foreign direct investment is commonly associated with the desire to attract this subset of assets.

Table III reports regressions identifying the effects of indirect and income tax rates on investment in PPE. The dependent variable in these regressions is the natural log of an affiliate's net PPE; the independent variables in all the regressions include indirect and income tax rates as well as $\ln(GNP)$, $[\ln(GNP)]^2$, and $[\ln(GNP)]^3$, as in Table II. As in Table II, specifications are presented for indirect tax rates alone (columns 1-3), income tax rates alone (columns 4-6), and both

¹⁴ Given the ambiguity in considering the appropriate definition of pretax income for calculating indirect tax rates, Appendix Table I replicates the specifications in Table II with an indirect tax rate that employs affiliate gross product

tax rates (columns 7-9). Also, the specifications vary the use of fixed effects, presenting results with no fixed effects (columns 1, 4, and 7), parent, industry, and year fixed effects (columns 2, 5, and 8) and parent, country, and year fixed effects (columns 3, 6, and 9).

The regression reported in column 1 of Table III implies that ten percent lower indirect tax rates are associated with 1.7 percent greater PPE, controlling for three powers of host country GNP, although this coefficient is statistically insignificant. The inclusion of parent, industry and year fixed effects likewise yields an insignificant effect but, as in Table II, the substitution of country fixed effects for industry fixed effects leads to a highly significant relationship between indirect tax rates and PPE location, suggesting that ten percent lower indirect tax rates are associated with 3.1 percent greater PPE. The similar regression framework when employed to consider the effect of income tax rates, as presented in column 6, suggests that ten percent lower income tax rates are associated with 2.7 percent greater PPE, although the estimated effect is statistically insignificant.

The regressions reported in columns 7-9 of Table III jointly consider the effect of indirect and income taxes in the location of PPE. The specification that employs parent, country and year fixed effects that is presented in column 9 of Table III identifies a comparable and distinct role of indirect taxes on the location of PPE relative to income taxes. The coefficients from column 9 imply that ten percent lower indirect tax rates are associated with 3.1 greater PPE and ten percent lower income taxes are associated with 2.8 percent greater PPE.¹⁵ These results suggest sizable and significant investment effects of indirect and income taxes, and the approximate equality of these coefficients is consistent with the theoretical predictions presented in section 3. This estimating equation, which uses affiliate-level observations and includes parent and country fixed effects, differs considerably from those used elsewhere in the literature on taxes and FDI. Nevertheless, the implied 0.6 elasticity that represents the sum of the estimated effects of direct and indirect taxes is perfectly consistent with previous results and suggests that estimated effects of corporate tax rate differences may largely capture the combined effects of income and indirect taxes.

as a denominator. Results employing this alternative definition provide similar, and sometimes stronger, results regarding the impact of indirect taxes on asset location.

4.2. *Intrafirm Trade Surpluses*

An alternative method of testing the impact of indirect taxes on investment is available by considering the effect of indirect and income taxes on intrafirm trade balances. In particular, the model developed in section 3 suggests that both income taxes and indirect taxes that take the form of property taxes can serve to alter affiliate factor demands and thereby change the nature of the trading relationships between affiliates and their U.S. parents. Reduced reliance on capital as an input for an affiliate facing high tax rates can be accomplished by greater imports from parent companies. With a given allocation of sales to exports, the reduced demand for local factors will be manifest in a larger trade surplus in intrafirm trade from the parent perspective.

The regressions reported in Table IV consider this alternative test of the impact of income and indirect taxes by analyzing the effect of these tax rates on a measure of trade surpluses between affiliates and their parents. The dependent variable in these specifications is a ratio, the numerator of which is the difference between exports by the U.S. parent to its foreign affiliate and imports from the foreign affiliate to the U.S. parent; the denominator is the sum of these exports and imports.¹⁶ In the regression reported in column 1 of Table IV, the 0.1752 coefficient on the indirect tax rate implies that ten percent lower tax rates are associated with intrafirm trade surpluses that are smaller by 1.8 percent of total intrafirm trade. Inclusion of parent, industry and year fixed effects – thereby capitalizing only on within-firm, within-industry variation – reduces the magnitude of this effect. In the regression reported in column 2, ten percent lower indirect tax rates are associated with intrafirm trade surpluses that are smaller by 0.7 percent of total intrafirm trade. Substituting country fixed effects for industry fixed effects in the regression presented in column 3 suggests that ten percent lower indirect tax rates are associated with intrafirm trade surpluses that are smaller by 1.6 percent of total intrafirm trade. Across all these

¹⁵ The results in Appendix Table II repeat the specifications from Table III with an alternative measure of the indirect tax rate that employs gross product as a measure of pretax income and provides similar results regarding the impact of indirect taxes on PPE location.

¹⁶ The investigation of intrafirm trade surpluses can also illuminate the proclivity of firms to reallocate profits in response to income tax incentives, as in Clausing (2001). Governments typically insist that firms use arm's length prices in trade with other members of the same controlled group. Such prices are notoriously difficult to enforce, particularly when (as is often the case for multinational firms) traded goods have unique characteristics that make it difficult to identify perfectly comparable items. While this alternative interpretation of the role of taxes is feasible in this setting with regard to income tax rates, it is harder to rationalize how indirect tax rates, as modeled in section 3, could similarly be construed to alter profit allocation decisions.

specifications, indirect tax rates influence trade balances in a statistically significant manner and in the direction implied by the model developed in section 3.

The regressions reported in columns 4-6 of Table IV provide a parallel set of specifications for considering the role of income tax rates in influencing affiliate trade surpluses. In the regression reported in column 4 of Table IV, the 0.3583 coefficient on the income tax rate implies that ten percent lower tax rates are associated with intrafirm trade surplus that are smaller by 3.6 percent of total intrafirm trade. The inclusion of a full set of year dummy variables, parent company dummy variables, and industry dummy variables in the specification presented in column 5 reduces the magnitude of the coefficient to 1.7, and the substitution of country fixed effects for industry fixed effects in column 6 produces similar results.

The regression reported in column 7 of Table IV employs both indirect and income tax rates as independent variables in order to jointly consider the effect of income and indirect tax rates on affiliate trade surpluses. The results indicate that ten percent lower indirect tax rates are associated with intrafirm trade surpluses that are smaller by 1.7 percent of total intrafirm trade and that ten percent lower income tax rates reduce trade surpluses by 3.4 percent of total intrafirm trade. Inclusion of parent, country and year fixed effects in the regression reported in column 8 reduces the magnitudes of the estimated tax effects. Ten percent lower indirect and income tax rates are associated with intrafirm trade surpluses that are smaller by 0.7 and 1.7 percent of total intrafirm trade. The substitution of country fixed effects for industry fixed effects in the regression presented in column 9 – as in the previous specifications of asset and PPE location – increases the measured effect of indirect tax rates on trade surpluses. Ten percent lower indirect and income tax rates are associated with intrafirm trade surpluses that fall, respectively, by 1.6 percent and 1.7 percent of total intrafirm trade.¹⁷

5. Conclusion.

Taxes other than income taxes are sizable and appear to influence significantly patterns of multinational investment that are reflected in asset and PPE locations and intrafirm trade patterns. 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. The data analysis indicates that income and indirect taxes have comparable effects on the investment behavior of American multinational firms, particularly after controlling for common parent and country effects.

Governments that compete with other countries for multinational investment may limit their non-income taxes and are likely to be increasingly aware of relative indirect tax burdens in their own and other jurisdictions. While there is no evidence of competitive reductions of indirect taxes, 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.

¹⁷ The results in Appendix Table III repeat the specifications from Table IV with an alternative measure of the indirect tax rate that employs gross product as a measure of pretax income and provides similar results regarding the impact of indirect taxes on affiliate trade surpluses.

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Data Appendix¹⁸

The Bureau of Economic Analysis (BEA) annual survey of U.S. Direct Investment Abroad from 1982 through 1997 provides a panel of data on the financial and operating characteristics 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 up 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.

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. A U.S. multinational entity is the combination of a single U.S. legal entity that has made the direct investment, called the U.S. parent, and at least one foreign business enterprise, called the foreign affiliate. In order to be considered as a legitimate foreign affiliate, the foreign business enterprise should be paying foreign income taxes, have a substantial physical presence abroad, have separate financial records, and should take title to the goods it sells and receive revenue from the sale.

The foreign affiliate survey forms that U.S. MNEs are required to complete vary depending on the year, the size of the affiliate, and the U.S. parent’s percentage of ownership of the affiliate. The most extensive data are available for 1982, 1989, and 1994, when BEA conducted Benchmark Surveys. In these years, all affiliates with sales, assets, or net income in excess of \$3 million in absolute value and their parents were required to file extensive reports. In non-benchmark years between 1982 and 1997, exemption levels were higher and less information is collected.¹⁹

BEA collects identifiers linking affiliates through time, thereby permitting the creation of a panel. By checking the status of all affiliates that filed forms in the previous year and are expected to fall within reporting requirements, BEA identifies which enterprises leave the sample. By monitoring news services for information on mergers, acquisitions, and other activities of U.S. companies, BEA identifies which new enterprises should be included in the sample. As a result, it is possible to examine affiliates when they appear in the sample for the first time.

With respect to indirect taxes, the survey form asks respondents to quantify their aggregate indirect tax burdens in the following manner:

¹⁸ This data description draws on Desai, Foley and Hines (2002).

¹⁹ From 1983-1988, all affiliates with an absolute value of sales, assets, or net income less than \$10 million were exempt, and this cutoff increased to \$15 million from 1990-1993 and \$20 million from 1995-1997. BEA uses reported data to estimate universe totals when surveys cover only larger affiliates or when only certain affiliates provide information on particular survey forms. Estimated data is unlikely to have a significant impact on the BEA’s published data at the industry or country level as data based on actual reports exceeds 90 percent of the estimated totals of assets and sales in each of the years between 1982 and 1997. To avoid working with estimated data, only affiliates required to provide all the information associated with a particular analysis are considered.

Taxes (other than income and payroll taxes) and nontax payments (other than production royalty payments) – Report all such taxes and nontax payments whether or not included in revenues or expenses in the income statement. Include amounts paid or accrued for the year, net of refunds or credits, to foreign governments, their subdivisions and agencies for—

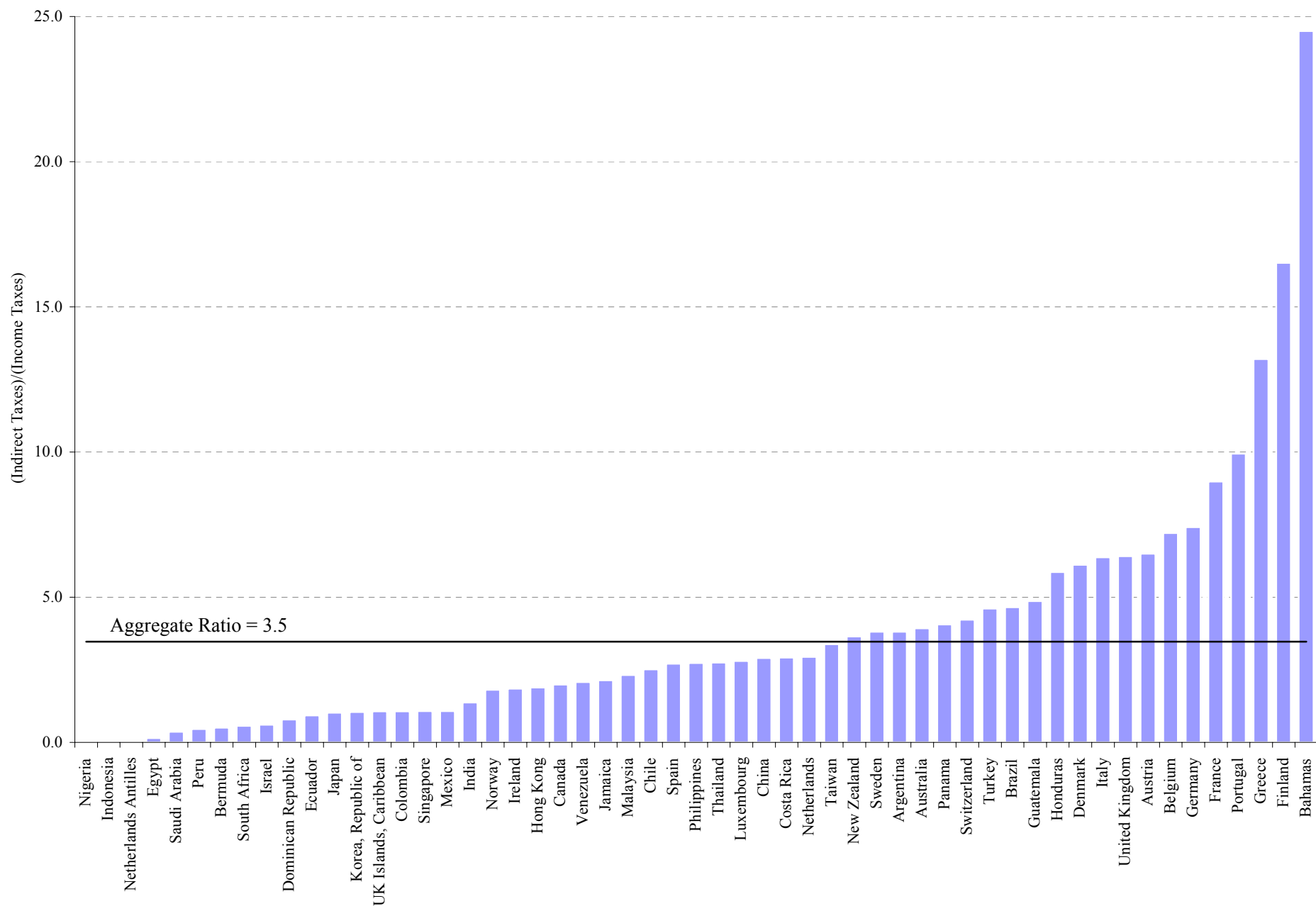
- a. Sales, value added, consumption, and excise taxes collected by the affiliate on goods and services that the affiliate sold;
- b. Property taxes and other taxes on the value of assets or capital;
- c. Any remaining taxes (other than income or payroll taxes); and
- d. Import and export duties, license fees, fines, penalties and all other payments or accruals of nontax liabilities (other than production royalty payments).

Figure 1: The Ratio of Indirect Taxes to Income Taxes for U.S. Multinational Affiliates, 1982-1997



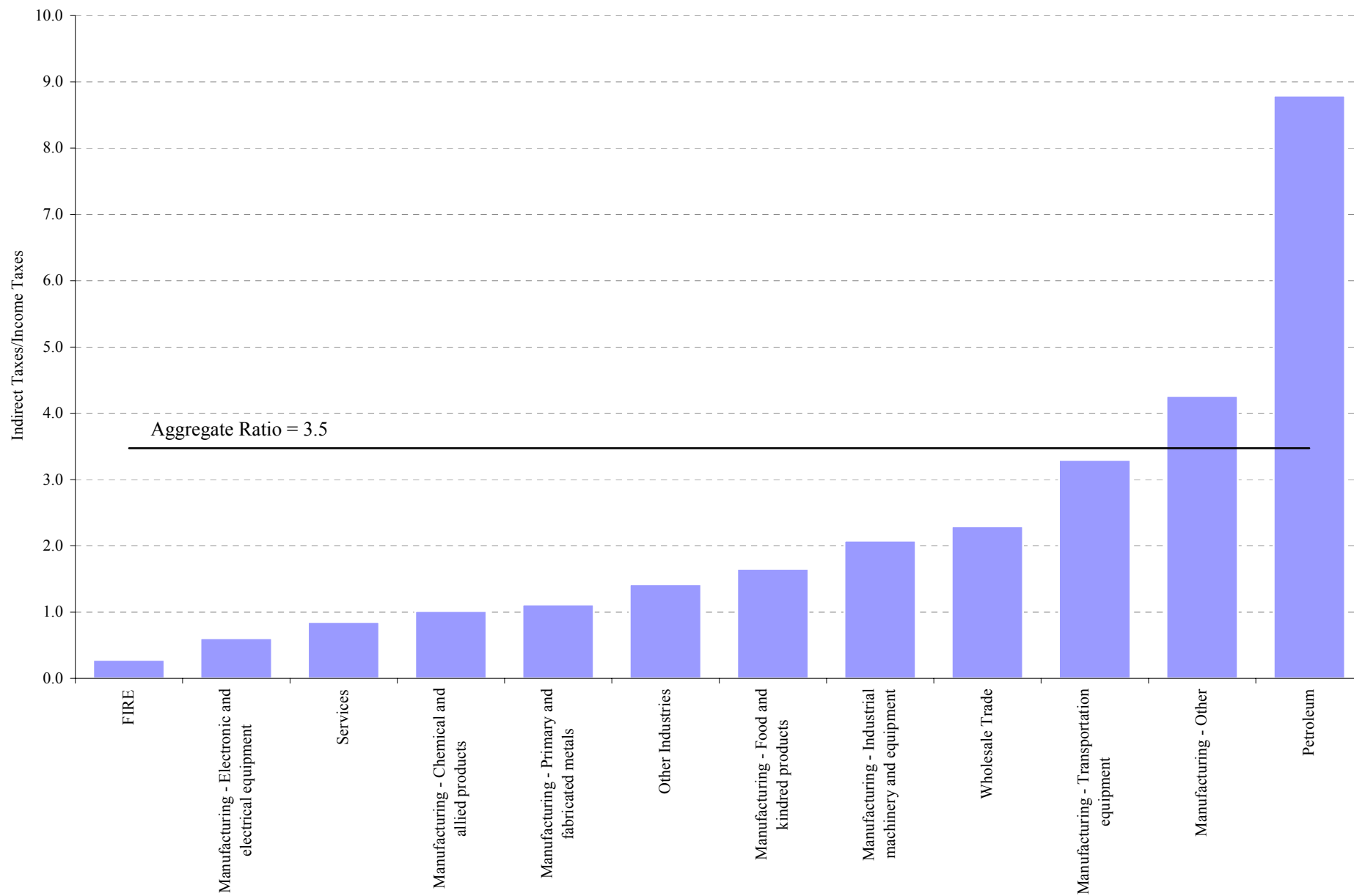
Note: The figure presents the ratio of indirect tax payments to income tax payments from 1982 to 1997, for all affiliates of U.S. multinationals and for affiliates in manufacturing industries.

Figure 2: The Ratio of Indirect Taxes to Income Taxes for U.S. Multinational Affiliates, by Country, 1994



Note: The figure presents the ratio of indirect tax payments to income tax payments by country for U.S. multinational affiliates in 1994. The aggregate ratio is of indirect taxes to income taxes paid worldwide by affiliates.

Figure 3: The Ratio of Indirect Taxes to Income Taxes for U.S. Multinational Affiliates, by Industry, 1994



Note: The figure presents the ratio of indirect tax payments to income tax payments by industry for U.S. multinational affiliates in 1994. The aggregate ratio is of indirect taxes to income taxes paid worldwide by affiliates.

Table I

Descriptive Statistics on U.S. Multinational Activity and Industry Tax Measures

	Benchmark Years			
	<u>1982</u>	<u>1989</u>	<u>1994</u>	<u>1997</u>
Number of Affiliates	14,918	15,243	17,898	10,838
Median Sales	11,742	14,445	16,337	49,783
Mean Sales	62,721	77,452	88,817	184,498
Median Assets	8,394	10,985	12,701	40,036
Mean Assets	39,207	57,200	73,749	157,450
Median Net PPE	1,402	1,560	1,523	13,523
Mean Net PPE	14,877	20,337	25,447	66,581
Median Employees	105	85	77	184
Mean Employees	419	401	376	622
Median US Trade Surplus	1.00	1.00	1.00	1.00
Mean US Trade Surplus	0.67	0.56	0.58	0.46
Median Net Income	292	561	435	1,792
Mean Net Income	1,674	4,155	3,687	9,785
Median Income Tax Rate	38.61%	32.49%	26.80%	27.23%
Mean Income Tax Rate	34.12%	30.07%	25.36%	26.74%
Median Indirect Tax Rate	11.88%	11.77%	10.24%	11.23%
Mean Indirect Tax Rate	25.67%	22.36%	23.95%	26.80%
<hr/>				
Correlation between Direct and Indirect Tax Rates	0.0907 (0.0000)	0.1158 (0.0000)	0.0349 (0.0503)	0.0778 (0.0015)

Notes: The top panel provides number counts and mean and median descriptive statistics for all affiliates of U.S. multinationals in 1982, 1989, 1994 and 1997. In 1982, 1989, and 1994, benchmark surveys were conducted, so cutoffs for inclusion in the sample are lower than in other years, as discussed in the data appendix. Sales, assets, net property, plant and equipment (PPE), and net income are measured in thousands of U.S. dollars. The U.S. trade surplus is defined as a ratio between zero and one; the numerator of this ratio is equal to the level of U.S. exports from a parent to its affiliate less exports from the affiliate to its parent while the denominator is the sum of U.S. exports from a parent to its affiliate and affiliate exports to its parent. Effective income tax rates are calculated by taking the ratio of the sum of foreign income taxes to the sum of net income plus foreign income taxes in each country/industry and year. Observations in which affiliates report negative net income are excluded from this calculation. Effective indirect tax rates are calculated by taking the ratio of the sum of indirect taxes to the sum of net income plus foreign income taxes in each country/industry and year. Observations in which affiliates report negative net income are excluded from this calculation. The bottom panel reports the correlation between income and indirect tax rates by year. The significance level of each correlation coefficient appears in parentheses.

Table II

The Impact of Indirect and Income Taxes on Investment in Affiliate Assets

	Dependent Variable: Log Assets at Entry								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Constant	139.7276 (28.6214)	143.3153 (21.6334)	342.8058 (163.8520)	140.2397 (29.8781)	137.3980 (21.3678)	333.4726 (167.5016)	135.3840 (28.3869)	139.5217 (21.5219)	342.1671 (163.9890)
Indirect Tax Rate	-0.0295 (0.0548)	-0.0417 (0.0417)	-0.1281 (0.0466)				-0.0216 (0.0550)	-0.0387 (0.0416)	-0.1272 (0.0465)
Income Tax Rate				-0.3208 (0.1068)	-0.2387 (0.0828)	-0.2145 (0.0869)	-0.2953 (0.1068)	-0.2350 (0.0835)	-0.1969 (0.0876)
Parent, Industry, and Year Fixed Effects?	N	Y	N	N	Y	N	N	Y	N
Parent, Country, and Year Fixed Effects?	N	N	Y	N	N	Y	N	N	Y
GNP Controls?	Y	Y	Y	Y	Y	Y	Y	Y	Y
No. of Obs.	15,447	15,447	15,447	15,628	15,628	15,628	15,447	15,447	15,447
R-Squared	0.0132	0.5056	0.4844	0.0138	0.5057	0.4829	0.0143	0.5060	0.4847

Note: The dependent variable is the log of affiliate assets. The sample includes the first appearance of all affiliates except those in financial service industries (ISI codes 600-679). The regressions are estimated using OLS, and the specifications in columns 2, 5, and 8 include parent, industry, and year fixed effects, while the specifications in columns 3, 6, and 9 include parent, country, and year fixed effects. The "Indirect Tax Rate" is calculated by taking the ratio of the sum of indirect taxes to the sum of net income plus foreign income taxes in each country/industry and year. Observations in which affiliates report negative net income are excluded from this calculation. The "Income Tax Rate" is calculated by taking the ratio of the sum of foreign income taxes to the sum of net income plus foreign income taxes in each country/industry and year. Observations in which affiliates report negative net income are excluded from this calculation. Three powers of log GNP are included in all specifications (coefficients not reported). Standard errors that correct for clustering of errors across observations in country/industry/year cells are presented in parentheses.

Table III

The Impact of Indirect and Income Taxes on Investment in Affiliate PPE

	Dependent Variable: Log Net PPE at Entry								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Constant	286.7704 (47.9224)	196.5484 (35.3886)	-93.2885 (292.9769)	262.1960 (45.3893)	199.9160 (34.8867)	-113.8954 (301.1445)	284.4283 (47.8126)	196.9340 (35.3648)	-97.3369 (292.4976)
Indirect Tax Rate	-0.1749 (0.0998)	0.1042 (0.0769)	-0.3059 (0.0874)				-0.1691 (0.0999)	0.1039 (0.0769)	-0.3053 (0.0873)
Income Tax Rate				-0.2206 (0.1706)	0.0396 (0.1461)	-0.2697 (0.1670)	-0.2081 (0.1723)	0.0271 (0.1475)	-0.2768 (0.1684)
Parent, Industry, and Year Fixed Effects?	N	Y	N	N	Y	N	N	Y	N
Parent, Country, and Year Fixed Effects?	N	N	Y	N	N	Y	N	N	Y
GNP Controls?	Y	Y	Y	Y	Y	Y	Y	Y	Y
No. of Obs.	13,129	13,129	13,129	13,304	13,304	13,304	13,129	13,129	13,129
R-Squared	0.0058	0.4978	0.4234	0.0055	0.4943	0.4197	0.0060	0.3642	0.4236

Note: The dependent variable is the log of affiliate net property, plant and equipment (PPE). The sample includes the first appearance of all affiliates except those in financial service industries (ISI codes 600-679). The regressions are estimated using OLS, and the specifications in columns 2, 5, and 8 include parent, industry, and year fixed effects, while the specifications in columns 3, 6, and 9 include parent, country, and year fixed effects. The "Indirect Tax Rate" is calculated by taking the ratio of the sum of indirect taxes to the sum of net income plus foreign income taxes in each country/industry and year. Observations in which affiliates report negative net income are excluded from this calculation. The "Income Tax Rate" is calculated by taking the ratio of the sum of foreign income taxes to the sum of net income plus foreign income taxes in each country/industry and year. Observations in which affiliates report negative net income are excluded from this calculation. Three powers of log GNP are included in all specifications (coefficients not reported). Standard errors that correct for clustering of errors across observations in country/industry/year cells are presented in parentheses.

Table IV

The Impact of Indirect and Income Taxes on Trade between Affiliates and their Parents

	Dependent Variable: (U.S. Exports - U.S. Imports)/(U.S. Exports + U.S. Imports)								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Constant	0.4938 (0.0062)	0.9089 (0.0627)	0.7341 (0.0905)	0.4349 (0.0101)	0.8484 (0.0646)	0.7442 (0.0903)	0.3926 (0.0107)	0.8407 (0.0645)	0.7153 (0.0903)
Indirect Tax Rate	0.1752 (0.0145)	0.0720 (0.0086)	0.1614 (0.0105)				0.1664 (0.0143)	0.0690 (0.0086)	0.1610 (0.0104)
Income Tax Rate				0.3583 (0.0286)	0.1702 (0.0178)	0.1731 (0.0234)	0.3427 (0.0286)	0.1678 (0.0178)	0.1723 (0.0233)
Parent, Industry, and Year Fixed Effects?	N	Y	N	N	Y	N	N	Y	N
Parent, Country, and Year Fixed Effects?	N	N	Y	N	N	Y	N	N	Y
No. of Obs.	80,834	80,834	80,834	80,982	80,982	80,982	80,834	80,834	80,834
R-Squared	0.0061	0.3465	0.2980	0.0065	0.3466	0.2950	0.0120	0.3477	0.2989

Note: The dependent variable is a ratio that measures the U.S. trade surplus in intrafirm trade. The numerator of this ratio is equal to the level of U.S. exports from a parent to its affiliate less exports from the affiliate to its parent. The denominator is the sum of U.S. exports from a parent to its affiliate and affiliate exports to its parent. The sample includes the first appearance of all affiliates except those in financial service industries (ISI codes 600-679). The regressions are estimated using OLS, and the specifications in columns 2, 5, and 8 include parent, industry, and year fixed effects, while the specifications in columns 3, 6, and 9 include parent, country, and year fixed effects. The "Indirect Tax Rate" is calculated by taking the ratio of the sum of indirect taxes to the sum of net income plus foreign income taxes in each country/industry and year. Observations in which affiliates report negative net income are excluded from this calculation. The "Income Tax Rate" is calculated by taking the ratio of the sum of foreign income taxes to the sum of net income plus foreign income taxes in each country/industry and year. Observations in which affiliates report negative net income are excluded from this calculation. Standard errors that correct for clustering of errors across observations in country/industry/year cells are presented in parentheses.

Appendix Table I
The Impact of Indirect Taxes, Differently Defined, on Investment in Affiliate Assets

	Dependent Variable: Log Assets at Entry								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Constant	135.2110 (26.5332)	132.0425 (19.7293)	327.8531 (155.1300)	140.2397 (29.8781)	137.3980 (21.3678)	333.4726 (167.5016)	140.8229 (28.3530)	137.3163 (21.4043)	351.0371 (166.5767)
Indirect Tax Rate	-0.1558 (0.1011)	-0.0503 (0.0848)	-0.3225 (0.0889)				-0.2200 (0.1115)	-0.0492 (0.0981)	-0.3842 (0.1000)
Income Tax Rate				-0.3208 (0.1068)	-0.2387 (0.0828)	-0.2145 (0.0869)	-0.2812 (0.1077)	-0.2307 (0.0843)	-0.1935 (0.0877)
Parent, Industry, and Year Fixed Effects?	N	Y	N	N	Y	N	N	Y	N
Parent, Country, and Year Fixed Effects?	N	N	Y	N	N	Y	N	N	Y
GNP Controls?	Y	Y	Y	Y	Y	Y	Y	Y	Y
No. of Obs.	16022	16022	16022	15,628	15,628	15,628	15340	15340	15340
R-Squared	0.0131	0.5074	0.4874	0.0138	0.5057	0.4829	0.0154	0.5097	0.4898

Note: The dependent variable is the log of affiliate assets. The sample includes the first appearance of all affiliates except those in financial service industries (ISI codes 600-679). The regressions are estimated using OLS, and the specifications in columns 2, 5, and 8 include parent, industry, and year fixed effects, while the specifications in columns 3, 6, and 9 include parent, country, and year fixed effects. The "Indirect Tax Rate" is calculated by taking the ratio of the sum of indirect taxes to the sum of affiliate gross product, a measure of value added, in each country/industry and year. Observations in which affiliates report negative gross product are excluded from this calculation. The "Income Tax Rate" is calculated by taking the ratio of the sum of foreign income taxes to the sum of net income plus foreign income taxes in each country/industry and year. Observations in which affiliates report negative net income are excluded from this calculation. Three powers of log GNP are included in all specifications (coefficients not reported). for clustering of errors across observations in country/industry/year cells are presented in parentheses.

Appendix Table II
The Impact of Indirect Taxes, Differently Defined, on Investment in Affiliate PPE

	Dependent Variable: Log Net PPE at Entry								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Constant	272.6147 (43.9412)	182.6978 (32.3710)	10.9704 (273.7366)	262.1960 (45.3893)	199.9160 (34.8867)	-113.8954 (301.1445)	296.6573 (47.6145)	197.5731 (35.4445)	-123.9764 (287.1584)
Indirect Tax Rate	-0.6678 (0.1906)	0.2166 (0.1730)	-0.9270 (0.1839)				-0.9210 (0.2129)	0.0904 (0.2029)	-1.1882 (0.2109)
Income Tax Rate				-0.2206 (0.1706)	0.0396 (0.1461)	-0.2697 (0.1670)	-0.1743 (0.1727)	0.0411 (0.1494)	-0.2738 (0.1701)
Parent, Industry, and Year Fixed Effects?	N	Y	N	N	Y	N	N	Y	N
Parent, Country, and Year Fixed Effects?	N	N	Y	N	N	Y	N	N	Y
GNP Controls?	Y	Y	Y	Y	Y	Y	Y	Y	Y
No. of Obs.	13,604	13,604	13,604	13,304	13,304	13,304	13,034	13,034	13,034
R-Squared	0.0069	0.4994	0.4285	0.0055	0.4943	0.4197	0.0089	0.4996	0.4286

Note: The dependent variable is the log of affiliate net property, plant and equipment (PPE). The sample includes the first appearance of all affiliates except those in financial service industries (ISI codes 600-679). The regressions are estimated using OLS, and the specifications in columns 2, 5, and 8 include parent, industry, and year fixed effects, while the specifications in columns 3, 6, and 9 include parent, country, and year fixed effects. The "Indirect Tax Rate" is calculated by taking the ratio of the sum of indirect taxes to the sum of gross product, a measure of value added, in each country/industry and year. Observations in which affiliates report negative gross product are excluded from this calculation. The "Income Tax Rate" is calculated by taking the ratio of the sum of foreign income taxes to the sum of net income plus foreign income taxes in each country/industry and year. Observations in which affiliates report negative net income are excluded from this calculation. Three powers of log GNP are included in all specifications (coefficients not reported). Standard errors that correct for clustering of errors across observations in country/industry/year cells are presented in parentheses.

Appendix Table III

The Impact of Indirect Taxes, Differently Defined, on Trade between Affiliates and their Parents

	Dependent Variable: (U.S. Exports - U.S. Imports)/(U.S. Exports + U.S. Imports)								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Constant	0.4972 (0.0057)	0.9054 (0.0642)	0.7314 (0.0910)	0.4349 (0.0101)	0.8484 (0.0646)	0.7442 (0.0903)	0.3894 (0.0106)	0.8352 (0.0661)	0.7127 (0.0908)
Indirect Tax Rate	0.4094 (0.0266)	0.2375 (0.0218)	0.4680 (0.0234)				0.4043 (0.0261)	0.2335 (0.0217)	0.4665 (0.0233)
Income Tax Rate				0.3583 (0.0286)	0.1702 (0.0178)	0.1731 (0.0234)	0.3584 (0.0288)	0.1726 (0.0179)	0.1722 (0.0234)
Parent, Industry, and Year Fixed Effects?	N	Y	N	N	Y	N	N	Y	N
Parent, Country, and Year Fixed Effects?	N	N	Y	N	N	Y	N	N	Y
No. of Obs.	80,608	80,608	80,608	80,982	80,982	80,982	80,608	80,608	80,608
R-Squared	0.0079	0.3475	0.3011	0.0065	0.3466	0.2950	0.0144	0.3487	0.3020

Note: The dependent variable is a ratio that measures the U.S. trade surplus in intrafirm trade. The numerator of this ratio is equal to the level of U.S. exports from a parent to its affiliate less exports from the affiliate to its parent. The denominator is the sum of U.S. exports from a parent to its affiliate and affiliate exports to its parent. The sample includes the first appearance of all affiliates except those in financial service industries (ISI codes 600-679). The regressions are estimated using OLS, and the specifications in columns 2, 5, and 8 include parent, industry, and year fixed effects, while the specifications in columns 3, 6, and 9 include parent, country, and year fixed effects. The "Indirect Tax Rate" is calculated by taking the ratio of the sum of indirect taxes to the sum of affiliate gross product in each country/industry and year. Observations in which affiliates report negative gross product are excluded from this calculation. The "Income Tax Rate" is calculated by taking the ratio of the sum of foreign income taxes to the sum of net income plus foreign income taxes in each country/industry and year. Observations in which affiliates report negative net income are excluded from this calculation. Standard errors that correct for clustering of errors across observations in country/industry/year cells are presented in parentheses.