ECONOMIC EFFECTS OF REGIONAL TAX HAVENS

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ABSTRACT

How does the opportunity to use tax havens influence economic activity in nearby non-haven countries? Analysis of affiliate-level data indicates that American multinational firms use tax haven affiliates to reallocate taxable income away from high-tax jurisdictions and to defer home country taxes on foreign income. Ownership of tax haven affiliates is associated with reduced tax payments by nearby non-haven affiliates, the size of the effect being equivalent to a 20.8 percent tax rate reduction. The evidence also indicates that use of tax havens indirectly stimulates the growth of operations in non-haven countries in the same region. A one percent greater likelihood of establishing a tax haven affiliate is associated with 0.5 to 0.7 percent greater sales and investment growth by non-haven affiliates, implying a complementary relationship between haven and non-haven activity. The ability to avoid taxes by using tax haven affiliates therefore appears to facilitate economic activity in non-haven countries within regions.

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1.   Introduction

Tax havens are low-tax jurisdictions that provide investors opportunities for tax avoidance. Examples of such tax havens include Ireland and Luxembourg in Europe, Hong Kong and Singapore in Asia, and various Caribbean island nations in the Americas. Low-tax jurisdictions are also common within countries, taking the form of special economic zones in China, low-tax states and enterprise zones in the United States, and tax-favored subnational regions including eastern Germany, southern Italy, eastern Canada, and others. The scope and magnitude of tax haven activity for multinational firms appears to be significant. In 1999, 59 percent of U.S. multinational firms with significant foreign operations had affiliates in tax havens.

Economic federations typically struggle with the impact and desirability of tax policy diversity among member states. In particular, there is widespread concern that low-tax areas within a federation impose a fiscal externality on other countries and might attract investment that would otherwise locate in high-tax areas within the same regions. There are no reliable estimates of the magnitude of such diversion. Moreover, there has been little consideration of the possibility that the availability of low-tax jurisdictions *facilitates* foreign investment and economic activity in high-tax jurisdictions within the same regions. The latter possibility arises if the ability to relocate taxable profits into low-tax jurisdictions improves the desirability of investing in high-tax areas, if low-tax jurisdictions facilitate deferral of home-country taxation of income earned elsewhere, or if affiliates in low-tax areas offer valuable intermediate goods and services to affiliates in high-tax areas. High-tax countries might then benefit from tax diversity within regions, particularly if domestic governments would prefer to offer tax concessions to multinational investors but are constrained not to do so by political or other considerations.

Tax havens figure prominently in current debates over the scope and consequences of tax competition. Countries competing for mobile foreign investment may have incentives to reduce taxes to levels below what they would be in the absence of foreign competition; indeed, there are circumstances in which international tax competition drives optimizing governments to reduce all capital tax rates to zero. Tax havens are widely believed to accelerate the process of tax competition between governments. Yet, it is conceivable that the tax avoidance opportunities

presented by tax havens allow other countries to maintain high capital tax rates without suffering dramatic reductions in foreign direct investment. Hence the proliferation and widespread use of tax havens may retard what would otherwise be aggressive competition between other countries to reduce taxes in order to attract and maintain investment. Indeed, despite the incentives in place to compete over tax rates, the tax burden on corporate income in OECD countries has fallen little if at all over the past 25 years (see Griffith and Klemm (2004)).

This paper evaluates the effects of tax haven operations on economic activities in foreign countries other than tax havens, analyzing the use of tax havens by American multinational firms. The evidence comes from confidential affiliate-level data on the activities of American multinational firms from 1982 to 1999, and it points to three conclusions. First, tax haven affiliates serve to facilitate the relocation of taxable income from high-tax jurisdictions and to facilitate deferral of repatriation taxes, suggesting that multinational parents with differing foreign tax rate exposures can benefit from havens. Second, affiliates located in larger tax haven countries are the most useful for reallocating taxable income from high-tax jurisdictions, and their effects are most pronounced within regions. Ownership of one or more nearby tax haven affiliates is associated with reduced tax payments comparable to what would be expected from a 21 percent local tax rate reduction. Third, there is no evidence that havens divert activity from non-havens within the same region, and, in fact, the opposite appears to be the case. Instrumental variables analysis indicates that haven and non-haven activity within a region are complementary, as the establishment of tax haven operations is associated with expansions of activity outside of tax havens.

The analysis begins by considering the characteristics of multinational parent companies with tax haven operations. Large multinationals, and those that are most active abroad are the most likely to operate in tax havens, suggesting that there are economies of scale in using havens to avoid taxes. Additionally, multinational parents with foreign (non-haven) operations concentrated in low tax countries, those in technology-intensive industries, and those in industries characterized by extensive intrafirm trade are more likely than others to operate in tax havens. While this evidence is consistent with the intuition that multinationals employ haven affiliates to reallocate taxable income from high-tax to low-tax jurisdictions through intrafirm trade and transfers of intangible property, the fact that multinationals with low foreign tax rates

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are more likely to operate in tax havens indicates that haven affiliates do not merely serve to relocate profits away from high-tax locations. Instead, this evidence suggests that American firms with low foreign tax rates also benefit from using tax havens, presumably to defer, or otherwise avoid, U.S. taxation of their foreign incomes.

Some of this evidence is open to multiple interpretations. It is possible that aggressive tax-sensitive firms are the most likely to establish tax haven affiliates and to concentrate their other foreign operations in low-tax jurisdictions, not due to any operational connection between these activities, but simply because these taxpayers, when given a choice, always select the lowest-tax locations. More generally, tax havens need not provide the same function for all multinational parents. In order to identify how a multinational's overall foreign tax rate influences its use of tax havens, the analysis distinguishes larger, more populous, tax haven countries from smaller tax haven countries, where little employment and capital are located. Taxpayers have greater opportunity to transfer taxable profits into larger havens, given the sizes of local economies. The evidence indicates that these larger tax havens serve a distinctive function, facilitating the reallocation of income from high-tax to low-tax locations, as parents with high average foreign tax rates make greater use of such larger havens, conditional on using havens at all. Ownership of an affiliate in a large tax haven country is associated with reduced tax payments elsewhere in the same region, the effect being of the same magnitude as a 21 percent local tax rate reduction.

This analysis of the uses of havens – for both income reallocation and deferral of repatriation taxes – does not in itself identify the effect of tax haven operations on overall levels of economic activity outside of tax havens. It is conceivable that tax havens facilitate investment in non-havens by reducing the cost of capital for such investments, by providing the means to reduce tax obligations, and by facilitating the provision of complementary nearby activities. The difficulty confronting empirical analysis of the impact of haven affiliates is that all aspects of a firm's regional activity are simultaneously determined. Foreign tax rates change infrequently and often in rough proportion to each other, making it difficult to use such tax changes to identify their impact on economic activity elsewhere in a federation.

Fortunately, it is possible to use differing rates of national economic growth to estimate the degree to which haven activity and non-haven economic activity influence each other. Firms investing in economies that subsequently grow rapidly exhibit higher growth rates of foreign direct investment than do firms investing in economies that subsequently grow slowly. Consequently, GDP growth rates can be used to predict differences between subsequent foreign investments of firms whose original investments were located in different countries, and this, in turn, can be matched to changes in the use of tax havens. Evidence from this instrumental variables analysis indicates that haven and non-haven activity are complementary, implying that policies that encourage the establishment of tax haven affiliates also indirectly encourage activities outside of tax havens in the same regions. Hence, while tax havens permit firms to redirect profits and tax revenues away from non-havens within regions, they also appear to facilitate economic activity in non-havens.

Section 2 of the paper reviews the taxation of foreign income and describes the empirical methodology used in the subsequent analysis. Section 3 describes the available data on American direct investment abroad and characterizes tax haven activity of American multinational firms. Section 4 presents empirical evidence of the determinants of demand for tax haven affiliates and the impact of tax haven operations on economic activity outside of tax havens. Section 5 discusses the implications of the empirical evidence, and section 6 is the conclusion.

## 2.	*International taxation and the role of tax havens*

An analysis of the influence of tax havens on non-havens sits at the intersections of two large bodies of research. The first considers the response of multinational firms to tax incentives, and the second considers the nature and consequences of tax competition across jurisdictions. This section reviews the research findings of these two literatures and then outlines the empirical methodology employed in the paper, with particular emphasis on the instrumental variables analysis of the interaction of activity in tax havens and non-havens.

### 2.1.	*Taxation and multinational firms*

A substantial body of research considers how taxation influences the activities of multinational firms.[1] This literature considers the effects of taxation on investment and on tax avoidance activities. With respect to investment, tax policies are obviously capable of affecting the volume and location of FDI since, all other considerations equal, higher tax rates reduce after-tax returns, thereby reducing incentives to commit investment funds. This literature has identified the effects of taxes through time-series estimation of the responsiveness of FDI to annual variation in after-tax rates of return and cross-sectional studies that exploit the large differences in corporate tax rates around the world to identify the effects of taxes on FDI. Several of these studies, reviewed in Hines (1997, 1999), report tax elasticities of investment equal to –0.6.

Contractual arrangements between related parties located in countries with different tax rates offer numerous possibilities for sophisticated tax avoidance. It is widely suspected that firms select transfer prices used for 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 differentiated or proprietary 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 violating any laws. Multinational firms can structure a variety of transactions – intrafirm debt, royalty payments, dividend repatriations, and intrafirm trade – in a manner that is conducive to tax avoidance. Studies of the responsiveness of firms to taxes on these margins examine reported profitabilities, tax liabilities, and specific measures of financial and merchandise trade in order to identify the effects of taxes.[2]

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[1] See Gordon and Hines (2002) for a survey. For a fuller discussion of the tax rules facing U.S. multinational firms and the evidence on behavioral responses to international taxation of U.S. multinationals, see Hines (1997, 1999) and Desai, Foley and Hines (2003).

[2] For evidence on intrafirm trade, see Clausing (2001, 2003) and Swenson (2001). For evidence on intrafirm debt, see Desai, Foley and Hines (2004) and Grubert (1998). For evidence on royalties, see Grubert (1998) and Hines (1995). For evidence on dividend repatriations, see Desai, Foley and Hines (2001) and Hines and Hubbard (1990). See Grubert and Mutti (1991) and Hines and Rice (1994) for evidence on differences in reported profitability in response to tax rates. While these studies exclusively use data on U.S. multinationals, Bartelsman and Beetsma (2003) use country level data within the OECD to identify the prevalence of profit-shifting activities more generally.

This study's emphasis on the role of haven activities is closest in spirit to Harris et al. (1993) and Hines and Rice (1994). Harris et al. (1993) report that the U.S. tax liabilities of American firms with tax haven affiliates are significantly lower than those of otherwise-similar American firms over the 1984-1988 period, which may be indirect evidence of tax-motivated income reallocation by firms with tax haven affiliates. Hines and Rice (1994) regress the profitability of all U.S.-owned affiliates in 59 countries against productive inputs and local tax rates and also identify tax havens specifically, dividing havens into the seven large economies with populations exceeding one million in 1982, the "Big 7," and all other tax havens, the so-called "Dots." This classification of tax havens is employed in the analysis that follows.

In contrast to other studies that rely on country-level or firm-level data, the analysis that follows employs detailed affiliate-level panel data in order to investigate several aspects of demand for tax haven affiliates on the part of multinational firms. These include the types of parent companies that employ havens, the association between parent company characteristics and the types of tax haven countries in which they establish affiliates, links between reported profit rates of non-haven affiliates and parent ownership of tax haven affiliates, and any effect of haven activity on non-haven activity within a firm. The detailed data also allow for controls for a variety of factors and fixed effects that might otherwise conflate such an analysis.

While the literature on multinationals and taxation emphasizes the use of havens to relocate profits away from high-tax jurisdictions, it is also possible that tax havens can be particularly useful to U.S. multinational firms that face repatriation taxes from activities in *low*-tax countries. The United States taxes the worldwide incomes of multinationals, provides partial credits to mitigate double taxation, and provides for relief through deferral until these profits are repatriated. As a consequence, profits earned in low-tax countries may generate U.S. tax liabilities when repatriated. Analyses in Altshuler and Grubert (2003) and Desai, Foley and Hines (2003) illustrate the uses of tax havens to facilitate deferral of repatriation taxes through a variety of ownership arrangements. These arrangements must be carefully structured in order to avoid immediate home country taxation of certain passive types of income, but they can nonetheless offer benefits to investors with significant potential exposure to home country taxation of lightly taxed foreign income. Consequently, tax havens can benefit multinationals

with profits in high-tax locations that can be reallocated to low-tax locations, and can also benefit multinationals with profits in low-tax locations on which repatriation taxes can be deferred.

2.2. *Tax competition*

The effect of tax haven activity on non-haven activity carries implications for the nature and consequences of tax competition. The literature on tax competition since Oates (1972), as reviewed in Wilson (1999), has largely been theoretical, and focused on the possibility that tax competition may result in an inefficient underprovision of public goods. An alternative stream of this literature emphasizes the virtues of tax competition in restraining an expansive state, as argued in Brennan and Buchanan (1980) and modeled in Edwards and Keen (1996). Further extensions of these models incorporate the political economy of fiscal policy and explore the associated consequences for the efficiency of tax competition, as in Gordon and Wilson (2001) and Janeba and Schjelderup (2002). Empirical efforts to consider the salience or consequences of tax competition include Devereux, Lockwood and Redoano (2002), who estimate parameters of reaction functions within the OECD to measure the extent to which tax competition has operated between 1983 and 1999, and Mendoza and Tesar (2002), who simulate the dynamics of tax competition within Europe. Buettner (2003) analyzes fiscal competition within Germany by considering the investment effects of tax policies in adjacent jurisdictions.

Analysis of tax haven use, and its consequences for non-haven activities, contributes to the tax competition literature in two primary ways. First, such an analysis can clarify the degree to which haven activities serve to undermine the fiscal base of non-havens. For example, it is possible to estimate the responsiveness of reported profits to tax rates for parents with and without tax haven affiliates. More importantly, it is commonly assumed in the tax competition literature that tax havens, and low-tax locations generally, divert investment from other, more highly taxed, locations within a region. Empirical analysis permits estimation of the effects of havens on non-havens, thereby entertaining and testing the possibility that havens encourage economic activity in non-havens.[3]

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[3] The suggestion that tax rate heterogeneity within a region need not lead simply to diversion of investment is related to the large literature on trade diversion and trade creation pioneered by Viner (1950). This literature focuses on the degree to which preferential trade arrangements are associated with increased trade or simply the diversion of trade from non-members, and the associated efficiency consequences.

2.3.   *Implied symmetry and estimation strategy*

While the empirical methodology employed in estimating the demand for havens and the nature of profit-shifting with havens is relatively straightforward, the analysis of the interaction of haven and non-haven activity merits some elaboration. The impact of tax haven operations on activities in locations other than tax havens can be approached in either of two ways. The most obvious method of addressing the issue is to consider the effect of a change in tax haven activity on the pattern and extent of activity outside of tax havens. The problem that this, or any other, strategy encounters is that tax haven and non-tax haven activity are jointly determined. A more promising method is to evaluate the effect of non-tax haven activity on operations in tax havens. Profit maximization implies that disparate operations have symmetric effects on each other, so the impact on tax haven operations of expanding activities in non-tax haven countries is the same as the impact on non-tax haven operations of expanding activities in tax haven countries. Since an instrument for changes in affiliate activity outside of havens is more readily available than an instrument for activity in tax havens, it turns out to be easier to measure the former effects and then make inferences about the latter given the symmetry of the problem.

To understand this symmetry, it is helpful to start with reviewing the implications of profit maximization. Firm i's after-tax profitability can be represented by the function $\pi(X_i, K_i, \theta, \varepsilon_i)$, in which X_i is a vector of firm-specific characteristics, K_i is a vector representing firm i's investments in each of the n countries, θ is a vector of characteristics of the n host countries, and ε_i is a firm-specific residual. The first-order conditions corresponding to optimal allocation of capital between each of the n countries are:

(1a)
$$\frac{\partial \pi(X_i, K_i, \theta, \varepsilon_i)}{\partial K_{ij}} = \lambda_i, \forall K_{ij} > 0$$

(1b)
$$\frac{\partial \pi(X_i, K_i, \theta, \varepsilon_i)}{\partial K_{ij}} \leq \lambda_i, \forall K_{ij} = 0,$$

in which λ_i is a firm-specific term reflecting the cost of capital. If firms all have access to the same capital sources, then λ_i should be the same for all firms. Since θ is common for all firms, it follows that (1a) and (1b) together imply that:

(2)
$$K_{ij} = f_j(X_i, \theta, \varepsilon_i), \forall j,$$

in which K_{ij} is the level of firm i's investment in country j.

The function (2) can be estimated in a cross-section of firms; doing so amounts to running a cross-sectional regression of asset demands on a vector of firm characteristics. This can be made an illuminating exercise by restricting it in various ways. For example, it is possible to construct a dependent variable that takes the value one if a firm has any tax haven affiliates, and zero otherwise. This dependent variable can then be used in a logit regression explaining demand for tax haven affiliates as a function of firm characteristics, including firm size, primary industry, degree of multinationality, research intensity, and other variables plausibly linked to the benefits of establishing and using a tax haven affiliate.

In order to address the issue of substitutability or complementarity between tax haven and non-tax haven operations, it is necessary to consider the implications of changes in foreign operations. Differentiating (1a), it follows that, for small perturbations in the level of investment by the affiliate in country h, K_{ih},

$$\frac{\partial^2 \pi(X_i, K_i, \theta, \varepsilon_i)}{\partial K_{ij}^2} dK_{ij} + \frac{\partial^2 \pi(X_i, K_i, \theta, \varepsilon_i)}{\partial K_{ij} \partial K_{ih}} dK_{ih} = 0,$$

or

(3)
$$dK_{ij} = -\frac{\partial^2 \pi(X_i, K_i, \theta, \varepsilon_i)/\partial K_{ij} \partial K_{ih}}{\partial^2 \pi(X_i, K_i, \theta, \varepsilon_i)/\partial K_{ij}^2} dK_{ih}.$$

The effect on investment in country j of a change in investment in country h is the ratio of second derivatives of the profit function. The term in the denominator of the right side of (3) is negative, reflecting the diminishing returns to total investment, so the sign of the effect equals

the sign of the second cross partial derivative in the numerator. It is noteworthy that an equivalent term appears in the equation describing the effect of a small change in K_{ij} on the level of K_{ih}:

$$(4) \qquad dK_{ih} = -\frac{\partial^2 \pi(X_i, K_i, \theta, \varepsilon_i)/\partial K_{ih} \partial K_{ij}}{\partial^2 \pi(X_i, K_i, \theta, \varepsilon_i)/\partial K_{ih}^2} dK_{ij}.$$

From the symmetry of second cross-partial derivatives, the numerator of the first term on the right side of (4) equals the numerator of the corresponding term in (3). Hence the effect of changes in K_{ih} on K_{ij} differs from the effect of K_{ij} on K_{ih} only in the relative magnitudes of the curvature terms that appear in the denominators of the first terms of the right sides of (3) and (4). Consequently, the complementarity or substitutability of operations in jurisdictions *j* and *h* can be evaluated either by estimating the effect of operations in *j* on operations in *h*, or by estimating the effect of operations in *h* on operations in *j*.

A simple approach to estimating the relationship expressed by equation (4) would be to regress in the cross section the presence or absence of tax haven operations on a vector of firm characteristics, including the magnitude of operations outside of tax havens. The difficulty raised by such an approach is that the resulting estimates will be biased by the presence of any omitted variables that are correlated (positively or negatively) with having operations in tax haven and non-haven countries. If there is reason to believe that the impact of such omitted variables is small, then it might be appropriate to run such a regression; the problem is that there is little reason to expect the impact to be small.

An alternative approach is to use the panel nature of the data, together with changing economic circumstances, to construct instruments for changes in operations outside tax havens. From (2), it follows that:

$$(5) \qquad dK_{ij} = f_{j1}(X_i, \theta, \varepsilon_i)dX_i + f_{j2}(X_i, \theta, \varepsilon_i)d\theta + f_{j3}(X_i, \theta, \varepsilon_i)d\varepsilon_i,$$

in which f_{jk} is the derivative of the f_j function with respect to its kth argument. The second term on the right side of (5), $f_{j2}(X_i, \theta, \varepsilon_i)d\theta$, raises the prospect of providing a suitable

instrument for estimation purposes. The $d\theta$ term captures exogenous changes in the economic environments of foreign locations, while the $f_{j2}(X_i, \theta, \varepsilon_i)$ term reflects that these changes need not impact all multinational firms to equal degrees. Hence, if there is reason to expect an exogenous change in the economic environment to influence investments by one firm more than it does investments by another, then the difference between these investment responses can be used to identify the substitutability or complementarity of investment in different locations.

The panel nature of the data suggests a powerful instrument that is suitable for this purpose. Economic growth rates differ between countries, and firms differ in their commitments to investing in different countries. Levels of foreign direct investment move together with economic growth rates in most countries, reflecting that marginal q, the ratio of the value of new investment to its cost, has common elements both for domestic and foreign investors. Thus, economies experiencing declining real costs of production, rising labor productivity, deregulatory episodes, or other changes that increase the rate of local economic growth are also ones in which foreign investors are likely to expand their operations. Consequently, American firms that invested heavily in economies that subsequently grew quickly tend to exhibit more dramatic increases in foreign direct investment than do firms that instead invested heavily in economies that subsequently grew slowly. A natural instrument for the change in firm i's level of foreign direct investment in non-tax haven countries is the growth rate of the countries in which it invests, weighted by the levels of its investments.

3. Data and descriptive statistics[4]

The empirical work presented in section 4 is based on the most comprehensive available data on the activities of American multinational firms. The Bureau of Economic Analysis (BEA) annual survey of U.S. Direct Investment Abroad from 1982 through 1999 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

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[4] This description of the data is drawn from Desai, Foley and Hines (2001).

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. multinational enterprises are required to complete vary depending on the year and the size of the affiliate. The most extensive data for the period examined in this study are available for 1982, 1989, 1994, and 1999 when BEA conducted Benchmark Surveys. In these years, all affiliates with sales, assets, or net income in excess of certain size cutoffs no more than $7 million in absolute value and their parents were required to file extensive reports. In non-benchmark years between 1982 and 1999, exemption levels were higher and less information was collected.[5] BEA collects identifiers linking affiliates through time, thereby permitting the creation of a panel.

Table 1 displays summary statistics for haven and non-haven countries which indicate the differences between these kinds of countries. Tax havens are low-tax foreign countries that offer advanced communication facilities, promote themselves as offshore financial centers, and frequently feature legislation promoting business or bank secrecy. Hines and Rice (1994,

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[5] From 1983-1988, all affiliates with an absolute value of sales, assets, or net income less than $10 million were exempt from reporting requirements, and this cutoff increased to $15 million from 1990-1993 and $20 million for 1995-1998. 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 1999. To avoid working with estimated data, only affiliates required to provide all the information associated with a particular analysis are considered.

Appendix 1) describe the identification of tax haven countries for the purpose of U.S. businesses in 1982, and the current study uses the intersection of this list of tax haven countries and the tax haven countries listed in Diamond and Diamond (2002). Seven of these countries had populations exceeding one million in 1982, and they are referred to as the Big 7.[6]

Table 1 indicates that, while more than 12% of affiliates in havens were holding companies in 1999, less than 6% of affiliates in non-havens were holding companies. This fact suggests that havens may indeed play an important role in helping multinationals reallocate profits and repatriate dividends in ways that avoid taxes, including U.S. repatriation taxes. Not surprisingly, tax rates in havens are much lower than tax rates in non-havens. The average magnitude of these differences persist despite the declining trend in tax rates over the period. Finally, the summary statistics also indicate that affiliates in havens sell higher fractions of their output to related parties abroad than do affiliates located outside of tax havens. These sale patterns offer opportunities to relocate profits to avoid U.S. or local taxes. Table 1 includes additional information on the extent of multinational activity in the Big 7 tax haven countries and in individual havens. Table 2 presents means and standard deviations of variables used in the estimation that follows.

4.   *Tax havens and taxpayer behavior*

The analysis starts by identifying characteristics of multinational parents that are associated with the use of havens. This is followed by distinguishing the uses of tax haven affiliates located in large countries from the uses of tax haven affiliates located in small countries, and by considering if havens are especially influential within regions. The analysis concludes by estimating the degree to which haven activity is a complement to or substitute for non-haven activity.

4.1.   *Demand for tax haven affiliates*

Table 3 presents coefficients from regressions estimating the determinants of demand for tax haven affiliates as a function of company attributes. The dependent variable in the logit

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[6] Big 7 countries include Hong Kong, Ireland, Lebanon, Liberia, Panama, Singapore, and Switzerland. All other haven countries are classified as Dots.

regressions reported in the first three columns is a dummy variable that takes the value one if a consolidated parent group includes a tax haven affiliate, and it is zero otherwise. Some of the independent variables are collected only in benchmark years, so the sample includes observations for parent groups in 1982, 1989, 1994, and 1999. Column one presents a minimalist specification in which only size variables are included as independent variables, the variable "log of non-haven sales" corresponding to the log of total foreign sales in countries other than tax havens, and the "log of parent sales" is the log of total sales by parent companies. Both sales coefficients are positive, indicating that larger firms are more likely than others to have tax haven affiliates. Additionally, the fact that the 0.5918 coefficient on non-haven sales exceeds the 0.1575 coefficient on parent sales implies that a higher fraction of foreign operations raises the likelihood that a firm has a tax haven affiliate.

The regressions reported in columns 2 and 3 add squared size terms as well as additional independent variables. Estimated coefficients on the square of the log of non-haven sales are positive, whereas estimated coefficients on the square of the log of parent sales are negative, implying that greater foreign operations contributes increasingly to the likelihood of having a tax haven affiliate, whereas the opposite is true of greater domestic operations. In order to consider the foreign tax characteristics that are associated with haven usage, the independent variable "average non-haven tax rate" measures a parent's weighted average non-haven tax rate, where the weights correspond to affiliate sales, and the tax rates by country are measured as the median tax rate of affiliates operating in a particular country and year. Higher average tax rates in non-haven foreign operations reduce the likelihood of establishing tax haven affiliates, as indicated by the –2.9084 coefficient in column two.[7] Parent firms in industries for which high fractions of total sales go to related parties abroad are more likely than others to have tax haven affiliates, though the 0.8545 coefficient in column two is only marginally statistically significant. Finally,

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[7] Tax rates are calculated from BEA data by taking the ratio of foreign income taxes paid to foreign pretax income for each affiliate, and using the medians of these rates as country-level observations for each country and year. Affiliates with negative net income are excluded for the purposes of calculating country tax rates. For a more comprehensive description of the calculation of affiliate tax rates, see Desai, Foley and Hines (2001). In particular, these income tax rates do not include withholding taxes on cross-border interest payments to related parties, since such taxes are endogenous to interest payments and in any case immediately creditable against home-country tax liabilities. Desai and Hines (1999) report that adjusting country tax rates for withholding taxes does not affect the estimated impact of taxation on affiliate borrowing, due to the combination of creditability and low withholding tax rates on related-party interest payments.

the estimated 3.1642 coefficient in column two indicates that companies with high R&D/sales ratios are more likely than others to have tax haven affiliates.

While the measure of non-haven tax rates is calculated with median tax rates facing affiliates in a country and year, it is useful to consider alternative measures of such tax rates to address the concern that this coefficient merely reflects the fact that aggressive firms both employ havens and actively locate investment in low tax non-haven locations. Column three repeats the regression in column two, replacing the "Average non-haven tax rate" with an average non-haven tax rate for other firms in the same industry.[8] This substitution uses industry variation in investment location to avoid some of the problems associated with the simultaneity of tax haven and non-tax haven investment decisions. The results that are very similar to those reported in column two.

Columns 4 through 6 repeat these regressions using Tobit specifications in which the dependent variable is the fraction of a firm's foreign affiliates located in tax havens. The independent variables have effects that are very similar to those reported in columns 1 through 3. The –0.6135 coefficient in column 5 implies that ten percent higher average foreign tax rates outside of tax havens is associated with a six percent reduction in the fraction of foreign affiliates located in tax havens. The 0.1981 coefficient in the same regression implies that ten percent greater industry sales to related parties abroad is associated with two percent higher fractions of affiliates located in tax havens, and the 0.4038 coefficient indicates that ten percent greater R&D/sales ratios increase the share of affiliates in tax havens by four percent. The results are largely unchanged when the industry non-haven tax rate is used as the tax rate measure in the regression reported in column six. Finally, it is useful to check whether regressions in which the dependent variable is based on a measure of activity, rather than counts of affiliates, produce similar patterns of coefficients. Columns 7-9 report estimated coefficients from Tobit regressions in which the dependent variable is the fraction of foreign sales accounted for by tax haven affiliates, with results very similar to those appearing in columns 4-6.

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[8] Specifically, the tax rate variable in the regressions in columns 3, 6 and 9 of Table 3 is based on the weighted average tax rates of other firms in the same industry, in a manner similar to that described in footnote 6. Rather than weight using the distribution of sales of a firm's affiliates, the weights employed in this alternative tax rate variable are based on the distribution of sales of all affiliates of parents in the same industry. Industries are defined using the BEA three-digit ISI codes, which are similar to three-digit SIC codes.

The results reported in Table 3 offer useful evidence of characteristics that stimulate demand for tax haven affiliates. Firms with extensive foreign operations are the most likely to establish tax haven affiliates, which is sensible under almost any interpretation of their function. Firms whose non-haven affiliates are disproportionately located in low-tax countries are more likely than others to have tax haven affiliates, suggesting that the use of tax havens to facilitate deferral of home-country taxation is a more powerful inducement to establish tax haven operations than is the potential transfer pricing use of tax havens. Parent companies in industries with greater intensities of sales to related parties abroad are more likely to have tax haven affiliates, which is consistent both with efforts to relocate taxable income from home countries to tax havens and with the use of tax haven affiliates to defer home country taxation of income reported to have been earned by other foreign affiliates. R&D-intensive firms are the most likely to have tax haven affiliates, which may reflect the benefits and relative ease of relocating income produced by intangible technology assets or intangible property itself.

In order to examine further how a multinational's overall foreign tax rate influences its use of tax havens, the analysis distinguishes larger, more populous, tax haven countries from smaller tax haven countries, where little employment and capital are located. Firms are likely to be more able to relocate profits to larger tax haven countries since they have more substantial operations in these environments and therefore are less likely to attract the suspicions of tax authorities. The regressions reported in table 4 are run using observations only from parent companies with tax haven affiliates; the dependent variables in these regressions are the shares of tax haven activities located in the Big 7 countries. Columns 1-3 of Table 4 report estimated coefficients from Tobit regressions in which the dependent variable is the fraction of tax haven affiliates located in the Big 7 countries. The sample consists of observations of parent companies with haven affiliates and covers the benchmark survey years of 1982, 1989, 1994 and 1999. Column 1 reports a 0.1065 estimated coefficient on the log of non-haven sales, and a –0.2546 coefficient on the log of parent sales, which together imply that larger parent firms, and those whose foreign affiliates contribute smaller fractions of total sales, concentrate less of their tax haven activity in Big 7 countries.

The regressions reported in columns two and three add the same explanatory variables as those used in the regressions presented in Table 3. The 2.2367 coefficient in column two

indicates that ten percent higher foreign tax rates are associated with 22 percent higher desired fractions of tax haven affiliates located in Big 7 countries. The 1.0699 coefficient in the same regression implies that ten percent greater industry sales to related parties abroad is associated with ten percent higher fractions of tax haven affiliates located in Big 7 countries, and the 1.3739 coefficient indicates that ten percent greater R&D/sales ratios have somewhat larger effects. Very similar results appear in column three, in which industry tax rates are used in place of firm tax rates, and in columns 4-6, in which the dependent variable is the fraction of tax haven sales accounted for by affiliates in Big 7 countries.

The results presented in Table 4 afford a more nuanced interpretation of the tax haven demand specifications presented in Table 3. High foreign tax rates among affiliates outside of tax havens are associated with significantly greater tax haven concentration in Big 7 countries, which is consistent with the use of these larger tax haven countries to relocate taxable incomes through transfer pricing. Sales to related parties abroad and high R&D/sales ratios may present opportunities to use transfer prices to relocate taxable income, so the positive association of these variables with the fraction of tax haven activity in Big 7 countries is again suggestive of transfer pricing motives at work.

4.2. *Tax havens and tax payments*

Table 5 presents regressions that further explore the use of tax haven affiliates to relocate taxable income with particular attention to the role of regional tax havens. The dependent variable in the regressions reported in Table 5 is the ratio of tax payments to sales for affiliates located outside of tax haven countries. The regressions in Table 5 investigate if this ratio is distinctive for affiliates of firms that make use of tax havens. If certain firms can relocate income to low or zero tax locations, then this ability will reduce observed returns and observed tax payments in high tax locations.[9]

The regressions reported in Table 5 include measures of affiliate leverage, defined as the ratio of total liabilities to total assets, since the tax deductibility of interest payments is likely to

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[9] There is no single dependent variable that is ideal from the standpoint of measuring tax-motivated income reallocation, though the use of alternative dependent variables, such as the ratio of after-tax income to equity, or the ratio of tax payments to equity, produces results very similar to those reported in Table 5.

induce a negative correlation between tax payments and greater leverage in a mechanistic way. The regressions also include dummy variables for parent companies, affiliate industries, and years, and the standard errors are clustered at the affiliate level. Country tax rates are positively associated with tax payments, as was expected, though parent ownership of any tax haven affiliate has only small and insignificant negative effects on tax payments in the regressions reported in columns one and two. Ownership of regional tax haven affiliates, however, is associated with significantly reduced tax payments. The –0.0207 coefficient in column three indicates that affiliates whose parent companies have tax haven affiliates in the same region pay 2.1 percent lower taxes as a fraction of sales. This, together with the 0.0996 estimated tax rate coefficient, implies that ownership of a regional tax haven affiliate has the same effect on tax payments as would a 20.8 percent lower tax rate.

The regression reported in column four of Table 5 distinguishes the effects of tax haven affiliates in large and small countries by adding a dummy variable for firms with regional tax havens located in Dots but not Big 7 countries. The positive and significant 0.0073 coefficient on this dummy variable indicates that ownership of regional affiliates in Dots but not Big 7 countries is associated with a smaller tax reduction than is broader ownership of tax haven affiliates.[10] This pattern is consistent with the evidence in Table 4 pointing to the income reallocation role of tax haven affiliates located in larger countries. The regressions reported in columns 5 and 6 repeat the regressions reported in 3 and 4, using a sample including affiliates whose parents own at least one tax haven affiliate somewhere; these regressions are identified because not all parents with tax haven affiliates have them in every region. The results are very similar to those reported in columns 3 and 4, suggesting that the patterns are not simple artifacts of comparing the characteristics of firms with and without tax haven affiliates.

The evidence presented in Table 5 points to the use of tax haven affiliates to facilitate reallocating taxable income from high-tax to low-tax jurisdictions, with a particularly pronounced effect within regions. This evidence is consistent with the tax haven demand regressions presented in Tables 3 and 4. The ability to reallocate taxable income and to defer

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[10] It is nonetheless the case that ownership of haven affiliates located in Dots is associated with reduced tax changes, the sum of the –0.0225 and 0.0073 coefficients in column four equaling –0.0152, which differs significantly from zero. The use of Dots to facilitate deferral of home country taxes is consistent with such a pattern, since deferral increases a firm's incentive to use other means to reallocate taxable income away from high-tax jurisdictions.

home country tax liabilities should increase the desirability of investing in countries other than tax havens, though it is possible that the attractiveness of tax haven locations diverts investment that might otherwise have located elsewhere. Hence the net effect of tax haven opportunities on business activity in non-haven countries is difficult to predict based on competing considerations, and must instead be judged on the basis of empirical evidence.

4.3.   Tax havens and non-haven activity

As discussed in section 2.3, the empirical strategy to identify the relationship between haven and non-haven activity is to use GDP growth rates as instruments for non-haven growth rates. This instrumental variables strategy takes a firm's initial distribution of activity among non-haven countries to be exogenous from the standpoint of subsequent changes in tax haven affiliate ownership. Foreign economies grow at different rates, and with them grow levels of economic activity by U.S.-owned affiliates. The first stage of the regressions uses the fact that firms differ in their initial distributions of foreign economic activity to predict different growth rates of subsequent activity, based on differences in the average GDP growth rates of the countries in which their activities were initially concentrated. These predicted growth rates then become the independent variables in second stage equations predicting the acquisition or elimination of tax haven affiliates.

Table 6 presents the results of the first stage regressions employed to generate predicted values then used in the regressions in Table 7. Observations represent changes between benchmark years in regional characteristics of foreign operations distinguished by American parent company. The dependent variable in the regressions reported in columns 1 and 2 of Table 6 is the annual growth rate (between benchmark surveys) of aggregate regional sales in countries other than tax havens. The dependent variable in columns 3 and 4 is the annual growth rate of regional net property, plant, and equipment (Net PPE) held by affiliates outside tax havens. The critical independent variable in these regressions is the weighted average of foreign GDP growth rates, in which the weights are fractions of non-haven foreign Net PPE in base periods. As the regressions indicate, weighted GDP growth rates correlate positively with growth of sales and

growth of capital stocks in the same regions, suggesting that they serve as reasonable instruments for changes in activity outside of tax havens.[11]

Columns 1 through 10 of Table 7 present estimated coefficients from second stage fixed effect logit equations in which predicted values of changes in sales and capital stocks of non-haven affiliates are used as independent variables.[12] Observations again represent changes between benchmark years in the regionally aggregated activities of parent companies. The dependent variable takes the value one if a firm has no tax haven affiliates in the region in the base period but has one or more tax haven affiliates in the region by the time of the following benchmark survey. The dependent variable is zero if a firm has one or more tax haven affiliates but loses them by the following benchmark survey. Observations of firms that never have tax haven affiliates, and those that always have tax haven affiliates, are excluded from the sample. This seemingly odd procedure, developed by Chamberlain (1980), corresponds to a logit model with unchanging firm fixed effects and permits straightforward estimation of the determinants of tax haven demand.

The results indicate that greater activity outside of tax havens is associated with greater demand for tax haven affiliates. The estimated 6.5934 coefficient on affiliate sales growth in column 1, and corresponding 8.4789 coefficient in column 2, indicate that higher sales growth rates outside of tax havens significantly influence the use of tax haven affiliates. This result is not simply driven by goods produced by non-haven affiliates and then sold in regional havens. In columns three and four, non-haven Net PPE growth is used in place of non-haven sales growth, and the results also indicate a complementary relationship between non-haven and haven activity.

The results indicate that firms whose initial investments were concentrated in economies that subsequently grew rapidly are the most likely to begin use of tax haven affiliates. These results hold when using sales growth as well as Net PPE growth. As a consequence of the

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[11] Numerous studies of firm growth, including Evans (1987) and Hall (1987), indicate that small firms grow faster than large ones. Therefore, specifications 1 and 3 control for measures of initial firm size. To ensure that the instrumental variables results that follow identified solely off of differences in initial size, the analysis also uses predicted values from specifications 2 and 4 that do not include proxies for initial size.

[12] Murphy and Topel (1985) discuss the problems associated with obtaining a valid estimate of variance in a two-stage maximum likelihood estimation setting such as this. The standard errors presented in Table 7 are based on Murphy-Topel estimates of variance.

symmetry established in section 2.3, this complementary relationship in turn indicates that the acquisition of tax haven affiliates encourages greater economic activity among foreign affiliates outside of tax havens. The regressions reported in columns 1 through 4 imply that, when evaluated at sample means, a one percent greater likelihood of establishing a tax haven affiliate is associated with 0.5 to 0.7 percent greater sales and investment growth outside of tax havens within the same region.

Columns 5 through 10 of Table 7 repeat with regional subsamples the specifications run on the whole sample and reported in columns 1 and 3. While the results within the Asia/Pacific are not statistically significant (columns 5 and 6), the European (columns 7 and 8), and American (columns 9 and 10) subsamples both exhibit coefficient magnitudes, signs, and significance levels that are similar to those of the whole sample. Given the much greater economic significance of Europe and the Americas for U.S. multinationals during the sample period, it is reassuring that their patterns so closely resemble those of the sample as a whole.

5. *Implications*

The ability of foreign investors to use tax havens carries implications for the policies of high-tax countries and for the dynamics of tax competition. Careful use of tax haven affiliates permits foreign investors to avoid some of the tax burdens imposed by countries with high tax rates, thereby maintaining foreign investment at levels exceeding those that would persist if tax havens were unavailable. This consideration suggests that high-tax countries might benefit from the existence of regional tax havens, though such an intuition immediately begs the question of whether high-tax countries would not do better simply to reduce their own tax rates on inbound foreign investment. Indeed, the Diamond and Mirrlees (1971) analysis of optimal taxation, as interpreted by Gordon (1986) and reviewed in Gordon and Hines (2002), implies that countries facing elastic supplies of foreign investment should reduce tax rates on foreign investors below the rates that are imposed on less tax-elastic domestic investors. It can be challenging, however, to implement such a program. Domestic political considerations make it difficult to offer foreign-owned businesses more favorable tax treatment than domestic businesses, and domestic firms facing such a tax regime would have incentives to restructure themselves as foreign firms. Governments of high-tax countries might prefer to permit tax avoidance by the use of affiliates

in foreign tax havens, in spite of the associated lost tax revenue and efficiency costs, if the ability to use tax havens is a realistic signal of the truly multinational, and therefore elastic, nature of an investment.

The available macroeconomic evidence indicates that countries have not reduced their taxation of foreign investment, or of capital income, to anything approximating the degree implied by many models of capital tax competition. The use of tax havens by foreign investors may help to explain this empirical pattern, as high-tax countries are able to maintain high tax rates while continuing to draw significant levels of foreign investment. It is not even necessary that high-tax countries are aware of the importance of tax havens in preserving their ability to attract foreign investment. One further implication of this analysis is that tax harmonization within federations may actually foster, rather than restrict, tax competition. Initiatives to impose tax harmonization would eliminate regional tax havens, thereby reducing foreign investment in the region. Downward pressure on national tax rates might well follow in an effort to attract investment, a process that could have been made less likely with the diversity afforded by allowing havens within a region.

6.   *Conclusion*

The evidence indicates that American multinational firms establish affiliates in tax haven countries as part of their international tax avoidance strategies. Tax haven affiliates appear both to facilitate the relocation of taxable income from high tax locations and to allow firms to defer repatriation taxes on income earned in low tax locations. Affiliates in larger tax haven countries appear to be particularly well suited for reallocating income, presumably reflecting the effects of government enforcement of transfer pricing rules. Contrary to many policy concerns and the assumptions of much of the tax competition literature, haven activity does not appear to divert activity from non-havens, as the estimates imply that firms establishing tax haven operations expand, rather than contract, their foreign activities in nearby countries other than tax havens.

From the standpoint of host country governments, the ability of foreign investors to use tax havens in the same region has the beneficial effect of stimulating investment, even as it may erode tax revenue collection from any additional investment. For governments that, on efficiency grounds or other grounds, would prefer to reduce tax rates on inbound foreign

investment but are constrained from doing so by political or other considerations, encouraging the widespread use of regional tax havens offers a convenient alternative. The fear that the existence and use of regional tax havens might encourage firms to substitute economic activity away from nearby high tax locations receives no empirical support in the behavior of American multinational firms.

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Table 1
Summary of Haven Activity

	Number of Reporting Affiliates				Number of Holding Companies				Country Tax Rate				Share of Affiliate Sales to Related Parties Abroad			
	1982	1989	1994	1999	1982	1989	1994	1999	1982	1989	1994	1999	1982	1989	1994	1999
All Havens	2,759	2,650	2,599	3,053	276	219	194	369	20.2%	12.4%	12.3%	10.3%	28.6%	30.2%	36.6%	37.5%
All Non-Havens	15,819	16,018	18,299	19,867	446	586	689	1,156	42.5%	35.5%	31.4%	30.6%	16.0%	17.8%	19.8%	18.5%
Big 7 Havens	1,592	1,722	1,877	2,042	165	111	105	148	21.3%	15.6%	14.5%	13.2%	20.4%	30.0%	35.2%	36.8%

Information for Selected Havens

	1982	1989	1994	1999
Hong Kong	323	452	525	555
Singapore	240	333	436	484
Switzerland	532	521	504	467
Ireland	216	250	282	403
UK Islands, Caribbean	157	159	118	330
Bermuda	356	302	299	316
Panama	198	135	111	98
Luxembourg	63	53	50	91
Bahamas	180	129	48	81
Barbados	15	33	45	67
Netherlands Antilles	315	179	91	40
Liberia	58	26	13	27

Notes: Summary statistics are provided for the years when benchmark surveys were performed: 1982, 1989, 1994, and 1999. "Number of Reporting Affiliates" is the total number of affiliates that operate in a particular country and year and file survey forms with BEA. Reporting exemption levels vary through time. All affiliates with an absolute value of sales, assets, or net income in excess of $1 million in 1982, $3 million in 1989, $3 million in 1994, and $7 million in 1999 are required to report. "Number of Holding Companies" is the number of those affiliates that are classified as enterprises engaged primarily in holding or owning securities for the purposes of exercising control. "Country Tax Rate" is defined as the median tax rate faced by affiliates within a country in a given year; these medians are averaged to obtain measures for the groupings of countries. "Share of Sales to Related Parties Abroad" is the ratio of sales to related parties abroad to total sales, aggregated within those country groupings. "Haven" countries and "Big 7 Havens" are those identified as such in Hines and Rice (1994); the "Big 7 Havens" are Hong Kong, Ireland, Lebanon, Liberia, Panama, Singapore, and Switzerland.

Table 2
Descriptive Statistics

	Mean	Median	Std. Dev.
Dependent Variables			
Have Haven Dummy	0.3778	0.0000	0.4849
Share of Affiliates in Havens	0.0789	0.0000	0.1476
Share of Affiliate Sales in Havens	0.0618	0.0000	0.1576
Share of Haven Affiliates in the Big 7	0.6441	0.8750	0.4171
Share of Haven Affiliate Sales in the Big 7	0.6952	1.0000	0.4276
Ratio of Foreign Taxes to Sales	0.0364	0.0122	0.0861
Affiliate Sales Growth in Non-Havens	0.0715	0.0662	0.2754
Affiliate Net PPE Growth in Non-Havens	0.0694	0.0596	0.2717
Haven Use Dummy	0.6011	1.0000	0.4899
Independent Variables			
Log of Non-Haven Sales	10.8954	10.6801	2.1573
Log of Parent Sales	12.5827	12.5594	2.0114
Average Non-Haven Tax Rate	0.3631	0.3687	0.0752
Industry Average Non-Haven Tax Rate	0.3641	0.3528	0.0520
Industry Share of Sales to Related Parties Abroad	0.1249	0.1103	0.0835
Parent Industry R&D to Sales Ratio	0.0260	0.0046	0.0581
Own Affiliate in Haven	0.8847	1.0000	0.3194
Parent Owns Haven Affiliates Only in Dot Havens	0.0406	0.0000	0.1973
Own Affiliate in Haven in Region	0.7485	1.0000	0.4339
Parent Owns Regional Haven Affiliates Only in Dot Havens	0.1190	0.0000	0.3238
Country Tax Rate	0.3568	0.3512	0.0964
Leverage	0.6326	0.5945	0.2306
Leverage Interacted with Country Tax Rate	0.2274	0.2013	0.1049
Beginning of Period Sales in Non-Havens	10.7907	10.6322	2.0359
Beginning of Period Net PPE in Non-Havens	8.7989	8.7265	2.4831
GDP Growth Rate	0.0421	0.0414	0.0189

Notes: "Have Haven Dummy" is a dummy variable set equal to one if a parent owns an affiliate in a haven. "Share of Affiliates in Havens" is the ratio of affiliates in havens to all affiliates, by parent, and "Share of Affiliate Sales in Havens" is the ratio of affiliate sales in havens to sales from all affiliates, by parent. "Share of Haven Affiliates in the Big 7" is the ratio of affiliates in Big 7 Havens to affiliates in all havens, by parent, and "Share of Haven Affiliate Sales in the Big 7" is the ratio of affiliate sales in Big 7 Havens to sales from affiliates in all havens, by parent. "Ratio of Foreign Taxes to Sales" is the ratio of foreign taxes to sales for affiliates in non-havens by year. "Affiliate Sales Growth in Non-Havens" and "Affiliate Net PPE Growth in Non-Havens" are annual growth rates for multinational parents in non-havens, by regions, for the periods between benchmark survey years. "Haven Use Dummy" is a dummy variable set equal to one if the parent begins using havens during a period (1982-1989, 1989-1994, 1994-1999) within a region and set equal to zero if the parent stops using a haven during a period within a region. "Log of Non-Haven Sales" is the log value of sales by affiliates in non-havens for a parent. "Log of Parent Sales" is the log value of worldwide sales for a parent. "Average Non-Haven Tax Rate" is the weighted average country tax rates for a parent in non-havens where country tax rates are the median tax rate for affiliates in that country and year and the weights are affiliate sales. "Industry Average Non-Haven Tax Rate" is the average non-haven tax rate faced by a firm's competitors where rates are aggregated across competitors using weights of non-haven sales. "Industry Share of Sales to Related Parties Abroad" is the weighted average industry ratio of sales to related parties abroad to total sales where industry ratios are determined with data aggregated at the three-digit level for all affiliates in that industry worldwide and weights are affiliate sales. "Parent R&D to Sales Ratio" is the ratio of parent R&D to sales. "Own Affiliate in Haven" is a dummy variable set equal to one if the parent of the affiliate owns an affiliate in a haven anywhere in the world in that year and is set equal to zero otherwise. "Parent Owns Haven Affiliates Only in Dots" is a dummy variable set equal to one in a particular year if the affiliate's parent owns at least one affiliate in a dot haven but no affiliates in big seven havens; it is set equal to zero otherwise. "Own Affiliate in Haven in Region" is a dummy variable set equal to one if the parent of the affiliate owns an affiliate in a haven in the same region as the affiliate in that year and is set equal to zero otherwise. "Parent Owns Regional Haven Affiliates Only in Dots" is a dummy variable set equal to one in a particular year if the affiliate's parent owns at least one affiliate in a dot haven within the affiliate's region but no affiliates in Big7 havens in that region; it is set equal to zero otherwise. "Country Tax Rate" is the median tax rate faced by affiliates within a country in a given year. "Leverage" is the ratio of total liabilities to total assets for the affiliate in that year. "Leverage Interacted with Country Tax Rate" is the product of "Leverage" and "Country Tax Rate. "Beginning of Period Sales in Non-Havens" is the value of sales in the first year of the period for parents in non-havens in the region. "Beginning of Period Net PPE in Non-Havens" is the value of Net PPE in the first year of the period for parents in non-havens in the region. "GDP Growth Rate" is the weighted average growth rate of the non-haven economies where the weights are the share of parent Net PPE in a country within that region.

Table 3

Determinants of the Demand for Havens

Dependent Variable:	Have Haven Dummy			Share of Affiliates in Havens			Share of Affiliate Sales in Havens		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Constant	-9.0327	-5.9885	-5.7235	-1.0884	-1.2838	-1.2623	-1.1289	-1.4433	-1.3607
	(0.3063)	(1.8713)	(1.8985)	(0.0411)	(0.2582)	(0.2686)	(0.0486)	(0.2808)	(0.2899)
Log of Non-Haven Sales	0.5918	-0.5778	-0.5959	0.0421	-0.0132	-0.0160	0.0355	-0.0348	-0.0363
	(0.0323)	(0.0836)	(0.0848)	(0.0042)	(0.0177)	(0.0185)	(0.0048)	(0.0209)	(0.0213)
Square of Log of Non-Haven Sales		0.0537	0.0543		0.0025	0.0026		0.0032	0.0033
		(0.0044)	(0.0044)		(0.0008)	(0.0008)		(0.0009)	(0.0009)
Log of Parent Sales	0.1575	0.7895	0.7408	0.0395	0.1494	0.1446	0.0434	0.1844	0.1804
	(0.0291)	(0.2923)	(0.2896)	(0.0049)	(0.0407)	(0.0408)	(0.0058)	(0.0431)	(0.0427)
Square of Log of Parent Sales		-0.0255	-0.0236		-0.0044	-0.0042		-0.0056	-0.0054
		(0.0114)	(0.0113)		(0.0015)	(0.0015)		(0.0016)	(0.0016)
Average Non-Haven Tax Rate		-2.9084	-2.4676		-0.6135	-0.5453		-0.5813	-0.7072
		(0.5904)	(1.2546)		(0.1108)	(0.2108)		(0.1231)	(0.2309)
Industry Share of Sales to Related Parties Abroad		0.8545	1.0141		0.1981	0.2303		0.2348	0.2690
		(0.4620)	(0.4662)		(0.0760)	(0.0775)		(0.0865)	(0.0881)
Parent R&D to Sales Ratio		3.1642	3.0290		0.4038	0.3758		0.5458	0.5249
		(0.6441)	(0.6247)		(0.0841)	(0.0828)		(0.0999)	(0.0984)
Year Fixed Effects?	Y	Y	Y	Y	Y	Y	Y	Y	Y
Use Industry Non-Haven Tax Rate?	N	N	Y	N	N	Y	N	N	Y
No. of Obs.	8,435	7,738	7,720	8,435	7,738	7,720	8,435	7,738	7,720
Log Likelihood	-4,062	-3,599	-3,608	-3,255	-2,853	-2,874	-3,298	-2,902	-2,912

Notes: The dependent variable in columns 1 through 3 is a dummy variable set equal to one if a parent owns an affiliate in a haven. The dependent variable in columns 4 through 6 is the ratio of affiliates in havens to all affiliates, by parent. The dependent variable in columns 7 through 9 is the ratio of affiliate sales in havens to sales from all affiliates, by parent. All of the specifications use parent level data drawn from 1982, 1989, 1994, and 1999. The specifications in columns 1 through 3 are logit specifications, and the specifications in columns 4 through 9 are Tobit specifications. "Log of Non-Haven Sales" is the log value of sales by affiliates in non-havens for a parent. "Log of Parent Sales" is the log value of worldwide sales for a parent. "Average Non-Haven Tax Rate" is the weighted average country tax rates for a parent in non-havens where country tax rates are the median tax rate for affiliates in that country and year and weights are affiliate sales. "Industry Share of Sales to Related Parties Abroad" is the weighted average industry ratio of sales to related parties abroad to total sales where industry ratios are determined with data aggregated at the three-digit SIC level for all affiliates in that industry worldwide and weights are affiliate sales. "Parent R&D to Sales Ratio" is the ratio of parent R&D to sales. Specifications 3, 6, and 9 use the "Average Non-Haven Tax Rate" faced by a firm's competitors as a measure of this variable for a particular firm. All specifications include year fixed effects and standard errors are clustered at the parent level.

Table 4

Determinants of the Demand for Havens, by Haven Type

Dependent Variable:	Share of Haven Affiliates in the Big 7			Share of Haven Affiliate Sales in the Big 7		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	3.2394	-0.5259	-1.3480	3.3275	0.2418	-1.0809
	(0.2487)	(1.3872)	(1.4217)	(0.2729)	(1.4767)	(1.5138)
Log of Non-Haven Sales	0.1065	0.2711	0.2666	0.1352	0.2392	0.2285
	(0.0199)	(0.0716)	(0.0672)	(0.0234)	(0.0873)	(0.0844)
Square of Log of Non-Haven Sales		-0.0079	-0.0076		-0.0054	-0.0049
		(0.0030)	(0.0028)		(0.0036)	(0.0035)
Log of Parent Sales	-0.2546	-0.0430	-0.0104	-0.3050	-0.0498	-0.0172
	(0.0274)	(0.2124)	(0.2135)	(0.0319)	(0.2253)	(0.2258)
Square of Log of Parent Sales		-0.0067	-0.0079		-0.0082	-0.0094
		(0.0078)	(0.0078)		(0.0082)	(0.0082)
Average Non-Haven Tax Rate		2.2367	3.6454		2.3337	4.1932
		(0.4874)	(0.9700)		(0.5449)	(1.0513)
Industry Share of Sales to Related Parties Abroad		1.0699	0.9718		1.1012	0.9967
		(0.3474)	(0.3444)		(0.3773)	(0.3699)
Parent R&D to Sales Ratio		1.3739	1.5325		1.5099	1.6430
		(0.5611)	(0.5612)		(0.6725)	(0.6690)
Year Fixed Effects?	Y	Y	Y	Y	Y	Y
Use Industry Non-Haven Tax Rate?	N	N	Y	N	N	Y
No. of Obs.	2,774	2,580	2,578	2,680	2,501	2,499
Log Likelihood	-2,567	-2,301	-2,302	-2,377	-2,135	-2,134

Notes: The dependent variable in columns 1 through 3 is the ratio of affiliates in Big 7 Havens to affiliates in all havens, by parent, in 1982, 1989, 1994 and 1999. The dependent variable in columns 4 through 6 is the ratio of affiliate sales in Big 7 Havens to sales from affiliates in all havens, by parent, in 1982, 1989, 1994 and 1999. All specifications are Tobit specifications. "Log of Non-Haven Sales" is the log value of sales by affiliates in non-havens for a parent. "Log of Parent Sales" is the log value of worldwide sales for a parent. "Average Non-Haven Tax Rate" is the weighted average country tax rates for a parent in non-havens where country tax rates are the median tax rate for affiliates in that country and year and the weights are affiliate sales. "Industry Share of Sales to Related Parties Abroad" is the weighted average industry ratio of sales to related parties abroad to total sales where industry ratios are determined with data aggregated at the three-digit SIC level for all affiliates in that industry worldwide and weights are affiliate sales. "Parent R&D to Sales Ratio" is the ratio of parent R&D to sales. Specifications 3, 6, and 9 use the "Average Non-Haven Tax Rate" faced by a firm's competitors as a measure of this variable for a particular firm. All specifications include year fixed effects and standard errors are clustered at the parent level.

Table 5

Havens and Tax Payments of U.S. Multinational Affiliates

Dependent Variable:	Ratio of Foreign Taxes to Sales					
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	0.0037	0.0034	0.0133	0.0141	-0.0022	-0.0066
	(0.0197)	(0.0194)	(0.0206)	(0.0208)	(0.0275)	(0.0275)
Own Affiliate in Haven	-0.0014	-0.0009				
	(0.0027)	(0.0026)				
Parent Owns Haven Affiliates Only in Dot Havens		-0.0015				
		(0.0040)				
Own Affiliate in Haven in Region			-0.0207	-0.0225	-0.0227	-0.0244
			(0.0064)	(0.0066)	(0.0070)	(0.0072)
Parent Owns Regional Haven Affiliates Only in Dot Havens				0.0073		0.0073
				(0.0029)		(0.0029)
Country Tax Rate	0.0973	0.0974	0.0996	0.0985	0.0961	0.0949
	(0.0440)	(0.0440)	(0.0422)	(0.0422)	(0.0432)	(0.0432)
Leverage	-0.0145	-0.0145	-0.0116	-0.0117	-0.0129	-0.0130
	(0.0214)	(0.0214)	(0.0204)	(0.0204)	(0.0209)	(0.0209)
Leverage Interacted with Country Tax Rate	-0.0401	-0.0401	-0.0461	-0.0437	-0.0414	-0.0388
	(0.0569)	(0.0569)	(0.0543)	(0.0542)	(0.0555)	(0.0554)
Parent, Industry, and Year Fixed Effects?	Y	Y	Y	Y	Y	Y
Restrict Sample to Affiliates of Parents with a Haven Affiliate?	N	N	N	N	Y	Y
No. of Obs.	137,895	137,895	137,895	137,895	103,431	103,431
R-Squared	0.5936	0.5936	0.5989	0.5995	0.6007	0.6013

Notes: The dependent variable is the ratio of foreign taxes paid to sales for affiliates in non-havens by year, from 1982 to 1999. The sample in the specifications preseented in columns 5 and 6 is restricted to those parents with an affiliate in a haven. The analysis uses analytic weights equal to sales to transform the specifications in a way that is equivalent to multiplying through by sales. "Own Affiliate in Haven" is a dummy variable set equal to one if the parent of the affiliate owns an affiliate in a haven anywhere in the world in that year and is set equal to zero otherwise. "Parent Owns Haven Affiliates Only in Dots" is a dummy variable set equal to one in a particular year if the affiliate's parent owns at least one affiliate in a dot haven but no affiliates in Big 7 havens; it is set equal to zero otherwise. "Own Affiliate in Haven in Region" is a dummy variable set equal to one if the parent of the affiliate owns an affiliate in a haven in the same region as the affiliate in that year and is set equal to zero otherwise. "Parent Owns Regional Haven Affiliates Only in Dots" is a dummy variable set equal to one in a particular year if the affiliate's parent owns at least median tax rate faced by affiliates within a country in a given year. "Leverage" is the ratio of total liabilities to total assets for the affiliate in that year. "Leverage Interacted with Country Tax Rate" is the product of "Leverage" and "Country Tax Rate." All specifications include parent, industry and year fixed effects and standard errors are clustered at the affiliate level.

Table 6

First Stage Regressions: Non-Haven Activity and Local Economic Growth

Dependent Variable:	Affiliate Sales Growth in Non-Havens		Affiliate Net PPE Growth in Non-Havens	
	(1)	(2)	(3)	(4)
Constant	0.3582	0.0070	0.2015	0.0034
	(0.0161)	(0.0073)	(0.0129)	(0.0081)
Beginning of Period Sales in Non-Havens	-0.0322			
	(0.0013)			
Beginning of Period Net PPE in Non-Havens			-0.0224	
			(0.0012)	
GDP Growth Rate	1.2134	1.2318	1.4204	1.4502
	(0.1643)	(0.1712)	(0.1839)	(0.1890)
Period Fixed Effects?	Y	Y	Y	Y
No. of Obs.	6,873	6,873	6,785	6,785
R-Squared	0.0918	0.0135	0.0632	0.0113

Notes: The dependent variable is the growth rate of sales (columns 1 and 2) and Net PPE (columns 3 and 4) for multinational parents in non-havens, by region, for the periods between benchmark survey years (1982-1989, 1989-1994, 1994-1999). The five regions are Europe, Latin America and Other Western Hemisphere, Asia/Pacific, Africa, and the Middle East. "Beginning of Period Sales in Non-Havens" is the value of sales in the first year of the period for parents in non-havens in the region. "Beginning of Period Net PPE in Non-Havens" is the value of Net PPE in the first year of the period for parents in non-havens in the region. "GDP Growth Rate" is the weighted average growth rate of the non-haven economies where the weights are the share of parent Net PPE in a country within that region. All specifications include period fixed effects.

Table 7

The Relationship between Haven and Non-Haven Activity, Within Regions

Dependent Variable:	Haven Use Dummy				Haven Use Dummy					
					Asia/Pacific		Europe		Latin America and Other Western Hemisphere	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Constant	0.0173	-0.1358	-0.0154	-0.1011	0.8334	0.9550	-0.0303	-0.1157	-0.2526	-0.2910
	(0.1388)	(0.2336)	(0.1434)	(0.2200)	(0.3607)	(0.3628)	(0.2285)	(0.2515)	(0.2248)	(0.2318)
Affiliate Sales Growth in Non-Havens	6.5934	8.4789			2.9064		7.9395		4.1771	
	(1.3346)	(3.7516)			(3.0858)		(2.6879)		(1.9855)	
Affiliate Net PPE Growth in Non-Havens			6.2493	7.2020		1.1997		7.5724		5.3181
			(1.3145)	(3.1900)		(2.7748)		(2.8271)		(2.1901)
Period Fixed Effects?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
IV with GDP Growth and Initial Levels?	Y	N	Y	N	Y	Y	Y	Y	Y	Y
IV with GDP Growth?	N	Y	N	Y	N	N	N	N	N	N
No. of Obs.	816	817	817	817	231	231	320	321	245	245
Log Likelihood	-531	-543	-534	-543	-130	-130	-208	-210	-167	-167

Notes: The dependent variable is a dummy variable set equal to one if the parent begins using havens during a period (1982-1989, 1989-1994, 1994-1999) within a region and set equal to zero if the parent stops using a haven during a period within a region. The five regions employed in the regressions in columns 1 through 4 are Europe, Latin America and Other Western Hemisphere, Asia/Pacific, Africa, and the Middle East. In columns 5 through 10, observations are not pooled across regions and results are presented separately for Asia/Pacific (columns 5 and 6), Europe (columns 7 and 8) and Latin America and Other Western Hemisphere (columns 9 and 10). "Affiliate Sales Growth in Non-Havens" is the predicted value of sales growth in non-havens from the first stage regressions presented in Table 6. "Affiliate Net PPE Growth in Non-Havens" is the predicted value of Net PPE growth in non-havens from the first stage regressions presented in Table 6. In columns 1, 3, 5, 7 and 9, the predicted values are from first-stage regressions that employ both initial levels of either sales or Net PPE and GDP growth rates. In columns 2, 4, 6, 8 and 10, the predicted values are from first-stage regressions that employ GDP growth rates. All specifications include period fixed effects, and standard errors are corrected as indicated in Murphy and Topel (1985).