

The Demand for Tax Haven Operations

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ABSTRACT

What types of firms establish tax haven operations, and what purposes do these operations serve? Analysis of affiliate-level data for American firms indicates that larger, more international firms, and those with extensive intrafirm trade and high R&D intensities, are the most likely to use tax havens. Tax haven operations facilitate tax avoidance both by permitting firms to allocate taxable income away from high-tax jurisdictions and by reducing the burden of home country taxation of foreign income. The evidence suggests that the primary use of affiliates in larger tax haven countries is to reallocate taxable income, whereas the primary use of affiliates in smaller tax haven countries is to facilitate deferral of U.S. taxation of foreign income. Firms with sizeable foreign operations benefit the most from using tax havens, an effect that can be evaluated by using foreign economic growth rates as instruments for firm-level growth of foreign investment outside of tax havens. One percent greater sales and investment growth in nearby non-haven countries is associated with an 1.5 to two percent greater likelihood of establishing a tax haven operation.

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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. American multinational firms make extensive use of tax havens: in 1999, 59 percent of U.S. firms with significant foreign operations had affiliates in tax haven countries.

This paper analyzes the activities of a panel of American multinational firms from 1982 to 1999 to identify the types of firms using tax havens and the purposes that tax haven operations serve. 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 in industries in which firms typically face low foreign tax rates, those that are technology-intensive, 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 in industries with low foreign tax rates 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 piece of evidence suggests that American firms with low foreign tax rates benefit from using tax havens 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 also the most likely 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 locate taxable profits in 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 in industries with high average foreign tax rates make greater use of such larger havens, conditional on using havens at all, and ownership of an affiliate in a large tax haven country is associated with reduced tax payments elsewhere in the same region.

The size of a firm's foreign operations and its use of tax havens are jointly determined, complicating the analysis of the extent to which the scale of activity in non-haven countries affects the demand for tax haven operations. Fortunately, it is possible to use rates of economic growth in foreign countries to predict differences between the subsequent foreign investment levels of American firms whose initial investments were located in different countries. Evidence from this instrumental variables analysis indicates that American firms are more likely to establish new tax haven operations if their non-haven investments are growing rapidly, which is consistent with the cross sectional evidence and the intuition that greater foreign investment increases the potential return to using tax havens.

Section 2 of the paper reviews the taxation of foreign income and discusses evidence of the impact of taxation. 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 operations, and in particular, the impact of high levels of foreign investment. Section 5 is the conclusion.

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

A substantial body of research considers the impact of taxation on investment and tax avoidance by multinational firms.¹ Tax policies are obviously capable of affecting the volume

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).

and location of foreign direct investment (FDI) since, all other considerations equal, higher tax rates reduce after-tax returns, thereby reducing incentives to commit investment funds. Previous studies identify 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 estimation that exploits the large differences in corporate tax rates around the world. A common finding of these studies, reviewed in Hines (1997, 1999), is that the estimated tax elasticity of investment is in the neighborhood of -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

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

² For evidence on intrafirm trade, see Clausing (2001, 2003) and Swenson (2001). For evidence on intrafirm debt, see Desai, Foley and Hines (2004a) 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 measure the prevalence of profit-shifting activities in a broader sample of countries.

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 countries 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 tests described below employ detailed affiliate-level panel data in order to investigate several aspects of demand for tax haven operations on the part of multinational firms. These aspects include correlations of firm attributes and use of tax haven operations, the characteristics of firms whose tax haven operations are concentrated in Big 7 as opposed to Dot locations, links between reported profit rates of non-haven affiliates and parent ownership of tax haven affiliates, and any effect of increased scale of non-haven activity on haven use by the same firm. The detailed data also allow for controls for a variety of factors and fixed effects that might otherwise confound such an analysis.

While the literature on multinationals and taxation emphasizes the use of tax haven operations 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.

3. *Data and descriptive statistics*³

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 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 its 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

³ This description of the data is drawn from Desai, Foley and Hines (2001).

levels were higher and less information was collected.⁴ BEA collects identifiers linking affiliates through time, thereby permitting the creation of a panel.

Table 1 displays summary statistics for American operations in tax havens and in non-haven 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, 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.

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. Since holding companies can be used to deploy funds from one foreign operation to other foreign investments without returning money to the United States in the process, the concentration of holding companies in tax havens is consistent with their use to 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 persists 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 selected individual havens. Table 2 presents means and standard deviations of variables used in the estimation that follows.

4. *Tax havens and firm behavior*

⁴ 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 1995-1999. 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.

The analysis begins by identifying characteristics of multinational firms that are associated with the use of tax havens. This analysis 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 the impact of tax havens within regions. The analysis concludes by employing an instrumental variables analysis to measure the extent to which changes in non-haven activity affect the demand for tax haven operations.

4.1. Demand for tax haven operations

Table 3 presents coefficients from regressions estimating the determinants of demand for tax haven operations as a function of company attributes. The dependent variable in the logit regressions reported in the first two columns is a dummy variable that takes the value one if a consolidated parent group includes a tax haven affiliate, and 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 difference between the 0.5918 coefficient on non-haven sales and the 0.1575 coefficient on parent sales implies that, after controlling for total (domestic plus foreign) sales, firms with higher fractions of their sales in foreign markets are the most likely to have tax haven affiliates.

The regression reported in column 2 adds squared size terms as well as additional independent variables. The estimated coefficient on the square of the log of non-haven sales is positive, whereas the estimated coefficient on the square of the log of parent sales is negative, implying that greater foreign operations contribute increasingly to the likelihood of having a tax haven affiliate, whereas the opposite is true of greater domestic operations.

Firms in different industries tend to invest in different foreign countries, and are thereby subject to differing average foreign tax rates. The independent variable “average industry non-haven tax rate” measures the weighted average non-haven tax rate of firms by three-digit

industry, where the weights correspond to affiliate sales, and the tax rates by country are measured as the median tax rate of all affiliates operating in a particular country and year.⁵ This use of an industry-specific, rather than firm-specific, measure of non-haven tax rates is motivated by the problem that tax haven and non-haven investments are jointly determined; and while this procedure does not remove all of the confounding effects of correlated omitted variables, it limits such effects to those that are industry-specific. The estimates imply that higher average tax rates in non-haven foreign operations reduce the likelihood of establishing tax haven affiliates, as indicated by the -2.4676 coefficient in column two.⁶ 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, as reflected in the 1.0141 coefficient in column two. Finally, the estimated 3.0290 coefficient in column two indicates that companies with high R&D/sales ratios are more likely than others to have tax haven affiliates.

Columns 3 and 4 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 and 2. The -0.5453 coefficient in column 4 implies that a ten percent higher average foreign tax rate outside of tax havens is associated with a five percent reduction in the fraction of foreign affiliates located in tax havens. The 0.2303 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 0.3758 coefficient indicates that a ten percent greater R&D/sales ratio increases the share of affiliates in tax havens by four percent. Finally, it is useful to check whether regressions in which the dependent variable is based on a measure of

⁵ 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. For purposes of calculating industry averages, industries are defined using the BEA three-digit ISI codes, which are similar to three-digit SIC codes, and tax rates are weighted by the distribution of sales of all affiliates of parents in the same industry.

⁶ Similar results to those presented on taxes in this table are obtained if tax rates by country are measured using statutory corporate tax rates, and these appear in Appendix Table 1. Desai, Foley and Hines (2004b) also report

activity, rather than counts of affiliates, produce similar patterns of coefficients. Columns 5 and 6 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 1-4.

The results presented in Table 3 offer useful evidence of characteristics that stimulate demand for tax haven operations. Firms with extensive foreign investments appear to be the most likely to establish tax haven affiliates. 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.⁷ 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.⁸

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

results using firm-specific non-haven tax rates in place of the industry averages, which closely resemble those reported in columns 2, 4, and 6 of Table 3.

⁷ The ability of American firms to defer home-country taxation is limited by Subpart F provisions that subject certain forms of passive income to immediate U.S. taxation, so the results presented here suggest that firms have mechanisms for circumventing these provisions. Some mechanisms by which such deferral is accomplished are detailed in IRS Notice 98-11. Specifically, this notice indicates that the "check-the-box" regulations of 1996 that facilitated the use of so-called hybrid entities (that can be used to avoid the Subpart F provisions) would be reconsidered as these regulations were employed widely to facilitate deferral in a spirit contrary to Subpart F. While the check-the-box regulations would help account for the use of havens to facilitate deferral in the latter part of the sample period, IRS Notice 98-11 makes clear that "the issues under Subpart F raised by hybrid branch arrangements may also be raised by certain partnership and trust arrangements" indicating that a variety of technologies exist for facilitating deferral of home-country taxation, and the use of these tax-avoidance methods long predates the 1996 adoption of "check-the-box" regulations.

⁸ These results on the demand for tax havens cohere with the results in Graham and Tucker (2005) that indicate that larger firms with more foreign activity and greater R&D activity are those that engage in tax avoidance through corporate tax shelters.

be better able to relocate profits to larger tax haven countries since they have more substantial operations in these environments and therefore high profit rates 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 and 2 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 regression reported in column 2 adds the same explanatory variables as those used in the regressions presented in Table 3. The 3.6454 coefficient in column two indicates that ten percent higher foreign tax rates are associated with 36 percent higher desired fractions of tax haven affiliates located in Big 7 countries. The 0.9718 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 1.5325 coefficient indicates that ten percent greater R&D/sales ratios have somewhat larger effects. Very similar results appear in the regressions reported in columns 3 and 4, 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 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.¹⁰

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

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.

¹⁰ Desai, Foley and Hines (2004b) compare the effects of having a haven affiliate with tax rate differences in an effort to quantify the tax-reducing effects of avoidance available using haven affiliates. This comparison is suspect, given that any measurement error in calculating tax rates may create a downward bias in the estimated tax rate effect. This downward bias in estimated tax rate effects in turn inflates the implied effect of owning a haven.

affiliates.¹¹ 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. Taken together, the regressions reported in Tables 3-5 suggest that American firms use tax haven operations to avoid foreign and domestic tax liabilities.

4.3. *Tax haven operations and non-haven activity*

If the value of potential tax savings associated with using tax havens increases more rapidly with firm size than does the cost of establishing haven operations, firms with extensive non-haven investments should have the greatest demand for tax haven operations. The evidence presented in Table 3 is consistent with this pattern, but it is not conclusive. Haven and non-haven activity are jointly determined and might both be functions of important correlated omitted variables.

The regressions presented in Tables 6 and 7 consider the effect of foreign (non-haven) investment levels on the demand for tax haven operations by using an instrumental variables estimation strategy that 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 regressions use the fact that firms differ in their initial

¹¹ 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.

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 activity growth rates then become the independent variables in second stage equations explaining the establishment or discontinuance of tax haven operations.

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, implying that firms whose initial investments were concentrated in countries whose economies subsequently grew very rapidly tend to expand their foreign investments more rapidly than do firms whose initial investments were concentrated in countries whose economies subsequently stagnated. Hence average foreign GDP growth rates, calculated using firm-specific weights, can serve as reasonable instruments for changes in activity outside of tax havens.¹²

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.¹³ Observations again represent changes between benchmark years in the regionally aggregated activities of parent companies. The

¹² Numerous studies of firm growth, including Evans (1987) and Hall (1987), indicate that small firms grow faster than large firms. Therefore, specifications 1 and 3 control for measures of initial firm size. To ensure that the instrumental variable results that follow are not identified solely by differences in initial size, the analysis also uses predicted values from specifications 2 and 4 that do not include proxies for initial size. The F-statistics of the first stage regressions reported in Table 6 exceed 19 in all specifications.

¹³ 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.

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. It has the virtue of effectively controlling for firm fixed effects through first differences, thereby removing the effects of considerations - including firm size, average industry foreign tax rate, and R&D intensity – that are roughly time-invariant when estimating the determinants of demand for haven affiliates.¹⁴

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 are associated with greater likelihood of establishing tax haven affiliates. This result does not merely reflect a process in which goods are produced by non-haven affiliates and then sold by regional tax haven affiliates. In columns three and four, non-haven Net PPE growth is used in place of non-haven sales growth, the results similarly indicating that firms accumulating capital at faster rates outside of tax havens are the ones that are most likely to acquire new operations in tax havens.

The results indicate that firms whose initial investments were concentrated in economies that subsequently grew rapidly are the most likely to establish new tax haven affiliates. The regressions reported in columns 1 through 4 imply that, when evaluated at sample means, one percent more rapid sales and investment growth is associated with an 1.5 to two percent greater likelihood of establishing a new tax haven affiliate in 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 region are not statistically

¹⁴ The fact that the Chamberlain procedure serves removes time-invariant firm characteristics from the estimating equation for haven demand explains why largely invariant firm characteristics, such as R&D intensity, that appear as independent variables in the regressions presented in Tables 3 and 4 are not included as independent variables in the regressions presented in Table 7.

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. Conclusion

The evidence indicates that American multinational firms establish operations in tax haven countries as part of their international tax avoidance strategies. Large firms with high shares of international activity are the most likely to have haven affiliates, and firms in industries characterized by high R&D intensities and significant volumes of intrafirm trade similarly exhibit the greatest demand for tax haven operations. Tax haven affiliates appear both to facilitate the relocation of taxable income from high tax locations and to reduce the cost of deferring home country taxation of income earned in low tax foreign 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. Firms investing in economies that subsequently grow very rapidly expand their own foreign investments at faster rates than other firms and are more likely to establish new tax haven operations confirming the role of scale in dictating the demand for tax haven operations.

Ever-increasing levels of foreign direct investment, the rising R&D intensity of multinational firms, and the growing volume of world trade between related parties together imply that the demand for tax haven operations is likely to increase over time, as are the concerns of non-haven policymakers. Firms clearly benefit from using tax haven operations to avoid taxes; what is less clear is the impact of this avoidance on the economies of countries with high tax rates.

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Table 1
Summary of Haven Activity

	<i>Number of Reporting Affiliates</i>				<i>Number of Holding Companies</i>				<i>Country Tax Rate</i>				<i>Share of Affiliate Sales to Related Parties Abroad</i>			
	<u>1982</u>	<u>1989</u>	<u>1994</u>	<u>1999</u>	<u>1982</u>	<u>1989</u>	<u>1994</u>	<u>1999</u>	<u>1982</u>	<u>1989</u>	<u>1994</u>	<u>1999</u>	<u>1982</u>	<u>1989</u>	<u>1994</u>	<u>1999</u>
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%
<i>Information for Selected Havens</i>																
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.
<i>Dependent Variables</i>			
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
<i>Independent Variables</i>			
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)
Constant	-9.0327 (0.3063)	-5.7235 (1.8985)	-1.0884 (0.0411)	-1.2623 (0.2686)	-1.1289 (0.0486)	-1.3607 (0.2899)
Log of Non-Haven Sales	0.5918 (0.0323)	-0.5959 (0.0848)	0.0421 (0.0042)	-0.0160 (0.0185)	0.0355 (0.0048)	-0.0363 (0.0213)
Square of Log of Non-Haven Sales		0.0543 (0.0044)		0.0026 (0.0008)		0.0033 (0.0009)
Log of Parent Sales	0.1575 (0.0291)	0.7408 (0.2896)	0.0395 (0.0049)	0.1446 (0.0408)	0.0434 (0.0058)	0.1804 (0.0427)
Square of Log of Parent Sales		-0.0236 (0.0113)		-0.0042 (0.0015)		-0.0054 (0.0016)
Average Industry Non-Haven Tax Rate		-2.4676 (1.2546)		-0.5453 (0.2108)		-0.7072 (0.2309)
Industry Share of Sales to Related Parties Abroad		1.0141 (0.4662)		0.2303 (0.0775)		0.2690 (0.0881)
Parent R&D to Sales Ratio		3.0290 (0.6247)		0.3758 (0.0828)		0.5249 (0.0984)
No. of Obs.	8,435	7,720	8,435	7,720	8,435	7,720
Log Likelihood	-4,062	-3,608	-3,255	-2,874	-3,298	-2,912

Notes: The dependent variable in columns 1 and 2 is a dummy variable set equal to one if a parent owns an affiliate in a haven. The dependent variable in columns 3 and 4 is the ratio of affiliates in havens to all affiliates, by parent. The dependent variable in columns 5 and 6 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 and 2 are logit specifications, and the specifications in columns 3 through 6 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 Industry Non-Haven Tax Rate" is the weighted average non-haven tax rate of firms in the same three-digit industry, 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. "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. 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)
Constant	3.2394 (0.2487)	-1.3480 (1.4217)	3.3275 (0.2729)	-1.0809 (1.5138)
Log of Non-Haven Sales	0.1065 (0.0199)	0.2666 (0.0672)	0.1352 (0.0234)	0.2285 (0.0844)
Square of Log of Non-Haven Sales		-0.0076 (0.0028)		-0.0049 (0.0035)
Log of Parent Sales	-0.2546 (0.0274)	-0.0104 (0.2135)	-0.3050 (0.0319)	-0.0172 (0.2258)
Square of Log of Parent Sales		-0.0079 (0.0078)		-0.0094 (0.0082)
Average Industry Non-Haven Tax Rate		3.6454 (0.9700)		4.1932 (1.0513)
Industry Share of Sales to Related Parties Abroad		0.9718 (0.3444)		0.9967 (0.3699)
Parent R&D to Sales Ratio		1.5325 (0.5612)		1.6430 (0.6690)
No. of Obs.	2,774	2,578	2,680	2,499
Log Likelihood	-2,567	-2,302	-2,377	-2,134

Notes: The dependent variable in columns 1 and 2 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 3 and 4 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 Industry Non-Haven Tax Rate" is the weighted average non-haven tax rate of firms in the same three-digit industry, 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. "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. 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 (0.0197)	0.0034 (0.0194)	0.0133 (0.0206)	0.0141 (0.0208)	-0.0022 (0.0275)	-0.0066 (0.0275)
Own Affiliate in Haven	-0.0014 (0.0027)	-0.0009 (0.0026)				
Parent Owns Haven Affiliates Only in Dot Havens		-0.0015 (0.0040)				
Own Affiliate in Haven in Region			-0.0207 (0.0064)	-0.0225 (0.0066)	-0.0227 (0.0070)	-0.0244 (0.0072)
Parent Owns Regional Haven Affiliates Only in Dot Havens				0.0073 (0.0029)		0.0073 (0.0029)
Country Tax Rate	0.0973 (0.0440)	0.0974 (0.0440)	0.0996 (0.0422)	0.0985 (0.0422)	0.0961 (0.0432)	0.0949 (0.0432)
Leverage	-0.0145 (0.0214)	-0.0145 (0.0214)	-0.0116 (0.0204)	-0.0117 (0.0204)	-0.0129 (0.0209)	-0.0130 (0.0209)
Leverage Interacted with Country Tax Rate	-0.0401 (0.0569)	-0.0401 (0.0569)	-0.0461 (0.0543)	-0.0437 (0.0542)	-0.0414 (0.0555)	-0.0388 (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 presented 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 (0.0161)	0.0070 (0.0073)	0.2015 (0.0129)	0.0034 (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 (0.1643)	1.2318 (0.1712)	1.4204 (0.1839)	1.4502 (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				Latin America and Other Western Hemisphere	
	(1)	(2)	(3)	(4)	Asia/Pacific		Europe		(9)	(10)
Constant	0.0173 (0.1388)	-0.1358 (0.2336)	-0.0154 (0.1434)	-0.1011 (0.2200)	0.8334 (0.3607)	0.9550 (0.3628)	-0.0303 (0.2285)	-0.1157 (0.2515)	-0.2526 (0.2248)	-0.2910 (0.2318)
Affiliate Sales Growth in Non-Havens	6.5934 (1.3346)	8.4789 (3.7516)			2.9064 (3.0858)		7.9395 (2.6879)		4.1771 (1.9855)	
Affiliate Net PPE Growth in Non-Havens			6.2493 (1.3145)	7.2020 (3.1900)		1.1997 (2.7748)		7.5724 (2.8271)		5.3181 (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).

Appendix Table 1

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)
Constant	-9.0327 (0.3063)	-4.7232 (2.1028)	-1.0884 (0.0411)	-0.9918 (0.3041)	-1.1289 (0.0486)	-1.2395 (0.3248)
Log of Non-Haven Sales	0.5918 (0.0323)	-0.5937 (0.0851)	0.0421 (0.0042)	-0.0153 (0.0184)	0.0355 (0.0048)	-0.0360 (0.0213)
Square of Log of Non-Haven Sales		0.0543 (0.0044)		0.0026 (0.0008)		0.0032 (0.0009)
Log of Parent Sales	0.1575 (0.0291)	0.8172 (0.2990)	0.0395 (0.0049)	0.1579 (0.0418)	0.0434 (0.0058)	0.1974 (0.0438)
Square of Log of Parent Sales		-0.0265 (0.0116)		-0.0047 (0.0016)		-0.0061 (0.0017)
Average Industry Non-Haven Tax Rate		-6.2454 (2.4752)		-1.4445 (0.3768)		-1.2804 (0.4174)
Industry Share of Sales to Related Parties Abroad		0.9841 (0.4666)		0.2239 (0.0768)		0.2602 (0.0875)
Parent R&D to Sales Ratio		2.9887 (0.6318)		0.3640 (0.0823)		0.5098 (0.0975)
No. of Obs.	8,435	7,678	8,435	7,678	8,435	7,678
Log Likelihood	-4,062	-3,581	-3,255	-2,831	-3,298	-2,870

Notes: The dependent variable in columns 1 and 2 is a dummy variable set equal to one if a parent owns an affiliate in a haven. The dependent variable in columns 3 and 4 is the ratio of affiliates in havens to all affiliates, by parent. The dependent variable in columns 5 and 6 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 and 2 are logit specifications, and the specifications in columns 3 through 6 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 Industry Non-Haven Tax Rate" is the weighted average non-haven tax rate of firms in the same three-digit industry, where the weights correspond to affiliate sales, and the tax rates by country are statutory tax rates in a particular country and year. "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. All specifications include year fixed effects and standard errors are clustered at the parent level.