The Impact of Headquarter and Subsidiary Locations on Multinationals' Effective Tax Rates

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ABSTRACT

We examine effective tax rates (ETRs) for 9,022 multinationals from 87 countries from 2006 to 2011. We find that, despite extensive investments in international tax avoidance, multinationals headquartered in Japan, the U.S., and some high-tax European countries continue to face substantially higher worldwide taxes than their counterparts in havens and other less heavily taxed locations. Other findings include: (a) Effective tax rates remained steady over the investigation period; (b) Entering a tax haven country for the first time results in a slight reduction in the firm's ETR; (c) ETR changes vary depending on whether the subsidiary is a financial conduit or an operating subsidiary. These results should aid ongoing international tax policy debates and expand scholars' understanding about the taxation of multinationals.

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Senate Finance Committee, March 11, 1999

Bob Perlman, Vice President of Taxes for Intel Corporation: "…if I had known at Intel's founding (over thirty years ago) what I know today about the international tax rules, I would have advised that the parent company be established outside the U.S. This reflects the reality that our Tax Code competitively disadvantages multinationals simply because the parent is a U.S. corporation..."

New York Senator Daniel Patrick Moynihan: "So, you would have left the United States for the tax shelters of the Cayman Islands. Do you think that the Marines are still down there if you need them?

1. Introduction

This paper provides the most comprehensive analysis to date of the impact of a multinational's locations on its global tax liability. We use Orbis ownership data and Compustat financial information for 9,022 multinationals headquartered in 87 countries to calibrate the impact that each country has on the typical firm's worldwide effective tax rate. We also quantify the immediate ETR impact of moving into a new country via a foreign subsidiary. The resulting statistics about various tax systems enhance our understanding of how differences across countries in corporate taxes affect multinationals. They also provide additional empirical underpinnings for the continuing international tax policy debates in the United States, the United Kingdom, and other countries as all nations compete in the market for corporate tax domicile.[1]

Markle and Shackelford (2012) compare ETRs for companies around the world using 2009 financial statements. We extend those comparisons through 2011. In addition, the data in this paper are more extensive, enabling us to conduct two new tests. First, we can (mostly) reconstruct each multinational's set of foreign and domestic subsidiaries from 2006-2011.[2] This

[1] Tax domicile is the location of the firm for tax purposes. Countries differ in their definitions of domicile, e.g., U.S. domicile is the country of incorporation; UK domicile is the location of operational headquarters. Throughout the paper, we observe countries of incorporation and operations and assume that domicile follows. To the extent these assumptions are wrong, our measures are erroneous.

[2] Orbis lists the subsidiaries ultimately controlled by the multinationals in our sample as of 2011. To determine when that subsidiary came under the control of the multinational, we use the presence of data in the shareholder

allows us to observe changes in ETRs as firms move into a new country. Second, the new data disclose the ownership of the subsidiaries (i.e., who owns whom throughout the tiers of the ownership structure). This permits us to test whether the ETR impact of entering a country depends on the subsidiary being an active operating company or a financial conduit that holds stock in other companies.

The updated comparisons and the results from the new tests should aid policymakers as they continue to adjudicate two competing views about multinationals and taxes (see discussion in Toder, 2012). One perspective, widely accepted among American corporate managers, is that establishing headquarters in the U.S. results in higher total worldwide taxes, that new companies anticipating substantial foreign operations should not incorporate in the U.S., that U.S. tax law results in inefficient build-up of cash abroad (e.g., Summers, 2013) and that companies located outside the U.S. have a tax advantage in the market for corporate control (Nakabayashi and Carter, 2013, Carroll, 2010, Huizinga and Voget, 2009, and Samuels, 2009, among others). Reasons include the U.S.'s atypical worldwide tax system, limits on the deductibility of some expenses, a relatively restrictive controlled foreign corporation (CFC) regime, and aggressive federal and state tax administration.[3] As one example that other countries dominate the U.S. as a domicile for multinationals and that companies currently domiciled in the U.S. would leave if the tax costs of exiting were not prohibitive, critics of the current U.S. system point to the strong legislation and political pressure that were needed to stem the exodus of U.S. companies through inversions (reincorporations in low-tax countries with no operational impact), following Stanley

information variables in previous years as an indicator that the subsidiary was controlled by the parent in that year. Unfortunately, we are not able to distinguish whether the first instance of data captures the acquisition of the subsidiary or the beginning of coverage of the subsidiary by Orbis. Furthermore, because we begin with the set of subsidiaries controlled by the multinational in 2011, we are unable to identify subsidiaries that were divested in our sample period.

[3] In overly simplistic terms, countries with territorial systems only tax the domestic income of companies domiciled in their country. In contrast, countries with worldwide systems tax all income (domestic and foreign) of their home companies and provide foreign tax credits to prevent double taxation of foreign profits.

Works' highly controversial aborted move to Bermuda in 2002 (see discussion in Desai and Hines, 2002). Furthermore, concerns about domicile competitiveness are not limited to the U.S. In his study of 278 changes in multinational headquarters involving 19 countries from 1997 to 2007, Voget (2011) shows that relocating to reduce global taxes is a widespread phenomenon.[4] In fact, a perceived inability to compete in the market for domicile reportedly contributed to the UK's 2009 adoption of a territorial system of taxing the foreign profits of British multinationals.[5]

Another perspective is less sympathetic to multinationals and the challenges they face in international taxation. From exposés of Dutch-Irish Sandwiches and other colorfully named tax plans, to claims of "stateless" income (Kleinbard, 2011a, 2011b), to Congressional and Parliamentary attacks on high-profile companies, such as Apple, Google, Starbucks, and Amazon, to OECD reports and plans,[6] many believe that multinational firms can easily erase any disadvantages arising from operating in high-tax domiciles. Scholars too have documented that multinationals can arrange their affairs to undo differences in taxation across countries.[7] By shifting income from high-tax to low-tax countries through transfer pricing, using hybrid entities that are treated as corporations in some countries and flow-through entities in others, stripping profits from high-tax countries through intracompany financing, repatriating under favorable tax conditions, and other tax avoidance mechanisms, multinationals mitigate, if not fully erode, the deleterious implications of doing business in a high-tax country.

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[4] From a policy perspective, it is important to remember that relocation is a zero-sum game; every relocation is a loss for one country but a gain for another. Thus, focusing solely on the companies that are leaving a country might lead to erroneous inferences. For example, in the Voget (2011) sample, more companies (37) left the UK than any other country. However, the same number relocated to the UK.

[5] For example, at one point, the *Financial Times* (September 21, 2008) quoted an anonymous source saying, "As we understand it, half the FTSE 100 is looking at this [redomiciling outside the UK.]." (Braithwaite, 2008).

[6] For example, see *Addressing Base Erosion and Profit Shifting*, released on February 13, 2013 and its action plan, which followed on July 19, 2013.

[7] See Blouin (2012) for a review of the international tax literature. For a smattering of studies over the last two decades, see Gravelle (2013), the United States Government Accountability Office (2013), Dharmapala et al. (2011), Dyreng and Lindsey (2009), Huizinga et al. (2008), Desai et al. (2006), Gordon and Hines (2002), Collins and Shackelford (1997), and Hines and Rice (1994), among many others.

Thus, how domicile affects a multinational's total worldwide taxes is an empirical question. To address these two perspectives, we analyze firm-level financial statement information. In particular, we regress firm-level ETRs (i.e., total income tax expense as a percentage of pre-tax income) on categorical variables for the countries in which the multinational is located—both at the parent and subsidiary levels. The regression coefficients on the categorical variables estimate the incremental impact of locating the headquarters of the multinational in a specific country or entering a new country through a subsidiary.

Our primary finding is that, despite decades of international tax planning and continuing reports of elaborate innovative schemes to avoid taxes, the effective tax rates of multinationals vary considerably depending on the sites of the company. We find dramatic differences in effective tax rates based on the headquarters of the multinational. Japanese-headquartered multinationals face the highest ETRs, by far. After controlling for industry and size, their ETRs average 8.5 percentage points higher than their runner-up counterparts from the U.S. The ETRs of American multinationals are slightly ahead of those from two major trading partners, France and Germany. On the other end of the distribution, multinationals from the Middle East (Tax Havens) enjoy ETRs that average 12.5 (10.8) percentage points lower than American firms. In short, we find that differences continue to persist in ETRs between high-tax and low-tax countries despite vast investment in international tax avoidance.

Other findings include the following: (1) Prior work had shown that worldwide ETRs fell in recent decades. We find stable ETRs from 2006 to 2011. (2) Industries are taxed similarly around the world, albeit with construction taxed a bit lightly and information a bit more heavily. Compared with the rest of the world, the U.S. taxes the financial services more heavily and information more lightly. (3) When a company first enters a tax haven, ETRs fall but only

by a small amount. (4) Whether a subsidiary is an equity holding company or a terminal operating subsidiary alters its ETR effect.

The remainder of the paper is organized as follows: Section 2 outlines the research design. Section 3 presents the empirical findings. Closing remarks follow.

2. Research Design

2.1. Regression Equation

It is difficult to undertake statistical analyses of cross-country variation, such as the impact of headquarter domicile on multinational ETRs, because country-level unobservables undermine identification. Ideally, we would address this limitation by randomly assigning headquarter countries to multinationals. Alternatively, if companies regularly moved their headquarters, then remedies, such as fixed effects, difference-in-differences, or instrumental variables, could provide reliable causal links. Unfortunately, too few companies move their headquarters across borders to provide sufficient power. Thus, in these initial tests of the impact of headquarters on firm ETRs, we mostly avoid statistical comparisons.

In light of these econometric challenges, we take the actual firm-level ETRs, control for as many observable factors as possible, and report the remaining variation in ETRs by country. For example, we control for industry because if the mining sector faces relatively low taxes throughout the world because of tax incentives for natural resources, then countries with disproportionately large numbers of miners might appear to enjoy lower levels of taxation than other countries do, even though the difference actually arises because of the industry mix. However, it is important to recognize that including control variables in a regression does not provide assurance that the country-level observables that plague cross-country tests have been

fully accounted for. Thus, the average tax rates that we compute should be viewed as statistics about tax systems, rather than measures of economic incentives.

With that caveat, we use the pooled, cross-sectional regression equation developed in Markle and Shackelford (2012) with the sole modification that we drop all variables involving indicators for multinational firms because all companies in this study are multinationals. By suppressing the intercept, the coefficients on the *COUNTRY* variables can be interpreted as the marginal cost of domiciling in a country, conditional on the control variables.

$$ETR_{it} = \sum \beta_{0_j} COUNTRY_{it}^{j} + \sum \beta_{1_k} INDUSTRY_{it}^{k} + \sum \beta_{2_m} YEAR_{it}^{m} + \sum \beta_{3_n} SIZE_{it}^{q} + \varepsilon_{it} \qquad (1)$$

where:

ETR_{it} = total worldwide income tax expense divided by net income before income taxes for firm *i* in year *t*.

$COUNTRY_{it}^{j}$ = an indicator variable equal to 1 if firm *i* is domiciled in country *j* in year *t*, equal to 0 otherwise.

$INDUSTRY_{it}^{k}$ = an indicator variable equal to 1 if firm *i* is identified as being in industry *k* (by two-digit NAICS) in year *t*, equal to 0 otherwise.

$YEAR_{it}^{m}$ = an indicator variable equal to 1 for firm-years for which $t = m$, equal to 0 otherwise.

$SIZE_{it}^{q}$ = the percentile rank of the size of variable *q* for firm *i* in year *t*. *n*={Assets, Revenue, Owners' Equity}.

For the dependent variable, we opt for total income tax expense in the numerator, as opposed to current income tax expense or cash taxes paid. The reason is that many non-U.S. companies only report the total income tax figure; thus, using the total provision maximizes the sample size. We recognize that the total income tax expense is an imperfect measure of the

firm's actual taxes paid in part because it fails to capture the impact of transactions for which taxable income is recognized after book income.[8] However, we take comfort from Markle and Shackelford's (2012) finding that the Pearson correlation coefficient between total and current income tax expense is 95%, suggesting that the increase in sample size may justify any loss of information about cross-firm differences in deferral tax avoidance. Finally, to mitigate the impact of outliers and errors in the data, we limit the sample to observations with non-negative ETRs less than or equal to 70%.

2.2. Sample

We conduct our tests using the most recent ownership information in Orbis (usually 2011 financial statement data). Orbis, a database maintained by Bureau van Dijk, dominates other databases because it enables us to observe the country locations for both headquarters and the foreign subsidiaries of many multinationals and to determine the ownership structure for the subsidiaries. We then match these firms to financial statement data in Compustat's Global and North America databases. The sample selection process yields 42,738 multinational-years from 2006 through 2011 spanning 87 countries, ranging from only five firm-years in two countries (Bahrain and Kazakhstan) to 13,234 observations in the United States. We combine countries with fewer than 400 observations into six categories: Africa, Asia, Europe, Latin America, Middle East, and Tax Havens. The remaining fifteen countries are included on their own and our

[8] See Graham et al. (2012) for a detailed discussion of the different tax figures found in the financial statements and the imperfections of each for tests such as these. In simplest terms, total income tax expense is the product of the tax rate and pre-tax book income adjusted for any items that are never subject to tax. Current income tax expense is the portion of total income tax expense that relates to the current year's taxable income. Cash taxes paid are the actual taxes paid to all governments in a particular year related to tax returns from the current and past years, net of any refunds.

main tests are conducted and results are reported using these 21 countries and groups (hereafter referred to simply as "countries").

For the 21 countries, Table 1 reports the firm-year means of Sales, Assets, Equity, Pretax income, *ETR*, and statutory tax rates.[9] 31% of the sample are companies whose headquarters are domiciled in the U.S. The mean American company has sales of $4.4 billion, assets of $10.9 billion, equity of $2.3 billion, pretax income of $0.4 billion, and an ETR of 28%.

3. Findings

3.1. Does the Location of the Multinational's Headquarters Matter?

Table 2 presents all regression coefficients from estimating equation (1). The *COUNTRY* coefficients are of primary interest because they denote the incremental ETR impact to a multinational of having its headquarters in a specific country. The wide range of *COUNTRY* coefficients is striking with the maximum value (30.4% for Japan) more than triple the smallest (9.4% for the Middle East, which relies on non-income tax levies on its natural resources). The U.S. has the second largest coefficient at 21.9%. The next four smallest coefficients all hail from locations associated with international tax avoidance: Tax Havens (11.1%), Singapore (13%), Switzerland (13.1%), and Taiwan (14.6%).

The results are not surprising in that they confirm widely-held views about which countries have the highest income taxes and which ones have the lowest income taxes. Nonetheless, it remains remarkable that with increasingly integrated global capital markets, domicile remains such an important factor in determining a multinational's total income tax burden. Apparently the tax and non-tax frictions of moving to a less heavily taxed domicile are

[9] The combined corporate statutory tax rate for the 30 OECD countries is available at www.oecd.org. Kevin Hassett kindly provided the maximum rate for non-OECD countries.

non-trivial. Otherwise, it is hard to explain the persistence of Japanese companies with *COUNTRY* coefficients exceeding 30.4% while Singaporean companies enjoy coefficients of just 13.0%.[10] These coefficient differences imply that the typical Singaporean company has an enormous advantage over its Japanese competitor, pocketing 17.4 cents more for every dollar of pre-tax profit. Restated, these estimates imply that a Japanese company that relocated its tax domicile to Singapore without affecting any other aspects of its business would increase its bottom line by 25% [(1-.13)/(1-.304)]. Other sizeable imbalances involving companies from similar markets include French companies at 21.7% when British companies are at 16.2%; American companies at 21.9% while Canadian companies are at 17.5%, and German companies at 20.6% when Swiss companies are at 13.1%.

The magnitude of the *COUNTRY* coefficients should not be taken as estimates of the actual ETRs from the financial statements, because the coefficients are the actual ETRs, conditional on industry, year, and size. Instead, the coefficients should be compared with each other. To aid in that comparison, Table 3 presents the results of F-tests comparing the *COUNTRY* coefficients for each country generated by estimating equation (1). It confirms the widespread differences among the equation (1) coefficients. A star in a cell of Table 3 indicates that the *COUNTRY* coefficient for the row country is statistically significantly different from the

[10] One potential explanation for the persistence of these large differentials is that income generated in Japan is taxed heavily and income generated in Singapore is taxed lightly. Then, if Japanese companies operate mostly in high-tax Japan and Singaporean companies operate mostly in low-tax Singapore, we might erroneously infer that headquarters matters when actually the location of operations determines the difference between Japanese and Singaporean companies' tax rates. Unfortunately, firms do not segregate their profits into domestic and foreign portions in their financial statements; so, we are unable to assess the extent to which differences in domestic taxation drives our inferences about headquarter effects.

COUNTRY coefficient of the column country.[11] The American *COUNTRY* coefficient differs significantly from every other country's coefficient, except the ones for France and South Africa.

In summary, these findings are consistent with the location of a firm's headquarters continuing to affect its global tax burden. We infer that, contrary to the assertions of some and despite many successful strategies for shifting profits from high-tax countries to low-tax countries, companies domiciled in high-tax countries still appear to pay much higher global taxes.

3.2. Variation in Headquarter ETR Effects Over Time and Industry

Tables 2 and 3 present results from tests that combine all firm-years from 2006-2011. Next, we estimate *COUNTRY* coefficients separately for each year to test whether ETRs have been trending over the six years under investigation. Instead, we find that ETRs have been generally steady over the period.

Table 4 shows that the distribution of countries from high-tax to low-tax remains consistent throughout the six years. Every year Japan has the largest *COUNTRY* coefficient, and the Middle East, the Tax Havens, Singapore and Switzerland are among the five locations with the lowest coefficients. The U.S. has the penultimate *COUNTRY* coefficient every year except 2011, when it comes in fourth. Moreover, the coefficients do not appear to be uniformly rising or falling over time. However, they are generally larger in 2009 and smaller in 2011. Thirteen of the 21 locations have their largest coefficient in 2009, while none has its lowest that year. In contrast, 14 of the 21 locations have their lowest ETR estimate in 2011, while none has its highest coefficient in that year.

[11] For example, the star in the upper left-hand corner indicates that the *COUNTRY* coefficients for Australia and China are significantly different at the 5% level; the lack of a star for Australia and Canada shows that their *COUNTRY* coefficients are not statistically different.

Next, we assess whether ETRs vary across industries. To do so, we modify equation (1) to include an interaction between *COUNTRY* and *INDUSTRY*.

$$ETR_{it} = \sum \beta_{0_j} COUNTRY_{it}^{j} + \sum \beta_{1_k} INDUSTRY_{it}^{k} + \sum \beta_{2_{jk}} (COUNTRY_{it}^{j} * INDUSTRY_{it}^{k})$$
$$\sum \beta_{3_m} YEAR_{it}^{m} + \sum \beta_{4_n} SIZE_{it}^{q} + \varepsilon_{it} \qquad (2)$$

We group two-digit SIC codes to ensure that each reported industry has at least 1,000 firm-years. All observations are included in the regressions, but only cells with 20 or more observations are reported. Manufacturers comprise 40% of the firm-years, followed by financial companies at 20%.

Table 5 breaks out the *COUNTRY*, *INDUSTRY*, and *COUNTRY*INDUSTRY* coefficients from estimating equation (2). The *COUNTRY* coefficients are in the far left column identified as the "Country main effect." The *INDUSTRY* coefficients are in the top row column identified as the "Industry main effect." The *COUNTRY*INDUSTRY* coefficients occupy the rest of the table.[12]

With one exception, the *INDUSTRY* coefficients range from -3.2% (Construction) to 5.4% (Information). This suggests that across the globe, on average, Construction is more lightly taxed than other industries and Information is more heavily taxed. The exception to this fairly tight industry band is Transportation at -18.9%. At first blush, this would imply that the Transportation industry is extremely tax-advantaged worldwide compared with other industries. However, the *COUNTRY*INDUSTRY* interactions involving Transportation are uniformly very large and positive, offsetting this large negative main effect. Thus, when both main and interactive effects are jointly considered, the Transportation industry is not an outlier. However,

[12] To get the total ETR impact for a particular industry in a specific country, sum these three coefficients. For example, to compute the ETR impact for the Australian construction industry, sum 19.5% (Australia country main effect), -3.2% (Construction industry main effect) and 8.8% (the *COUNTRY*INDUSTRY* coefficient for Australian Construction for a total ETR effect of 25.1%.

because of the unusual coefficients for the Transportation industry, we ignore it in the remainder of our discussion of Table 5.

The interaction coefficients enable us to see how specific countries vary their taxes across industries, after accounting for the normal worldwide variation captured in the Industry main effect, discussed above. For example, compared with other countries (and ignoring Transportation), the U.S. taxes Information relatively lightly, as shown by a -8.9% interaction term, and taxes Finance relatively heavily, as demonstrated by a 4.9% interaction term. We find striking similarities across countries in the interaction terms. Specifically, we compute the Pearson coefficient correlation using the interaction terms for the six countries with enough firm-years to report coefficients for all industries (i.e., China, Sweden, UK, U.S., Europe and Tax Havens). Despite marked tax and non-tax differences across these six countries, the smallest correlation among the 15 pairs formed by them is 72%, indicating that the interaction terms rise and fall together across industries for these six countries. The U.S. correlations range from 79% (Sweden) to 93% (Europe).

3.3. How Does Expansion into a New Country affect a Multinational's Worldwide ETR?

So far, the paper has looked at the ETR effect of the country in which the multinational establishes its headquarters. We now shift to quantifying the immediate impact on effective tax rates of expanding into a new country through a foreign subsidiary. To assess the immediate impact of the country location of a foreign subsidiary on a multinational's ETR, we regress ETR on categorical variables that identify the countries in which a firm has subsidiaries. Using a firm fixed effects model and a control for year, the regression equation is:

$$ETR_{it} = \sum \beta_{0_i} \gamma_i^n + \sum \beta_{1_j} SUB_{it}^j + \sum \beta_{2_n} YEAR_{it}^q + \varepsilon_{it} \qquad (3)$$

where: SUB_{it}^{j} = an indicator variable equal to 1 if firm *i* reports a subsidiary in country *k*, equal to 0 otherwise;

Because we adopt a firm fixed effects model, maintain the year dummy, and have a sample where the foreign subsidiary locations only change when the multinational expands, the *SUB* coefficient captures the impact on effective tax rates of entering a new country. Therefore, each *SUB* coefficient is the estimated ETR impact in the first year arising from establishing a subsidiary in a particular foreign country.

We use the same sample of 42,738 firm-years from 2006-2011. For these firm-years, there are 224,090 *SUB* variables with a value of one, led by 23,807 subsidiaries in the United States, 16,957 in the United Kingdom, and 10,098 in Germany.

The first column of Table 6 shows the *SUB* regression coefficient estimates for the 48 countries with at least 1000 firm-years where *SUB* has a value of one. Coefficients range from -1.3 for Belgium (implying that multinationals from all countries lower their ETRs by 1.3 percentage points on average when they enter Belgium) to 1.9 for the British Virgin Islands (implying that multinationals increase their ETRs by 1.9 percentage points on average when they enter the British Virgin Islands). Both of these coefficients are significantly different from zero. However, they are the exceptions. Only two other coefficients are significant at the 10% level—Poland at -0.9 and the United States at 0.7, the latter estimate consistent with assertions that the U.S. is a high-tax country. The shortage of statistically significant coefficients is not surprising because the immediate influence of any single subsidiary on a multinational's worldwide tax liability should be small. The net effect of many companies from many countries (plus the normal measurement error that plagues all empirical work) would not be expected to result in

huge percentage point changes in effective tax rates. Nonetheless, we do find the sign and magnitude of the coefficients interesting.

Other countries with particularly large positive coefficients are Portugal (0.9), Sweden (0.9), Romania (0.7), Argentina (0.7) and the UK (0.7). Other locations where foreign subsidiaries appear to substantially lower ETRs are Slovakia (-0.9), Denmark (-0.8), and the Cayman Islands (-0.7), a well-known tax haven. Consistent with establishing a subsidiary in a tax haven leading to a reduction in effective tax rates, the mean (median) coefficient for the countries most commonly identified as tax havens (Bermuda, Cayman Islands, Hong Kong, Ireland, Luxembourg, the Netherlands, Singapore, Switzerland, Taiwan and Other Tax Havens) is slightly negative at -0.2 (-0.1). Surprisingly, however, the *SUB* coefficients are not correlated with the statutory tax rates for these countries, implying that the immediate effect of a foreign subsidiary's statutory tax rate is undone or masked when it is included as part of a multinational's portfolio of locations around the world.

The remainder of Table 6 shows the *SUB* coefficients when the regression is run for subsets based on the headquarters of the multinational.[13] For example, the U.S. column shows the results from equation (3) when the only observations are firm-years for American multinationals. Coefficients vary widely by the domicile of the multinational's parent. By comparing the coefficients across countries, we can see the extent to which ETR impact of a foreign subsidiary fluctuates across countries. For example, the impact appears similar for American, British and German multinationals with positive Pearson correlation coefficients for these three columns of regression estimates. In contrast, both the U.S. and UK columns of coefficients are negatively correlated with the Japanese column of coefficients, implying that establishing a subsidiary for a Japanese company in a particular country has a very different

[13] Coefficients are reported if there are at least 100 firm-years.

immediate impact on effective tax rates than it does for an American or British company. Reviewing a few key tax havens demonstrates the divergence between U.S. and Japanese coefficients: The Hong Kong coefficient for American (Japanese) multinationals is -0.7 (1.8). The Irish coefficient for American (Japanese) multinationals is -0.3 (-3.1). The Singaporean coefficient for American (Japanese) multinationals is zero (-1.7).

3.4. Comparisons of Operating Subsidiaries and Holding Companies

Dyreng et al. (2013) stress that not all subsidiaries are the same. Some house operations; others are financial conduits transporting capital from headquarters to those operating subsidiaries. The remaining tests in the paper distinguish between operating subsidiaries and their corporate shareholders, which may conduct production, marketing, and other nonfinancial activities of the firm, but (principally) serve as financial links between headquarters and the operating subsidiaries. The purpose of these tests is to see if the type of subsidiary affects its impact on effective tax rates.

We anticipate that taxes play a secondary role, if any, in the location of operating subsidiaries. For example, if operating subsidiaries are principally concerned with sales, then demand for the company's products likely drives the site. If the operating subsidiaries are principally for manufacturing, then efficiencies associated with the factors of production likely drive the location. On the other hand, the fungibility of money provides some flexibility in site decisions for holding companies, which merely serve to pass funds from headquarters to operating subsidiaries. Thus, we expect to see the location decisions for at least some financial conduits to be tax-motivated with likely destinations being tax havens and larger countries noted for facilitating tax avoidance, such as the Netherlands.

To compare operating and financial subsidiaries, we use the Dyreng et al. (2013) sample of terminal operating subsidiaries and their immediate corporate shareholders. Unfortunately, their data are limited to American, British, Canadian, French, German, Italian, and Japanese-headquartered multinationals, which nearly halves our sample to 23,004 firm-years. Untabulated sensitivity tests, however, provide some confidence that this smaller sample is representative of the larger sample that we have used to date in this paper.[14]

Table 7 enables us to compare regression coefficient estimates for terminal operating subsidiaries (Panel A) and equity holding companies (Panel B). Specifically, Panel A presents findings from reestimating a modified equation (3), where we assign one to *SUB* only if the firm has a subsidiary in the country that is a terminal subsidiary, i.e., owns stock in no other company. Following Dyreng et al., 2013, we infer that terminal subsidiaries are solely operating subsidiaries because, by definition, they own no other companies. Panel B depicts statistics from reestimating a different modification of equation (3), assigning one to *SUB* only if the firm has a subsidiary in the country that owns a terminal subsidiary. We report countries with at least 500 subsidiaries and coefficients with at least 100 firm-years.

When observing Table 7, we first notice that Panel A reports results for 117,062 terminal operating subsidiaries spread across 48 countries. In contrast, Panel B presents findings for only 37,517 equity holding companies in 18 countries. Furthermore, 14% of the operating subsidiaries are located in tax havens and larger countries associated with international tax planning (specifically, Hong Kong, Ireland, Netherlands, Singapore or Switzerland), significantly less than the 18% of the financial conduits found in those countries. This is

[14] To assess the impact of the smaller sample on our analyses, we reestimate equation (3) using the reduced sample. When we compare results using the complete sample of 42,738 observations from Table 6 with results using the sample of only 23,004 firm-years, we find the two columns of regression coefficients for American multinationals is correlated at the 97% level, suggesting inferences are largely the same using the smaller sample.

consistent with real operations occurring throughout the world wherever business opportunities arise with less concern for taxes, while financial conduits are more likely to be concentrated in countries that can facilitate tax-efficient cash transfer along the company's equity supply chain (see discussion in Dyreng et al., 2013). For example, a multinational might set up an equity holding company in the Netherlands for all of its European operating subsidiaries because Dutch holding companies enjoy certain advantages in global cash management. In our data, the Dutch holding company would appear as a single observation in Panel B, while each of the operating companies in the different European countries would show up as separate observations in Panel A.

Recognizing the financial conduit specialization in certain countries, we now turn to the more relevant question for this inquiry, namely, do coefficients vary depending on whether the subsidiary is an operating company or a holding company? To test this question, we compute the Pearson correlation coefficient for the columns of coefficients in Panel A and Panel B. Using all firm-years, the correlation coefficient is -0.01, implying that the immediate ETR impact of an operating subsidiary in a country is unrelated to the immediate impact of a financial conduit in the same country.

When we restrict the correlation test to multinationals headquartered in specific countries, we find conflicting results. For American multinationals, the Pearson correlation coefficient is negative (-0.21), suggesting that operating and financial subsidiaries immediately affect ETRs in opposite directions. For example, establishing an operating company in Luxembourg for an American multinational results in an immediate 0.7 percentage point ETR boost, on average; whereas, a financial intermediary in Luxembourg immediately drives down ETRs by 2.1 percentage points. We also find negative correlations for France (-0.18) and Germany (-0.75).

However, the sign is positive for Japan (0.27) and the UK (0.59), suggesting that operating and financial subsidiaries affect ETR similarly in the first year in those countries. We infer from these results that in at least some countries the immediate tax effects of locating a subsidiary in a country vary substantially depending on whether the subsidiary is an operating company or a financial conduit. The takeaway is that focusing simply on where a multinational has its subsidiaries may be insufficient to understand the immediate ETR impact of a country; rather, it may be necessary to know the type of subsidiary that is being deployed.

Next, we estimate the following regression to identify individual countries where subsidiary type matters:

$$ETR_{it} = \sum \beta_{0_i} \gamma_i^n + \sum \beta_{1_j} SUB_{it}^j + \sum \beta_{1_j} HOLD_{it}^k + \sum \beta_{2_n} YEAR_{it}^q + \varepsilon_{it} \qquad (4)$$

where *HOLD* is one if the firm has an equity holding subsidiary. Significant *HOLD* coefficients will indicate that the immediate ETR impact for a subsidiary varies whether the subsidiary is a financial conduit or a terminal holding company. In untabulated results, we find that the *HOLD* coefficient is significantly greater than zero for three countries (Brazil, Spain, and the United States) and significantly less than zero for five countries (Australia, Cayman Islands, Finland, Luxembourg, and Poland). Note that two of the countries with negative *HOLD* coefficients, the Cayman Islands and Luxembourg, are tax havens, suggesting that these countries are effective locations for establishing financial conduits that can lead to immediate effective tax rate reductions.

The final set of tests introduces an interaction between types of subsidiaries that enables us to examine each of the subsidiary components by estimating the following equation:

$$ETR_{it} = \sum \beta_{0_i} \gamma_i^n + \sum \beta_{1_j} HOLD_{it}^j + \sum \beta_{2_k} OPERATE_{it}^k + \sum \beta_{3_{jk}} (HOLD_{it}^j * OPERATE_{it}^k)$$

$$+\sum \beta_{4_n} YEAR_{it}^{q} + \varepsilon_{it} \qquad (5)$$

OPERATE is one if the firm has a terminal subsidiary, and its coefficients capture the main effect for operating companies, i.e., the impact in the first year of establishing a holding company in the country. The *HOLD* coefficients capture the main effect for financial conduits, i.e., the impact in the first year of establishing a holding company in the country. The interaction's coefficients capture the joint effect on ETRs in the first year of having both the operating and the holding company.[15]

Although Table 8 only reports interactions if there are at least 500 firm-years, there remain far too many to detail here. For brevity, we leave them for the reader to peruse. We close by noting that the most negative *HOLD* coefficients are for tax havens: Other Tax Havens (-5.5), the Netherlands (-3.1), and Luxembourg (-2.5).[16] This is consistent with tax havens being a highly desirable location for equity holding companies. Of course, using this same logic, we might have expected Ireland and Switzerland to have had negative *HOLD* coefficients, but neither does. The U.S. has a positive coefficient (2.8), consistent with its reputation as a lousy base for global expansion because of its worldwide tax system. Nonetheless, many companies have American holding companies. As with much of the documentation in this paper, the findings raise as many questions as they answer. We look forward to future work, both theoretical and empirical, that furthers our understanding of how multinationals undertake efficient international tax planning.

[15] Note that the interaction is one even if the conduit does not hold stock in that particular operating company. For example, suppose a firm has a holding company in the Netherlands and an operating company in China. The interaction of China and the Netherlands is one even if the Dutch holding company does not own the stock of the Chinese operations.

[16] These coefficients can be interpreted as: ETRs average 5.5 (3.1) [2.5] percentage points less for companies that have an equity holding company located in one of the small tax havens not specifically identified (Netherlands) [Luxembourg].

4. Closing Remarks

This paper extends our understanding of the impact of country location on effective tax rates. It updates prior work with more recent financial statement information, provides the first estimates of the immediate ETR impact of entering a new country, and explores differences in the tax impact of financial and operating subsidiaries. The empirical documentation should benefit policymakers, practitioners, and researchers who wrestle with the complex issues surrounding international tax policy.

Our principal findings include:

- Despite enormous investments in tax planning designed to flatten the differences in taxes across countries, the tax domicile of a company appears to be a major determinant of a firm's worldwide effective tax rate. Major differences persist in the ETRs of multinationals simply because their parents reside in different countries. For example, establishing headquarters in Japan, rather than Singapore, results in a 17 percentage point increase in a firm's ETR. Yet, Japanese companies continue to compete favorably against Singaporean and other companies located in much more tax-favorable domiciles. The same is true for American multinationals (whose ETRs are second only to Japan's). This persistence of widely divergent ETRs deserves further investigation.
- Effective tax rates were stable from 2006-2011. This stands in contrast to studies of earlier periods that had documented a steady worldwide decline in ETRs.
- Compared with the rest of the world, the U.S. taxes financial firms more heavily and the information sector more lightly.
- When a multinational enters a tax haven for the first time, its ETR usually declines slightly.

- The tax impact of entering a new country through a subsidiary differs depending on whether the subsidiary is an equity holding company or an operating company.

We close by repeating two caveats. This paper relies on the tax information in the financial statements, not actual tax return data. To the extent the accounting data poorly capture a firm's actual tax activities, we measure with error. The same criticisms can be made about our reliance on accounting disclosures for determining the tax domicile of the firm and its portfolio of subsidiaries. If the financial statements are a poor lens through which to observe these aspects of the company, our inferences could be misleading. On the positive side, the extensive aggregation in this paper should mitigate any firm-level measurement error. Nonetheless, readers should interpret these findings with caution.

Second, as discussed above, our statistical tests of the effect of headquarters on ETRs are potentially flawed because of identification problems that plague cross-country comparisons. Although some companies have changed the headquarters country and in fact inversions and similar locations are a partial motivation of this paper, too few have done so to provide us with enough power to conduct tests that would better specify causal links. Thus, once again, readers should be cautious. These problems should not affect our analyses of foreign subsidiaries because companies often change the location of their foreign subsidiaries and in fact the movement into new countries is the source of variation that we exploit in our tests of foreign subsidiaries.

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Table 1

Country/Group	N	Revenue	Assets	Equity	Pretax Income	ETR	Statutory rate
FULL SAMPLE	42,738	3,701	12,222	1,994	371	25%	36%
AUSTRALIA	1,562	2,123	10,765	1,422	324	22%	30%
CANADA	617	3,216	17,766	3,069	599	23%	32%
CHINA	2,523	1,114	7,072	743	150	21%	27%
FRANCE	1,072	6,873	10,179	3,461	662	28%	33%
GERMANY	1,210	6,564	30,978	2,857	458	26%	33%
INDIA	592	1,162	3,874	745	177	22%	34%
JAPAN	3,704	6,516	18,830	3,020	361	38%	41%
SINGAPORE	519	992	6,837	1,055	173	17%	18%
SOUTH AFRICA	484	2,255	6,930	1,194	317	28%	35%
SOUTH KOREA	1,215	4,702	8,389	1,757	320	24%	25%
SWEDEN	1,073	1,787	10,450	1,162	202	21%	27%
SWITZERLAND	677	5,200	30,658	3,379	551	19%	21%
TAIWAN	1,486	1,577	4,212	804	116	19%	22%
UNITED KINGDOM	4,309	3,087	13,891	1,626	352	20%	29%
UNITED STATES	13,234	4,486	10,948	2,338	459	28%	39%
AFRICA	92	6,617	4,533	717	3,925	25%	30%
ASIA	427	795	5,355	784	152	24%	31%
EUROPE	4,346	3,671	17,739	2,292	395	24%	27%
LATIN AMERICA	585	2,334	5,320	1,444	368	24%	29%
MIDDLE EAST	753	815	5,567	895	138	14%	27%
TAX HAVENS	2,258	1,447	4,040	1,150	196	16%	10%

Notes: This table presents the means of the variables by country/group. All figures are in millions of U.S. dollars. ETR = total tax expense/pretax income. Statutory rate is the weighted average maximum corporate rate for the group, weighted by number of observations.

Table 2

	N	Estimate
AdjR 2		0.80
N		42,738
AUSTRALIA	1,562	17.8
CANADA	617	17.5
CHINA	2,523	16.3
FRANCE	1,072	21.7
GERMANY	1,210	20.6
INDIA	592	17.1
JAPAN	3,704	30.4
SINGAPORE	519	13.0
SOUTH AFRICA	484	20.6
SOUTH KOREA	1,215	18.2
SWEDEN	1,073	16.6
SWITZERLAND	677	13.1
TAIWAN	1,486	14.6
UNITED KINGDOM	4,309	16.2
UNITED STATES	13,234	21.9
AFRICA	92	19.3
ASIA	427	18.5
EUROPE	4,346	17.9
LATIN AMERICA	585	17.1
MIDDLE EAST	753	9.4
TAX HAVENS	2,258	11.1
Asset rank		(0.1)
Equity rank		0.0
Sales rank		0.2
NAICS 11		(1.7)
NAICS 21		(3.1)
NAICS 22		1.3
NAICS 23		0.7
NAICS 31		0.2
NAICS 32		(3.4)
NAICS 33		(2.7)
NAICS 42		0.6
NAICS 44		0.9
NAICS 45		0.7
NAICS 48		(2.9)
NAICS 49		1.3
NAICS 51		(1.8)
NAICS 52		1.8
NAICS 53		0.5
NAICS 54		0.6
NAICS 56		1.1
NAICS 61		5.0
NAICS 62		2.5
NAICS 71		(1.7)
NAICS 81		6.7
NAICS 99		(2.1)
2006		0.5
2007		0.3
2009		(0.3)
2010		(0.8)
2011		(0.6)

$$ETR_{it} = \sum \beta_{0_j} COUNTRY_{it}^{j} + \sum \beta_{1_k} INDUSTRY_{it}^{k} + \sum \beta_{2_m} YEAR_{it}^{m} + \sum \beta_{3_n} SIZE_{it}^{q} + \varepsilon_{it} \qquad (1)$$

Notes: This table reports the results of estimating Equation (1) on the full sample. Asset rank (Sales rank) [Equity rank] is the percentile rank of the amount of total assets (operating revenue) [shareholders' equity] reported by the multinational in the year. The excluded industry is NAICS industry is 72 (Accommodation and Food Service). The excluded year is 2008. These were selected to be excluded because they had the median mean ETR by respective grouping.

Table 3

	CANADA	CHINA	FRANCE	GERMANY	INDIA	JAPAN	SINGAPORE	SOUTH AFRICA	SOUTH KOREA	SWEDEN	SWITZERLAND	TAIWAN	UNITED KINGDOM	UNITED STATES	AFRICA	ASIA	EUROPE	LATIN AMERICA	MIDDLE EAST	TAX HAVENS
AUSTRALIA		*	*	*		*	*	*			*	*	*	*					*	*
CANADA			*	*		*	*	*			*	*		*					*	*
CHINA			*	*		*	*	*	*		*	*		*	*		*		*	*
FRANCE					*	*	*		*	*	*	*	*			*	*	*	*	*
GERMANY					*	*	*		*	*	*	*	*	*			*	*	*	*
INDIA						*	*	*			*	*		*					*	*
JAPAN							*	*	*	*	*	*	*	*	*	*	*	*	*	*
SINGAPORE								*	*	*			*	*	*	*	*	*	*	*
SOUTH AFRICA									*	*	*	*	*				*	*	*	*
SOUTH KOREA											*	*	*	*					*	*
SWEDEN											*	*		*					*	*
SWITZERLAND												*	*	*	*	*	*	*	*	*
TAIWAN													*	*	*	*	*	*	*	*
UNITED KINGDOM														*	*		*		*	*
UNITED STATES															*	*	*	*	*	*
AFRICA																			*	*
ASIA																			*	*
EUROPE																			*	*
LATIN AMERICA																			*	*
MIDDLE EAST																				

$$ETR_{it} = \sum \beta_{0_j} COUNTRY_{it}^{j} + \sum \beta_{1_k} INDUSTRY_{it}^{k} + \sum \beta_{2_m} YEAR_{it}^{m} + \sum \beta_{3_n} SIZE_{it}^{q} + \varepsilon_{it} \qquad (1)$$

Notes: This table presents the results of F-tests comparing the estimates of the β_0s generated by estimating Equation (1) on the full sample.
* in a cell indicates that the row β_0 and the column β_0 are statistically different at the 5% significance level.

Table 4

	2006	2007	2008	2009	2010	2011
AdjR 2	0.82	0.82	0.79	0.78	0.80	0.80
N	7,268	7,419	6,880	7,044	7,190	6,937
AUSTRALIA	19	21	19	21	21	17
CANADA	20	20	19	21	20	17
CHINA	20	21	18	20	18	15
FRANCE	23	25	23	26	25	22
GERMANY	23	25	21	23	23	20
INDIA	17	20	18	22	20	19
JAPAN	33	36	31	33	32	31
SINGAPORE	14	17	16	16	15	12
SOUTH AFRICA	21	23	21	25	25	21
SOUTH KOREA	19	23	21	21	20	18
SWEDEN	18	19	18	19	20	17
SWITZERLAND	15	17	15	15	17	14
TAIWAN	14	17	18	20	17	15
UNITED KINGDOM	17	19	18	20	19	14
UNITED STATES	24	26	23	26	25	21
AFRICA	22	18	18	26	25	22
ASIA	18	22	22	23	22	18
EUROPE	20	21	20	22	21	17
LATIN AMERICA	17	19	19	24	21	18
MIDDLE EAST	11	10	10	15	15	11
TAX HAVENS	11	13	13	16	14	13

$$ETR_{it} = \sum \beta_{0_j} COUNTRY_{it}^{j} + \sum \beta_{1_k} INDUSTRY_{it}^{k} + \sum \beta_{2_m} YEAR_{it}^{m} + \sum \beta_{3_n} SIZE_{it}^{q} + \varepsilon_{it} \qquad (1)$$

Notes: This table presents the results of estimating Equation (1) on separate samples for each year. Each cell reports the estimate of β_0 for each country/group.

Table 5

	Country main effect	Construction	Finance	Information	Manufacturing	Mining	Professional	Real Estate	Retail Trade	Transportation
Industry main effect		(3.2)	(1.6)	5.4	(1.3)	(2.7)	3.9	(3.1)	(1.0)	(18.9)
AUSTRALIA	19.5	8.8	4.1	(5.2)	(1.3)	(8.0)	(0.3)		4.8	21.2
CANADA	21.5		(2.3)	(11.9)	(7.8)	1.9	(5.6)			12.6
CHINA	18.3	8.0	(2.6)	(15.5)	(3.1)	4.4	(9.5)	10.8	4.2	16.9
FRANCE	24.6	4.7		(7.5)	(2.1)		(5.5)	(8.1)	(2.9)	9.5
GERMANY	20.9		(2.2)	(6.4)	1.0		(2.4)	3.0		
INDIA	21.5		4.6	(13.7)	(2.2)		(14.4)			
JAPAN	33.0	2.4	1.6	(6.6)	(2.9)		(1.6)	3.4	0.2	17.9
SINGAPORE	14.4	(0.4)	1.3		0.9	(1.8)	(4.3)			19.7
SOUTH AFRICA	21.9									
SOUTH KOREA	19.0	5.8	1.3	(10.2)	(0.3)		(0.9)		2.5	14.0
SWEDEN	19.4	2.9	(2.2)	(10.4)	(3.3)	4.1	(4.6)	4.5	(2.4)	
SWITZERLAND	11.1		3.3	(6.0)	3.2		1.1	12.0	0.2	25.1
TAIWAN	18.9	(4.6)	(0.3)		(3.8)		(7.5)		(2.5)	11.3
UNITED KINGDOM	16.5	4.5	2.9	(7.8)	1.1	(2.0)	(2.7)	4.3	1.6	17.8
UNITED STATES	24.3	0.8	4.9	(8.9)	(3.8)	1.4	(5.9)	3.3	(0.5)	15.7
AFRICA	16.3		9.2							
ASIA	14.9		11.6		2.2					
EUROPE	18.8	1.9	2.7	(4.8)	(0.5)	2.3	(0.3)	3.2	1.5	17.5
LATIN AMERICA	20.2	7.3	(2.6)	(9.4)	(0.2)				(1.1)	10.7
MIDDLE EAST	7.7	(0.0)	12.8	(3.9)	0.2		(2.8)	3.4		18.1
TAX HAVENS	12.2	8.2	2.3	(9.4)	0.6	(0.9)	(4.1)	2.6	4.1	12.6

$$ETR_{it} = \sum \beta_{0_j} COUNTRY_{it}^{j} + \sum \beta_{1_k} INDUSTRY_{it}^{k} + \sum \beta_{2_{jk}} \left(COUNTRY_{it}^{j} * INDUSTRY_{it}^{k}\right) + \sum \beta_{3_m} YEAR_{it}^{m} + \sum \beta_{4_n} SIZE_{it}^{q} + \varepsilon_{it} \qquad (2)$$

Notes: This table reports the results of estimating Equation (2) on the full sample. The first column reports the β_0 for each country. The top row reports the β_1 for each industry. Each cell reports the estimate of $\beta_2$for the given country in the given industry. All firm-years were included in the regression. Estimates are reported for country-industries with 20 or more observations.

Table 6

	All	Australia	France	Germany	Japan	Singapore	South Korea	Sweden	Switzerland	Taiwan	UK	US	Europe	Tax Havens
AdjR 2	0.65	0.72	0.62	0.58	0.45	0.52	0.53	0.66	0.61	0.49	0.65	0.65	0.56	0.60
N	42,738	1,562	1,072	1,210	3,704	519	1,215	1,073	677	1,486	4,309	13,234	4,346	2,258
ARGENTINA	0.7	.	2.8	1.4	3.0	.	.	.	.	.	3.9	0.0	1.2	.
AUSTRALIA	0.4	0.6	(8.3)	2.2	(3.1)	.	.	3.4	0.7	.	0.2	0.7	1.7	(0.1)
AUSTRIA	0.5	.	(0.1)	0.7	4.4	.	.	(6.9)	(3.3)	.	0.2	(0.8)	2.4	.
BELGIUM	(1.3)	.	(0.9)	(0.5)	(1.5)	.	.	4.6	(3.5)	.	(0.9)	0.4	(3.2)	.
BERMUDA	(0.4)	.	.	.	.	.	.	.	.	.	4.0	0.3	.	2.0
BRAZIL	0.2	.	(2.0)	(2.0)	(0.1)	.	.	(5.6)	0.5	.	(0.7)	0.3	0.1	.
BRITISH VIRGIN ISLANDS	1.9	.	.	.	.	.	.	.	.	0.3	3.4	0.8	.	(1.0)
CANADA	0.3	(0.0)	(2.8)	2.8	0.7	.	.	(3.9)	1.3	.	(1.8)	(0.2)	1.9	6.6
CAYMAN ISLANDS	(0.7)	.	.	.	.	.	.	.	.	2.2	(1.0)	(1.8)	(0.1)	2.8
CHILE	(0.2)	.	(4.4)	.	.	.	.	.	.	.	(4.8)	(0.2)	0.8	.
CHINA	0.3	(3.2)	(3.3)	0.4	0.5	(0.6)	.	(1.9)	(0.3)	.	0.0	(0.3)	(1.5)	1.4
CZECH REPUBLIC	0.2	.	(0.1)	0.8	0.9	.	.	2.3	2.2	.	1.2	(0.4)	(0.2)	.
DENMARK	(0.8)	.	(6.3)	(1.3)	1.5	.	.	1.3	1.3	.	(2.4)	(0.5)	(0.2)	.
FINLAND	0.0	.	3.1	.	2.8	.	.	1.2	1.0	.	0.2	(0.2)	(1.2)	.
FRANCE	0.3	0.6	(1.8)	1.6	0.9	.	.	(1.6)	0.3	.	2.0	0.3	(0.2)	0.5
GERMANY	(0.4)	(2.4)	(1.0)	4.4	(1.0)	.	0.9	(6.9)	0.8	2.7	(1.5)	0.2	0.1	(1.1)
GREECE	0.4	.	(4.1)	.	.	.	.	.	.	.	(1.6)	(1.4)	7.7	.
HONG KONG	(0.3)	(0.1)	1.1	1.2	1.8	(3.5)	.	0.1	(7.2)	.	(1.3)	(0.7)	0.2	0.3
HUNGARY	0.2	.	(3.8)	(0.4)	2.0	.	.	(5.7)	10.0	.	1.1	0.1	(2.0)	.
INDIA	(0.2)	.	(3.1)	1.1	(1.8)	.	.	(1.8)	0.3	.	(0.8)	0.3	(1.5)	.
INDONESIA	0.1	(0.7)	8.9	.	(0.8)	0.7	.	.	.	.	(3.6)	(1.8)	(1.0)	(3.5)
IRELAND	0.1	(1.5)	4.9	(2.7)	(3.1)	.	.	2.7	4.7	.	1.2	0.3	0.8	(0.3)
ITALY	(0.0)	.	4.1	(3.3)	(1.8)	.	.	0.7	(1.3)	.	0.9	(0.1)	0.6	.
JAPAN	(0.5)	.	3.9	(5.5)	0.3	.	.	4.0	(3.7)	.	0.1	(0.2)	(1.6)	.
LUXEMBOURG	0.0	.	3.6	1.8	.	.	.	.	(2.3)	.	(0.7)	0.1	(0.4)	3.1
MALAYSIA	0.2	0.6	(3.7)	(5.5)	(1.4)	6.4	.	.	(5.3)	.	6.6	1.2	(1.4)	0.9
MEXICO	(0.3)	.	1.6	(3.9)	(0.4)	.	.	.	(9.8)	.	(1.4)	0.1	1.7	.
NETHERLANDS	0.0	2.6	(6.8)	4.0	(0.1)	.	.	(0.1)	1.3	3.5	(0.1)	0.5	(0.5)	(2.6)
NEW ZEALAND	0.1	2.3	.	.	(1.7)	.	.	.	(6.6)	.	(1.1)	(0.4)	3.3	.
NORWAY	(0.5)	.	(2.2)	(7.6)	.	.	.	(0.6)	2.2	.	(0.3)	(1.5)	(0.9)	.
PHILIPPINES	(0.5)	.	10.2	.	3.2	.	.	.	.	.	(3.1)	(1.9)	0.9	.
POLAND	(0.9)	.	(3.7)	1.4	2.2	.	.	(2.1)	(0.6)	.	(1.8)	(1.1)	(0.4)	.
PORTUGAL	0.9	.	5.1	6.8	3.5	.	.	.	(0.8)	.	1.1	1.0	0.4	.
ROMANIA	0.7	.	2.3	3.9	.	.	.	.	.	.	0.9	1.8	(0.3)	.
RUSSIAN FEDERATION	(0.5)	.	(0.3)	(2.6)	1.0	.	.	(0.2)	0.9	.	(1.7)	(0.1)	(0.8)	.
SINGAPORE	0.0	(4.5)	(1.5)	4.0	(1.7)	(3.1)	.	5.7	0.2	.	1.6	0.0	0.8	0.8
SLOVAKIA	(0.9)	.	(4.8)	(3.6)	.	.	.	.	.	.	.	0.7	0.0	.
SOUTH AFRICA	(0.1)	.	(0.3)	3.9	(2.2)	.	.	.	(0.2)	.	(0.2)	0.5	(3.2)	.
SOUTH KOREA	0.1	.	4.0	6.3	0.8	.	(3.3)	.	9.7	.	0.7	(0.1)	(2.9)	.
SPAIN	(0.1)	.	(6.2)	(2.8)	0.1	.	.	(0.7)	6.2	.	(0.9)	(1.0)	2.5	(3.9)
SWEDEN	0.9	.	7.2	(0.3)	0.3	.	.	(12.0)	(3.3)	.	0.1	0.9	0.4	.
SWITZERLAND	(0.4)	.	1.8	(1.0)	(1.1)	.	.	3.1	(6.7)	.	(2.2)	0.4	(0.5)	(1.2)
TAIWAN	(0.2)	.	.	0.1	0.2	.	.	.	7.7	0.5	0.6	(1.4)	0.2	.
THAILAND	(0.2)	.	6.2	1.9	(1.8)	.	.	.	2.5	.	0.8	0.5	3.0	.
TURKEY	(0.6)	.	(7.1)	0.3	.	.	.	.	(1.5)	.	3.8	(0.9)	(2.7)	.
UNITED KINGDOM	0.7	(0.3)	3.0	0.6	(3.4)	6.4	(2.6)	3.0	(3.7)	7.3	12.6	0.6	0.6	1.2
UNITED STATES	0.7	(1.5)	(1.7)	2.0	(0.1)	(0.5)	(3.6)	0.6	(1.1)	2.4	0.1	0.7	0.4	1.3
OTHER TAX HAVENS	(0.1)	1.9	(1.0)	5.5	.	.	.	.	2.5	.	(0.6)	0.1	(0.6)	(1.6)

$$ETR_{it} = \sum \beta_{0_i} \gamma_i^n + \sum \beta_{1_j} SUB_{it}^j + \sum \beta_{2_n} YEAR_{it}^q + \varepsilon_{it} \qquad (3)$$

Notes: This table reports the results of estimating Equation (3) on the sample of multinationals described in the column heading. Each cell reports the β_1 for each country.

Table 7, Panel A

	All	Canada	France	Germany	Italy	Japan	UK	US
AdjR2	0.65	0.76	0.62	0.56	0.68	0.45	0.64	0.65
N	23,004	551	980	1,126	372	3,641	4,018	12,303
ARGENTINA	0.8	.	5.2	.	.	.	3.3	(0.5)
AUSTRALIA	0.3	.	(8.6)	1.9	.	(0.2)	(0.9)	1.7
AUSTRIA	0.1	.	2.0	(1.2)	.	5.4	3.3	(1.4)
BELGIUM	(0.4)	.	1.6	(3.0)	.	(0.8)	(0.4)	(0.2)
BERMUDA	0.2	.	.	.	.	.	.	0.6
BRAZIL	0.6	.	2.5	0.4	.	0.1	(0.5)	0.7
CANADA	0.5	1.5	1.6	3.6	.	0.6	(1.8)	0.5
CHILE	(1.8)	.	(12.4)	.	.	.	(6.6)	(1.3)
CHINA	(0.1)	.	(3.1)	(1.9)	.	(0.7)	1.3	(0.4)
COLOMBIA	3.0	.	7.0	.	.	.	.	2.5
CZECH REPUBLIC	0.2	.	(2.3)	4.0	.	0.7	2.0	(0.4)
DENMARK	(0.9)	.	(5.5)	.	.	5.4	(2.2)	(1.1)
FINLAND	0.3	.	3.5	.	.	3.1	(0.5)	0.1
FRANCE	0.8	.	0.3	4.4	2.9	0.3	2.2	0.6
GERMANY	(0.2)	.	(2.8)	0.6	(0.1)	(1.7)	(1.6)	0.7
GREECE	(2.2)	.	(8.1)	.	.	.	.	(4.5)
HONG KONG	(0.6)	.	0.7	(0.7)	.	1.8	(1.7)	(0.6)
HUNGARY	0.7	.	(0.9)	(3.8)	.	2.2	(0.1)	2.8
INDIA	0.5	.	2.0	4.7	.	(0.7)	(0.4)	0.8
INDONESIA	0.5	.	11.2	.	.	(0.5)	.	.
IRELAND	1.0	.	6.1	(3.3)	.	2.5	2.3	0.7
ITALY	(0.1)	.	2.1	(1.4)	(7.5)	(1.6)	0.8	(0.4)
JAPAN	(0.7)	.	4.0	.	.	0.3	(0.6)	(0.3)
LUXEMBOURG	0.6	.	0.5	2.6	6.5	.	(1.1)	0.7
MALAYSIA	0.1	.	(0.1)	(5.5)	.	(2.1)	8.4	(0.1)
MEXICO	0.4	.	(0.8)	(10.5)	.	0.2	(2.6)	0.4
NETHERLANDS	(0.5)	.	0.5	(2.9)	.	0.6	(0.5)	(0.4)
NEW ZEALAND	0.3	.	.	.	.	.	0.2	0.1
NORWAY	(0.4)	.	(3.8)	.	.	.	0.9	(0.5)
PERU	(0.1)	.	.	.	.	.	.	(1.4)
PHILIPPINES	(1.2)	.	.	.	.	3.1	.	(3.7)
POLAND	(0.4)	.	(0.8)	1.1	.	1.5	(1.4)	(1.2)
PORTUGAL	1.5	.	5.0	4.7	.	.	3.1	0.6
ROMANIA	0.4	.	(1.8)	2.7	.	.	(0.4)	2.3
RUSSIAN FEDERATION	(0.7)	.	0.6	(6.1)	.	(0.2)	(2.6)	0.7
SINGAPORE	0.1	.	(0.3)	5.3	.	(1.5)	0.9	0.3
SLOVAKIA	(1.6)	.	(4.2)	3.4	.	.	.	(0.2)
SOUTH AFRICA	0.4	.	2.5	16.8	.	(5.1)	(2.1)	0.8
SOUTH KOREA	0.3	.	(4.5)	(0.7)	.	1.1	0.1	0.2
SPAIN	(0.8)	.	(0.9)	(6.8)	(3.6)	2.0	(1.8)	(1.3)
SWEDEN	1.0	.	4.4	1.1	.	(0.3)	2.1	0.8
SWITZERLAND	(0.7)	.	2.2	.	.	(0.6)	(2.7)	(0.8)
TAIWAN	(0.6)	.	.	.	.	(0.3)	0.9	(1.8)
THAILAND	0.0	.	(0.8)	0.2	.	(2.0)	(1.3)	1.9
TURKEY	0.2	.	(8.8)	0.4	.	.	.	(1.6)
UNITED ARAB EMIRATES	(0.3)	.	.	.	.	.	0.5	0.6
UNITED KINGDOM	0.2	3.8	0.8	(0.5)	(1.4)	(3.3)	4.0	0.3
UNITED STATES	(0.1)	(5.4)	(1.1)	3.7	(0.0)	(0.8)	(0.5)	0.4
VENEZUELA	2.0	.	.	.	.	.	.	0.3
OTHER TAX HAVENS	0.2	.	(2.5)	(4.5)	.	1.7	0.6	0.4

$$ETR_{it} = \sum \beta_{0_i} \gamma_i^n + \sum \beta_{1_j} OPERATE_{it}^j + \sum \beta_{2_n} YEAR_{it}^q + \varepsilon_{it} \qquad (3a)$$

Notes: This table reports the results of estimating Equation (3a) on the sample of multinationals described in the column heading. Each cell reports the β_1 for each country.

Table 7, Panel B

	All	Canada	France	Germany	Italy	Japan	UK	US
AdjR2	0.65	0.75	0.58	0.53	0.60	0.43	0.63	0.65
N	23,004	551	980	1,126	372	3,641	4,018	12,303
AUSTRALIA	(1.7)	.	.	.		(8.6)	(1.0)	(0.9)
BELGIUM	0.2	.	0.6	.		(1.6)	1.3	1.0
BRAZIL	3.3	.	.	.	.	.		3.0
CANADA	0.5	6.0	(1.5)	.	.		1.8	0.2
FRANCE	1.0	.	1.9	(7.2)	.	1.4	4.0	1.0
GERMANY	0.4	.	3.1	(0.5)	.	2.0	0.4	0.6
IRELAND	1.1	.	.	.	.		3.0	0.6
ITALY	(0.1)	.	2.4	4.6	0.2	.	.	(0.1)
JAPAN	0.5	.	.	.		1.0	.	0.9
LUXEMBOURG	(2.3)	.	.	.	.		(4.0)	(2.1)
MEXICO	0.3	.	.	.	.	.		1.5
NETHERLANDS	(0.0)	.	(9.6)	2.9	.	2.3	(1.8)	0.2
SPAIN	2.3	.	6.5	4.0	.	.	(0.6)	0.8
SWEDEN	0.9	.	1.1	.	.	.	6.7	(2.3)
SWITZERLAND	(0.0)	.	(3.1)	.	.	.		0.3
UNITED KINGDOM	(0.4)	.	(5.2)	(2.7)	.	(4.1)	1.5	0.3
UNITED STATES	1.1	4.0	(1.5)	(0.0)	(26.9)	2.9	0.7	1.1
OTHER TAX HAVENS	(1.2)	.	.	.	.		0.3	(2.0)

$$ETR_{it} = \sum \beta_{0_i} \gamma_i^n + \sum \beta_{1_j} HOLD_{it}^j + \sum \beta_{2_n} YEAR_{it}^q + \varepsilon_{it} \qquad (3b)$$

Notes: This table reports the results of estimating Equation (3b) on the sample of multinationals described in the column heading. Each cell reports the β_1 for each country.

Table 8

	Main effect for terminals	Australia	Belgium	Canada	France	Germany	Ireland	Italy	Japan	Luxembourg	Netherlands	Spain	Sweden	Switzerland	UK	US	Other Tax Havens
Main effect for holds		**(2.4)**	**3.2**	**3.3**	**0.4**	**(0.5)**	**4.3**	**5.9**	**0.2**	**(2.5)**	**(3.1)**	**7.1**	**(1.7)**	**2.9**	**1.0**	**2.8**	**(5.5)**
ARGENTINA	(0.1)				5.8	(4.0)					2.1	(2.0)			0.3	(1.0)	(0.2)
AUSTRALIA	1.1	4.0	(2.1)	(1.2)	(1.7)	(1.5)	0.7	2.6			(1.2)	0.3	0.0	2.9	0.5	(0.9)	1.2
AUSTRIA	0.2				(2.5)	(1.1)					1.1	2.1			3.5	(4.6)	
BELGIUM	(0.6)		3.8	0.4	(4.6)	(1.3)	4.0	(0.5)			1.1	1.7			(0.1)	0.1	2.7
BERMUDA	(2.2)														2.7	1.9	
BRAZIL	(0.3)	2.6	(0.6)	0.9	(0.4)	2.7	(0.1)	(0.2)	0.6	0.3	(2.3)	2.3		(0.6)	(0.7)	(0.1)	1.2
CANADA	1.7	0.3	(3.3)	0.8	(1.8)	(0.1)	1.5	2.0	(1.5)	1.4	1.8	(0.4)	0.1	1.3	(1.0)	(2.1)	1.2
CHILE	(4.1)				(5.7)	2.9					1.3				3.1	0.5	
CHINA	(0.3)	(3.1)	1.4	(0.0)	(1.0)	1.7		3.3	2.1		(2.2)	0.6		(2.8)	2.0	(0.7)	0.6
COLOMBIA	10.5										(2.1)				(2.2)	(3.6)	
CZECH REPUBLIC	0.2				(1.9)	0.2					(1.7)	1.1			(3.1)	1.5	
DENMARK	(4.3)				1.8	2.3					0.5				2.8	(1.1)	
FINLAND	0.1				2.2	(0.1)					0.9				1.1	(0.8)	
FRANCE	0.8	(4.3)	(1.7)	0.6	2.8	1.3	0.6	(1.4)		(1.5)	(0.5)	0.1	(3.8)	(1.6)	(2.5)	2.6	(2.7)
GERMANY	0.2	(1.5)	(1.2)	1.6	(0.2)	(0.2)	2.4	(2.8)	(1.7)	(1.7)	1.0	2.7	3.0	1.6	(1.5)	0.3	0.7
HONG KONG	(1.1)				2.3	1.9					1.2				(1.3)	0.6	
HUNGARY	2.3				(0.0)	(3.5)					(1.2)				1.8	(1.2)	
INDIA	(2.1)				2.7	(0.9)					(0.3)				1.3	2.4	
IRELAND	2.6			(0.8)	0.1	(0.1)	(2.0)	0.4			(1.3)	(1.3)			0.1	(0.7)	0.5
ITALY	(1.6)	(0.0)	0.8	(0.3)	2.9	0.5		(0.3)			1.4	0.7		(0.5)	1.3	(1.4)	(0.8)
JAPAN	(0.9)	(0.9)	(0.8)	1.2	1.6	1.5			(0.8)		0.0	1.7			(0.2)	0.7	(3.4)
LUXEMBOURG	(0.7)				2.1	(1.0)					(3.3)				0.3	3.2	
MALAYSIA	(1.5)				(1.7)	(3.2)					0.5				4.2	0.1	(1.5)
MEXICO	(2.3)	2.3	2.5	(0.0)	0.3	(0.4)	2.6	2.6			0.4	1.3			(0.5)	1.9	(2.6)
NETHERLANDS	(0.1)	(3.6)	1.4	1.0	(1.7)	2.0	0.6	0.5	(0.5)	0.0	(0.7)	(3.3)	(1.3)	2.9	0.5	0.2	(1.7)
NEW ZEALAND	0.1					3.2					(1.2)				(4.8)	3.0	
NORWAY	1.5				(0.5)	(2.7)					2.1				(1.1)	0.1	
PERU	6.2															(4.8)	
PHILIPPINES	(3.7)					(4.1)					1.2				7.3	(2.6)	
POLAND	(1.0)	1.0	(0.1)	(0.2)	(0.8)	(1.3)		3.8			1.8	0.5			0.6	(0.4)	(0.9)
PORTUGAL	5.3				(0.2)	2.4					(1.2)	2.0			(1.0)	(4.6)	
ROMANIA	(2.0)				(0.3)	7.1					(0.9)				1.3	(0.9)	
RUSSIAN FEDERATION	1.5				(2.9)	(0.4)					(0.3)	(0.5)			(1.4)	(0.1)	
SINGAPORE	1.6	(0.2)	0.7	(2.3)	0.6	(1.8)	0.2	2.7	0.8		1.7	(0.7)			(2.5)	(1.2)	0.4
SLOVAKIA	(5.7)					2.0					2.0				(1.2)	4.5	
SOUTH AFRICA	2.5				2.0	0.1					(5.8)	0.3			(1.5)	1.6	
SOUTH KOREA	1.7				0.5	1.1					3.9				(1.7)	(0.5)	
SPAIN	(2.0)	0.3	(0.4)	(1.9)	1.3	0.8	(2.5)	(2.6)		3.6	1.9	(1.7)	(0.4)	(0.1)	0.5	0.7	(1.8)
SWEDEN	0.5				1.5	1.7					0.8	(3.0)			(0.7)	(0.1)	
SWITZERLAND	2.2				(4.5)	(1.5)					(0.4)	1.7			0.7	(2.8)	
TAIWAN	(1.8)					(1.8)					(1.4)				5.1	1.9	
THAILAND	(0.4)				5.0	3.4					0.8	0.1			(2.8)	(2.2)	
TURKEY	(3.5)				(0.7)	3.2					0.3				2.5	4.3	
UNITED KINGDOM	0.6	0.5	(0.2)	(2.8)	0.7	(1.3)	0.4	(2.2)	(1.8)	(2.0)	1.1	(2.0)	(2.7)	(2.7)	(0.6)	(0.7)	4.8
UNITED STATES	0.1	0.7	(2.0)	(1.7)	0.6	0.8	(2.2)	(4.3)	1.9	1.8	1.1	(3.8)	4.5	(5.6)	(0.5)	(0.8)	4.0
VENEZUELA	(2.0)														(3.1)	4.5	
OTHER TAX HAVENS	2.5			2.3	2.9	(1.6)					1.0	(3.6)			(1.5)	(1.4)	0.0

$$ETR_{it} = \sum \beta_{0_i} \gamma_i^n + \sum \beta_{1_j} HOLD_{it}^j + \sum \beta_{2_k} OPERATE_{it}^k + \sum \beta_{3_{jk}} (HOLD_{it}^j * OPERATE_{it}^k) + \sum \beta_{4_n} YEAR_{it}^q + \varepsilon_{it} \qquad (4)$$

Notes: This table reports the results of estimating Equation (4) on the sample of multinationals domiciled in Canada, France, Germany, Italy, Japan, The UK, and The U.S. The first column reports the β_2 for each country. The top row reports the β_1 for each country. Each cell reports the estimate of $\beta_3$for the column-row pair of countries. All firm-years were included in the regression. Estimates are reported for country pairs with 500 or more observations.