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CROSS-COUNTRY COMPARISONS OF CORPORATE INCOME TAXES

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ABSTRACT

To our knowledge, this paper provides the most comprehensive analysis of firm-level corporate income taxes to date. We use publicly available financial statement information for 11,602 public corporations from 82 countries from 1988 to 2009 to estimate country-level effective tax rates (ETRs). We find that the location of a multinational and its subsidiaries substantially affects its worldwide ETR. Japanese firms always faced the highest ETRs. U.S. multinationals are among the highest taxed. Multinationals based in tax havens face the lowest taxes. We find that ETRs have been falling over the last two decades; however, the ordinal rank from high-tax countries to low-tax countries has changed little. We also find little difference between the ETRs of multinationals and domestic-only firms. Besides enhancing our knowledge about international taxes, these findings should provide some empirical underpinning for ongoing policy debates about the taxation of multinationals.

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1. Introduction

This paper exploits recently available financial statement information about non-U.S. companies to enhance our understanding of how taxes affect multinationals and to provide some empirical underpinnings for the ongoing debates in the United States, the United Kingdom, and other countries about competition in the market for tax domicile.¹ It is widely accepted among American tax practitioners and corporate managers that U.S. domicile results in higher total worldwide taxes, new companies anticipating substantial foreign operations should not incorporate in the U.S., and companies domiciled outside the U.S. have a tax advantage in the market for corporate control (see Samuels, 2009, Carroll, 2010, among many others). Reasons include the U.S.'s use of a worldwide tax system, which diminishes the advantages of operating through subsidiaries located in low-tax foreign countries and makes the U.S. somewhat unique among its trading partners, limits on the deductibility of some expenses, a relatively restrictive controlled foreign corporation (CFC) regime, and aggressive federal tax administration.² As evidence 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 (as one example) to the strong legislation and political pressure that were needed to stem the exodus of U.S. companies through inversions

¹ By "domicile," we mean the location of the firm for tax purposes. There is no standard definition of domicile. For example, domicile is the legal residence or site of incorporation in the U.S., but the location of operational headquarters in the UK.

² 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. Timothy McDonald, Vice President of Finance and Accounting for Procter & Gamble, likely spoke for many U.S. managers when he called the Netherlands, who have a territorial system with few restrictions on the deductibility of expenses related to foreign activities, the model system for taxing multinationals (Tuerff, et al., 2008, p.79). Consistent with American companies envying their Dutch competitors, allegedly fewer than five of the 20 largest Dutch companies are paying any corporate income tax to the Netherlands (Dohmen, 2008).

(reincorporations in low-tax countries with no operational impact), following Stanley Works' highly controversial aborted move to Bermuda in 2002.³

However, 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 (2008) shows that relocating to reduce global taxes is a widespread phenomenon. Most recently, the UK has seen several companies leave for domiciles in tax havens.⁴ In fact, 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).⁵ This inability to compete for domicile contributed to the UK's recent adoption of a territorial system of taxing the foreign profits of its multinationals.⁶

³ See Desai and Hines (2002) for detailed discussions of the inversions. Capturing the fiery rhetoric in 2002 concerning U.S. inversions, Johnston (2002) reported, "Senior senators from both parties used blunt language today to denounce companies that use Bermuda as a mail drop to reduce their American income taxes by tens of millions of dollars, calling them 'greedy' and 'unpatriotic' tax evaders whose actions could not be tolerated 'in a time of war'." In March, 1999, these issues were center stage in a famous exchange during the testimony of Bob Perlman, Vice President of Taxes for Intel Corporation, before the Senate Finance Committee. Perlman stated, "...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." (Perlman, 1999). The Senate Finance Committee's ranking Democrat, New York Senator Daniel Patrick Moynihan retorted, "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?...So money matters more to you than country?...I am sure you will reconsider it, but if you do move, well, just keep in check with the American consul. You might never know." (United States Senate Committee on Finance, 1999, p.17.)

⁴ The exodus is not limited to corporate domicile. Jones and Houlder (2010) report the one-quarter of London's hedge fund employees have recently moved to Switzerland to avoid higher taxes.

⁵ In 2008, Henderson Group, Charter, Shire, WPP, and the United Business Media, emigrated to Ireland and the Regus Group to Luxembourg (Werdigier, 2008 and Faith, 2008), while Kingfisher, Brit Insurance, RSA Insurance, and Prudential, among others, threatened to leave (Werdigier, 2008, Braithwaite, 2008). Colin Meadows, the Chief Administrative Officer for Invesco, who moved left the UK for Bermuda in December, 2007, stated "...we wanted to make sure the transaction in moving our domicile was tax neutral for our shareholders. Moving to the U.S. would not have been a tax neutral situation. When it came down to it, it was a very short list of places that we considered and Bermuda was at the top." (Neil, 2007). Decentering also may explain some of the departures (Desai, 2008). However, whether the departures are solely or partially tax-driven, the larger and longer-lasting implications for the British people may be the newly formed companies that will never have any roots in the UK.

⁶ Although UK multinationals widely welcomed the exemption of foreign dividends under a territorial system, some question whether it is enough to stifle the exodus. Ian Brimicombe, head of tax at AstraZeneca, doubted that the change in the law would bring back the firms that had already exited the UK and noted that companies with intellectual property or finance subsidiaries were still disadvantaged in the UK. (Houlder, 2008).

Conversely, scholars have long documented that multinationals are adept at arranging 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 the impact of domicile in a high-tax.⁸ As a recent example, *Bloomberg* (October 21, 2010) claims that by routing its offshore rights to intellectual property through two Irish subsidiaries, a Dutch subsidiary, and a Bermuda entity, Google reduced its total tax rate on foreign profits to 2.4%, saving \$3.1 billion over the last three years (Drucker, 2010).⁹

Some add that the tax avoidance opportunities that arise from conducting business in multiple countries gives multinationals an advantage over their domestic-only counterparts.¹⁰ With regards to any possible domicile disadvantages that U.S. multinationals might face, Stephen Shay, the deputy assistant secretary for international tax affairs at the U.S. Treasury, asserts that the size of the U.S. domestic market and the fact that other countries with smaller

⁷ See Blouin and Krull (2009), Huizinga and Laeven (2008), Desai, et al (2006), Gordon and Hines (2002), Shackelford and Shevlin (2001), Collins and Shackelford (1997), among many others, over the last two decades.

⁸ Consistent with U.S. multinationals' exploiting their ability to report profits in locations with more favorable tax systems than the U.S., the foreign affiliates of American companies reported more of their aggregate net income in the Netherlands (13%), Luxembourg (8%), and Bermuda (8%) than any country in 2006 (<http://www.bea.gov/international/di1usdop.htm>). Other locations with profits that far exceeded assets, sales and employees were Ireland (7%), Switzerland (6%), Singapore (4%), and UK islands in the Caribbean (3%). For comparison, 7% of the aggregate net income of U.S. foreign affiliates was reported to Canada (the U.S. largest trading partner) and the UK, while only 2% was reported in high-tax Japan and Germany.

⁹ Although we cannot verify these figures, a casual review of Google's financial statements suggests that they pay substantially less on their foreign profits that would be expected, given their presence in many relatively high-tax countries.

¹⁰ For example, after the HM Revenue and Customs National Audit Office (2007) reported that a third of the UK's 700 largest companies paid no tax in the 2005-2006 financial year, Bill Dodwell of Deloitte stated, "That 700 of the largest companies and groups are only paying 54 per cent of corporation tax shows the giant contribution of small companies. It is probably because many are less international and so have different planning opportunities." (Houlder, 2007). Referring to U.S. multinationals, Johnston (2008) adds "...very few grasp how corporate taxes favor multinationals over domestic firms."

economies have to rely more on cross-border trading renders the U.S. unique and incomparable with other countries, thus justifying differences in the U.S. taxation of multinationals (Coder, 2010). In effect, he argues that the economic advantages of the U.S. market offset any tax disadvantages associated with U.S. domicile.

As a result of these conflicting perspectives about whether multinationals are overtaxed or undertaxed, it is an empirical issue whether domicile substantially affects a multinational's total worldwide taxes.¹¹ To shed light on this question, we use firm-level financial statement information to estimate the extent to which the location of a firm's operations affects its global corporate income taxes.¹² We measure corporate income taxes by estimating country-level effective tax rates (ETRs). In particular, we regress firm-level ETRs (based on cash taxes paid and current and total tax expense as reported in firms' financial statements) for 28,343 firm-years spanning 82 countries on categorical variables for the domicile of the parent and whether the company is a multinational. The regression coefficients on the categorical variables provide estimates of country-level ETRs for both domestic firms (those operating in only one country) and multinationals. Besides comparing multinational ETRs across domiciles, we test whether domestics and multinationals face similar ETRs and how ETRs vary over time and across

¹¹ The tax domicile debate entered the U.S. Presidential debate on September 26, 2008, when Republican Presidential candidate Senator John McCain stated, "Right now, American business pays the second-highest business taxes in the world, 35 percent. Ireland pays 11 percent. Now, if you're a business person, and you can locate any place in the world, then, obviously, if you go to the country where it's 11 percent tax versus 35 percent, you're going to be able to create jobs, increase your business, make more investment, et cetera. I want to cut that business tax. I want to cut it so that businesses will remain in—in the United States of America and create jobs." His opponent, then-Senator Barack Obama, countered, "Now, John mentioned the fact that business taxes on paper are high in this country, and he's absolutely right. Here's the problem: There are so many loopholes that have been written into the tax code, oftentimes with support of Senator McCain, that we actually see our businesses pay effectively one of the lowest tax rates in the world."

¹² Ideally, companies would be randomly assigned to countries and permitted time to rearrange their accounting, legal, investing, financing, production, marketing, and other activities in light of the tax particulars of their assigned country. We would then compare the global taxes for each company, recognizing that their international tax planning acumen might enable the companies assigned to high-tax countries to undo any tax disadvantages. Unfortunately, such experiments are impossible. Thus, we are relegated to examining the actual taxes paid (as estimated using financial statement disclosures) by multinationals domiciled in countries for non-random reasons, which we can only partially control for in our tests.

industries. We then add categorical variables that denote the location of the firm's foreign subsidiaries, enabling us to estimate the marginal ETR impact for every domicile of foreign subsidiaries, including tax havens.

The principal finding from the study is that domicile substantially affects multinationals' ETRs. Even though many firms reportedly engage in increasingly aggressive international tax planning with transfer pricing, hybrid entities and other tax avoidance strategies, they apparently are unable to completely undo the differences in tax law across countries. Consequently, many countries continue to collect large sums of corporate income taxes from multinationals even though tax havens and other low-tax countries exist. In fact, we find that the ETRs for multinationals in high-tax countries roughly double those in low-tax countries. In particular, multinationals domiciled in Japan face the highest ETRs, followed by those domiciled in the U.S., France and Germany. Multinationals domiciled in tax havens usually enjoy the lowest ETRs. In some countries, multinationals face higher ETRs than their domestic counterparts; in others, multinationals face lower ETRs. There is no global pattern.

Furthermore, we find that, although ETRs have steadily declined worldwide over the last two decades (most notably in Japan), the ordinal rank from high-tax countries to low-tax countries has changed little. Furthermore, ETRs vary widely across industries throughout the world with retailers and construction typically facing ETRs much higher than those of miners and information firms. However, the variation is similar across countries. In almost all countries, the same industries are high-tax and low-tax, and high-tax countries tend to tax all industries more heavily than low-tax countries do. We also find the ETR for a multinational is greater if its subsidiaries are located in high-tax countries than if its subsidiaries are located in low-tax countries. For example, U.S. multinationals can reduce their ETR by locating a subsidiary in a

tax haven. A subsidiary in the Singapore (Ireland) reduces the cash ETR of the typical U.S. multinational by 2.0 (1.6) percentage points.

Data limitations have prevented scholars from estimating the marginal tax cost associated with the domicile of multinationals. An early study, Collins and Shackelford (1995), uses total income tax expense to compute ETRs for four countries (Canada, Japan, the UK, and the U.S.) and ten years (1982-1991). Subsequently, Collins and Shackelford (2003) adds Germany and estimates ETRs from 1992-1997; however, with data for only eight Japanese firm-years and 36 German firm-years, they are effectively limited to studying three countries. In both studies, they conclude that the parents of multinationals domiciled in the U.S. and the UK faced similar ETRs, both of which exceeded the parent ETRs in Canada. In neither study did they have information about the location of the company's subsidiaries. Two other studies compare (total income tax expense) ETRs across countries. Lu and Swenson (2000) and Lee and Swenson (2008) document average ETRs for a wide range of countries for 1995-1998 and 2006-2007, respectively. Using the Global Vantage and Compustat Global databases, they calculate country-level ETRs and use them as a basis for comparison for the Asia-Pacific countries that were the focus of their studies. Neither study separates domestic-only and multinational corporations or has information on the location of firms' subsidiaries. As a result, inferences in both studies are limited to cross-country comparisons at the aggregate and industry levels.

Dyreng and Lindsey (2009) exploit text-searching software to collect foreign operations information for all U.S.-incorporated firms in the Compustat database between 1995 and 2007 and estimate the average worldwide, federal, and foreign tax rates on U.S. pre-tax income. Their estimate of a 1.5 percentage point reduction in ETRs for U.S. companies that have activities in a

tax haven is comparable with our haven estimates. A limitation of their study is that they do not have access to data for companies domiciled outside the U.S.

The remainder of the paper is organized as follows: Section 2 develops the regression equation used to estimate the ETRs. Section 3 details the sample selection. Sections 4, 5, and 6 present the empirical findings. Closing remarks follow.

2. Regression Equation

To compare the tax rates of multinationals and domestic firms across countries and to determine whether multinationals and domestics in the same country face different tax rates, we could simply use the actual firm-level ETRs. However, erroneous inferences about the level of taxation across countries could be reached because companies are not randomly assigned across countries. For example, if the technology sector faces relatively low taxes throughout the world because of tax incentives for research, then countries with disproportionately large number of technology firms might appear to enjoy lower levels of taxation than other countries when the difference actually arises because of the industry mix. Therefore, to control for such possible industry, year, and firm size differences across countries, we estimate a modified version of the pooled, cross-sectional regression equation developed in Collins and Shackelford (1995):¹³

$$\begin{aligned}
 ETR_{it} = & \sum \beta_{0j} COUNTRY_{it}^j + \sum \beta_{1j} (COUNTRY_{it}^j * MN_{it}) \\
 & + \sum \beta_{2k} INDUSTRY_{it}^k + \sum \beta_{3m} YEAR_{it}^m + \sum \beta_{4n} SIZE_{it}^n + \varepsilon_{it} \quad (1)
 \end{aligned}$$

where: ETR_{it} = the effective tax rate for firm i in year t .

¹³ Collins and Shackelford's (1995) regression model includes categorical variables indicating whether the firm's income statement is consolidated or restated in accordance with U.S. GAAP. We exclude all unconsolidated firm-years from our sample to avoid potentially including both parents and their subsidiaries as separate observations. We cannot include the restatement variable because our data do not include it.

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

MN_{it} = an indicator variable equal to 1 if firm i has a foreign subsidiary 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.

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

We suppress the intercept so that the coefficients on the *COUNTRY* variables can be interpreted as the marginal cost of domiciling in a country, i.e., the effective tax rate for domestic firms.¹⁴ Throughout the paper, we refer to the coefficient on the *COUNTRY* variable as the *domestic ETR*. Suppressing the intercept also means that the coefficient on the *COUNTRY***MN* variables is the incremental tax cost for multinationals (as compared with the domestic-only firms) in that country. Positive values are consistent with multinationals in a country facing higher ETRs than their domestic counterparts face. Negative values are consistent with domestics in a country facing higher ETRs than their multinational counterparts face.

Throughout the paper, we refer to the sum of the coefficients on the *COUNTRY* and the *COUNTRY* * *MN* variables as the *multinational ETR*.¹⁵

¹⁴ To estimate equation (1), one industry and one year have to be excluded from the regression. To determine which industry to leave out, we calculate the mean *ETR* in each industry (two-digit NAICS) and then determine the median of those means. The industry with the median mean is the one left out. We implement a similar procedure on the years.

¹⁵ Note that the magnitude of the domestic and multinational ETRs cannot be directly compared with the actual ETRs from the financial statements, which serve as the dependent variable. The domestic and multinational ETRs

The coefficients on *INDUSTRY* and *YEAR* are used to determine whether ETRs vary across industries and time. Three control variables are intended to capture size (*SIZE*): the percentile ranks of Total Assets, Revenues, and Equity. Prior studies of the impact of size on ETRs have been inconclusive. Rego (2003), Omer et al. (1993), and Zimmerman (1983) find a negative relation, consistent with economies of scale and political costs. Conversely, Armstrong, et al. (2010), Jacob (1996), Gupta and Newberry (1997) and Mills (1998) find no relation.

The ETRs are collected from each firm's financial statements.¹⁶ The ETR denominator is net income before income taxes (NIBT). Since financial reporting rules vary across countries and thus affect the computation of NIBT, we conduct sensitivity tests using total revenues and an adjusted net income as denominators.¹⁷ Results are qualitatively the same.

Three different numerators are used in our ETR computations: (i) actual cash taxes paid (cash ETR), (ii) current worldwide income tax expense (current ETR), and (iii) total worldwide income tax expense (total ETR).¹⁸ All measures are collected from the company's publicly available financial statements. Because the focus of this study is on the actual corporate income taxes paid, cash ETR is the superior numerator.¹⁹ Unfortunately, not all countries require firms

are the tax rates, conditional on industry, year, and size. That said, our empirical analysis shows that the estimated ETRs are very similar to the actual ETRs from the financial statements.

¹⁶ Note that the ETRs in this study are not marginal tax rates, as detailed in Scholes, et al., 2009. They ignore implicit taxes, cannot assess who bears the burden of corporate income taxes, and cannot capture incentives to employ new capital (see Fullerton, 1980, and Bradford and Fullerton, 1981, for a discussion of marginal effective tax rates). Neither are they the tax rates related to investment decisions developed in Devereux and Griffith (1998) and Gordon, et al (2003).

¹⁷ Adjusted net income is intended to add back two key expenses whose accounting rules vary across countries, namely depreciation expense and research and development expense. Using revenues as the denominator goes even further and eliminates any cross-country variation in expenses.

¹⁸ See Hanlon and Heitzman (2010), Graham, et al, 2011, Dyreng et al, 2008, and Hanlon (2003), among others, for detailed discussions of these three measures, how they are computed, and potential limitations.

¹⁹ One disadvantage of the cash ETR, compared with the current and total ETRs, is that it includes all taxes paid during the year regardless of the year in which the income related to those taxes was earned. For example, cash taxes paid could include additional taxes arising from an audit of past years' tax returns. Thus, the numerator may include taxes related to income from years, other than the current year, while the denominator (book income before taxes) is limited to income from the current year. In contrast, with current income tax expense (which is designed to capture the taxes paid in the current year attributable to economic activity during the current year) as the numerator, both the numerator and the denominator contain the current year's economic activities alone. That said, because our

to disclose the actual taxes paid during that year in their financial statements. Thus, to expand our sample, we turn to the current ETR in some tests. However, it, too, is not a mandatory disclosure in all countries. Thus, to maximize the observations in the study, we also report the total ETR.

3. Sample

We use two different databases to collect a sample of firms for this study. To collect information about the location of ultimately-owned subsidiaries, we use the Orbis database.²⁰ We include all parents that have at least one subsidiary.²¹ We then match these parents to their financial statement information in the Compustat databases. We collect three different tax variables: total tax expense, current tax expense, and cash taxes paid. The main tests in the paper use current tax expense, so it is that sample we describe in detail here. If a firm-year does not report current tax expense but does report both total and deferred tax expense, we calculate current tax expense as total less deferred. As a validity check on the data, we delete all observations for which the difference between the ETR with total tax expense in the numerator and the ETR with the sum of current and deferred tax expense in the numerator is greater than one percentage point.²² We attempt to mitigate the impact of outliers and errors in the data by limiting the sample to observations with non-negative ETR less than or equal to 70%.

estimates are based on a large sample of firm-years, we doubt that any mismatching for the cash ETR affects the inferences drawn from this analysis. Consistent with that expectation, conclusions are qualitatively identical whether cash taxes paid, current tax expense, or total tax expense is the numerator.

²⁰ Bureau van Dijk collects information directly from Annual Reports and other filings. In addition, it obtains information from several information providers, including CFI Online (Ireland), Dun & Bradstreet, Datamonitor, Factset, LexisNexis, and Worldbox.

²¹ We define an “ultimately-owned” subsidiary as one for which all links in the ownership chain between it and its ultimate parent have greater than 50% ownership.

²² To further reduce concerns about inaccurate data, we eliminate from the sample any country for which more than 50% of the observations of current tax expense are zero.

The Orbis subsidiary measure has one serious flaw. Orbis only reports the subsidiary information as of the most recent updating of the information.²³ We are unable to assess the extent to which this data limitation affects the conclusions drawn from this study. However, to mitigate the potential for miscoding the existence and location of foreign subsidiaries, we limit the primary tests in this paper to firm-years since 2004.²⁴ Our logic is that the foreign subsidiary coding is correct for 2009, has fewer errors in 2008 than in 2007, and has fewer errors in 2007 than in 2006, and so forth. We arbitrarily select the last five years for which we have data as the cut-off for our primary tests in the hope that the miscoding is of an acceptable level for these most recent years. In subsequent tests, we present estimated coefficients from separate regressions for each year, and in untabulated tests, we estimate one regression that uses all of the firm-years. Conclusions are similar regardless of the sample period.

Another potential limitation of using Orbis is that it may fail to identify all of the firm's subsidiaries, a potential limitation that we are unable to fully assess.²⁵ However, it seems reasonable that if Orbis were to overlook some subsidiaries that they would be those that are smaller, less significant and potentially inactive. Since we are aggregating all firms into a single country-wide ETR, we trust that imperfections in the data will have limited impact on the

²³ For example, if a company had no subsidiary in Canada before 2009 (the most recent year in the database) and then incorporated a subsidiary in Canada in 2009, we would erroneously treat the company as having had a Canadian subsidiary for all years in our sample. Likewise, if a company had a subsidiary in Canada for all years before 2009 and then liquidated the Canadian subsidiary in 2008, we would erroneously treat the company as not having had a subsidiary in Canada for any year in our sample.

²⁴ Another advantage of limiting the analysis to recent years is that it mitigates potential survivorship bias. The Orbis database is limited to companies presently in existence. Thus, our analysis is limited to firms that have survived throughout the investigation period. By restricting the sample to firm-years since 2004, we reduce the deleterious effects of survivorship bias.

²⁵ In an attempt to assess the potential magnitude of this problem (at least for U.S. firms), we compare the list of the countries that Orbis identifies with the list of countries that Dyreng and Lindsey (2009) identify using a search of the 10-K, Exhibit 21, filed by U.S. multinationals. Dyreng and Lindsey (2009) list the percentage of U.S. multinationals having material operations in each foreign country. When we calculate that same percentage using the Orbis data, we find that our calculated percentage is within 10 percentage points of that of Dyreng and Lindsey (2009) for 84 of the 92 countries reported in both studies. This gives us some assurance that the data are reasonably complete, at least for U.S. firms, but the differences indicate that there are imperfections in our data.

conclusions. Nevertheless, despite these possible problems with using Orbis, we use it because no other publicly-available database provides as much information about as many firms and countries as it does.

Our sample selection process yields a main sample for the years 2005-2009 of 28,343 firm-years spanning 82 countries, ranging from only one firm-year in six countries to 9,452 firm-years in Japan.²⁶ We combine the countries with fewer than 200 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 main tests are conducted and results are reported using these 21 countries and groups. For the 21 countries and groups, Table 1 reports the firm-year means of Sales, Assets, Equity, and Pretax income, dichotomized into 13,917 domestic-only firms and 14,426 multinationals. Not surprisingly, multinational firms average more sales, assets, equity, and pretax income than domestics do.

The next two columns of Table 1 present the mean and median ETRs, respectively, where $ETR = \text{Current tax expense} / \text{Pretax income}$. These are the actual ETRs from the firms' financial statements, not ETRs estimated from regression analysis. The domestics (multinationals) have mean ETRs of 28% (27%) and median ETRs of 30% (28%). The final column presents the average statutory tax rate for the country-years in the sample.²⁷ The numbers reported are the weighted average rates, where the weighting was done by number of firm-years. In the full sample, domestics and multinationals faced average statutory tax rates of 39%.

²⁶ An advantage of investigating this period is that it includes both economic expansion (2005-2007) and contraction (2008-2009), potentially permitting us to generalize beyond a single phase of the business cycle.

²⁷ We use the combined corporate statutory tax rate calculated for the 30 OECD countries and available at www.oecd.org (Table II.1). For the non-OECD countries in our sample, we use the maximum rate in data kindly provided by Kevin Hassett.

In general, the three tax rate columns paint a similar picture. Countries with high statutory tax rates tend to have high ETR. Two exceptions are Canadian and German domestic companies, both of whom have mean current ETRs that are more than 20 percentage points lower than their statutory rates, consistent with a high statutory rate but a narrow tax base. The U.S. also has a relatively large spread with the mean current ETR for multinationals 11 percentage points below the statutory tax rate.

4. Primary Findings

4.1. Do the ETRs estimated from the regression coefficients differ from the actual ETRs?

Table 2 presents the domestic-only ETRs, which are the *COUNTRY* coefficients from estimating equation (1), and the multinational ETRs, which are the sum of the *COUNTRY* and the *COUNTRY*MN* coefficients. Results are presented using all three numerators, cash taxes paid (cash ETR), current income tax expense (current ETR) and total income tax expense (total ETR).

The actual ETRs from the financial statements (those shown in Table 1) are reported in columns immediately to the left of the estimates.²⁸ There is little difference between the mean of the actual ETRs and the estimates from equation (1). For the six pairings of actual and estimated ETRs (domestic cash ETRs, multinational cash ETRs, domestic current ETRs, multinational current ETRs, domestic total ETRs and multinational ETRs), the correlation is never less than 94%. Furthermore, the difference between the actual ETR and the estimated ETR is never more

²⁸ To illustrate, for Australian companies, using cash taxes paid, the mean raw ETR from the financial statements for domestic-only firms is 26%, while the estimated cash ETR for domestics is 23%. The same figures for multinationals are 24% (raw) and 22% (estimated). The remaining columns are when the numerator is current ETR and total ETR, respectively.

than six percentage points.²⁹ Thus, we infer from the similarity between the actual and estimated ETRs that the control variables (for industry, year and size) have little impact on the coefficients of interest. This pattern holds throughout the paper, suggesting that the inferences drawn in this study would be similar whether we used the actual ETRs from the financial statements or the ETRs estimated in the regression. For brevity, we will focus exclusively on the estimated ETRs in the remainder of the paper.

4.2. Do ETRs differ between domestics and multinationals?

Next, we use Table 2 to compare the estimated ETRs for domestic-only firms with those for multinationals. (Asterisks indicate statistically significant differences between multinational and domestic estimates.) We have enough firm-years to report estimated domestic cash ETRs for eight countries or groups of countries (Australia, Canada, Malaysia, UK, U.S., Asia, Europe, and Latin America).³⁰ All estimated domestic cash ETRs for these countries (Table 2, column 2) are within five percentage points of their multinational counterparts (Table 2, column 4), and the correlation between the two sets of ETRs is 84%. In three cases, the multinational and domestic cash ETRs are significantly different from each other at the 0.05 level: Cash ETRs for Canadian multinationals (19%) exceed those for its domestics (14%). The ETRs for Europe are lower for their multinationals (21% vs. 24%). The U.S. multinational cash ETR estimate is significantly

²⁹ Interestingly, when the numerator is cash taxes paid (current income tax expense), the estimated ETR never (only once) exceeds the raw ETR. The pattern flips when the numerator is total tax expense. There, the estimated ETR exceeds the raw ETR in all, but two, cases.

³⁰ Although we have enough observations (216) for Japan to report their cash ETRs, we chose to omit them from Table 2 because there appear to be errors in the data. Only 3% of the Japanese companies reporting current tax expense also report cash taxes paid. This suggests that either few companies report cash taxes paid in Japan (and they may not be representative of the Japanese population) and/or the data are incomplete or erroneous for this item. Either explanation could lead to erroneous inferences about the cash taxes paid by Japanese companies; thus, we err on the side of caution. Such dramatic differences are not found for any other country.

greater than the U.S. domestic cash ETR estimate, although by just one percentage point (21% vs. 20%).

As mentioned above, there are more firm-years when current income tax expense or total income tax expense are used as the numerator. This larger number of observations enables us to report 17 (20) domestic (multinational) current ETRs and 18 (21) domestic (multinational) total ETRs. The correlation between these domestic ETRs and their multinational counterparts is 73% for the current ETRs and 89% for the total ETRs. The mean of the absolute values of the difference between the domestic and the multinational ETRs is three (two) percentage points for both current (total) ETRs with no difference exceeding six percentage points.

Twelve of the 17 countries with both domestic and multinational current ETRs have domestic and multinational ETRs that are statistically different from each other. However, no clear directional pattern exists. In seven cases the multinationals ETR are larger; in five cases the domestic ETRs are greater. A similar split exists among the total ETRs. Multinational total ETRs exceed domestic ones for five countries/groups while domestic total ETRs are larger in six cases. Among U.S. firms, multinationals face a 23% current ETR, while domestics have a 19% current ETR, but the total ETRs for U.S. multinationals and domestics are the same (30%).

We infer from this analysis that although about half of the countries have domestic and multinational ETRs that are statistically different from each other, the direction is not consistent (i.e., sometimes the domestics have higher ETRs and sometimes the multinationals do).

Although there are surely cases where transfer pricing, hybrid entities, and other tax plans enable multinationals to pay less tax per dollar of profit than domestics do, we do not find evidence to support those who claim that multinationals' consistently pay lower taxes. Likewise, we find no support for contentions that multinationals consistently operate at a tax disadvantage compared

with their domestic counterparts because of expense allocations, foreign tax credit limitations, or other restrictions that potentially result in taxation both at home and abroad.

That said, two caveats bear mentioning. First, these inferences depend critically on the data correctly classifying firms as multinational and domestic and, as acknowledged above, the data are imperfect. Second, the decision to operate abroad is endogenous. It is possible that the firms that expand into foreign markets are those with the best ability to avoid the higher tax costs that arise from being a multinational. Alternatively, the firms that choose to become multinationals may be those with the best ability to exploit the tax advantages arising from being able to spread income across multiple countries. Thus, readers should be cautious in interpreting these coefficients as the change in ETRs that would arise if domestics became multinationals or multinationals reverted to domestic-only status.

4.3. Does the domicile of a multinational affect its ETR?

Table 2, column 4 reports estimated multinational cash ETRs for 13 countries, ranging from 11% (Middle East) to 22% (Australia, France, Germany, and UK) with mean (median) [standard deviation] of 18% (18%) [4%]. The U.S. multinational cash ETR is 21%. The 20 estimated multinational current ETRs (column 8) range from 9% for Bermuda (followed by 10% for the Cayman Islands and 13% for the Tax Havens) to a high of 31% for Japan (which exceeds the next highest, the U.S., by eight percentage points) with mean (median) [standard deviation] of 17% (17%) [5%]. The polar countries are the similar when we shift from current to the estimated multinational total ETRs (column 12), which range from 16% for Cayman Islands (followed by Bermuda at 17% and the Tax Havens at 18%) to 39% for Japan (followed by the

U.S. at 30%) with mean (median) [standard deviation] of 24% (25%) [5%].³¹ We infer from this analysis of cash, current, and total multinational ETRs that the domicile of the multinational significantly affects a firm's ETR. The estimated ETRs for the highest taxed countries are always at least double those for the least heavily taxed countries. In short, domicile appears to matter for multinational corporations. The rank order of the countries holds across ETR measures.

Hereafter, current ETRs alone are reported because they allow us to study more countries than would be possible with cash ETRs, and, although total ETRs would enable us to add Africa to the analysis, current ETRs better approximate the more desirable, but too often unobservable, measure, actual cash taxes paid.³² In addition, no distinction is made between domestic and multinational ETRs because we find no consistent differences between them.

4.4. Have ETRs changed over time?

The findings above are for firm-years from 2005 to 2009. By combining years, we increase the number of observations per country, enabling us to study more countries. However, by combining years, we may mask cross-temporal changes in tax law. Thus, we next report annual estimated current ETRs, using the complete sample of domestic and multinational firm-years and modifying equation (1) to allow annual estimates for each country and dropping the separate estimates for multinationals (*COUNTRY*MN*). These estimated regression coefficients enable us to analyze the changes in ETRs from 1988 to 2009 for each country. By examining more than two decades of ETRs, we can see their sensitivity to expansions and recessions.

³¹ It is not surprisingly that current ETRs are substantially less than total ETRs since deferred tax liabilities usually exceed deferred tax assets (see Poterba et al. 2011 and Raedy et al., 2011, among others).

³² The inferences drawn from using current and total ETRs are identical, as would be expected since the Pearson correlation coefficient between the two estimated ETRs is 95%. The correlation between cash and current (total) ETRs is 73% (86%).

Table 3 reports the annual estimated current ETRs. Percentages are only presented if there are at least 20 observations, but all available firm-years are included in the regressions. We find that the high-tax to low-tax rank across countries has changed little over the two decades. In 1988, the first year for which we have data, the Japanese ETR was the highest at 44% (20 percentage points ahead of the next country, UK). In the most recent year for which we have data, 2009, they were the highest at 30% (five percentage points higher than France, the country with the next largest ETR). In fact, in every year Japanese current ETRs are substantially higher than those in any country.³³ Ignoring Japan, the U.S., UK, France and Germany have had the highest current ETR in 19 of the 22 years, and none of those countries' ETRs is ever more than nine percentage points below the penultimate ETR. In 1989 (the first year for which we report their ETRs), the Tax Havens enjoyed the lowest multinational ETR at 22%, two percentage points below the next lowest ETR (Canada's). Since then, the Tax Havens, the Cayman Islands, Bermuda, and Taiwan have never had a year where their ETR was more than ten percentage points above the minimum ETR.

Over the two decades, ETRs fell steadily. For the nine countries with enough observations to report annual ETRs in both 2009 and 1989, all had lower ETRs in 2009 than in 1989 with a mean and median decline of 12 percentage points. The largest ETRs drops were 22 percentage points for Japan and 15 percentage points for Switzerland and the UK. The U.S. had a decline of 12 percentage points from 32% in 1989 to 20% in 2009. Thirteen of the 17 countries with enough observations to compute annual ETRs in both 2009 and 1999 experienced a reduction in their ETR with a mean (median) decline of 3 (5) percentage points. The largest

³³ Though beyond the scope of this study, Japan's remarkable ability to sustain substantially higher tax rates than its trading partners throughout two decades warrants further investigation. Ishi (2001) and Griffith and Klemm (2004) (among others) document the gap, but we are aware of no study that attempts to ascertain the reasons why the gap has persisted for such a long period. That said, Japan is currently debating a reduction in their corporate income tax rate from 40% to 35%, which would be effective April 1, 2011.

declines in ETR were 12 percentage points (Japan and Germany). The U.S. ETR fell percentage points from 25% in 1999 to 20% in 2009.³⁴

Of course, the relatively low ETRs in 2009 may reflect the worldwide recession. Indeed, six countries (Bermuda, Japan, Sweden, Switzerland, the UK and Europe) never experienced lower ETRs than they did in 2009. Furthermore, when we compare 2009 ETRs with those in 2006, we find that the 2006 ETRs are 2 percentage points higher, on average. Furthermore, when we compare 2006 ETRs with 1999 ETRs, we find no decline in ETRs, on average. We infer from this analysis that ETRs did fall during the latest recession, whether this was caused by declining profitability (recall that we limit our sample to profitable companies) or a resumption of the long, slow slide in ETRs is indeterminable. Furthermore, it is possible that ETRs in 2006 were higher than would have been the case, had the economy not been so strong during the middle years of that decade. Nevertheless, the particularly low ETRs in the latter years of the decade should be cautiously interpreted in light of the global economic downturn.

To summarize, despite steady global declines in ETRs, the rank order of countries has remained remarkably constant over time. Japan's ETRs continued to far exceed those from any other country. In fact, the smallest Japanese ETR over the two decades (30% in 2009) would have exceeded the ETR for any other country in any year since 2000. Similarly, the tax havens have consistently enjoyed the lowest ETRs. However, the spread between high-tax countries and tax havens has narrowed over the two decades because the tax havens began with low tax rates and maintained them, while all high-tax countries have reduced their ETRs. The U.S. ETR has declined at the average rate, keeping it among the highest taxed countries and substantially trailing only those in Japan.

³⁴ These findings are consistent with those of the 2008 study by the OECD discussed in Hodge (2008) which documented that 2008 was the seventeenth consecutive year in which the average statutory corporate tax rate in non-U.S. OECD countries fell while the U.S. rate remained unchanged.

4.5. *Do ETRs vary across industries?*

To assess whether ETRs vary across industries, we estimate a modified equation (1) using current ETRs and industry groupings based on two-digit NAICS codes. We group two-digit codes to ensure that each reported industry has at least 800 firm-years. All observations are included in the regressions, but only cells with 20 or more observations are reported.³⁵

Manufacturers comprise 41% of the firm-years.

Table 4 shows considerable variation across industry ETRs. Averaging across all countries, we find that the average current ETR ranges from Mining at 11% to Retail Trade at 27%. Retail Trade has the highest ETR in the U.S. and Japan. When we limit the analysis to the 13 countries/groups with ETRs for at least five industries, we find that the maximum rate appears in different industries for different countries. Finance has the highest rate for three countries (France, India and Sweden). Other is highest in Germany, Europe, and Latin America. The only industries that are never the highest are Manufacturing, Mining, and Real Estate.

Mining is clearly the least taxed industry. Averaging across all countries, its 11% ETR is seven percentage points below Information. Moreover, for the six countries reporting Mining ETRs (Australia, Canada, Japan, the UK, the U.S., and Europe), the Mining ETR is the lowest across all industries. Among the seven other countries with at least five industries, thrice Information has the lowest ETR.

Despite the variation across industry ETRs, those countries with high ETRs in general tend to have high ETRs across most industries and those countries with low ETRs in general tend

³⁵ Requiring 20 observations ensures that the reported ETR is not driven by a few country-years. However, readers should be cautious in interpreting these figures for countries with fewer observations because they may represent a handful of companies who appear in multiple years. More reliance can be placed on their countries with larger samples. Those include Canada, Japan, Taiwan, the UK, the U.S., Europe, and the Tax Havens, each of which totals more than 500 observations (see Table 1).

to have low ETRs across most industries. Japanese ETRs equal or exceed those from all other countries in every industry, except Mining. Consistent with its being a tax haven, Bermuda has the lowest ETRs in four of the five industries in which it has enough observations to report an ETR. The U.S. has the lowest Mining ETR at 6%.

Countries also differ substantially in the extent to which ETRs vary across their industries. Using the coefficient of variation for each country's industry ETRs as a standardized measure of the spread, among those countries with at least five ETRs, we find that Bermuda, at 12%, has the least variation among industry ETRs. India (34%), Australia (33%) and the U.S. (32%) have the most variation, suggesting that those countries have more industry-specific provisions than do other countries.

We infer from the results in Table 4 that ETRs vary widely across industries and industry ETRs vary widely within countries. Nonetheless, the relative ETR across industries seems similar across all countries. Furthermore, high-tax countries tend to tax all industries more than low-tax countries do. Finally, scholars should note that failure to control for cross-industry variation in ETRs could lead to erroneous inferences about tax burdens across countries. For example, although only 3% of our sample companies are in Mining, 24% of Canadian companies are in that industry. Since Mining is a lightly taxed industry, Canada might appear to be a lower-taxed country than would be the case if its industry mix was more representative of the global mix. This difference in industry mix should not affect our earlier estimates, however, because we control for industry in equation (1).

4.6. Additional Tests

The data enable us to conduct a battery of additional tests and robustness checks, which we discuss briefly in this section. In every case, the inferences drawn above hold.

One, it is difficult to determine where the profits generated from intangible assets are earned. As a result, firms with large amounts of intangible assets may be better able to avoid taxes (see discussions in Huizinga et al., 2008, Mutti and Grubert, 2007, and Desai et al., 2006, among many others). To assess whether firms with greater amounts of intangibles have lower ETRs, we would ideally sort firms based on their levels of intangible assets. Unfortunately, information about the amount of intangible assets is not publicly available. Thus, we turn to an observable figure, total research and development expenses, which, we assume, is positively correlated with the firm's level of intangibles. We estimate equation (1) for those firm-years with positive values for research and development expenses, modifying the equation to include a categorical variable for those firm-years where research and development expense as a percentage of total assets is above the median. Consistent with high intangible firms having lower ETRs, we find that the coefficient on the categorical variable is -2.0% and highly significant.

Two, some have conjectured that a territorial system collects less revenue than a worldwide system. Concerns about the revenue implications of excluding dividend taxation under a territorial system has become of central importance since the UK and Japan in December, 2008, decided to revamp their international tax laws by shifting from a worldwide tax system to a territorial tax system. Meanwhile, President Obama has proposed to strengthen the U.S.'s worldwide tax system by restricting deferral of U.S. taxation on foreign profits, while U.S. multinationals are coalescing around a territorial system with generous deductions of

worldwide expenses.³⁶ To test the impact of a worldwide system on ETRs, we estimate equation (1), after adding a categorical variable equal to one if the parent country has a worldwide tax system, and zero otherwise. Contrary to expectations, the estimate of the coefficient on the worldwide indicator is -1.4% and significant, indicating that, on average, firms domiciled in worldwide countries face lower ETRs.

Three, in countries with imputation, the corporate income tax serves as a form of withholding tax because the corporate tax (or some part of it) can be used to offset shareholders' dividend taxes. Thus, it is possible that corporate tax planning is less important in imputation countries because firms in those countries have less incentive to lower their ETRs than do those in classical systems, such as the U.S., where corporate taxes do not offset shareholder taxes. We test this possibility by modifying equation (1) to include a categorical variable that indicates whether the firm is domiciled in a country with any form of imputation. We find that the estimated coefficient on the imputation variable is insignificant.

Four, another cross-country difference is whether tax losses can be carried back to offset the prior year's taxable income.³⁷ When we add a categorical variable indicating whether a country permits losses to be carried back, we find that the coefficient on that variable is insignificant.³⁸

³⁶ See Weiner (2009), United States House of Representatives (2007), Clausing and Avi-Yonah (2007), and The President's Advisory Panel on Federal Tax Reform (2005), among many others, for proposals about U.S. international tax law reform. Interestingly, a principal cost of repealing deferral for some companies would be the deleterious impact on book income. Under current tax law, APB 23 permits firms to classify foreign profits as permanently reinvested, which enables them to report no deferred income taxes for any possible U.S. taxes to be paid at repatriation (see Graham et al., 2010, Graham et al., 2011 and Shackelford et al., 2011, among others). Repealing deferral would render this discretion under APB 23 irrelevant. This possibility led Ralph Hellmann, lead lobbyist for the Information Technology Industry Council, to state that the benefit of APB 23 deferral "...hits the bottom line of companies more than any other issue right now. We have to defeat it [repeal of deferral]." (Drucker, 2009).

³⁷ This information is obtained from International Tax Summaries prepared by Deloitte and available through its website.

³⁸ We conduct no tests concerning the carryforward of losses because Estonia is the only country that does not permit it.

Five, the corporate income tax is only one of many taxes, and in many countries, it is a relatively minor source of government revenue. To the extent countries rely on alternative taxes, they may need less revenue from corporate income taxes, which are the sole tax used to compute ETRs. Alternatively, high income tax countries may levy high taxes across the board. Consistent with a trade-off among revenue sources, we find that the value-added tax rate is negatively correlated with ETRs.³⁹ When we exclude companies domiciled in the U.S. (the only major country without a value-added tax), the correlation is even more negative. To determine whether the value-added tax affects the inferences drawn above, we include the value-added tax rate in equation (1) and find a positive and significant coefficient estimate. However, inferences about the relative ETRs across countries are unaltered.

Six, we include the maximum statutory corporate income tax rate in equation (1). As expected, we find a positive coefficient on the statutory rate, and the relative ranks of the countries/groups somewhat altered. This implies that the ETRs are driven by differences in both tax rates and tax bases.

Seven, the sample excludes all firm-years with losses (i.e., negative NIBT). In this sensitivity test, we add back the 11,416 firm-years with losses and actual ETRs (from the financial statements) that equal zero and estimate equation (1).⁴⁰ By definition, adding these loss firm-years lowers the estimated ETRs. We find that the inclusion of loss firm-years has inconsequential impact on the relative high-tax to low-tax rank across the countries: the Japanese ETR remain the highest at 21%, three percentage points above the African ETR. The Bermudan ETR is the lowest at 2%, two percentage points below the Cayman Islands' ETR.

³⁹ We thank Kevin Hassett for providing us with the valued-add tax data.

⁴⁰ Consistent with the main tests, we exclude observations for which the absolute value of ETR is greater than 70%.

Eight, the sample includes firm-years with zero ETRs as long as their NIBT was positive. In this robustness check, we drop those 1,372 firm-years with non-positive ETRs as reported in the financial statements. By definition, eliminating these zero ETR firms increases the estimated ETRs. We find that the deletion of non-positive ETRs has inconsequential impact on the relative high-tax to low-tax rank across the countries: Japanese ETR is 36%, ten percentage points above that for the U.S., the country with the next highest ETR. Bermudan and Cayman Islands' ETRs are the lowest at 13%.

5. Results from Comparing Foreign Subsidiaries

5.1. How much does the location of its foreign subsidiaries affect a multinational's ETR?

In this section, we expand the domestic-multinational dichotomy to consider whether the domiciles of foreign subsidiaries affect ETRs. We begin by turning our attention to tax havens, the most extreme example of a low-tax country. If companies domiciled in tax havens enjoy lower ETRs than companies domiciled in other countries (as the evidence above suggests), then it follows that multinationals with tax havens should have substantially lower ETRs than multinationals without tax havens.

To test this proposition, we modify equation (1) by adding a categorical variable indicating whether a multinational had a tax haven, interacting it with the *COUNTRY*MN* variable in equation (1), and estimating the equation. Surprisingly, we find that multinationals with tax havens do not have lower ETRs than multinationals without havens (results are untabulated). In fact, the current ETR, averaged across all countries is 17% for multinationals without havens and 19% for multinationals with havens. Both figures are 23% for American multinationals, and for almost half of the countries/groups (including France, India, Japan, the

UK, and all three listings of tax havens) the spread is within percentage point. One reason that having a haven may not result in a lower ETR is that the countries that establish tax havens are countries that would have substantially higher ETRs, if they had no haven. Therefore, havens may lower ETRs, but not enough to overcome the boost to ETRs arising from higher profitability. Unfortunately, we cannot observe the counter-factual, i.e., comparing multinationals with havens to those same companies if they had no havens. Nonetheless, this initial test provides no evidence that the location of the subsidiary affects the worldwide ETR.

Next, we move beyond a tax haven dichotomy to consider all countries where foreign subsidiaries exist. In Equation (1), we use the presence of a foreign subsidiary to distinguish multinationals from domestic-only firms. Here, we replace that single categorical variable with categorical variables for all locations of foreign subsidiaries. The coefficients on the foreign subsidiary variables enable us to assess the extent to which the location of a foreign subsidiary affects the ETRs of the worldwide enterprise. The regression equation is:

$$\begin{aligned}
 ETR_{it} = & \sum \beta_{0_j} COUNTRY_{it}^j + \sum \beta_{1_k} SUB_{it}^k \\
 & + \sum \beta_{2_m} INDUSTRY_{it}^m + \sum \beta_{3_n} YEAR_{it}^n + \sum \beta_{4_p} SIZE_{it}^p + \varepsilon_{it} \quad (2)
 \end{aligned}$$

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

All other variables are defined the same as in equation (1). The estimated regression coefficients on SUB are the estimated impact on ETRs arising from having a subsidiary in a particular foreign country.

We continue to use the same 21 groups as in the previous section for the parents but allow countries to have their own SUB indicator if they host subsidiaries of 500 or more parents. Each firm-year has one country in which its $COUNTRY$ variable is coded one. However, it has n

SUBs coded one, where n is the number of different countries in which the parent has at least one subsidiary.⁴¹

We use the same sample of 28,343 firm-years (from 2005-2009) with current income tax expense as the numerator for the ETR that was used in Table 2. For these firm-years, there are 80,723 *SUB* variables with a value of one. All 56 subsidiary locations have at least 200 firm-years. The UK is the most popular location for foreign subsidiaries with 7,608 firm-years.

Table 5 shows the regression coefficient estimates for *COUNTRY* and *SUB*. The *COUNTRY* coefficients from equation (2) should be the same as the *COUNTRY* coefficients from equation (1), except to the extent that identifying the location of a firm's foreign subsidiaries, as opposed to just identifying the existence of a foreign subsidiary provides information. It seems plausible that knowing the subsidiary's domicile would substantially affect inferences because foreign subsidiaries are not randomly distributed across parents. Multinationals from some countries might be more likely to operate in high-tax countries (e.g., French companies may be more likely to have a subsidiary in high-tax Germany than would be Taiwanese companies, which might partially account for the higher ETRs in France.). That said, we find that specifying the location of the foreign subsidiary in the regression only results in only one *COUNTRY* coefficients changing more than three percentage points from the corresponding *COUNTRY* coefficients in Table 2. The domestic Indian ETR rises from 15% to 19%.

We now turn our attention to the *SUB* coefficients. We expect cross-country variation in the *SUB* coefficients to the extent that locating a foreign subsidiary in a country affects the multinational's ETR. For example, if a firm can shift profits from a high-tax country to a tax haven, then its ETR should be lower and the *SUB* coefficient for the haven should reflect those

⁴¹ For example, if a U.S. parent has subsidiaries in Canada, Germany, and Bermuda, *COUNTRY^{US}*, *SUB^{CANADA}*, *SUB^{GERMANY}*, and *SUB^{BERMUDA}* would be coded one, while all other *COUNTRY* and *SUB* variables would be coded zero.

tax savings. These *SUB* coefficients are conditional on the location of all other foreign subsidiaries. Thus, they can be interpreted as the incremental impact on ETRs of having a subsidiary in a particular foreign country.

The *SUB* coefficients range from a 1.6 percentage points decrease in ETRs for multinationals with a subsidiary in the Tax Havens to a 2.6 percentage points increase in ETRs for multinationals with a subsidiary in Croatia. Besides the Tax Havens, the dozen most negative *SUB* coefficients include tax havens, such as the Singapore (-1.2 percentage points) and Bermuda (-0.7 percentage points) plus a country widely associated with global tax mitigation, Hong Kong, at -0.8 percentage points. These findings are consistent with a foreign subsidiary in at least some tax havens lowering the parent's ETR. However, interestingly, two other countries associated with tax avoidance, the Netherlands and Ireland, have positive coefficients.

Not surprisingly, some of the more positive *SUB* coefficients include countries with relatively high taxes, e.g., France (1.3 percentage points), the UK (1.2), Italy (0.9) and Japan (0.7). However, once again the results are a bit mixed. When we segregate the sample based on OECD membership, we find no evidence that subsidiaries located in (usually high-tax) OECD countries boost the ETRs of their multinational enterprise more than subsidiaries located in other (often lower taxed) countries.

Contrary to high-tax countries resulting in highly tax subsidiaries, we find that having a U.S. subsidiary lowers a multinational's ETR by 0.5 percentage points. This finding is consistent with the U.S. Government Accountability Office's (2008) report that U.S.-controlled U.S. companies pay more taxes than foreign-controlled U.S. companies. It provides support for arguments by U.S. companies that they face a competitive disadvantage in the U.S. marketplace, since most non-U.S. multinationals (Japanese multinationals being the notable exception) already

lower ETRs before the added bonus of an ETR reduction when they establish an American subsidiary.

Finally, we measure the correlation between the *COUNTRY* coefficients and the *SUB* coefficients in Table 5 for the 20 countries/groups with both *COUNTRY* and *SUB* coefficients. If countries tax their domestic-only firms similarly to the foreign-controlled subsidiaries domiciled in their country, then the *COUNTRY* coefficients (indicating ETRs for domestic-only firms) should be positively correlated with the *SUB* coefficients (indicating the incremental ETR for multinationals with subsidiaries in that country). Consistent with this expectation, we find a positive correlation between the *COUNTRY* and *SUB* coefficients of 37%, which is significant at the 0.05 level using a one-tailed test. We interpret these findings as evidence that countries that tax their domestic-only firms heavily also tax their foreign subsidiaries heavily and vice versa. Though not surprising, to our knowledge, this is the first documentation that domestic-only firms and foreign subsidiaries in the same country face relatively similar levels of taxation.

We infer from this array of tests that some evidence exists that the domicile of the subsidiary affects the overall firm ETR; however, the evidence is far from overwhelming. Although we find no ETR difference between multinationals with tax havens and those without, some *SUB* coefficients are consistent with low-tax countries lowering overall ETRs and high-tax countries increasing them. Yet, there are notable exceptions to this pattern, e.g., Ireland, the Netherlands and the U.S. Nevertheless, we do find that countries that tax parents heavily tend to tax foreign subsidiaries heavily and vice versa. All in all, the evidence is mixed about whether the domicile of the foreign subsidiary affects the multinational's overall effective tax rate.

5.2. Parent-subsidiary interactions

One possible reason for the mixed findings in the prior section is that we restrict the *SUB* coefficient to be the same, regardless of the domicile of the parent. For example, establishing a subsidiary in Ireland may substantially lower an American firm’s ETR while having little effect on the ETR of a multinational domiciled in the UK. If so, by forcing the same *SUB* coefficient on Ireland for all countries, we may be masking its differential impact across countries. Thus, in this section, we alter the research design to allow for the possibility that foreign subsidiaries affect the ETRs of their parents differently depending on the domicile of the parent.

To conduct this extension, we modify equation (2) by replacing the *SUB* variables with interactions between the *COUNTRY* and *SUB* variables. We then compare the coefficients on the interactions to assess the extent to which subsidiaries affect parents differently, depending on whether the parent is in a high-tax or low-tax country.

$$\begin{aligned}
 ETR_{it} = & \sum \beta_{0j} COUNTRY_{it}^j + \sum \beta_{1l} COUNTRY_{it}^j * SUB_{it}^k \\
 & + \sum \beta_{3m} INDUSTRY_{it}^m + \sum \beta_{4n} YEAR_{it}^n + \sum \beta_{5p} SIZE_{it}^p + \varepsilon_{it} \quad (3)
 \end{aligned}$$

Table 6 presents the estimated interaction coefficients (no coefficients are shown unless there are at least 50 observations in a cell) for major parent locations and select subsidiary countries. The dependent variable is always current ETR, except for the last column, which reports results for the U.S. only, using the cash ETR as the dependent variable (no other country has enough cash ETR observations to warrant tabulation).⁴²

There are far too many *COUNTRY*SUM* coefficients in Table 6 to cover them in any detail here. Thus, for brevity, we comment only on U.S. inbound and outbound activities and leave the many other statistics in this table for the reader to peruse. Beginning with inbound

⁴² Each number in Table 6 represents the marginal ETR impact from a particular parent-subsidiary country mix. For example, on the first line the -8.9 means that a French parent has a 8.9 percentage points lower current ETR, on average, if it has a subsidiary in Argentina.

investment, Table 5 shows that a subsidiary in the U.S. lowers a multinational's current ETR by 0.5 percentage points, on average. Table 6 expands the analysis to show that having a subsidiary in the U.S. affects a multinational differently, depending on its domicile, suggesting that the *SUB* coefficient constraint in equation (2) materially affects inferences. We find that the marginal effect of an American subsidiary on current ETRs ranges from a decrease of 1.9 percentage points for a European parent to an increase of 3.8 percentage points for a German parent.

For outbound investment from the U.S., we turn to the last column in the table, which shows the marginal effect on cash taxes paid for an American multinational having operations in various countries. We find weak evidence that investments in developed, (generally) high-tax countries increase U.S. companies' cash ETRs. Locating a subsidiary in an OECD country listed increases the American multinational's cash ETR by 0.2 percentage point, while a subsidiary in a non-OECD country drives down the U.S. multinational's ETR by 0.5 percentage point. The difference is significant at the 10% level.

However, locating a subsidiary in a tax haven (Ireland, Luxembourg, Singapore or the Tax Havens) lowers U.S. multinationals' cash ETRs by -1.2 percentage points, on average.⁴³ This is significantly less than the 0.05 percentage point increase for the non-haven countries (at the 0.05 level). Moreover, if tax havens are typically paired with subsidiaries in high-tax locations (e.g., if Bermudan subsidiaries always co-exist with higher taxed British subsidiaries), then clustering effects among subsidiaries may understate the importance of tax havens because the tax haven coefficients may be capturing some of their companion high-tax countries' impact on ETRs (Dyreng et al, 2011).

⁴³Even though they are computed with different data and methodology, this study's 1.2 percentage point cash ETR reduction for these four tax havens is similar to Dyreng and Lindsey's (2009) 1.5 percentage point estimate for tax haven activity by U.S. multinationals.

6. Closing Remarks

To our knowledge, this paper provides the most comprehensive analysis of international corporate income tax expense to date. It is the first study to compute effective taxes using cash taxes paid and current and total income tax expense data for thousands of companies around the world. Our principal findings include: The domiciliary location of a multinational company substantially affects its worldwide tax liability. Japanese multinationals consistently face the highest ETRs. American multinationals face among the next highest ETRs. Tax haven multinationals enjoy the lowest ETRs. Multinationals and domestic-only firms face similar ETRs. ETRs declined worldwide over the last two decades; however, the ordinal rank from high-tax countries to low-tax countries remained remarkably constant. ETRs vary considerably across industries. The evidence mostly shows that the location of its foreign subsidiaries affects a multinational's worldwide ETR.

Understanding the role that domicile plays in multinational decisions is central to both scholarly and policy discussions about international taxes. Two decades ago, the taxation of multinationals was an obscure area of the law, understood by few practitioners, rarely mentioned in policy circles, and largely ignored by academe. Today, globalization has made the taxation of international commerce relevant to most businesses, central to policy discussions about jobs, trade, and competitiveness, and an area of principal interest to scholars in economics, accounting, law, finance, and related fields. The ETR estimates in this study should provide useful and needed quantitative information as policymakers, business, and scholars around the globe grapple with the complexities surrounding the taxation of multinational activities.

By shedding light on the importance of domicile for multinationals, the paper is particularly timely for American policymakers as the U.S. struggles to respond to Japan and the

UK's recent decisions to adopt territorial taxation, which have left the U.S. as the sole major power still employing a system of worldwide taxation. To the ire of many U.S.-domiciled multinationals, President Obama has proposed strengthening the worldwide system through further restrictions on the deferral of U.S. tax on foreign profits. U.S. multinationals appear to be coalescing around territorial taxation as long as expenses related to foreign-source income can still be deducted against U.S. income. The findings in this study may hasten the development of U.S. tax reform by showing that U.S. multinational ETRs are among the highest in the world. Moreover, if territorial taxation further lowers the taxes on Japanese and British multinationals, then the U.S. may be forced to provide some tax relief for its multinationals to maintain some level of international tax competitiveness.

Further work is warranted to understand how the tax order of countries has remained so steady over two decades of radical worldwide changes in tax policy, financial reporting, economic development, law, politics, technology, and many other areas. Although tax rates have fallen dramatically over the last 20 years, high-tax countries remain high-tax, and low-tax countries remain low-tax. Perhaps globalization permits countries to change their tax systems but forces a herding effect because tax changes in one country reverberate around the globe (see Griffith and Klemm, 2005, for a discussion of tax competition among OECD countries). If so, countries, including the U.S., may find it difficult to sustain policies that do not conform to international norms.

As with any empirical study, simplifying assumptions are necessary. We close by repeating a few of the key caveats in this paper. First, although the data are superior to any in the past, they are incomplete. We have accounting information, not actual tax returns. We only know the location of foreign subsidiaries in the most recent year of the data. The data may not

capture all foreign subsidiaries. Furthermore, our analysis assumes that the decision to locate a subsidiary in a foreign country is made without consideration of the portfolio of current subsidiary locations or possible ones in the future. Finally, although we have the most extensive database to date, some countries have a limited number of domiciled companies. Therefore, readers should interpret data for small countries with some caution. That said, the study is the best attempt to date to compare the effective tax rates of all publicly-traded companies around the globe.

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Table 1 – Summary statistics by country/group. 2005-2009.

		N	Revenue	Assets	Equity	Pretax Income	Mean current ETR	Median current ETR	Statutory tax rate
Full sample	DOM	13,917	993	2,266	543	93	28	30	39
	MNAT	14,426	5,309	14,386	2,553	587	27	28	39
AUSTRALIA	DOM	104	1,416	2,404	563	125	22	25	30
	MNAT	342	2,311	12,549	1,775	505	22	26	30
BERMUDA	DOM	29	1,004	2,546	1,566	276	5	2	0
	MNAT	289	840	1,307	474	110	12	9	0
CANADA	DOM	568	997	1,809	641	118	14	7	36
	MNAT	603	2,359	7,062	1,936	417	21	21	36
CAYMAN ISLANDS	DOM	9	201	308	215	42	10	8	0
	MNAT	198	312	454	259	52	13	11	0
FRANCE	DOM	150	389	4,109	594	69	25	28	35
	MNAT	212	17,583	67,342	8,325	1,828	23	25	35
GERMANY	DOM	116	3,837	2,347	506	100	16	13	37
	MNAT	324	13,431	51,792	5,902	1,060	24	25	37
INDIA	DOM	113	597	1,657	363	109	22	23	34
	MNAT	269	774	1,350	491	135	17	14	34
JAPAN	DOM	6,194	703	2,574	377	45	37	41	40
	MNAT	3,258	5,563	11,256	2,308	341	36	37	40
MALAYSIA	DOM	174	465	1,503	374	61	19	19	27
	MNAT	107	615	6,346	650	144	17	18	27
SOUTH AFRICA	DOM	71	575	1,203	729	165	18	19	29
	MNAT	150	2,466	9,150	1,342	422	25	26	29
SWEDEN	DOM	94	243	682	284	61	10	2	28
	MNAT	196	2,268	9,033	1,545	386	18	20	28
SWITZERLAND	DOM	50	1,461	3,127	1,591	394	17	15	21
	MNAT	164	8,574	62,774	4,848	1,093	19	18	21
TAIWAN	DOM	207	1,139	1,887	718	111	20	20	25
	MNAT	689	1,993	1,984	795	147	18	17	25
UNITED KINGDOM	DOM	1,047	344	683	306	60	20	22	30
	MNAT	892	5,452	34,334	3,211	788	24	26	30
UNITED STATES	DOM	3,830	1,655	2,366	771	152	23	25	39
	MNAT	5,244	6,358	11,496	2,964	804	28	30	39
AFRICA	DOM	13	269	1,026	189	51	21	23	26
	MNAT	25	471	3,042	532	128	21	21	30
ASIA	DOM	210	826	1,662	444	110	21	20	32
	MNAT	67	1,981	5,736	1,130	240	18	19	31
EUROPE	DOM	556	642	1,327	440	97	21	21	23
	MNAT	842	5,325	22,379	2,458	616	21	22	29
LATIN AMERICA	DOM	166	1,366	1,976	815	159	21	21	30
	MNAT	111	4,179	8,632	2,070	849	24	22	28
MIDDLE EAST	DOM	47	480	1,771	325	104	11	10	15
	MNAT	110	965	5,473	898	192	17	11	31
TAX HAVENS	DOM	169	1,297	5,393	2,509	367	10	8	18
	MNAT	334	1,788	9,465	2,179	328	15	14	18

This table presents the means of the variables by country/group and firm type (DOM = domestic, MNAT = multinational). All figures are in millions of U.S. dollars. ETR = current tax expense/pretax income. Statutory rate is the weighted average maximum corporate rate for the group, weighted by number of observations.

Table 2 – Main results. Pooled sample 2005-2009.

	cash ETR				current ETR				total ETR			
	0.71				0.80				0.87			
	12,509				28,343				41,642			
AdjR2	Domestic		Multinational		Domestic		Multinational		Domestic		Multinational	
N	Actual	Estimate	Actual	Estimate	Actual	Estimate	Actual	Estimate	Actual	Estimate	Actual	Estimate
AUSTRALIA	26	23	24	22	22	20	22	19	26	27	26	26
BERMUDA			14	14			12	9			16	17
CANADA	15	14	20	19*	14	13	21	18*	23	23	26	26*
CAYMAN ISLANDS							13	10			15	16
FRANCE			27	22	25	23	23	19*	27	28	29	28
GERMANY			25	22	16	15	24	19*	27	29	29	29
INDIA			18	17	22	19	17	13*	26	26	21	22*
JAPAN					37	33	36	31*	42	41	39	39*
MALAYSIA	19	19			19	16	17	15	23	24	19	20*
SOUTH AFRICA					18	16	25	20*	25	26	29	28*
SWEDEN					10	10	18	14*	19	21	25	25*
SWITZERLAND			19	15	17	18	19	14*	19	22	21	21
TAIWAN					20	17	18	14*	20	21	18	19*
UNITED KINGDOM	22	20	24	22	20	17	24	20*	23	24	27	26*
UNITED STATES	22	20	25	21*	23	19	28	23*	29	30	30	30
AFRICA											26	28
ASIA	26	24			21	20	18	16	23	23	21	21*
EUROPE	26	24	23	21*	21	20	21	18	25	26	25	26
LATIN AMERICA	19	19	19	16	21	18	24	19	24	25	23	23*
MIDDLE EAST			11	11			17	14	13	15	18	19*
TAX HAVENS			18	16	10	10	15	13*	16	18	17	18

This table presents the results of estimating $ETR_{it} = \sum \beta_{0j} COUNTRY_{it}^j + \sum \beta_{1j} (COUNTRY_{it}^j * MN_{it}) + CONTROLS$ on three separate samples, each with ETR calculated as the tax measure in the column heading scaled by pretax income. The subcolumns titled Actual report the mean ETR as reported on the financial statements. The subcolumns titled Estimate report the estimates of the coefficients. The Domestic Estimate is the estimate of β_0 for each country/group. The Multinational Estimate is the estimate of $(\beta_0 + \beta_1)$ for each country/group. All available observations were included in the estimation, but estimates are only reported for countries/groups having 50 or more observations. * indicates that β_1 is statistically significant at the 5% level, i.e., that the number in the Domestic Estimate column is statistically different from the number in the corresponding Multinational Estimate column. For example, the estimate of cashETR for Canadian domestic firms (14%) is statistically different from the estimate for Canadian multinational firms (19%).

Table 3 – Results by year, 1988-2009. Current tax expense. Multinationals and Domestics pooled.

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
AdjR2	0.92	0.92	0.90	0.91	0.90	0.89	0.88	0.87	0.87	0.87	0.86	0.84	0.84	0.82	0.79	0.77	0.78	0.79	0.80	0.82	0.81	0.79
N	2,295	2,460	2,501	2,510	2,543	2,744	3,253	3,736	4,307	4,545	4,364	4,773	4,834	4,365	4,890	5,780	6,415	6,298	7,532	5,848	4,318	4,347
AUSTRALIA		29	22				22	20	22	22	19	20	22	16	18	16	19	21	23	21	18	17
BERMUDA							10		12	9	9	10	7	11	11	8	9	10	11	12	12	7
CANADA	14	24	15	19	21	19	22	21	22	20	19	21	21	20	19	15	18	19	18	18	16	15
CAYMAN ISLANDS															8	8	8	12	11	9	13	13
FRANCE		29	21	26	24	23	25	27	29	29	29	28	27	26	25	25	24	25	21	22	18	25
GERMANY									29	33	32	31	31	27	26	28	21	18	21	19	20	19
INDIA				22	12	8	13	12	17	12	6	9	8	12	15	12	13	17	17	18	19	
JAPAN	44	52	41	48	46	43	45	44	44	43	43	42	41	38	36	32	33	34	34	34	36	30
MALAYSIA				32	25	25	28	25	27	22	21	5	21	23	22	18	20	20	17	16	17	15
SOUTH AFRICA										16	14	13	18	18		16		20	21	20	21	20
SWEDEN							20	15	18	19	18	19	20	22	18	15	16	15	15	13	15	11
SWITZERLAND		26	19	27	20	12	22	20	22	19	20	19	21	21	19	19	20	20	17			11
TAIWAN									12	8	12	8	8	8	12	11	12	15	15	15	18	16
UNITED KINGDOM	24	33	25	31	27	24	28	26	28	25	24	24	23	22	22	20	20	19	20	20	22	18
UNITED STATES	22	32	23	30	26	23	27	26	27	25	24	25	25	23	21	18	20	24	23	24	23	20
ASIA						12	18	20	22	21	18	18	23	20	16	14	22	21	22	18	20	16
EUROPE		27	20	24	20	17	21	21	23	22	22	25	25	24	25	23	22	22	20	20	20	17
LATIN AMERICA						8			15	12	10	13	19	15	21	14	16	22	19	20	22	18
MIDDLE EAST											13	13	15	18	16	15	14	17	18			
TAX HAVENS		22	15	18	16	12	17	16	18	16	13	16	16	14	14	14	16	15	14	11	13	11

This table presents the results of estimating $ETR_t = \sum \beta_j COUNTRY_t^j + CONTROLS$ on separate samples for each year. $ETR = Current\ tax\ expense / Pretax\ income$. Each cell reports the estimate of β_0 for each country/group. Estimates are reported for country-years with 20 or more observations.

Table 4 – Results by industry. 2005-2009. Current tax expense. Multinationals and Domestics pooled.

	Construction (23)	Finance (52)	Information (51)	Manufacturing (31, 32, 33)	Mining (21)	Other	Professional (54)	Real Estate (53)	Retail Trade (44, 45)	Transportation (48, 49)
AdjR2	0.80	0.74	0.78	0.84	0.63	0.84	0.83	0.79	0.89	0.83
N	1,071	2,897	1,815	11,002	812	4,229	1,522	952	1,534	919
AUSTRALIA		24	26	23	8	24	24			
BERMUDA		11		10		12		12		14
CANADA	19	18	14	19	9	20	26		23	15
CAYMAN ISLANDS				12		14				
FRANCE	27	29	15	27		24	23	15		
GERMANY		18	18	24		24	19	19		
INDIA	23	27	13	19			12			
JAPAN	33	30	36	34	14	39	39	38	41	39
MALAYSIA	24	21		14		21				
SOUTH AFRICA		18		22		20				
SWEDEN		19	11	19		17	13	12		
SWITZERLAND		18		18		17				
TAIWAN				16		24				15
UNITED KINGDOM	26	19	17	22	15	22	25	19	24	19
UNITED STATES	30	20	19	26	6	27	27	19	31	19
AFRICA		23								
ASIA	20	22		16		24				
EUROPE	22	23	19	22	13	24	18	14	22	13
LATIN AMERICA	19	23	17	20		24			24	
MIDDLE EAST		20		14		16				
TAX HAVENS	11	14	14	15		16	17	17		16

This table reports the results of estimating $ETR_{it} = \sum \beta_{0j} COUNTRY_{it}^j + CONTROLS$ for each industry (two-digit NAICS numbers included in each group are included in parentheses). Each cell reports the estimate of β_0 for the given country in the given industry. All firm-years in 2005-2009 in the industry were included in the regressions. Estimates are reported for country-industries with 20 or more observations. $ETR = Current\ tax\ expense/Pretax\ income$.

Table 5 – 2005-2009. Current tax expense. Subsidiary specification.

AdjR2	0.80				
N	28,343				
Parents	Estimate	Subsidiaries	Estimate	Subsidiaries	Estimate
AUSTRALIA	19	ARGENTINA	0.6	LUXEMBOURG	(0.5)
BERMUDA	10	AUSTRALIA	0.1	MALAYSIA	(0.9)
CANADA	16	AUSTRIA	(0.7)	MEXICO	0.7
CAYMAN ISLANDS	11	BELGIUM	0.3	NETHERLANDS	0.3
FRANCE	21	BERMUDA	(0.7)	NORWAY	0.9
GERMANY	18	BRAZIL	(0.5)	PERU	0.5
INDIA	15	BULGARIA	(1.3)	POLAND	0.2
JAPAN	33	CANADA	0.6	PORTUGAL	0.4
MALAYSIA	16	CAYMAN ISLANDS	(0.1)	ROMANIA	0.0
SOUTH AFRICA	19	CHILE	1.1	RUSSIA	(0.6)
SWEDEN	12	CHINA	(0.3)	RUSSIAN FEDERATION	(0.3)
SWITZERLAND	15	COLOMBIA	1.4	SINGAPORE	(1.2)
TAIWAN	15	CROATIA	2.6	SLOVAKIA	(1.6)
UNITED KINGDOM	18	CZECH REPUBLIC	(0.4)	SOUTH AFRICA	2.5
UNITED STATES	21	DENMARK	(0.1)	SOUTH KOREA	(1.6)
AFRICA	22	ESTONIA	(0.4)	SPAIN	(1.2)
ASIA	19	FINLAND	(0.2)	SWEDEN	(0.2)
EUROPE	19	FRANCE	1.3	SWITZERLAND	0.8
LATIN AMERICA	19	GERMANY	(0.5)	THAILAND	(0.7)
MIDDLE EAST	13	GREECE	(0.5)	UNITED KINGDOM	1.2
TAX HAVENS	12	HONG KONG	(0.8)	UNITED STATES	(0.5)
		HUNGARY	0.1	VENEZUELA	(0.8)
		INDIA	(0.4)	AFRICA	2.1
		IRELAND	0.4	ASIA	0.3
		ITALY	0.9	EUROPE	(1.4)
		JAPAN	0.7	LATIN AMERICA	1.3
		LATVIA	0.3	MIDDLE EAST	0.7
		LITHUANIA	0.4	TAX HAVENS	(1.6)

This table presents the results of estimating $ETR_{it} = \sum \beta_{0j} COUNTRY_{it}^j + \sum \beta_{1k} SUB_{it}^k + CONTROLS$. The Parents column reports the estimate of β_0 for each country/group. The Subsidiaries column reports the estimate of β_1 for each country/group.
 $ETR = Current\ tax\ expense / Pretax\ income$.

Table 6 – 2005-2009. Current tax expense. Subsidiary specification.

Subsidiaries	Parents	FRANCE	GERMANY	JAPAN	SWEDEN	SWITZERLAND	TAIWAN	UK	EUROPE	USA	USA Cash
ARGENTINA		(8.9)		(1.1)				2.8	6.0	(0.3)	(0.0)
AUSTRALIA			(1.1)	(0.8)				0.5		0.9	1.1
AUSTRIA		(0.6)	(2.5)	0.6	4.3	(0.3)		(0.8)	1.7	(0.7)	0.7
BELGIUM		(4.8)	(5.3)	0.4	(3.8)	1.3		2.0	1.0	0.8	1.4
BERMUDA										(1.8)	
BRAZIL		1.7	1.4	(2.0)		(2.0)		1.7	3.8	(0.5)	(0.5)
BULGARIA									2.5	(9.3)	
CANADA		0.8	(3.5)	(2.6)		(0.9)		(0.2)	(0.5)	1.8	1.4
CAYMAN ISLANDS										1.3	
CHILE		11.7		(0.3)				7.3	(1.5)	0.3	2.3
CHINA				1.3			(0.4)			(1.8)	(1.6)
COLOMBIA										2.6	
CROATIA									0.2	4.3	
CZECH REPUBLIC		(1.9)	5.2	0.8		(6.5)		(3.5)	(0.6)	(0.1)	0.4
DENMARK		3.6	(1.1)	3.5	1.5			(2.2)	(1.0)	(0.7)	(1.4)
ESTONIA					5.1				(0.1)	0.3	
FINLAND		(7.6)	1.5	0.1	5.2			0.7	0.4	(0.3)	0.5
FRANCE			(1.9)	1.8	4.0	4.8		1.0	(0.2)	1.0	1.1
GERMANY		(6.7)		(0.0)	1.0	(4.3)	2.2	2.7	(1.1)	(0.7)	(2.0)
GREECE		(8.8)	3.5					(10.3)		(2.6)	(0.4)
HONG KONG				(0.9)						(0.8)	
HUNGARY		(2.7)	(4.0)	4.4					1.9	(2.4)	0.8
INDIA				0.8						(1.5)	(2.7)
IRELAND		6.1	0.5	(1.0)				0.8	(1.5)	(0.5)	(1.6)
ITALY		5.8	2.0	0.6	1.2	1.2		2.8	(0.7)	1.5	1.7
JAPAN		6.8	(1.2)			(0.8)	(2.6)	2.4	(5.9)	0.4	0.2
LATVIA									(2.7)		
LUXEMBOURG		(3.1)	2.5	(2.3)				(3.4)	0.5	(0.8)	(1.1)
MALAYSIA				(1.2)						0.1	1.0
MEXICO		(2.2)	1.3	(0.5)		0.0		(0.4)	2.8	0.9	1.4
NETHERLANDS		(0.3)	3.9	(1.1)	(7.3)	(1.7)	0.3	3.8	(1.2)	(0.1)	(0.5)
NORWAY		2.7	(6.8)	(1.4)	1.0			6.0	(0.4)	0.5	0.3
PERU										(1.3)	
POLAND		10.7	1.5	(0.6)	(1.5)	8.2		(3.6)	(0.7)	2.1	2.7
PORTUGAL		(2.3)	3.8	0.2				(3.1)	(0.4)	1.1	(0.9)
ROMANIA		(2.9)	3.9	2.1					(0.8)	1.9	(0.3)
RUSSIA									(4.0)	1.1	
RUSSIAN FEDERATION		3.6	(5.3)	(0.5)				(0.1)	1.2	(1.6)	(1.6)
SINGAPORE		16.3		(1.9)				1.6		(1.4)	(2.0)
SLOVAKIA		0.0	(11.1)	(1.7)					(0.6)	(2.9)	
SOUTH AFRICA										3.7	
SOUTH KOREA		(15.8)	4.7	1.0						(2.4)	(2.4)
SPAIN		(4.6)	4.4	(1.1)	5.8	2.3		(1.5)	0.4	(1.6)	(2.2)
SWEDEN		(2.0)	7.5	0.9		(0.5)		(1.6)	(3.2)	0.8	(0.6)
SWITZERLAND		(10.9)	(1.2)	(1.5)	(4.0)			(0.9)	2.9	0.6	0.1
THAILAND				(1.2)						(0.8)	(0.8)
UNITED KINGDOM		1.1	1.4	0.5	(0.4)	(8.6)	(1.3)		2.4	2.3	0.5
UNITED STATES		(0.8)	3.8	(0.8)	3.2	3.7	(1.5)	(1.9)	0.1		
VENEZUELA				4.5						0.5	
AFRICA		(11.9)						2.9		4.5	3.9
ASIA				(0.6)						1.8	(0.6)
EUROPE		17.4	4.0							(1.7)	(1.4)
LATIN AMERICA										0.9	(0.1)
MIDDLE EAST										3.6	1.0
TAX HAVENS							(2.1)		(3.5)	(2.2)	(0.2)

This table presents the results of estimating $ETR_{it} = \sum \beta_{0j} COUNTRY_{it}^j + \sum \beta_{2n} COUNTRY_{it}^j * SUB_{it}^k + CONTROLS$ on a subsample of the sample described in Table 1 for which we have necessary subsidiary information. Each cell reports the estimate of β_2 for the interaction of the given parent and subsidiary variables. For example, the estimate of β_2 for the interaction term $COUNTRY_{it}^{USA} * SUB_{it}^{ARGENTINA}$ is -0.3. All interaction terms were included in the estimation, but estimates are only reported for cells with 50 or more observations. $ETR = Current\ tax\ expense / Pretax\ income$ for all columns except the last. The last column reports the results of a separate regression with $ETR = Cash\ taxes\ paid / Pretax\ income$.