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 12,533 corporations from 79 countries from 1988 to 2007 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 for the last two decades worldwide; however, the ordinal rank from high-tax countries to low-tax countries 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 multinational profits.

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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 a debate about the competitiveness of countries 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, that new companies anticipating substantial foreign operations should not incorporate in the U.S., and that 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, 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 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

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[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 twenty largest Dutch companies are paying any corporate income tax to the Netherlands (Dohmen, 2008).

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. 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).[4] 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.[5]

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[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] 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.

[5] 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.[6] 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 country.[7] Furthermore, some claim that the tax avoidance opportunities that arise from conducting business in multiple countries gives multinationals an advantage over their domestic-only counterparts.[8] Moreover, 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, stated last month that the size of the U.S. domestic market and the fact that other countries with smaller economies have to rely more on cross-border trading renders the U.S. unique and incomparable with other countries, thus justifying differences in U.S. taxation of multinationals (Coder, 2010). In effect, he argues that the economic advantages

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[6] 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.

[7] 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.

[8] 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."

of the U.S. market offset any tax disadvantages associated with U.S. domicile. In short, it is an empirical issue whether domicile substantially affects a multinational's total worldwide taxes.[9]

To shed empirical 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.[10] We measure corporate income taxes by estimating country-level effective tax rates (ETRs). In particular, we regress firm-level ETRs (based on both cash taxes paid and current tax expense) for 12,533 parents domiciled in 79 countries with subsidiaries in 209 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 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. Lastly, we use the data and estimates to develop a measure of each country's book-tax conformity.

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[9] 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."

[10] 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.

The principal finding from the study is that domicile continues to substantially affect 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 even though tax havens and other low-tax countries exist. In fact, we find that the ETRs for multinationals in high-tax countries 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 enjoy the lowest ETRs. In some countries, multinationals face higher ETRs than their domestic counterparts; in others, multinationals face lower ETRs. However, 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 UK, and the Netherlands), the ordinal rank from high-tax countries to low-tax countries has changed little. Furthermore, ETRs vary widely across industries throughout the world with construction companies and retailers typically facing ETRs double 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 Cayman Islands (Bermuda) reduces the cash ETR by 3.1 (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.

Recently, 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):[11]

$$ETR_{it} = \sum \beta_{0_j} COUNTRY_{it}^j + \sum \beta_{1_j} (COUNTRY_{it}^j * MN_{it})$$

$$+ \sum \beta_{2_k} INDUSTRY_{it}^k + \sum \beta_{3_m} YEAR_{it}^m + \sum \beta_{4_n} SIZE_{it}^n + \varepsilon_{it} \qquad (1)$$

where: ETR_{it} = the effective tax rate 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.

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[11] 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.

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.

$n=\{$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.[12] 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*.[13]

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

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[12] 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.

[13] 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 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.

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.[14] 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.[15] 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).[16] 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. Unfortunately, not all countries require firms 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 occasionally use the total ETR.

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

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[14] 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).

[15] 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.

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

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 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.

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. [17]

We include all parents that have at least one subsidiary.[18] 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

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[17] 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.
[18] 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.

and the ETR with the sum of current and deferred tax expense in the numerator is greater than one percentage point.[19] 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%.

The Orbis subsidiary measure has a serious flaw. Orbis only reports the subsidiary information as of the most recent updating of the information.[20] 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 2002.[21] Our logic is that the foreign subsidiary coding is correct for 2007, has fewer errors in 2006 than in 2005, and has fewer errors in 2005 than in 2004, 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.

Our sample selection process yields a main sample for the years 2003-2007 of 35,673 firm-years spanning 79 countries, ranging from only one firm-year in three countries to 10,458 in Japan. We combine the countries with fewer than 100 observations into six categories: Africa, Asia, Europe, Latin America, Middle East, and Tax Havens. The remaining twenty countries are

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[19] 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.

[20] For example, if a company had no subsidiary in Canada before 2007 (the most recent year in the database) and then incorporated a subsidiary in Canada in 2007, 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 2007 and then liquidated the Canadian subsidiary in 2006, we would erroneously treat the company as not having had a subsidiary in Canada for any year in our sample.

[21] 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 2002, we reduce the deleterious effects of survivorship bias.

included on their own and our main tests are conducted and results are reported using these 26 countries and groups. For the 26 countries and groups, Table 1 reports the firm-year means of Sales, Assets, Equity, and Pretax income, dichotomized into 14,499 domestic-only firms and 21,174 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 $ETR = Current\ tax\ expense/Pretax\ income$. These are the actual ETRs from the firms' financial statements, not ETRs estimated from regression analysis. The domestics (multinationals) have mean ETRs of 27% (25%) and median ETRs of 29% (26%). The final column presents the average statutory tax rate for the country-years in the sample.[22] The numbers reported are the weighted average rates, where the weighting was done by number of firm-years. In the full sample, domestics (multinationals) faced average statutory tax rates of 39% (38%).

In general, the three tax rate columns paint a similar picture. Countries with high statutory tax rates tend to have high ETR. One notable exception is multinationals domiciled in Bermuda and Cayman Islands. They face the zero statutory rates but their ETRs are not much lower than those in most other countries. This discrepancy between statutory and effective tax rates is consistent with multinationals in tax havens having extensive foreign operations in high-tax countries. Even though they may face no taxes on their domestic income, they still must pay taxes abroad.

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[22] 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.

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 are reported in columns immediately to the left of the estimates (Mean).[23] 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 93%. Furthermore, the difference between the actual ETR and the estimated ETR is never more than four percentage points. 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.

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[23] To illustrate, for Australian companies, using cash taxes paid, the mean raw ETR from the financial statements for domestic-only firms is 25%, while the estimated cash ETR for domestics is 23%. The same figures for multinationals are 25% (raw) and 23% (estimated). In the center of the table, when current income tax expense is the numerator, the mean raw ETR for domestic-only firms is 17%. The estimate also is 17%. For multinationals, the raw (estimated) current ETR is 20% (18%). At the far right, we find that when the total income tax expense is the numerator, the mean raw (estimated) ETR for domestics is 23% (23%) and for multinationals is 25% (24%).

4.2. Do ETRs differ between domestics and multinationals?

Next, we compare the estimated ETRs for domestic-only firms with those for multinationals. We have enough firm-years to report estimated domestic cash ETRs for seven countries or groups of countries (Australia, Canada, Malaysia, Singapore, UK, U.S. and Asia). The estimated domestic cash ETRs for these countries are within two percentage points of their multinational counterparts with two exceptions: Canada's domestic cash ETR is 13%, while its multinational cash ETR is 18%; Malaysia's domestic cash ETR is 24%, while its multinational cash ETR is 17%. These also are the only two countries where the multinational and domestic cash ETRs are significantly different from each other at the 0.05 level (as indicated in Table 2 with an asterisk). The domestic cash ETR and the multinational cash ETR estimate for the U.S. are the same, 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 19 domestic current ETRs and 22 domestic total ETRs. The correlation between these domestic ETRs and their multinational counterparts is 78% for the current ETRs and 88% for the total ETRs. The absolute value of the difference between the domestic and the multinational ETRs is two percentage points for both current ETRs and total ETRs. The largest differences in absolute value are Sweden's current ETRs, which are 16% for multinationals but only 8% for domestics, and Germany's current ETRs, which are 22% for multinationals but only 15% for domestics. Among the current ETRs, seven countries' domestic MTRs exceed their multinational ETRs, while 10 countries' multinational ETRs exceed their domestic ETRs. Half of the 18 countries with both domestic and multinational current ETRs have domestic and multinational ETRs that are statistically different from each other. Conversely, among the total

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ETRs, domestic ETRs tend to be larger. Fourteen countries' domestic ETRs exceed their multinational ETRs, while seven countries' multinational ETRs exceed their domestic ETRs. Thirteen of the 22 countries with both domestic and multinational total ETRs have domestic and multinational ETRs that are statistically different from each other. The U.S. domestic (multinational) current ETR is 19% (22%). The U.S. domestic (multinational) total ETR is 29% (28%). Both pairs are statistically different.

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

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

Table 2 reports estimated multinational cash ETRs for 18 countries, ranging from 11% (Cayman Islands and the Tax Havens) to 23% (Australia and France) with mean (median) [standard deviation] of 17% (17%) [4%]. Another tax haven, Bermuda, has the next lowest cash ETR at 12%. The U.S. multinational cash ETR is 20%, fourth highest.

By shifting to current ETRs, we can compare taxes across six more (groups of) countries: China, Japan, Norway, Sweden, Taiwan and Latin America. The multinational current ETRs triple from a low of 11% (Bermuda and Cayman Islands) to a high of 31% (Japan) with mean (median) [standard deviation] of 18% (18%) [4%]. The Tax Havens have the next lowest current ETR at 12%. The U.S. multinational current ETR is 22%, the same as Germany's and exceeded only by those in Japan and France (23%).

The Pearson correlation coefficient between the estimated cash ETRs and the estimated current ETRs is 87%. The largest difference between cash ETRs and current ETRs in absolute value is five percentage points for Australia (23% for cash taxes paid and 18% for current income taxes). Two other spreads in absolute value are three percentage points (both Switzerland and the Middle East are 14% in cash ETR and 17% in current ETR). No other spreads exceed two percentage points. We conclude that the estimated cash ETRs and the estimated current ETRs are sufficiently similar that for the remainder of the paper, we focus on the current ETRs because they enable us to compare more countries.

We could add Russia and Africa by using total ETRs. However, ETR estimates are substantially larger using total ETRs, which is not surprising since deferred tax liabilities usually exceed deferred tax assets (Poterba, et al. 2009). Thus, it appears that using current ETRs closely approximates actual tax payments, but using total ETRs overstates the corporate tax payments. That said, the rank order remains similar across countries and correlation between cash (current) ETRs and total ETRs across countries is 86% (94%). In particular, Table 2 shows that the multinational total ETRs range from 14% (Cayman Islands and Bermuda) to 37% (Japan) with mean (median) [standard deviation] of 22% (22%) [5%]. The Tax Havens and

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Taiwan have the next lowest total ETR at 15%. The U.S. multinational cash ETR is 28%, tied

for second with Germany. France, Russia, and Africa follow at 26%.

We infer from this analysis of cash, current, and total multinational ETRs that the

domicile of the multinational significantly affects a firm's ETR. After controlling for industry,

year, and size, we find that ETRs in the highest taxed countries are two to three times larger than

those in the least heavily taxed countries. The rank order of the countries holds across ETR

measures. Japan, the U.S., France and Germany are always among the highest taxed countries

(Australia only appears to be a high-tax country when we use cash taxes paid). Tax havens, such

as the Cayman Islands and Bermuda, dominate the low-tax countries.   Furthermore, OECD

countries consistently have higher ETRs than do other countries. Ignoring the groups of

countries (e.g., Asia, Tax Havens, etc.), the mean current ETR for the eight non-OECD countries

is 15% and the mean current ETR for the 11 OECD countries is 20%. In fact, except for South

Africa at 21% and Malaysia at 17%, all eight non-OECD countries have lower current ETRs than

any of the 11 OECD countries.

   4.4. Have ETRs changed over time?

The findings above are for firm-years from 2003 to 2007. 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 ETRs, using the complete sample of firm-years and modifying equation (1) to

allow annual estimates for each country. These estimated regression coefficients enable us to

analyze the changes in ETRs over time for each country.

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. As noted above, hereafter in the paper no distinction is made between domestic and multinational ETRs because we find no consistent differences between them, and current ETRs alone are reported because they provide more observations and closely approximate ETRs estimated using the more desirable tax measure, cash taxes paid.

We find that the high-tax to low-tax rank across countries has changed little over the two decades. In 1988, the Japanese multinational ETR was the highest at 36% (11 percentage points ahead of the next country, UK). In 2007, they were the highest at 34% (seven percentage points higher than Russia, the country with the next largest ETR). In fact, in every year Japanese current ETRs are substantially higher than those in any country.[24] Ignoring Japan, the U.S., UK, France and Germany have had the highest current ETR in 15 of the 20 years, and except for 2005, none of those countries' ETRs was more than ten percentage points below the penultimate ETR. In 1989 (the first year for which we report its ETR), the Tax Havens enjoyed the lowest multinational ETR at 14%, eight percentage points below the next lowest ETR in Canada. Since then, the Tax Havens, the Cayman Islands, Bermuda, and Taiwan have never had a year where their ETR was more than seven percentage points above the minimum ETR.

Over the two decades, ETRs fell steadily. For the 10 countries with enough observations to compute annual ETRs in both 2007 and 1989, all had lower ETRs in 2007 than in 1989. The largest ETRs drops were Japan (15 percentage points), the UK (11 percentage points), and the

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[24] 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.

Netherlands (ten percentage points). The U.S. had a more modest decline of five percentage points from 29% in 1989 to 24% in 2007.

For the 19 countries with enough observations to compute annual ETRs in both 2007 and 1996, only four countries had a higher current ETR in 2007 than in 1996 and only one (Latin America) had an increase of more than two percentage points. The largest declines in ETR were Singapore (13 percentage points), Japan (ten percentage points), Germany, Malaysia and the Netherlands (nine percentage points), France (eight percentage points), and the UK (seven percentage points). The U.S. had a more modest decline of three percentage points from 27% in 1996 to 24% in 2007.[25]

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 ETRs over the two decades (33% in 2005 and 2006) would have exceeded the ETR for any other country in any year that we investigated. 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. Finally, the U.S. ETR has declined, but less so than the ETRs for other countries. Consequently, U.S. ETRs have risen from slightly above-average two decades ago to near the worldwide penultimate, trailing only those in Japan.

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[25] 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 1,000 firm-years. All observations are included in the regressions, but only cells with twenty or more observations are reported. Manufacturers comprise 42% of the firm-years.

Table 4 shows considerable variation across industry ETRs. However, even though the resulting current ETR estimates vary widely across industries, the rank order of industry ETRs is similar across countries, i.e., heavily taxed industries tend to be heavily taxed across all countries and lightly taxed industries tend to be lightly taxed across all countries. Specifically, the average current ETR across countries is highest for the Construction and Retail Trade industries at 23%. Of the 17 countries who report ETRs for the Construction industry, 11 show a higher ETR for Construction than any other industry. The highest U.S. ETR is in Construction at 32%, followed by Retail Trade at 28%. The Mining industry enjoys the lowest average ETR at 11%, followed by the Information sector at 12%. Of the 19 countries that report Mining or Information ETRs, only four have their lowest ETR in another industry. The lowest U.S. ETR is in Mining at 7%, followed by Information at 13%. Australia is the only country with at least four industry ETRs that does not have its highest ETR in either Construction or Retail Trade or its lowest ETR in either Mining or Information.

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 to have low ETRs across most industries. For example, Japanese ETRs equal or exceed those from all other countries in every industry, except Construction, where Chinese ETRs exceed

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them by one percentage point. Tax havens tend to have the lowest ETRs across industries. Bermuda has the lowest ETRs in four of the eight industries in which it has enough observations to report an ETR. The Cayman Islands have the lowest ETR in the Finance industry at 5%.

Countries differ substantially in the extent to which ETRs vary across their industries. For example, the spread from highest ETR in Australia (Transportation at 24%) to the lowest ETRs (Finance and Professional at 16%) is only eight percentage points. Conversely, the spread is 25 percentage points in the U.S. (from Mining at 7% to Construction at 32%). Using the coefficient of variation for each country's industry ETRs as a standardized measure of the spread, we find that Australia at 14% and the U.K. at 20% have the least variation among industry ETRs. The Cayman Islands (49%), Malaysia (46%), China (45%), India (44%) and the U.S. (36%) have the most variation across industry. These findings suggest that Australian and British tax law have fewer industry-specific provisions than do the tax laws in the countries with greater industry ETR variation.

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 all 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 it would if its industry mix was more representative of the global mix. This difference in industry mix should not affect our 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. We conduct these tests using the current tax expense sample shown in Table 2 but do not separate domestic and multinational firms within countries. 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 -1.8% 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

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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.[26] 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. We find that the worldwide coefficient is insignificant.

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.[27] 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 not statistically significant.[28]

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[26] 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. 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).

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

[28] 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.[29] When we exclude companies domiciled in the U.S. (the only major country without a value-added tax), the correlation is more strongly 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 would be 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 5,045 firm-years with losses and actual ETRs (from the financial statements) that equal zero and estimate equation (1).[30] 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 28%, two percentage points above the Italian ETR. The Bermudan ETR is the lowest at 6%, one percentage point below the Cayman Islands'.

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[29] We thank Kevin Hassett for providing us with the valued-add tax data.
[30] 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 2,418 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%, seven percentage points above those for Russia, the country with the next highest ETR. The Bermudan and Cayman Islands ETRs are the lowest at 14%. Once again, the U.S. and European countries generally have higher ETRs than Asian countries.

All in all, we conclude from this series of additional tests that the earlier inferences about ETRs hold. Next, we expand the domestic-multinational dichotomy to consider whether the domiciles of foreign subsidiaries affect ETRs.

5. Results from Comparing Foreign Subsidiaries

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

In Equation (1), we use the presence of a foreign subsidiary to distinguish multinationals from domestic-only firms. In this section, 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 tax burdens of its parent. The regression equation is:

$$ETR_{it} = \sum \beta_{0_j} COUNTRY_{it}^j + \sum \beta_{1_k} SUB_{it}^k$$

$$+ \sum \beta_{2_m} INDUSTRY_{it}^m + \sum \beta_{3_n} YEAR_{it}^n + \sum \beta_{4_p} SIZE_{it}^p + \varepsilon_{it} \qquad (2)$$

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 coefficient

on *SUB* is the estimated impact on ETRs arising from having a subsidiary in that foreign country.

We continue to use the same 26 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*

*SUB*s coded one, where *n* is the number of different countries in which the parent has at least one

subsidiary.[31]

We begin with the original sample of 35,673 firm-years (from 2003-2007) with current

income tax expense as the numerator for the ETR. We lose 555 firm-years whose companies

indicated that they had a foreign subsidiary (which was adequate for coding it as a multinational

in estimating equation (1)), but did not specify the location of the foreign subsidiary, rendering it

unusable for estimating equation (2). For these remaining 35,188 firm-years, there are 154,994

SUB variables with a value of one. All 47 subsidiary locations have at least 1,600 firm-years.

The UK is the most popular location for foreign subsidiaries with 9,730 firm-years.

Table 5 shows the regression coefficient estimates for *COUNTRY* in Panel A and *SUB* in

Panel B. 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 are more likely to have a subsidiary in high-tax Germany than are Indian

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[31] 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.

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 three

COUNTRY coefficients changing more than two percentage points from the corresponding

COUNTRY coefficients in Table 2. The domestic Swedish tumbles from 14% to 8%, the

German ETR decreases from 20% to 15% and the Canadian ETR declines from 17% to 14%.

We now turn our attention to Panel B and 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 tax savings. The *SUB* coefficients range from a 1.8 percentage points decrease in ETRs for

multinationals with a subsidiary in Taiwan to a 1.4 percentage points increase in ETRs for

multinationals with a subsidiary in Africa. 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. Consistent with expectations,

some of the more negative *SUB* coefficients include tax havens, such as the Cayman Islands

(-1.6 percentage points), Singapore (-0.8 percentage points), Tax Havens (-0.7 percentage

points), British Virgin Islands (-0.7 percentage points) and Luxembourg (-0.6 percentage points).

Some of the more positive SUB coefficients include countries with relatively high taxes, e.g.,

Japan (1.2 percentage points) and France (1.1 percentage points). When we segregate the sample

based on OECD membership (untabulated), we find that having a foreign subsidiary in an OECD

country increases current ETRs by 0.2 percentage points, while having a foreign subsidiary in a

non-OECD country reduces ETRs by 0.4 percentage points. This difference is significant at the

0.01 level, using a *t*-test of the means, which is consistent with higher taxes among OECD countries.

Contrary to this pattern of high-tax countries resulting in highly tax subsidiaries, we find that having a U.S. subsidiary lowers a multinational's ETR by 0.8 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 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 25 countries with both *COUNTRY* and *SUB* coefficients. If countries tax their domestic-only firms similarly to the foreign-controlled companies 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 36%, 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.

5.2. Parent-subsidiary interactions

The prior section restricts the *SUB* coefficient to be the same, regardless of the domicile of the parent. 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. Specifically, 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.

$$ETR_{it} = \sum \beta_{0_j} COUNTRY_{it}^j + \sum \beta_{1_l} COUNTRY_{it}^j * SUB_{it}^k$$

$$+ \sum \beta_{3_m} INDUSTRY_{it}^m + \sum \beta_{4_n} YEAR_{it}^n + \sum \beta_{5_p} SIZE_{it}^p + \varepsilon_{it} \qquad (3)$$

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).[32]

For brevity, we comment here 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 investment, Table 5 shows that a subsidiary in the U.S. lowers a multinational's current ETR by 0.8 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. The marginal effect of

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[32] Each number in Table 6 represents the marginal ETR impact from a particular parent-subsidiary country mix. For example, on the first line the -3.3 means that a French parent has a 3.3 percentage points lower current ETR, on average, if it has a subsidiary in Argentina.

an American subsidiary on current ETRs ranges from a decrease of 7.9 percentage points for a

Dutch parent to an increase of 3.3 percentage points for a Canadian 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 no evidence that investments in high-tax, developed countries

increase U.S. companies' cash ETRs. Locating a subsidiary in the 25 OECD countries listed in

Table 6 increases the American multinational's cash ETR by 0.1 percentage point, compared

with a statistically insignificantly different mean decrease of 0.2 percentage points for

subsidiaries located in the 21 non-OECD countries (or groups of countries). However, locating a

subsidiary in one of the five tiny "dot" tax havens (Bermuda, Cayman Islands, Luxembourg, the

British Virgin Islands and Tax Havens) lowers U.S. multinationals' cash ETRs by -1.2

percentage points, on average.[33] This is significantly less (at the 0.01 level) than the 0.1

percentage point increase for the 41 non-haven countries.[34] The regression coefficient estimates

imply that a U.S. multinational with subsidiaries in the all five locations would enjoy a combined

cash ETR reduction of 6.2 percentage points, on average, with the most beneficial locations

being the Cayman Islands with a 3.1 percentage point cash ETR reduction and Bermuda with a

1.6 percentage point cash ETR reduction. 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 could be capturing some of their

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[33]This study's 1.2 percentage point cash ETR reduction for every dot tax haven is similar to Dyreng and Lindsey's (2009) 1.5 percentage point estimate for tax haven activity by U.S. multinationals, even though the studies are computed with very different data and methodology.

[34] Contrary to expectations, we find no difference in cash ETRs effects between the non-tax haven countries and the four large tax havens in the study: Hong Kong, Ireland, Singapore and Switzerland.

companion high-tax countries' impact on ETRs. We look forward to future work that attempts to grapple with the clustering of foreign subsidiaries and its impact on ETRs.

6. Cross-country Comparisons of Book-tax Conformity

The paper closes by using the data in this study to address the ongoing, global debate about increasing the alignment between book and tax accounting.[35] Although continuing adoption of International Financial Reporting Standards throughout the world is standardizing financial accounting rules, countries still vary in the extent to which they permit transactions to be accounted for differently for books and for taxes. Historically, in some countries book and tax accounting have been very similar, often statutorily set. In other countries, particularly current and former members of the British Empire, book treatment serves as a default for tax accounting, but many transactions are treated differently.

To shed some light on cross-country variation in book-tax conformity, we substitute the absolute value of the difference between pretax book income and an estimate of taxable income as the numerator in equation (1) and keep all other variables the same. It is necessary to take the absolute values because temporary differences reverse. By taking the absolute value, we capture differences arising from both book income exceeding taxable income and taxable income exceeding book income. We follow conventional measures by estimating the unobservable taxable income as current tax expense grossed-up by the statutory tax rate.[36] The new numerator is intended to capture the extent to which book and tax accounting diverge. If book and tax were perfectly conformed, i.e., book and tax accounting rules were identical, the numerator would

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[35] See Hanlon, et al (2005), Desai (2006), Shackelford (2006), McClelland and Mills (2007), Freedman (2004, 2008), Graham, et al (2010), Hanlon and Heitzman (2010), and Atwood, et al (2010), among many others, for a discussion of the pros and cons of increased book-tax conformity.
[36] See Hanlon (2003) and Hanlon et al (2005) for issues that arise when using financial statement information to estimate taxable income.

always be zero. As they diverge, the numerator increases. Thus, the estimated regression coefficient on *COUNTRY* will be decreasing in conformity.

We find considerable differences across countries in book-tax conformity. Table 7 reports the *COUNTRY* coefficients from estimating equation (1) for 2003 to 2007. The *COUNTRY* coefficients serve as a measure of the extent to which book and tax accounting diverge, conditional on the controls in equation (1) for industry, year and size. Our "conformity index" ranges from low divergence of 37% (New Zealand) to high divergence of 86% (Canada) with a mean (median) [standard deviation] of 53% (52%) [10%], implying that the absolute value of total book-tax differences (the numerator) equal about half of pre-tax profits. The U.S. conformity index is 56%, ninth highest among the 37 countries for which we compute an index.

As expected, we find that the 11 countries currently or once under the British Crown have less book-tax conformity (a mean of 58%) than the other 26 countries (a mean of 51%). The difference is significant at the 0.05 level. To the extent book and tax accounting diverge because some accounting earnings are excluded from the tax base and this narrowing of the tax base requires a higher tax rate, we would expect a positive correlation between the conformity index and the statutory tax rate. Contrary to expectations, we find the Pearson correlation between each country's conformity index and its mean statutory rate during the investigation period is not statistically significant. Although we have no prediction, we also find no difference in the conformity index between OECD countries and non-OECD countries. Likewise, we find no significant difference in the conformity index between countries that were required to use IFRS during the investigation period and those that were not required to use IFRS.

A problem that any new index faces is determining whether it actually measures the underlying phenomena that it is designed to capture. It is beyond the scope of this paper to

thoroughly test our index; however, we can compare it with a recent one developed in Atwood, et al (2010). They compute country-year measures of book-tax conformity using the root mean squared error from regressions of current tax expense on domestic pretax income, foreign pretax income, and total dividends.[37] Because their index comes from the variance of the residuals, it depends critically upon correctly specifying their model. It also assigns heavier weight to observations further from the mean. When we examine the 29 countries and three years (2003-2005) that the studies have in common, we find a reasonably high level of agreement.[38] The Pearson correlation for the two indices is 0.42. Generally, both indices identify the same countries as high conformity and low conformity.[39] Two notable exceptions are South Africa, who we identify as high conformity and Atwood, et al (2010) identify as high divergence and China, who we identify as high divergence and they identify as high conformity.[40]

Finally, we use the Atwood, et al (2010) book-tax conformity measure to assess the impact of cross-country differences in book and tax accounting on our Table 2 estimates of cross-country ETRs. (We cannot use our own index, since it is computed using the same data that we use to compute our measures of ETRs.) Consistent with book-tax conformity mattering, we find a positive correlation between their measure and the absolute value of the difference between a firm's maximum statutory tax rate and its ETR. When include their conformity measure in equation (1), we find that the coefficient on the conformity measure is positive and

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[37] They include dividends to control for differences between imputation and classical system countries. Their model ignores other tax and non-tax differences across countries or industries.

[38] Atwood et al. (2010) calculate conformity measures for 1993-2005. We use their annual values for 2003-2005 and their 2005 values for 2006 and 2007, which we collect from an earlier draft of the paper.

[39] One problem that both indices face is that they base their measures on reported income and taxes. An ideal measure of a country's mandated book-tax conformity would exclude the effects of earnings and tax management. We thank Jana Raedy for identifying this limitation. We look forward to research that dichotomizes the legal conformity from any discretionary behavior response.

[40] China has been transitioning away from conformity. In 2002 it adopted a comprehensive Accounting System for Business Enterprises that lessened book-tax conformity by allowing firms to provide for asset-impairment losses (Lin, 2006).

significant, implying that cross-country differences in financial reporting may partially explain difference is ETRs. However, the rank order of high-tax to low-tax countries is unaffected.

7. Closing Remarks

To our knowledge, this paper provides the most comprehensive analysis of international corporate income taxes to date. It is the first study to compute effective taxes using cash taxes paid and current 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 highest ETRs. Tax haven multinationals enjoy the lowest ETRs. Multinationals and domestic-only firms face similar ETRs. ETRs fell worldwide over the last two decades, but the ordinal rank from high-tax countries to low-tax countries remained remarkably constant because all countries reduced their tax burdens. ETRs vary considerably across industries. A multinational's worldwide ETR is affected by the location of its foreign subsidiaries.

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 interest to scholars in accounting, economics, finance, law, 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 have fallen relatively little over the last two decades compared with several key trading partners, particularly Japan, Germany and the UK. Increasingly, U.S. 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 may find it difficult to sustain policies that do not conform to international norms.

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Table 1

		N	Revenue	Assets	Equity	Pretax Income	Mean current ETR	Median current ETR	Statutory tax rate
Full sample	DOM	14,499	586	1,486	325	57	27	29	39
	MNAT	21,174	3,916	11,815	1,873	425	25	26	38
AUSTRALIA	DOM	369	152	423	152	22	17	18	30
	MNAT	709	1,146	6,265	809	189	20	24	30
BERMUDA	DOM	5	168	313	266	20	-	-	-
	MNAT	624	416	640	269	56	12	10	-
CANADA	DOM	601	489	785	346	56	12	5	36
	MNAT	747	2,154	15,197	1,721	371	20	21	36
CAYMAN ISLANDS	DOM	-	-	-	-	-	-	-	-
	MNAT	554	167	254	138	30	12	11	-
CHINA	DOM	204	285	1,392	185	39	13	-	30
	MNAT	164	1,241	5,104	820	165	17	15	30
FRANCE	DOM	91	259	2,863	453	48	22	26	35
	MNAT	537	10,152	38,353	4,235	986	26	28	35
GERMANY	DOM	89	196	240	92	16	16	8	39
	MNAT	508	9,421	38,026	4,004	693	25	26	39
INDIA	DOM	169	247	1,039	169	43	18	18	34
	MNAT	487	717	1,379	431	116	17	14	35
JAPAN	DOM	6,294	572	1,597	274	35	38	42	40
	MNAT	4,164	4,744	11,378	2,000	316	35	37	40
MALAYSIA	DOM	437	99	302	96	15	20	21	28
	MNAT	342	290	1,362	279	59	17	18	28
NETHERLANDS	DOM	7	979	449	207	48	31	33	33
	MNAT	208	3,995	10,312	1,845	314	21	21	31
NORWAY	DOM	45	154	2,237	192	39	19	22	28
	MNAT	169	1,386	6,635	819	207	19	19	28
RUSSIAN FEDERATION	DOM	77	1,392	2,034	1,177	227	28	28	24
	MNAT	40	2,378	3,537	1,927	629	28	29	24
SINGAPORE	DOM	128	98	398	148	25	16	16	20
	MNAT	379	411	3,198	481	79	17	16	20
SOUTH AFRICA	DOM	69	256	687	511	93	21	24	29
	MNAT	145	1,662	6,226	877	282	23	24	29
SWEDEN	DOM	65	293	649	337	69	8	1	28
	MNAT	403	1,883	8,176	1,183	255	19	20	28
SWITZERLAND	DOM	41	156	860	344	36	16	14	23
	MNAT	344	5,788	44,517	3,054	646	20	19	22
TAIWAN	DOM	1,292	305	606	211	35	18	19	25
	MNAT	700	1,229	2,277	709	124	16	15	25
UNITED KINGDOM	DOM	801	316	623	296	56	19	21	30
	MNAT	1,320	4,284	21,093	2,182	609	22	25	30
UNITED STATES	DOM	3,036	968	2,445	520	97	22	24	39
	MNAT	6,378	5,090	9,663	2,351	624	26	28	39
AFRICA	DOM	21	12,676	2,766	1,296	3,479	26	26	32
	MNAT	44	555	3,068	472	81	24	21	30
ASIA	DOM	185	559	1,062	352	81	19	19	32
	MNAT	157	666	2,307	444	90	20	20	32
EUROPE	DOM	221	253	1,355	248	41	22	22	26
	MNAT	1,207	3,859	20,146	2,047	476	23	24	30
LATIN AMERICA	DOM	160	1,021	1,560	717	138	22	18	31
	MNAT	205	2,592	4,154	1,289	465	21	20	28
MIDDLE EAST	DOM	26	288	906	133	25	11	6	16
	MNAT	175	723	4,142	582	115	18	14	32
TAX HAVENS	DOM	66	125	360	211	46	8	6	18
	MNAT	464	1,679	6,450	1,602	289	13	12	17

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

	cash ETR				current ETR				total ETR			
AdjR2	0.70				0.78				0.85			
N	16,343				35,673				49,806			
	Domestic		Multinational		Domestic		Multinational		Domestic		Multinational	
	Mean	Estimate	Mean	Estimate	Mean	Estimate	Mean	Estimate	Mean	Estimate	Mean	Estimate
AUSTRALIA	25	23	25	23	17	17	20	18	23	23	25	24
BERMUDA			12	12			12	11			15	14
CANADA	13	13	19	18*	12	14	20	19*	22	22	26	24*
CAYMAN ISLANDS			11	11			12	11			14	14
CHINA					13	14	17	16	23	22	19	18*
FRANCE			27	23	22	22	26	23	26	26	28	26
GERMANY			23	19	16	15	25	22*	27	27	30	28
INDIA			18	16	18	18	17	14*	25	24	22	20*
JAPAN					38	34	35	31*	42	40	39	37*
MALAYSIA	23	24	17	17*	20	19	17	17*	23	23	22	21*
NETHERLANDS			19	17			21	18			23	21
NORWAY							19	18	26	27	26	25
RUSSIAN FEDERATION					28	27			31	29	27	26*
SINGAPORE	17	18	17	16	16	17	17	15	19	19	19	18
SOUTH AFRICA			23	19	21	19	23	21	26	25	28	25
SWEDEN					8	8	19	16*	19	20	26	24*
SWITZERLAND			18	14			20	17	20	22	20	19*
TAIWAN					18	16	16	13*	18	18	16	15*
UNITED KINGDOM	24	21	22	19	19	18	22	20*	23	23	27	25*
UNITED STATES	23	20	23	20	22	19	26	22*	29	29	30	28*
AFRICA											26	26
ASIA	22	20	22	21	19	20	20	21	22	22	21	21
EUROPE			23	19	22	23	23	21	25	25	26	24
LATIN AMERICA					22	19	21	18	26	25	23	21*
MIDDLE EAST			14	14			18	17	14	14	19	19*
TAX HAVENS			13	11	8	11	13	12	14	16	15	15

This table presents the results of estimating $ETR_{it} = \sum \beta_{0_j} COUNTRY_{it}^j + \sum \beta_{1_j} (COUNTRY_{it}^j * MN_{it}) + CONTROLS$ on three separate samples, each with ETR calculated as the tax measure in the column heading scaled by pretax income. The subcolumns titled Mean 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.

Table 3

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
AdjR2	0.82	0.91	0.91	0.91	0.90	0.89	0.88	0.87	0.87	0.87	0.86	0.84	0.83	0.82	0.79	0.77	0.77	0.78	0.79	0.80
N	1,022	2,241	2,502	2,523	2,528	2,711	3,240	3,683	4,316	4,623	4,403	4,857	4,994	4,392	5,109	6,054	6,759	6,851	8,394	7,305
AUSTRALIA		27	24	26		21	20	17	19	18	17	18	18					15	21	20
BERMUDA							10	4	13	10	8	9	7	11	14	10	11	10	10	13
CANADA	14	22	17	16	22	20	21	19	23	21	18	21	22	19	21	16	19	18	16	17
CAYMAN ISLANDS													8	9	12	11	11	12	12	13
CHINA																	13	18	18	17
FRANCE		26	23	22	25	23	24	23	29	28	27	27	25	25	27	26	25	21	20	21
GERMANY									29	34	31	30	30	26	28	29	22	17	20	20
INDIA				19	13	8	11	7	16	12	6	9	8	11	17	13	14	17	17	18
JAPAN	36	49	44	45	48	43	44	40	44	43	43	41	40	38	39	34	34	33	33	34
MALAYSIA			32	29	26	25	26	22	26	24	20	4	22	22	23	20	20	20	18	17
NETHERLANDS		25	20	20	19	15	17	18	24	23	20	22	20	20	26	20	22	16	19	15
NORWAY										12	15	20	22	26	29	23	19	20	19	19
RUSSIAN FEDERATION																		26	23	27
SINGAPORE							26	23	27	27	19	21	20	19	23	20	18	15	15	14
SOUTH AFRICA										16	14	12	18	15		20		19	21	21
SWEDEN							19	12	17	18	16	18	18	21	20	17	17	14	15	16
SWITZERLAND		23	22	24	22	13	21	17	22	19	19	19	19	20	21	20	20	17	15	17
TAIWAN									14	8	12	9	8	11	18	15	15	17	15	15
UNITED KINGDOM	25	30	29	28	28	24	27	22	27	24	24	23	23	22	24	21	20	18	19	20
UNITED STATES	23	29	26	26	28	24	26	22	27	26	23	24	24	22	23	20	21	23	23	24
AFRICA																		30	23	
ASIA								22	25	25	18	17	23	19	18	16	23	21	22	20
EUROPE		24	26	22	24	20	21	17	23	22	21	24	23	23	27	24	23	21	20	20
LATIN AMERICA									16	12	11	13	17	15	24	17	18	21	20	20
MIDDLE EAST											14	15	14			21	17	16	20	10
TAX HAVENS		14	13	12	14	11	14	9	17	14	12	11	13	14	16	13	14	11	13	13

This table presents the results of estimating $ETR_i = \sum \beta_{0_j} COUNTRY_i^j + CONTROLS$ 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

	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	0.78	0.69	0.75	0.81	0.58	0.82	0.79	0.79	0.88	0.80
N	1,616	3,993	2,205	14,814	1,012	5,252	1,948	1,247	1,875	1,292
AUSTRALIA	20	16	17	20		20	16	18	21	24
BERMUDA	19	11	10	9		10		10	14	12
CANADA	21	13	7	17	8	18	15	15	21	17
CAYMAN ISLANDS	21	5	6	11		12	14			
CHINA	33					13			31	15
FRANCE	30	23	10	26		25	21	16	27	
GERMANY		15	11	26		23	15	16		
INDIA	23	18	7	16		17	7			
JAPAN	32	23	32	33	17	38	34	38	40	41
MALAYSIA	28	22	1	16		21	15	26		15
NETHERLANDS				20		24	13			
NORWAY		16		20						11
RUSSIAN FEDERATION			26	23						
SINGAPORE	15	19	10	15	8	17	14			17
SOUTH AFRICA		14		22		20				
SWEDEN		11	10	18		18	12	12		
SWITZERLAND		12		20		16	12	21		
TAIWAN	13	16	11	15		20	12		20	18
UNITED KINGDOM	27	16	15	21	13	19	20	20	21	21
UNITED STATES	32	15	13	24	7	23	21	19	28	18
AFRICA		21								
ASIA	20	19		13		14				
EUROPE	21	20	15	22		23	16	16	23	21
LATIN AMERICA	17	14	12	20		21			19	
MIDDLE EAST		17	7	13						
TAX HAVENS	16	11	8	13		11		13		11

This table reports the results of estimating $ETR_{it} = \sum \beta_{0_j} COUNTRY_{it}^j + CONTROLS$ 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 2003-2007 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

AdjR2		0.78	
N		35,118	
Parents	Estimate	**Subsidiaries**	Estimate
AUSTRALIA	18	ARGENTINA	(0.1)
BERMUDA	11	AUSTRALIA	0.9
CANADA	17	AUSTRIA	0.7
CHINA	16	BELGIUM	(0.2)
FRANCE	22	BERMUDA	0.1
GERMANY	20	BRAZIL	(0.7)
INDIA	16	CANADA	0.2
JAPAN	34	CAYMAN ISLANDS	(1.6)
MALAYSIA	19	CHINA	0.5
NETHERLANDS	18	CZECH REPUBLIC	(0.3)
NORWAY	19	DENMARK	(0.6)
RUSSIAN FEDERATION	27	FINLAND	0.4
SINGAPORE	16	FRANCE	1.1
SOUTH AFRICA	19	GERMANY	(0.5)
SWEDEN	14	HONG KONG	0.2
SWITZERLAND	17	HUNGARY	(0.1)
TAIWAN	16	INDIA	0.3
UNITED KINGDOM	19	INDONESIA	(0.4)
UNITED STATES	21	IRELAND	0.3
AFRICA	27	ITALY	0.3
ASIA	21	JAPAN	1.2
EUROPE	21	LUXEMBOURG	(0.6)
LATIN AMERICA	20	MALAYSIA	(0.8)
MIDDLE EAST	17	MEXICO	0.6
TAX HAVENS	13	NETHERLANDS	0.4
		NEW ZEALAND	1.1
		NORWAY	0.5
		POLAND	0.4
		PORTUGAL	(0.4)
		RUSSIAN FEDERATION	(0.1)
		SINGAPORE	(0.8)
		SOUTH AFRICA	0.5
		SOUTH KOREA	(1.2)
		SPAIN	(0.3)
		SWEDEN	0.6
		SWITZERLAND	1.1
		TAIWAN	(1.8)
		THAILAND	(0.8)
		UNITED KINGDOM	1.4
		UNITED STATES	(0.8)
		VIRGIN ISLANDS (BRITISH)	(0.7)
		AFRICA	1.4
		ASIA	0.4
		EUROPE	(0.2)
		LATIN AMERICA	0.7
		MIDDLE EAST	0.4
		TAX HAVENS	(0.7)

This table presents the results of estimating $ETR_{it} = \sum \beta_{0_j} COUNTRY_{it}^j + \sum \beta_{1_k} SUB_{it}^k + CONTROLS$. 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

Subsidiaries	AUSTRALIA	CANADA	FRANCE	GERMANY	JAPAN	NETHERLANDS	SWEDEN	SWITZERLAND	UNITED KINGDOM	EUROPE	UNITED STATES	Cash UNITED STATES
				ETR = Current tax expense/Pretax income								Cash
ARGENTINA			(3.3)	(6.7)	0.1			5.8	(2.5)	2.0	(0.1)	(0.2)
AUSTRALIA		0.5	0.8	(2.2)	(1.0)	5.5	2.6	0.9	2.4	(0.6)	0.4	0.2
AUSTRIA			0.3	0.6	(0.1)	2.2	1.3	1.2	0.5	0.6	0.1	0.8
BELGIUM			(6.9)	(4.8)	0.5	(2.0)	1.4	(3.4)	2.5	0.8	(0.4)	(0.3)
BERMUDA		(3.4)			3.6			(1.4)	(1.9)	(2.0)	(0.2)	(1.6)
BRAZIL		(4.2)	2.4	3.1	(1.0)	(7.3)	0.2	0.4	2.9	0.8	(0.7)	(0.0)
CANADA	0.0		1.3	0.2	(2.0)	(1.1)	(3.2)	(2.2)	(2.4)	(1.4)	1.4	1.2
CAYMAN ISLANDS		4.7		(3.2)	(11.9)				0.9	(2.7)	(2.0)	(3.1)
CHINA	7.2		1.6	(4.8)	(1.3)	2.9	2.6	2.3	2.0	3.7	0.5	0.7
CZECH REPUBLIC			1.5	2.4	1.6	4.0	1.9	(0.8)	1.0	(2.3)	(1.0)	(0.6)
DENMARK			(5.8)	(1.4)	1.4	(6.8)	3.7	6.9	(2.1)	(0.4)	(0.9)	(1.2)
FINLAND			2.7	(5.6)	(1.1)		3.8	(1.9)	(2.8)	(1.4)	0.2	0.6
FRANCE	2.5	6.2		2.2	0.9	(5.4)	(2.4)	3.9	2.5	(1.3)	0.6	1.0
GERMANY	(1.8)	(2.7)	(1.4)		0.2	8.3	(4.3)	(3.6)	3.0	(1.7)	(0.2)	(1.4)
HONG KONG	(4.4)		(0.7)	1.9	(1.0)	(0.3)	0.8	(1.4)	(2.4)	(6.6)	1.3	0.3
HUNGARY			0.6	(1.6)	(0.0)	9.5	(2.0)	(2.4)	0.7	1.3	(0.8)	0.1
INDIA	(1.3)		0.5	2.6	3.2		2.9	(5.0)	(1.8)	(3.8)	0.3	(0.1)
INDONESIA	(1.9)		(1.6)	18.8	(2.7)			0.8	3.2	0.2	0.2	0.2
IRELAND		(1.2)	(2.2)	(0.1)	0.8	(12.1)	2.7	(2.1)	2.6	1.3	(1.1)	(1.2)
ITALY			(0.9)	(1.0)	0.1	(2.7)	0.3	8.2	0.8	(1.5)	1.3	1.5
JAPAN		(1.3)	(1.2)	1.1		2.9	(2.9)	(5.3)	2.8	(0.1)	0.5	(0.8)
LUXEMBOURG			0.5	(1.0)	(1.3)	4.6	0.3	(3.0)	(2.5)	0.2	(0.9)	(1.0)
MALAYSIA	(0.5)		2.2	4.0	(0.2)	1.7	(3.5)	(0.6)	(1.7)	(2.5)	(1.2)	(1.0)
MEXICO		3.4	2.5	(1.3)	(1.8)	15.8	2.8	(4.9)	(1.5)	(0.9)	1.8	1.7
NETHERLANDS	(0.8)	3.2	3.1	(0.2)	(0.5)		(1.8)	(1.6)	1.5	0.1	0.6	0.5
NEW ZEALAND	3.1		5.0	0.1	(0.1)			(0.1)	1.7	2.2	0.6	1.5
NORWAY			1.1	0.7	(0.6)		4.8	(3.5)	3.5	0.8	(0.4)	(0.2)
POLAND			2.7	(2.3)	1.6	(2.8)	(0.2)	6.6	(1.3)	(0.9)	1.1	1.6
PORTUGAL			(0.2)	3.7	0.2	4.8	(2.6)	(2.4)	(2.6)	0.4	0.6	0.4
RUSSIAN FEDERATION			0.2	0.3	(0.3)	4.5	(1.5)	0.5	0.2	0.4	(0.1)	(0.7)
SINGAPORE	0.2	(4.2)	(3.9)	(2.0)	(1.1)	3.1	(6.1)	3.4	0.6	(1.3)	(0.6)	(0.0)
SOUTH AFRICA			(1.8)	(4.6)	2.4		6.4	(0.7)	2.3	(0.4)	0.2	0.1
SOUTH KOREA			(2.1)	(2.5)	2.0		2.3	0.9	(0.1)	(0.4)	(1.4)	(1.6)
SPAIN		0.3	1.2	5.9	(1.2)	(1.8)	5.2	(1.2)	(1.4)	2.9	(1.5)	(2.1)
SWEDEN			0.6	9.4	(0.2)	(4.2)		2.0	1.7	1.9	0.6	0.0
SWITZERLAND		(4.4)	3.4	1.8	(0.8)	(5.2)	(0.3)		(3.4)	3.8	1.1	1.5
TAIWAN			(4.0)	1.7	(2.5)			0.5	(3.7)	2.2	(0.3)	(0.6)
THAILAND	4.2		2.5	1.9	0.5			(4.2)	(2.8)	5.1	(1.3)	(1.4)
UNITED KINGDOM	2.8	3.0	1.0	2.0	1.4	7.8	2.2	(2.1)		0.9	2.5	0.7
UNITED STATES	0.7	3.3	0.8	1.0	(1.8)	(7.9)	0.7	1.2	(0.5)	0.8		
VIRGIN ISLANDS (BRITISH)		2.8							(0.8)	4.0	(0.5)	(1.0)
AFRICA			(1.2)	(3.6)	0.5			3.0	1.0	0.3	2.2	2.6
ASIA	(0.6)		(0.1)	0.0	2.7		(2.2)	2.8	4.2	(2.4)	(0.7)	0.5
EUROPE			(0.0)	3.7	(0.7)	(3.9)	(2.0)	1.4	(0.3)		(1.1)	0.1
LATIN AMERICA		0.1	(2.8)	(3.9)	1.9		(4.6)	2.7	1.6	1.5	(0.1)	1.6
MIDDLE EAST		10.3	0.6	4.9	1.7	7.1		0.8	(2.0)	2.3	2.4	(0.2)
TAX HAVENS	(3.7)	1.3	0.1	(9.1)	(1.3)	1.0	0.5	0.2	1.9	(4.2)	0.3	0.5

This table presents the results of estimating $ETR_{it} = \sum \beta_{0_j} COUNTRY_{it}^j + \sum \beta_{2_n} COUNTRY_{it}^j * SUB_{it}^k + CONTROLS$ 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 $COUNTRY_{it}^{AUSTRALIA} * SUB_{it}^{FRANCE}$ is 2.5. 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 $ETR = Cash\ taxes\ paid/Pretax\ income$.

Table 7

Country	Book-Tax Difference
AUSTRALIA	0.54
AUSTRIA	0.52
BELGIUM	0.54
BRAZIL	0.49
CANADA	0.86
CHILE	0.41
CHINA	0.64
DENMARK	0.43
FINLAND	0.43
FRANCE	0.46
GERMANY	0.56
GREECE	0.49
HONG KONG	0.60
INDIA	0.60
INDONESIA	0.48
IRELAND	0.82
ISRAEL	0.59
ITALY	0.45
JAPAN	0.42
MALAYSIA	0.48
MEXICO	0.55
NETHERLANDS	0.56
NEW ZEALAND	0.37
NORWAY	0.52
PHILIPPINES	0.47
POLAND	0.51
RUSSIAN FEDERATION	0.56
SINGAPORE	0.49
SOUTH AFRICA	0.43
SPAIN	0.48
SWEDEN	0.58
SWITZERLAND	0.52
TAIWAN	0.53
THAILAND	0.69
TURKEY	0.53
UNITED KINGDOM	0.51
UNITED STATES	0.56

This table reports the results of estimating $BTD_{it} = \sum \beta_{0_j} COUNTRY_{it}^j + CONTROLS$ on a sample of countries each of which has at least 50 observations 2003-2007. $BTD = \left| \frac{Pretax\ income - Current\ tax\ expense/Statutory\ rate}{Pretax\ income} \right|$. The number reported for each country is its estimate of β_0 which is interpreted as decreasing in the book-tax conformity in the country.