

# Corporate Domicile and Average Effective Tax Rates: The Cases of Canada, Japan, the United Kingdom, and the United States

JULIE H. COLLINS

*Kenan-Flagler Business School, Carroll Hall, CB 3490, University of North Carolina, Chapel Hill, NC  
27599-3490*

DOUGLAS A. SHACKELFORD

*Kenan-Flagler Business School, Carroll Hall, CB 3490, University of North Carolina, Chapel Hill, NC  
27599-3490*

## ***Abstract***

We use financial statement information to estimate three alternative average effective tax rates for firms domiciled in Canada, Japan, the United Kingdom, and the United States during the period 1982 to 1991. While many of the firms we examine operate worldwide, we use the term *domicile* to refer to the legal residence or site of incorporation of the parent company. Our objective is to determine the *marginal* impact of a company's domicile on its worldwide tax burden, with controls for industry and year. We find both among domestic-only companies and among multinational companies the domiciles are consistently ranked in descending order by average effective tax rates as Japan, the United Kingdom, the United States, and Canada. In comparing domestic-only companies and multinationals domiciled in the same jurisdiction, only U.S. multinationals consistently face a greater tax burden than their domestic counterparts.

**Key words:** effective tax rates, financial statements, domicile

## **1. Introduction**

We use financial statement information to estimate average effective tax rates (ATRs) for firms domiciled in Canada, Japan, the United Kingdom, and the United States during the period 1982 to 1991. We use the term *domicile* to refer to the legal residence or site of incorporation of the parent company. For example, Grand Metropolitan is domiciled in the United Kingdom, although it likely has operations in all countries examined here, as well as many additional countries. Our investigation is designed to determine the *marginal* impact of a company's domicile on its worldwide tax burden, with controls for industry and year. In addition, we determine whether multinational companies located in a particular domicile face differential tax burdens than domestic-only companies from the same domicile.

Our investigation is the first to utilize Standard & Poor's international financial database, *Global Vantage*, to compare tax burdens across countries. The *Global Vantage* database contains publicly available annual financial statement information for 7,220 companies from thirty countries dating back to 1982.<sup>1</sup> We discuss the data items available to estimate ATRs

and provide in the Appendix detail of key intercountry differences in financial reporting practices that affect the interpretation of these estimates.

Using financial statement information to estimate ATRs across countries represents a unique contribution to existing literature. In the past, there was little firm-specific comparable data for companies located in different domiciles. Thus, traditional intercountry tax-rate comparisons are based on simulated marginal effective tax rates and, until recently, have been limited to simulations of firms operating in a single country (e.g., King and Fullerton, 1984; Jorgenson and Landau, 1993).

We find that both among domestic-only companies and among multinational companies the domiciles are consistently ranked in descending order by average effective tax rates as Japan, the United Kingdom, the United States and Canada. In comparing domestic-only and multinationals domiciled in the same jurisdiction, only U.S. multinationals consistently face a greater tax burden than their domestic counterparts. This is particularly true during the latter half of our observation period and within the mining and construction and manufacturing industries.

The remainder of this paper is organized as follows. The next section motivates and positions this paper in relation to existing literature. Section 3 describes our sample of companies and the average effective tax-rate measures constructed from *Global Vantage* financial statement information. Section 4 reports our regression results examining the marginal impact of domicile on a firm's tax burden. The final section summarizes and compares our findings to previous average and marginal effective tax-rate studies.

## 2. Motivation and prior literature

In recent years, many business leaders have expressed concern over the challenge of remaining competitive in a world economy. Taxes, a costly factor of production that differs across geographic jurisdictions, is often cited as a culprit to maintaining global competitiveness (e.g., Merrill and Patrick, 1992). Countries differ in their taxation of foreign, as well as domestic, profits generated by companies domiciled within their borders. For example, there is substantial intercountry variation in the method for relieving international double taxation, the ability to cross-credit foreign taxes (i.e., offset home-country taxes on income generated in one foreign jurisdiction with foreign taxes paid in another jurisdiction), the sourcing of global income and expenses, the taxation of unrepatriated foreign income, the taxation of income generated by joint ventures, and the treatment of investments in developing countries. Such differences could discourage newly forming companies from choosing a particular domicile and entice existing corporations to move their sites of legal incorporation. Hines (1991) provides a detailed example of a United States-domiciled multinational corporation, McDermott, that reorganized as a Panamanian corporation in 1982 because of the perceived high tax cost of maintaining a U.S. domicile.

We estimate the impact of domicile on tax burdens using average effective tax rates. Fullerton (1984) and Bradford and Fullerton (1981) provide detailed discussions of the appropriate use of marginal and average effective tax rates. Ideally, marginal effective tax rates capture incentives to employ new capital, while average effective tax rates measure distributional burdens. However, marginal rates require numerous simplifying assumptions, including

assumptions about the tax status of shareholders, firm financing policies, firm asset purchase decisions, the reflection of inflation in asset prices, interest rates, and economic depreciation rates. Bradford and Fullerton (1981) demonstrate the sensitivity of simulated marginal effective tax rates to the assumed discount rate and effect of inflation on nominal interest. Furthermore, simulated marginal tax-rate methodologies are much too broad to account for many important, legal complexities in corporate tax systems and must combine, via weighted average or some other technique, asset-specific marginal effective tax rates to yield interindustry or other aggregated comparisons. As a result of these limitations, average tax rates can provide a reasonable approximation for comparing expected taxes on a marginal investment (Fullerton, 1984, pp. 24, 30).

Slemrod and Timbers (1990) recognize simulated marginal effective tax rates only provide rough guidelines for tax policy analysis in complex environments. Thus, they focus on a limited analysis of how specific U.S. and Japanese multinational tax rules affect competitiveness and foreign direct investment incentives.

This is the first study to use financial statement data to compare intercountry average effective tax rates (ATRs). Many researchers have used financial statements to estimate ATRs of firms domiciled in a particular country, but cumbersome and inaccessible financial statement information for firms domiciled in other countries prevented the extension of these studies to the international arena.<sup>2</sup> Standard & Poor's new *Global Vantage* system now provides easily accessible financial statement data for researchers to estimate ATRs across numerous companies and countries.

Our firm-specific ATRs reflect the composition and age of specific capital in place, actual investment growth rates, actual depreciation and inventory accounting choices, and income and associated taxes from assets other than inventory, machinery, and structures (e.g., land, goodwill, and research and development). Thus, our ATR estimates reflect actual, rather than assumed, corporate production functions of the firms domiciled in each country. On the other hand, simulated marginal effective tax rates reflect new investments in only inventory, machinery, or structures and universally assume tax minimizing accounting methods (e.g., LIFO inventory accounting and the most accelerated depreciation method). Largely due to the potential constraint of financial statement conformity, these assumptions are not consistently accurate for tax burden comparisons. For example, only 34 percent of 600 U.S. corporations surveyed by the American Institute of Certified Public Accountants used LIFO inventory accounting for 50 percent or more of their inventories in 1990 (AICPA, 1992, p. 142).<sup>3</sup>

To the extent we can separate domestic-only and multinational firms domiciled in a particular country, our ATR measures allow us to estimate the marginal impact on firms' worldwide tax burdens of operating outside the home country. As indicated earlier, the worldwide tax burdens of multinational firms are determined by a host of complex rules (e.g., tax-base definitions such as earnings and profits and deduction allocations) and unique planning opportunities (e.g., income-shifting flexibility, deferral and cross-crediting opportunities, export advantages, and tax-sparing arrangements). Thus, the effect of a particular domicile's tax system on the competitiveness of firms operating abroad, as well as domestically, is an empirical question that cannot be answered simply by comparing domestic-only tax rates across countries. Further, limited illumination is shed on the question by comparing intercountry simulated marginal effective tax rates for home- or host-country

combination inbound and outbound direct investment. Such studies (e.g., Jun, 1993; OECD, 1991) are unable to capture the impact on a multinational's tax burden of operating in a portfolio of countries and taking advantage of a myriad of tax-planning opportunities.<sup>4</sup>

Nevertheless, estimating ATRs with financial statement data is not without limitations. We are unable to incorporate shareholder-level taxation on capital income in our tax-rate estimates. This is of particular concern for international comparisons where the tax treatment of corporate distributions reflects different shareholder tax rates, as well as varying degrees of shareholder and corporate tax integration.<sup>5</sup> In addition, intercountry differences in financial reporting practices are particularly problematic in estimating comparable ATRs across countries. We discuss the impact of such differences on our estimates and present alternative estimates representing varying levels of intercountry comparability.

### 3. Methodology

#### 3.1. Average effective tax-rate measures

Ideally, we would measure average effective tax rates as current and discounted future worldwide income taxes payable on current worldwide economic income divided by current worldwide economic income. Unfortunately, neither the numerator nor denominator of this ideal measure is observable.<sup>6</sup> We use current income taxes paid or payable for the year on earnings as determined for financial accounting purposes as the numerator.<sup>7</sup> This amount is computed from *Global Vantage* data as total tax provision (TXT) less deferred income taxes (TXDF) and less other taxes (TCDO). (The total tax provision is the tax expense based on financial statement income.)<sup>8</sup>

No accounting earnings computation perfectly measures true economic income. We estimate the effective tax-rate denominator using three alternative measures with varying degrees of intercountry comparability. The first is net income before taxes, appropriations to untaxed reserves, minority interest income, and extraordinary items (NIBT). This measure, however, is tainted by intercountry differences in financial reporting practices.

Four prominent differences in accounting methods are depreciation, goodwill amortization, pension expense, and research and development expense. Briefly, Japanese firms typically use a more accelerated method of depreciation than firms domiciled in the other three countries, and U.K. firms often use the current value, rather than the historical cost, of assets to compute depreciation. Japanese companies amortize goodwill over a much shorter period than U.S. and Canadian companies, and U.K. companies take goodwill as a direct offset to equity leaving reported earnings unaffected. U.K. firms typically provide for pension expense on a cash rather than accrual basis. Finally, Japanese and U.S. firms expense research and development costs more rapidly than Canadian and U.K. firms. An extensive discussion of these and other differences in financial reporting practices in Canada, Japan, the United Kingdom, and the United States is provided in the Appendix.

To achieve greater comparability across countries, we compute a second effective tax-rate measure using adjusted net income (ADJNI) in the denominator. Adjusted net income is net income before taxes (NIBT) plus depreciation, amortization, goodwill write-offs, pension expense, and research and development expenses. Finally, we estimate effective

tax rates using total revenue (REV) in the denominator. While the total revenue measure eliminates intercountry differences in accounting for expenses, it also implicitly assumes that true profit margins are constant across firms from four different countries and a host of industries.

### 3.2 *Sample*

The sample includes all *Global Vantage* companies domiciled in Canada, Japan, the United Kingdom, and the United States from 1982 to 1991 with positive net revenues, any nonzero value (positive or negative) for net income before taxes, and nonnegative values for depreciation, goodwill write-offs, pension expense, and research and development expense.<sup>9</sup> Companies also are excluded if current taxes or the industry code (SIC) are missing. The resulting sample comprises 30,037 company years. The company years by country are Canada—1,786, Japan—2,999, the United Kingdom—5,456, and the United States—19,796.

### 3.3 *Descriptive statistics*

Descriptive statistics for the sample are provided in Tables 1 through 4. Table 1 provides summary statistics for certain income statement items across countries. The statistics demonstrate that there are considerable differences in sample companies across countries. Japanese companies are much larger and have lower profit margins than companies from the other three countries. The mean revenue (REVENUE) for a Japanese company is \$4.5 billion, three to five times as large as the mean revenue of firms domiciled in the other countries. Companies domiciled in the United States are of similar size to companies domiciled in the United Kingdom, while Canadian companies are somewhat smaller. Likewise, mean net income before taxes (NIBT) for Japanese companies is \$196 million, more than double the income for companies from other countries. However, Japanese profit margins (NIBT/REV) are less than other countries' profit margins. The mean NIBT/REV for Japanese companies is 4.3 percent, compared to 6.2 percent for Canadian, 8.7 percent for U.K., and 7.1 percent for U.S. companies. After-tax profit margins differ even more. The mean (NIBT-TAX)/REV for Japanese companies is 1.9 percent, less than one-third the profitability of U.K. companies (5.8 percent) and less than one-half the profitability of Canadian (4.2 percent) and U.S. (4.6 percent) companies.

Surprisingly, the sample firms do not indicate substantial differences across countries in depreciation expense. Unlike companies domiciled in the other three countries, Japanese companies are required to expense for financial accounting purposes the same amount of depreciation they deduct on their tax returns. If Japanese companies adopt the most accelerated depreciation method available for tax purposes, Japanese book depreciation likely will exceed the book-depreciation expenses reported in other countries. However, the mean depreciation as a percentage of mean revenues for Japanese companies is 4 percent, which is actually less than the 5 percent ratio for Canadian and American companies. This is consistent with companies in "one book" countries not choosing the tax-minimizing method of computing taxable income because the same method must be chosen for reporting financial

Table 1. Descriptive statistics by country (all dollar amounts in millions).

	Canada (n = 1,786)		Japan (n = 2,999)		United Kingdom (n = 5,456)		United States (n = 19,796)	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
REVENUE	\$791	1,700	\$4,556	13,503	\$1,121	3,194	\$1,337	4,942
NIBT	49	178	196	470	97	322	95	446
ADJNI	105	343	431	1,223	154	565	189	847
TAX	16	51	108	256	32	114	34	162
FORTAX	2	11	1	16	12	65	10	110
DEPR	42	118	161	611	39	202	61	287
GOODWILL	0	0	0	1	0	0	0	0
PENEXP	5	20	19	102	9	33	11	110
RDEXP	9	68	56	252	9	60	22	167
ASSETS	1,542	4,757	8,471	37,240	1,930	11,160	1,935	8,645
EQUITY	396	901	1,208	2,754	481	1,603	507	1,865

*Notes:*

REVENUE is the net revenues;

NIBT is net income before taxes;

ADJNI is net income before taxes, depreciation, amortization, goodwill write-off, pension expense, and research and development expense;

TAX is current foreign and domestic income taxes;

FORTAX is current and deferred foreign taxes;

DEPR is depreciation expense;

GOODWILL is the goodwill write-off against income;

PENEXP is pension expense;

RDEXP is research and development expense.

accounting income, which companies generally do not want to minimize (see Cummins, Harris, and Hassett, 1993).

Consistent with their larger size, Japanese companies report larger tax payments per firm. The mean of current domestic plus foreign income taxes (TAX) for Japanese companies is \$108 million, more than triple the amount for companies from the other countries. Conversely, Japanese companies report the lowest mean current plus deferred foreign income taxes (i.e., foreign tax provision or FORTAX). FORTAX as a percentage of ADJNI ranges from 0.2 percent for Japanese companies to 7.8 percent for U.K. companies. However, these numbers appear suspect. The number of companies reporting nonzero foreign tax provisions varies greatly by country: 10 percent of the Canadian companies, 3 percent of Japanese companies, 61 percent of U.K. companies, and 24 percent of U.S. companies report nonzero foreign tax provisions. The wide range suggests that the variation may be caused more by differences in financial statement practices across countries than actual foreign tax payments. On the other hand, these statistics are consistent with reports of unusually low U.S. tax payments by Japanese companies subject to American corporate taxes.<sup>10</sup>

Table 2 provides summary statistics of mean annual effective tax rates from 1982 to 1991 by country. The three tax rates ( $ATR_{NIBT}$ ,  $ATR_{ADJNI}$ , and  $ATR_{REV}$ ) are computed annually

Table 2. Average effective tax rates by countries (1982-1991).

	All Companies				Multinational Companies			
	Canada (n = 1,786)	Japan (n = 2,999)	United Kingdom (n = 5,456)	United States (n = 19,796)	Canada (n = 218)	Japan (n = 81)	United Kingdom (n = 3,482)	United States (n = 5,047)
<b>ATR<sub>NIBT</sub></b>								
Mean	.18	.52	.30	.25	.19	.57	.31	.29
Standard deviation	.20	.16	.15	.20	.19	.06	.14	.20
25th percentile	0	.48	.23	0	0	.54	.25	.11
Median	.10	.55	.32	.28	.14	.57	.33	.32
75th percentile	.35	.61	.38	.41	.32	.61	.38	.42
<b>ATR<sub>ADJNT</sub></b>								
Mean	.12	.30	.21	.17	.10	.32	.22	.18
Standard deviation	.14	.15	.11	.14	.12	.11	.10	.14
25th percentile	0	.19	.14	.02	.01	.25	.16	.07
Median	.06	.31	.22	.16	.08	.32	.22	.17
75th percentile	.21	.41	.28	.27	.16	.37	.28	.26
<b>ATR<sub>REV</sub></b>								
Mean	.025	.038	.036	.027	.028	.059	.037	.030
Standard deviation	.047	.038	.042	.040	.054	.039	.040	.032
25th percentile	0	.015	.012	.002	.003	.033	.015	.008
Median	.008	.029	.025	.017	.015	.049	.027	.022
75th percentile	.032	.049	.044	.038	.036	.095	.043	.042

Note: A company is classified as a multinational if it reports a nonzero value for the foreign tax provision (current plus deferred foreign taxes).

ATR<sub>NIBT</sub> is total current income taxes scaled by net income before taxes;

ATR<sub>ADJNT</sub> is total current income taxes scaled by net income before taxes, depreciation, goodwill amortization, pension expense, and research and development expense;

ATR<sub>REV</sub> is total current income taxes scaled by net revenues;

with total current income taxes (TAX) in the numerator and alternative income measures as scalars: (1) NIBT, (2) ADJNI, and (3) revenues (REV). To limit the annual average effective tax rates to realistic measures, negative (positive) average effective tax rate observations are truncated at zero (70 percent).<sup>11</sup>

Mean and median  $ATR_{NIBT}$  and  $ATR_{ADJNI}$  in Table 2 indicate that Japanese companies pay higher percentages of income in taxes than companies from other countries. Canadian companies, on average, face lower average effective tax rates than U.K or U.S. companies. However, mean  $ATR_{REV}$  range from 2.5 percent to 3.8 percent for all four countries. This suggests that the country differences indicated by the  $ATR_{NIBT}$  and  $ATR_{ADJNI}$  measures may reflect differences in accounting practices, tax burdens, and/or profitability.

Table 2 also reports the same statistics for companies that report nonzero amounts of foreign current and deferred income taxes (FORTAX). Unfortunately, multinational companies are not identified by *Global Vantage*. The only information that is available in the database that is suggestive of multinational activities is the foreign tax provision, which is total current and deferred foreign income taxes of the consolidated entity reflected in the financial statement. Unlike tax returns, financial statements generally reflect the worldwide consolidated entity. However, Japan is a notable exception. Historically Japanese companies have filed separate-company, rather than consolidated, financial statements. In recent years, many large Japanese companies have released consolidated statements. Of the Japanese company years in this study, 1,659 (55 percent) include only information from separate-company financial statements. All of these companies do not report a foreign tax provision.<sup>12</sup> One hundred and twenty-eight (2 percent) of the U.K company years also only report separate-company information.

We assume throughout the study that the 8,828 company years with nonzero values for FORTAX involve multinationals. This assumption is problematic for two reasons. One, multinationals need not pay or recover material amounts of foreign taxes. Two, as discussed above, many Japanese financial statements exclude foreign subsidiary operations and reflect only the Japanese parent company, likely contributing to the fact only 3 percent of Japanese companies (eighty-one company years) report nonzero amounts of foreign taxes.<sup>13</sup>

The  $ATR_{NIBT}$  and  $ATR_{ADJNI}$  for the multinationals are similar to the tax rates shown for the full sample. Japanese multinationals pay larger percentages of their income in taxes than companies from other countries. Contrary to the earlier  $ATR_{REV}$  estimates, Japanese multinationals also appear to pay higher taxes as a percentage of revenues. However, these statistics should be interpreted with caution given the small number of Japanese companies classified as multinationals.

Table 3 reports mean average effective tax rates across one-digit SICs for each country. Half of the companies are manufacturers (SICs 2 and 3).<sup>14</sup> The next most common industry is trade (SIC 5), comprising 14 percent of the sample. Countries are not represented equally across industries. More of the Canadian companies (32 percent) are in mining and construction (SIC 1) than any other industry. Japanese companies are concentrated in manufacturing (68 percent). U.K. companies are predominantly in manufacturing (45 percent) and trade (20 percent). American companies form a plurality in every industry. Fifty-two percent of the American companies are manufacturers.

Average effective tax rates fluctuate somewhat across industries. Excluding SIC 0—Agriculture, which is composed of few observations, the mean  $ATR_{NIBT}$  for American



Table 3. Mean average effective tax rates by one-digit SIC.

SIC Description	Canada (n = 1,786)	Japan (n = 2,999)	United Kingdom (n = 5,456)	United States (n = 19,796)
0 Agriculture				
ATR <sub>NIBT</sub>	na	.16	.47	.14
ATR <sub>ADJNI</sub>	na	.08	.33	.10
ATR <sub>REV</sub>	na	.001	.080	.035
Number of company years	0	5	29	60
1 Mining and construction				
ATR <sub>NIBT</sub>	.10	.55	.26	.17
ATR <sub>ADJNI</sub>	.06	.43	.19	.11
ATR <sub>REV</sub>	.027	.029	.035	.025
Number of company years	577	231	561	1,197
2 Manufacturing <sup>a</sup>				
ATR <sub>NIBT</sub>	.20	.53	.31	.29
ATR <sub>ADJNI</sub>	.13	.30	.21	.19
ATR <sub>REV</sub>	.019	.040	.034	.032
Number of company years	281	725	1,155	3,854
3 Manufacturing <sup>b</sup>				
ATR <sub>NIBT</sub>	.19	.50	.30	.26
ATR <sub>ADJNI</sub>	.13	.26	.20	.15
ATR <sub>REV</sub>	.016	.037	.029	.027
Number of company years	262	1,314	1,314	6,353
4 Transportation and utilities				
ATR <sub>NIBT</sub>	.27	.47	.30	.19
ATR <sub>ADJNI</sub>	.17	.20	.19	.12
ATR <sub>REV</sub>	.045	.035	.034	.030
Number of company years	249	216	332	2,475
5 Trade				
ATR <sub>NIBT</sub>	.29	.56	.30	.31
ATR <sub>ADJNI</sub>	.20	.39	.22	.22
ATR <sub>REV</sub>	.015	.020	.023	.019
Number of company years	102	273	1,104	2,785
6 Finance, insurance, and real estate				
ATR <sub>NIBT</sub>	.11	.51	.32	.20
ATR <sub>ADJNI</sub>	.10	.40	.27	.17
ATR <sub>REV</sub>	.023	.072	.095	.031
Number of company years	186	209	406	782
7 Services				
ATR <sub>NIBT</sub>	.22	.59	.30	.23
ATR <sub>ADJNI</sub>	.14	.39	.21	.15
ATR <sub>REV</sub>	.023	.083	.040	.032
Number of company years	89	26	419	1,516

Table 3. Continued.

SIC Description	Canada (n = 1,786)	Japan (n = 2,999)	United Kingdom (n = 5,456)	United States (n = 19,796)
8 Health and other services				
ATR <sub>NIBT</sub>	.26	na	.27	.23
ATR <sub>ADJNI</sub>	.18	na	.21	.17
ATR <sub>REV</sub>	.021	na	.034	.030
Number of company years	40	0	86	742
9 Other				
ATR <sub>NIBT</sub>	na	na	.30	.19
ATR <sub>ADJNI</sub>	na	na	.19	.15
ATR <sub>REV</sub>	na	na	.028	.008
Number of company years	0	0	50	32

Notes: ATR<sub>NIBT</sub> is total current income taxes scaled by net income before taxes;

ATR<sub>ADJNI</sub> is total current income taxes scaled by net income before taxes, depreciation, goodwill amortization, pension expense and research and development expense;

ATR<sub>REV</sub> is total current income taxes scaled by net revenues.

a. Companies manufacturing food, tobacco, textiles, apparel, lumber and wood, paper, printing and publishing, chemicals, and petroleum refining products are included in SIC 2.

b. Companies manufacturing rubber and plastic, leather, stone, clay, glass, concrete, primary or fabricated metal, industrial or commercial machinery, computer, electrical transportation equipment, measuring instruments, and photographic, jewelry, and recreational products are included in SIC 3.

companies ranges between 17 percent (SIC 1—Mining and Construction) and 31 percent (SIC 5—Trade). Manufacturing (SICs 2 and 3) and trade have the most disparate average effective tax rates in Canada, perhaps reflecting the preferential tax rates levied on profits from manufacturing in Canada.

The pattern of higher Japanese taxes is constant across industries. The mean ATR<sub>NIBT</sub> and ATR<sub>ADJNI</sub> for Japanese companies, in all SICs where there are a substantial number of Japanese companies (SIC 1 through 7), always exceeds the mean average tax rates for companies in the other three countries. Mean ATR<sub>REV</sub> again suggest that these apparent differences in rates may be caused by differences in accounting for expenses.

Table 4 shows mean average effective tax rates across years for each of the four countries. Tax rates show little variation across years. There is a slight increase in all tax rate measures during the mid-1980s. This is consistent with a worldwide expansion during the midpoint of the examination period sandwiched between two worldwide recessions.

## 4. Results

### 4.1. Regression model

The preceding analyses suggest that there may exist differences in tax burdens based on the domicile of the company. However, these apparent differences may actually be the result of differences in industry concentration or other factors. To determine more precisely the

Table 4. Mean effective tax rates by years.

Years	Canada (n = 1,786)	Japan (n = 2,999)	United Kingdom (n = 5,456)	United States (n = 19,796)
1982				
ATR <sub>NIBT</sub>	.17	.48	.30	.23
ATR <sub>ADJNI</sub>	.11	.29	.20	.15
ATR <sub>REV</sub>	.024	.035	.027	.026
Number of observations	151	259	433	1,656
1983				
ATR <sub>NIBT</sub>	.17	.50	.29	.24
ATR <sub>ADJNI</sub>	.13	.30	.19	.17
ATR <sub>REV</sub>	.027	.037	.031	.028
Number of observations	155	292	466	1,740
1984				
ATR <sub>NIBT</sub>	.18	.54	.31	.25
ATR <sub>ADJNI</sub>	.12	.32	.21	.17
ATR <sub>REV</sub>	.028	.041	.035	.030
Number of observations	155	313	487	1,817
1985				
ATR <sub>NIBT</sub>	.19	.52	.32	.24
ATR <sub>ADJNI</sub>	.13	.30	.23	.17
ATR <sub>REV</sub>	.029	.037	.036	.029
Number of observations	157	339	507	1,956
1986				
ATR <sub>NIBT</sub>	.21	.51	.33	.26
ATR <sub>ADJNI</sub>	.14	.29	.23	.18
ATR <sub>REV</sub>	.029	.036	.039	.031
Number of observations	169	342	533	1,980
1987				
ATR <sub>NIBT</sub>	.21	.54	.32	.28
ATR <sub>ADJNI</sub>	.14	.31	.23	.19
ATR <sub>REV</sub>	.036	.039	.041	.031
Number of observations	182	358	569	1,992
1988				
ATR <sub>NIBT</sub>	.19	.53	.32	.26
ATR <sub>ADJNI</sub>	.12	.32	.23	.17
ATR <sub>REV</sub>	.028	.044	.042	.028
Number of observations	191	348	578	2,054
1989				
ATR <sub>NIBT</sub>	.18	.51	.29	.25
ATR <sub>ADJNI</sub>	.10	.30	.22	.16
ATR <sub>REV</sub>	.023	.041	.038	.027
Number of observations	205	335	612	2,147
1990				
ATR <sub>NIBT</sub>	.14	.50	.28	.25
ATR <sub>ADJNI</sub>	.10	.29	.19	.15
ATR <sub>REV</sub>	.018	.037	.036	.025
Number of observations	216	282	637	2,229

Table 4. Continued.

Years	Canada (n = 1,786)	Japan (n = 2,999)	United Kingdom (n = 5,456)	United States (n = 19,796)
1991				
ATR <sub>NIBT</sub>	.13	.53	.27	.25
ATR <sub>ADJNI</sub>	.08	.26	.18	.15
ATR <sub>REV</sub>	.017	.031	.030	.023
Number of observations	205	131	634	2,225

Notes: ATR<sub>NIBT</sub> is total current income taxes scaled by net income before taxes;

ATR<sub>ADJNI</sub> is total current income taxes scaled by net income before taxes, depreciation, goodwill amortization, pension expense and research and development expense;

ATR<sub>REV</sub> is total current income taxes scaled by net revenues.

relation between average effective tax rates and country of domicile, the following equation is estimated using multiple regression:

$$\begin{aligned} \text{ATR}_{it} = & \sum \beta_{0j} \text{COUNTRY}_{it} + \sum \beta_{1j} (\text{COUNTRY}_{it} * \text{MN}_{it}) + \beta_{2k} \text{INDUSTRY} \\ & + \beta_{31} \text{YEAR}_{it} + \beta_4 \text{UNCON}_{it} + \beta_5 \text{RESTATE}_{it} + \epsilon_{it} \end{aligned} \quad (1)$$

where

ATR = Total current income taxes (TAX) for company *i* in year *t* divided by INCOME, where INCOME is measured as: (1) net income before taxes (NIBT), (2) net income before taxes plus depreciation, amortization, goodwill write-offs, pension expense and research and development expense (ADJNI), or (3) net revenues (REV) for company *i* in year *t*;

COUNTRY = Categorical variable that equals one if company *i* is domiciled in country *j*, where *j* = 1 to 4 encompassing Canada, Japan, the United Kingdom, and the United States;

MN = Categorical variable that equals one if the foreign tax provision (current plus deferred foreign taxes) for company *i* for year *t* is not equal to zero;

INDUSTRY = Categorical variable that equals one if the two-digit SIC for company *i* in year *t* is the two-digit SIC for industry *k* where *k* = 1 to *m*, encompassing all two-digit SICs spanned by companies *i* = 1 to *n*;

YEAR = Categorical variable that equals one if year *t* for company *i* is the same as year 1, where 1 = 1982 to 1991;

UNCON = Categorical variable that equals one if the income statement for company *i* in year *t* is unconsolidated;

RESTATE = Categorical variable that equals one if the income statement for company *i* in year *t* is restated in accordance with U.S. GAAP.

The regression is conducted using a pooled, cross-sectional approach. The average effective tax rates discussed above—ATR<sub>NIBT</sub>, ATR<sub>ADJNI</sub>, and ATR<sub>REV</sub>—serve as dependent variables. The variables of interest are categorical variables for each country (COUNTRY)

and multinationals in each country (COUNTRY\*MN). Other explanatory variables are included to control for differences across industry (INDUSTRY) and year (YEAR).

Two additional control variables are included in the regression, UNCON and RESTATE. A categorical variable is included for all separate-company observations (UNCON) to capture any potential impact separate-company only reporting has on average effective tax rates. The other control variable, RESTATE, arises because of *Global Vantage* reporting practices. If a non-U.S. company provides financial statements prepared according to their domestic accounting standards, as well as restated financial statements that comply with U.S. generally accepted accounting principles (GAAP), *Global Vantage* reports the restated financial statement data. Of the company years in this study, the financial statements of 1,359 Japanese company years are restated to comply with U.S. accounting principles. A categorical variable is included for these companies to control for any effects of restatement on average effective tax rates.<sup>15</sup>

#### 4.2. Primary regression results

Table 5 reports the estimates of the coefficients for the variables of interest in equation (1). When  $ATR_{NIBT}$  is the dependent variable, domicile in Canada increases average effective tax rates by 12 percent; Japan, 43 percent; the United Kingdom, 17 percent; and the United States, 15 percent. The largest country difference between  $ATR_{NIBT}$  and  $ATR_{ADJINI}$  occurs with Japan, suggesting that perhaps Japanese accounting practices for expenses inflate their  $ATR_{NIBT}$  relative to other countries. However, when  $ATR_{ADJINI}$  is the dependent variable, Japanese domicile still results in twice as great an increase to the effective rate than domicile in any of the other countries (21 percent for Japan versus 10 percent for the United Kingdom). Using  $ATR_{REV}$ , the United Kingdom and Japan report similar average effective tax rates. U.S. companies pay 1(0.9) percent less of sales in taxes than companies

Table 5. Pooled cross-sectional regression results from estimating equation (1) for all countries and years.

	COUNTRY Estimated Regression Coefficients (t-statistics)			COUNTRY**MN Estimated Regression Coefficients (t-statistics)		
	$ATR_{NIBT}$	$ATR_{ADJINI}$	$ATR_{REV}$	$ATR_{NIBT}$	$ATR_{ADJINI}$	$ATR_{REV}$
Canada	0.118 (6.13)	0.060 (4.22)	0.010 (2.47)	0.011 (0.81)	-0.004 (-0.44)	0.004 (1.32)
Japan	0.429 (21.71)	0.209 (14.35)	0.027 (6.71)	0.025 (1.15)	0.041 (2.60)	0.018 (4.13)
United Kingdom	0.169 (8.81)	0.097 (6.86)	0.028 (6.98)	0.039 (7.21)	0.023 (5.80)	-0.001 (-1.18)
United States	0.146 (7.84)	0.079 (5.78)	0.018 (4.68)	0.044 (13.45)	0.019 (7.97)	0.002 (3.66)
adj R <sup>2</sup>	0.72	0.67	0.42			
n	30,037	30,037	30,037			

in the United Kingdom (Japan), the Canadian companies pay 0.8 percent less than U.S. companies. Comparisons of the estimates of the COUNTRY coefficients indicate that all are significantly different from each other, except for the United Kingdom and Japan when  $ATR_{REV}$  is the dependent variable.

In short, it appears that domicile has a significant effect on average effective tax rates. Under all measures, Japan appears to have at least as heavy a corporate tax burden as the United Kingdom. The U.K. tax rate always exceeds the U.S. tax rate, which also exceeds the Canadian tax rate.<sup>16</sup>

The estimated coefficients for COUNTRY\*MN indicate whether multinationals face higher tax burdens than domestics within a country. Using  $ATR_{NIBT}$  as the dependent variable, the COUNTRY\*MN estimate for the United Kingdom and the United States is positive and significant, indicating that U.K. and U.S. multinationals face a 4 percent annual increase in average effective tax rates over their domestic counterparts. On average, U.K. (U.S.) multinationals pay 23 percent (30 percent) more of their NIBT in taxes than domestic-only U.K. (U.S.) corporations.<sup>17</sup> The multinational surcharge is not large enough, however, to change the overall ordering of countries by tax burden, discussed above. Using  $ATR_{ADJNI}$  as the dependent variable, multinationals in each country, except Canada, appear to face higher taxes than domestic companies. Using  $ATR_{REV}$  as the dependent variable, only Japanese and U.S. multinationals appear to face higher taxes than domestic companies.<sup>18</sup>

In summary, U.S. multinationals are the only multinationals that consistently appear to pay higher taxes than their domestic counterparts. The US\*MN coefficient is significantly positive with each ATR measure. The NIBT and ADJNI (REV) US\*MN coefficients imply that the average U.S. company in this study would pay \$4 (\$3) million more in annual U.S. taxes if it were a multinational rather than a domestic corporation. The significant NIBT and ADJNI UK\*MN coefficients provide some evidence that U.K. multinationals face higher tax rates than U.K. domestic-only companies. The average annual U.K. multinational surcharge implied by both the NIBT and ADJNI coefficients also is \$4 million. Canadian multinationals' average effective tax rates are never statistically different from their domestic counterparts. This may partially reflect the fact that Canada operates a territorial tax system (thus alleviating any potential double taxation) with regard to foreign direct investment in particularly large trading partner countries (e.g., the United States). Once again, inferences are difficult to draw about Japanese multinationals because so few Japanese companies are classified as multinationals in this study.

There are a variety of reasons why multinationals domiciled in a particular country might face higher average effective tax rates than domestic-only companies operating in that country. First, multinationals may operate in other countries that impose higher taxes than the home country. Second, the home country may impose higher taxation on foreign-source income than on domestic-source income. Examples of higher taxation of foreign-source income in the U.S. tax law include foreign-tax-credit limitations, interest allocation, and disallowance of accelerated depreciation methods for foreign assets. Third, higher average effective tax rates for multinationals may reflect higher profitability of foreign investments relative to domestic investments or higher profitability of multinationals relative to domestic-only companies. Financial statement disclosures are inadequate to identify the source of higher tax rates for multinationals. However, differences in profitability do not appear to explain the tax rate differential for U.S. (U.K.) multinationals, NIBT/REV is 10 percent

(12 percent) compared to 11 percent (12 percent) for the entire set of companies domiciled in the United States (United Kingdom).

In considering the competitiveness of multinationals versus domestic-only companies domiciled in each *other* host country excluding Japan, the total ATRs of multinationals imply that U.S. multinationals face a higher tax burden than Canadian-only companies (using all ATR measures) and than U.K.-only companies (using the NIBT and ADJNI measures, but not using the REV measure).<sup>19</sup> Similarly, U.K. multinationals face a heavier tax burden than U.S.-only or Canadian-only firms. However, the average Canadian multinational's tax burden remains below that of U.K. or U.S.-only companies.

### 4.3. Supplemental regression results

Tables 6 and 7 reestimate equation (1) by dropping one of the control variables and estimating the equation across measures of the deleted variable. First, INDUSTRY is dropped, and separate regression results are provided for each industry (Table 6). Second, YEAR is dropped, and coefficients are reported for each year (Table 7). The overall conclusions, discussed above, regarding the rank ordering of country ATRs and multinational taxation are unaltered by these supplemental tests.

**4.3.1. Variation across industries.** Table 6 provides pooled cross-sectional regression results for each one-digit SIC (SICs 1 through 7). Focusing on  $ATR_{NIBT}$  and  $ATR_{ADJNI}$  we observe several interesting patterns. First, examining manufacturing (SICs 2 and 3) and trade (SIC 5), the industries comprising the bulk (65 percent) of our sample, the largest intraindustry difference in average effective tax rates occurs in Canada. This is consistent with the lower statutory tax rates applied to manufacturing profits in Canada.<sup>20</sup> In addition, it appears that the overall lower average effective tax rates documented earlier for Canada may be particularly attributable to Canada's lower tax rates relative to the other countries in three industries: mining and construction, manufacturing, and finance, insurance and real estate (SICs 1 through 3 and 6).<sup>21</sup> Using  $ATR_{NIBT}$  Japanese companies have higher average effective tax rates across all industries. The  $ATR_{ADJNI}$  industry measures indicate that the Japanese tax burden is most disparate from that of other countries in the mining and construction, finance, insurance and real estate, and services industries (SICs 1, 6, and 7).<sup>22</sup>

The variability of tax burdens across sectors, as reflected in our ATR measures, may be a useful measure of within-country variation in industry tax incentives.<sup>23</sup> If so, the United Kingdom would appear to be the most successful at maintaining a level playing field across industries. Using  $ATR_{NIBT}$ , U.K. rates range from 25 percent to 29 percent, a spread of only 4 percent. U.S. rates range from 15 percent to 32 percent, a spread of 17 percent. Canadian rates range across sections from 10 percent to 31 percent, a spread of 21 percent, and Japanese rates range from 41 percent to 63 percent, a spread of 22 percent. Similarly, using  $ATR_{ADJNI}$ , the U.K. range is 11 percent, and the U.S., Canadian, and Japanese ranges are 14 percent, 17 percent, and 28 percent, respectively.

Consistent with our earlier analyses, U.S. multinational average effective tax rates consistently differ from U.S. domestic-only tax rates across sectors. Using either  $ATR_{NIBT}$  or  $ATR_{ADJNI}$ , U.S. multinationals in the mining and construction sector (SIC 1) face the

Table 6. Estimated regression coefficients by one-digit SIC.

SIC	1	2	3	4	5	6	7
a. Dependent variable is $ATR_{NIBT}$							
COUNTRY estimated regression coefficients (t-statistics):							
Canada	0.099 (6.08)	0.219 (16.69)	0.196 (12.74)	0.236 (14.69)	0.305 (15.59)	0.121 (6.02)	0.204 (7.27)
Japan	0.557 (18.50)	0.548 (36.66)	0.551 (43.76)	0.406 (13.65)	0.519 (23.84)	0.541 (22.77)	0.633 (6.12)
United Kingdom	0.259 (13.91)	0.280 (24.75)	0.269 (20.08)	0.247 (14.55)	0.290 (24.70)	0.290 (11.19)	0.256 (11.29)
United States	0.169 (11.44)	0.284 (36.79)	0.246 (35.21)	0.150 (13.46)	0.315 (32.50)	0.209 (12.26)	0.212 (12.44)
COUNTRY*MN estimated regression coefficients (t-statistics):							
Canada	0.090 (3.40)	-0.068 (-2.01)	-0.001 (-0.04)	-0.036 (-1.10)	-0.132 (-1.28)	-0.064 (-0.89)	0.005 (0.07)
Japan	na	0.034 (0.60)	0.028 (1.08)	na	0.001 (0.02)	na	na
United Kingdom	0.018 (1.05)	0.045 (4.15)	0.041 (3.18)	0.013 (0.63)	0.023 (2.13)	0.037 (1.63)	0.058 (2.82)
United States	0.072 (5.14)	0.056 (8.83)	0.047 (8.89)	0.034 (2.37)	-0.027 (-2.41)	0.012 (0.91)	0.054 (4.41)
$R^2$	0.60	0.79	0.73	0.65	0.78	0.73	0.63
b. Dependent variable is $ATR_{ADJNT}$							
COUNTRY estimated regression coefficients (t-statistics):							
Canada	0.058 (4.91)	0.141 (14.25)	0.148 (13.50)	0.142 (13.44)	0.227 (14.46)	0.110 (6.21)	0.151 (7.56)
Japan	0.441 (19.97)	0.285 (25.36)	0.271 (30.09)	0.170 (8.66)	0.318 (18.22)	0.413 (19.67)	0.449 (6.11)
United Kingdom	0.203 (14.82)	0.194 (22.74)	0.189 (19.98)	0.158 (14.08)	0.197 (20.94)	0.265 (11.53)	0.199 (12.35)
United States	0.109 (10.03)	0.188 (32.32)	0.164 (32.90)	0.094 (12.74)	0.228 (29.35)	0.169 (11.21)	0.144 (11.86)
COUNTRY*MN estimated regression coefficients (t-statistics):							
Canada	0.035 (1.78)	-0.027 (-1.08)	-0.029 (-1.46)	-0.020 (-0.91)	-0.129 (-1.57)	-0.046 (-0.73)	-0.056 (-1.26)
Japan	na	0.007 (0.16)	0.049 (2.60)	na	0.081 (1.76)	na	na
United Kingdom	-0.022 (-1.75)	0.022 (2.69)	0.015 (1.58)	-0.005 (-0.37)	0.030 (3.47)	0.022 (1.12)	0.015 (1.00)
United States	0.047 (4.56)	0.028 (5.83)	0.009 (2.38)	0.009 (0.99)	-0.016 (-1.75)	0.036 (3.11)	0.014 (1.65)
$R^2$	0.60	0.73	0.64	0.58	0.75	0.70	0.58



Table 6. Continued.

SIC	1	2	3	4	5	6	7
c. Dependent variable is $ATR_{REV}$							
COUNTRY estimated regression coefficients (t-statistics):							
Canada	0.024 (5.60)	0.017 (6.98)	0.016 (6.30)	0.036 (8.44)	0.014 (4.71)	0.020 (2.67)	0.021 (3.72)
Japan	0.028 (3.47)	0.027 (9.62)	0.030 (14.88)	0.018 (2.28)	0.012 (3.65)	0.083 (9.24)	0.068 (3.29)
United Kingdom	0.037 (7.52)	0.032 (15.01)	0.027 (12.70)	0.027 (5.97)	0.020 (11.17)	0.118 (11.89)	0.034 (7.58)
United States	0.021 (5.40)	0.028 (19.13)	0.025 (22.10)	0.021 (7.16)	0.018 (11.91)	0.032 (4.95)	0.027 (7.95)
COUNTRY*MN estimated regression coefficients (t-statistics):							
Canada	0.013 (1.790)	-0.006 (-0.98)	-0.003 (-0.75)	0.003 (0.39)	0.002 (0.11)	0.019 (0.68)	-0.004 (-0.35)
Japan	na	-0.008 (-0.78)	0.033 (7.84)	na	-0.021 (-2.30)	na	na
United Kingdom	-0.008 (-1.86)	-0.001 (-0.48)	0.000 (0.08)	-0.006 (-1.01)	0.003 (1.93)	-0.029 (-3.42)	0.005 (1.17)
United States	0.008 (2.21)	0.007 (6.05)	0.001 (1.02)	-0.009 (-2.23)	0.006 (3.59)	-0.012 (-2.35)	0.009 (3.67)
$R^2$	0.22	0.51	0.45	0.31	0.37	0.45	0.43

Note: SIC codes are defined as follows: 1 is mining and construction, 2 and 3 are manufacturing, 4 is transportation and utilities, 5 is trade, 6 is finance, insurance, and real estate, and 7 is services.

largest differential tax rate from their domestic counterparts.  $ATR_{NIBT}$  ( $ATR_{ADJNI}$ ) is 7 percent (5 percent) higher for multinationals. The other consistent differences for U.S. multinationals using  $ATR_{NIBT}$  or  $ATR_{ADJNI}$  are within the manufacturing and trade industries. U.S. multinationals have significantly higher average effective tax rates than their domestic counterparts in the manufacturing industry.  $ATR_{NIBT}$  ( $ATR_{ADJNI}$ ) is 6 percent (3 percent) and 5 percent (1 percent) higher in SICs 2 and 3, respectively, for multinationals. U.S. multinationals have significantly lower average effective tax rates than their domestic counterparts in the trade industry.  $ATR_{NIBT}$  ( $ATR_{ADJNI}$ ) is 3 percent (2 percent) lower for multinationals. The only other consistent significant differences for multinationals using  $ATR_{NIBT}$  or  $ATR_{ADJNI}$  are for U.K. companies within SIC 2—manufacturing and SIC 5—trade.  $ATR_{NIBT}$  ( $ATR_{ADJNI}$ ) is 5 percent (2 percent) higher in SIC 2 for U.K. multinationals, and  $ATR_{NIBT}$  ( $ATR_{ADJNI}$ ) is 2 percent (3 percent) higher in SIC 5 for U.K. multinationals.

Comparisons across industries are difficult with  $ATR_{REV}$  because of variation in the production function. For example, using  $ATR_{REV}$ , the trade industry has low tax rates, and the financial sector has high tax rates. These differences, however, likely are attributable to differences in margin across industries. The trade industry typically faces a low profit margin.

Table 7. Estimated regression coefficients by year.

SIC	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
a. Dependent variable is $ATR_{NIBT}$										
COUNTRY estimated regression coefficients (t-statistics):										
Canada	0.115 (2.06)	0.124 (2.58)	0.177 (3.64)	0.194 (4.04)	0.166 (3.18)	0.136 (2.69)	0.120 (2.55)	0.056 (1.32)	0.081 (1.69)	0.054 (1.03)
Japan	0.383 (6.47)	0.414 (8.11)	0.493 (9.71)	0.505 (10.04)	0.425 (7.94)	0.449 (8.84)	0.423 (8.88)	0.349 (8.08)	0.405 (8.27)	0.449 (8.01)
United Kingdom	0.121 (2.16)	0.133 (2.78)	0.215 (4.47)	0.244 (5.17)	0.192 (3.75)	0.181 (3.64)	0.189 (4.05)	0.106 (2.52)	0.155 (3.27)	0.149 (2.89)
United States	0.148 (2.75)	0.170 (3.74)	0.202 (4.39)	0.190 (4.20)	0.152 (3.09)	0.148 (3.10)	0.136 (3.03)	0.080 (2.00)	0.128 (2.84)	0.137 (2.77)
COUNTRY*MN estimated regression coefficients (t-statistics):										
Canada	-0.065 (-0.33)	-0.104 (-0.56)	-0.021 (-0.44)	0.022 (0.50)	0.008 (0.18)	0.003 (0.06)	0.053 (1.39)	0.037 (1.10)	-0.050 (-1.42)	0.036 (0.93)
Japan	0.099 (1.37)	0.014 (0.22)	0.008 (0.13)	-0.005 (-0.08)	0.033 (0.47)	0.032 (0.48)	-0.009 (-0.15)	0.043 (0.62)	0.026 (0.38)	0.029 (0.35)
United Kingdom	0.110 (5.58)	0.097 (5.43)	0.061 (3.58)	0.028 (1.61)	0.037 (2.09)	0.011 (0.69)	0.020 (1.26)	0.034 (2.19)	0.025 (1.49)	0.029 (1.60)
United States	-0.055 (-1.20)	-0.049 (-1.25)	0.026 (2.66)	0.030 (3.09)	0.042 (4.22)	0.043 (4.46)	0.059 (6.67)	0.054 (6.08)	0.068 (7.30)	0.053 (5.33)
$R^2$	0.69	0.73	0.75	0.73	0.74	0.76	0.77	0.74	0.69	0.64
b. Dependent variable is $ATR_{ADJNI}$										
Canada	0.027 (0.63)	0.059 (1.61)	0.083 (2.22)	0.161 (4.38)	0.098 (2.58)	0.072 (1.86)	0.042 (1.20)	0.016 (0.53)	0.050 (1.52)	0.066 (1.90)
Japan	0.156 (3.47)	0.189 (4.83)	0.246 (6.27)	0.318 (8.26)	0.190 (4.85)	0.203 (5.21)	0.203 (5.72)	0.172 (5.44)	0.232 (6.94)	0.219 (5.83)
United Kingdom	0.028 (0.66)	0.043 (1.16)	0.109 (2.92)	0.204 (5.66)	0.126 (3.36)	0.109 (2.85)	0.101 (2.90)	0.064 (2.09)	0.117 (3.61)	0.114 (3.30)
United States	0.052 (1.29)	0.079 (2.27)	0.109 (3.07)	0.166 (4.82)	0.095 (2.63)	0.087 (2.38)	0.056 (1.68)	0.032 (1.09)	0.087 (2.82)	0.103 (3.10)
COUNTRY*MN estimated regression coefficients (t-statistics)										
Canada	-0.058 (-0.38)	-0.111 (-0.78)	0.005 (0.13)	0.003 (0.10)	-0.014 (-0.46)	0.002 (0.06)	0.007 (0.26)	-0.026 (-1.07)	0.001 (0.06)	-0.007 (-0.28)
Japan	0.116 (2.13)	0.045 (0.93)	0.038 (0.80)	0.021 (0.42)	0.022 (0.43)	0.035 (0.67)	0.023 (0.48)	0.031 (0.61)	0.042 (0.88)	0.064 (1.16)
United Kingdom	0.075 (5.03)	0.058 (4.26)	0.035 (2.69)	0.021 (1.54)	0.020 (1.55)	0.010 (0.76)	0.006 (0.52)	0.020 (1.76)	0.010 (0.86)	0.015 (1.23)
United States	-0.055 (-1.59)	-0.045 (-1.51)	0.012 (1.65)	0.024 (3.23)	0.019 (2.54)	0.018 (2.41)	0.028 (4.31)	0.023 (3.63)	0.031 (4.89)	0.018 (2.76)
$R^2$	0.64	0.67	0.69	0.67	0.69	0.70	0.73	0.69	0.65	0.60

Table 7. Continued.

SIC	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
c. Dependent variable is $ATR_{REV}$										
COUNTRY estimated regression coefficients (t-statistics):										
Canada	0.001 (0.11)	0.011 (1.22)	0.014 (1.28)	0.029 (2.80)	0.016 (1.35)	0.012 (1.05)	0.005 (0.53)	-0.001 (-0.05)	0.002 (0.16)	0.007 (0.81)
Japan	0.013 (1.26)	0.023 (2.43)	0.028 (2.52)	0.043 (3.97)	0.026 (2.18)	0.027 (2.31)	0.028 (2.84)	0.024 (2.30)	0.026 (2.51)	0.024 (2.66)
United Kingdom	0.006 (0.67)	0.017 (1.86)	0.025 (2.30)	0.042 (4.16)	0.032 (2.79)	0.033 (2.90)	0.035 (3.65)	0.024 (2.36)	0.030 (2.96)	0.024 (2.89)
United States	0.009 (0.96)	0.018 (2.16)	0.024 (2.33)	0.036 (3.72)	0.023 (2.11)	0.017 (1.58)	0.015 (1.58)	0.010 (1.00)	0.013 (1.37)	0.013 (1.70)
COUNTRY*MN estimated regression coefficients (t-statistics):										
Canada	-0.030 (-0.89)	-0.052 (-1.49)	0.006 (0.62)	0.002 (0.26)	0.005 (0.49)	0.005 (0.46)	0.030 (3.83)	-0.004 (-0.50)	-0.001 (-0.12)	0.001 (0.23)
Japan	0.034 (2.74)	0.026 (2.20)	0.025 (1.81)	0.021 (1.51)	0.014 (0.90)	0.015 (0.95)	0.014 (1.07)	0.012 (0.72)	0.015 (1.03)	0.009 (0.68)
United Kingdom	0.006 (1.88)	0.006 (1.94)	0.004 (0.93)	0.000 (0.11)	-0.000 (-0.05)	-0.006 (-1.63)	-0.006 (-1.82)	-0.003 (-0.70)	-0.005 (-1.44)	-0.004 (-1.31)
United States	-0.014 (-1.75)	-0.008 (-1.14)	-0.002 (-1.06)	-0.001 (-0.66)	0.001 (0.59)	0.006 (2.71)	0.008 (4.31)	0.003 (1.59)	0.005 (2.47)	0.005 (3.22)
$R^2$	0.44	0.47	0.44	0.42	0.41	0.43	0.49	0.37	0.36	0.42

**4.3.2. Variation across years.** Examining within-country variation in ATRs across years is particularly interesting, since each of the four countries experienced major tax reform during the 1980s. Briefly, the U.K. statutory corporate tax rate was reduced from 52 to 35 percent and accelerated depreciation was repealed in 1984. The U.S. and Canadian corporate tax rates were reduced 46 to 34 percent and 36 to 28 percent, respectively, and investment incentives, such as the investment tax credit and accelerated depreciation, were repealed in 1986. Japan initially reduced corporate income tax rates from 42 to 37.5 percent and repealed accelerated depreciation in 1988. In addition, Japan moved from a split rate to a classical system by removing the differentiation between distributed and undistributed profits.<sup>24</sup>

The annual estimated coefficients in Table 7 (which control for differences in industry composition) indicate slightly more variation across time in ATRs than the earlier univariate analysis. Generally, average effective tax rates increase in the early 1980s, peak in the mid-1980s, and decline in the late 1980s for all countries. However, it is difficult to discern clearly variation attributable to tax reform within countries. For example, the Japanese statutory rate reductions post-1989 are not evidenced in the data at all. While there is a slight pattern of lower U.S. rates post-1986 and some indication of lower Canadian rates post-1988, these patterns may be attributable to changing economic conditions, since there are similar trends for other countries. The inability to clearly discern changes in average effective tax rates attributable to tax reforms may occur because each of the tax reforms

both broadened the tax base, as well as lowered statutory tax rates, with an ambiguous predicted effect on average effective tax rates.

The tax reform most evident in the data is the U.K. budget for 1984. While statutory rates were reduced, a primary expected impact of the 1984 budget was to bring many tax-exhausted companies back onto the tax rolls. Prior to the 1984 budget, the government's Green Paper on corporation tax published in 1980 estimated that due to accumulated tax losses and surplus-advance corporate tax (ACT), as many as one-third of U.K. companies paid no corporate tax and would not for the foreseeable future, and another one-third moved in and out of tax from year to year. Thus, the increase in U.K. ATRs beginning in 1984 documented in Table 7 are consistent with the expected impact of bringing large numbers of U.K.-corporations back onto the tax rolls. However, as discussed above, interpretation of increasing ATRs in the mid-1980s is confounded by worldwide economic expansion.

Inferences drawn about differential taxation for multinationals vary across years. The U.K. multinational "surcharge" evidenced in the primary regression is only evident in the early years (1982–1984 with  $ATR_{NIBT}$  and  $ATR_{ADJNI}$  and 1982 and 1983 with  $ATR_{REV}$ ). These years also coincide with the lowest estimated U.K. domestic tax rates, suggesting that the multinational surcharge may be greatest when the home country tax rate is lowest.<sup>25</sup>

The U.S. multinational surcharge is evident with  $ATR_{NIBT}$  and  $ATR_{ADJNI}$  from 1984 to 1991 and is highest in 1988 and 1990. The U.S. multinational surcharge appears only post-1986 using  $ATR_{REV}$ . While like the U.K. multinational surcharge, the U.S. multinational surcharge is positively correlated with low home-country tax-rate years, the mapping is not as clear for U.S. companies.<sup>26</sup> For example, the U.S. multinational penalty is not evident in 1982 and 1983, which were relatively low U.S. effective tax-rate years. It appears that the U.S. multinational penalty may be a function of low home country tax rates, more stringent foreign-tax-credit rules enacted in TRA 1986, as well as potentially other unidentified factors.

#### 4.4. Sensitivity analyses

The findings in this study are robust to a battery of specification tests. This section briefly describes alternative regressions that were conducted; however, the conclusions drawn from all of the sensitivity tests are unchanged from those described above. The first set of tests address the impact on the variables of interest of UNCON, which controls only for parent-company (rather than consolidated) financial statements, and RESTATE, which controls for companies whose financial statements are restated to conform to U.S. accounting principles. In the primary pooled cross-sectional regression, UNCON is  $-0.04$  and significant using  $ATR_{NIBT}$ ,  $0.02$  and significant using  $ATR_{ADJNI}$ , and insignificant using  $ATR_{REV}$ . RESTATE is insignificant using  $ATR_{NIBT}$ ,  $-0.02$  and significant using  $ATR_{ADJNI}$  and  $0.004$  and significant using  $ATR_{REV}$ . Conclusions are unchanged when UNCON and RESTATE are deleted and when they are interacted with a categorical variable denoting a Japanese company.

The second specification tests permit average effective tax rates to exceed 70 percent. Conclusions are unchanged when regressions are reestimated. The third specification deletes the multinational categorical variable because of concerns about measurement error with

Japanese companies. Again, inferences drawn from the regression results are unchanged. In the fourth test, revenues is added as an explanatory variable to capture company size differences. Countries commonly have special incentives for small business. As a result, average effective tax rates could be a function of size. However, conclusions are unchanged when revenues are included as an explanatory variable.

The fifth sensitivity test excludes all observations with negative income measures and reestimates the pooled, cross-sectional regression. Conclusions are unchanged. The sixth sensitivity test excludes all observations for which there is not a positive tax payment. Conclusions drawn from the coefficients on the COUNTRY variables are unchanged. However, results differ from the prior multinational estimates. US\*MN is negative in all regressions and significant using  $ATR_{ADJNI}$  and  $ATR_{REV}$ . This indicates that the multinational surcharge for U.S. companies is sensitive to the treatment of companies receiving tax refunds or generating net operating loss carryforwards.

Finally, the sample is restricted to post-1987 company years to determine if coefficients shift across time as each of the countries implement some form of tax reform. The relative rank of each country is unchanged; however, a small increase in the average effective tax rate for each country is noted. For example, in the primary pooled cross-sectional regression, the U.S. tax rate using  $ATR_{NIBT}$  increases from 15 percent to 16 percent; using  $ATR_{ADJNI}$  it increases from 8 percent to 10 percent; and using  $ATR_{REV}$  it increases from 1.8 percent to 2.5 percent. This upward movement suggests that U.S. average effective tax rates have moved up slightly since tax reform.

## 5. Conclusion

This is the first study to use financial statement information to compare average effective tax rates across countries. Our results are robust to alternative specifications of the average effective tax-rate measure, suggesting the problem of defining comparable income bases is not an insurmountable obstacle to using financial statement-based estimates for comparing intercountry tax burdens. Among the four countries we compare, we consistently find that they are ranked by average effective tax rates in descending order as follows: Japan, the United Kingdom, the United States, and Canada. This country ranking persists when we compare domestic-only companies across domiciles and multinational-only companies across domiciles. In addition, the lower relative tax burden for Canadian companies is particularly evident within the mining and construction, manufacturing, and finance, insurance, and real estate sectors.

We also compare multinationals and domestic-only companies within domiciles. A generalizable pattern emerges only for the United States. Multinationals domiciled in the U.S. consistently pay higher taxes than their domestic counterparts. The U.S. multinational tax surcharge is particularly evident in the manufacturing industry and mining industry and during the post-U.S. tax reform years included in our observation period.

All countries' average rates increase in the early 1980s, peak in 1984 or 1985, and decline in subsequent years. We are unable to clearly isolate variation in ATRs attributable to the major tax reforms occurring in each country during the 1990s (other than the increase in U.S. multinational ATRs post-1986 mentioned above). This may occur because all countries' tax reforms not only lowered statutory tax rates, but also broadened the tax base.

To compare our findings to other effective tax-rate estimates, it is useful to distinguish the effective tax-rate estimates provided in prior studies as follows: (1) ATR estimates for U.S. companies with no distinction between domestic-only and multinational U.S. companies (e.g., GAO, 1992), (2) marginal effective tax rate (MTR) estimates restricted to domestic-only investments for companies domiciled in the U.S. and other jurisdictions (e.g., OECD, 1991), and (3) MTR estimates distinguishing between domestic and nondomestic investments for companies domiciled in the United States and other jurisdictions (e.g., Altshuler and Mintz, 1994; Devereux and Freeman, 1994; and OECD, 1991).

Prior studies deriving ATR estimates from financial statement data fall in the first classification. Our annual U.S. average ATR estimates (Tables 4 and 7) are consistently lower than the GAO (1992) ATR estimates for each year estimates are available for comparison (1982–1983 and 1986–1989). In addition, we do not document nearly as pronounced of an upward trend in ATRs post-1986.<sup>27</sup> However, the GAO estimates are calculated using a nonrandom sample of 220 large U.S. corporations (all listed on the *Fortune* 500) and are weighted by income.<sup>28</sup>

Prior MTR studies falling in classifications 2 and 3 employ the King-Fullerton methodology to simulate marginal effective tax rates. Although one would not necessarily expect consistent country tax burden rankings based on marginal and average effective tax rate estimates, our findings generally are consistent with those of prior studies. The OECD (1991) study estimates MTRs for domestic-only investment in manufacturing using January 1, 1991 tax laws and ranks the four countries we investigate by MTRs (from highest to lowest) as Japan, Canada, the United Kingdom, and the United States, with the smallest difference between the United Kingdom and the United States. Our relative country tax burden rankings are similar for all countries other than Canada. In addition, our country rankings generally are consistent with OECD (1991, p. 83) provided estimates of corporate taxes as a percentage of GDP (although the reported corporate tax to GDP ratios tend to be slightly higher in Canada than in the United States). While there are many factors likely contributing to the relative differences among Canadian average and simulated marginal tax burdens, one potential factor is the actual operating and complex tax strategies of Canadian companies (particularly in the manufacturing, mining and construction, and finance, insurance, and real estate sectors) differ from the assumptions of simulated marginal tax rate estimates.

From 1982 to 1991, we estimate that the average U.S. multinational paid \$4 million more in annual U.S. taxes than domestic-only U.S. companies with the same level of income. This finding of a large U.S. multinational surcharge, particularly after 1986 is consistent with Altshuler and Mintz (1994) and Devereux and Freeman (1994). Altshuler and Mintz (1994, Table 6) find that the differential in MTRs for U.S. company domestic investments versus U.S. company investments in Canada, Japan, or the United Kingdom are magnified as a result of the more stringent interest allocation rules enacted in TRA 1986. Similarly, Devereux and Freeman (1994, Figures 10–16) report that from 1984 to 1989, a U.S. company's cost of capital for outward foreign direct investment into France, Germany, Japan, Italy, Netherlands, and the United Kingdom was consistently higher than the cost of capital for outward foreign direct investment into these same countries by companies domiciled in any of the other jurisdictions. Our results further attribute the U.S. multinational surcharge to tax reform and isolate the largest impact in the manufacturing sector and mining and construction sector.

## Appendix

This appendix summarizes principal financial reporting practices in Canada, Japan, the United Kingdom, and the United States that impact the use of *Global Vantage* for international tax research. We discuss the following reporting practices that vary across the four countries and the implications of these differences for international tax research: consolidation practices, segment reporting, installment sales, cost of goods sold, depreciation, goodwill, capitalization of interest expense, pension expense, research and development costs, and income tax expense.

### *Consolidation practices*

In general, a parent firm consolidates subsidiaries in which it owns more than half of the stock. Exceptions apply to U.K. and Japanese firms. Though not required, it is common practice for a U.K. parent to consolidate subsidiaries in which the parent exercises some control and owns at least 20 percent of equity capital (*Doing Business in the United Kingdom*, 1991). Japanese firms prepare unconsolidated financial statements for their shareholders and consolidated financial statements for the Ministry of Finance. They consolidate only if the parent firm owns more than half of the subsidiary's voting power *and* the subsidiary represents at least 10 percent of the combined total sales or total assets of the consolidated group (*World Accounting*, 1991). This practice excludes small subsidiaries from the consolidated group and limits disclosure of cross-holdings of securities (less than 50 percent) among members of keiretsus.<sup>29</sup>

### *Segment reporting*

Segment reporting refers to the provision of separate summary financial statement information by major industry lines and geographic areas (both referred to as segments). U.S., Canadian, and U.K. GAAP require income and asset information by segments. Japanese GAAP requires income information only by segments. Unfortunately, *Global Vantage* does not report segmented data, thus excluding important information such as foreign sales or foreign operating income. *Global Vantage* does, however, report foreign taxes.<sup>39</sup>

### *Installment sales*

U.S., Canadian, and U.K. firms are not permitted to use the installment sales method of accounting for financial statement purposes and thus report installment sales in full in the year of sale. However, Japanese companies are allowed to use the installment sales method for tax purposes if the company also uses the installment method for financial reporting. Since the installment method defers revenue recognition, Japanese firms have an incentive to defer taxes, albeit at a cost of reduced earnings. Japanese companies electing installment sales treatment will report less income than other firms in the year of an installment sale and more income in subsequent years.

### *Cost of goods sold*

United States is the only country where the LIFO method of inventory reporting is widely used. LIFO is not permitted in the United Kingdom, and although allowed is not common practice in Canada or Japan. Because LIFO decreases earnings as prices rise, the earnings of U.S. LIFO companies generally are understated relative to their U.K., Canadian, and Japanese counterparts. Unfortunately, *Global Vantage* does not indicate the company's inventory costing method. In addition, U.S., U.K., and Canadian firms value inventories at the lower of cost or market. In contrast, Japanese firms normally report inventories at cost (Nobes and Parker, 1988, p. 162).

### *Depreciation*

Differences in accounting for depreciation may represent the most significant intercountry difference in financial reporting. The two principal depreciation differences are (1) Japanese firms may elect to depreciate assets more rapidly, since they must use the same depreciation methods for tax and parent-only book purposes, and (2) U.K. firms are allowed to compute depreciation on the current value of assets rather than the historical cost of assets (Choi and Mueller, 1992, p. 104; *World Accounting*, 1991; *Doing Business in the United Kingdom*, 1991, p. 131). These differences are likely to reduce accounting earnings for Japanese and U.K. firms compared to American and Canadian companies.

### *Goodwill*

Goodwill is the difference between the acquisition price of a firm and the fair values of the target's separable net assets. In Japan, however, goodwill is measured on the basis of the book value of acquired assets (Choi and Mueller, 1992, p. 105).

U.S., Canadian, and Japanese firms amortize goodwill for financial statement purposes over forty, forty, and five years, respectively. In contrast, accounting standards in the United Kingdom permit firms to directly reduce stockholder's equity by the full amount of acquired goodwill, thus avoiding any reduction in earnings reported on the income statement. *Global Vantage* reports the goodwill write-off separately for financial companies and includes goodwill with other amortization expenses for industrial companies.

### *Capitalization of interest expense*

Generally, interest expense is treated as an expense when incurred. However, interest incurred specifically for the acquisition and preparation of assets for their intended use is sometimes capitalized as part of the cost of the asset and subsequently expensed through depreciation of the asset. Rules for capitalizing production period interest expense vary widely across countries. Japanese GAAP provides little guidance concerning capitalization of interest expense, and most Japanese firms do not capitalize interest (*World Accounting*,



1991). Similarly, Canadian accounting for interest varies across firms and industries, with real estate being the principal industry in which firms capitalize interest (*World Accounting*, 1991). U.S. GAAP permits capitalization of interest associated with assets requiring a period of time to be prepared for their intended use (such as assets constructed for company's own use and assets intended for sale or lease that are constructed as discrete projects). The United Kingdom provides the most generous interest capitalization rules, allowing capitalization of interest incurred for a wide range of production activities (AICPA, 1987, p. 36). Thus, interest capitalization may cause U.K., and to a lesser degree U.S., firms to report more earnings than Japanese firms. *Global Vantage* reports the amortization of capitalized interest but does not report the balance of capitalized interest.

#### *Pension expenses*

Pension expense for U.S. and Canadian firms is accrued when employee services are rendered and may differ substantially from the cash contributions to the pension plans. Conversely, pension expense for U.K. firms normally equals the contributions to the pension plans (cash basis). Japanese companies traditionally provide lump-sum retirement and severance payments to departing employees and can report 40 percent, 50 percent, or 100 percent of the estimated liability for these payments. Thus, pension accounting generally results in U.K. companies reporting more earnings than U.S. and Canadian firms, while the income effect on Japanese companies is indeterminable. *Global Vantage* reports the total pension expense without providing any supporting detail.

#### *Research and development costs*

U.S. and Japanese firms expense research and development costs. U.K. and Canadian firms expense research costs but capitalize and amortize development costs. *Global Vantage* reports total research and development costs as a single amount.

#### *Income tax expense*

Accounting for income taxes varies across the countries. Japanese accounting principles prohibit Japanese firms from reporting deferred taxes on their primary parent-only financial statements, though it is acceptable to report deferred taxes on MOF consolidated financial statements (*World Accounting*, 1991). U.K. companies are required to disclose deferred taxes only when it is probable that a liability or asset will materialize. However as a matter of practice, many U.K. firms disclose deferred taxes in a footnote. Canadian firms report total current, deferred, and other taxes as a single item, as well as disclose deferred taxes separately. U.S. firms separately report current, deferred, and total taxes. *Global Vantage* provides separate data items for available current, deferred, other, and total taxes, though the current tax data item is missing for the majority of Canadian firms.

*Table A1.* Potential effects of intercountry differences in accounting practices on reported earnings.

	United Kingdom	Canada	Japan
Installment sales	N	N	—
Cost of goods sold	+	+	+
Depreciation	—	N	—
Goodwill	+	N	—
Interest capitalization	+	N	—
Pension expenses	+	N	?
Research and development costs	+	+	N

Table A1 summarizes the potential effects of intercountry differences in accounting practices on reported earnings. U.S. accounting standards are used as the benchmark to compare the impact of Canadian, U.K., and Japanese accounting practices on earnings. If a country's accounting practices regarding a particular matter generally cause firms in that country to report more (less) net income than U.S. firms would report, the applicable box contains a + (—). Neutral effects (relative to the United States) are denoted with an N, and unclear effects are denoted with a ?. These denotations refer to the effect accounting practices on earnings in the year of a transaction.

### Acknowledgments

The authors thank Lowell Dworin, Michael Keen, Peter Merrill, Jack Mintz, Joel Slemrod, an anonymous referee, and participants at the International Tax Policy Forum Conference for helpful comments. They are grateful to the International Tax Policy Forum and the Center for Financial and Accounting Research, University of North Carolina for financial support and Deen Kemsley for outstanding research assistance.

### Notes

1. Like *Compustat* and *Extel Financial Ltd*, also produced by Standard & Poor's, the *Global Vantage* database provides information on all available publicly traded companies from each country included in the database. We have selected for study the countries with the most comprehensive coverage in the database. Approximately, 40 percent of the companies included in the database are incorporated in the United States, 10 percent in Japan, 10 percent in the United Kingdom, and 5 percent in Canada.
2. Ando and Auerbach (1988) use financial statement data to estimate ATRs from 1966 to 1981 for a small sample of nineteen American and twenty-one Japanese firms.
3. All companies included in the survey are registered with the Securities and Exchange Commission. Many of the companies have securities traded on one of the major stock exchanges—80 percent on the New York and 8 percent on the American. The 600 companies span a complete cross-section of industries and range in relative size.
4. The OECD report (1991, p. 125) indicates that "All the limitations with the King and Fullerton methodology are, of course, still present when the analyses become transnational, but there are in addition several others.

- The restriction that the parent raises finance only in the country in which it is resident is one; others are the neglect of thin capitalization rules, the assumption that assets are transferred between members of the same group at their true economic values, the absence of any attempt to assess the effects of the taxation of exchange rate gains and losses, and the restriction of the analysis to the simplest form of group relations—parent:subsidiary—rather than looking at more complex group structures and possibilities for treaty shopping.”
5. Shareholder and corporate tax integration can differ within a country, as well as across countries. For example, U.K. multinationals are not able to obtain a credit for advance corporate tax (ACT) withheld on dividends paid from foreign income.
  6. An estimate of the future taxes due on current financial statement income can be obtained from the deferred income tax amount. However, there is not sufficient information available to discount this estimate.
  7. Current taxes or the current tax provision is defined as the income taxes paid or payable (or refundable) for a year as determined by applying the provisions of the enacted tax law to the taxable income for that year of the entity or entities reflected in the financial statement (e.g., Statement of Financial Accounting Standards No. 109, Accounting for Income Taxes).
  8. *Global Vantage* provides total current federal, foreign, provincial/state, and local taxes as a single data item (TXC). However, TXC is missing for over 75 percent of the firms domiciled in Canada. In addition, it is not possible to separate the various components of current taxes (i.e., federal, foreign, provincial/state, and local) using *Global Vantage*. Thus, we use TXT, which is widely reported, and subtract TXDF and TCDO.
  9. The sole purpose of these screens is to eliminate inactive companies or companies undergoing unusual restructuring.
  10. See U.S. House of Representatives (1990), Wheeler (1988), Grubert, Goodspeed, and Swenson (1993), and Collins, Kemsley, and Shackelford (1995).
  11. An average effective tax rate for each company also is computed using two alternative measures that do not require truncation.  $(\Sigma \text{TAX}) / (\Sigma \text{income})$  and mean of  $\Sigma (\text{TAX} / \text{income})$ , where the summation is across company years and income is measured by NIBT, ADJNI, and REV. Inferences drawn from these alternative measures are unchanged from the reported average effective tax rates. The quartile summary statistics for the alternative average effective tax rates are almost identical to the results in Table 2. The means are similar when income is NIBT or REV but are distorted by near-zero denominators when income is ADJNI. Not surprisingly, standard deviations always are larger with the two measures that do not truncate.
  12. This finding implies that Japanese companies do not invest in foreign countries through branch operations because foreign taxes incurred by branch operations should be reflected on the Japanese investor's financial statements. An alternative interpretation is that separate company financial statements do not disclose foreign taxes.
  13. Misclassifying multinational companies with immaterial amounts (and thus not reported) of foreign income taxes as domestic companies likely results in a downward bias in our multinational ATR estimates. However, the direction of the bias is unclear for those firms paying or recovering material amounts of foreign income taxes but not reporting these amounts in the financial statements.
  14. Companies manufacturing food, tobacco, textiles, apparel, lumber and wood, paper, printing and publishing, chemicals, and petroleum refining products are included in SIC 2. Companies manufacturing rubber and plastic, leather, stone, clay, glass, concrete, primary or fabricated metal, industrial or commercial machinery, computer, electrical, transportation equipment, measuring instruments, and photographic, jewelry, and recreational products are included in SIC 3.
  15. Sensitivity tests, discussed later in the paper, found that neither UNCON nor RESTATE has any effect on the variables of interest in this study.
  16. While provincial income taxes may represent a large share of the tax burden levied on Canadian companies, recall that these taxes are included in the numerators of our average effective tax rate measures. Thus, the Canadian estimates are not biased downward by the exclusion of an important share of the tax burden. We reestimated equation (1) using two alternative dependent variables, taxes scaled by total stockholder's equity and taxes scaled by total assets. When taxes are scaled by equity, conclusions are unchanged from those drawn using income measures as scalars. This finding is not surprising because equity is largely the sum of prior income and expenses. When taxes are scaled by assets, the estimates for the COUNTRY coefficients indicate a different ordering among, the four countries, particularly with regard to Japan. The COUNTRY coefficients are: U.K.—0.014, U.S.—0.010, Japan—0.007, and Canada—0.003. Each coefficient is significantly different from the others. These results suggest that the Japanese tax burden is less than indicated

- by the income scalars. However, total assets are not comparable across countries because Japanese companies are more heavily leveraged than companies from the other three countries. The mean debt-to-asset ratio for Japanese companies is 0.66. The mean debt-to-asset ratio for companies from the other three countries is 0.55 to 0.56. Higher leverage among Japanese companies increases total assets for Japanese companies and lowers taxes-to-asset ratios. Because conclusions are unchanged using equity as a scalar and because differences in leverage contaminate total assets as a scalar, we do not use either of these scalars in later tests.
17. This percentage increase is computed by dividing the coefficient for COUNTRY\*MN by the coefficient for COUNTRY. For example, for U.S. multinationals the computation is 0.044/0.146 or 30 percent.
  18. To determine if inferences drawn about differences between multinationals and domestic companies within a country are distorted by information from other countries, we also estimate separate pooled, cross-sectional regressions for each country. The results suggest that earlier analyses are not so distorted.
  19. We hesitate to include Japanese-only companies in this comparison because of the degree of noise in our classifications of Japanese-only and Japanese multinational companies.
  21. To test for differences in ATRs between Canadian manufacturers and other companies, we repeated the primary regression including a categorical variable that equals 1 if the company is a Canadian manufacturer (SIC 2 or 3). Using  $ATR_{NIBT}$  and  $ATR_{ADJNI}$  as dependent variables, the results support lower ATRs for Canadian manufacturers. With  $ATR_{NIBT}$  ( $ATR_{ADJNI}$ ), Canadian manufacturers face a 5 percent (1 percent) lower ATR. No difference is identified when  $ATR_{REV}$  is the dependent variable.
  21. Canadian companies have significantly lower ATRs than all other domiciles within SICs 1, 2, 3, and 6 using NIBT, within SICs 1, 2, and 6 using ADJNI, and within SICs 2, 3, and 6 using REV.
  22. Japanese companies have significantly higher ATRs (at the 5 percent level) than all other domiciles within each SIC using NIBT and within each SIC other than 4 using ADJNI.
  23. Recall, the denominators of our ATR measures are derived from financial statement computed income, and in all countries, except Japan, this income measure does not reflect industry-specific tax incentives that reduce the tax base. However, the numerator of our ATR measures reflects such incentives.
  24. See Whalley (1990) for a more complete discussion of country-specific changes in tax regimes occurring throughout the 1980s.
  25. The annual regression coefficients for U.K. domestic-only companies and U.K. multinationals are negatively correlated at a significance level of 5 percent using  $ATR_{ADJNI}$  and  $ATR_{REV}$  and are not related using  $ATR_{NIBT}$ . The U.K. also is the only country that taxes companies domiciled within its borders on worldwide income *and* requires the foreign tax credit limitation be calculated on a subsidiary-by-subsiary basis. Specifically, U.K. firms cannot offset high-taxed dividends from one foreign country against low-taxed dividends from another country unless both dividends flow through a foreign holding company ("mixer company"). Thus, the relative tax burdens of U.K.-domestic-only and multinational corporations may be more sensitive to home country tax rates.
  26. The annual regression coefficients for U.S. domestic-only companies and U.S. multinationals are not significantly related using any of the ATR measures.
  27. GAO (1992) concludes that the post-TRA 1986 ATR increase observed in their sample is, in large part, attributable to the reversal of previously deferred tax expenses for long-term contracts, installment sales, and investment tax credits.
  28. To determine if our results are sensitive to weighting schemes, we reestimate the average effective tax rates for each country, weighting observations by sales and assets. Inferences regarding the tax burdens of each country are unchanged.
  29. A keiretsu is a group of Japanese companies with sibling relations.
  30. *Global Vantage* data item for foreign taxes represents the total amount of current and deferred income taxes paid or payable to foreign governments.

## References

- Altshuler, R. and J. Mintz. (1995). "U.S. Interest-Allocation Rules: Effects and Policy." *International Tax and Public Finance*, 2(1).
- American Institute of Certified Public Accountants. (1987). *The Accounting Profession in The United Kingdom*. AICPA.

- American Institute of Certified Public Accountants. (1992). *Accounting Trends and Techniques*. AICPA.
- Ando, A, and A. Auerbach. (1988). "The Cost of Capital in the United States and Japan: A Comparison." *Journal of the Japanese and International Economies*, 2, 134-158.
- Bradford, D., and D. Fullerton. (1981). "Pitfalls in the Construction and Use of Effective Tax Rates." In C. Hullén (Ed.), *Depreciation, Inflation, and the Taxation of Income from Capital* (pp. 251-278). Washington, D.C.: Urban Institute Press.
- Choi, F., and G. Mueller. (1992). *International Accounting*. Englewood Cliffs, NJ: Prentice Hall.
- Collins, J., D. Kemsley, and D. Shackelford. (1995). "Tax Reform and Foreign Acquisitions: A Microanalysis." *National Tax Journal*, 48(1), 1-21.
- Cummins J., T. Harris, and K Hasset. (1993). "Accounting Standards, Information Flow, and Firm Investment Behavior." NBER working paper.
- Devereux, M., and H. Freeman. (1995). "The Impact of Tax on Foreign Direct Investment: Empirical Evidence and the Implications for Tax Integration Schemes." *International Tax and Public Finance*, 2(1).
- Doing Business in the United Kingdom*. (1991). City: Price Waterhouse.
- Fullerton, D. (1984). "Which Effective Tax Rate?" *National Tax Journal*, 37(1), 23-41.
- Governmental Accounting Office (GAO). (1992). *1988 and 1989 Company Effective Tax Rates Higher Than in Prior Years*. Washington, D.C.: GAO. GAO/GGD-92-111.
- Grubert, H., T. Goodspeed, and D. Swenson. (1993). "Explaining the Low Taxable Income of Foreign-Controlled Companies in the United States." In A. Giovannini, R.G. Hubbard, and J. Slemrod (Eds.), *Studies in International Taxation* (pp. 237-270). Chicago: University of Chicago Press.
- Hines, J. (1991). "The Flight Paths of Migratory Corporations." *Journal of Accounting, Auditing, and Finance*, 6, 447-479.
- Jorgenson, D., and R. Landau. (1993). *Tax Reform and the Cost of Capital. An International Comparison*. Washington, D.C.: Brookings.
- Jun, J. (1993). "The Impact of International Tax Rules on the Cost of Capital." NBER working paper.
- King, M., and D. Fullerton. (1984). *The Taxation of Income from Capital*. Chicago: University of Chicago Press.
- Merrill, P., and R. Patrick. (1992). "U.S. International Tax Policy for a Global Economy." *Tax Notes International*, January 20, 137-143.
- Nobes, C., and R. Parker. (1988). *Comparative International Accounting*. Deddington, U.K.: Philip Alan.
- Organization for Economic Co-operation, and Development. (1991). *Taxing Profits in a Global Economy: Domestic and International Issues*. Paris: OECD.
- Slemrod, J., and K. Timbers. (1990). "Japanese and U.S. Tax Treatment of their Resident Multinationals: Who Has the Competitive Advantage ?" University of Michigan working paper, prepared for Princeton University and the Japanese Ministry of Finance Conference on Comparative Tax Policy.
- U.S. House of Representatives. (1990). "Tax Underpayments by U.S. Subsidiaries of Foreign Companies." Hearings Before the Subcommittee on Oversight of the Committee on Ways and Means, One Hundred First Congress, Second Session, July 10 and 12.
- Whalley, J. (1990). "Foreign Responses to U.S. Tax Reform." In J. Slemrod (Ed.), *Do Taxes Matter? The Impact of the Tax Reform Act of 1986* (pp. 286-314). Cambridge, MA: MIT Press.
- Wheeler, J. (1988). "An Academic Look at Transfer Pricing in a Global Economy." *Tax Notes*, July 4, 87-96.
- World Accounting*. (1991). City: Bender.