



# The Revenue Consequences of Using Formula Apportionment to Calculate U.S. and Foreign-Source Income: A Firm-Level Analysis

DOUGLAS SHACKELFORD

*University of North Carolina, Kenan-Flagler Business School, Campus Box 3490, McColl Building, Chapel Hill, NC 27599-3490*

JOEL SLEMROD

*University of Michigan*

## ***Abstract***

This paper examines the 1989–1993 publicly available financial reports of 46 U.S.-based multinationals to estimate the revenue implications of implementing a U.S. federal formula apportionment system. Ignoring behavioral responses, we estimate shifting to an equal-weighted, three-factor formula would have increased their U.S. tax liabilities by 38 percent, with an 81 percent increase for oil and gas firms. We find the firms report a lower percentage of their worldwide profits as American profits than their American share of assets, sales, or payroll. The results may be attributed to more profitable foreign operations, tax-motivated income shifting, or measurement error.

**Keywords:** formula apportionment, multinational taxation, revenue estimates, financial statements, accounting for income taxes

## **1. Introduction**

No state in the United States attempts for tax purposes to measure the within-state profits of multistate enterprises by requiring separate accounting. Instead, all states use some variety of formula to apportion U.S. (and, in some cases, worldwide) profits to the state; the formula is based on the fraction of U.S. assets, sales, and/or payroll that is located or carried out within the state. In contrast, no country applies a similar formula to calculate for tax purposes the profits of a multinational enterprise that are domestic-source. Instead, all countries use some method based on separate accounting and arms-length prices between related corporations.

Some (e.g., Musgrave, 1973; Bird and Brean, 1986; Bucks and Mazerov, 1993) have argued that countries ought to abandon the separate-accounting approach in favor of a formula apportionment approach. McLure has advocated formula apportionment in the context of the European Union (McLure, 1989) and the former Soviet Republics (McLure, Martinez-Vasquez, and Wallace, 1995). Bird and Brean argue that the separate accounting “is fundamentally flawed because it is inconsistent with the economic reality of the operations of related groups, particularly in the international context.” (p. 1382) In contrast, formula apportionment “avoids the detailed inquiry into particular transactions characteris-

tic of arm's-length separate accounting and curtails the freedom of firms to move accounting profits around to minimize taxes." (p. 1393)

Critics of formula apportionment often acknowledge the operational difficulties of separate accounting, but assert that formula apportionment leads to even greater problems, especially if adopted unilaterally. Gordon and Wilson (1986) show that formula apportionment creates factor price distortions which often put multijurisdictional firms at a competitive disadvantage; it also creates incentives for cross-hauling of output.

This paper does not attempt to resolve this debate. Instead, it provides some quantitative underpinning by estimating, for 46 of the largest U.S.-based multinational corporations, the revenue implications of replacing the current U.S. rules based on separate accounting with rules based on formula apportionment.<sup>1</sup> Our primary source of information is the publicly available financial reports of the corporations themselves. We find that, over the five-year period from 1989 to 1993, shifting to an equal-weighted, three-factor formula would have increased the U.S. tax liability of these firms by 38 percent, with an 81 percent increase for firms in the oil and gas sector. The increase in tax liability is not due to any one of the three factors. Overall, U.S. firms report a lower percentage of their worldwide profits as U.S. profits than their U.S. share of assets, sales, or payroll. Further research is needed to determine to what extent this is due to higher profitability (per unit of these factors) of foreign operations, income shifting for tax purposes, some combination of these explanations, or measurement error.

One proviso should be noted. Our estimates of the tax liability under apportionment presume that there would be no behavioral responses affecting tax liability of such a radical change in the tax regime. In fact, there are likely to be important responses to the changed set of incentives; on net we expect those changes would probably reduce the multinational group's worldwide tax liability below what our calculations (if expanded to include foreign tax liability) would suggest.

## **2. Background**

### ***2.1. Brief Description of Current U.S. Law***

The U.S. taxes the worldwide income of its resident corporations. Firms may, however, claim a credit for income taxes paid to foreign governments as long as these taxes do not exceed what would be the U.S. tax due on the foreign-source income. Thus, the calculation of tax liability requires the division of worldwide profits into U.S.-source and foreign-source income. The U.S. follows the generally accepted worldwide practice of allocating income and expenses across jurisdictions by focusing on the characteristics of specific transactions between presumably distinct economic entities, using as a standard the arrangements that would have been made between unrelated parties operating at "arms length." Section 482 of the U.S. Internal Revenue Code authorizes the IRS to allocate revenue or expenses among related companies "to prevent evasion of taxes or clearly to reflect the income" of multinational enterprises. It is widely agreed that the implementation of these rules is highly complex and costly, leaves considerable uncertainty as to their precise implications,

and provides incentives for financial and real decisions which, in the absence of taxation, could not be in the companies' interest or be consistent with efficient resource allocation.

## ***2.2. Brief Description of How Formula Apportionment Works in States, and How it Would Work for the U.S.***

None of the U.S. states that tax corporate income relies on separate accounting to determine taxable income of multistate enterprises. Rather they use a formula which allocates U.S. income (or, in some states, worldwide income) to the state depending on the fraction of U.S. assets, sales, and/or payroll in the state. Most, but not all states, use a formula which uses all three factors; in addition, the measurement and weights attached to the factors vary widely from state to state. Whether the taxable income base for a state formula can be worldwide, rather than U.S., has been a controversial issue.

The U.S. states' formula apportionment system of taxing corporate income is entirely territorial, or source-based. That is, the declared intent of the formula is to calculate, in order to tax, own-state income; there is no declared intent to tax out-of-state income. Thus, there is no need for a system of relief from double taxation.<sup>2</sup> In contrast, the U.S. system intends to tax worldwide income and provides limited tax credits to alleviate the double tax burden on foreign-source income. This system of foreign tax credits requires that worldwide income be divided into U.S. source and foreign-source income. This paper addresses the revenue implications of changing the U.S. system to a territorial one, in which U.S. income is based on formula apportionment of accrued worldwide income (without deferral of foreign income until repatriation).

There is, however, no logical reason that a formula apportionment system cannot be part of a system of worldwide income taxation, under which foreign-source income for calculating the limit on foreign tax credits is determined by formula instead of separate accounting. Furthermore, the current deferral of U.S. taxation on the earnings of foreign subsidiaries could, in principle, be retained in a formulary system by adjusting worldwide taxable income for changes in unrepatriated foreign earnings.

## ***2.3. Previous Literature***

Frisch (1983), using cross-tabulated data from 1972 tax returns, aggregated to fifteen industry groups and seventeen countries, simulates the impact on tax liability of the U.S. unilaterally adopting an equally-weighted, two-factor formula apportionment system, using sales and assets as the two factors (data on employment were not available). The foreign tax credit mechanism of 1972 is assumed to stay in place, as is the deferral of the tax liability of foreign subsidiaries. In particular, Frisch assumes that "grossed-up" intrafirm dividends stay constant; he varies the payout ratio inversely with the measure of foreign income. Thus, if apportionment decreases the fraction of worldwide income considered foreign, domestic-source income increases, but foreign-source income and foreign taxes remain constant, by assumption. For firms that are not in an excess foreign tax credit situation, this will increase foreign tax credits because the amount of foreign tax attributed to a

given grossed-up dividend flow increases (lower foreign income but unchanged foreign tax payments increase the average foreign tax rate). In the simulation U.S. tax liabilities, net of credits, increases by \$2.06 billion from \$11.81 billion to \$13.87 billion, or 19%. When firm behavioral responses with respect to financial and investment decisions are modeled, the total tax increase is only \$1.37 billion; although the increase in U.S. tax liability is \$1.78 billion, foreign tax liabilities decline by \$0.41 billion in the simulation. In Frisch's model, the move to formula apportionment reduces assets abroad by \$4.35 billion, or 4.3% of the total.

Sheffrin and Fulcher (1983) perform a similar exercise using 1979 data from annual reports and SEC 10-K information for the 100 largest U.S.-based corporations engaged in manufacturing. They compute U.S. profits using formulae based on the geographic breakdown of assets and sales. Because payroll is not available, they do not evaluate formulae which involve it as a factor. Unlike Frisch, they do not calculate the implications of the change in taxable profits on the worldwide tax liability of the U.S. firms.

Sheffrin and Fulcher conclude that, for the 100 largest manufacturing corporations, 1979 U.S. profits per an equal-weighted, two-factor apportionment formula would be 13 percent higher than book profits. Virtually the entire difference was attributable to the oil and auto sectors. When these firms were eliminated from the sample, book profits actually exceeded apportioned profits, although only by 0.9 percent. They are careful to "not claim the 13 percent of income is over-apportioned but merely that the two estimates of profits (apportioned U.S. profits and book U.S. profits) are quite different." (p. 207). Sheffrin and Fulcher (1984) repeat this exercise using 1979, 1980, and 1981 data, obtaining broadly similar results.

Schadewald (1996) repeats Sheffrin and Fulcher's analysis using 1994 financial statements for 38 of the largest U.S. companies. He finds that, on average, apportioned income exceeds book income by 1 percent if apportioned solely on sales, by 5 percent if apportioned solely on assets, and by 3 percent if apportioned using both factors equally. Similar to Sheffrin and Fulcher's findings, Schadewald reports that, with an equally-weighted formula based on assets and sales, the four companies whose apportioned income as a percentage of worldwide income most exceed book income as a percentage of worldwide income are an automobile company (General Motors) and three oil companies (Mobil, Chevron and Texaco).

The methodology employed in this study differs from Sheffrin and Fulcher and Schadewald's in two ways. First, we derive an estimate of the payroll factor, and include it in a three-factor formula. Second, we apportion an estimate of worldwide taxable income, rather than accounting earnings. However, like Sheffrin and Fulcher and Schadewald but unlike Frisch, we do not calculate the implications of formula apportionment on worldwide tax liability under a system of worldwide taxation with a foreign tax credit and deferral, because the financial statement disclosures, on which we rely for our estimates of worldwide taxable income, provide insufficient information to determine the amount of foreign-source income currently taxed under a deferral system. We can, though, estimate the tax that would be due on U.S.-source income under a factor apportionment system without deferral.

### 3. Methodology

Under a formula apportionment system, the tax liability to the U.S. government would be equal to

$$T_{us} = t_{us} \Pi_w [1/3(A_{us}/A_w + S_{us}/S_w + P_{us}/P_w)] \quad (1)$$

For illustration we use the equal-weighted, three-factor formula of assets ( $A$ ), sales ( $S$ ), and payroll ( $P$ ). A subscript of  $W$  indicates a worldwide figure, while a subscript of  $US$  indicates a U.S. figure.  $\Pi$  stand for taxable income, and  $t_{us}$  is the statutory U.S. tax rate. Note that  $\Pi_w$  multiplied by the expression in brackets is the formula estimate of U.S. taxable income. Below we describe our procedures for obtaining estimates of the components of  $T_{us}$  from the company's financial statements. Appendix A further details the process for one company-year (Hewlett-Packard in 1991).

#### 3.1. Estimating Worldwide Taxable Income

Companies do not disclose the taxable income reported on U.S. or foreign tax returns in their financial reports; however, taxable income can be estimated from the income tax footnote. The footnote decomposes the income tax provision (or expense) into current and deferred portions for both domestic and foreign-source income.<sup>3</sup> It also reconciles the actual effective tax rate for book purposes (tax provision divided by the value of book income) to the statutory rate of corporation tax. According to U.S. GAAP, the reconciliation is supposed to disclose each permanent difference between the tax provision and pretax book income taxed at the U.S. statutory rate (e.g., municipal bond interest), each tax rate adjustment (e.g., capital gains deduction), and each credit that exceeds 5% of the tax liability that would arise if the statutory rate were to be applied to net income before taxes.<sup>4</sup>

Domestic taxable income is estimated by summing the current domestic tax provision, our best estimate of the actual domestic taxes paid, and the domestic credits from the reconciliation and dividing this sum by the statutory corporate tax rate (0.34 or 0.35).<sup>5</sup> This follows from the fact that the current tax provision approximates the tax rate multiplied by taxable income, minus domestic credits. Foreign taxable income is estimated by repeating this process, and worldwide income is obtained by summing these two measures.<sup>6</sup>

The computation is more problematic for foreign taxable income than for domestic income because there is less information in the financial statements concerning the computation of foreign income taxes than U.S. income taxes. We use the tax footnote's current foreign tax provision, which approximates actual foreign taxes paid, to estimate foreign taxable income. By grossing up the foreign taxes provision by the foreign effective tax rate, we compute foreign taxable income, as determined by foreign tax law. We are unable, however, to determine the amount of taxable income that would have been generated if U.S. tax law had been applied to the foreign operations because we do not have sufficient information to adjust for differences in domestic and foreign tax bases.

We use the rate reconciliation to estimate the appropriate foreign tax rate to gross-up the current foreign tax provision into foreign taxable income. There is no customary tax

rate for grossing up the foreign current tax provision; however, if the effective tax rate on foreign earnings substantially differs from the U.S. statutory rate and the foreign tax is material (i.e., exceeds the 5% threshold), the difference should be separately disclosed in the reconciliation.<sup>7</sup> The difference is expressed either as a percentage of pretax book income or a dollar amount which can be converted to a percentage of the absolute value of pretax book earnings.<sup>8</sup> The percentage difference is added to or subtracted from the U.S. statutory rate to estimate the average foreign statutory tax rate.<sup>9</sup>

Ideally the percentage difference attributable to foreign tax rates would be grossed-up by the percentage of foreign taxable income for book purposes to total taxable income for book purposes before adding it to or subtracting it from the U.S. statutory rate.<sup>10</sup> Unfortunately, we cannot observe foreign taxable income or total taxable income for book purposes; thus, we are unable to adjust properly the information from the rate reconciliation regarding tax rate differences. To test the sensitivity of ignoring the foreign taxable income to total taxable income ratio, we reestimated U.S. tax liabilities using apportionment with an adjustment ratio composed of foreign net income before taxes and total net income before taxes, respectively.<sup>11</sup> We find that our estimates of the aggregate U.S. tax under formula apportionment using adjustment ratios based on accounting earnings are 1.5 percent lower than the estimates reported later in the paper, which ignore any adjustment for the foreign percentage of taxable income.

Worldwide taxable income is the sum of domestic- and foreign-source taxable income. The estimated tax on U.S.-source income under a factor apportionment system is the product of worldwide taxable income, the formula for the fraction of worldwide income in the U.S., and the U.S. tax rate, less U.S. tax credits.<sup>12</sup>

### ***3.2. Potential Measurement Error in Income Tax Disclosures***

The study's usefulness in furthering the apportionment debate depends critically on the information content of income tax footnote disclosures.<sup>13</sup> Despite difficulties in understanding and interpreting tax disclosures, financial statements remain the best public source of firm-level tax information. To maximize their usefulness for this project and minimize misclassification, three certified public accountants (an author and two research assistants) analyzed each disclosure in detail and agreed on its most likely interpretation.

The income tax disclosures vary cross-sectionally and cross-temporally, potentially introducing several forms of measurement error in our computations. One, accounting for equity investments is different for book and tax.<sup>14</sup> Two, discontinued operations, extraordinary items and accounting changes are excluded from the calculation of the income tax provision. Rather each is listed net-of-tax on the income statement without current or deferred classification and thus must be excluded from this analysis. Three, utilization of net operating losses and credits is difficult to assess; we assume none expires unutilized.<sup>15</sup> Four, foreign disclosures in the reconciliation are vague and require judgement. "Lower/higher taxes related to other jurisdictions" clearly refers to differences in the tax rates of foreign jurisdictions; however, descriptions such as "international operations" are less informative.<sup>16</sup> Five, the state tax provision is sometimes separately stated, sometimes included with the federal provision and sometimes included with the foreign provision. Six, during the

period of investigation, the GAAP accounting treatment for income taxes underwent unprecedented change from APB 11 to SFAS 96 to SFAS 109.<sup>17</sup> Although computations and disclosures varied throughout the period as companies adopted the new standards, the components we use in our calculations are available for all years. We make no adjustment, however, for possible intertemporal inconsistencies arising from changes in definitions or financial reporting incentives. Finally, anecdotal evidence suggests companies create an “audit cushion” (overstatements of the income tax payable and deferred taxes including interest, penalties and future anticipated assessments) to buffer the effects of adjustments by the IRS and to manage the accounting earnings stream.<sup>18</sup>

The extent to which measurement error limits the usefulness of our estimates of formulary tax liability is unclear; however, the potential magnitude is large enough that caution should be exercised in interpreting our results. Unfortunately, we are unaware of any additional publicly available data that could add precision to our estimates.

### ***3.3. Estimating Assets and Sales Factors***

Recall states employ apportionment factors with components for assets, sales, and payroll. Our assets and sales factors for federal apportionment are computed from disclosures in the geographic segment footnote. Companies must segregate assets, sales, and other information between domestic and foreign sources if revenue or assets from foreign operations exceed 10 percent of the company’s total. If the footnote provides no information on foreign operations, we presume that the threshold is not met, and the company is excluded from the investigation because its multinational activities are relatively minor. We compute our U.S. assets (sales) factor as the domestic portion of assets (sales) divided by the total of foreign and domestic assets (sales) as disclosed in the segment footnote. Interarea transactions, if disclosed, are excluded from both assets and sales. Similar to tax footnotes, geographic segment disclosures vary cross-sectionally and cross-temporally and reportedly are managed to reduce their usefulness to competitors.<sup>19</sup> Again, three CPAs examined all information to limit misclassification.<sup>20</sup>

### ***3.4. Estimating U.S. and Worldwide Payroll***

To our knowledge, no companies disclose the geographic breakdown of employee compensation; thus, we are unable to estimate the payroll factor from financial statements alone. To form estimates of the payroll component of the formula, we use aggregate data about parent companies and foreign affiliates of U.S. multinational corporations compiled by the 1989 U.S. Government’s Benchmark Survey. The publication includes aggregated data on payroll, sales and assets by 82 industries and 16 geographic locations.<sup>21</sup> Our estimate of the payroll factor assumes each company has the same relative factor proportions as companies in its industry and located in its mix of countries. In particular, we calculate sector-typical payroll-sales and payroll-assets ratios separately for U.S. and foreign operations, and apply these ratios to the actual company-specific sales and asset data in the financial statements.

Industry is determined by Compustat's primary SIC and countries by geographic segment disclosures.

We estimate the payroll factor as follows: First, the company's primary SIC is matched to the most similar Benchmark industry classification. Second, geographical areas from the segment disclosures of the firm and the Benchmark survey are matched as closely as possible. If the company's segment disclosures combine jurisdictions (e.g., France and Italy), survey figures for each jurisdiction are summed. If the survey data are unavailable for foreign assets, sales, or payroll in a jurisdiction at the initial industry level, data are considered missing from all tables, and we move up the Benchmark tables to a broader industry level.

Third, similarly, if the geographic segment disclosures of the firm combine jurisdictions and there are missing data for any of the jurisdictions, we move up the Benchmark tables to a broader industry level for all jurisdictions. This continues until we reach the broadest industry level, which classifies companies into petroleum, manufacturing, wholesale trade, finance, services or other industries. At that point, we return to the original industry level, and we move left across the tables to a broader geographical area. We repeat this process until survey data are available for all jurisdictions within an industry.

These procedures provide us with an estimate of the ratio of payroll to sales for every firm  $f$  in a set of geographical areas, including the U.S.; denote this ratio as  $(P/S)_{fi}$ , where  $i$  denotes the area and  $i$  equals  $u$  for the United States. We can then estimate the payroll factor for firm  $f$  as follows:

$$(P_{us}/P_w)_f^S \cong \frac{S_{fu} \cdot (P/S)_{fu}}{S_{fu} \cdot (P/S)_{fu} + \sum_{i \neq u} S_{fi} \cdot (P/S)_{fi}}$$

because  $S_{fi} \cdot (P/S)_{fi}$  is an estimate of  $P_i$ .

Similarly, we can use the sectorial data on the ratio of payroll to assets by area to calculate for each firm a set of ratios we denote  $(P/A)_{fi}$ . Another estimate of the payroll factor is then:

$$(P_{us}/P_w)_f^A \cong \frac{A_{fu} \cdot (P/A)_{fu}}{A_{fu} \cdot (P/A)_{fu} + \sum_{i \neq u} A_{fi} \cdot (P/A)_{fi}}$$

The measure for the payroll factor used in this paper is the simple average of  $(P_{us}/P_w)^S$  and  $(P_{us}/P_w)^A$ .

#### 4. Results

We estimate the effects of apportionment on the tax liabilities of 46 of the 55 largest U.S. manufacturers in 1993, as determined by *Fortune* (see footnote 1 for sample selection procedures). The largest sectors (determined by two-digit primary SIC) are petroleum refining (SIC 29) and transportation equipment (SIC 37), each with eight companies. There are seven chemical companies (SIC 28) and five companies each in food (SIC 20), machinery and computer equipment (SIC 35), and measurement instruments (SIC 38). Table 1 provides descriptive statistics for the 230 company-years analyzed in the study. The mean company-year has U.S. (foreign) sales of \$16 (\$10) billion and U.S. (foreign) assets of \$21 (\$9)



Table 1. Descriptive statistics ( $n = 230$  company-years from 1989–1993) (all dollars in millions).

	mean	std dev	minimum	median	maximum
U.S. Sales	16,385	16,281	3,487	10,262	99,573
Foreign Sales	10,250	15,070	0	4,898	89,388
U.S. Assets	21,365	34,386	2,161	10,888	219,903
Foreign Assets	8,902	12,941	0	4,661	55,161
Foreign Tax Rate	0.38	0.08	0.18	0.35	0.69
Worldwide Taxable Income	1,785	1,842	(335)	1,200	9,573
Current Domestic Provision	279	324	(235)	177	1,764
Tax under Apportionment	386	374	(103)	279	1,808
Tax Difference: tax under Apportionment less Current Domestic Provision	107	222	(268)	37	1,215
Difference/Current Domestic Provision	0.36	4.63	(56.56)	0.11	26.84
Difference/Sales	0.0033	0.0056	(0.0105)	0.0021	0.0263
Difference/Assets	0.0037	0.0068	(0.0131)	0.0020	0.0334

billion with estimated worldwide taxable income of \$1.8 billion. The mean (median) equal-weighted, three-factor apportionment tax is \$386 (\$279) million, compared to a mean (median) current tax provision of \$279 (\$177) million. Apportionment would increase the mean (median) company-year's tax liability on U.S.-source income by \$107 (\$37) million or 36 (11) percent. The increase averages 0.33 (0.37) percent of sales (assets).

Table 2 reports firm-by-firm, year-by-year results, using the three-factor formula. Over the five-year period from 1989 to 1993, the estimated tax on U.S.-source income under apportionment exceeds the current domestic tax provision for 36 (78 percent) of the 46 companies examined. Companies would pay more under formula apportionment in 174 (76 percent) of the 230 company-years examined. The number of companies with a tax increase ranges from 34 (74 percent) in 1993, 1991 and 1989 to 37 (80 percent) in 1990. Over the five-year period, General Motors experiences the largest increase (\$4,911 million), followed by IBM (\$3,377 million), Mobil (\$2,597 million), Chevron (\$2,476 million) and Exxon (\$1,509 million). The tax bill for eight companies (Alcoa, Chevron, General Motors, IBM, Johnson & Johnson, Mobil, Phillips Petroleum, and United Technologies) more than doubles, and Digital moves from refund to taxpaying status. The aggregate tax increase over the five-year period exceeds one percent of aggregate sales for five companies: Phillips Petroleum (1.6 percent), Alcoa (1.4 percent), Chevron (1.4 percent), Johnson & Johnson (1.2 percent) and IBM (1.0 percent). The largest estimated aggregate five-year tax decreases are for Boeing (\$900 million), Procter & Gamble (\$477 million) and Dow Chemical (\$201 million). The aggregate decrease in no company's tax liability exceeds 25 percent of the aggregate current tax liability or 0.7 percent of aggregate sales.

Table 3 summarizes the results. Over the entire sample, the tax liability on U.S.-source

Table 2. Comparison of estimated tax under equal-weighted, three-factor apportionment and the current domestic tax provision by company-year (all dollars in millions).

Company	Increased (Decreased) Tax under Apportionment					Estimated Tax under Apportionment					Current Domestic Tax Provision							
	5-Yr Total	1993	1992	1991	1990	1989	5-Yr Total	1993	1992	1991	1990	1989	5-Yr Total	1993	1992	1991	1990	1989
Allied Signal	99	5	1	0	46	46	427	100	56	48	98	124	328	95	55	48	52	78
Alcoa	715	159	70	118	186	182	969	105	117	68	284	395	254	(54)	47	(50)	99	212
Amoco	886	293	208	180	177	27	3059	397	534	668	741	718	2173	104	326	488	564	691
Archer Daniels	(111)	(33)	(45)	(33)	0	0	846	127	176	147	221	175	958	160	222	179	221	175
Ashland Oil	29	7	7	6	4	6	230	31	48	39	83	30	201	24	41	33	79	24
Atlantic Richfield	(53)	(42)	5	0	60	(75)	2567	339	297	355	577	999	2620	382	292	355	517	1074
Baxter	92	36	23	26	4	3	398	51	78	78	84	107	306	15	55	52	80	104
Boeing	(900)	(268)	(180)	(154)	(178)	(119)	2700	845	548	388	527	393	3600	1113	728	542	705	512
Bristol-Myers	244	113	79	7	40	5	2108	370	420	435	421	462	1864	257	341	428	381	457
Caterpillar	7	8	27	20	(36)	(13)	251	71	(36)	(33)	108	140	244	63	(63)	(53)	144	153
Chevron	2476	333	457	407	691	588	4217	727	786	571	1298	836	1741	394	329	163	607	248
Chrysler	181	(6)	94	87	21	(15)	993	517	160	(2)	0	318	812	523	66	(89)	(21)	333
Coca-Cola	376	60	68	120	159	(31)	1827	416	346	324	294	447	1451	356	278	205	135	478
Digital	434	(24)	114	242	42	61	208	(29)	(42)	7	76	197	(226)	(5)	(156)	(235)	34	136
Dow Chemical	(201)	(101)	(83)	(49)	(6)	39	2156	303	298	380	436	740	2357	404	381	429	442	701

Table 2. Continued.

Company	Increased (Decreased) Tax under Apportionment					Estimated Tax under Apportionment					Current Domestic Tax Provision							
	5-Yr Total	1993	1992	1991	1990	1989	5-Yr Total	1993	1992	1991	1990	1989	5-Yr Total	1993	1992	1991	1990	1989
DuPont	1372	152	297	118	387	418	3440	473	331	783	986	867	2068	321	34	665	599	449
Eastman Kodak	345	4	(14)	176	51	128	1278	248	335	65	415	215	933	244	349	(111)	364	87
Exxon	1509	159	239	212	522	376	4252	781	881	901	999	689	2743	622	642	689	477	313
Ford	905	(225)	281	181	68	598	3377	1034	159	273	566	1344	2472	1259	(122)	92	497	746
General Electric	425	103	45	126	6	145	6130	1489	929	987	1429	1296	5705	1386	884	861	1423	1151
General Motors	4911	1209	944	1143	984	631	6048	979	1104	1060	1258	1648	1137	(231)	160	(84)	274	1017
Goodyear	234	93	46	9	34	52	543	186	152	81	46	78	308	93	106	71	12	26
Hewlett-Packard	372	83	10	51	119	109	1219	413	258	220	149	179	847	330	248	169	30	70
IBM	3377	226	499	527	1215	910	4339	222	384	753	1594	1386	962	(4)	(115)	226	379	476
International Paper	(63)	(5)	(15)	0	(20)	(23)	902	109	105	151	228	309	965	114	120	151	248	332
Johnson & Johnson	753	130	158	158	132	176	1378	319	323	294	237	206	625	189	165	136	105	30
Lockheed	8	2	(1)	5	(1)	3	1245	85	209	204	543	204	1237	83	210	199	544	201
McDonnell Douglas	(44)	(12)	14	(31)	(11)	(4)	306	108	(103)	180	87	34	350	120	(117)	211	98	38
Merck	63	36	3	40	3	(18)	2898	704	618	548	570	458	2835	668	615	508	568	476
3M	(13)	(50)	(8)	(16)	9	51	1950	380	363	380	387	439	1963	430	371	396	378	388
Mobil	2597	558	494	518	665	363	3227	633	561	652	771	611	630	75	67	134	106	248
Motorola	217	135	71	51	(19)	(20)	743	268	146	105	128	97	526	133	75	54	147	117

Table 2. Continued.

Company	Increased (Decreased) Tax under Apportionment					Estimated Tax under Apportionment					Current Domestic Tax Provision							
	5-Yr Total	1993	1992	1991	1990	1989	5-Yr Total	1993	1992	1991	1990	1989	5-Yr Total	1993	1992	1991	1990	1989
Pepsico	185	28	42	29	46	40	1904	495	455	345	347	262	1719	467	413	316	302	222
Phillip Morris	413	159	178	(9)	1	85	7576	1358	1808	1755	1482	1174	7163	1199	1630	1764	1481	1089
Phillips Petroleum	1029	121	175	215	358	160	1373	181	207	268	498	219	344	60	32	53	140	59
Procter & Gamble	(447)	66	(144)	(127)	(169)	(73)	2571	701	412	501	522	435	3018	635	556	628	691	508
Raytheon	(11)	3	(1)	(1)	1	(13)	1419	277	287	262	282	312	1431	274	288	264	281	324
Rockwell	11	(7)	10	(55)	26	37	1437	233	209	359	273	364	1426	240	199	414	246	328
Sara Lee	291	37	115	75	41	23	809	212	213	151	121	112	519	175	98	76	80	89
Tenneco	89	38	(56)	8	41	58	662	73	381	58	121	29	573	35	437	50	80	(29)
Texaco	548	66	20	(99)	163	398	1122	71	108	50	360	533	574	5	88	149	197	135
United Technologies	812	161	264	105	137	144	1238	167	119	243	399	309	426	6	(145)	138	262	165
USX	60	16	11	16	2	15	259	65	53	14	80	47	199	49	42	(2)	78	32
Westinghouse	218	12	35	42	50	79	827	150	160	12	185	320	609	138	125	(30)	135	241
Weyerhaeuser	(8)	11	0	(11)	5	(13)	453	156	48	(34)	106	179	461	145	47	(23)	100	192
Xerox	160	(4)	19	34	57	53	869	129	99	239	229	173	710	133	80	205	172	120

Table 3. Summary statistics (all dollars in millions).

	5-Year Total	1993	1992	1991	1990	1989	5-Year Total Oil & Gas	5-Year Total Other Mfg
Current Domestic Provision (1)	64,161	13,225	10,523	10,863	14,532	15,017	11,225	52,936
Three-factor, Equal- weighted Apportionment (2)	88,751	17,067	15,098	15,331	20,646	20,609	20,306	68,445
Difference (2)–(1)	24,591	3,842	4,576	4,468	6,113	5,591	9,081	15,510
Asset Factor Only Apportionment	88,358	17,113	15,067	15,247	20,442	20,488	19,417	68,941
Sales Factor Only Apportionment	80,553	15,425	13,618	13,825	18,786	18,890	18,169	62,384
Payroll Factor Only Apportionment	97,343	18,655	16,609	16,922	22,709	22,447	23,333	74,010

income under the three-factor formula apportionment would be 38 percent higher than under the current rules. These results are qualitatively similar to those calculated in earlier studies, but we find that the increase in tax liability is substantially higher than the earlier work. The increase is not due to any particular factor. There would be a large increase under a single-factor formula for each factor, amounting to 38 percent for assets, 26 percent for sales, and 52 percent for payroll. Moreover, there would be an increase in every year with any single factor.

Nine oil and gas companies (two-digit primary SICs 13 and 29) account for 37 percent of the difference between actual tax and tax under the three-factor formula. The average tax increase for the oil and gas sector would be 81 percent, compared to 29 percent for all other firms in this study. The mean (median) oil and gas company-year (company) reports 68 (69) percent of its assets are located in the U.S. and 70 (78) percent of its sales are made in the U.S. and we estimate that 78 (85) percent of its compensation was paid to U.S. employees; however, it reports only 42 (30) percent of its pretax book earnings as domestic-source. This characterization of the oil and gas industry is consistent with earlier estimates.

To limit the analysis to multinational corporations with extensive operations outside the U.S., we exclude any company that did not report geographic segment disclosures in all five years. Three other companies, which are included in the study, also appear to have limited foreign activities. Boeing and McDonnell Douglas report no foreign assets, and Ashland Oil reports no foreign sales. When we exclude these three companies from the analysis, our inferences are unaltered; the overall tax increase under apportionment is 43 percent.

Over time for any given firm, the two measures of U.S. profits certainly move together—the average Pearson correlation coefficient is 0.81. Whether the U.S. tax per apportionment is more or less variable than the book tax payments depends on how variation is defined;

however, the firm-average standard deviation compared with the firm-average mean tax liability is actually lower under apportionment, 0.52 compared to 0.62.

Finally, to address our concerns regarding the adequacy of financial statement information for estimating the revenue effects of an apportionment system, we provided an earlier draft of this paper and detailed computations of our estimates to the tax directors of several companies in the sample. We requested comments regarding our interpretation of their financial information and their assessment of the correctness of our estimates for their companies. Six companies responded to our requests. Three companies indicated that our estimates were essentially correct. Two other companies indicated that we overstated their tax liability under apportionment, while one claimed that we had understated it. One of the three companies indicating misstatement provided sufficient confidential information to permit us to estimate the magnitude of the discrepancy. The aggregate difference over the five-year period between their and our estimates of the apportionment tax came to 14 percent of their aggregate current domestic tax provisions.

We interpret the firm responses as consistent with cross-company variation in the usefulness of financial statements for evaluating corporate tax positions. Despite some mis-measurement, there appears to be no consistent direction of bias, either overstating or understating the apportionment tax. Nevertheless, estimates for specific companies or company-years should be cautiously interpreted.

## 5. Conclusions

The overall finding can be stated simply: on average U.S. multinational enterprises, and especially those in the oil and gas sector, report that the fraction of their worldwide income earned in the U.S. is significantly less than the fraction of their worldwide assets, sales, or payroll that is in the U.S. One might argue that this implies the foreign operations are relatively more profitable per any of those factors than are the domestic operations; if the arms-length allocation formula worked flawlessly, that would be the necessary conclusion. Alternatively, this finding reflects successful shifting of taxable income out of the U.S.<sup>22</sup> Either interpretation is contingent on the usefulness of financial statement information for estimating formulary tax liability. As a result, caution should be exercised in interpreting the results.

These findings do not necessarily imply that corporate tax burdens would be higher under worldwide formula apportionment. The aggregate tax base might be higher, but the corporate tax rate could conceivably be reduced to make the change revenue neutral. However, the results presented here do suggest that the tax burden would then be shifted from purely domestic corporations to multinational enterprises.

The calculations offered in this paper do not settle the question of whether separate accounting or formula apportionment provides a more accurate procedure for measuring U.S.-source income. They do, though, suggest that the revenue consequences of switching to formula apportionment would be substantial, especially for the oil and gas sector; unless the corporate tax rates were to be simultaneously reduced, U.S. tax liabilities would rise.

**Appendix A****Estimation of Hewlett-Packard's 1991 U.S. Tax under Apportionment**

Per Hewlett-Packard's 1991 tax footnote (page 30 in its annual report), the current federal tax provision is \$169 million and the total foreign ("Non-U.S.") tax provision is \$223 million. The 1991 financials do not partition the foreign provision into current and deferred portions. Thus, we review subsequent tax footnotes to determine if the disaggregation may have been presented in later years. Indeed, the 1992 tax footnote (page 34 in its annual report) reports \$228 million as current foreign tax provision and \$5 million as deferred tax benefit (negative provision) in 1991. (If no subsequent information is available, we assume all of the provision is current.) The 1991 rate reconciliation reports reductions of 0.4 percent in the effective tax rate for "research and development tax credits" and 2.4 percent for "lower rates in other jurisdictions, net," which we assume relates to lower effective tax rates in foreign jurisdictions.

The R&D credit (0.4 percent) is converted to a dollar amount by multiplying 0.4 percent by net income before taxes of \$1,127 million (from the income statement) for a product of \$5 million. The domestic taxable income is the current domestic tax provision of \$169 million plus \$5 million (R&D credit) grossed up at the maximum statutory tax rate of 34 percent or \$511 million. The foreign effective tax rate is 34 percent rate reduced for lower foreign tax rates by 2.4 percent or 31.6 percent. The foreign taxable income is the current foreign tax provision of \$228 million grossed up by 31.6 percent or \$721 million. Thus, worldwide taxable income is \$1,232 million (\$511 million + \$721 million).

The apportionment factors are determined from the geographic area information on page 36 in the annual report. The sales factor is U.S. "unaffiliated customer sales" divided by all such sales or  $0.44[6390/(6390 + 5378 \text{ (European sales)} + 2726 \text{ (Other sales)})]$ . The assets factor is U.S. "identifiable assets" divided by all such assets or  $0.54[6487/(6487 + 3314 \text{ (European assets)} + 2186 \text{ (Other assets)})]$ .

The computation of the payroll factor is a bit more complex. Per Compustat, Hewlett-Packard's primary SIC is Office and Computing Machines (3570), which matches "Office and computing machines" on the Benchmark survey. Using the office and computing machines data from Benchmark Table II.K 1—Selected Financial and Operating Data of U.S. Parents, by Industry of U.S. Parent, we find industry parent assets are \$121,954 million (column 1); industry parent sales are \$87,484 million (column 6); and industry parent compensation is \$33,299 million (column 8).

Hewlett-Packard's 1991 geographic segment disclosures segregate data for the United States, Europe and "Other areas." Total European sales and assets are available in the Benchmark affiliate data, but total European compensation is missing for affiliates in the office and computing machines industry (Table II.G 12—Employee Compensation of Affiliates, Industry of U.S. Parent by Country). Thus, we move up to the next industry level with complete information ("Machinery, except electrical"). Total European compensation for affiliates in machinery, except electrical is \$17,019 million. Likewise, total European sales in machinery, except electrical is \$101,955 million (Table II.E 9—Sales by Affiliates, Industry of U.S. Parent by Country), and assets is \$85,132 million (Table II.B 15—Total Assets of Affiliates, Industry of U.S. Parent by Country).

No further description of “Other areas” is provided in the 1991 financials; however, Hewlett-Packard’s 1993 geographic segment disclosures identify the other areas as “Asia Pacific, Canada, Latin America.” Because no Asia Pacific data are available for affiliate assets in office and computing machines, we move up to a broader industry level, “Machinery, except electrical.” Because data are missing for Canadian affiliates in the broader industry, we would move up to an even broader industry; however, the broader industry is “Manufacturing.” To avoid classification in such a broad category, we return to the original industry, office and computing machines, and move across the Benchmark tables to a broader geographical area, which, in this case, is all geographic areas. Worldwide affiliate sales for the office and computing machines is \$118,025 million (Table II.E 9); worldwide affiliate assets are \$93,742 million (Table II.B 15); and worldwide affiliate compensation is \$18.737 million.

Combining the segment disclosures and the survey data, the sales-weighted payroll factor is 0.646,  $\{(33299/87484)*6390\}/[\{(33299/87484)*6390\} + \{(17019/101955)*5378\} + \{(18737/118025)*2726\}]$ , and the assets-weighted payroll factor is 0.617,  $[\{(33299/121954)*6487\}/[\{(33299/121954)*6487\} + \{(17019/85132)*3314\} + \{(18737/93742)*2186\}]]$ . Thus, the average payroll factor is 0.63.

The equal-weighted, apportionment factor is 0.54 [the mean of 0.44 (sales), 0.54 (assets), and 0.63 (payroll)]. U.S. apportionment tax before credits is \$226 million, the product of worldwide taxable income (\$1,232 million), the apportionment factor (0.54) and the U.S. maximum statutory rate for 1991 (0.34). With R&D credits of \$5 million, the estimated apportionment tax is \$221 million or \$52 million greater than our best estimate of the taxes paid under the current system, \$169 million (current domestic tax provision).

### Acknowledgments

We are grateful to Julie Collins and participants at the 1995 Spring Symposium of the National Tax Association for comments and Mark Harradine, Marlene Plumlee, and especially Mary Margaret Myers for research assistance on this project. We also thank three anonymous referees and Michael Keen for insightful comments and suggestions.

### Notes

1. Of the 55 largest American companies, eight companies (Anheuser-Busch, Citgo, Coastal, Conagra, Georgia Pacific, IBP, Martin Marietta and Shell) were dropped because their foreign operations were not large enough percentages of their businesses in all five years of the investigation period to warrant the geographic segment disclosures on which we rely for our computations. RJR Nabisco also was deleted from the sample because its \$25 billion leveraged buyout, which occurred during the examination period, potentially distorted its tax position.
2. Although theoretically there is no need for relief from double taxation, differences in apportionment systems across jurisdictions, as in the states, can result in income avoiding taxation completely or being subject to taxation in multiple jurisdictions without credit relief.
3. The tax provision includes all income taxes arising from the year’s business activities. Taxes paid in the current year comprise the current tax provision; taxes paid or expected to be paid in other years comprise deferred taxes. Deferred taxes are an accounting concept and are unrelated to the deferral of U.S. taxation on the profits of foreign subsidiaries.



4. GAAP (generally accepted accounting principles) are a common set of standards and procedures adopted by the accounting profession. The principles are either enacted by an authoritative accounting board or accepted over time as an accepted practice. The American Institute of Certified Public Accountants (AICPA) requires its members to prepare financial statements in accordance with GAAP.
5. Because credits are book, not tax, this estimation procedure assumes book and tax credits are equal. Credits are reported in 31 percent of the company-years examined; the mean credit is \$6 million. Also, if the alternative minimum tax (AMT) applies to a firm, the appropriate tax rate for this computation may be 20 percent. Using the alternative minimum tax rate would generate alternative minimum taxable income rather than the regular taxable income. However, because AMT credits can offset AMT taxes in other years, the appropriate tax rate for current AMT filers may be the regular tax rate. Unfortunately, AMT disclosures are insufficient to determine the applicability of the AMT and the adjustments, if any, to our computation of domestic taxable income.
6. The current income tax provision is classified as domestic and foreign based on the location of the tax payments, not on the source of the income earned. As a result, foreign income, that also is taxed in the U.S. (e.g., branch income or repatriated income) could be counted twice. Double counting of foreign income, however, should generally be relevant only if the U.S. tax rate exceeds the foreign tax rate. If so, information on foreign tax credits is needed to avoid double counting. Unfortunately, there are scant foreign tax credits disclosures for the companies we examined. In the one case where foreign tax credits were separately disclosed in the rate reconciliation and the U.S. tax rate exceeded the foreign tax rate, we adjusted our measure of worldwide taxable income to avoid double counting.
7. The tax footnote classifies Puerto Rican income as domestic for purposes of computing pretax book income (Weber and Wheeler, 1992). Thus, we do not adjust the foreign effective tax rate for Puerto Rican tax rate differences. However, when we adjust the effective foreign tax rates for the seven companies that report Puerto Rican rate differences, the effect is immaterial.
8. A positive (negative) difference indicates foreign tax rates exceed (are less than) U.S. rates. Absolute values of pretax book earnings are needed to ensure the sign of the difference is maintained when converting to a percentage.
9. For one company during two years, the estimated effective foreign tax rate fell outside the bounds of zero and 70 percent, we replace those two years with the mean of the estimated effective foreign tax rates for the other three years. Likewise, one year was replaced for three other companies.
10. For example, if the rate reconciliation indicates the effective tax rate is 5 percent lower because foreign tax rates are less than U.S. tax rates, domestic taxable income is \$300, and foreign taxable income is \$100, the foreign tax rate that reconciles the current foreign tax provision and foreign taxable income is 20 percent lower [ $5/(100/400)$ ]. To prove, let the U.S. tax rate equal 35 percent and the foreign tax rate equal 15 percent. The U.S. statutory rate times the worldwide taxable income is \$140 ( $0.35 * \$400$ ) yielding an effective tax of \$120 ( $0.35 * \$300 + 0.15 * \$100$ ). The rate reconciliation for the difference in the tax rates is 0.05 [ $(\$140 - \$120)/\$400$ ].
11. The reported results in this paper ignore the adjustment ratio because we believe that reliance on book earnings introduces more measurement error than it corrects. Using book earnings to compute the adjustment ratio is problematic because companies report negative foreign earnings and/or negative total earnings and even when both measures are positive, the ratio of foreign earnings to total earnings can be small, resulting in an unreasonably large gross-up. For example, in 1992 IBM reported a domestic loss of \$7,678 million, a foreign loss of \$1,348 million, and a 17 percent higher effective tax rate on foreign operations. Using book earnings to adjust the tax rate difference from the rate reconciliation, we compute a foreign tax rate of 148 percent,  $0.34 + \{0.17/[-1,348/(-7,678 - 1,348)]\}$ . Similarly in 1993 Procter & Gamble reported domestic earnings of \$318 million, foreign earning of \$31 million, and a reduction in the effective tax rate of 15 percent caused by lower foreign taxes, resulting in a foreign tax rate of -134 percent,  $0.35 + \{-0.15/[31/(318 + 31)]\}$ . Presumably, if foreign and total taxable income were observable, the adjustment would be straightforward and the resulting foreign tax rates would be reasonable. (As noted in footnote seven, foreign tax rate estimates greater than 70 percent or less than zero were replaced with the average foreign tax rate over the other years for that company.)

12. Accounting for tax credits is problematic for at least four reasons. One, all credits (e.g., foreign, research and development, alternative minimum tax) are usually netted together in the rate reconciliation. If foreign tax credits were separately disclosed, they could be grossed-up to estimate foreign-source income subject to U.S. taxation in the current year, thus, enabling us to estimate apportionment under a worldwide tax system with deferral. Unfortunately, foreign tax credits are presented separately in the rate reconciliation for only three companies in our study in any year (Amoco, Raytheon, and United Technologies). Two, we assume all credits are domestic-source. Three, the tax credits are for book purposes, not tax purposes, because actual credits used in the tax return are not disclosed. Four, we ignore the alternative minimum tax because there are limited AMT disclosures in the financial statements; however, alternative tax bases could be incorporated in an apportionment tax system.
13. Caterpillar's 1993 tax footnote captures the sentiments of many frustrated users of income tax disclosures:

Taxation of a multinational company involves many complex variables, such as differing tax structures from country to country and the effect of U.S. taxation of foreign profits. These complexities do not permit meaningful comparisons of the U.S. and foreign components of profit before taxes and the provision for income taxes. Additionally, current relationships between the U.S. and foreign components are not reliable indicators of such relationships in future periods.
14. Companies that do not have significant influence over their investment, which is usually defined as ownership interest of less than 20 percent, record equity investments on their books using the cost method. Under the cost method, the investment is always valued at acquisition costs, dividends are recognized as revenue when received, and gains and losses on the investment are recognized upon sale. If significant influence exists and the ownership interest is less than 50 percent, the investment is recorded using the equity method. Under the equity method, the investor's share of earnings (losses) increases (decreases) the carrying value of the investment while dividends received decrease the carrying value of the investment. Companies combined under the equity method are included in the reconciliation of the statutory rate to the effective rate only if pretax income includes equity method income computed on a before-tax basis (Weber and Wheeler, 1992). Ownership interest greater than or equal to 50 percent requires consolidation for book purposes; however, for tax purposes companies can elect to consolidate if they have an 80 percent ownership interest. All other equity investments are accounted for under the cost method for tax purposes. Even if related corporations have a common ownership interest of 80 percent, the consolidated entity may still differ for book and tax purposes because tax laws do not allow the consolidation of Puerto Rican corporations or foreign corporations (Weber and Wheeler, 1992).
15. The valuation allowance in post-Statement of Financial Accounting Standard 109 (current GAAP accounting for income taxes) financial statements potentially may shed light on the utilization rate, but this study did not employ this information. Also, net operating loss carryovers affect financial statements differently depending on whether they are carried back or forward. Carrybacks do not affect current year taxable income because they are currently refundable and credited to the current tax provision. Conversely, carryforwards result in misstatement of current year taxable income. Carryforwards are excluded from the current year estimate of taxable income because they are credited to the deferred tax provision. Current year taxable income is overstated (understated) to the extent NOLs created in the current (prior) year are carried forward to future years (recognized in the current year).
16. For example, Exxon's 1993 rate reconciliation includes an "adjustment for non-U.S. taxes in excess of theoretical U.S. tax" and "U.S. tax on non-U.S. operations." We assume the former describes differences between domestic and foreign tax rates and the latter does not. (Our best guess is that the latter refers to differences between the actual taxes on repatriation of foreign profits and the deferred taxes recognized when the foreign earnings were booked.)
17. APB Opinions are the official pronouncements of the Accounting Principles Board. Statement of Financial Accounting Standards (SFAS) are the official pronouncements of the Financial Accounting Standards Board (FASB), which superseded the Accounting Principles Board in 1973. Together APB Opinions and SFAS direct U.S. GAAP. APB 11 guided accounting for income taxes from its adoption in 1967. SFAS 96 was adopted in 1987 and designed to replace APB 11, but was not uniformly accepted by the business community. In response, SFAS 96 superseded SFAS 96 in 1992. Because of the tumultuous transition from APB 11 to SFAS 109, our sample includes company-years with income taxes accounted for under three separate guidelines.

18. See *Arthur Young v. Commissioner*, 465 U.S. 805, 104 S.Ct. 1495, 79 L.Ed.2d 826 (1984) and William L. Raby, "Tax Clinic-Tax Accrual Review of Unasserted Deficiencies—AICPA vs. ABA," *The Tax Advisor*, October, 1976, p. 600-601 for discussions of the presence of audit cushions. See Beverly Enterprises, Inc.'s 1990 annual report for an example of a disclosed audit cushion. See "Provision for IRS examination" (Weber and Wheeler, 1992, p. 25).
19. Cross-sectional differences partly arise because SFAS 14 permits managers discretion in determining foreign revenues and assets. Geographic areas can be determined by origin or destination of sales and are defined differently (e.g., North America may or may not include Mexico). To aid in our interpretation of the segment disclosures, we adjust our classifications for other information about foreign operations in the financial statements.
20. Tax and geographic information is taken from the annual report of the applicable year unless information is missing for materiality reasons. If a later year discloses new types of information because it has reached the materiality threshold and now reports the amounts for the previous year, the new data are used.
21. To determine U.S. and foreign assets, sales and payroll, we use survey data from the following tables:
 

US information	Table II. K 1. Selected Financial and Operating Data of US Parents by Industry of US Parent—columns 1 (total assets), 6 (sales) and 8 (employee compensation);
Foreign assets	Table II.B 15 Total Assets of Affiliates, Industry of US Parent by Country;
Foreign sales	Table II.E 9 Sales of Affiliates, Industry of US Parent by Country;
Foreign payroll	Table II.G 12 Employee Compensation of Affiliates, Industry of US Parent by Country.
22. For indirect empirical evidence that the extent of income shifting is substantial, see Harris, Morck, Slemrod and Yeung (1993) and Hines and Rice (1994).

## References

- Bird, Richard M., and Donald J. S. Brean. (1986). "The Interjurisdictional Allocation of Income and the Unitary Taxation Debate." *Canadian Tax Journal* 34(6), November-December, 1377–1416.
- Bucks, Dan R., and Michael Mazerov. (1993). "The State Solution to the Federal Government's International Transfer Pricing Problem." *National Tax Journal* 46(3), September, 385–392.
- Frisch, Daniel. (1983). "Issues in the Taxation of Foreign Source Income." In M. Feldstein (ed.), *Behavioral Simulation Methods in Tax Policy Analysis*. Chicago: University of Chicago Press, pp. 289–330.
- Gordon, Roger, and John Wilson. (1986). "An Examination of Multijurisdictional Corporate Income Taxes Under Formula Apportionment." *Econometrica* 54(6), November, 1357–1373.
- Harris, David, Randall Morck, Joel Slemrod, and Bernard Yeung. (1993). "Income Shifting in the U.S. Multinational Corporations." In A. Giovanni, R. G. Hubbard, and J. Slemrod (eds.), *Studies in International Taxation*. Chicago: University of Chicago Press, pp. 277–302.
- Hines, James R., Jr., and Eric Rice. (1994). "Fiscal Paradise: Foreign Tax Havens and American Business." *Quarterly Journal of Economics* 109(1), 149–182.
- McLure, Charles E., Jr. (1989). "Economic Integration and European Taxation of Corporate Income at Source: Some Lessons from the U.S. Experience." In M. Crammie and B. Robinson (eds.), *Beyond 1992: A European Tax System*. London: Institute for Fiscal Studies, pp. 39–51.
- McLure, Charles E., Jr., Jorge Martinez-Vasquez and Sally Wallace. (1995). "Subnational Fiscal Decentralization in Ukraine." In R. M. Bird, R. Ebel, and C. Wallich (eds.), *Decentralization of the Socialist State: Intergovernmental Finance in Transition Economies*. Washington: The World Bank, pp. 281–319.
- Musgrave, Peggy B. (1973). "International Tax Base Division and the Multinational Corporation." *Public Finance* 27(4), 394–411.
- Schadewald, Michael S. (1996). "Global Apportionment: How Would it Affect the Largest U.S. Corporations?" *Tax Notes International* July 8, 131–139. Also see correction in "Correction to Tax Policy Forum on Global Apportionment." *Tax Notes International* July 15, 193.
- Sheffrin, Steven M., and Jack Fulcher. (1983). "Alternate Divisions of the Tax Base: How Much Is at Stake?" In C. E. McLure, Jr. (ed.), *The State Corporate Income Tax: Issues in Worldwide Unitary Combination*. Stanford: Hoover Institution Press, pp. 192–209.
- Sheffrin, Steven M., and Jack Fulcher. (1984). "The Container Case: Can We Identify the Winners and Losers." *Proceedings of the Annual Conference of the National Tax Institute of America*.
- Weber, Richard P., and James E. Wheeler. (1992). "Using Income Tax Disclosures to Explore Significant Economic Transactions." *Accounting Horizons*, 14–29.