Changes in State Corporate Tax Apportionment Formulas and Tax Bases

by Elliott Dubin

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Introduction

States generally apportion the total net income of a multistate business to their state using a three-factor formula. The most commonly used three-factor formula multiplies the total net income of the firm by the proportion of the firm's sales in the state to total sales, and multiplies that ratio by a weighting factor plus the ratio of the firm's payroll in the state by that factor's weight plus the ratio of the firm's property in the state by the property factor weight. The sum of the weights must equal one (1) to neither overapportion nor underapportion the firm's net income to each state in which the firm does business. The algebraic expression of the apportionment formula may be found in the appendix (p. 571).

In recent years, some states have increased the weight of the sales factor and decreased the concomitant weights of the payroll and property factors in the apportionment formula. Simafranca provides two reasons why states would adopt that policy. First, increasing the weight of the sales factor reduces the production costs for in-state firms relative to their out-of-state competitors, which over time, and assuming other states do not follow suit, would provide an incentive for those firms to expand their production facilities and hire more workers. Second, increasing the weight of the sales factor encourages out-of-state businesses to locate their facilities in the state.[1] When a state increases the sales factor weight, its corporate income tax revenues are expected to decline in the short run. However, in the longer run, it is expected that the increased economic activity induced by this policy will result in higher individual income tax revenue, higher business property tax revenue, higher sales tax revenue, and possibly higher business income tax revenue.[2]

This report adds to the already large body of literature that examines the effects of changing the weight of the sales factor on state economic development measured by changes in state corporate income tax revenue and/or bases, changes in employment, and changes in business investment. I estimate the effect of changes in the weight of the sales factor on the corporate income tax base as measured by the capacity of state and local governments to raise revenue from the corporate income tax. The measure of corporate income tax capacity was first developed by the former U.S. Advisory Commission on Intergovernmental Relations (ACIR) in 1962, through its representative tax system (RTS), to more accurately reflect the amount of revenue from each tax source that is potentially available to each state in a given year. Those estimates were continued with changes to the method and the addition of ACIR's representative expenditure system (RES).[3] Since the ACIR was disbanded, the Federal Reserve Bank of Boston has continued publishing those estimates.[4]

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[1]Ryan Simafranca, "The Double-Weighted Sales Formula —A Plague on Interstate Commerce," *Tax Notes*, Dec. 4, 1995, p. 1253.

[2]Sanjay Gupta, Jared Moore, Jeffrey Gramlich, and Mary Ann Hoffman, "Empirical Evidence on the Revenue Effects of State Corporate Income Tax Policies," *National Tax Journal*, Vol. LXII, No. 2, June 2009, p. 243.

[3]Marcia Howard, RTS 1991, "State Revenue Capacity and Effort." U.S. Advisory Commission on Intergovernmental Relations, M-187, September 1993.

[4]Yesim Yilmaz, Sonya Hoo, Matthew Nagowski, Kim Rueben, and Robert Tannenwald, "Measuring Fiscal Disparity Across the U.S. States: A Representative Revenue

The RTS is essentially the average tax system of all the states applied to each state's potential tax base. That is, the RTS provides an estimate of the tax yield that would result from applying a standard, representative set of tax rates to standard definitions of tax bases. The representative tax rate for a particular tax is the sum of all state and local tax collections of that tax divided by the sum of all state and local uniformly defined tax bases for that particular tax. The *tax capacity* of a state is the taxes the state, and its constituent local governments, would have collected if it were to apply the representative tax rates as defined previously to the standard tax bases in the state.[5] The standard base is the base that is potentially taxable; it includes the value (or volume) of all economic stocks or flows that the state and local governments would have been able to tax, in the absence of nonstandard exemptions, exclusions, deductions, and other tax preferences and tax relief items. The use of a standardized base to measure revenue capacity allows the comparison of states' abilities to raise revenues from any particular tax or revenue source independent of the policies actually implemented in each state.

For the most part, the data show that increasing the weight of the sales factor increases measured tax capacity, which is not to be expected because the payroll and property factors are taxed more lightly following the usual change in apportionment formulas — that is, increasing the weight of the sales factor. However, that is not true in all cases. Also, we find that the change in corporate income tax capacity remains after the increase in the weight of the sales factor. That implies that the corporate income tax base does not necessarily increase as expected, but remains depressed. However, in those states in which the corporate tax base increases when the weight of the sales factor is increased, the upward change also remains. That does not necessarily imply that increasing the weight of the sales factor results in a reduced rate of economic growth.

The next section presents a brief description of the method used to derive the estimates of state corporate tax capacity and a comparison to the ACIR estimates. The third section presents estimates of the effect of changes in the apportionment weights on the estimates of state corporate income tax capacity. The last section is the summary and conclusions.

State Corporate Income Tax Capacity

A. Derivation of the Estimates of State Tax Capacity Measures

Ideally, the measure of state corporate tax capacity would be the sum of every corporation's net income attributable to its economic activity in each state. That information is not available. And even that measure is not truly objective because, to a large extent, each multistate corporation determines its own net income. The measure of state corporate tax capacity used in this report is an estimate of the National Income and Products Accounts (NIPA) measure of corporate profits before taxes of domestic industries for each of the 14 industrial sectors[6] apportioned to each state by using a variant of the apportionment formula presented earlier in this report. The estimated apportioned earnings of each industrial sector are then summed to derive an estimate of total corporate tax capacity. A state-level panel comprising representatives from all states plus the District of Columbia and spanning 2001 to 2008 was chosen; that period was because it is the only period that contains consistent data based on the North American Industrial Classification System (NAICS). Also, the earnings from international trade are disregarded because almost all states limit their jurisdiction to the water's edge. The earnings of Federal Reserve Banks are also disregarded because states cannot legally impose their taxes on those institutions.

The NIPA measure of profits before taxes is used as the base for state corporate income taxes because that measure of profits reflects the inventory and depreciation accounting practices used for federal income tax returns and is sometimes referred to as book profits.[7] Most states that impose corporate net income taxes use federal net income, with some adjustments, as the basis for apportioning a multistate corporation's net income. Further, the problem of endogeneity does not exist because the measure of corporate profits (tax capacity) is independent of

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System/Representative Expenditure System Approach, Fiscal Year 2002." A Joint Report of the Tax Policies," *National Tax Journal*, Vol. LXII, No. 2, June 2009, p. 243.

[5]*Id.* at p. 12.

[6]Agriculture, forestry, fishing, and hunting; mining; utilities; construction; manufacturing; wholesale trade; retail trade; transportation and warehousing; information; finance insurance, real estate, leasing, and management of enterprises; professional and business services; educational services, healthcare, and social assistance; arts, entertainment, recreation, accommodations, and food services; and other services, except government.

[7]Kenneth A. Petrick, "Corporate Profits: Profits Before Tax, Profits Tax Liability, and Dividends: Methodology Paper," U.S. Department of Commerce, Bureau of Economic Analysis, September 2002, p. 4.

state tax policies such as tax rates, credits, and the throwback or throwout of sales.

The apportionment formula uses the actual apportionment formula used by each state in any year, rather than the traditional, equally weighted three-factor apportionment formula of sales, payroll, and property.[8] According to the Federation of Tax Administrators, as of January 1, 2008, only 12 states use the traditional, equally weighted three-factor formula; 11 states use only one factor (sales), and Indiana and Minnesota will use only the sales factor to apportion income in 2011 and 2013, respectively.[9] The apportionment formula used to estimate corporate income tax capacity for Nevada, Washington, and Wyoming, the three states without any corporate income tax, is 50 percent sales, 25 percent payroll, and 25 percent property.

The lack of data on the distribution of a common definition of property that is used in apportionment formulas, by industry, by state, and by year necessitated a further modification of the method to apportion industry profits to the states. Here, the weight of the payroll factor is doubled to account for the lack of the property factor. The algebraic expression of the apportionment formula as modified to account for the doubling of the weight of the payroll factor is also in the appendix.

Before the report proceeds any further, *a concern* should be addressed. The lack of data on the property factor on a state-by-state basis may impart some unknown bias into the estimates of state corporate tax capacity. The two-factor apportionment formula used in this article implicitly assumes that the payroll and property factors are distributed among the states in a similar manner. There is no way of knowing whether that assumption is valid or, if it is invalid, how much error is imparted to the estimates.

B. Data Sources

The sales factor in the apportionment formula is based on industry sales in a particular state relative to total U.S. sales, that is, sales on a destination basis. The U.S. Census Bureau's quinquennial Economic Census publishes sales by industry by state on an origin basis. In this report, estimates of sales by industry by state were derived using the ACIR method to estimate sales on a destination basis within a state. Briefly, the annual U.S. input/output and use tables were manipulated to derive an estimate of industry-to-industry sales for the U.S. sales for final uses were weighted by each state's share of gross domestic product. A detailed exposition of the sources and methods is in the appendix.

Sales-factor apportionment weights were provided by research of Commerce Clearing House personnel from CCH archives. Profits before taxes (PBT) comes from the interactive data of the U.S. Department of Commerce, Bureau of Economic Analysis; Table 6.17D (see Table 1, next page).[10] Data on salaries and wages by state were obtained from the Department of Commerce, Bureau of Economic Analysis SA07 series.[11]

III. Results

Table 2 (p. 567) presents estimates of corporate tax capacity by state for 2001 through 2008. The annual fluctuations in state corporate tax capacity are the result of variations in the level of national corporate profits before taxes, changes in the composition of corporate profits by industry, changes in apportionment weights for the sales and the concomitant change in the weight of the payroll factor, and changes in the distributions of sales and salaries and wages by industry by state.[12] Those changes result in wide annual fluctuations in corporate tax capacity for each state. For example, between 2003 and 2004 and between 2004 and 2005, U.S. tax capacity rose by 40.0 percent and 36.8 percent, respectively, and fell by 24.4 percent between 2007 and 2008. Among the individual states, the annual percentage changes in corporate tax capacity are much greater. For example, Idaho's corporate income tax capacity rose by 130.4 percent between 2002 and 2003. But between 2007 and 2008, its corporate tax capacity fell by 63.8 percent.

Table 3 (p. 568) contains estimates of corporate tax capacity by state for 2001 through 2008 with the distribution of profits among industries and national total of profits before taxes unconstrained but with the apportionment weights used by the states constrained to their 2001 levels. That is, the estimates of corporate income tax capacity are the same as those in the previous table with only the apportionment weights held constant at the 2001 values. Constraining the apportionment weights to those used in 2001 permits one to isolate the effect of changes in the apportionment weights on the corporate income tax capacity by state.

The *bold* entries signify the 18 states that have changed the sales-factor apportionment weight at least once during the 2001-2008 time span. In each

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[8]*Supra* note 3, at pp. 124-126.

[9]Federation of Tax Administrators, *available at* http://www.taxadmin.org/fta/rate/corp_app.html.

[10]*Available at* http://www.bea.gov/national/nipaweb/ Table View.asp?SelectedTable=232&ViewSeries=NO&Java=no&Request3 Place=N&3Place=N&FromView=YES&Freq=Year&FirstYear=1998&LastYear= 2007&3Place=N&Update=Update &JavaBox=no#Mid.

[11]*Available at* http://www.bea.gov/regional/spi/default.cfm? sel Table=SA07N&selSeries=NAICS.

[12]All states that changed their apportionment formula during this period increased the weight of the sales factor.

Table 1.
Corporate Profits of Domestic Industries, Before Taxes

Industry	2001	2002	2003	2004	2005	2006	2007	2008	Average 2001-2008
	(millions of dollars)								
Domestic industries (less deposits of Federal Reserve Banks)	$514,146	$583,944	$717,643	$1,004,341	$1,374,148	$1,552,043	$1,388,936	$1,049,849	$1,020,631
Agriculture, forestry, fishing, and hunting	1,257	181	2,159	3,156	4,504	4,729	6,031	3,672	3,211
Mining	15,637	5,585	16,071	24,043	43,277	57,015	56,985	67,766	35,797
Utilities	24,773	12,514	12,477	19,803	30,534	53,722	49,308	40,351	30,435
Construction	44,226	40,836	39,757	56,763	84,512	84,582	72,353	61,060	60,511
Manufacturing	46,934	48,385	75,041	173,448	260,260	326,742	296,228	192,393	177,429
Wholesale trade	48,413	51,736	59,652	81,659	100,755	114,024	118,213	85,502	82,494
Retail trade	70,893	80,655	89,004	99,249	127,695	136,458	128,137	84,461	102,069
Transportation and warehousing	917	126	7,543	14,688	29,500	42,137	30,795	10,173	16,985
Information	-24,693	-4,575	4,311	45,224	81,358	92,750	90,637	85,528	46,318
Finance, insurance, and real estate[1]	207,245	251,577	302,518	355,970	445,809	439,210	348,505	248,483	324,915
Professional, scientific, and technical services[2]	20,072	31,077	41,052	52,141	65,854	72,746	84,110	75,658	55,339
Healthcare, educational services, and social assistance	34,715	40,303	44,241	48,444	59,404	63,255	65,395	61,497	52,157
Arts, entertainment, and recreation[3]	14,942	17,554	15,881	21,479	28,943	31,394	28,392	22,836	22,678
Other services, except government	8,815	7,990	7,936	8,274	11,743	13,279	13,847	10,469	10,294

Industry	2001	2002	2003	2004	2005	2006	2007	2008	Average 2001-2008
	(Percent of total)								
Domestic industries (less deposits of Federal Reserve Banks)	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
Agriculture, forestry, fishing, and hunting	0.24	0.03	0.30	0.31	0.33	0.31	0.43	0.35	0.31
Mining	3.04	0.96	2.24	2.39	3.15	3.72	4.10	6.45	3.51
Utilities	4.82	2.14	1.74	1.97	2.22	3.51	3.55	3.84	2.98
Construction	8.60	6.99	5.54	5.65	6.15	5.52	5.21	5.82	5.93
Manufacturing	9.13	8.29	10.46	17.27	18.94	21.33	21.33	18.33	17.38
Wholesale trade	9.42	8.86	8.31	8.13	7.33	7.44	8.51	8.14	8.08
Retail trade	13.79	13.81	12.40	9.88	9.29	8.91	9.23	8.05	10.00
Transportation and warehousing	0.18	0.02	1.05	1.46	2.15	2.75	2.22	0.97	1.66
Information	-4.80	-0.78	0.60	4.50	5.92	6.05	6.53	8.15	4.54
Finance, insurance, and real estate[1]	40.31	43.08	42.15	35.44	32.44	28.67	25.09	23.67	31.83
Professional, scientific, and technical services[2]	3.90	5.32	5.72	5.19	4.79	4.75	6.06	7.21	5.42
Healthcare, educational services, and social assistance	6.75	6.90	6.16	4.82	4.32	4.13	4.71	5.86	5.11
Arts, entertainment, and recreation[3]	2.91	3.01	2.21	2.14	2.11	2.05	2.04	2.18	2.22
Other services, except government	1.71	1.37	1.11	0.82	0.85	0.87	1.00	1.00	1.01

[1]Includes management of companies and enterprises.
[2]Includes administrative services and waste management services.
[3]Includes accommodation and food services.
Source: U.S. Department of Commerce, Bureau of Economic Analysis.

Table 2.
State Corporate Income Tax Capacity: Current-Year Distribution of Profits and
Current-Year Apportionment Weights

State	2001	2002	2003	2004	2005	2006	2007	2008
	(millions of dollars)							
United States	$514,146	$583,944	$717,643	$1,004,341	$1,374,148	$1,532,043	$1,388,936	$1,049,849
Alabama	5,891	6,455	8,098	11,784	16,476	18,745	17,040	12,804
Alaska	1,342	1,237	1,680	2,368	3,473	4,072	3,776	3,376
Arizona	8,322	9,405	11,665	16,158	22,996	26,309	23,742	17,709
Arkansas	3,427	3,825	4,771	6,946	9,540	10,736	9,901	7,476
California	63,708	73,506	90,752	129,036	178,225	197,679	178,680	133,507
Colorado	8,643	9,878	10,298	14,798	20,852	23,627	21,759	18,973
Connecticut	9,571	10,793	13,032	17,805	23,890	26,056	23,672	17,291
Delaware	2,273	2,644	3,182	4,164	5,719	6,004	5,131	3,771
District of Columbia	2,325	2,872	3,540	4,906	6,546	7,194	6,784	5,183
Florida	24,388	28,807	35,525	48,987	68,548	75,618	67,046	49,127
Georgia	14,734	16,735	20,387	28,830	39,689	43,789	40,101	29,566
Hawaii	1,849	2,157	2,610	3,558	4,842	5,313	4,792	3,508
Idaho	1,724	1,913	4,408	6,785	9,678	11,040	10,179	3,689
Illinois	24,520	27,472	33,800	46,535	62,159	68,543	62,407	47,409
Indiana	10,131	11,213	14,026	20,568	27,724	30,628	27,685	20,930
Iowa	4,878	5,570	6,963	10,220	13,727	15,354	14,230	11,125
Kansas	4,166	4,693	5,795	8,320	11,526	13,326	12,330	9,435
Kentucky	5,761	6,326	7,964	11,364	15,697	17,733	16,153	12,187
Louisiana	6,949	7,046	9,219	13,210	19,455	26,501	24,786	18,309
Maine	1,837	2,109	2,550	3,536	4,614	5,008	4,772	3,645
Maryland	9,380	11,085	13,197	18,103	24,603	26,702	24,208	18,668
Massachusetts	15,888	18,138	21,564	29,401	38,391	41,804	38,308	28,745
Michigan	17,438	19,757	24,133	32,326	42,701	45,153	40,140	29,623
Minnesota	10,217	11,691	14,346	20,148	26,825	29,211	26,644	20,129
Mississippi	3,155	3,465	4,276	6,061	8,322	9,549	9,504	7,190
Missouri	9,738	11,095	13,247	18,136	24,633	26,767	24,073	18,235
Montana	1,093	1,155	1,448	2,007	2,883	3,321	3,110	2,580
Nebraska	2,785	3,148	4,006	5,615	7,575	8,510	7,878	6,272
Nevada	3,970	4,467	5,586	8,115	11,668	12,986	11,757	8,896
New Hampshire	2,380	2,740	3,349	4,710	6,311	6,956	6,202	4,628
New Jersey	18,825	22,261	26,570	35,739	47,379	51,757	46,573	34,964
New Mexico	2,338	2,438	3,131	4,375	6,188	7,093	6,595	5,596
New York	47,861	54,001	63,851	85,904	114,964	125,204	106,502	79,919
North Carolina	14,060	15,899	19,740	27,899	38,722	43,974	40,179	29,230
North Dakota	973	1,028	1,291	1,815	2,527	2,920	2,741	2,298
Ohio	19,524	22,109	27,052	37,987	51,008	55,391	49,713	36,703
Oklahoma	4,724	4,836	6,313	8,911	12,775	15,683	14,420	12,420
Oregon	5,558	6,348	7,871	11,582	15,629	18,616	17,081	12,874
Pennsylvania	21,415	24,280	29,991	41,160	55,650	61,564	55,998	42,167
Rhode Island	1,714	2,056	2,582	3,494	4,596	4,991	4,435	3,232
South Carolina	5,711	6,346	7,889	11,039	15,090	16,991	16,091	12,215
South Dakota	973	1,210	1,623	2,233	2,998	3,316	3,068	2,301
Tennessee	8,756	10,123	12,629	18,110	24,470	27,323	24,641	18,316
Texas	39,281	43,769	54,701	78,982	110,982	127,886	119,498	95,264
Utah	3,527	3,938	4,799	6,741	9,623	11,302	10,719	8,230
Vermont	925	1,032	1,262	1,787	2,454	2,705	2,462	1,840
Virginia	12,847	15,110	18,864	26,437	36,505	39,651	35,746	26,985
Washington	9,848	11,770	14,633	20,779	29,025	32,814	30,784	23,598
West Virginia	2,194	2,171	2,882	4,109	5,858	6,714	6,081	5,045
Wisconsin	9,541	10,828	13,174	18,820	25,443	28,209	25,356	19,459
Wyoming	1,069	992	1,376	1,936	2,970	3,708	3,462	3,207

Source: Table 1 and Bureau of Economic Analysis.

Table 3. State Corporate Income Tax Capacity: Current-Year Distribution of Profits and 2001 Apportionment Weights								
State	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2,008**
	(millions of dollars)							
United States	$514,146	$583,944	$717,643	$1,004,341	$1,374,148	$1,532,043	$1,388,936	1,049,849
Alabama	5,891	6,456	8,096	11,785	16,476	18,782	17,024	12,785
Alaska	1,342	1,237	1,682	2,372	3,478	4,082	3,820	3,435
Arizona	8,322	9,407	11,661	16,157	22,992	**26,365**	*23,677*	**17,649**
Arkansas	3,427	3,825	4,769	6,946	9,538	10,755	9,886	7,466
California	63,708	73,518	90,711	129,029	178,189	197,909	177,896	132,921
Colorado[1]	*8,643*	*9,879*	*10,295*	*14,801*	*20,854*	*23,663*	*21,756*	18,955
Connecticut	9,571	10,795	13,026	17,803	23,883	26,071	23,456	17,141
Delaware	2,273	2,644	3,180	4,163	5,717	6,005	5,078	3,732
District of Columbia	2,325	2,872	3,539	4,906	6,545	7,198	6,737	5,148
Florida	24,388	28,811	35,507	48,980	68,528	75,673	66,639	48,806
Georgia	14,734	16,737	20,378	28,827	39,680	**43,611**	**39,526**	**28,960**
Hawaii	1,849	2,157	2,609	3,558	4,840	5,315	4,764	3,488
Idaho	1,724	1,914	4,406	6,784	9,676	11,061	10,192	3,679
Illinois[2]	**24,520**	*27,476*	*33,786*	*46,536*	*62,151*	*68,627*	*62,156*	*47,238*
Indiana	10,131	11,214	14,022	20,570	27,722	30,696	**27,534**	*20,414*
Iowa	4,878	5,571	6,961	10,221	13,727	15,378	14,202	11,114
Kansas	4,166	4,694	5,793	8,321	11,525	13,350	12,314	9,423
Kentucky	5,761	6,327	7,963	11,366	15,699	17,769	16,153	12,196
Louisiana	6,949	7,047	9,221	13,219	19,466	**22,911**	*21,433*	*16,892*
Maine	1,837	2,110	2,549	3,536	4,613	5,014	**4,535**	*3,430*
Maryland	9,380	11,087	13,191	18,102	24,597	26,726	24,074	18,567
Massachusetts	15,888	18,141	21,553	29,398	38,380	41,839	38,027	28,531
Michigan	17,438	19,760	24,125	32,327	42,697	45,222	**40,062**	**29,524**
Minnesota	**10,217**	*11,693*	*14,340*	*20,147*	*26,820*	*29,246*	**26,604**	**20,182**
Mississippi[3]	*3,155*	*3,466*	*4,275*	*6,062*	*8,322*	*9,567*	**8,697**	*6,626*
Missouri	9,738	11,097	13,241	18,135	24,628	26,800	23,966	18,145
Montana	1,093	1,156	1,448	2,008	2,885	3,327	3,119	2,592
Nebraska	2,785	3,149	4,005	5,615	7,574	8,522	7,855	6,253
Nevada	3,970	4,467	5,585	8,117	11,669	12,999	11,719	8,875
New Hampshire[3]	*2,380*	*2,741*	*3,347*	*4,710*	*6,309*	*6,965*	*6,177*	*4,607*
New Jersey	18,825	22,265	**26,972**	*36,141*	*47,962*	*52,311*	*46,670*	*34,848*
New Mexico	2,338	2,438	3,131	4,378	6,193	7,108	6,625	**5,536**
New York	47,861	54,011	63,816	85,892	114,931	**127,664**	**116,511**	*87,286*
North Carolina	14,060	15,901	19,732	27,899	38,714	44,038	40,043	29,124
North Dakota	973	1,029	1,291	1,815	2,528	2,925	2,744	2,307
Ohio[3]	*19,524*	*22,112*	*27,042*	*37,987*	*51,001*	*55,478*	*49,562*	*36,590*
Oklahoma	4,724	4,837	6,315	8,919	12,787	15,723	14,517	12,562
Oregon	5,558	6,349	**7,782**	**11,245**	*15,343*	**17,727**	*16,183*	*12,017*
Pennsylvania[3]	*21,415*	*24,284*	*29,980*	*41,160*	*55,643*	*61,644*	**55,804**	**42,046**
Rhode Island	1,714	2,056	2,581	3,494	4,595	4,996	4,405	3,209
South Carolina	5,711	6,347	7,887	11,039	15,087	17,020	**15,429**	*11,509*
South Dakota	973	**1,119**	*1,572*	*2,150*	*2,896*	*3,217*	*2,965*	*2,162*
Tennessee[1]	*8,756*	10,124	12,623	18,109	24,464	27,366	24,574	18,254
Texas	39,281	43,776	54,686	78,996	110,991	128,082	119,302	95,226
Utah	3,527	3,939	4,798	6,742	9,624	**11,252**	*10,661*	*8,230*
Vermont	925	1,032	1,262	1,787	**2,411**	*2,675*	*2,430*	*1,818*
Virginia	**12,847**	*15,112*	*18,856*	*26,436*	*36,499*	*39,691*	*35,572*	*26,853*
Washington	9,848	11,772	14,626	20,777	29,018	32,857	30,679	23,504
West Virginia	2,194	2,172	2,883	4,113	5,864	6,730	6,119	5,098
Wisconsin	9,541	10,830	13,169	18,820	25,438	**28,373**	**25,551**	*19,627*
Wyoming	1,069	992	1,377	1,940	2,976	3,719	3,512	3,270

[1]Increased sales-factor apportionment weight in 1999.
[2]Increased sales-factor apportionment weight in 1999 and 2000.
[3]Increased sales-factor apportionment weight in 2000.
Note: Bold entries signify when the apportionment factor was changed; italized entries are years following the change in apportionment factors.
Source: Table 1 and Bureau of Economic Analysis.

Table 4.
Percentage Difference in State Corporate Income Tax Capacity: Current-Year Apportionment Weights vs. 2001 Apportionment Weights: Current-Year Distribution of Profits

State	2001	2002	2003	2004	2005	2006	2007	2008
				(Percent Difference)				
United States	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Arizona	0.00	0.00	0.00	0.00	0.00	**-0.21**	*0.27*	**0.34**
Colorado[1]	*0.00*	*-0.02*	*0.03*	*-0.02*	*-0.01*	*-0.16*	*0.01*	*0.10*
Georgia	0.00	0.00	0.00	0.00	0.00	**0.41**	**1.45**	**2.09**
Illinois[2]	0.00	*-0.02*	*0.04*	*0.00*	*0.01*	*-0.12*	*0.40*	*0.36*
Indiana	0.00	0.00	0.00	0.00	0.00	0.00	**0.55**	**2.53**
Louisiana	0.00	0.00	0.00	0.00	0.00	**15.67**	*15.64*	*8.39*
Maine	0.00	0.00	0.00	0.00	0.00	0.00	**5.23**	**6.25**
Michigan	0.00	0.00	0.00	0.00	0.00	0.00	**0.19**	**0.33**
Minnesota	**0.00**	*-0.02*	*0.04*	*0.00*	*0.02*	*-0.12*	*0.15*	**-0.26**
Mississippi[3]	*0.00*	*-0.01*	*0.03*	*-0.01*	*0.00*	*-0.19*	*9.28*	*8.51*
New Hampshire[3]	*0.00*	*-0.01*	*0.04*	*0.01*	*0.02*	*-0.13*	*0.41*	*0.46*
New Jersey	0.00	0.00	0.00	**-1.11**	*-1.22*	*-1.06*	*-0.21*	*0.33*
New Mexico	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.09**
New York	0.00	0.00	0.00	0.00	0.00	**-1.93**	**-8.59**	*-8.44*
Ohio[3]	*0.00*	*-0.02*	*0.04*	*0.00*	*0.01*	*-0.16*	*0.30*	*0.31*
Oregon	0.00	0.00	**1.14**	**2.99**	*1.86*	**5.01**	*5.55*	*7.13*
Pennsylvania[3]	*0.00*	*-0.02*	*0.04*	*0.00*	*0.01*	*-0.13*	**0.35**	*0.29*
South Carolina	0.00	-0.01	0.03	0.00	0.02	-0.17	**4.29**	**6.13**
South Dakota	0.00	**8.06**	*3.28*	*3.86*	*3.50*	*3.06*	*3.50*	*6.44*
Tennessee[1]	*0.00*	*-0.01*	*0.04*	*0.01*	*0.03*	*-0.16*	*0.28*	*0.34*
Utah	0.00	0.00	0.00	0.00	0.00	**0.44**	*0.54*	*0.00*
Vermont	0.00	0.00	0.00	0.00	**1.76**	*1.12*	*1.29*	*1.20*
Virginia	**0.00**	*-0.02*	*0.04*	*0.00*	*0.02*	*-0.10*	*0.49*	*0.49*
Wisconsin	0.00	0.00	0.00	0.00	0.00	**-0.58**	**-0.76**	*-0.86*

[1]Increased sales-factor apportionment weight in 1999.
[2]Increased sales-factor apportionment weight in 1999 and 2000.
[3]Increased sales-factor apportionment weight in 2000.
Note: Bold entries signify when the apportionment factor was changed; italized entries are years following the change in apportionment factors.
Source: Tables 2 and 3.

case, increasing weight was placed on the sales factor. Six states changed the sales factor apportionment weight just prior to 2001 and are included in bold here. The italicized entries indicate state corporate income tax capacity following a change in the apportionment weight of the sales factor.

The change in state corporate tax capacity resulting from changes in apportionment weights only is shown in Table 4. Each entry in Table 4 is the percentage difference between the corresponding entries in tables 2 and 3. For example, the entry for New Jersey in 2003 in Table 4 is the percentage difference between the entry for New Jersey in 2003 in Table 3 and the corresponding entry in 2003 in Table 2. That is, when New Jersey changed the weight of the sales factor in its apportionment formula from one-third in 2002 to one-half in 2003, its corporate tax base fell by

1.5 percent. For states that did not change their apportionment weights during that period — for example, Arkansas — the annual percentage change in corporate tax base is constrained to equal zero to avoid confusion. Those states will have very small positive or negative calculated changes for a given year because the sum of total profits before tax for all states for each year will be constant regardless of changes in any state's apportionment formula.

IV. Discussion of the Results

As noted earlier, total corporate tax capacity fluctuates widely from year to year for each state primarily because of cyclical changes in aggregate corporate profits as well as in the distribution of profits by industry and changes in the distributions of sales and salaries and wages by industry by state. Changes

in state apportionment factor weights also influence the changes in state corporate income tax capacity.

Total corporate tax capacity fluctuates widely from year to year for each state.

It was assumed that the increased weight placed on the sales factor by the 18 states that did alter their apportionment formula from 2001 to 2008 period was done to spur economic development. That is, states initially expect to collect less corporate income tax revenue from their in-state firms — that is, firms with property or payroll in the state but a relatively small proportion of their sales in that state. Conversely, the greater weight placed on the sales factor would perhaps increase revenue from out-of-state firms with in-state sales but relatively little or no property or payroll in the state.[13] Over time, however, the lower weights on property and payroll supposedly are expected to induce out-of-state firms to relocate within that state's borders or to retain in-state firms that might have relocated elsewhere. If successful, that strategy would improve the local economy and provide additional revenue from corporate income taxes, property taxes, sales taxes, and individual income taxes.[14]

If that theory holds, reducing the weight of the payroll apportionment factor would lower corporate tax capacity. The experience of most of the states that increased the weight of the sales factor in their apportionment formula is *not* the expected one. Of the 19 states that increased the weight of the sales factor during this period, 13 experienced increased corporate income tax capacity in the year of the change and thereafter (see Table 4.) Only three states — New Jersey, New York, and Wisconsin — experienced reduced corporate tax capacity following a change in the sales-factor apportionment weight. Three states — Arizona, Minnesota, and Virginia — had mixed results. The states in which corporate tax capacity rose following a change in their sales-factor apportionment weights could be characterized as market states, while the other states could be characterized as production states. Edmiston found that market economies tended to gain revenues when the weight of the sales factor was increased (corporate tax capacity increased), and corporate tax capacity decreased in the "produc-

tion" states.[15] Seven states — Colorado, Illinois, Mississippi, New Hampshire, Ohio, Pennsylvania, and Tennessee — increased their sales-factor apportionment weight before 2001. It is not possible to characterize Colorado, New Hampshire, Ohio, or Tennessee as either market or production states because there was no later change in their sales-factor apportionment weight to predict what would happen to corporate tax capacity following a change in the weight in the apportionment formula.

The experience of most of the states that increased the weight of the sales factor in their apportionment formula is not the expected one.

For most states that changed their apportionment formula during this period, the resulting change in their corporate tax capacity was quite small. However, there were some notable exceptions. When Louisiana changed the sales-factor apportionment weight from 0.5 to 1.0 in 2006, corporate tax capacity rose by 15.7 percent, 15.6 percent, and 8.4 percent in 2006, 2007, and 2008, respectively. Similar changes in the weight of the sales-apportionment factor resulted in increases of more than 9 percent in Mississippi, approximately 5 percent and 7 percent in Oregon, and about 4.3 percent in South Carolina. Corporate tax capacity in South Dakota rose by more than 8 percent in 2002 and by more than 3 percent in later years following a change in the weight of its sales factor from one-third to one-half in 2002.

New York increased the sales-factor apportionment weight from 0.5 to 0.6 in 2006 and from 0.6 to 1 the following year. Corporate tax capacity in New York fell by 1.9 percent between 2005 and 2006 and another 8.6 percent between 2006 and 2007 following the 2006 change, and it fell by another 8.4 percent between 2007 and 2008.

When states reduce the apportionment weights of the payroll and property factors, the corporate tax base declines in the year of the change and in the following years, as expected for production states, while the converse is true for market states. The theory also predicts that the lower apportionment weights on the payroll and property factors should

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[13]Nexus questions will not be discussed here.

[14]Sanjay Gupta, Jared Moore, Jeffrey Gramlich, and Mary Ann Hoffman, *supra* note 2.

[15]Kelly Edmiston, "Strategic Apportionment of the State Corporate Income Tax: An Applied General Equilibrium Analysis," 55 *National Tax Journal* 2 (June 2002), pp. 239-262.

induce firms to expand their operations or to relocate in those states that have lowered the apportionment weights on payroll and property. The results shown in Table 4 can neither support nor rebut those theoretical arguments.

V. Conclusions

The purpose of this report is to observe how changes in the apportionment weights affect state corporate income tax capacity. The simple method used here shows that increasing the weight of the sales factor in the apportionment formula generally results in an increased corporate tax base, which was not the expected result. However, there may be other factors not taken into account that could have produced similar results. For example, if data for a larger or smaller number of industrial sectors were used, the results could have been different. If a longer time frame with consistent NAICS data were available, the results could have been different since there were a significant number of states that changed their apportionment formula before 2001. Further, if a consistent definition of property used in state apportionment formulas were available, the change in corporate tax bases could have been different. Thus, despite the large amount of literature on this subject, there is no definitive answer regarding the long-term effect of changes in the weights of the apportionment factors on either corporate tax bases or longer-term economic development.

Appendix
General Apportionment Formula

$$\Pi_{ijt} = \Pi_{it} \cdot \{\alpha_{jt} (S_{ijt}/S_{it}) + \beta_{it}(L_{ijt}/L_{it}) + \gamma_{it} (P_{ijt}/P_{it})\}$$

Where:

Π_{ijt} are the profits of industry sector (i) in state (j) at time (t)

Π_{it} are the profits of industry sector (i) at time (t)

$\acute{\alpha}_{jt}$ is the weight of apportionment factor for sales in state (j) at time (t)

S_{ijt}/S_{it} is the ratio of the sales of industry sector (i) in state (j) at time (t) to total sales of industry sector (i) at time (t)

β_{it} is the weight of the apportionment factor for payroll in state (j) at time (t)

L_{ijt}/L_{it} is the ratio of the payroll of industry sector (i) in state (j) at time (t) to total payroll of industry sector (i) at time (t)

γ_{it} is the weight of the apportionment factor for property in state (j) at time (t)

P_{ijt}/P_{it} is the ratio of the property of industry sector (i) in state (j) at time (t) to the total property of industry sector (i) at time (t)

$$\acute{\alpha}_{jt} + \beta_{it} + \gamma_{it} = 1$$

However, since we do not have data on the property factor by state, the apportionment formula used here is:

$$\Pi_{ijt} = \Pi_{it} \cdot \{\alpha_{jt} (S_{ijt}/S_{it}) + (1 - \alpha_{jt}) (L_{ijt}/L_{it})\}$$

Derivation of Sales by Industry by State, 2001 Through 2008

Because corporate sales by destination are unlikely to mirror either payroll or retail sales, neither of those proxies was used to estimate the sales factor in the formula. The Economic Census, published every five years by the U.S. Bureau of the Census, contains data on sales by industry by state; but, these data represent shipments from the state; i.e., sales by state of origin. The apportionment of corporate income is based on sales by state of destination. Estimates of sales by industry by state on a destination basis were derived using a method very similar to the ACIR method found in the September 1993 publication cited previously. As shown below, a proxy for sales by destination was derived through the use of Gross State Product by industry by state and annual national input-output tables for 2001-2007 according to the following procedure:

Let:

$Tabl_{i,c}$ = the percentage of the dollar value of industry i's output that is commodity c. The distribution of commodity outputs is based on the "Make of Commodities" table (Table 1) in the U.S. input-output tables.

$Tab2_{c,j}$ = the percentage of the total dollar value of commodity c used as an input in industry j. Where c is not used as an intermediate input but is purchased by all final users, and where GDP of each state constitutes a 15th industry. The distribution

$$\text{Where} \quad A_{i,j} = \sum_{i=1}^{14} \sum_{c=1}^{14} (Tabl_{i,c} * Tab2_{c,j})$$

is the percentage of industry i's output purchased by industry j.

When j is GDP, $A_{i,j}$ is the amount of industry i's output that is sold as final goods.

Now let:

$GDP_{j,s}$ is the percentage of industry j's gross domestic product located in state s. Where industry j is final use expenditures, the cell value represents that state's share of total sales.

Then:

$$\textbf{Sales}_{i,s} = \sum_{j=1}^{14} (A_{i,j} * GDP_{j,s})$$

Where $\textbf{Sales}_{i,s}$ is the share of industry i's output sold in each state s.

Thus, $\textbf{Sales}_{i,s}$ is used as a proxy for the sales-by-destination factor in the three-factor formula.

Sources

Corporate Profits by Industry (2001-2008). *Available at* http://www.bea.gov/national/nipaweb/Table View.asp?SelectedTable=232&ViewSeries=NO&Java =no&Request3Place=N&3Place=N&FromView=YES &Freq=Year&FirstYear=2001&LastYear=2007&3Pla ce=N&Update=Update&JavaBox=no

Payroll (2001-2008).

Available at http://www.bea.gov/regional/spi/def ault.cfm?selTable=SA07N&selSeries=NAICS.

Input-Output Tables (2001-2007). *Available at* http://www.bea.gov/industry/iotables/table_list.cfm? anon=98817.

Gross Domestic Product by Industry (2001-2008). *Available at* http://www.bea.gov/regional/index.htm #gsp.   ✩