POLITICAL ECONOMY RESEARCH INSTITUTE

PERI

University of Massachusetts Amherst

Declining Corporate Income Taxes in the 1990s: A State-by-State Analysis of Effective Tax Rates

Elissa Braunstein

2004

UMASS

WORKING PAPER SERIES

Number 91

Declining Corporate Income Taxes in the 1990s:
A State-by-State Analysis of Effective Tax Rates

Elissa Braunstein
Assistant Research Professor
Political Economy Research Institute
University of Massachusetts Amherst
Gordon Hall, 418 N. Pleasant St.
Amherst, MA 01002
413/577-3147
braunstein@peri.umass.edu

July 29, 2004

Summary

Between 1995 and 2000, inflation-adjusted federal corporate income taxes grew

an average of 2.0 percent a year; the annual average for state and local corporate tax

revenue actually declined by 0.12 percent during the same period. A number of state-

level studies have documented this decline by showing that corporations are paying a

declining share of state taxes. But such results are inconclusive because they do not

control for changes in corporate profitability. In this paper we use data from the

National Income and Product Accounts to create a time series of corporate profits by

state, enabling us to investigate corporate income taxes while controlling for corporate

profits. Our findings are striking: out of the 42 states studied, 41 show a statistically

significant decline in their effective corporate income tax rates between 1991 and 2001.

The average decline for all states is 4.6 percent per year, which means that effective

corporate income tax rates fell by a little over one-third over the decade of the 1990s and

into 2001. After accounting for the impact of the growth in income of S corporations, this means that states lost about $11 billion on corporate income tax revenue in fiscal 2002 due to the decline in effective corporate income tax rates.

Declining Corporate Income Taxes in the 1990s:
A State-by-State Analysis of Effective Tax Rates

The decline in corporate income taxes at both the federal and state levels has been widely documented by government agencies, academic researchers and the press. In a recent report published by the General Accounting Office using data from the Internal Revenue Service, it was found that between 1996 and 2000, 61 percent of U.S.-controlled and 71 percent of foreign-controlled corporations reported no tax liabilities (GAO 2004). Among those corporations that did pay taxes, an estimated 94 percent of U.S.-controlled and 89 percent of foreign-controlled corporations paid less than five percent of their income in taxes in 2000 (Ibid.)[1] These findings are not a reflection of low corporate profitability. Corporate income grew at an annual average of 3.9 percent during this period; gross domestic product by 4.6 percent (both in inflation-adjusted terms).[2]

While these overall trends are troubling, there is strong evidence that conditions at the state level are especially severe. Between 1995 and 2000, inflation-adjusted federal corporate income taxes grew an average of 2.0 percent a year; the annual average for state and local corporate tax revenue actually declined by 0.12 percent during the same period.[3] Work done at the Congressional Research Service has documented that much

---

[1] The federal corporate income tax rate is 35 percent.

[2] See appendix for details on data and methodology. Note that corporate income includes: corporate profits before taxes with the inventory valuation adjustment and capital consumption allowance, net corporate interest, and business transfer payments. GDP is based on GDP by industry.

[3] Data are from the National Income and Product Accounts. These differences between federal and state revenues also speak to one explanation of the decline in corporate income tax revenue – the increasing

of the overall decline in the average effective corporate tax rate (federal and state and local combined) in the latter half of the 1990s is due to declines in state and local tax corporate tax revenue (Maguire 2000).[4] These results are compelling, but they only address the aggregate picture.

A number of state-level studies have documented the declining share of corporate income taxes in state tax revenue, but such results are inconclusive because they do not control for changes in corporate profitability. Declining shares of corporate income taxes may be explained by declining profits; they are not necessarily a result of tax cuts or tax avoidance. But it is difficult to control for changes in state-level corporate profits because there is no standardized source of data on corporate profits by state. This is partly because of the complexity of the typical corporation's inter-state and –national activities. In this brief we use data from the National Income and Product Accounts to make such estimates, creating a time series of corporate income by state that enables us to investigate corporate income taxes while controlling for corporate profits.[5]

We do this by presenting state-by-state estimates of changes in effective corporate income tax rates (ECITR) over the course of the 1990s and into 2001,

---

number of Subchapter S corporations, whose profits are passed through to their owners and taxed as personal income. Since these passthroughs are happening at both the state and federal levels, the large decline in state and local corporate income tax revenue, as compared to federal revenue, indicates that S corporations are not the main culprit in state declines.

[4] This research showed that the annual average corporate tax rate for the 1980s, about 28 percent, is only slightly higher than the annual average of the 1990s, 27 percent. But in the last half of the 1990s, this average is a full percentage point lower than in the first half because of declines in state and local effective rates (which declined form 5.5 percent in 1990 to 3.8 percent in 1998) (Maguire 2000).

[5] A similar methodology was employed to estimate capital income by state in a recent study by the firm Ernst & Young (Cline, Fox, Neubig and Phillips 2004).

beginning with a brief review of the aggregate numbers. ECITRs express state corporate income tax revenue as a proportion of corporate income. They are a measure of taxation that, when considered over time, capture broad changes in the structure of taxation, such as changes in the statutory tax rate, the effectiveness of the state's tax collection efforts, or the ability of corporations to avoid paying taxes. All of these factors will change the amount of tax revenue that the state collects, and thus alter the effective tax rate. Taken together, they largely reflect the public policy environment.[6]

The state-level results confirm the aggregate findings that state governments are facing severe declines in the yield of the corporate income tax, though there is some variability from state to state. Out of the 42 states with corporate income taxes we evaluated, 41 show a statistically significant decline in their effective corporate income tax rates between 1991 and 2001. The average decline for all states is 4.6 percent per year, which means that effective corporate income tax rates fell by a little over one-third during the decade of the 1990s and into 2001.[7]

States in Aggregate

Figure 1 graphs the course of the effective corporate income tax rate for the U.S. states in aggregate between 1977 and 2001. The gray vertical bars indicate periods of recession, and have been added in to illustrate the cyclical variability of the ECITR.

---

[6] Economic growth may also impact effective tax rates, as discussed later on in the brief. Thus, not all changes in the ECITR are directly attributable to public policy. To address this issue, the summary statistics we use control for cyclical effects in one of two ways: (1) by comparing two points in time that reflect similar stages in the business cycle; and (2) by using regression analysis to estimate a time trend from one business cycle to the next.

[7] The average decline is actually a continuously compounded rate (see appendix for details).

That is, the effective corporate income tax rate tends to fall and rise *before* and *after* recessions respectively, declining well before recessions begin, and taking longer to recover after recessions end. The 1990s look a bit different than the 1980s, though, in that the corporate tax rates peaked very early in the cycle (1994), beginning a decline that lasted through the entire boom period of the late 1990s.

This pattern illustrates another important element to Figure 1 in addition to the cyclical variability: a clear downward trend in the effective corporate tax rate. The solid line labeled "trendline" tracks this decline. It illustrates the average annual compounded rate of change over the entire period, which equals –2.3 percent (see methodology appendix for details; for ease of exposition, we will refer to the compounded rate simply as an annual average rate). In other words, the ECITR for the U.S. states as a whole declined at an annual average rate of –2.3 percent between 1977 and 2001. Comparing the two endpoints of this trendline, the ECITR declined a total of 41.2 percent (from 3.4 percent to 2.0 percent) between 1977 and 2001. If the 1977 trendline rate, 3.4 percent, had prevailed in 2001, states would have collected another $23.3 billion in corporate income taxes.[8] According to data on corporate net income from the Internal Revenue Service, up to $5 billion of that amount is potentially attributable to the growth in income of S corporations, whose profits are passed through to their owners and taxed as personal income. After taking out this amount, states would still be left with another $18.3 billion in additional revenue. This is a

---

[8] This amount is figured by comparing the two endpoints of the trendline. If we used the actual amount of state corporate income taxes collected in 2001, the difference is similar: $18.9 billion.

significant amount; it would have covered nearly half of the $37 billion in budget

shortfalls states faced in fiscal 2002 (NCSL 2002).

Figure 1
Effective corporate income tax rates (ECITR),
U.S. State government totals
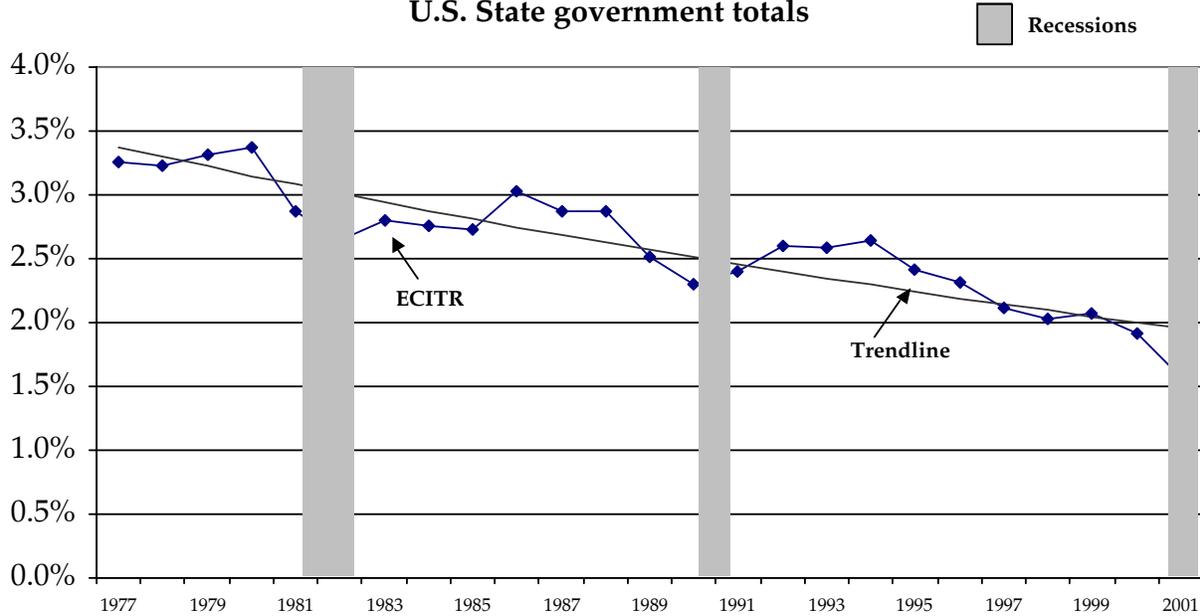
Source and notes. Author's calculations (see methodology appendix for details). Effective corporate income tax rates (ECITR) equal state government corporate income tax collections as a percent of state corporate income. Recession dates and duration are drawn from NBER business cycle data; they represent peak to trough. The trendline is based on the formula for continous compounding (see appendix for details), and is statistically significant at the 99 percent level.

Turning to differences between the time periods depicted in Figure 1, the

rate of change has increased in the most recent business cycle. Measuring trough to

trough, the more recent period (1991-2001) gives an annual average compounded rate of

change of –4.4 percent; the prior period (1982-1991) gives a annual rate of –1.6 percent.

These results indicate that the decline in corporate tax rates sped up significantly in the

1990s, despite the fact that average annual economic growth of gross state product in

the two periods was about equal (3.4 percent). Summing the annual decline over the

entire period, the ECITR declined a total of –35.4 percent (this compares with a decline

of only –13.3 percent in the 1982-1991 period).[9] Once again, thinking in terms of the

revenue impact of this decline, if 1991 rates had prevailed in 2001, states would have

collected another $14.5 billion in tax revenue in fiscal 2002. Correcting for the growth in

income of S corporations during this period, the decline is $11 billion.[10] This is

equivalent to 30 percent of the states' total budget gaps in fiscal 2002 ($37 billion).

Now we turn to a state-by-state analysis, focusing on the period of more

precipitous declines in the 1990s to investigate how these patterns have been distributed

among the states.

State-by State Analysis

Table 1 presents two measures of the change in the effective corporate income

tax rate by state. The first measure, entitled "period change," figures the percent

change in the tax rate from period A to period B. Because corporate income taxes at the

state level are highly variable in any one year, the tax rate in each period is an average

over three years.[11,12] Each period ends in a business cycle trough (1991 and 2001), and

---

[9] Note that summing over the period is based on the formula for continuous compounding; see appendix for details.

[10] The figure used here for the impact of S corporations on state corporate tax revenue, $3.5 billion, is virtually the same as that figured in a report y the Multistate Tax Commission, $3.4 billion, which looked at a similar span of time (Multistate Tax Commission 2003).

[11] To further control for variability, each year's ECITR is actually a three-year moving average. The sum of corporate income tax revenues for the preceding, current and consequent years is divided by total corporate income for the same span to arrive at the current year's ECITR. See the appendix for details.

[12] Caution should be exercised in making inter-state comparisons of effective tax rate levels. This is because some of the data we use on capital charges is national data, and there are potentially large differences between states in this data that make inter-state comparisons potentially problematic. There is less likely to be variation within states over time, hence making inter-state comparisons of changes in effective tax rates is a reasonably reliable use of the national data.

includes the two years preceding that trough.[13] The percent change between periods A

and B shows the total amount, in percentages, that the ECITR has changed from the

beginning to the end of the 1990s. All 42 of the states evaluated experienced declines in

the ECITR based on this measure. Some of the declines are very significant:

Connecticut experienced a 72 percent decline in its ECITR; Hawaii, Iowa and Rhode

Island, more than –50 percent; Kansas, Kentucky, Louisiana and Ohio, over –40 percent.

The average decline for all 42 states was –29 percent.

Table 1
State Changes in the Effective Corporate Income Tax Rate

	Period change			Annual compounded rate of change	
	A avg ECITR, 1989-1991	**B** avg ECITR, 1999-2001	**Percent change between A and B**	**Average annual rate 1991-2001**	**Total for the period, 1991-2001**
Alabama	1.5%	1.1%	-28.7%	-3.9%*	-32.0%
Alaska[a]					
Arizona	1.9%	1.7%	-11.5%	-2.6%**	-22.9%
Arkansas	1.9%	1.6%	-13.7%	-2.5%*	-21.8%
California	3.5%	2.6%	-26.6%	-3.9%*	-32.0%
Colorado	1.2%	1.1%	-4.3%	0.1%	1.3%
Connecticut	4.2%	1.2%	-72.2%	-16.1%*	-79.9%
Delaware	2.9%	2.1%	-29.2%	-3.1%*	-26.4%
Florida	1.7%	1.4%	-17.1%	-2.6%**	-22.5%
Georgia	1.9%	1.2%	-37.3%	-5.0%*	-39.3%
Hawaii	1.7%	0.7%	-56.4%	-5.4%*	-41.6%
Idaho	2.5%	1.7%	-33.7%	-5.7%*	-43.4%

---

[13] The analysis was also conducted using dates for state business cycles, which can be quite different from national business cycles. See the appendix for further discussion of these state business cycle results.

	Period change			Annual compounded rate of change	
	A avg ECITR, 1989-1991	B avg ECITR, 1999-2001	Percent change between A and B	Average annual rate 1991-2001	Total for the period, 1991-2001
Illinois	1.8%	1.6%	-11.1%	-1.8%**	-16.1%
Indiana	2.4%	2.3%	-2.8%	-4.3%*	-35.1%
Iowa	1.9%	0.9%	-51.1%	-7.4%*	-52.0%
Kansas	2.4%	1.4%	-40.8%	-6.9%*	-49.7%
Kentucky	2.5%	1.4%	-44.4%	-5.2%*	-40.4%
Louisiana	1.5%	0.8%	-48.6%	-6.1%*	-45.8%
Maine	2.2%	1.8%	-21.1%	-2.7%***	-23.4%
Maryland	1.4%	1.3%	-8.8%	-0.9%***	-9.0%
Massachusetts	3.5%	2.4%	-30.4%	-5.1%*	-40.0%
Michigan[a]					
Minnesota	3.1%	2.2%	-28.4%	-4.4%*	-35.8%
Mississippi	1.9%	1.7%	-10.8%	-1.8%*	-16.6%
Missouri	1.3%	0.8%	-36.2%	-5.5%*	-42.5%
Montana	3.1%	2.5%	-20.8%	-2.7%*	-23.4%
Nebraska	1.6%	1.3%	-21.7%	-3.5%*	-29.5%
Nevada	NA	NA	NA	NA	NA
New Hampshire[a]					
New Jersey	3.0%	2.0%	-32.6%	-3.3%*	-27.8%
New Mexico	1.3%	1.3%	-3.1%	-1.1%***	-10.5%
New York	2.9%	2.0%	-30.7%	-6.1%*	-45.6%
North Carolina	2.5%	1.5%	-40.8%	-6.9%*	-49.6%
North Dakota	2.5%	2.1%	-14.8%	-3.9%**	-32.0%
Ohio	1.8%	1.0%	-43.9%	-6.3%*	-46.7%
Oklahoma	1.4%	1.1%	-16.4%	-3.4%*	-28.8%
Oregon	1.7%	1.1%	-34.5%	-7.6%*	-53.1%
Pennsylvania	3.3%	2.0%	-38.4%	-7.0%*	-50.4%
Rhode Island	1.7%	0.8%	-52.2%	-10.3%*	-64.1%
South Carolina	1.5%	0.9%	-36.7%	-6.2%*	-45.9%
South Dakota[a]					
Tennessee	2.3%	1.9%	-16.0%	-1.6%*	-14.6%

	Period change			Annual compounded rate of change	
	A avg ECITR, 1989-1991	B avg ECITR, 1999-2001	Percent change between A and B	Average annual rate 1991-2001	Total for the period, 1991-2001
Texas	NA	NA	NA	NA	NA
Utah	1.7%	1.2%	-31.3%	-5.1%**	-39.8%
Vermont	1.6%	1.5%	-10.2%	-2.1%**	-19.3%
Virginia	1.3%	0.9%	-33.3%	-4.3%*	-35.2%
Washington	NA	NA	NA	NA	0.0%
West Virginia	4.0%	2.9%	-27.2%	-2.4%*	-21.7%
Wisconsin	2.8%	1.7%	-38.9%	-6.3%*	-46.8%
Wyoming	NA	NA	NA	NA	NA

Source and notes: Author's calculations based on data and methodology described in the appendix. ECITR is the effective corporate income tax rate, figured as state corporate tax revenue as a percent of state corporate income; "NA" indicates not applicable because the state lacks a corporate income tax. Asterisks indicate level of statistical significance: * is significant at the 99 percent level, ** at the 95 percent level, and *** at the 90 percent level.
[a] Alaska, Michigan, New Hampshire and South Dakota were excluded due to the incompatibility of their corporate income tax systems with the corporate income base used in the analysis.

The second measure, the annual compounded rate of change, is another way of looking at the same data, but it does not always indicate the same result because this method uses regression analysis to account for the years in between the two periods. Here there are two measures: the average annual rate shows how much the ECITR changed on an annual basis between 1991 and 2001 (measuring from business cycle trough to trough). The total for the period sums up the annual changes. It is this total that is directly comparable to the period change between A and B discussed above. For all states that show a statistically significant rate of change (as indicated by an asterisk), the two measures are consistent with one another.

Summarizing the results of average annual changes, of the 42 states evaluated, 41 show statistically significant declines in the ECITR, with the 42nd state, Colorado, showing a small (0.1% per year), but statistically insignificant, positive change. The annual declines range between –16.1 percent (for Connecticut) and –0.9% percent (for Maryland). The average annual change for all states is –4.6 percent, compared to 4.4% for the U.S. states as a whole reported in the previous section. This average annual change amounts to an average total change of –36.7 percent for the entire period.

Looking at the two measures together, it is clear that the vast majority of states have experienced a deterioration in their capacities to collect corporate income taxes. Some of this decline is due to changes in the federal tax base, as most states use federal taxable income as the starting point for determining state taxable income. Fox and Luna (2002) figure that the federal corporate income tax base declined by about 10 percent over the course of the 1990s. Dividing that by the effective corporate income tax rate decline for the U.S. states as a whole during this period, 35 percent, gives a rough estimate that declines in the federal tax base were responsible for about 29 percent of the decline in state tax rates.

In addition to federal tax policy, changes in state tax policy will affect corporate income tax revenue. Peter Fisher, in a simulation of corporate taxation in 20 manufacturing-intensive states between 1990 and 1998, estimates that state policies lowered effective corporate tax rates by about 30% (Fisher 2002). The form of these policy effects cover a wide range. Some states, such as Connecticut (which lowered corporate income tax rates from 11.5 percent in 1990 to 7.5 percent by 2001) and Arizona

(which lowered corporate income tax rates from 9.3 percent to 6.968 percent over the same period), have changed statutory rates on corporate income in ways that are reflected in effective corporate tax rates. But the impact of policy shifts in most states is not as straightforward. For example, because corporate profits come from doing business across many states and countries, states use "apportionment" formulas to figure out what proportion of profits is subject to taxation. Historically, the most common apportionment formula has equally weighted sales, payroll, and property, and the proportion of profits taxed has been based on the share of a corporation's sales (one-third weight), payroll (one-third weight) or property (one-third weight) located in that state. This equal-weighted apportionment formula is now more the exception than the rule, with most states now at least double-weighting the sales factor (Fox and Luna 2002). This is partly the result of inter-state tax competition, as double-weighting the sales factor gives tax advantages to firms with a high proportion of out-of-state sales. And when a state adopts such policies, it is difficult for neighboring states to resist matching these tax advantages for potentially footloose firms. Indeed, the problem of economic competition between the states, and their costs to state governments and citizens, has been a continuing area of concern among state policymakers.[14] Combined with the increasing international mobility of firms, states are facing increasing pressures to produce more "business-friendly" tax environments.

---

[14] For a good review of these issues, see the collection of papers written for the conference "Reigning in the Competition for Capital," Humphrey Institute of Public Affairs, University of Minnesota, February 27-28, 2004. http://www.hhh.umn.edu/projects/prie/c4c_papers.htm

A third factor driving down corporate tax revenue is the increasing incidence of tax avoidance. Corporations are using ever more complex strategies to shelter their profits from taxation (Department of the Treasury 1999). Globalization has probably contributed to this problem, as multinational firms can engage in transfer pricing which inflates costs in high tax jurisdictions, and/or transfers profits to low tax jurisdictions (LMSB 2003). A study by the Multistate Tax Commission on international and domestic tax sheltering activity by corporations estimated that compared to the 1980-89 period, state governments lost about $12.8 billion in corporate tax revenues in 2001 alone due to tax sheltering (Multistate Tax Commission 2003). The issue of tax avoidance overlaps with that of state tax policy, as sometimes states tacitly collude in this tax avoidance as they jockey for a competitive edge against other states in attracting business (Burstein and Rolnick 1994).

As the yield of state corporate income taxes continues to decline, states increasingly face ongoing structural budget deficits that do not turn around when recessions recede. That some states experienced less decline than others suggests that tax policies matter, and that there are alternatives to what appears to be a nearly universal trend. In an increasingly integrated world, with a growing sense of competition for new business investment and expanded opportunities for corporate tax avoidance, incorporating the fact that there are alternatives should be a central aspect of policymaking.[15]

---

[15] See Mazerov (2003) for a discussion of some of these alternatives, and Avi-Yonah (2004) for an overall defense of corporate taxation.

References

Avi-Yonah, Rueven S. 2004. "Corporations, Society and the State: A Defense of the Corporate Tax." University of Michigan Public Law and Legal Theory Research Paper No. 40.

Bureau of Economic Analysis (BEA). 2001. "A Guide to the NIPA's." www.bea.gov/an/nipaguide.htm.

Burstein, Melvin L. and Arthur J. Rolnick. 1994. "Congress Should End the Economic War Among the States." 1994 Annual Report Essay, Federal Reserve Bank of Minneapolis.

Cline, Robert, William Fox, Tom Neubig and Andrew Phillips. 2004. "Total State and Local Business Taxes. A 50-State Study of the Taxes Paid by Business in FY2003." Report Prepared for The Council on State Taxation by Ernst & Young, LLP.

Department of the Treasury (U.S.). 1999. "The Problem of Corporate Tax Shelters, Discussion, Analysis and Legislative Proposals." Washington, D.C.: Department of the Treasury.

Fisher, Peter. 2002. "Tax Incentives and the Disappearing State Corporate Income Tax." *State Tax Notes* 23(9): 767-775.

Fox, William F. and LeAnn Luna. 2002. "State Corporate Tax Revenue Trends: Causes and Possible Solutions." *National Tax Journal* LV(3): 491-508.

General Accounting Office (GAO). 2004. "Comparison of the Reported Tax Liabilities of Foreign- and U.S.-Controlled Corporations, 1996-2000." Washington, D.C., February.

Large and Midsize Business Division (LMSB). 2003. "LMSB Compliance Priorities." Internal Revenue Service, December.

Maguire, Steve. 2000. "Average Effective Corporate Tax Rates." Washington, D.C.: Congressional Research Service.

Mazerov, Michael. 2003. "Closing Three Common Corporate Income Tax Loopholes Could Raise Additional Revenue for Many States." Washington, D.C.: Center on Budget and Policy Priorities.

Multistate Tax Commission. 2003. "Corporate Tax Sheltering and the Impact on state Corporate Income Tax Revenue Collections." Washington, D.C.: Multistate Tax Commission, July 15.

National Conference of State Legislatures (NCSL). *State Budget Update: November 2002*. Washington, D.C.: NCSL.

Methodology and Data Appendix

Corporate income

        Corporate income by state is based on data from the National Income and Product Accounts on gross state product (GSP) and personal income by state.[16] Gross state product is separated into the following three categories: compensation of employees, indirect business taxes and nontax liabilities, and property-type income. Property-type income includes proprietors' income and capital charges, which is further subdivided into the following categories (in principle, there is nothing less aggregated than the three categories of GSP mentioned above).

Proprietors' income

        income of unincorporated establishments[17] with the inventory valuation
            adjustment (IVA)[18] and the capital consumption allowance (CCA)[19]
        rental income of persons[20]

Capital charges

        corporate profits before taxes with IVA and CCA
        net interest
        business transfer payments[21]
        subsidies less current surplus of government enterprises[22]
        government consumption of fixed capital

        From property-type income in GSP, we subtract "proprietors' income with IVA and CCA" and the "rental income of persons," both from the state's personal income

---

[16] It is important to note that GSP estimates are establishment-based, not company-based. That is, production is measured in the states where the product is produced, not where it is reported by multi-establishment companies for tax purposes. The implication here is that profits shifted to other states for tax purposes are not reflected in state GSP, and hence the results will capture the tax effects of such sheltering.

[17] Current production income of sole proprietorships and partnerships and of tax exempt cooperatives. Also includes net rental income of owner-occupants of farm dwellings (BEA 2001).

[18] The inventory valuation adjustment is the difference between the cost of inventories withdrawals valued at acquisition cost, and the cost of inventory withdrawals valued at replacement cost (BEA 2001).

[19] The capital consumption allowance is the charge for the using up of fixed capital (BEA 2001).

[20] This includes the imputed net rental income of owner-occupants of nonfarm dwellings; the net current production income of persons from the rental of real property (except those primarily engaged in the real estate business); and royalties received by persons from patents, copyrights, and rights to natural resources (BEA 2001).

[21] Business transfer payments are payments made by businesses for which no current services are performed, and exist primarily of personal injury claims, corporate gifts to nonprofits, and taxes paid by domestic corporations to foreign governments (BEA 2001).

[22] Subsidies are grants paid by government agencies to private business and other government enterprises (BEA 2001).

account. The result is an estimate of capital charges. Capital charges are an overstatement of corporate profits because they include the following categories which should not be categorized as corporate income: noncorporate net interest; subsidies less current surplus of government enterprises, and government consumption of fixed capital.

Table A-1 shows the relative distribution of actual corporate income and these noncorporate income categories within capital charges, based on national data of GDP by industry, which records disaggregated data.[23] There is a small but significant variability of actual corporate income relative to capital charges. Moreover, actual corporate income is only about 70 percent of capital charges, which means estimates based on capital charges will be overstated. To account for these differences, we take the percentage of capital charges represented by actual corporate income as indicated in Table A-1, and use that to figure the state-by-state estimates. We will refer to the resulting estimate as corporate income, and it is the estimate of corporate profits used in the paper.

Table A-1
Proportion of Capital Charges (percent)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Noncorporate net interest	26.0	25.0	23.3	21.7	21.1	20.1	19.3	20.4	20.4	21.0	22.7
Subsidies less current surplus of government enterprises	-1.5	-1.6	-2.0	-1.6	-1.3	-1.2	-0.9	-1.1	-1.5	-1.5	-2.0
Government consumption of fixed capital	10.1	10.3	10.5	10.1	9.7	9.4	8.9	8.9	9.1	9.1	9.4
Corporate income	65.4	66.2	68.3	69.7	70.4	71.7	72.7	71.8	72.0	71.3	69.9

Source and Notes: Author's calculations based on BEA data on GDP by industry. Corporate income includes: before-tax corporate profits with IVA; net corporate interest; business transfer payments; and corporate capital consumption allowances.

---

[23] GDP by industry is the national counterpart to GSP, though GSP does not include charges associated with Federal operations overseas.

Corporate profits at the national level were figured by adding corporate profits with IVA and CCA, net corporate interest, and business transfer payments from GDP by industry in the NIPA tables.

Effective corporate income tax rates (ECITR)

Effective corporate income tax rates are state corporate income tax revenue as a percent of corporate income for that state. Note that tax revenues are in fiscal years and corporate income in calendar years. This is due to data limitations, as GSP is not published on a quarterly basis, and detailed quarterly data on state tax revenue only goes back to 1993. Since taxes come due after the calendar year has ended, the ECITR uses tax revenue from the fiscal year that equals the calendar year used for corporate income plus one.[24]

To control for variability, each year's effective corporate income tax rate is a 3-year moving average of the revenues and income in the years prior, current, and after the stated year. That is, for year n, the ECITR is equal to:
$(TR_n + TR_{n+1} + TR_{n+2})/(CI_{n-1} + CI_n + CI_{n+1})$, where *TR* equals state corporate tax revenue and is in fiscal years, and *CI* equals corporate income and is in calendar years. These figures were rendered in real dollars. Because the U.S. state total has less variability, we do not use moving averages for these figures.

Price deflators

For state tax revenue, we used the consumer price index-urban published by the Bureau of Labor Statistics. For corporate income, we used the national GDP deflator published by the U.S. Bureau of Economic Analysis. Deflators derived from state-specific data on GSP did not yield significantly different results.

State tax revenue data

All tax revenue data are from the U.S. Census Bureau, with the exception of Florida and Illinois. For Florida, because of large differences between Census and state data, figures on corporate income tax revenue were taken directly from *March 2004 Revenue Estimating Conference Comparison Report*, Office of Economic and Demographic Research, The Florida Legislature. Illinois data are from the Illinois Department of Revenue's *Annual Report*, and include only corporate income taxes collected on behalf of the state. Illinois also has a personal property replacement tax (PPRT), a tax collected for local governments. Although the PPRT is a tax on corporate income, we did not account for it in our figures because it is also levied on partnerships and other forms of non-corporate businesses, whose income is not included in the base; and it is distributed to local governments, so it is not comparable to the state tax revenue figures reported for other states. We did, however, use only Census data for the figures on U.S. totals. The latter does not include Washington, D.C.

---

[24] Using the same fiscal and calendar year was also tried; the core results are the same.

Tax revenue data refer to state fiscal years that end on June 30 in all but four states: New York, which ends on March 31; Texas, on August 31; and Alabama and Michigan, on September 30.

State versus National Business Cycles

The analysis in the paper uses data on the national business cycle in order to compare economically similar points in time. However, state business cycles can differ significantly from the national business cycles. Using data on state GSP growth, we also ran the figures using state business cycles. Twenty of the 42 states had business cycle beginning or end dates that differed from the national cycle. For the most part, there were no significant differences in the results: the state business cycle-based period change average was 27.9%, compared to the national business cycle-based average of 28.8% reported in the paper. The states for which there were significant differences are reported in the **table A-2.** A good part of these differences has to do with the different number of years in the state versus national business cycles. The longer the time period, the more of a decline one is going to capture, since ECITRs are clearly undergoing a secular decline. For overall consistency, we decided it best to use national business cycle data.

Table A-2
Comparing State and National Business Cycle Data

	Using state business cycle data		Using national business cycle data	
	Period change	Sum of annual average	Period change	Sum of annual average
Colorado	-19.1%	-3.5%	-4.3%	1.3%
Delaware	-8.5%	-7.4%	-29.2%	-26.4%
Hawaii	-21.9%	24.9%	-56.4%	-41.6%
Oklahoma	-4.3%	-18.6%	-16.4%	-28.8%

Source and notes: Author's calculations based on data described in this appendix. The national business cycle is 1991-2001. The state business cycles used were the following: Colorado, 1989-2001; Delaware, 1992-1998; Hawaii, 1996-2001; and Oklahoma, 1989-2001.

Annual average compounded rate of change

In order to calculate the average annual compounded rate of change, we used the following standard formula for continuous compounding: $y = Ae^{rt}$. Then, taking natural logs, we get: $\ln y = \ln A + rt$. We then used regression analysis to figure r, the average annual compounded rate of change, where y equals the effective corporate income tax rate, and t equals time. To calculate the total decline over the entire period, we used the following formula: $\int y_t dt = \int Ae^{rt} dt = e^{rt} \Big|_{t_0}^{t_{end}} = e^{rt} - 1$.