Massachusetts' Tax Competitiveness

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Is Massachusetts' tax system discouraging businesses from locating and expanding within its territory? While this issue is as old as Massachusetts itself, it is one of the most important facing the Commonwealth today. As employers have become increasingly footloose, the importance of maintaining a hospitable business climate has grown. If Massachusetts' taxes are deterring firms from locating and expanding within its territory, then the Commonwealth should consider ways of making its tax system less repellent. On the other hand, if its tax system is not such a deterrent, the Commonwealth should devote more attention to issues of greater concern to its employers, such as high unemployment insurance taxes, workers' compensation premiums, health care cost, and energy prices.[1]

In 1993, Massachusetts, concluding that its business tax climate needed improvement, increased its investment tax credit from 1 percent to 3 percent. Most of the Commonwealth's principal economic competitors[2] also granted their businesses significant tax relief last year, much of it in the form of new tax credits for investment and research and development (Table 1). In New England, businesses enjoyed a tax cut in every state except Maine.[3]

During the last few years, many states, including Connecticut, Massachusetts, and Rhode Island, have conducted in-depth evaluations of their business tax climate.[4] This article is based on the most recent study of Massachusetts' tax competitiveness, conducted by the Massachusetts Special Commission on Business Tax Policy (Commonwealth of Massachusetts 1993). The Commission, chaired by Richard Syron, President of the Federal Reserve Bank of Boston, was created to conduct a broad evaluation of the Commonwealth's business tax policy according to the normative criteria of fairness, neutrality, simplicity, and competitiveness.[5]

The article presents guidelines and analytical tools that policymakers will find useful in evaluating their state's business tax climate.

Section I identifies state and local tax characteristics that, according to both economic theory and anecdotal evidence, exert the most influence on firms' locational choices. Section II shows how many widely cited indicators of tax competitiveness fail to capture these characteristics. Section III presents two indicators that do and uses them to evaluate Massachusetts' tax competitiveness. Section IV summarizes the article and draws policy conclusions.

Relative to its principal economic competitors, Massachusetts compares favorably according to the tax burden that should concern profit-maximizing businesses the most: the extent to which taxes depress the long-run rate of return on business investment. Given this finding, as well as widespread evidence that factors other than taxes are more important determinants of business location, the article concludes that, on the whole, the Commonwealth's tax structure is neither an asset nor a liability in interstate economic competition.[6]

An exception to this general assessment is the modest competitive handicap created by the Commonwealth's relatively high tax burden on upper-income households. Highly skilled, well-informed workers, including business executives who decide where firms locate and expand, generally fall into the high-income category. These workers can raise the cost of doing business at a site by demanding increased compensation to offset high personal taxes. The Commonwealth's tax burden on these households, although average relative to those imposed by its competitors as a group, is well above the national median and significantly higher than those imposed by such economic competitors as Arizona, Illinois, New Hampshire, Texas, and Washington. Lowering taxes on the well-to-do, however, would cost the Commonwealth needed revenue and raise concerns about the fairness of its tax structure.

Massachusetts compares favorably to its economic competitors on the tax burden that should concern profit-maximizing businesses the most: the extent to which taxes depress the long-run rate of return on business investment.

I. State and Local Tax Characteristics That Most Influence Businesses' Choice of Where to Locate and to Expand

Hundreds of empirical studies have addressed this issue. The evidence produced has been conflicting and inconclusive.[7] While some studies have identified tax characteristics that deter firms from locating within a state, other studies have found that these

[1] In a recently released study, the Massachusetts Taxpayers Foundation (1993) noted that the Commonwealth ranks high compared to other states according to these costs of doing business, as well as in wages.

[2] Although Massachusetts' economic competitors vary by industry, the Massachusetts High Technology Council, an interest group representing many of the Commonwealth's major high tech companies, has identified 17 states as the Commonwealth's principal economic competitors. The Council has divided them into three groups: 1) other New England states (Connecticut, Maine, New Hampshire, Rhode Island, and Vermont); 2) other high technology states (Arizona, California, Maryland, North Carolina, Texas, and Washington); and 3) other industrial states (Illinois, Michigan, New Jersey, New York, Ohio, and Pennsylvania).

[3] Whether New Hampshire's businesses as a whole actually received a tax reduction is a matter of some dispute. The state reduced its tax rate on business profits from 8 percent to 7.5 percent in FY94, and from 7.5 percent to 7 percent starting in FY95. Some small and mid-sized businesses, however, were subject to a new tax, in lieu of the business profits tax, called the business enterprise tax. See *Fiscal Facts* (1993). Although the total package of business tax reforms is supposed to be neutral, revenues from the business enterprise tax during the first four months of FY94 have fallen far short of expectations. See *Fiscal Facts* (1994).

[4] For example, see Connecticut Task Force on Revenue (1991), KPMG Peat Marwick (1993), and Commonwealth of Massachusetts (1993).

[5] One of the Commission's most important tasks was to evaluate the desirability of mandatory tax reporting, or "tax disclosure"—requiring businesses to disclose to the public items from their state income tax returns. The Commission produced five working papers, a majority report, and a minority report, all of which are available from the author on request.

[6] Massachusetts' tax system may be a competitive liability in certain industries. For example, Fox (1993) argues that Massachusetts' bank tax creates powerful incentives for banks providing services to customers within the Commonwealth to locate their facilities in other states.

[7] See Tannenwald (1993), Kenyon (1991), Bartik (1991), and Wasylenko (1991) for surveys of those studies conducted since 1980. Literature surveys that include pre-1980 surveys include Due (1961), New York State Legislative Commission on the Modernization and Simplification of Tax Administration and the Tax Law (1984), and Kieschnick (1981).

Table 1
Business Tax Relief Measures Enacted in 1993 by Massachusetts and Its Principal Economic Competitors[a]

State	Type of Legislation
Arizona	Environmental technology incentives created, including various tax exemptions such as a sales tax exemption for sales of paper machine clothing, and a transaction privilege tax exemption for the sale of electricity, natural gas, etc. used in the manufacturing process, and a tax credit for construction costs;
	Research and development tax credit increased.
California	Investment tax credit created;
	Sales tax exemptions for qualified businesses introduced;
	Research and development tax credit created;
	Small business capital gains exclusion from taxation introduced;
	Tax credit allowed against alternative minimum tax for businesses claiming enterprise zone and/or Los Angeles revitalization zone tax credits;
	Sales tax exemption introduced for products used as poultry litter.
Connecticut	Employee training tax credit extended and increased;
	Corporation business tax credit for research and development[b] created;
	Tax credit for the purchase of capital goods by small and medium-sized businesses introduced;
	Corporate profits tax rate reduced.
Illinois	Business tax credits for manufacturing firms created (includes youth training tax credit, dependent care tax credit, and investment tax credit).
Massachusetts	Investment tax credit increased;
	Tax credit introduced for property used exclusively in a certified project within an economic opportunity area;
	Abandoned building tax credit created.
New Hampshire	Business profits tax rate reduced;
	Threshold for exemption from filing a tax return increased;
	Business profits tax credit created for business enterprise tax paid;
	Temporary capital expenditures tax credit created;
	Research and development tax credit created;
	Investment tax credit created;
	Three-year business transition tax credit for firms that have experienced losses in the last two years created.
North Carolina	Investment tax credit created.
Ohio	Tax credit for property used in manufacturing created.
Rhode Island	Surcharge on the corporate income tax repealed;
	Investment tax credit for manufacturers increased.
Vermont	New jobs income tax credit created;
	Manufacturer's investment tax credit created;
	Net operating loss carryback permitted;
	Special tax rate introduced for fuel used in manufacturing.

[a]Massachusetts' principal economic competitors, as identified by the Massachusetts High Technology Council, include Arizona, California, Connecticut, Illinois, Maine, Maryland, Michigan, New Hampshire, New Jersey, New York, North Carolina, Ohio, Pennsylvania, Rhode Island, Texas, Vermont, and Washington

[b]The only non-incremental R&D credit in the nation.

Source: Commerce Clearing House (1993); *State Tax Notes* (various issues, December 1992 to present).

same characteristics exert no such effect.[8] Virtually all studies have found that factors other than taxes are more important determinants of where a business decides to locate and expand, including the cost of labor, the availability of labor with appropriate skills, regulatory burden, proximity to raw materials, proximity to markets, and climate. These findings have led some policy analysts to conclude that state and local policymakers worry about taxes too much.[9]

The Commonwealth should continue to be concerned about its tax competitiveness for at least two reasons, however. First, while tax characteristics may not significantly affect *interstate* locational choices, tax differences among municipalities clearly do affect site selection within a metropolitan area.[10] Parts of New Hampshire and Rhode Island lie on the fringes of the metropolitan areas of several Massachusetts cities. Large differences in state tax burdens between the Commonwealth and these neighboring states have driven both businesses and households over the border in the past.

Second, most studies have measured tax differences very broadly; few have focused on those interstate tax differences that should matter most to businesses according to economic theory. As discussed more fully below, this flaw can be attributed to the difficulty of constructing relevant measures of tax competitiveness from readily available data.

The Criteria of a Good Indicator of Tax Competitiveness

As argued elsewhere by the author (Tannenwald 1987b, 1993), business executives are primarily interested in making profits. Consequently, they are most concerned about those state and local taxes that impinge on the profitability of their firms. Examples include corporate income taxes, property taxes on industrial and commercial property, and sales taxes on business inputs.

Ideally, measures of tax competitiveness should capture the impact of state and local taxes on the long-run profitability of investment projects. When well-informed business executives weigh alternative sites for a facility, they are concerned about the tax burden that the facility will bear over its lifetime, not just during the first few years of its existence. Furthermore, they are interested in how taxes at all levels of government interact to affect their company's bottom line. For example, they should take into account the deductibility of state and local taxes from federal taxable income. A good indicator of tax competitiveness should take this feature into account, too.

Businesses are also concerned, although to a lesser extent, about the burden of state and local taxes paid mostly by individuals, as opposed to businesses, such as the personal income tax, residential property tax, and retail sales tax. Such taxes can indirectly affect a firm's bottom line by inducing workers to demand higher pre-tax rates of compensation. The extent to which employers must accede to these demands depends on the value and scarcity of workers' skills, the ease with which workers can migrate to sites with lower taxes, and the degree to which workers are aware that alternatives exist.

Workers who are well-informed and endowed with scarce, valuable skills tend to be highly compensated managers and professionals. These workers, including managers responsible for locational deci-

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[8] For example, Wasylenko and McGuire (1985) analyzed determinants of employment growth for 48 states between 1973 and 1980. They found positive, statistically significant relationships between the following tax variables and employment growth variables:

Tax Variable	*Employment Growth in:*
Changes in relative tax effort	Total employment Manufacturing Services
Effective personal income tax rate	Wholesale trade Retail trade Finance
Sales tax rate	Wholesale trade

Wasylenko and Carroll (1993) attempted to replicate Wasylenko and McGuire (1985), examining comparable data from 1981 through 1985. They found all of the above correlations to be statistically *insignificant* over the later time period, except for changes in relative tax effort and manufacturing employment. Taxes did not affect total employment growth in the updated version.

The inability of Wasylenko and Carroll to replicate Wasylenko and McGuire's results led Wasylenko and Carroll to attempt to replicate Helms's (1985) cross-section time-series study done for 1965–1979, which, according to Wasylenko, "yields the most consistent evidence to date that taxes affect economic growth" (Wasylenko 1992). Wasylenko and Carroll attempted to replicate Helms's results for 1967 through 1988. Wasylenko (1992) reported the following results of this attempt:

> We found that in most industry divisions the tax variables switched from being statistically significant in the 1960s and 1970s to being statistically insignificant in the 1980s. In particular, the significance of the tax variable coefficients for manufacturing changed to insignificant between 1983 and 1984, so that studies examining the pre-1984 period cannot be used to discuss the tax effects in the recent period (Wasylenko 1992).

[9] See, for example, Pomp (1987), McGuire (1993), and New York Legislative Commission on the Modernization and Simplification of Tax Administration and the Tax Law (1984).

[10] See Luce (1990), Summers and Luce (1987), McHone (1986), McGuire (1985), Charney (1983), Church (1981), and Wasylenko (1980). However, some studies have found that intrametropolitan tax differentials do not affect business locational decisions, for example, Bradbury, Downs, and Small (1982), and Grubb (1982).

sions, generally fall into the highest income brackets. Consequently, states concerned about their tax competitiveness should compare their average tax burden on well-to-do families with that imposed by competitor states.[11]

Finally, businesses must ultimately choose a municipality as well as a state in which to locate a facility. Businesses are therefore interested in how taxes affect their bottom line at alternative cities and towns, not alternative states. The business tax climate at alternative sites within a state can vary widely. Consequently, a good indicator of tax competitiveness should be capable of making intercity as well as interstate tax comparisons.

Why Useful Indicators of Tax Competitiveness Are Difficult to Construct

The statistics required to construct useful indicators of tax competitiveness are not readily available. Consider, for example, the data needed to assess the degree to which taxes imposed at various sites depress the long-run rate of return to investment projects, such as the construction of a new plant or office building. At a minimum, one would need information concerning the technological, financial, and geographic characteristics of a large sample of businesses and the investment projects that they typically undertake.[12] Acquisition of such information would be prohibitively costly and intrusive.

Business taxes as a percentage of business profits would serve as a crude proxy for the tax burden on business investment. However, the data needed to compute this percentage are not readily available either. State-specific (let alone city-specific) estimates of business profits are not made because a large portion of such profits are earned by multistate and multinational companies. Such companies are so thoroughly integrated that any method of dividing their profits geographically is necessarily arbitrary and imprecise.[13]

Even if profits could be divided geographically and reported jurisdiction by jurisdiction, collections of most state taxes are not reported at the municipal level. If they were, it would be difficult to distinguish state and local taxes paid by businesses from those paid by households. Many taxes, such as the property tax and general sales tax, are paid by both types of taxpayer. State and local governments generally do not publish the amount of sales tax and property tax paid by each type.[14]

If state-specific and city-specific ratios of business taxes to profits could be measured, analysts would have difficulty accounting for the "shifting" of these taxes. The burden of business taxes is ultimately borne by people. While the treasurer of a firm may write the check to the government for taxes owed, the actual burden of the taxes is borne by the business's owners (in the form of reduced after-tax profits), employees (in the form of reduced compensation), or customers (in the form of higher prices). The burden of a business tax, especially the property tax and corporate profits tax, may ultimately be spread across a broad spectrum of individuals residing in many different states (or nations) as households and businesses adjust their behavior to tax-induced changes in prices, rates of compensation, and rates of return. Who ultimately bears the burden of taxes on business property and corporate profits is one of the most contentious issues in public finance.[15] Most economists would agree, however, that the tax burden "sticks" far from where it "hits."

[11] In theory, employers could be equally or more concerned about the tax burden on workers from low- and middle-income households, since their compensation accounts for the bulk of labor costs. This would be possible even though such workers are generally easier to replace from local labor pools than high-income managers and professionals. However, based on discussions with many consultants who advise businesses on locational choices, the author believes that these choices are much more heavily influenced by the tax burden on high-income households.

[12] For example, in order to estimate how building a new factory would affect a manufacturer's federal, state, and local corporate income tax liability, one would need to know, among many other pieces of information, the mix of equipment, structures, inventories, and other assets owned by the manufacturer; the distribution of its payroll, capital stock, and sales among the states and between the United States and other countries; and the manufacturer's experience rating used in the calculation of its unemployment insurance tax liability.

[13] Despite these problems, at least two attempts have been made to estimate corporate profits on a state-by-state basis, one by the U.S. Advisory Commission on Intergovernmental Relations (1993, 1990), and one by Tannenwald (1987b). Both sets of estimates, however, are necessarily based on crude analytical techniques.

[14] One can crudely estimate the allocation of property tax revenues into their residential and nonresidential components if one has separate, state-specific or city-specific estimates of the value of residential and nonresidential property. Estimates based on such data are used in the estimation of the share of a state's taxes for which businesses are liable (see text, Section III). However, comparable state-specific estimates of the value of residential and nonresidential real property are reported only once every five years, with a two- to three-year lag, in the U.S. *Census of Governments*. Official statistics breaking down the value of each state's taxable personal property into its business and individual components are not collected at all.

[15] See McLure (1980) for an overview of views concerning the incidence of state corporate income taxes, and Aaron (1975) for a discussion of the incidence of property taxes.

Lack of available data has also hindered attempts to measure differences among states in the burden of state and local taxes on high-income households. Although many states have computerized files of individual income tax returns, these returns do not reveal the amount of state and local property, sales, and excise taxes paid by each income tax filer. Furthermore, tax officials do not require all sources of income to be reported.[16]

The burden of taxes imposed on households can be shifted, too. For example, the burden of a state's income and property taxes can be shifted through their deductibility from federal taxable income. The federal government recoups the tax revenue lost through the deduction by borrowing, cutting spending, or raising taxes elsewhere. As a result, part of the burden of state and local income and property taxes is borne by households throughout the nation. Section IV will present an indicator of tax competitiveness modified to take into account this particular form of shifting.

II. Some Commonly Cited, Misleading Indicators of Tax Competitiveness

Public officials, interest groups, and researchers have compared states' business tax climates with whatever imperfect data are available. Many of these widely circulated indicators of tax competitiveness are misleading. An analysis of each indicator's strengths and weaknesses is beyond the scope of this article.[17] This section briefly evaluates six of the most frequently cited measures, three indicating that Massachusetts' taxes are not competitive and three indicating that they are.

Three Indicators Showing That Massachusetts' Taxes Are Not Competitive

Statutory corporate tax rate. Some groups, contending that the Commonwealth's business tax climate is unattractive, point to its high statutory tax rate on corporate profits, the seventh highest among the 43 states with a corporate profits tax (Table 2). This indicator fails to take into account other taxes and fees paid by businesses, such as taxes on personal property and net worth, real estate taxes, license taxes, sales taxes on business inputs, and user charges. It also fails to take into account differences in the way in which states define taxable corporate income. Some states with a high statutory rate may define taxable profits narrowly, allowing relatively generous deductions and exclusions or granting generous credits against the tax.

Corporate income tax collections as a percentage of "business-related" income. Massachusetts ranked 12th according to this statistic in FY91 (Table 2). The principal problem with this indicator, apart from its focus on only one business tax, is that business-related income earned by a state's residents is unrelated to the business profits earned within the state's territory. A state's business-related income is the sum of the proprietors' income, dividends, rents, and interest received by its residents. Much of the underlying economic activity generating this income is not located in the state. For example, large mutual funds invest in enterprises operating throughout the world. Consequently, in any given year, the dividends received by Massachusetts residents from these funds can grow rapidly even if business profits earned within the Commonwealth are shrinking.

Revenue burden is a poor indicator of tax competitiveness because it fails to focus on those taxes, fees, and charges of greatest concern to business.

Personal income tax burden. Personal income tax burden is the ratio of state and local personal income taxes paid to statewide personal income. In FY91 the Commonwealth had the third highest personal income tax burden in the nation. While nationwide state and local personal income tax collections were 2.3 percent of personal income, in Massachusetts they were 3.9 percent. Only two of the Commonwealth's principal economic competitors, New York and Maryland, imposed a higher personal income tax burden (Table 3).

The income tax is only one of several taxes that households pay. Moreover, personal income tax burden does not necessarily reveal the income tax bur-

[16] Examples of income sources not reported on income tax forms include employer contributions to 401(k) plans, Individual Retirement Accounts, pension plans, medical insurance premiums, and employee contributions to 401(k) plans, health reimbursement accounts, and dependent care reimbursement accounts.

[17] A more extensive analysis is provided in Tannenwald (1993).

Table 2
State Tax Rates on Corporate Profits as of 2/1/93 and State and Local Corporate Tax Collections as a Percent of Business-Related Income, FY 1991

State	Highest State Tax Rate as of 2/1/93		State and Local Collections as a Percent of Business-Related Income, FY 1991		State	Highest State Tax Rate as of 2/1/93		State and Local Collections as a Percent of Business-Related Income, FY 1991	
	Percent	Rank	Percentage	Rank		Percent	Rank	Percentage	Rank
Massachusetts	9.5	7	2.10	12	Florida	5.5	36	.73	44
Other N.E.					Georgia	6	31	1.66	23
Connecticut	11.5	3	2.38	6	Hawaii	6.4	30	2.20	9
Maine	8.93	15	1.34	31	Idaho	8	20	1.25	33
New Hampshire	8	20	1.91	15	Indiana	3.4	45	1.47	27
Rhode Island	9	11	.98	39	Iowa	12	2	1.41	28
Vermont	8.25	18	.95	41	Kansas	4	44	1.69	21
Other High Tech					Kentucky	8.25	18	1.67	22
Arizona	9.3	9	1.25	33	Louisiana	8	20	2.23	8
California	9.3	9	2.78	5	Minnesota	9.8	6	2.27	7
Maryland	7	27	1.09	36	Mississippi	5	38	1.83	18
North Carolina	7.75	25	1.90	16	Missouri	5	38	.24	46
Texas	X	X	.00	47	Montana	6.75	28	1.74	20
Washington	X	X	.00	47	Nebraska	7.81	24	.93	42
Other Industrial					Nevada	X	X	.00	47
Illinois	4.8	43	1.55	26	New Mexico	7.6	26	.93	42
Michigan	X	X	4.28	2	North Dakota	10.5	4	1.64	24
New Jersey	9	11	2.13	10	Oklahoma	6	31	1.10	35
New York	9	11	2.01	13	Oregon	6.6	29	1.07	37
Ohio	8.9	16	1.95	14	South Carolina	5	38	1.40	29
Pennsylvania	12.25	1	1.76	19	South Dakota	X	X	.96	40
All Other					Tennessee	6	31	1.85	17
Alabama	5	38	1.26	32	Utah	5	38	1.61	25
Alaska	9.4	8	9.92	1	Virginia	6	31	1.02	38
Arkansas	6	31	1.37	30	West Virginia	9	11	3.50	3
Colorado	5.4	37	.69	45	Wisconsin	7.9	23	2.12	11
Delaware	8.7	17	3.35	4	Wyoming	X	X	.00	47
District of Columbia	10	5			Median	7.6		1.58	

X = Not applicable (state does not tax corporate profits).
Source: Commerce Clearing House (1993); US Bureau of Economic Analysis; U.S. Bureau of the Census.

den imposed by a state on its high-income households, a more important competitive consideration.

Three Indicators Showing That Massachusetts' Taxes Are Competitive

Revenue Burden. Perhaps the most widely cited indicator of a state's tax competitiveness is its revenue burden, the sum of its taxes, fees, and charges as a percentage of its personal income. In FY91, Massachusetts' revenue burden ranked 38th among the 50 states and compared favorably with those of its 17 principal economic competitors (Table 3).

While widely cited, revenue burden is a poor indicator of tax competitiveness because it fails to focus on those taxes, fees, and charges of greatest concern to business. By including all revenue sources in its numerator, the ratio provides no insight into the burden of either business taxes (which should estimate business taxes relative to profits) or of household taxes (which should estimate household taxes relative to household income.)

Property tax burden. Property tax burden is the ratio of statewide property tax collections to statewide personal income. Fifteen years ago, when the Commonwealth had one of the highest property tax burdens in the nation, the notion that the Commonwealth's property taxes are a competitive plus would have been considered impossible. Yet, in FY91 the Commonwealth's property tax burden ranked 11th when compared with those of its 17 principal competitors and was the lowest in New England by far. Nationally, the Commonwealth's property tax burden was less than 10 percent above the national

Table 3

Personal Income Tax, Property Tax, and General Own-Source State and Local Revenues per $1,000 of Personal Income, Fiscal Year 1991

State	Personal Income Tax Revenues per $1,000 of Personal Income		Property Tax Revenues per $1,000 of Personal Income		State and Local Own-Source Revenues per $1,000 of Personal Income	
	Amount	Rank	Amount	Rank	Amount	Rank
Massachusetts	38.74	3	36.08	21	144.31	38
Other N.E.						
Connecticut	5.54	41	43.72	12	130.21	47
Maine	26.95	15	45.64	10	157.07	22
New Hampshire	1.54	42	61.65	1	122.17	50
Rhode Island	22.25	29	45.78	9	146.83	34
Vermont	25.25	20	51.43	4	167.73	13
Other High Tech						
Arizona	20.04	32	39.92	14	169.87	10
California	26.55	16	30.67	29	158.73	21
Maryland	40.10	2	27.78	35	136.78	43
North Carolina	31.13	11	22.68	39	141.66	41
Texas	.0005	45	39.43	16	147.59	33
Washington	.00	46	32.08	27	162.83	17
Other Industrial						
Illinois	18.97	35	37.88	17	135.70	44
Michigan	23.89	23	47.92	8	161.49	19
New Jersey	17.02	36	48.97	7	142.11	40
New York	42.69	1	48.98	6	194.12	4
Ohio	31.44	10	30.43	30	146.12	36
Pennsylvania	22.67	25	29.10	31	134.08	45
All Other						
Alabama	19.36	33	11.00	50	145.26	37
Alaska	.00	46	57.53	2	523.91	1
Arkansas	22.88	24	16.54	46	133.71	46
Colorado	22.43	26	35.64	23	154.13	27
Delaware	34.32	8	14.94	49	166.11	15
Florida	.00	46	36.18	20	149.21	32
Georgia	25.53	19	29.04	32	150.74	30
Hawaii	36.30	5	20.32	41	188.83	5
Idaho	28.00	12	27.83	34	155.68	24
Indiana	25.88	17	33.23	25	149.85	31
Iowa	27.85	13	39.67	15	165.64	16
Kansas	19.27	34	37.74	18	151.81	29
Kentucky	35.30	6	17.71	45	157.06	23
Louisiana	12.56	39	18.31	44	176.81	8
Minnesota	35.09	7	37.53	19	184.32	7
Mississippi	13.88	38	25.83	37	154.43	26
Missouri	22.13	30	21.05	40	124.03	49
Montana	22.33	28	33.36	24	154.71	25
Nebraska	21.37	31	41.99	13	162.45	18
Nevada	.00	46	23.04	38	146.81	35
New Mexico	16.30	37	15.16	48	201.65	3
North Dakota	11.54	40	32.40	26	185.90	6
Oklahoma	24.69	22	16.11	47	160.20	20
Oregon	38.63	4	49.90	5	169.54	11
South Carolina	25.19	21	27.34	36	153.24	28
South Dakota	.002	44	36.07	22	142.22	39
Tennessee	1.19	43	19.96	42	129.63	48
Utah	27.61	14	28.45	33	166.43	14
Virginia	25.63	18	31.78	28	139.44	42
West Virginia	22.38	27	19.08	43	168.24	12
Wisconsin	33.79	9	44.41	11	170.27	9
Wyoming	.00	46	53.92	3	247.76	2
U.S. Average	22.71		34.88		155.38	
Median	23.38		32.81		154.57	

Source: U.S. Bureau of the Census (1993) and author's calculations.

median, ranking 21st among the 50 states (Table 3). The gap between the Massachusetts property tax burden and the U.S. median has narrowed steadily over the past 15 years, primarily because of Proposition 2½, the Commonwealth's formal property tax limitation (Commonwealth of Massachusetts 1986).

Business executives do not see all property taxes in the same light, however. They regard residential property taxes as a personal cost, diminishing their disposable income and that of their employees. Nonresidential property taxes are a cost of doing business that diminishes their firm's profitability. Consequently, the burden of residential property taxes is best estimated by dividing them by personal income, while the burden of nonresidential property taxes is best estimated by dividing them by profits. As discussed above, the data needed to construct these ratios are not readily available. Lumping all property taxes together and dividing them by personal income provides little useful information to executives trying to estimate the impact of these taxes on their firms' after-tax rate of return.

"Business's Share." Business's share is the percentage of total state and local taxes for which businesses, as opposed to individuals, are liable.[18] At just under 21 percent, the Commonwealth ranked 48th out of 50 states according to this statistic in 1990 (Table 4). Some public interest groups have erroneously concluded from this ranking that businesses are taxed lightly in Massachusetts and are not paying their "fair share" of the total tax bill.[19]

Both contentions indicate how widely this statistic is misunderstood. The share of a state's taxes collected from businesses has nothing to do with how heavily or how fairly the state taxes its businesses. Rather, this share is determined primarily by the characteristics of the state's economy, especially its labor intensity.

Labor is compensated primarily in the form of wages and salaries. Owners of capital are compensated for the use of their property in the form of profits. Consequently, wages and salaries are large

Table 4
Business's Share of State and Local Taxes, FY 1990, and Index of Tax Effort, 1988

	Business's Share as Percent of Total Taxes, FY90		Index of Tax Effort (National Average = 100), 1988	
State	Percentage	Rank	Value	Rank
Alaska	78.77	1	127	2
Wyoming	68.34	2	94	26
Montana	51.51	3	102	13
Delaware	45.71	4	84	44
Louisiana	44.08	5	90	35
Texas	42.81	6	88	40
West Virginia	42.62	7	88	40
New Hampshire	37.32	8	66	50
Kansas	36.62	9	104	11
Florida	34.51	10	82	48
Alabama	33.80	11	84	44
New Mexico	32.97	12	99	18
North Dakota	32.44	13	91	33
Tennessee	32.43	14	83	47
Connecticut	32.19	15	90	35
Mississippi	32.15	16	94	26
Oklahoma	31.95	17	89	37
Kentucky	31.91	18	88	40
Arizona	31.81	19	96	23
Nevada	31.21	20	69	49
Washington	31.02	21	102	13
Pennsylvania	30.95	22	97	21
South Carolina	30.50	23	96	23
California	30.09	24	94	26
New Jersey	29.52	25	101	16
Missouri	29.42	26	86	43
Illinois	29.25	27	102	13
Virginia	29.11	28	91	33
Michigan	28.73	29	112	5
Oregon	28.71	30	99	18
New York	28.53	31	152	1
Ohio	28.44	32	97	21
Colorado	28.42	33	89	37
Utah	28.23	34	106	9
Vermont	26.84	35	100	17
North Carolina	26.57	36	93	30
Indiana	26.19	37	93	30
Georgia	25.45	38	89	37
Maryland	25.42	39	108	8
South Dakota	25.35	40	95	25
Arkansas	24.38	41	84	44
Minnesota	24.22	42	112	5
Hawaii	24.12	43	112	5
Idaho	24.08	44	93	30
Rhode Island	23.73	45	104	11
Maine	23.23	46	105	10
Nebraska	21.03	47	98	20
Massachusetts	20.72	48	94	26
Wisconsin	20.37	49	119	3
Iowa	19.31	50	113	4
U.S. Average	30.31		100	
Median	29.47		94.5	

Note: ACIR (1990) describes tax effort as "the extent to which a state utilizes its available tax bases . . . Tax effort is determined by comparing a state's actual revenues with its estimated capacity to raise revenues. It is computed by dividing a state's *revenue per capita* (actual collections divided by population) by its *capacity per capita* and multiplying by 100. The result can be interpreted as the intensity with which a state uses its tax bases, relative to the national average of 100 (p. 13)."

Source: Tannenwald (1993); U.S. ACIR (1990).

[18] The methodology for estimating business's share was developed in 1981 by the U.S. Advisory Commission on Intergovernmental Relations (1981).

[19] For example, in a flyer supporting a proposal to require publicly traded corporations in Massachusetts to divulge publicly certain items from their state income tax return, the Tax Equity Alliance of Massachusetts asked:

> Business's share of all taxes collected in Massachusetts is low—49th of all 50 states (only Nebraska is lower). Why is corporate Massachusetts paying an ever-shrinking share of the pie, when the rest of us are paying more?

More on Business's Share of Taxes

The share of a state's taxes paid by businesses, as opposed to households, depends primarily on the labor intensity of the state's economy. It is also influenced by a state's per capita income, the importance of extractive industries to its economy, and the importance of agriculture.

1. *Business's share and per capita income.* Per capita income is negatively correlated with business's share. States with high per capita income have unusually rich personal income tax bases, giving them a high yield from any given income tax structure. Massachusetts ranks 5th in per capita income.

2. *Business's share and extractive industries.* The three states in which businesses pay the highest share of taxes by far are Alaska, Wyoming, and Montana (Table 4), each of which has an economy dominated by the extraction of fossil fuels. These states, as well as others rich in extractable natural resources, generate a large fraction of their revenue by levying severance taxes and property taxes on natural resources. The burden of these taxes is borne by energy consumers throughout the world, companies engaged in mineral extraction, or owners of mineral rights, not by business as a whole. In these states, business's share bears no relationship to how heavily the typical business is taxed. Massachusetts has virtually no capacity to impose severance taxes because it has practically no extractable natural resources.

3. *Business's share and agriculture.* Clear-cut exceptions to the rule that states with high business's share are capital-intensive lie outside the dotted oval in the upper-left and lower-right quadrants of Figure 1. Note that states outside the oval in the lower-right quadrant (high capital intensity, low business's share) are farm states. Modern agriculture is a relatively capital-intensive industry. State and local governments tend to tax farmers lightly because of the volatility of their income, the illiquidity of their assets, and their political clout.

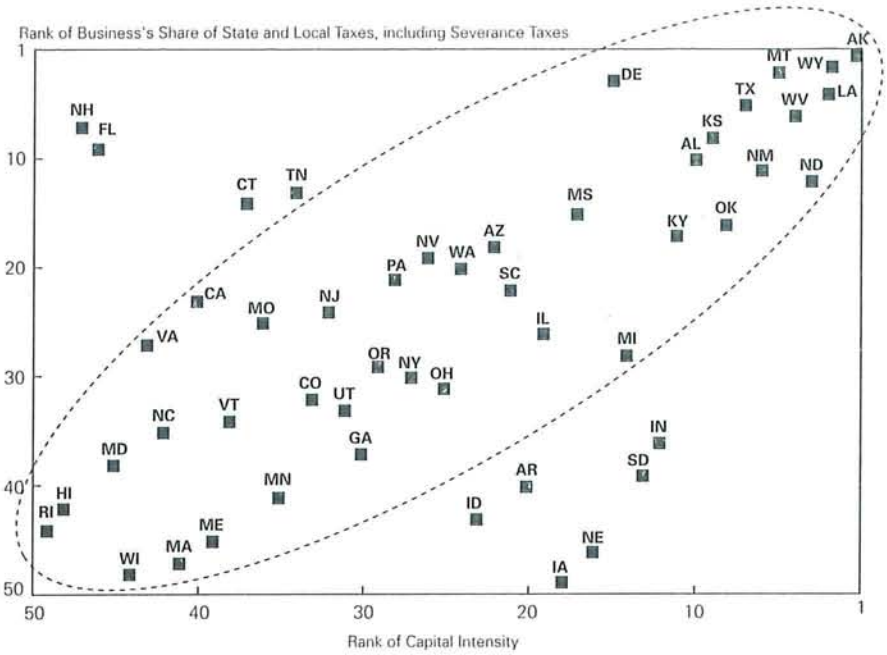
4. *Labor-intensive states with high business share.* The states lying outside of the dotted oval in the upper-left quadrant of Figure 1 (labor-intensive, high business share) are Connecticut, Florida, New Hampshire, and Tennessee. None of these states had a broad-based personal income tax in 1990. Until recently, Connecticut had a long-standing strategy of taxing personal income lightly in order to compete with New York, a state imposing the highest personal income tax burden in the nation, for both businesses and households within the New York City metropolitan area. New Hampshire's lack of either a broad-based income tax or a retail sales tax can be explained in part by a desire to compete with high-income-tax Massachusetts for residents and businesses within the greater Boston metropolitan area. Florida has rejected a broad-based personal income tax in part to compete for retirees.

5. *Summary of Factors Affecting Business's Share.* Labor intensity, per capita income, the importance of extractive industries, and the importance of agriculture explain almost 70 percent of the variation in business's share in FY90.[20] Massachusetts is a labor-intensive state largely devoid of mining, whose residents enjoy one of the highest average incomes in the nation. These factors, not how heavily or fairly business is taxed, are responsible for the small proportion of taxes paid by business in the Commonwealth.

6. *Further problems with business's share.* Estimates of business's share are necessarily imprecise because it is extremely difficult to divide revenues from some taxes into their business and household components. However, even if business's share could be clearly identified, business's share would still be a poor proxy for business taxes as a percentage of business profits. Most states that collect a high share of their taxes from businesses impose a low overall tax burden. The U.S. Advisory Commission on Intergovernmental Relations (ACIR) periodically compares states in terms of "tax effort"—the taxes they collect relative to the taxable resources at their disposal.[21] Among the 10 states with the highest business shares in 1990, eight had a tax effort at or below that of the median state (Table 4). In each of these eight states, businesses are paying a high share of a total tax bill that is low relative to the state's taxable resources. In these states, business taxes as a percentage of profits could be average or low, even though business's share of total taxes is high.

Figure 1

States Ranked According to Capital Intensity and Business's Share of State and Local Taxes, 1990



Source: Capital stock data – Munnell, Alicia H. "How Does Public Infrastructure Affect Regional Economic Performance?" *New England Economic Review*, Sept./ Oct.1990, pp. 11-32; Employment data – U.S. Bureau of Economic Analysis; Business's share data – Appendix, Massachusetts Special Commission on Business Tax Policy, *Massachusetts' Tax Competitiveness* and calculations by staff of the Massachusetts Special Commission on Business Tax Policy.

relative to profits in a state with a labor-intensive economy. Furthermore, in such a state, the value of residential property is large relative to the value of nonresidential property, other things equal, because of the relatively small stock of plant and equipment. Taxes on profits and nonresidential property are the two largest state and local business taxes. Taxes on personal income (the most important component of which is wages and salaries) and residential property are two of the largest state and local taxes on individuals. Consequently, business's share tends to be high in capital-intensive states and low in labor-intensive states such as Massachusetts. The positive relationship between capital intensity and business's share is demonstrated in Figure 1 by the states falling within the dotted oval.

Other economic characteristics that influence business's share, as well as other reasons why it is a

[20] The regression equation demonstrating the explanatory power of these variables is:

BS = .0036(K/L) − .0006AGR + .0004SEV + .0000022PY + .1511
(3.67)** (−2.13)* (2.07)* (1.66) (2.95)**

Degrees of freedom: 44 R^2 = .68

Note: Numbers in parentheses are t-statistics

**Significant at the 1 percent level, two-tailed test

*Significant at the 5 percent level, two-tailed test

Variables

BS = Business's share of state and local taxes, FY90. See Tannenwald (1993, Appendix D) for method of calculation and sources of data.

K/L = Capital/labor ratio, 1990. See Tannenwald (1993, Appendix E) for method of calculation and sources of data.

AGR = Value of farmland per capita, 1990. Source: U.S. Advisory Commission on Intergovernmental Relations (1993).

SEV = Severance tax capacity per capita, 1988. Source: U.S. Advisory Commission on Intergovernmental Relations (1990).

PY = Personal income per capita, 1990. Source: U.S. Bureau of the Census (1993).

Number of observations: 49. (Alaska is excluded, because its estimated business's share is so extreme.)

[21] See note, Table 4, and U.S. Advisory Commission on Intergovernmental Relations (1990, 1993) for a further description of tax effort and related concepts, as well as a detailed explanation of how the Advisory Commission's index of tax effort is calculated.

poor indicator of tax competitiveness, are discussed in the accompanying Box.

III. The Representative Firm and Representative Household Approaches to Evaluating Tax Competitiveness

Given the difficulty of constructing indicators of tax competitiveness from available "hard data," public policy analysts should consider alternative strategies for evaluating their state's business tax climate. Two promising alternatives are the "representative household" and the "representative firm" approaches.

The Representative Firm Approach to Evaluating Tax Competitiveness

This approach enables policy analysts to view taxes paid by firms at alternative locations through the eyes of a profit-maximizing business executive in the process of choosing a site for a new facility. How would such an executive evaluate the "tax climate" at each site? Such an approach reveals the degree to which business taxes imposed at a given site depress the after-tax rate of return on marginal business investment projects.

In 1993, the Massachusetts Special Commission on Business Tax Policy used this approach to evaluate the competitiveness of several of the Commonwealth's cities.[22] Specifically, the Commission "located" hypothetical firms representative of selected manufacturing industries at five sites within Massachusetts, 10 sites in competitor states, and one fictitious site at which no state and local taxes are imposed.[23] It assumed that pre-tax rates of return and costs other than taxes were the same at each site. The Commission computed annual total local, state, and federal tax liabilities and the net after-tax cash flow of each firm 60 years into the future.[24] The Commission assumed that the pre-tax rate of return on all investments undertaken by the representative firms is 25 percent.

The Commission assumed that each firm builds a new facility at each of the 16 sites, including the firm's current site. This expansion requires the firm to invest in new equipment, structures, inventories, and financial assets and to hire more workers. As a result of the expansion, each firm makes larger profits and pays more taxes. By comparing after-tax cash flows before and after expansion, one can calculate the long-run rate of return of the new facility at each site for each representative firm. By assumption, differences across sites in rates of return reflect only differences in state and local tax burdens. (See Appendix I and S.H. Brooks Co. 1993 for methodological details.)

The measures generated by this approach meet most of the criteria of a good indicator of tax competitiveness. They take into account most business taxes and how they affect a firm's return on a project over the project's entire lifetime.[25] They also capture how taxes at all levels of government interact to affect a firm's bottom line. Finally, the approach permits comparisons of tax competitiveness across cities and towns, not just states.

Two empirical studies performed by Leslie Papke (1987, 1991) support this approach's validity. In both studies, Papke used the same methodology as the Special Commission on Business Tax Policy to measure the degree to which state tax structures depress the rate of return on marginal business fixed investment. Her 1987 study estimated the impact of this effective tax rate on the rate of capital formation within a state, while her 1991 study investigated its impact on business starts. She found both impacts to be negative and statistically significant.

The representative firm approach has its drawbacks. Even within a given industry, firms vary widely in asset mix, capital-labor ratio, geographic dispersion of factors of production, and other characteristics that affect state and local tax liability. No one firm is truly "representative" of the industry as a whole. In a similar vein, within a given state, municipalities, counties, and special districts vary considerably in the taxes they impose. Consequently, it is difficult to pick one city or town whose tax characteristics are representative of a whole state. However, the representative firm approach permits policy analysts to test the sensitivity of their results to varying assumptions concerning all of these variables.

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[22] The Commission hired Dr. Stephen H. Brooks to assist in this evaluation. Dr. Brooks had assisted the Massachusetts Special Commission on Tax Reform in a similar evaluation based on the representative firm approach. See S.H. Brooks Co. (1993) and Commonwealth of Massachusetts (1986).

[23] One site, Memphis, Tennessee, is located in a state not included in the list of Massachusetts' principal economic competitors compiled by the Massachusetts High Technology Council. However, Memphis is a competing location for clothing manufacturers, one of the industries included in the analysis.

[24] While a 60-year time horizon seems long, simulations assuming a 30-year time horizon produced similar results.

[25] Fees and charges are not taken into account, an omission that tilts the results against sites located in states (such as Massachusetts) that rely relatively lightly on fees and charges for revenue.

Table 5
After-Tax Rates of Return on New Facilities of Representative Firms at Selected Locations, for Selected Industries, Assuming Tax Laws in Effect as of January 1, 1993
Percent

	Apparel		Fabricated Metals		Computers		Electronics		Instruments	
Site of New Facility	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank
Bedford, MA	16.4	11	17.5	7	17.7	7	17.6	6	17.2	7
Chelmsford, MA	16.6	6	17.7	4	17.9	4	17.7	4	17.4	4
Foxboro, MA	16.5	7	17.6	5	17.8	5	17.7	4	17.4	4
Greenfield, MA	16.5	7	17.6	5	17.8	5	17.6	6	17.3	6
Waltham, MA	16.3	14	17.4	9	17.6	8	17.5	9	17.1	10
Average of MA Sites	16.5		17.6		17.8		17.6		17.3	
Los Angeles, CA	16.5	7	17.3	12	17.4	12	17.3	12	17.1	10
Stamford, CT	16.4	11	17.2	13	17.3	13	17.2	13	16.9	13
Rockford, IL	16.5	7	17.5	7	17.6	8	17.6	6	17.2	7
Hagerstown, MD	16.9	2	18.0	2	18.1	2	17.9	2	17.7	2
Nashua, NH	16.7	3	17.4	9	17.5	11	17.4	11	17.1	10
Poughkeepsie, NY	16.7	3	17.9	3	18.0	3	17.8	3	17.5	3
Greenville, NC	16.4	11	17.2	13	17.2	14	17.2	13	16.9	13
Lancaster, PA	15.8	15	16.7	15	16.8	15	16.8	15	16.5	15
Memphis, TN	16.7	3	17.4	9	17.6	8	17.5	9	17.2	7
El Paso, TX	17.5	1	18.4	1	18.5	1	18.4	1	18.0	1
"Tax-Free Site"	18.6		19.0		19.2		18.9		18.8	

Note: "Tax-Free Site" is a fictitious location in which no state and local taxes are collected.
Source: S.H. Brooks Co. (1993), Table 9.

One set of computations performed by the Commission using this approach is presented in Table 5. Each row in the table summarizes the results of a set of simulations in which one of the cities is assumed to be the site where the industry-specific representative firms expand. Each of the cities, including the assumed expansion site itself, is treated as an alternative pre-expansion site for the firms.[26] Consequently, 16 rates of return are calculated at each expansion site, one for each possible pre-expansion site. Each entry in Table 5 presents the average of the 16 rates of return computed at the expansion site for each industry-specific representative firm.[27] The higher the average rate of return, the lower the tax burden on the new facility.

The differences in return on assets (ROA) across sites shown are generally small. When the highest and lowest ROAs in each industry are thrown out, the range of ROAs is between 0.6 and 0.8 of a percentage point, depending on the industry analyzed.[28] The average ROAs at the Massachusetts expansion sites generally rank high. In the manufacture of fabricated metals, computers, and electronics, seven of the non-Massachusetts sites have a lower ROA and only three have a higher ROA. Interestingly, given New Hampshire's reputation as a low-tax state, in four industries at least four of the five Massachusetts sites have a higher average ROA than Nashua, the one site included in the sample from New Hampshire. The lower average ROAs at Nashua reflect the city's relatively high property tax.

[26] This is appropriate since, in making its tax system competitive, Massachusetts attempts to attract the investment of firms located at sites throughout the country (and, for that matter, the world).

[27] In theory, the dispersion across sites in the average rates of return presented in Table 5 could be biased downward by the disproportionately large representation of sites from one state (Massachusetts) in the 16-site sample. In fact, this dispersion is similar even when only one Massachusetts site is included, rather than five. Furthermore, the inclusion of a fictitious site that levies no state and local taxes ("Tax-Free") exaggerates the inter-site dispersion in average effective rates of return.

[28] There are two outliers: Lancaster, Pennsylvania and El Paso, Texas. El Paso always has the highest ROA (the lowest tax burden) because Texas is the only state represented among the sites that has no corporate income tax. The difference in ROA between these extreme cases varies between 1.6 and 1.8 percentage points, depending on the industry analyzed.

Two factors are primarily responsible for the favorable rankings of the Massachusetts sites. First, the Commonwealth's taxes on nonresidential property are relatively low. Second, its recently enacted 3 percent investment tax credit is a relatively attractive subsidy for purchases of plant and equipment. As can be seen in Table 1, however, many competitor states have also recently enacted attractive business tax credits, many of which will become effective over the course of 1994 and 1995. Consequently, the competitive advantage created by the Commonwealth's tripling of its investment tax credit will be narrowed.

Moreover, while the Commonwealth's investment tax credit boosts the relative ROAs at the Massachusetts sites, it does not significantly increase these ROAs in absolute terms. Simulations performed by the Commission indicate that the tripling of the Commonwealth's investment tax credit in 1993 from 1 percent to 3 percent raised the ROA at each Massachusetts site by about 0.2 of a percentage point. This small increase in ROA improved the ranking of the Massachusetts sites only because the variation in ROAs across sites is so small.

The Commission found that other cuts in the Commonwealth's business taxes would also exert small effects on the ROAs at the Massachusetts sites. For example, a reduction in the statutory corporate income tax rate from 9.5 percent to 7.5 percent, which would be widely viewed as a significant tax cut, would also reduce these ROAs by only an estimated 0.2 of a percentage point. This estimated impact is so small because state and local taxes generally account for only 1 to 2 percent of total business costs.[29] The small fraction of total costs accounted for by such taxes is reflected in the last row of Table 5. The row presents the results of simulations for "Tax-Free Site," the fictitious site at which no state or local taxes are collected. The ROAs at Tax-Free Site are only 1.3 to 2.1 basis points higher than the average for all of the Massachusetts sites.

The Representative Household Approach

In this approach, the hypothetical taxpayers whose tax burdens are compared across sites are households instead of businesses. Unlike approaches that rely solely on readily available aggregate data, this approach allows policy analysts to focus on the tax burden imposed by competing jurisdictions on high-income households.

Like the characteristics of "representative" firms, the characteristics of representative high-income households are difficult to identify. Nevertheless, policy analysts using the representative household approach can test the sensitivity of their results to modifications of assumed household characteristics. In many cases, varying these characteristics within reasonable ranges does not significantly affect estimated relative tax burdens borne by hypothetical households at alternative locations.

The best-known analysis utilizing the representative household approach, published annually by the Government of the District of Columbia (DC), compares the state and local tax liabilities of representative families of four residing in DC and the largest city of each state (Government of the District of Columbia 1993). DC performs such comparisons for representative families at four income levels: $25,000, $50,000, $75,000, and $100,000. Taxes taken into account include state and local personal income taxes, property taxes, general sales taxes, motor fuel taxes, motor vehicle registration fees, and motor vehicle excise taxes. These taxes account for over 75 percent of state and local tax collections nationwide.

Table 6 presents DC's 1992 results for its representative high-income family (annual income of $100,000), modified to eliminate some of the biases in DC's estimation procedure. (These biases are discussed in Appendix II.) The table takes into account the way that the burden of state and local personal income taxes and property taxes is lightened by their deductibility from federal taxable income.[30]

The dispersion across sites in household tax burdens is much greater than the dispersion across sites in business tax burdens reported in Table 5. At the site with the highest household tax burden (Bridgeport, CT), the representative high-income family paid 13.2 percent of its income in state and local taxes (Table 6, column 6). The comparable percentage at the site with the lowest household tax burden (Anchorage, AK) was 2.4 percent, almost 11 percentage points lower.

[29] This was the range suggested by consultants advising businesses interviewed by the staff of the Massachusetts Special Commission on Business Tax Policy. See Tannenwald (1993, p. 28).

[30] Federal taxpayers who itemize deductions may deduct their state and local income and property tax payments from federal taxable income. Since the representative high-income family is assumed to itemize and to be in the 28-percent marginal federal income tax bracket, each deducted dollar of state and local income and property tax reduces federal tax liability by $.28. The net burden of each deducted tax dollar is therefore $.72. In order to take deductibility into account, the representative household's income and property tax bills were therefore multiplied by 0.72.

Table 6

Estimated Burden of State and Local Taxes on Households for a Family of Four with an Annual Income of $100,000 in 1992

Rank	Largest City	State	(1) Income Tax	(2) Property Tax	(3) Sales Tax	(4) Auto Taxes	(5) Total Major Household Taxes: Amount[a] ($000)	(6) Total Major Household Taxes: Percent of Income
1	Bridgeport	CT [b]	3,240	6,018	1,596	2,359	13.2	13.2
2	New York City	NY [b]	6,641	1,556	2,655	199	11.1	11.1
3	Newark	NJ [b]	2,371	6,947	1,327	234	10.9	10.9
4	Providence	RI [b]	2,634	4,620	1,476	1,400	10.1	10.1
5	Detroit	MI [b]	4,643	3,624	949	342	9.6	9.6
6	Portland	ME [b]	4,073	2,404	1,567	1,397	9.4	9.4
7	Baltimore	MD [b]	3,948	3,896	1,231	358	9.4	9.4
8	Philadelphia	PA [b]	5,445	2,500	1,187	195	9.3	9.3
9	Milwaukee	WI	3,818	3,183	1,516	352	8.9	8.9
10	Washington	DC	4,879	1,321	1,786	331	8.3	8.3
11	Los Angeles	CA [b]	3,517	1,621	1,987	1,127	8.3	8.3
12	Columbia	SC	3,589	1,182	1,687	1,677	8.1	8.1
13	Boston	MA	4,142	1,734	1,213	987	8.1	8.1
14	Minneapolis	MN	4,213	1,398	1,543	885	8.0	8.0
15	Columbus	OH [b]	4,272	1,719	1,492	341	7.8	7.8
16	Omaha	NE	3,151	1,585	1,642	1,429	7.8	7.8
17	Louisville	KY	4,784	649	1,664	707	7.8	7.8
18	Honolulu	HI	4,923	1,125	1,173	524	7.7	7.7
19	Virginia Beach	VA	3,057	1,346	1,365	1,910	7.7	7.7
20	Atlanta	GA	3,012	1,478	2,021	1,136	7.6	7.6
21	Wichita	KS	2,935	1,246	1,516	1,874	7.6	7.6
22	Charlotte	NC [b]	3,704	1,076	1,839	848	7.5	7.5
23	Salt Lake City	UT	3,607	1,010	2,043	753	7.4	7.4
24	Portland	OR	4,826	2,064	0	275	7.2	7.2
25	Boise City	ID	4,244	803	1,701	343	7.1	7.1
26	Des Moines	IA	3,277	1,515	1,461	713	7.0	7.0
27	Charleston	WV	3,496	421	1,878	1,169	7.0	7.0
28	Denver	CO	2,797	1,080	2,000	1,062	6.9	6.9
29	Kansas City	MO	3,285	930	1,583	1,105	6.9	6.9
30	Burlington	VT [b]	3,441	1,865	1,282	268	6.9	6.9
31	Little Rock	AR	3,883	597	1,614	719	6.8	6.8
32	Oklahoma City	OK	3,505	611	1,843	778	6.7	6.7
33	Phoenix	AZ [b]	1,860	1,602	1,835	1,219	6.5	6.5
34	Chicago	IL [b]	1,740	2,002	2,043	390	6.2	6.2
35	Jackson	MS	2,467	880	1,576	1,228	6.2	6.2
36	Albuquerque	NM	3,256	954	1,669	269	6.1	6.1
37	Wilmington	DE	4,432	1,278	0	273	6.0	6.0
38	Indianapolis	IN	2,730	811	1,203	1,221	6.0	6.0
39	Birmingham	AL	2,387	503	2,246	725	5.9	5.9
40	New Orleans	LA	1,678	409	2,444	1,124	5.7	5.7
41	Billings	MT	3,286	1,113	0	1,156	5.6	5.6
42	Manchester	NH [b]	0	4,549	0	841	5.4	5.4
43	Sioux Falls	SD	0	1,448	1,943	1,809	5.2	5.2
44	Fargo	ND	1,740	1,228	1,593	327	4.9	4.9
45	Seattle	WA [b]	0	1,332	1,992	1,311	4.6	4.6
46	Las Vegas	NV	0	1,327	1,679	1,097	4.1	4.1
47	Houston	TX [b]	0	1,618	1,930	363	3.9	3.9
48	Jacksonville	FL	0	1,863	1,644	295	3.8	3.8
49	Memphis	TN	0	426	2,305	417	3.1	3.1
50	Cheyenne	WY	0	603	1,287	1,006	2.9	2.9
51	Anchorage	AK	0	2,226	0	168	2.4	2.4

[a]Sum of (1) + (2) + (3) + (4).

[b]One of Massachusetts' principal economic competitors, as identified by the Massachusetts High Technology Council.

Note: The figures in columns (1) and (2) equal the representative family's estimated personal income and property tax liabilities, respectively, multiplied by 0.72 to reflect 1) the fact that state and local income and property taxes are deductible from federal taxable income and 2) the assumption that the representative family's marginal federal tax rate is 28 percent. Consequently, taxpayers who itemize their deductions on the federal return bear a net burden of only $0.72 on every dollar of state and local personal income or property taxes paid. Although some state and local automobile taxes (motor vehicle excise taxes based on the value of the automobile) are also deductible from federal taxable income, the figures listed in column (4) do not take such deductibility into acount.

Source: Government of the District of Columbia (1993); Case and Cook (1989); and author's calculations. See Appendix II for the methodology used to estimate housing values underlying estimates of property taxes in column (2).

When residing in Boston, the representative high-income household bore a high state and local tax burden relative to that borne at most of the 50 other sites. The household's tax burden in Boston, almost 8.1 percent of income, ranked 13th and was 1.1 percentage points above the median (at Des Moines, IA). Boston ranked high for two reasons: 1) its housing is expensive, forcing its homeowners to spend a large fraction of their income on property taxes, and 2) Massachusetts imposes a high personal income tax burden.

In general, Massachusetts should feel fairly comfortable about its tax competitiveness.

However, Boston stood 10th among the 18 cities when ranked along with the largest city of each of its 17 principal competitor states. In general, Boston compared favorably with cities in other industrial and New England states but unfavorably with cities in other high tech states. The high-income family's tax burden was significantly higher in Boston than in several competitor sites, including Phoenix, Arizona; Chicago, Illinois; Manchester, New Hampshire; Seattle, Washington; and Houston, Texas.

The implications of the DC study for Massachusetts' tax competitiveness, as opposed to Boston's, should be drawn cautiously. If DC had used a sample of municipalities other than the largest city in each state, Massachusetts might compare less favorably with its rivals than does Boston in Table 6. The reason is that, in many states other than the Commonwealth, the local tax burden on households is significantly lower outside the state's largest city than within it. In these states, municipalities have the option of supplementing their property tax revenues by imposing local income, payroll, and sales taxes. Frequently, a state's largest city imposes these taxes at higher rates than most other municipalities in the state. Detroit, New Orleans, and Philadelphia are cases in point.

In Massachusetts, by contrast, the only broad-based tax available to Boston, or, for that matter, any other municipality, is the property tax. Boston's lack of broad-based tax options limits its capacity to impose higher taxes than other cities and towns within its state. The relatively small portion of the total state and local tax revenues collected at the local level in Massachusetts further limits the difference between the state and local tax burden on Boston's households and the comparable burden on households residing in other municipalities within the Commonwealth.

IV. Summary

In general, Massachusetts should feel fairly comfortable about its tax competitiveness. Its tax system is not a major competitive liability, inducing a large number of business firms to pass up the Commonwealth's cities and towns for sites in other states. Factors other than the Commonwealth's taxes, such as its high cost of labor and health care, its harsh climate, and its distance from important, growing consumer markets in the Southeast and Southwest, are more significant drawbacks.

The Commonwealth's relatively heavy tax burden on high-income households is a mildly anti-competitive feature of its tax system. These households include among their ranks many well-informed professionals and business managers possessing scarce, valuable skills, who can raise the costs of doing business at a site by demanding compensation to offset high personal taxes.

Appendix I

More on the Methodology Used in the Representative Firm Approach

This methodology is set forth in detail in S.H. Brooks Co.(1993). The first step is to construct a mix of assets for each representative firm based on published industrywide data. Each asset type is assigned an economic service life and is assumed to depreciate in a straight line. Based on this information, one calculates the constant-dollar fraction of the initial capital stock of each asset type that must be purchased each year in the steady state to maintain the capital stock's constant-dollar value. Each asset type is assigned a vector of price deflators, which are used to determine the current-dollar investment streams needed to maintain the constant-dollar value and the current-dollar value of the capital stock in each year.

It was assumed that in each year the rate of return on the capital stock, net of economic depreciation but before taxes, is 25 percent. With the exogenous variables assumed and endogenous variables calculated up to this point, one can apply federal, state, and local tax laws to determine the stream of cash flow in each year under the assumption that no expansion takes place. In each year, cash flow takes into account after-tax returns to investment as well as the cost of the investment. The whole exercise is repeated assuming

that the representative firm expands by 10 percent but maintains the same mix of capital by asset type.

The figures reported in Table 5 are the internal rates of return to the new investment stream, which includes both the initial investment and the stream of investment needed to maintain the initial investment's constant-dollar value.

This internal rate of return, r, is calculated according to the following formula:

$$E^0 = \frac{[C^{1n} - C^{1o}]}{[1 - r]^1} + \frac{[C^{2n} - C^{2o}]}{[1 - r]^2} + \cdots + \frac{[C^{60n} - C^{60o}]}{[1 - r]^{60}}$$

where: E = the investment representing the expansion (assumed to to take place in year 0)
C^n = the cash flow assuming no expansion
C^o = the cash flow assuming expansion takes place.

Appendix II

Methodology for Estimating Residential Property Values of Representative High-Income Households Used in DC Study and the Computations Reported in Table 6

The methodology used in the DC study consists of the following two-step procedure:

1) The city's median housing value, as reported from the latest decennial Census of Housing, is divided by its median family income, as reported in the latest decennial Census of Population.

2) The resulting ratio, Q, is reduced by 5 percent to arrive at the ratio of housing value to income for the representative high-income household in each city. This adjustment reflects the assumption that high-income households allocate a smaller percentage of their income to housing than the median household.

Note that DC uses the ratio of median housing value to the median income of all families—renters as well as homeowners—as the benchmark for the housing-to-income ratio of the representative high-income family in each city. However, these families are assumed to own their own home. A more relevant benchmark, therefore, would be the ratio of median housing value to the median income of homeowners. In most cities, the median family income of homeowners is considerably higher than that of renters. In 1989, for example, the median income of homeowners in Boston city proper was $41,741, while the median income of renters was $20,918 (U.S. Bureau of the Census and U.S. Department of Housing and Urban Development 1991). DC's estimated ratios of housing value-to-income are therefore biased upward.

Other things equal, this bias should be less severe in cities with a relatively high incidence of owner-occupancy of homes. In such cities, the median income of homeowners is likely to be closer to the median income of all families. According to the *Annual Housing Survey* (U.S. Bureau of the Census and U.S. Department of Housing and Urban Development 1991), 31 percent of Boston's housing units were owner-occupied in 1989, far lower than the 49 percent average for central cities throughout the nation. In fact, Boston had the lowest incidence of owner occupancy among the 11 cities singled out for in-depth analysis in the 1989 American Housing Survey for the United States (Table A-1).

Table A-1
Owner and Renter Occupancy of Year Round Housing Units in 1989, for 11 Central Cities

Central City	Total Occupied Housing Units (000)	Owner-Occupied Units as a Percent of Total	Renter-Occupied Units as a Percent of Total
Boston, MA	229.2	31.1	68.9
Dallas, TX	380.6	46.3	53.7
Detroit, MI	385.6	57.4	42.6
Fort Worth, TX	167.1	58.5	41.5
Los Angeles, CA	1195.5	40.6	59.4
Minneapolis, MN	156.8	52.7	47.3
Philadelphia, PA	607.0	64.8	35.2
Phoenix, AZ	312.7	56.7	43.3
San Francisco, CA	309.8	34.7	65.3
Tampa, FL	115.2	54.3	45.7
Washington, D.C.	249.8	38.7	61.3

Source: U.S. Bureau of the Census, Annual Housing Survey Division.

Consequently, the upward bias in the estimated property values of Boston-based households is especially severe.

A second source of bias that tilts the DC study against Boston is its failure to take into account the deductibility of state and local personal income and property taxes from federal taxable income. As noted in footnote 30, each deducted state and local tax dollar reduces the federal taxes of a household in the 28-percent federal marginal tax bracket by 28 cents. The net burden for such households of each dollar of state and local income or property tax paid is therefore 72 cents. Massachusetts relies more heavily on income and property taxes than most states. Consequently, failure to take the deductibilty of these taxes into account is another source of upward bias in DC's estimates of the relative tax burden borne by Boston-based households.[31]

[31] By contrast, DC's procedure for estimating the 1991 value of residential real estate owned by representative high-income households in alternative cities produced an estimate for Boston that was biased downward. The latest decennial Census data available in 1991 were for 1980. Since 1980, the ratio of median housing value to median family income in Boston has risen much more rapidly than in the nation as a whole. Therefore, using the 1980 ratio of median housing value to median family income as a benchmark imparted a downard bias to the estimate of real estate prices in Boston in 1991. As a result, the 1991 property tax bill of the representative high-income family in Boston ranked 48th out of 51 cities. The total tax burden on Boston's high-income household ranked 26th among all cities. Nevertheless, Boston's ranking with respect to its principal economic competitors was similar in 1991 and 1992. Whereas in 1992, Boston ranked 9th out of 18, in 1991 it ranked 7th. As in 1992, Boston compared favorably with the majority of other New England states and industrial states, but ranked above the median for high tech states.

The Modified DC Methodology Used in the Preparation of Table 6. The methodology used in Table 6 modifies that used in the DC study to eliminate these two sources of bias. In each city, the value of residential property owned by the representative high-income household was assumed to equal 1.885 × the city's median housing value, as reported in the 1990 U.S. Census of Population. The assumed 1.885 ratio was derived from Case and Cook (1989). Case and Cook arrayed all homeowners residing in the Boston Metropolitan Statistical Area from lowest to highest family income. The median income of all families in the ninth (second-to-highest) decile was $95,287, close to the $100,000 income of the representative high-income households used in the DC study. The median housing value of families in the ninth income decile was $318,000. In the tenth income decile (the highest), the median family income was $224,000 and the median housing value was $720,000. The housing value of a family with an income of $100,000, H($100,000), was estimated by interpolating as follows:

$$H(\$100{,}000) = \$318{,}000 + (\$100{,}000 - \$95{,}287) \times (\$720{,}000 - \$318{,}000)/(\$224{,}000 - \$95{,}287) = \$332{,}720$$

The median housing value in the Boston Metropolitan Area in 1987 was $176,500. $332,720/$176,500 = 1.885. For each city in the DC study, this ratio was assumed to equal the ratio of the median housing value in the city to the housing value for the representative high-income household residing in that city.

In Table 6, the deductibility of state and local personal income and property taxes has been taken into account by multiplying the representative high-income household's income tax and property tax liabilities by 0.72. This fraction was chosen because the household is assumed to itemize its deductions and to be in the 28 percent federal marginal income tax bracket.

Despite these modifications, Boston's ranking in the DC study is not that different from its ranking in Table 6. In the unmodified DC study, the Boston household ranks 10th out of the 51 cities in the sample, and 9th out of the 18 cities located in either the Commonwealth or one of its principal rival states. As in the modified results reported in Table 6, Boston compares most favorably with the largest city of other New England states and least favorably with the largest city of other high-tech states.

Failure of DC Study to Take User Charges into Account. A third source of bias in the DC study that works to Boston's disadvantage, although not corrected for in Table 6, is its failure to take into account the fees and charges paid by representative households residing in each city. In 1991 Massachusetts' state and local fees and charges as a percentage of personal income ranked 49th out of the 50 states and the District of Columbia, and 16th when compared with its 17 principal rival states (U.S. Bureau of the Census 1993). Boston would compare more favorably with other cities in the DC study if fees and charges were taken into account.

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