1997

Taxation and economic development: the state of the economic literature

Michael J. Wasylenko
Syracuse University

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Michael Wasylenko

Professor of Economics and Senior Research Associate in the Center for Policy Research at the Maxwell School of Citizenship and Public Affairs, Syracuse University.

Those who shape state and local fiscal policy have had a sustained interest in the role that taxation plays in the economic development of states, regions, cities, and special districts or zones. At least 75 studies of employment growth, investment growth, or firm location include an analysis of taxes. Interest in the topic is fueled further when firms complain about the business climate in general or about taxation in particular. State or local policymakers then have the unenviable task of deciphering firms' complaints and deciding whether additional tax incentives and lower taxes represent economic rents or constitute a timely and necessary response to keep firms in place.

Tax policy is not considered by firms or policymakers in isolation from other aspects of site selection, including benefits from public goods that might accrue to firms or to its workers. The literature also has pointed to a number of other variables as important determinants of firm location or employment growth decisions. Nonetheless, I leave the discussion of expenditures and of special tax abatement and incentive programs to other papers at this symposium, and this paper will limit its scope to the role of taxation.

At one level, that tax policy influences economic behavior has become a basic tenet for economic policymakers. For example, taxation is assumed to influence multinational firms' financial decisions about repatriation of profits. Periodically, the World Bank relates economic performance in developing countries to the level of taxation and finds that countries with lower marginal tax rates have higher economic growth. In the United States, at least some economists believe that cutting federal taxes would spur enough growth in the national economy that the budget deficit would increase by only 73 percent of the tax cut. Moreover, recent evidence by Auerbach and Hassett (1992) suggests that the user cost of capital plays an important role in stimulating nonresidential fixed investment in the United States.

In the state and local area, researchers have struggled mightily over

the past 20 years to resolve the extent to which tax policy influences the level and distribution of employment and investment among states or regions. Bartik (1994a,b) has suggested that the interregional elasticity of economic activity with respect to taxes is between −0.1 and −0.6, or that 10 percent lower taxes will raise employment, investment, or firm births between 1 and 6 percent. These findings have implications for state and local tax policy. However, the range of the elasticity is not estimated with much precision, and it matters a great deal to policymakers whether the elasticity is −0.1, −0.6, or somewhere in between.

Policymakers' keen interest in the elasticity of economic activity with respect to taxes suggests that states and regions are indeed interested in manipulating their tax systems in an attempt to attract business or to foster growth.

This paper will argue that the wide range of the elasticity estimates has less to do with the type of activity being measured than with the variations in data, time periods, and other variables used in the estimation equation. In effect, the results are not very reliable and change depending on which variables are included in the estimation equation or which time period is analyzed.

Fiscal experts advising on tax policy have long suggested that states and localities levy taxes with low marginal tax rates and broad bases. Moreover, states and localities should not use tax systems to redistribute income among residents or economic sectors, because of the potential for firm and household flight (Feldstein and Vaillant 1994). Instead, redistribution of income, to the extent desirable, should be done through state and local expenditures or, better yet, be done by the central government.

Policymakers' keen interest in the elasticity of economic activity with respect to taxes suggests that states and regions are indeed interested in manipulating their tax systems in an attempt to attract business or to foster growth. In effect, many states engage in a form of industrial policy using taxes as their primary instrument. To some, this appears to come at the expense of following the tax policy advice mentioned above, which is based on tax neutrality concepts that are advanced by broad tax bases and low marginal tax rates. Such a tax system might, in the longer run, more effectively foster economic activity and growth.

In the next section some conceptual, measurement, and estimation issues are discussed. The second section summarizes the empirical results on taxation for studies examining various types of investments. Results for interstate or interregional studies receive the most emphasis here, but intra-regional location studies are also discussed. There is also a growing literature on whether taxes matter to international location decisions. The results from these studies are presented as well, because evidence regarding the range of the elasticity of investment and employment growth with respect to international tax differences may give additional insight into the size of the tax elasticities across states. A third section focuses on some additional considerations of concern to policymakers. The paper closes with the major issues for state and local tax policymakers with respect to economic development.

Conceptual and Estimation Issues

Most studies relating economic development to tax policy and other variables can be said to use ad hoc empirical specifications. Thus, at best, these studies demonstrate statistical association rather than show the nature of the relationship between tax policy and economic development.

In effect, the model that underlies most empirical work is a profit or cost function. Manufacturing industries, which typically sell their products in national and international markets, are generally modeled independent of local area demand, as these firms might be most footloose and hence sensitive to local cost factors. But manufacturing firms may be choosing location in part on the basis of regional markets. For example, a manufacturing firm might want to locate in the Midwest, the South, or even near California owing to market considerations. In such cases, regional rather than local markets might be a key variable shaping the firm's location decision. Nonmanufacturing industries, which are more likely to serve a local market, have to consider both local cost and local market factors in their location decisions. Thus, mod-

els must be carefully specified and include both cost and market factors.

Dependent Variables

The most common measures of economic development are income, employment, investment, plant expansions, relocations, and births. Studies done before 1980 generally used aggregate employment or employment growth data and analyzed a single period of cross-sectional data across states. As an example, a typical data set from a 1970s study included manufacturing employment in each of the 48 contiguous states in a specific year or manufacturing employment growth in each of the 48 states during some time period. Investment decisions were rarely examined, and only a few studies used income as a dependent variable. The preoccupation with employment in part reflects the importance that policymakers attach to jobs and job growth in their regions or states. Job growth, despite down-sizing, right-sizing, and productivity growth in manufacturing, is still the variable politicians identify most often with prosperity.

Nonetheless, policymakers and researchers have become much more sophisticated consumers and producers of these data. Job stability in manufacturing in a region is not necessarily an indicator of stagnation. Relatively high productivity growth might mean fewer new jobs, but it also may mean competitive manufacturing firms that provide steady employment and relatively high wages.

Income levels, income growth, and investment measures have been used less frequently in studies of state and local economic development. Personal income data are not necessarily good measures of economic activity in a region or state, as the income data include measures of dividends paid, capital gains, and income produced outside of the area or region. Moreover, local income data are not readily available for inter-Census years. (The U.S. Department of Commerce has produced a gross state product series, but those data are available only until 1992.) Wage and salary data or earnings are available by place of work, however, and could be used as a measure of location-specific economic activity.

Investment data, while good measures of economic activity, have not received much attention at the state and local level, despite the long-standing attention given to the link between investment and tax policy at the national level (Hall and Jorgenson 1967; Auerbach and Hassett 1992). Investment data are not as readily available at the state and local levels as they are at the national level.

Nonetheless, investment has appropriately received more attention in recent studies. One reason is that manufacturing industries have invested heavily in the past 15 years to modernize plants and raise productivity. At the same time they have downsized their work forces. While the share of nonagricultural employment in manufacturing has declined steadily throughout the 1980s and 1990s, the share of nonagricultural output in manufacturing has remained constant. Thus, investment may be an important measure of manufacturing presence in a region, and some researchers have modeled investment rather than employment decisions at a regional or state level.

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The 1980s brought studies using micro data and examining firm births, relocations, and branch plants. Most of the research focus was again on manufacturing industries. Typically in these studies, the dependent variable is the number of plant births or a logit model based on numbers of plants in a state or local area.

The location of foreign direct investments began to receive more attention in the later 1980s and in the 1990s. The explanatory variables used in these studies are similar to those used in other studies of plant location. However, the taxation of foreign plants is complicated by international tax rules governing corporations and individuals who are taxed in more than one country. These complications will be discussed below.

Explanatory Variables and Measurement

The profit functions that undergird empirical work on economic growth and firm location behavior include as variables the cost of inputs such as labor,

energy, capital, and taxes, as well as public expenditure variables, agglomeration economies, and other environmental factors. Indicators of market size, such as population and per capita income, are generally included to represent local demand.

An implicit assumption in most studies is that ultimately the net return to capital is the same across states or localities, because if net returns were different, capital would relocate to obtain a higher net return and such relocations would equalize net returns. Variations in the gross-of-tax cost of capital are determined by variations in taxes on capital in the state or locality. Thus, studies exclude the net return to capital (assumed in equilibrium to be the same across regions) from the model, and include taxes or tax rates sufficient to capture the variations in gross returns that induce plant movements and other shifts in employment or investment activity.

Non-fiscal variables. Labor costs typically are measured using the average gross manufacturing wage rate in the state. Variations in fringe benefits and other costs such as workers' compensation or unemployment insurance have not entered most models because data are either lacking (in the case of fringe benefits) or not readily available (in the cases of workers' compensation and unemployment insurance). Moreover, average wages in a state probably do not represent the wages that firms actually face in choosing locations within the state. In fact, in any state, wages typically are higher in larger urban areas than in smaller urban areas or rural locations.

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Energy costs also are not precisely measured. Studies typically include either state averages or energy costs in a particular area of each state. To the extent that energy prices are not uniform within a state, the state average does not reflect energy costs throughout the state. The second approach may also mismeasure the energy costs that employers face, unless employment growth in a state is concentrated in the area where energy costs happen to have been measured.

Studies have not generally found energy costs to be significant determinants of plant location or of employment growth, however. Moreover, with deregulation of energy prices and production, natural gas prices, at least, are likely to be more uniform across the country now than they were 10 years ago. Electricity prices have not been deregulated as quickly as natural gas prices, partly because electrical energy is not as easily transmitted across regions as natural gas. However, with deregulation, energy costs are likely to lose what limited influence they may have had on firm location decisions, as energy costs become more uniform across states and regions.

Other factors that researchers hypothesize influence firm location and economic growth are unionization of the labor force and right-to-work laws. Agglomeration economies also figure prominently as variables influencing firm location and economic growth. Numerous studies find that agglomeration economies have large and statistically significant effects on firm location. The implication is that when a region has firms in a particular industry or industry group, the region will likely attract more such firms. This might occur because firms want to take advantage of technological transfers when industries are concentrated or because of the presence of a labor force with skills needed in a particular industry.

Tax and expenditure variables. The fiscal variables receive much attention in this literature. These variables are what policymakers can control, and they want to know what effect these variables have on economic growth and firm location. The impact of taxes on firms is difficult to measure, because accurate measurement relies in part on the incidence of the tax. For example, the state corporate income tax, depending on the incidence of the tax, might reduce the return to capital or the return to labor, or affect the price of output or land. The incidence of the tax therefore affects how sensitive firms are to it. If labor is immobile, corporate taxes may fall on labor and not affect firm profits and location. On the other hand, if the corporate tax is borne by capital, firm location decisions are more likely to be affected.

Another aspect of the fiscal environment is the quality and quantity of services provided by government. If government is providing the level of services that residents and firms demand, then taxes may still matter at the margin, as there may be better methods of taxation. But higher taxes that do not buy propor-

tionately more or better services are more likely to deter some firms from specific locations.

Firms may also value some services and not others. For example, firms may value transportation infrastructure to move their products and inputs, or value high-quality primary and secondary educational systems to attract workers to the area. They may not value higher state spending on welfare, prisons, or other social programs. (See Ronald Fisher, below, for a summary of this literature.) The point here is that studies need to include both the taxation and the services the taxes buy in their estimating equations. Some studies have included only police and fire services along with taxes as determinants of firm location or economic growth, but firms' interest in expenditures may not be limited to police and fire services. As for any other class of variable, omitting relevant expenditure variables might bias the results.

The fiscal variables—taxes, the quality and quantity of services provided by government—are what policymakers can control, and they want to know what effect these variables have on economic growth and firm location.

Helms (1985) developed an innovative approach to including fiscal variables in the empirical work. He formulated a budget equation for the jurisdiction in question, in his case, the state. For state and local governments combined, the budget deficit (or surplus) is equal to the sum of all state and local revenue sources (denoted by subscript i) less the sum of state and local spending on various functions (denoted by j): $Deficit\ (surplus) = \sum REV\ (i) - \sum EXP\ (j)$. Helms then includes all but one of the revenue and expenditure items in the estimating equation for economic growth in the states.

The advantage of this approach is that all current revenue sources and all current expenditures are included in the growth model, as opposed to the researcher imposing restrictions by omitting certain revenue or expenditure variables from the estimating equation. Even more important, time-series models that do not account for all expenditures and revenues leave open the question of how the increased tax revenues are used, when simulations are done to assess the effect of tax increases on economic activity. The budget equation attempts to close the model so that increases in taxes are accounted for either by increased spending or by reduced deficits (increased surpluses).

The disadvantages of the budget equation approach stem from two sources: All variables in the equation typically have been deflated by income or population, and the approach complicates the interpretation of the coefficients and makes it difficult to determine a simple tax elasticity. On the first point, for example, as an indicator of service levels, primary and secondary education expenditures should be measured per pupil rather than per capita or as a percentage of income. If states have different pupil-to-population ratios, then education expenditure per capita may mismeasure the amount spent on educating children.

On the second point, one simple tax elasticity cannot be calculated because including the other revenue and expenditure variables implies that the full budget impact of a tax change (or any fiscal change) must be accounted for; in particular, the use to which the tax revenues would be put (changes in spending, other taxes, or the deficit) affects the employment/investment response. For estimation purposes, one of the revenue or expenditure variables from the budget equation must be excluded from the estimating equation in order to avoid exact multicollinearity. The estimated coefficients on any fiscal variable remaining in the equation are then interpreted relative to the omitted numeraire.

Helms omitted welfare spending from the estimating equation; in this framework, the direct interpretation of any of the estimated coefficients on the fiscal variables is that a change in that fiscal variable is offset by a compensating change in welfare spending. Of course, it is possible to calculate the effects of other fiscal experiments. For example, suppose one wanted to decrease corporate taxes and exactly offset the revenue loss with an increase in sales taxation. For this experiment, the difference in the coefficients on the corporate and sales tax variables would form the basis of the elasticity calculation. Any number of fiscal experiments are possible, and the net effect of fiscal actions would be summarized by the coefficients on each of the affected fiscal variables. The tax elasticity would vary, however, with the specific experiment.

The value in the Helms approach is to point out that taxes are not changed in a vacuum; reduced taxes

by themselves will generally add to the deficit. Researchers and policymakers need to be clearer about how tax reductions are paid for. But if taxes do affect economic activity, at least part of any tax reduction (and deficit increase) would be offset by new revenues generated by the new economic activity. This makes the fiscal variables themselves endogenous, a point that is addressed below. Bartik (this issue) makes similar points about the limitations inherent in the Helms approach.

Measuring tax variables. In most of the literature, tax variables are measured either by the nominal tax rates for each tax or by the ratio of the revenue collected to personal income or population. Of these two measures, the ratio of revenues collected to income or population (average tax burden) is better, because it captures aspects of both the nominal rate of the tax and the tax base, whereas the nominal rate approach takes no account of the definition of the tax base and is more likely to mismeasure the burden of the tax. Neither approach typically incorporates the tax incentives offered to specific firms or other types of location subsidies.

Most explanatory variables, from wages to taxes, are measured imprecisely relative to what firms actually pay. This makes it difficult to know if study results accurately represent the impact of these variables.

In addition, a number of underlying provisions in the tax code can adversely affect particular industries. Some examples include how a state's tax code provisions for depreciation of capital interface with the federal depreciation laws; corporate income tax throwback rules, when corporations with operations in more than one state are not taxed on the share of profits allocated to another state; tax nexus principles that determine the conditions under which a state can tax a company that is not physically located in the state; and a host of other practices embedded in the tax codes of states. These aspects of the tax code are largely unmeasured in most studies and may affect locations and growth in as yet unknown ways.

For a newly locating firm or expanding business, the effect taxes would have on the rate of return to investment is better measured by the marginal rate of taxation on the investment or the user cost (Hall and Jorgenson 1967). James Papke (1995) and Leslie Papke (1987) have used a representative tax approach to measure the marginal after-tax rate of return on investment (or the marginal rate of business taxes). Their approach takes a representative firm in each industry of interest and estimates the after-tax rate of return to the firm's investment in each different state. The size of the after-tax return depends on the number of taxes, the treatment of depreciation, the availability of tax credits and exemptions for new investment, and the interaction of federal, state, and local taxes, as well as the structure and location of existing operations, the distribution of product sales, the type of asset, the tax rates, and other tax factors. Using this approach, they have successfully estimated after-tax rates of return for representative firms in various states.

Their approach takes account very well of many hidden tax code differences among states. For example, James Papke's recent study (1995) examines the impact that tax incentives have on the after-tax rate of return. He finds that, at least for the six Great Lakes states, tax incentives (investment tax credits and property tax abatements) have very modest effects on the net returns to new investment. More important, he notes that certain tax provisions, such as the corporate apportionment formula and the treatment of sales to non-nexus states, affect the after-tax rate of return more than tax incentives offered by states to new firms. He reports that the sensitivity of profit rates to the throwback rule is about double that to property tax abatement and investment tax subsidies.

This approach has elevated the thinking about state and local taxes among both researchers and policymakers. While the approach necessitates a number of assumptions about the incidence of taxes and requires one to believe that the representative firm in an industry adequately characterizes marginal investment tax rates for all firms in the industry, the model makes these assumptions transparent. In contrast, when average measures of tax burdens are used in the analysis, the incidence assumptions lie in the background and are not explicitly dealt with in the model or the estimation. Moreover, the average tax rate approach is not specific to industries and certainly not to firms. On these criteria as well as on the general notion of measuring marginal as opposed to average

tax rates, the Papkes' approach considerably improves the measurement of tax variables.

However, studies utilizing the after-tax approach typically omit other aspects of taxation from consideration. Personal income and sales taxes might influence firm location as well as the after-tax rate of return on investment. Moreover, the treatment of expenditures in models using the after-tax rate of return approach has been less than thorough (Tannenwald 1996; L. Papke 1991 and 1987). These limitations are not inherent in the measure of returns to investment. Researchers using the representative tax approach should consider using a wider array of tax and expenditure variables in their models.

In summary, the point to underscore in this section is the imprecision with which most explanatory variables are measured. Everything from wages to taxes is imprecisely measured, relative to what firms may actually pay. This mismeasurement makes it difficult to know whether the empirical results from these studies accurately represent the impact of these variables.

Econometric Issues

While many econometric issues could be discussed and one (specification bias) has been raised above, simultaneous equation bias (the explanatory variables might be simultaneously determined with the dependent variable) is the most common problem in the research on this topic. This bias is more likely to occur when aggregate data are analyzed. For example, in a model explaining employment growth using workers' wages, taxes, and other explanatory variables, the level of taxes and wages might be explained in part by the employment growth. If not accounted for, this simultaneous determination will bias the coefficient estimates.

Simultaneity bias can be corrected in a variety of standard ways, including instrumenting the simultaneous explanatory variables and using lagged values of the explanatory variables in the estimating equation instead of contemporaneous values. The lag period used is generally arbitrary. However, for panel data sets, a one-period lag on the explanatory variable is commonly used as a pseudo-instrumental variable in the equation, because the lagged value of each explanatory variable is thought to be the best predictor of each contemporaneous explanatory variable. However, one should use the predicted value of the contemporaneous explanatory variable as an explanatory variable (even if the predicted value is estimated from the lagged value) and not the lagged value itself, because the predicted value is more likely to be purged of the contemporaneous correlation with the dependent variable.

Another econometric issue is rooted in the use of more sophisticated panel data sets. Most early studies used a cross section of data for a single year, and suggested that the results generalized across time periods. Newer studies, starting with Helms (1985), introduced panel data or included more than one year of data in the analysis. Helms analyzed data for 14 years (from 1965 to 1979) and 48 states. The panel data allow the use of fixed effects (state) to address heterogeneity and reduce omitted variable bias. However, panel data estimation assumes that the regime governing the empirical equations does not change throughout the time period of the data and thus the values of the coefficients remain the same for all time periods in the analysis.

Carroll and Wasylenko (1994), using panel data to analyze employment levels in states in the 1970s and 1980s, find that taxes were less important in the 1980s than in the 1970s. Nonetheless, provided the regime is constant or that allowance is made for regime shifts, estimation using panel data can be more robust, as the larger data set allows correction for heterogeneity and specification problems.

Data Used

As noted above, aggregate data on economic activity include income, investment, employment, and gross state product. Aggregate employment growth is a combination of firm births, deaths, relocation, expansions, and new branch plants, and each component of employment growth may occur for different underlying reasons. Micro data allow one to focus on each aspect of employment growth and obtain separate elasticity estimates for each aspect. Thus, some researchers prefer micro data and believe that these data provide a clearer picture of economic activity. Moreover, specific knowledge about factors affecting each component of economic growth is of interest to policymakers.

Researchers have used micro data from Dun & Bradstreet, Fortune 500 firms, and independent surveys. A relatively new source of information is micro-level firm and plant data from the U.S. Bureau of the Census; these data are available only to employees of the Census and to those the Census designates as employees. While this presents some barriers to use, nonetheless these data represent a rich source of

information for researchers interested in firm location or other aspects of firm behavior.

Beginning with Schmenner (1978; 1980) and continuing with Carlton (1979; 1983), studies have used micro data on branch plant locations, firm births, or plant expansions as dependent (left-hand-side) variables. The location patterns are examined within states or localities. Estimation techniques can become more complicated, as the model now gives each plant an opportunity to select among the 48 states or regions. The micro data are a series of decisions about whether (1) or not (0) to locate in a particular state or region, and multinomial logit analysis is used to accommodate the data and the decision model. Using an alternative estimation approach, Leslie Papke (1991) has used a count model, where in essence she looks at the micro data and adds up or counts how many plant births occurred in each state. Regardless of the estimation technique, in most studies using micro data, the explanatory variables are measured as aggregate values, so that the estimation examines how individual firms respond to aggregate explanatory variables. In the section below, the differences in the tax elasticity results found in studies using aggregate and micro data are highlighted.

Table 1
Summary of Econometric Results of Tax Effects on Business Location: Interregional and Interstate Studies

Dependent Variable	Tax Elasticity[a]	Business Tax Elasticity
Employment or Employment Growth (Aggregate Data)		
Total Employment	6 studies (5) [−.85 to .0] −.58	3 studies (2) [−.16, 0] −.11
Manufacturing Employment	13 studies (8) [−1.54 to .05] −.10	2 studies (1) [−.26, 0]
Other Employment	1 study (0) −.02	1 study (0) 0
Investment (Aggregate Data)		
Investment in Manufacturing	6 studies (3) [−1.02 to .54] −.60 or 0	7 studies (6) [−.36 to −.10] −.20
Gross State Product, Income, or Value-Added (Aggregate Data)	12 studies (7) [−.88 to .27] −.07	1 study (0) −.14
Births or Location (Micro data)		
Manufacturing	3 studies (2) [−.40, 0] −.18	19 studies (15) [−15.7 to .6] −.20

[a]The cells of the table report the number of studies where an elasticity measure can be estimated, the number of those studies in which the tax elasticity was statistically significant (in parentheses), the range of elasticity estimates [in brackets], and the median elasticity. The source for the results is Bartik (1991), pp. 216–34. The results reported there are regrouped by type of study for this table. Studies done since 1991 (cited in the references) are added to the table.

Empirical Results

Bartik (1991) has provided a thorough catalog of employment, investment, and location studies. A few studies of investment and employment have been done since his review and they are included in this review. (Carroll and Wasylenko (1994) and Goss and Phillips (1994) examine total employment, for example.) Still other studies done since Bartik's review examine the locations of foreign direct investments. The recent interest in foreign investment reflects data availability as well as a large increase in foreign direct investment during the 1980s.

Table 1 reports the tax elasticity results for studies of interregional or interstate aggregate economic growth and domestic firm location, by type of analysis. The results are sorted by whether an overall tax elasticity or a business tax (corporate income tax or property tax) elasticity is measured. The results are also sorted by type of data used: state- (or regional-) level aggregate data or micro data on location. Within the aggregate category, results are reported for total employment, manufacturing employment, and manufacturing investment, and for gross state product, income, or value-added measures of economic activity. The studies using micro data generally have examined manufacturing plant births.

Two general observations can be made. First, most of the studies focus on location, employment, or investment decisions made by manufacturing firms. Second, studies using micro data have largely focused on the effect of business taxes on manufacturing location, whereas studies using aggregate data have generally examined the effect of total taxes on manufacturing employment.

All of these studies suffer from at least some of the measurement and other difficulties noted above. Nonetheless, the results based on a variety of data sets over a long time period are more similar than they are different. The range of the elasticity point estimates is still fairly wide, however.

Interregional Studies

Bartik has suggested in his 1994 reviews that the average elasticity is −0.3 for the tax responsiveness of location and economic growth for states or regions, and that the range of the elasticity estimates is between −0.1 and −0.6. The information in Table 1 for each category of analysis (employment, investment, and so on) recounts the number of studies reporting tax elasticities, the number of studies in which the elasticity is statistically significant, the range of the elasticity estimates, and the median value of the estimated tax elasticity. For the total tax responsiveness of aggregate economic activity (manufacturing employment or investment, aggregate gross state product, or other measures of output), 23 of the 38 studies report statistically significant elasticities, and the median values of the estimates for various categories of analysis range from −0.58 to −0.02, with most of the medians clustering around −0.1. For the three studies examining the effect of total taxes using micro data on location choice, the median elasticity is −0.18.

Of the 34 studies (including those using aggregate and micro data) examining business tax elasticities, 24 report statistically significant elasticity estimates. The median values of these elasticity estimates cluster between 0.0 and −0.26, indicating not much responsiveness of economic activity among regions to business taxes. Put another way, from studies using both aggregate and micro data, a large share of the elasticity estimates indicate less responsiveness than the −0.3 average reported above.

Moreover, the results for the interregional effects of taxes on economic activity are not stable. Elasticity estimates range between implausibly high values of −15.7 in one or two studies to positive 0.54 in others. Based on the reported median values, however, the studies using micro data more consistently report lower elasticity values than studies using the aggregate data.

Still, most policymakers are reluctant to dismiss the possibility that taxes have statistically significant effects on economic activity. Several carefully done studies by respected researchers find tax elasticities larger than the −0.6 upper bound of Bartik's range (L. Papke 1991; McConnell and Schwab 1990; Munnell 1990; Bartik 1989; and Wasylenko and McGuire 1985). But at least an equal number of researchers using similar care and sophistication in their approaches find small or statistically insignificant tax effects (Tannenwald 1996; Carroll and Wasylenko 1994; Wasylenko and Carroll 1991; McGuire and Wasylenko 1987; Carlton 1983; Bradbury, Downs, and Small 1982; Schmenner 1982; and Browne, Mieszkowki, and Syron 1980).

These differences apparently are not related to the type of data used (aggregate or micro) in the study, the other variables included in the analysis, or whether taxes are measured using the representative tax approach or the average tax approach. For example, L. Papke (1991) uses the representative tax approach and estimates relatively large tax elasticities in three of the five industry groups that she examines. Tannenwald (1996) also uses the representative tax approach and finds smaller tax effects that are statistically insignificant.

Most policymakers are reluctant to dismiss the possibility that taxes have statistically significant effects on economic activity.

Some of the variation in results may be related to the time period that is analyzed. For example, Carroll and Wasylenko (1994) estimate their model using data from 1967 to 1988, and find that taxes have a larger impact before 1982 than after. Some of the variation in the results between time periods might be caused by the consequences of interstate competition that encourages all states to reduce tax rates and burdens and bring them more in line with those in neighboring states. The more similar are tax rates across states, the less influence taxes will have on location choice. James Papke (1995), using the representative tax approach to estimate 1995 marginal business tax rates, finds that for the six Great Lakes states, the after-tax rates of return to investment are so similar that there are virtually no tax reasons to prefer one of these states over another.

Policymakers often hear that higher state personal

Table 2
Tax Elasticities for Foreign Investments and Plant Locations in the United States

Study	Analysis	Data Years	Tax Elasticity
Ondrich and Wasylenko (1993)	Manufacturing plant births	1978–1987	Corporate taxes −0.567. Other taxes not significant.
Hines (1996)	State share of foreign manufacturing investment	1987	Corporate income tax rate elasticity −0.65.
Woodward (1992)	Number of Japanese branch plants	1980–1989	Unitary taxation negatively affects location. Other tax rates not statistically significant.
Coughlin, Terza, and Arromdee (1991)	Foreign direct investments by state	1981–1983	Not statistically significant.
Moore, Steece, and Swenson (1987)	Net foreign investment in manufacturing assets by state	1977–1981	Unitary taxation is statistically significant. Tax burdens are not statistically significant.
Luger and Shetty (1985)	Number of new foreign start-ups in three industries	1979, 1981–1983	Negative for drug manufacturing. Positive for industrial machinery and motor vehicle production.

Source: Wasylenko (1994).

income taxes deter business location and employment growth. Two studies (Wasylenko and McGuire 1985; Goss and Phillips 1994) find that states with higher personal taxes have lower employment growth. Carlton (1983) and others do not find statistically significant effects for personal taxes, however.

The fact that the tax elasticity results are unstable is also reflected in the different conclusions drawn in literature reviews on location choice. Two recent literature reviews (Lynch 1996; Kusmin 1994) find little evidence that the level of state and local taxation figures prominently in business-location decisions. Lynch, in particular, notes that there is no evidence that state and local tax cuts, when paid for by reducing public services, stimulate economic activity or create jobs. Moreover, state and local tax incentives and financial inducements are not the only or even primary influences on business investment decisions.

On the other hand, Phillips and Goss (1995) have done a meta-analysis, a statistically based and perhaps more systematic approach to a literature review. In effect, the analysis treats the estimated tax elasticities as observations in a data set and regresses the tax elasticities on explanatory variables describing the estimation model used to obtain each elasticity. The meta-analysis suggests that the average tax elasticity is −1.14, when public services and fixed effects are included in the analysis. The average tax elasticity is −0.4 when the models include only taxes, however. Phillips and Goss point out that one would expect this finding of a smaller (less negative) tax elasticity when measures of service levels are excluded, because of omitted variable bias. When no measures of services are included, the coefficient on taxes also picks up any (positive) effects of services on growth to the degree that service levels and taxes are positively correlated (as they typically are since higher taxes finance more services).

While more systematic, the meta-analysis treats all estimated tax elasticities the same, whether statistically significant or not, one of the flaws in the analysis which the authors recognize. Moreover, a few outlier elasticities could drive the statistical results. The disagreement highlighted in these recent reviews clearly underscores the instability of the elasticity estimates.

Foreign Direct Investment

Table 2 reports results for recent location studies of foreign direct investment in the United States. This analysis is complicated by at least two aspects of international taxation and state tax rules that apply to multinational companies. Some home countries use territorial tax systems, in which the home countries do not tax the foreign investment. Foreign investors from these countries may therefore be sensitive to United States (host) country taxes. On the other hand, foreign

Table 3
Summary of Econometric Results of Tax Effects on Business Location: Intra-regional Studies

Dependent Variable	Property or Business Tax Elasticity[a]
Employment or Employment Growth (Aggregate Data)	
Total Employment	4 studies (3) [−1.95 to −.81] −1.85
Manufacturing Employment	1 study (1) −.79
Births or Location (Micro data)	
Manufacturing	5 studies (4) [−2.70 to .62] −1.59
Other	1 study (1) −4.43

[a]The cells of the table report the number of studies where an elasticity measure can be estimated, the number of those studies in which the tax elasticity was statistically significant (in parentheses), the range of elasticity estimates [in brackets], and the median elasticity. The source for the results is Bartik (1991), pp. 216–34. The results reported there are regrouped by type of study for this table. Studies done since 1991 (cited in references) are added to the table.

investors from home countries using residential tax systems are subject to taxes in both host and home countries (upon repatriation of profits), but receive a tax credit in the home country for direct taxes paid in the host country. For these investors, host country taxes probably would not matter, if taxes in the host country are lower than in the home country (and hence fully creditable), but taxes may affect location if host country taxes are higher than home country taxes or if the investor is in an excess credit position. The second issue is the definition of the profits that states apportion. In the 1980s, up to 11 states applied a worldwide unitary concept to determine the profits of a foreign investor.

Worldwide unitary taxation is found to have a negative effect on investment or branch plant location in two of the six studies reported in Table 2. Two other studies find that the corporate income tax rate itself has a negative effect on investment or location. Moreover, both of the studies report a tax elasticity close to −0.6. (Hines reported the −0.65 elasticity estimate in a seminar on his paper at Syracuse University in September 1996. This result is not explicitly reported in his 1996 paper, however.) There is some variation in the results, as is the case for domestic investment.

Intra-Regional Studies

Table 3 reports the elasticities of intra-regional employment and location with respect to property or business taxes. Fewer studies analyze intra-regional elasticities than inter-regional elasticities. Of the 11 intra-regional studies reported here, four analyze total employment, five examine manufacturing plant locations, one looks at aggregate manufacturing employment, and one looks at the location of industries other than manufacturing. Nine of the 11 studies report statistically significant tax elasticities.

A basic finding of this literature is that the smaller the overall area over which a business is choosing a location, the more similar are nontax factors across the subareas. For example, a typical choice for a firm might be whether to locate in a city or in one of its suburbs. With a metropolitan-wide labor market, the same labor force would be available to the firm in all the areas being considered, and other cost factors, such as energy, would also be similar across the area. In this context, fiscal factors take on more significance. Thus, the tax elasticities are expected to be higher in intra-regional studies, and Bartik (1991) and others have concluded that the intra-regional elasticity is about −1.5.

In fact, Table 3 does show higher elasticities for intra-regional studies than Table 1 shows for interregional ones. For example, for total employment and manufacturing plant births (the two categories with the most studies), the median intra-regional elasticities are −1.85 and −1.59, respectively. For intra-regional aggregate manufacturing employment and nonmanufacturing location, the elasticities are also high relative to the interregional results. The tax elasticities within a region appear to be at least four times the interregional elasticities.

Summary

Taxes do not appear to have a substantial effect on economic activity among states. In part, states and regions have acted to neutralize the effect of taxes by adopting tax systems that are more alike. Without significant differences in state tax systems, taxes will not play a significant role in firm location and expansion. Given any particular tax elasticity estimate, however, the degree to which a specific state's tax rate will affect economic activity in the state depends on the

degree to which the state's tax burden deviates from that in relevant comparison states. As long as the tax elasticity is negative and significantly different from zero, high-tax states will lose more economic activity than average or low-tax states. Indeed, the highest-tax states, such as Minnesota, Wisconsin, and New York, have recently acknowledged that high taxes may be responsible for the low rates of job creation in those states (*State Policy Reports* 1994).

States appear to overestimate the degree to which taxes affect economic outcomes and hence are not very receptive to the finding that taxes have little effect nor to the explanation that, from a national perspective, firm location and economic activity are zero-sum games for states. State policymakers feel pressure to keep the state economy growing and producing jobs for its citizens. Thus, other than stating that tax elasticities are small, more specific advice for state policymakers is needed.

Advice About Tax Policy

Courant (1994) has urged researchers in this area to look beyond a count of the number of jobs created, even if taxes do have significant effects on economic activity. He reminds us that state government intervention to influence job growth is not always warranted. One reason for intervention might be the existence of agglomeration economies that demand temporary government subsidy or special tax treatment to get the industry beyond some critical mass. This is similar to arguments made in the international trade literature in favor of a country's pursuit of an industrial policy. Courant also notes, however, that appropriate intervention might occur rarely and generally would involve more action than simply lowering taxes to attract more firms.

Both Courant (1994) and Bartik (1993) urge the extension of our analysis to the beneficiaries of job creation. For example, the social implications of job creation, which persons or groups (the poor, single mothers, or high-skilled workers) benefit from job creation, should be addressed. The wage levels of the new jobs as well as the nature of the jobs created are also of interest. The creation of low-wage, part-time jobs creates fewer economic benefits than full-time jobs, for example.

The issue of what types of jobs are created and who benefits from them is of special interest now, given welfare reform and the need for many able-bodied persons to find jobs. Even if state fiscal policy instruments simply move jobs from one location to another, this relocation of existing jobs might still be looked upon favorably when the intention is to attract jobs to a particular location.

Moreover, the specific tax reform chosen will affect the types of jobs created. Generally, reductions in capital or business taxes would attract more capital-intensive firms, which may pay higher wages and benefit those with more education and job skills. Reducing the highest personal income tax brackets might attract firms that use more human capital in the workplace and persons who have high earnings, such as software developers and engineers. But neither approach is likely to attract jobs for low-wage workers and, indeed, tax policy may not appropriately be directed at creating low-wage jobs.

The issue of what types of jobs are created and who benefits from them is of special interest now, given welfare reform and the need for many able-bodied persons to find jobs.

Migration of workers into and out of areas can reduce or eliminate the effectiveness of targeting certain jobs to residents in specific locations. Marston (1985, p. 74), for example, has argued that shocks or subsidies in particular labor markets only temporarily reduce unemployment in the area. In a short period of time, in-migration of workers to the area eliminates the benefits to the original residents.

In contrast to that argument, Cross (1988) and Bartik (1991) contend that even temporary employment of previously unemployed persons imparts work skills (hysteresis effects) and leaves them permanently more likely to find jobs. Nonetheless, based on 18 studies, Bartik (1993) concludes that 60 to 90 percent of jobs created by employment programs go, in the long run, to in-migrants to the area or unintended beneficiaries. Even more problematic is a recent finding by Blanchard and Katz (1992) suggesting that in the long run, new in-migrants to the area take all of the newly created jobs.

Disagreement can also be found in the literature over which racial, gender, and age groups benefit

from job growth. Several studies find that job creation programs increase employment more among blacks than among whites (Frey and Speare 1988; Moore and Laramore 1990; Bound and Holzer 1991; Freeman 1991; Bartik 1992), while other researchers find no differences (Ihlanfeldt 1992) or even smaller job effects for blacks than for whites (Ihlanfeldt and Sjoquist 1991).

Ladd concludes in her 1994 survey that place-based subsidies and even people-based, place-based subsidies have failed to raise employment levels and the well-being of the targeted residents. Her results relate specifically to enterprise zone-type programs, where the programs are costly and the benefits elusive. In fact, spatially targeted subsidies in the form of tax reductions are, by most evidence, inefficient mechanisms by themselves for increasing the employment of residents in states and regions.

While competition for jobs will probably remain a component of state and local tax policy, firms may favor a stable business tax system that efficiently funds the services demanded by businesses and citizens of the state. A general policy of low tax rates and broad tax bases should remain the standard for states. States with structural deficits, high marginal tax rates, and inefficient service delivery should pay more attention to the effects of taxes on economic development. However, a more effective policy might be to reform the tax system, realign expenditure to citizen demands, and close the deficits over time. This will likely attract more firms than will tax reductions that are not accompanied by systematic fiscal reform. In fact, policymakers' heightened concern about tax effects on business may signal deeper fiscal problems that small changes in the tax code are unlikely to remedy.

Conclusions

The competition for industry among states is unlikely to end, and the effect of taxation and fiscal incentives is likely to remain of interest to policymakers. This review of the literature suggests that taxes have a small, statistically significant effect on interregional location behavior. The suggested estimate of the interregional elasticity is -0.2. However, all elasticity estimates must be viewed in the context of the state and its fiscal position vis-à-vis other states. The effect of a specific state's taxes depends not only on the elasticity, but also on the extent to which the state's overall (state and local) tax levels are significantly different from the average of the states it competes against. A large deviation from the average tax level, multiplied by the tax elasticity, will yield a large location, employment, or investment effect.

Intra-regional studies produce tax elasticities that are quadruple or more those found in the interregional studies. With other cost and market variables very similar among different locations within a region, fiscal differences within the region play a more significant role in location choice.

Most important, ad hoc tax reforms should not be used as a back-door remedy to systematic deficiencies in a tax or fiscal system or in the name of improving the business climate. A band-aid approach to tax reform creates more inequities and inefficiencies than it resolves. When the business climate of a state becomes so problematic that tax laws need to be changed routinely to attract businesses, the practice may be a symptom of problems with the tax system itself and a signal that systematic tax reform might be a more useful approach. In effect, tax reform treats existing and new firms equally, and responsible reform will also systematically account for any tax revenue lost due to reform. It is probably the case that sound tax and fiscal policy obviates many of the tax perks that businesses seek.

As a result of federal reform, new responsibilities for welfare spending represent fiscal challenges for the states; state welfare expenditures will likely increase, possibly leading to more variations in taxes among states. States that handle welfare reform and growth in Medicaid expenses in line with their own community's preferences and with fiscal integrity will, in the long run, attract jobs and investment.

Fiscal reform should move toward more efficient tax systems and expenditure accountability. Where distributional and economic development considerations are concerned, policymakers should press analysts for a more complete understanding of the beneficiaries of any policy action.

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Discussion

Comments on this paper are combined with those on the following paper and begin on page 67.