The Effects of State and Local Public Services on Economic Development

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The purpose of this paper is to summarize the burgeoning literature concerning the relationship between public services, or at least government spending, and economic development in the jurisdiction providing those services, as measured by changes in population, employment, income, or the number of firms. Much of this work, particularly the initial studies, arose as a reaction to research examining the effects of taxes on economic growth. Taxes, of course, are a means by which public services may be financed. If taxes reduce growth or inhibit development, then presumably no democratic government would collect taxes unless there were (at least partially) offsetting benefits. Accurate estimates of the possible negative effects of taxes require similar estimates of the possible benefits from the public services financed by the taxes. As this work has advanced, however, the public policy focus has become more positive, as the research seeks to identify public service actions that governments might use to stimulate various types of development.

Just as the focus of this research has evolved, so has the technical sophistication of the underlying theoretical models and econometric methods. The initial attempts to include government services often were simply "afterthoughts" to research focused on tax effects. In many instances, one or two measures of government spending were included in a more or less ad hoc manner as controls. As the research has become more sophisticated and more concerned about service effects, attempts have been made to include the entire governmental budget, to better measure the quantity and quality of public services, to account for the possible reverse causation of growth affecting public service choice, and to allow for possible differential effects of public services on different industries or factors of production.

The paper begins with a survey of the general results concerning the economic development or growth effects of transportation, public safety, and education spending or services as well as the results of studies relating public capital to national productivity. These results represent

Table 1
Summary of Results, Studies of Selected Public Services

Highways (Transportation)	Public Safety	Education
10/15 positive	5/9 positive	12/19 positive
8/15 positive and significant	4/9 positive and significant	6/19 positive and significant
	2/8 positive and negative, by industry and functional form	5/19 highly varied results

the current conventional wisdom about the relationship between economic growth and the provision of public services, and they also illustrate the theoretical and econometric issues that are still unresolved or at least bring some uncertainty to the interpretation of those results. In the next section of the paper, each of these difficult theoretical and empirical issues is considered and evaluated. One question is whether the issue has been dealt with adequately in the existing research; another is whether the issue appears to exert an important influence on the statistical results. Some suggestions for additional research or a refocused research direction are offered in the final section.

It is important to note at the start that the topic of this paper has been the subject of a very large number of research studies, and that many of these already have been surveyed and evaluated comprehensively. Prominent reviews include Bartik (1991), Wasylenko (1991), Munnell (1992), and Fox and Murray (1993), among others. Fortunately, many of these people and others who have conducted specific studies of the development effects of fiscal policy are participating in this symposium. Primarily a consumer of this research rather than a producer, I see my role not as one of replicating or duplicating those prior reviews, but rather as one of characterizing the existing state of knowledge as a means of raising interesting new questions and inducing important new research.

What Do We Know (or Think We Know)?

In many studies, government spending, public capital, or public services are estimated to exert a positive and statistically significant effect on economic development (Table 1). But the results vary greatly. Perhaps the most that can be concluded is that *some* public services clearly have a positive effect on *some* measures of economic development in *some* cases. A single partial-equilibrium result does not appear to exist and, indeed, various reasons discussed below suggest why one should not look for one.

Highways and Transportation Facilities

Of all the public services examined for an influence on economic development, transportation services, and highway facilities especially, show the most substantial evidence of a relationship. Of the 15 studies reviewed, a positive effect of highway facilities or spending on economic development is reported in 10 (or nearly 70 percent), with that effect being statistically significant in eight of the cases. A summary of these results is shown in Table 2.

This significant and positive relationship arises in studies of very different types—whether the unit of observation is differences among states or differences locally, whether transportation service is measured by highway spending or by a physical measure of facilities (miles of highways per area), for different measures of economic development (including employment, income, new investment, and the like), and in studies that attempt to correct for state or local fixed effects as well as those that do not. Those studies that measure highway service with a physical measure of facilities (usually highway density) report positive and significant results more often than those that measure highway spending. It also seems important that while some studies report an insignificant relationship, only one (Dalenberg and Partridge 1995) actually reports a significant *negative* relationship between development and highway spending.

Often difficult to calculate because of the variety of measures of government spending or facilities as well as differences in the units of observation and measures of growth, the magnitudes of the estimated effects of highway spending on economic development appear to be quite small, even when significantly positive. Luce (1994), for example, suggests that a 90 percent increase in public works/public safety spending per household would translate into about a 30 percent increase in manufacturing employment, but no increase in employment at all in retail trade and finance.

The work by Dalenberg and Partridge (1995) is of interest partly for what it suggests about the major

Table 2
Selected Studies of Highway (Transportation) Effects

Author(s) and Year	Transportation Measure	Development Measure	Unit of Observation	Results
Dalenberg and Partridge (1995)	Highway spending/ personal income	Employment	Metropolitan areas	−, significant
Evans and Karras (1994)	Highway capital stock and current highway spending	Gross state product	States	−, not significant for capital stock; +, not significant for spending
Luce (1994)	Access to highway and railroads	Employment, labor force	Local governments	−, labor force +, significant, employment
Garcia-Mila and McGuire (1992)	Highway miles per square mile	Gross state product	States	+, significant
Coughlin, Terza, and Arromdee (1991)	Highway miles per square mile	Foreign investment	States	+
Jones (1990)	Highway spending per capita	Employment, personal income, investment	States	−, not significant +, some significant
Luce (1990)	Highway spending/ personal income		States	−
Mofidi and Stone (1990)	Highway spending/ personal income	Manufacturing investment and employment	States	+, jointly significant
Reynolds and Maki (1990)	Highway spending per capita	New plants	Labor market areas	insignificant
Bartik (1989)	Highway miles per square mile	Small business start-ups	States	+, not significant
McGuire and Wasylenko (1989)	Highway spending per capita	Employment	States	−, not significant
Carlino and Mills (1987)	Highway miles per square mile	Population, employment	Counties	+, significant
Place (1986)	Highway spending		States	+, not signficant
Bartik (1985)	Highway miles per square mile	New plants	States	+, significant
Helms (1985)	Highway spending/ personal income	Personal income	States	+, significant

issues that need to be addressed in this area of research. These authors examine the effects of highway and other public spending on employment in aggregate and for specific sectors among metropolitan areas, over a 15-year period. The research accounts for the entire set of government fiscal policies by including measures of all taxes and spending categories (relative to one omitted category); it attempts to correct for unobserved area-specific factors by using three-year first differences for employment; it examines the disaggregated effects on different types of industries; and it explores a possible influence of the stock of public capital separate from marginal changes to the stock (new highway spending). In short, Dalenberg and Partridge seem to have done all the right things theoretically and econometrically, and even they call their finding of a significant negative relationship between employment and highway spending "surprising."

Dalenberg and Partridge offer three possible explanations for this result. It may be that the *average* effect of highways is positive, but that the *marginal*

effect is negative, given the current stock. Or it may be that greater highway expenditures are responses to deteriorating highways and represent declining highway service. Or highway service may influence development only at the state level, and not locally. The relationship between government spending and the actual quantity and quality of public service provided is a crucial one. Similarly, spillovers can be substantial for many public services, suggesting both that one jurisdiction's service or spending can seriously underestimate the total service available and that the value of one jurisdiction's public service may depend on the decisions of others. These are some of the issues considered in the second section of this paper.

Of all the public services examined for an influence on economic development, transportation services, and highway facilities especially, show the most substantial evidence of a relationship.

It is also interesting to compare Dalenberg and Partridge's (1995) results to those reported by Luce (1994). Both are relatively recent studies of highway effects on local economic development, measured by employment in aggregate and for specific sectors. Both use appropriate empirical techniques to test and correct for possible endogeneity between government service and economic development. Both take account of the entire public sector budget by including the exhaustive set of government spending and taxing categories. The studies differ in at least two important ways. Luce examines the effects of fiscal policy on employment among localities in a single metropolitan area, while Dalenberg and Partridge examine the effects among different metropolitan areas. Luce measures transportation service by *both* public works (and public safety) spending and a measure of physical access to transportation facilities, while Dalenberg and Partridge use highway spending as a fraction of personal income. Even in an area with relatively good agreement about results, and with such care by the researchers, dramatically different results arise: Luce reports positive effects of public works spending (not significant) and access (significant) on employment, while Dalenberg and Partridge find a significant negative relationship between highway spending and employment.[1]

Public Safety

The structures of the nine studies of the effect of public safety services on development reported in Table 3 are more similar than those for the transportation studies, but the results are slightly less consistent. Less than one-half of the study results indicate a significant positive effect of public safety spending on economic development, as measured by changes in employment or new investment. As with transportation, the influence of public safety spending seems to be more important for some industries than others; Luce (1994) and Papke (1991) report substantial differences in effects both within manufacturing and between manufacturing and other sectors. (See Table 5, below). Among the difficult to explain or less than obvious results, Luce (1994) finds public safety/public works spending very important for employment in wholesale trade but not important for retail employment, while Papke (1991) reports police and fire protection spending to be positively and significantly related to new investment in publishing but negatively and significantly related to investment in electronic component manufacturing.

One major difference from the transportation studies is that public safety services are in each case measured by government spending on public safety and not at all by measures of public safety facilities or activity. Because environmental circumstances are likely to vary substantially among localities or metropolitan areas, the difficulty of translating spending into services or public safety itself may be severe in this instance. Devising useful measures of public safety also may be problematic. Carlino and Mills (1987), in a study of changes in population and employment among counties, proposed including crime rates as an explanatory variable, in addition to measures of highway density, educational attainment, use of industrial revenue bonds, and per capita taxes. However, they excluded crime rates from the reported regressions, noting that "Crime rates produced unstable coefficients, presumably because of serious under-

[1] I do not mean to criticize these authors specifically. Their studies merely illustrate the point that even with good agreement about techniques and expected results, substantial differences in actual results still occur.

Table 3
Selected Studies of Public Safety (Police, Fire) Effects

Author(s) and Year	Public Safety Measure	Development Measure	Unit of Observation	Results
Tannenwald (1996)	Per capita spending	Capital spending	States	+, significant
Tannenwald and Kendrick (1995)	Per capital spending	Capital spending	States	+ and −, significant and not depending on functional form
Evans and Karras (1994)	Current spending	Gross state product	States	−, not significant
Luce (1994)	Public safety and public works spending per household	Employment, labor force	Local governments	+, significance varies by industry
Papke (1991)	Per capita spending	Plant births	States	varies by industry three +, two −
Jones (1990)	Per capita spending	Employment, personal income, investment	States	+, significant
Bartik (1989)	Per capita spending	Small business start-ups	States	−, not significant
Deich (1989)	Per capita spending	Small business starts and branch plants	States	+, significant
Papke (1987)	Per capita spending	Capital spending	States	+, not significant

reporting of crimes" (Carlino and Mills 1987, p. 44).

As with transportation, public safety is another category where the interjurisdictional effects may be substantial. Jones (1990) examines the effects of spending in various public services categories on changes in employment, investment, and income among states and reports nearly uniformly positive and often statistically significant coefficients on police and fire spending. But Jones calls these results "puzzling." One of his concerns is the uncertain manner by which police spending is translated into public safety. Another is the fact that most police and fire protection spending is done by local governments, and spending may vary substantially within states. He hypothesizes that state averages of police and fire spending may be serving as a proxy for a broad set of local government services.

Education

Of the three major public services categories reviewed here, the evidence about a relationship between economic development and spending on education is least convincing. Of the 19 studies reviewed, 12 show a positive relationship, but only six studies report a *significant* positive relationship, and in five of the 19 the results are highly variable *within* each study (Table 4). One study even reports a significant negative effect of education spending on development. In short, the empirical evidence about whether and how education influences economic development is quite cloudy.

One possible reason for the uncertainty in these results is that education service or level is measured by education spending, and education is one area where the relationship between spending and service is highly variable. Many differences in circumstances affect the educational outcomes that result from a given level of spending. In addition, education spending decisions primarily are made by local government, and most states show very substantial variation in spending levels (and education levels) among localities. It is not clear, therefore, that the statewide average spending can reflect the educational situation in each of those local areas. The difference in educational spending between two cities in any one state often is as great or even greater than the difference between two state averages. Finally, educational outcomes are the cumulative result of a series of spending decisions, not one. And the final outcomes may not be known for many years after secondary education is completed.

As in the case of public safety, Carlino and Mills (1987) proposed using a specific measure of educational attainment, median years of schooling, rather

Table 4
Selected Studies of Education Effects

Author(s) and Year	Education Measure	Development	Unit of Observation	Results
Tannenwald and Kendrick (1995)	Per capita spending	Capital spending	States	+, significant and not depending on functional form
Dalenberg and Partridge (1995)	Change in spending	Employment	Metropolitan areas	+, significant
Evans and Karras (1994)	Current spending	Gross state product	States	+, significant
Luce (1994)	Spending per pupil	Employment, labor force	Local governments	+, significant, labor force −, not significant, employment
Garcia-Mila and McGuire (1992)	Spending and median years of schooling	Gross state product	States	+, significant
Jones (1990)	Per capita spending	Employment, personal income, investment	States	Varies by period and development measure
Luce (1990)	Spending/personal income	Employment	States	+, significance varies by year
Mofidi and Stone (1990)	Spending/personal income	Manufacturing investment and employment	States	+, significant and not
O'hUallachain and Satterthwaite (1990)	Education percentage of local spending		Local	monthly not significant
Reynolds and Maki (1990)	Per capita spending	New plants		monthly not significant
Bartik (1989)	Per capita spending	Small business start-ups	States	+, not significant
Carroll and Wasylenko (1989)	Spending/personal income	Employment change	States	+, not significant
McGuire and Wasylenko (1989)	Per capita spending	Employment	States	+/−, not significant
Testa (1989)	Spending per pupil			+, significant
Nakosteen and Zimmer (1987)	Per capita spending	Firm migration	States	−, significant
Quan and Beck (1987)	Per capita spending	Wages, employment	States	+, not significant
Place (1986)	Per capita spending		States	−, not significant
Helms (1985)	Spending/personal income	Personal income	States	+, significant
Wasylenko and McGuire (1985)	Spending/personal income	Employment	States	+, significant

than just education spending, to explain changes in county population and employment. Again, however, they found it necessary to exclude that measure from their analysis, noting that "median schooling and family income cannot both be included in the same regressions" (Carlino and Mills 1987, p. 44), most likely because schooling affects income and income affects the choice of schooling. Garcia-Mila and McGuire (1992) used both education spending and median years of schooling and reported that both are positive and statistically significant for gross state product. Including years of schooling reduces the magnitude of the spending coefficient, as one might expect. Garcia-Mila and McGuire also noted that ed-

ucation spending may be endogenous to income. This is but one example of the possible endogeneity problems that must be dealt with in this research.

National Productivity

A related but somewhat distinct body of research has explored the possible relationship between the stock of public capital or infrastructure and national factor productivity and resulting economic growth. Prominent in this work are studies by Aschauer (1989) showing that private and public capital are complementary, by Munnell (1990) showing that labor and public capital also are complementary, and by Garcia-Mila and McGuire (1992), who report that both highway and education services contribute to economic growth, in addition to labor and private capital. The implication is that increases in public capital or infrastructure increase the productivity of both private capital and labor, generating increases in output and income. Aschauer's work, particularly, was viewed as dramatic and thus controversial, as it showed a very large return from investment in public capital. In this work, what has come to be called the *core infrastructure*—transportation and communication facilities, electric and gas utilities, water and sewer systems—seems to exert the greatest effect on productivity and growth, more than public buildings or other forms of public capital.

As noted, these results have been controversial and have come under attack from both policymakers and academics. A number of subsequent studies, including Holtz-Eakin (1994), Evans and Karras (1994), and Garcia-Mila, McGuire, and Porter (1996) suggest that the previous results were spurious or at least biased by not controlling for important time- or area-specific effects correlated with the level or growth of public capital. The results of studies that use statistical techniques to control for these unobserved fixed characteristics that also influence growth find smaller or zero returns to additional marginal investment in public capital.

Some analysts have suggested that public capital increases the productivity of private capital and labor, but with diminishing returns. Fox and Murray (1993) in particular cite a number of cross-section studies showing diminishing returns from infrastructure investments. Thus, investments in public capital may have contributed substantially to private productivity in the past, but as the stock of public capital has grown, the effects of additional public infrastructure investments may be small or nonexistent. Similarly, in declining areas or regions where the public capital stock has been allowed to deteriorate substantially, the returns from new investment or reinvestment may be high, as reported by Deno (1988).

Finally, it seems entirely possible that time series studies of aggregate private factor productivity using national data might show a positive effect of public capital, even though public capital may not exert a measurable effect on development in specific states or jurisdictions, what Fox and Murray (1993) call "site development." Again, if substantial spillovers or externalities are associated with specific types of infrastructure, then the cumulative effect on the national economy could be positive even if the effect is insignificant in one location. For instance, the installation of a major communications tower may have little effect on development where the tower is located, but substantial effect on the growth of industries that utilize the tower's services. Similarly, satellites have stimulated little "site development" in space but substantial productivity growth and output in the communications and entertainment businesses and in the national economy. Still, studies using national data and fixed-effects techniques (Tatom 1991) find no association.

The fixed-effects studies also have received some criticism. Munnell argues that differencing the development measure over a short time period may miss any underlying long-run relationship between public services and development, such as would seem to be the case for education. In addition, the fixed-effects studies often report inaccurate estimates of labor and private capital shares of output. Because the estimated shares for these inputs are too large, some important factor still seems unaccounted for.

Differential Impact by Sector

As with the study of tax effects, a major and not unexpected result concerning public services is an apparent differential influence on different industries or sectors. Unfortunately, the work to date does not appear to have shown any consistent pattern among the set of services and industries. For instance, in the three major studies reported on in Table 5, the results are simply all over the place. Comparing the effects of education spending in Dalenberg and Partridge (1995), who report an insignificant positive effect in all disaggregated sectors, to those in Luce (1994), who shows an insignificant negative effect in most sectors, one might reasonably conclude that no differential effects exist for those broad sectors.

The manufacturing sector in aggregate has been

Table 5
Variation in Effects of Public Services by Sector

Study Characteristics and Type of Public Services	Sign and Significance by Industry			
	+ significant	+ not	− not	− significant
Dalenberg and Partridge (1995)				
Measure of Economic Development: employment				
Observations: metropolitan areas				
Highway spending		Services	Transportation, FIRE (finance, insurance, real estate)	Manufacturing, wholesale and retail trade, total
Education spending	Total	FIRE, manufacturing, services, transportation, wholesale and retail trade		
Spending net of highways, education, and welfare	Wholesale and retail trade	FIRE, transportation, total	Manufacturing, services	
Luce (1994)				
Measure of Economic Development: employment				
Observations: local governments				
Public Safety/Public Works	Manufacturing, services, wholesale trade	Finance, retail trade, total		
Education spending	Retail trade		Finance, manufacturing, services, wholesale trade, total	
Other spending	Finance	Manufacturing, services, retail and wholesale trade, total		
Papke (1991)				
Measure of Economic Development: manufacturing new investment				
Observations: states				
Police and Fire spending	Publishing	Communications equipment, furniture	Apparel	Electronic components

studied more than any other, but Papke's (1991) results suggest substantial differential effects *within* that sector. The theory suggests that public services may have different effects because of differences in private factor intensities, which may be more firm-specific than sector-specific. One interpretation, then, may be that sufficient variation of firm characteristics is present within the broad sectoral categories to mask any effects based on *firm* characteristics. Thus, it may be necessary to follow Papke's strategy of disaggregating individual sectors in order to see well-defined differences. For instance, some types of retail and service firms may share common technological production characteristics, while other types of service firms may be more similar to a subset of manufacturing entities.

Simultaneous Changes in Taxes and Services

One important aspect of those studies that account for the entire set of government revenues and expenditures is the opportunity to analyze the net

effect of balanced-budget changes. One popular example is a comparison of the effects of increased taxes used to finance additional transfer payments with increased taxes used to finance additional public works, public safety, or education services. Another experiment simply substitutes public works, public safety, or education spending for transfers, holding overall taxes constant. And still another uses a simultaneous increase in all taxes and spending (or perhaps a reduction in the surplus).

Several researchers have reported the possibility that higher taxes, when used to increase spending on specific services, could produce a net positive effect on economic development.

Several researchers conducting these statistical experiments have reported the possibility that higher taxes, when used to increase spending on specific services, could produce a net positive effect on economic development. For instance, Helms (1985, pp. 578–79), one of the first to find such a result, reported "raising the property tax . . . to allow an increase in transfers . . . would lead to a first-year decrease in personal income;" by contrast, a "short-run increment in income results from a property tax-financed increase in local educational expenditures. . . ." After examining the effects by sector, however, Luce (1994) suggests that such stimulative effects may occur for certain industries but not all. His work suggests that increased taxes to fund additional public safety/public works spending would lead to a net increase in employment for the manufacturing, service, and wholesale trade sectors. But because the increased spending would be financed by taxes paid by all sectors, including finance and retail trade, where employment was not estimated to increase in response to public safety spending, the net effect on aggregate employment would be negative. The similarity of spending and tax effects is clear from the estimated elasticities: The median inter-area tax elasticity is in the range of -0.25 to -0.50, while the positive public services elasticities reviewed here vary from 0.02 to 0.65.

Even if it is true, however, that an increase in taxes to finance some specific additional government spending properly estimated shows an increase in aggregate economic growth (however measured), it is not clear what the policy conclusion should be. If a government is already providing the locally efficient quantity of public services, then obviously simultaneous increases in revenue and spending would *reduce* residents' welfare (and social welfare, in the absence of spillover benefits). An empirical finding that simultaneous increases in revenue and spending raise employment or income, then, can be interpreted two ways. One is that the government is not providing the Pareto-efficient quantity of public services, perhaps because of a disequilibrium or because of imperfections in the public choice process. The other possible interpretation, stressed by Courant (1994), is that any increases in employment, investment, or even income are not welfare-maximizing for the residents. Thus, Courant challenges the fundamental question posed by much of this research by asking: Should the focus be on employment and investment or on social welfare (utility)?

Conceptual Issues in Measuring the Impact of Public Services

Public Services as Inputs to Production

Bartik (1991) identifies three ways in which public services might influence economic growth or development through an impact on business inputs. Public services may be an unpriced input to production; expansion of public services may reduce the prices paid by business for those services; and some public services may work to reduce the cost of private inputs used by business. Examples seem obvious. Public highways provide an input (usually unpriced) to many businesses; expansion of public airports may reduce the full price business must pay for air transport; and public education may reduce quality-adjusted prices of labor by increasing the supply of workers of a given quality (either by increasing average skills everywhere or by attracting additional workers to a specific location).

In all of these cases, the idea is that the public input reduces production costs directly or increases the productivity of a private input and thus increases output. The underlying model is one in which firms are passive recipients of public services. As explained by Deno (1988, p. 400), "firms do not purchase public

capital on a per unit basis. . . . local governments supply public capital to firms in return for a lump sum property tax payment. . . ." An alternative perspective is one in which firms become demanders of public services or capital and active participants in the public choice process. (Firms may not vote directly, but owners and employees do vote, and firms may provide contributions for various purposes.) In that case, firms do purchase publicly provided inputs at some tax price, and those input prices may alter production technologies (relative input combinations) as well as costs and output.

Suppose, for example, that a firm's output depends on labor, L, private capital, K, as well as public services, G, characterized by the production function

$$Q = Q(L, K, G).$$

Suppose also that public services are financed by a tax on private capital (or labor), so that the private production cost is

$$C = P_L{*}L + P_K{*}K + hG,$$

where h is the firm's tax price of public services or share of taxes. Given that the objective of the firm is to minimize costs for every output, if h is assumed constant the resulting conditions are:

$$Q_L/Q_K = P_L/P_K,$$

$$Q_K/Q_G = P_K/h, \text{ and}$$

$$Q_L/Q_G = P_L/h.$$

If a firm's tax price, h, is low enough the firm may prefer public services or public capital to either labor or private capital, *even if the public input is less productive than the private inputs.* In such a case, firms may actually prefer to receive more of the public input, so a substitution effect is working against increases in private investment or employment. A corresponding scale effect may be great enough to generate increases in K and L, but that is not guaranteed. The point is that if public inputs to business are subsidized sufficiently and if firms are given sufficient opportunity to substitute those public inputs for private ones, output may increase without an increase in private investment or employment. The economic growth effect of the public service would be captured by some measures, but not all.[2]

[2] A similar result arises if h is not constant but is a function of either K or L as a consequence of a wage or property tax. In that case, the private/public capital equilibrium condition is $Q_K/Q_G = (P_K + dh/dK)/h$.

Public Services and Changes in Consumer Behavior

It also appears possible that provision of public services might alter private consumption patterns, as suggested by Clotfelter (1977) and others. For instance, it seems clear that creation and expansion of the interstate highway system had substantial (positive) effects on consumer demand for automobiles and on the automobile industry. To the extent that the production of automobiles is unevenly distributed geographically, the expansion of the automobile industry influenced by public highway investment created local or regional development benefits.

While highways may present the most dramatic example, in numerous other less dramatic instances government services have altered private consumption, and indeed in some cases that was the primary objective of the government expenditure. A community or state may invest heavily in recreational facilities, for instance, which will serve to attract visitors from other jurisdictions. In addition, those facilities may induce jurisdiction residents to alter their behavior toward increased use of the facilities and increased consumption of privately provided complements. The public service or facility may not attract population in the form of residents, but it may attract additional private spending that contributes to growth of employment or income. In short, public services or government spending may influence economic development through demand-side as well as supply-side adjustments.

Public Services versus Government Expenditures

One of the potentially most serious difficulties for studies of the effects of public services on economic development is the problem of measuring both the quantity and the quality of those public services or facilities. As already noted, the dominant practice is to use measures of government spending (per capita or relative to income) to reflect public service levels or public capital. But economists have long recognized that government spending does not necessarily translate directly to additional public output or service.

Bradford, Malt, and Oates (1969) suggested three alternative ways of characterizing public output: spending on inputs; the directly produced output or facilities that result from those inputs (such as hours of police patrols); and the consumer output or consumption service that results partly from the directly produced output or facility. Suppose directly produced

public output, Q, depends on labor (L), capital (K), and other (X) public inputs, as follows:

$$Q = q(L, K, X).$$

Government spending is then wL + rK + pX, where w, r, and p are the respective input prices. The final result from the point of view of consumers or the consumer output, G, then depends on characteristics of the community such as environment (E), population (N), and private consumption (Z) as well as on the directly produced public output, Q:

$$G = g(Q, E, N, Z).$$

One might envision, then, a progression of alternative measures of public services. The most narrow is public capital, followed by public expenditure (per capita or relative to income), a measure of both public capital and current spending together, the physical output of a public service, and finally actual public consumption or results. This suggests another reason why the productivity studies of public capital are flawed, as a focus on public capital alone clearly seems too narrow. The focus should be on *services*, not capital.

Obviously, then, differences among jurisdictions in input prices or environmental or population characteristics influence the relationship between government spending and the public services provided. Increased spending need not lead to a greater quantity or quality of public services if input prices have risen or environmental conditions changed. One possible solution to this difficulty is to utilize measures of directly produced public output (on-duty police officers per square mile, student-teacher ratios, and the like) instead of spending, and to include measures of environmental factors. But *single* measures of output are unlikely to be sufficient and the environmental factors are numerous and sometimes unobservable. The characteristics included in most studies are those related to possible business development rather than factors that affect the quality of the resulting public services.

An alternative solution, and the one increasingly applied in this research, is to assume that input-price and environmental differences among jurisdictions remain constant and to apply fixed-effects techniques. Helms (1985) illustrates clearly the importance of doing so. He argues that "the important differences between states . . . must be accounted for, and strong doubts are cast upon results based on single cross sections, which cannot do so" (1985, p. 580). He concludes that "Fixed-effects estimation is thus seen to be both appropriate and necessary . . ." (1985, p. 581).

The Government Budget Constraint

Particularly among the earliest research, it was common simply to add one or two government spending variables to the equation testing for the effect of taxes on development, as a control. Either it was believed that only certain categories of government services were expected to influence economic development or that one or two categories would serve as good proxies for aggregate spending. In fact, research has shown not only that different categories of government services have different effects on development, but also that some types of spending may reduce development. In addition, among types of government services that appear to influence development, the effect is uneven among industries or types of development.

Helms (1985) was among the first to point out that omitting expenditure-side measures may bias the estimated effects of taxes, because the coefficients would measure the net effect of simultaneous changes in taxes and spending. Rather, Helms proposed using the government's budget identity to identify the exhaustive set of revenue and spending variables and omitting one measure from the estimation to avoid perfect multicollinearity. Helms excluded transfer payments, so that the estimated coefficients on the tax variables represented the effect of increasing taxes to finance increased transfers and the expenditure variables' coefficients represented the effect of increasing spending in that category by decreasing transfer spending.

Mofidi and Stone (1990), using this approach to examine fiscal effects on manufacturing employment and investment among states, showed clearly that the tax effects were substantially underestimated when only selected spending measures were included in the estimation. They conclude that much of the ambiguity or inconsistency seen in this literature arises because the complete tax and services effects have not been properly separated in the analysis. Obviously, this problem can apply to estimation of spending or public services effects as well as taxes. If the revenue side of the government budget is not fully specified in a study of services effects, the coefficients on the services variables would effectively capture the combined effect of increased spending partly financed by an increase in the omitted taxes, which should lead to an underestimate of the services effect. In addition to the studies mentioned above, Luce (1994), Evans and Karras (1994), and Dalenberg and Partridge (1995) use this approach.

Public Choice Regarding Government Spending

Still another important theoretical and empirical factor recognized in many of these studies is the possible endogeneity of the fiscal variables, as economic growth is expected to influence the choice of government service levels and thus taxes. This may be a particular concern with transfer payments, which have been the focus of several studies and which clearly are expected to be cyclical. A number of traditional approaches have been used to deal with this potential problem, including two-stage estimation techniques (Dalenberg and Partridge 1995; Luce 1994), instrumental techniques (Helms 1985), and use of lagged variables (Coughlin, Terza, and Arromdee 1991; Quan and Beck 1987), as well testing for exogeneity using the usual methods, such as the Hausman test (Mofidi and Stone 1990).

One result from the literature examining demand for public services implies that some of the concern about endogeneity may be alleviated. In addition to the positive effect of economic growth on consumer demand for public services, Hamilton (1983) and others have argued that income growth may be a factor *reducing* the marginal cost of public services. For instance, the inputs necessary to achieve a given level of public safety (police and fire protection) may fall as consumers alter their private consumption with increasing income. A similar case might be made for education, as consumers purchase more educational inputs privately as income rises. If this is the case, then rising income (or other forms of economic development) would increase the demand for services but reduce the cost of providing those services; as a result, *expenditures* may not rise (or at least not rise as much as otherwise).

Externalities and Public Goods

A final issue concerns the relationship between the value- or productivity-enhancing effects of public services provided by one locality or state and the public services provided by other similar jurisdictions. It seems obvious that the value of an "interstate" highway in one state depends on the existence of similar and interconnected highways in other states (thus the idea for a federal grant program). Some authors consider possible externalities; for example, Dalenberg and Partridge (1995, p. 631) note a possibility "that positive infrastructure spillover effects across government boundaries offset the negative relationship observed at the metropolitan level." However, if the possibility is handled empirically, usually it is only through some time-specific effect that allows for aggregate changes in public spending or other factors. This issue is also considered by Munnell (1990) and Holtz-Eakin (1994).

An Unfinished Research Agenda

Is there any systematic evidence that these analytical issues affect the empirical results substantially and consistently? Or any reason to believe that certain of these analytical issues are more important than others? Phillips and Goss (1995) have conducted a regression analysis (called a meta-analysis) in which the estimated tax elasticities from some 84 studies are regressed on variables representing the technical characteristics of the studies. The analysis provides two important findings relevant to the issues discussed above. First, they report that estimated tax elasticities differ substantially, depending on whether public services effects are included. Combining this finding with that of Mofidi and Stone (1990) suggests that allowing for the full range of government fiscal decisions is crucial. Second, they report that most differences in analytical technique (other than the inclusion of public services) do not lead to substantial differences in results, with the possible exception of failing to control for fixed effects.

More attention needs to be paid to the normative, welfare issues related to economic development. The key is to define precisely the objectives of both development policy and public service provision.

These findings about technique by Phillips and Goss relate to the question: How does one obtain improved estimates of the effects of public services on economic development? In addition to including the full range of fiscal policies and controlling for fixed effects, I would also suggest that more attention be paid to the issue of interjurisdictional externalities. One can think of this from two perspectives. First, one might explore how public services levels in one juris-

diction are affected by public spending or capital in other jurisdictions. Alternatively, one might argue that economic development in one jurisdiction depends on "regional" public services. If the focus really should be on service level (rather than capital or spending), then these interjurisdictional effects cannot be ignored. The educational level of the population in a specific jurisdiction obviously has been influenced by educational spending or services in the past in many jurisdictions.

I would suggest, however, that the more important research question may be different: What should one do with an estimate of the marginal effects of public services on economic development, assuming that a set of "good" estimates can be obtained? Suppose, for example, that a high-quality study shows that simultaneous increases in taxes and in school spending have no effect on employment in the state or locality. I suspect that very few would conclude that school spending should, *because of this result*, be eliminated or reduced substantially. It might be that education ultimately affects earnings rather than employment, or perhaps any employment increase occurs in a different jurisdiction, or perhaps education increases *utility*, if not income.

More attention needs to be paid, then, to the normative, welfare issues related to economic development.[3] In this, I wish to associate myself with the views of Paul Courant (1994) mentioned earlier. The key issue is to define precisely the objectives of both development policy and public services provision. Suppose that a simultaneous increase in taxes and spending does lead to economic development (measured by employment or investment). As noted earlier, this may reflect inefficiency in public provision initially, in which case additional public services are appropriate. Alternatively, it may reflect a move away from the efficient level of public services, even though certain groups might benefit. For instance, it has sometimes been suggested that at least an implicit goal of development policy is to increase land values. And landowners may not be residents. Other possibilities seem clear. If employment increases, who gets those jobs? Does an increase in employment occur simultaneously with an increase in income (higher labor demand), or does the increased employment arise from increased supply and lower wages?

From this viewpoint, it seems very important to understand who benefits from the various forms of "economic development"; that is, the distributional implications of using fiscal policy for development, as opposed to allocative, purposes. I take this opportunity, then, to renew a research suggestion I have advanced before. It is important to develop better estimates (or in some cases initial estimates) of the incidence of public sector expenditures or services. It seems apparent, at least to this public finance economist, that tax incidence has received a disproportionate amount of attention from scholars, compared to expenditure incidence. Only when we have a clear understanding of who benefits from changes in public services will we be able to evaluate carefully the welfare implications of economic development that arises from attractive public services.

Finally, as researchers, we also need to be sensitive to how our work is interpreted and subsequently used by policymakers. In one study of the effects of public services on development published by a very respectable academic journal in the 1990s, the author includes the following summary sentence: *"The estimates . . . suggest that educational services are the only productive current government service."*[4] I suspect that the author was referring narrowly to the specific econometric estimates, but in almost any broader context this statement seems silly. The author then states: *"Without evidence that government capital does indeed generate empirically important direct nonmarket consumption services . . . ,"* that is, evidence that local residents benefit from local public capital, *"providing more is not appropriate."* What about the simple fact that residents often vote for more spending or facilities or that individuals vote with their feet in favor of communities with "good" public services? In short, there is ample opportunity for these econometric estimates to be misunderstood and misused, and researchers should not encourage that tendency.

[3] Remember that many localities enact provisions to *limit* development, explicitly.

[4] As this is a general point rather than specific comment about that paper, the identity is not disclosed here.

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Discussion

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Both Michael Wasylenko and Ronald Fisher provide good reviews of the research literature on how state and local fiscal systems affect economic development. My comments will highlight the main themes in their reviews and give my own perspective on these themes. My emphasis will be on how research can better inform policymakers.

Main Themes of Wasylenko and Fisher

Wasylenko's and Fisher's reviews have five themes that I wish to highlight. First is the recurring theme that research on state and local fiscal systems and economic development often results in quite *fragile results*. Equally competent research projects may get widely divergent estimates of the economic development effects of fiscal variables. Second, the fiscal variables in this research are *difficult to measure*. The measurement difficulties are particularly acute for public services variables. Third, the research faces econometric difficulties because measured fiscal variables are often *endogenous*, in that they might be affected by economic development.

Fourth, despite these problems, they find some *consensus* that tax and public services variables do have some effects on state and local economic development. Wasylenko argues that tax studies suggest an elasticity of −0.2 for interregional studies, and elasticities at least four times as great for intra-regional studies. Fisher points out that many studies find that at least some public services do matter for state and local economic development.

Fifth, both Wasylenko and Fisher emphasize that a fiscal system's effect on economic development is an *incomplete measure* of its true social benefit. A complete cost-benefit analysis should consider who pays for public services and who benefits from them, who gets the jobs, and the effects of economic development on the local budget.

I will add a few of my own comments to these various themes, and suggest how more research might help policymakers.

The Fragility of Estimates and Consensus Findings

As mentioned by Wasylenko, my position is that the interregional tax elasticity is between −0.1 and −0.6, which seems consistent with Wasylenko's conclusion. I also agree with Wasylenko and most other researchers that the intra-regional tax elasticity is considerably greater, perhaps in the range from −1.0 to −3.0.

It is true that as interregional studies add in controls for fixed regional effects and public services, the estimated tax elasticity often increases in absolute value. Fixed-effect controls are particularly influential on estimates. Some might interpret this as establishing that elasticities closer to −0.6 are more plausible than elasticities close to −0.1. I have argued in the past that fixed-effect estimates have econometric advantages. However, few studies have both fixed-effect and public services controls, which means that one must be wary about endorsing these greater elasticity numbers.

To convince skeptics that taxes and public services affect economic development, we need more studies that rely on natural "experiments," examining the response to large changes in tax or expenditure regimes such as Proposition 13 in California or Kentucky's school reforms.

In addition, I have become more concerned in recent years about measurement and endogeneity problems in many studies that use fixed-effect controls. Studies that use fixed-effect controls often use coarser data on taxes and public services. Fixed-effect studies must generate multiple observations for each local economy in order to allow estimation. This means that one must use the tax and public services data most readily available, which are data on revenues and expenditures. But current revenue and expenditure per capita, or as percentages of personal income, are poor measures of tax rates or public services. Furthermore, fiscal measures using current revenue and expenditure are probably highly endogenous. I will discuss these measurement and endogeneity issues later in these comments.

The fragility of estimates has led some to be skeptical of the consensus estimates of tax elasticities (for example, see McGuire 1992). To convince skeptics that taxes and public services affect economic development, we need more studies that rely on natural "experiments"—studies that observe how similar local economies or firms respond to large, exogenous changes in tax regimes or public services. With large changes in tax rates or public services, measurement issues and endogeneity issues become less of a concern. If we can compare similar local economies or firms, concerns about omitted variable bias are reduced.

To be specific, we need studies that will examine the response to large changes in tax or expenditure regimes, such as Proposition 13 in California, Proposition 2½ in Massachusetts, the Engler administration's shift from property to sales taxation in Michigan, or Kentucky's school reforms. To avoid problems caused by unobservable differences in state economies, we could focus on comparing individual counties' economic development in states that experienced these regime shifts, to development in similar counties in states that did not experience these regime shifts. Research by Isserman and his colleagues indicates ways in which similar counties might be identified (Isserman 1994). To control further for unobservables, the research might analyze differences across industries to see if they are consistent with the expected impacts of such shifts in fiscal regime. For example, one expects capital-intensive industries to be especially responsive to property taxes, and industries using skilled labor to be especially responsive to school quality.

The best examples of this kind of research are a paper by Hines (1996) and another by Holmes (1995). Hines's study is the most convincing evidence to date that taxes matter to business location decisions. He compares the effects of taxes on business location for firms from countries that provide full tax credits for U.S. taxes paid—thus making state and local taxes irrelevant to the location decision—to the location effects of taxes for foreign firms from countries that allow only a deduction for U.S. taxes before profits are taxed in the home country. Holmes's study compares job growth in counties on the border between right-to-work and non-right-to-work states with job growth in counties in the interiors of the two groups of states.

Hines's study finds that firms from countries that only allow deductions for U.S. taxes paid are more sensitive to state and local taxes in their location decisions than firms from countries that allow tax credits for U.S. taxes. This finding is hard to explain unless taxes, or some state characteristic that is highly correlated with taxes, really do affect location decisions. Holmes's study finds large growth advantages for right-to-work over non-right-to-work states for counties near the border between the two groups of states, compared to counties in the interiors of the two groups. This finding is hard to explain unless right-to-work laws, or some state characteristic that is strongly correlated with right-to-work laws, really do affect economic development.

Measuring Public Services

Accurately measuring the quality and quantity of public services is difficult. Consider education. I suspect the difficulty in measuring education quality is one reason that some studies, as Fisher points out, do not find education to have significant effects on economic development. It is difficult to believe that current expenditure on education is the measure of education quality that is most relevant to business decision-making. Education should be most relevant to businesses because it affects the productivity of the workers that the business can hire. The current quality of the work force depends on the quality of education over a lengthy history. Furthermore, education quality depends only in part on public sector inputs; other determinants include the socioeconomic characteristics of the students. Finally, the gross amounts of public sector inputs, such as money or number of teachers per student, are only part of the public sector contribution to educational quality; one also has to consider the effectiveness with which these public sector resources are deployed.

Fisher suggests that including fixed effects for local jurisdictions may control for the omitted variables, other than current public spending, that affect the quality of state and local public services. Fixed effects may help, but I am not confident that they resolve this problem. We need studies that measure public service quality more carefully from a business perspective. We need studies that focus on large exogenous changes in public service quality. For example, one might consider states that have undertaken significant education reforms, and carefully measure how work force quality has changed as a result.

The Endogeneity Issue

The endogeneity of state and local fiscal variables is particularly acute for variables that are measured using actual revenues and expenditures, because revenues and expenditures are directly and immediately affected by local economic development. Endogeneity problems are reduced when researchers use measures such as tax rates, or serious measures of public service quality. Tax rates and public service quality are of course *politically endogenous*, in that local economic development trends will influence policymakers' choices about tax rates and public service quality. But the response of tax rates and public service quality to local economic development may be long delayed, making tax rates and public service quality "less endogenous" than actual revenues and expenditures.

Because of both the measurement problems and the endogeneity problems, I have become increasingly skeptical of the "budget constraint" approach used by Helms (1985) and other researchers (for example, Bartik 1996a). Defining all tax and public service variables as percentages of personal income, or per capita, almost ensures that all fiscal variables will be poorly measured. It makes no sense to scale all tax and public service variables by the same denominator, whether the denominator is population or personal income. For example, as Wasylenko points out, shouldn't education quality depend more on school spending per student than on spending per person or as a proportion of personal income? In addition, public service quality may, as noted above, be only loosely related to current expenditure. Finally, all the current revenue and expenditure variables in the Helms approach are highly endogenous. One can use instrumental variables to try to correct for this, but it is difficult to find good instruments that will be convincing to other researchers.

Why Do We Care About How State and Local Fiscal Variables Affect Economic Development?

As noted by Wasylenko and Fisher, we should be clear about why the effect of state and local fiscal variables on economic development is important for social well-being. I will argue that the relationship between fiscal variables and economic development is important for public policy for four reasons. Research should be more focused on how fiscal variables affect

economic development in ways that are relevant for public policy.

Employment Growth

I argue that we care about local employment growth because wages often do not clear labor markets. Wages often exceed the opportunity cost of labor; studies by Gordon (1973) and Jones (1989) suggest that the lowest wage at which the typical unemployed individual is willing to work—the "reservation wage"—averages about 85 percent to 90 percent of his or her previous wage. Because wages often exceed the opportunity cost of labor, creating jobs in a local labor market usually provides social benefits.

I have argued that the social benefits of job creation probably persist in the long run (Bartik 1991). Blanchard and Katz (1992) argue that the effects of employment growth on local employment rates die out after five years. Bartik (1993) uses Blanchard and Katz's data to argue that their model is misspecified. When their data are used in a more general model, the effects of local employment growth on labor force participation persist for at least 17 years.

We care about local employment growth because wages often do not clear labor markets, and creating jobs in a local labor market usually provides social benefits.

The social benefits of local employment growth probably are higher in local economies with high unemployment, because reservation wages will be lower. These social benefits of job creation may be nonexistent in low unemployment areas, where reservation wages may be close to market wages. If the costs of job creation are similar across different local economies, then high unemployment areas should more vigorously pursue economic development. But we know little about whether the costs of creating jobs through tax reductions or public service expansions are different in different local areas. As argued by Courant (1994), we need more research on the relative effectiveness of development policies in different local economies.

What implications do the benefits of local employment growth have for the principle that local public services levels should be chosen so that marginal benefits of public services equal marginal costs? (This issue is raised by Ronald Fisher.) This principle still applies, except that we must consider an additional category of benefits and costs. Traditionally we have considered just the direct effects of public services and taxes on household well-being. We now must also consider their indirect effects on household well-being, through their influence on employment growth.

As Wasylenko points out, a complete cost-benefit analysis of local fiscal policy should also consider the revenue effects of local employment growth. I would add that the analysis should consider the effects of growth on public expenditures. Research suggests that local employment growth is often a fiscal drain, once one considers the marginal capital expenditure required to deal with the resulting household in-migration (Bartik 1996b).

Employment Growth by Industry

The benefits of local employment growth vary by industry. Growth in "high wage-premium" industries probably has greater effects on labor force participation and earnings (Bartik 1996c). We need more research on how the effects of state and local fiscal variables differ across industries. My own experience is that industry-specific estimates often are imprecise or have implausible magnitudes. I suspect that similar findings are buried in the unpublished computer printouts of many other researchers.

Productivity

We want to know the effects of state and local fiscal variables on productivity, even if local income per capita is unchanged. The usual assumption in economics is that, in the long run, local or sector-specific increases in productivity are spread over the entire economy. We need more research that looks at how local policies affect productivity.

Externalities

As highlighted by Fisher, a key issue is whether the public services of one state or local area provide spillover benefits for nearby state or local areas. If so, then state and local fiscal decisions will likely be inefficient without federal intervention. This issue has

become even more important given recent trends toward a reduced federal role in providing public services. To my knowledge, only Bartik (1996a) has examined this issue. This study found evidence that state public services cause positive spillovers on manufacturing output in nearby states. More research should examine this issue.

Conclusion

In sum, current research on fiscal policies and local economic development suffers from three key problems:

- serious measurement difficulties;
- a lack of focus on the issues that are crucial for public policy; and
- endogeneity of the fiscal variables.

New research is needed to address these problems. We need research that is more careful about measuring public service quality and tax rates. We need research that provides more specific evidence on how fiscal variables affect different industries and different local economies. We need more research that looks at effects of fiscal variables on productivity and at spillover effects on nearby state and local areas. Finally, research on fiscal variables and economic development will be more convincing if it can exploit large, natural "experiments" in varying state tax and public service policies.

These types of new research will require much more time spent on data construction. The payoff for this extra time will be empirical results that are more useful for policymakers.

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Discussion

Harley T. Duncan, Executive Director of the Federation of Tax Administrators. The views reflected in these comments are the author's and should not be construed as reflecting the policies or opinions of the Federation or its members.

The papers by Michael Wasylenko and Ronald Fisher have as their principal aim three objectives: first, to review trends in the research examining the relationships between economic development and state and local tax policy (Wasylenko) and expenditure or fiscal policy (Fisher); second, to identify the major conceptual and methodological difficulties involved in such research; and third, to summarize the key findings of the research in a fashion that will be meaningful to policymakers.

In my estimation, as one not steeped deeply in the economics and measurement issues of such research, Wasylenko and Fisher have succeeded on all three counts. In so doing, they have made the results of extensive, sophisticated research understandable to those in a position to act on its results. At the same time, the research they describe has a strong tendency to leave policymakers in a quandary about how to proceed. Wasylenko concludes that taxes, and particularly specific incentives, do not have much impact on levels of economic development. Yet, the "hottest topic" in state legislatures is what sort of tax incen-

tives should be enacted. The Fisher paper, because of its subject matter and the inherent difficulties therein, is perhaps even more problematic from a policymaker's point of view, because the research yields no systematic set of results or relationships between expenditure policy and development. Nonetheless, the papers do help policymakers to understand the research results and to plot an appropriate course of action.

Tax Policy and Economic Development

What Wasylenko Did Right

In three areas, I believe that Wasylenko has done "the right stuff" and made a contribution to the work that state and local policymakers have at their disposal.

The paper does an excellent job of identifying and discussing the conceptual difficulties researchers face in trying to estimate with any precision the impact of tax policy on economic development. Particularly instructive is the discussion of the difficulties in finding adequate "right-hand-side" measures for wage rates, energy costs, return to capital, and "taxes that matter." In addition, the general discussion of the difficulties in developing appropriate approaches to evaluating the effects of particular tax or fiscal incentives, as well as the paucity of studies of this subject, is enlightening, if not discouraging, given the prominence of tax incentives in today's tax policy debates.

The paper also does an excellent job of distilling the key conclusions of the empirical research and presenting them in a manner in which they can be compared and contrasted along important lines. It takes no small amount of courage (but it is correct, it seems to me) to conclude that taxes have a relatively small impact on economic development, given the diverse and relatively small elasticities discovered in the research.

Based on his analysis, Wasylenko offers at least three pieces of general guidance to policymakers that should, in my estimation, be heeded: First, policymakers should concern themselves more with issues of general tax policy such as horizontal equity and tax neutrality than with tax incentives. Second, it is the significant variations in tax structure and tax levels from surrounding or competing states that make a difference, not varying tax incentives. Third, special incentives should not be seen as a substitute for necessary general tax reform.

What Remains to Be Done

Departing from Wasylenko's work, I think additional work needs to be done in two areas in order to provide more assistance to policymakers. First, it seems to me that some discussion and attention should be paid to the substantially different and variable elasticities obtained in studies that focus on *business tax* elasticities, as opposed to tax elasticities generally. These studies generally suggest elasticities well below the norm for taxes generally and are quite erratic. This, in my estimation, deserves further analysis and comment.[1]

Second, the Wasylenko paper found that the research on specific types of tax incentives (particularly enterprise zones) had reached rather diverse and inconclusive results. In my estimation, significantly more work needs to be done in this area if it is to be of value to policymakers. The effect of tax incentives in stimulating job creation and investment is the tax issue most frequently presented to state legislators today. States are under intense pressure to continue to enact and expand such incentives; to wit, Michigan recently enacted a law establishing "renaissance zones," in which certain types of investment will be virtually without tax. The current research is less than helpful in evaluating the various proposals. Given the ubiquitous nature of enterprise zones, their rough similarity from state to state, and their federal counterparts, it would seem possible to design a research agenda that looks at the impact of zones generally and the effects of particular types of incentives therein (for example, personal property exemptions, property tax abatements, job creation credits, and so on). This could be a real addition to the information available to policymakers. The paper prepared by Peter Fisher and

Studies find business tax elasticities to be well below the norm for taxes generally and quite erratic; this finding deserves further analysis and comment.

[1] A possible explanation may be the relatively small differences in business tax levels across states, as examined in Papke (1995) and Tannenwald (1996).

Alan Peters in this volume is an excellent first step in this regard, but in the design of future research the needs of policymakers should be kept foremost in mind.

Raising the Discussion to the Next Level

The question then becomes what policy prescriptions (or at least suggestions) we can draw from the work of Wasylenko and others in trying to evaluate tax policy and economic development. In my estimation, at least two policy implications can be drawn.

With all due modesty, I would suggest that the Wasylenko results buttress arguments I made in an earlier paper, in which I suggested that the manner in which states compete on the tax front could be divided into three categories—"The Good, the Bad and the Ugly" (Duncan 1992). The "good" category consists of general competition among the states for the lowest level of tax burden consistent with the provision of a desired level and quality of public services. And, in fact, most of the studies reviewed do suggest that lower overall tax levels are statistically related to higher levels of economic development, although the results are varied and generally small. Nonetheless, this finding argues that the general tax level is the appropriate area of competition for states, if there is to be competition. This conclusion is similar to the "Convoy Theory" of competition espoused by John Shannon (1994), a keen student of intergovernmental fiscal relations.[2] And as Wasylenko notes, the trend among the states to lower both individual and corporate marginal tax rates is emblematic of this effect.

I agree . . . that competition among the states is self-regulating to a considerable degree, without any "dumbing-down" or "race-to-the-bottom" effect. States are more than capable of regulating their own activities and establishing their own policies.

In the "bad" category, I placed tax competition in the form of various tax incentives aimed at stimulating investment and job creation. I argued that such incentives were disruptive of horizontal equity and had a very high likelihood of subsidizing decisions that would otherwise be made anyway, rather than stimulating new activity. The research done to date supports this thesis. The research goes further to indicate that most jobs do not go to intended beneficiaries.

In the final "ugly" category, I placed tax competition in the form of bidding wars among the states for individual company and facility locations. In my view, such bidding wars meet no test of sound tax policy and breed mistrust of government institutions. Wasylenko's review of the research does not directly address this form of competition.

In short, the Wasylenko paper effectively marshals the arguments supporting a position that states are best off competing on the basis of overall tax policies and levels rather than through specific incentives.[3] Furthermore, his suggestion that states avoid using specific tax incentives when in fact overall tax reform is required, is also a message to which the states should pay attention.

The second policy prescription to be drawn from the analysis is the need for states to place tax incentives in the context of an overall development policy and to subject such incentives to periodic analysis and evaluation. Given the limited impact that can be expected from such incentives, it seems prudent to review their utility regularly. I suggested several parts of such a policy analysis in my earlier piece (1992). Likewise, Dabson, Rist, and Schweke (1996) have suggested a broad policy framework in which tax incentives should be considered and placed.

Two Final Comments

In discussing tax incentives and economic development, I feel compelled to comment on two emerging topics in the field. It strikes me that one of the most interesting questions is the potential constitutional infirmity of many state tax incentives. Walter Hellerstein, the constitutional scholar on state and local

[2] Shannon's thesis is that states avoid tax policies, rates, and levels that cause them to stand out from the bulk of the states because of their negative connotations from a development standpoint. In this fashion, tax competition acts as an invisible regulator of state tax actions. J. Papke (1995) finds a similar effect of tax competition.

[3] I have some concern that Wasylenko's conclusions about the impact of taxes on "intra-regional" decisions as well as some of the suggestions in Dabson, Rist, and Schweke (1996) might be interpreted to suggest that offering incentives in such bidding wars can be determinative.

taxation, has developed a cogent line of argument that concludes that U.S. Supreme Court jurisprudence may well cause a number of tax incentives to be found in violation of the antidiscrimination requirements of the Commerce Clause (Hellerstein and Coenen 1996). In particular, Hellerstein finds suspect those incentives in which the coercive power of the state is involved (for example, a credit lowering an existing liability because of in-state investment, as opposed to an outright exemption of some in-state activity). Peter Enrich (1996) has reached a similar conclusion regarding the constitutionality of many incentive programs, albeit through somewhat different reasoning. If Hellerstein and Enrich are correct, the potential for a seismic disturbance in the tax incentive landscape is relatively great and an item for students in the field to watch.

I disagree with the conclusion of Burstein and Rolnick (1996) about a potential federal role in regulating tax competition among the states. I agree with Shannon (1994) and J. Papke (1995) that competition among the states is self-regulating to a considerable degree, without any "dumbing-down" or "race-to-the-bottom" effect. The demand for quality services precludes such a race to the bottom, and states are more than capable of regulating their own activities and establishing their own policies. As one modest example of the ability of states to act together, I would point to recent actions of the member states of the Northeast States Tax Officials Association (NESTOA) to agree on common guidelines to govern issues of residency and domicile, to eliminate potential multiple taxation of intangible income, and to resolve conflicting determinations of domicile among member states.

Expenditure Policy and Economic Development

Fisher's paper is intended to achieve objectives similar to Wasylenko's; namely, to summarize the empirical work examining the relationship between the provision of certain types of public services and economic development; to identify the conceptual and methodological issues that are involved in such studies and which limit the precision and utility of such research; and to identify some areas for further work. Fisher, too, does an excellent job in hitting these targets. Nonetheless, I must admit that I was less than satisfied when I finished digesting Fisher's paper that I had a good idea what the research was telling me or which policy actions one should take in response to the research. The fault is in no way Fisher's. It is, instead, the fault of the difficulties involved with research of this nature and the mixed results it has generated.

The research is "all over the board" and somewhat inconsistent in its results as to whether investments in public services can increase levels of economic development. For example, the relationship between transportation investments and development is generally positive (but not overpowering), and it is statistically significant only half of the time. Likewise, the relationship between public safety expenditures and development is generally positive, but so inconsistent and variable across industry groups as to cause one to question the meaning of the relationship. Most disturbing, I suppose, is the less than convincing evidence about a positive relationship between education services and economic development. In addition, seemingly inexplicable differences exist across industry groups in the relationship with certain services.

The research examining the relationship between the provision of certain types of public services and economic development is "all over the board" and somewhat inconsistent in its results as to whether investments in public services can increase levels of economic development.

Simply put, if one tried to act on this research, one would likely become very confused and uncertain. If anything, the tendency would be to underinvest or disinvest in public services, because of the quandary.

As Fisher points out, it seems likely that the primary reason for such mixed results is the difficulty

[4] See Enrich's comments elsewhere in this issue.

[5] Enrich (1996) also argues that the Commerce Clause of the U.S. Constitution can act as a brake on interstate competition without the need for federal involvement.

[6] See NESTOA Domicile Working Group, "Final Report to Commissioners: Domicile Status in NESTOA States," May 8, 1996, available from the author.

of the questions involved. Essentially, the research must try to account for the quality of public services or the outcomes of public expenditures in a jurisdiction, using strictly quantitative measures. If a given level of expenditure produces different outcomes across jurisdictions, development responses may indeed be different. Another difficulty is, of course, the variation in the types of services demanded by certain industries. To the extent that an industry or installation does not require a particular service (at least not to extraordinary levels), an increase in spending for such a service presumably will have no effect on its decisions.

What, then, can be said about the policy implications of Fisher's work? Despite the inconsistent relationships shown in the research, it seems inappropriate to say that it makes no difference what we do in terms of investing for development purposes. Instead, it seems the "right" answer is to consider public investment policies and choices as an integral part of an overall strategy for state or local economic development. Such a strategy would include an evaluation of current development patterns in the state and region, the comparative advantages and disadvantages of the state vis-à-vis its "competitors," the strategic objectives of the state, and the mix of public policies, including investments in transportation, education, or public safety, that would help to achieve those goals. If a particular industry group to which the state is well-suited requires a particular type of training or communications or transportation infrastructure, then public spending can be used in those areas.

That is to say, public expenditures can serve a development policy and be a contributor to development, even though they are unlikely to be "stimulators/initiators" of development. Many of the policy guidelines recommended by Dabson, Rist, and Schweke (1996) for tax incentives are equally appropriate for public expenditure policies.

The difficulty of defining policy choices because of the lack of clarity in the research does not mean that Fisher's paper should be given short shrift. He does an excellent job of identifying and explaining the conceptual issues and difficulties involved in this type of research and of outlining some of the approaches that could be taken in the future. Fisher's paper should be reviewed thoroughly by those intending to undertake research in this area.

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Discussion

Therese J. McGuire, Associate Director of the Institute of Government and Public Affairs and Associate Professor at the College of Urban Planning and Public Affairs, University of Illinois at Chicago.

It is with great pleasure that I comment on these two survey pieces. While numerous surveys have been made of the literatures covered by Michael Wasylenko and Ronald Fisher, a sense of confusion and uneasiness remains about what we are to conclude from the plethora of studies. And conclude we must, because the issue of the effect of taxes and government services on economic development is of great importance to public policymakers and residents/voters across the country. I can think of no one whose assessment of the state of our "art" I trust more than Mike's and Ron's.

The central question posed in the Wasylenko paper is whether taxes are a significant determinant of regional and local economic development. Relying heavily on a previous survey of the empirical literature by Bartik, Wasylenko suggests that a consensus has developed among researchers that taxes do matter, but that the effect is relatively small (an elasticity of -0.2). I challenge whether a consensus that taxes matter really has been achieved, and I suspect that Wasylenko himself is ambivalent about this conclusion. My qualms stem primarily from Wasylenko's own work in this area, much of it with Robert Carroll or Therese McGuire, in which he finds that the empirical results are sensitive to the choice of time period to be analyzed.

Thus, I suggest that a new survey of this well-trod literature would be most useful if it only briefly summarized previous surveys of the literature and instead focused attention on three subsets of the literature: (1) the Wasylenko oeuvre; (2) the empirical literature since the Bartik 1991 survey; and (3) a hand-picked selection of favorites. Wasylenko does mention recent studies several times in his review, but these new studies are not clearly identified or critically examined, nor is a synthesis provided of what the most recent evidence has to offer. In particular, it is not made clear whether the most recent evidence (since Bartik's 1991 survey) supports or is in conflict with the results of the earlier literature.

Another cause of Wasylenko's seeming ambivalence about the "consensus conclusion" might be the fact that the evidence from studies of specific tax incentives and enterprise zones, which appears to indicate that specific tax incentives have limited impact on business location decisions, contradicts the conclusion that taxes matter. It is imperative that we reconcile the findings from these two related, but separate, literatures. It would improve the clarity of our thinking on tax incentives to see a summary of the results of the tax incentives literature presented in a table similar to those Wasylenko has provided summarizing the econometric studies.

Finally, I appeal to Wasylenko in this paper, and to all contributors to this literature, to provide guidance on what we should advise state policymakers when they turn to us for help in designing tax or economic development policy. Do we really believe that if Minnesota lowered its rather high tax burdens by 10 percent, the state would see a 2 percent or greater increase in employment growth or investment? And even if we decide we believe this to be the case in the short run, what do we know, if anything, about the long run? The statement in Wasylenko's paper alluding to certain high-tax states acknowledging that their high taxes may be responsible for their recent slow employment growth is not convincing, as these states have been high-tax states essentially forever, whereas their employment prospects have fluctuated over time. The empirical literature is not very helpful in explaining long-run, major patterns in employment, investment, and income growth.

Researchers and policy analysts should use caution in advising policymakers on the importance of public services and taxes as tools of economic development policy.

Turning to the paper by Fisher, I begin by pointing out that the two papers have 27 references in common and perhaps should have a greater number in common. Despite this overlap, the emphasis in the Fisher paper is on expenditures rather than taxes and the conclusion reached is quite different. Fisher provides five tables that summarize very nicely the empirical literature examining the effects of three key types of public services on economic development: transportation, public safety, and education. He con-

cludes that the best studies arrive at conflicting results, most dramatically in a comparison of Luce (1994) and Dalenberg and Partridge (1995), but also in his discussion of Table 5, where he notes that "the results are simply all over the place." One of the studies summarized in Table 5 is L. Papke (1991), which has become very influential in our thinking about the effects of taxes on manufacturing investment. Fisher provides us with a fresh look at this important work when he points out that the results for police and fire spending run the gamut across the manufacturing industries that Papke analyzes.

After his thorough literature review, Fisher discusses several conceptual issues faced by researchers attempting to estimate the impact of public services on economic development. This discussion is equally clear, but it leaves the reader hanging a bit in that he does not suggest implications or offer lessons for future research. He does provide hints about how researchers might address the services versus expenditures issue, but the reader is given little guidance on the other issues.

In my view, Fisher gives too much credence to the early results of Aschauer (1989) and Munnell (1992) on the productivity of public infrastructure. While he notes that this early work has been controversial and criticized, and that subsequent work has reached opposing conclusions, he still allows that the early results could be correct. He argues that Aschauer's finding of a strong positive effect of public capital on private productivity might reflect past stocks of investment, while the marginal effect of investment in public capital might be small or zero. But the models employed in the two sets of literature are virtually identical; only the estimation techniques differ. (Two papers, Holtz-Eakin (1994) and Garcia-Milà, McGuire, and Porter (1996), provide assessments of the different estimation techniques and contrasting results.) Thus, the two sets of results do not cleanly divide along the line of stocks versus flows of public capital. Nor is the argument convincing that the positive effects reported in Aschauer might be due to his use of national data. Studies of national data using appropriate time-series techniques do not corroborate the earlier findings (for example, Tatom 1991).

Two minor comments for future research. One suggestion for a better measure of education services is student test scores by school district. These data are available on a comparable basis only within a given state, but they could be used in intra-regional studies of the effects of education on economic development. A question on the education literature: Do any studies examine higher education separately from K-12 education? If not, this too would be a useful area for future research.

In summary, Fisher's reading of the best studies of the effects of public services on economic development is that the results are conflicting and inconclusive. To me, this implies that researchers and policy analysts should use caution in advising policymakers on the importance of public services and taxes as tools of economic development policy.

Discussion

Robert M. Ady, Executive Consultant, Deloitte & Touche/Fantus Consulting.

As a part of my comments on the papers by Ronald Fisher and Michael Wasylenko, I should like first to review the facility location process, highlighting the effects of taxation. I will then comment on the effects of public services on economic development. The analysis will be based on my practical experience at Deloitte & Touche/Fantus Consulting and on the firm's data base showing the relative importance of location factors as they have related to company location decisions by Fantus clients. These clients have hired Fantus to assist them in siting manufacturing facilities, distribution centers, office/service centers, and research and development laboratories.

Location Criteria: The Role of Taxes

The "art" of facility location was first developed by Fantus Consulting, and its techniques are now used by site seekers everywhere. The basic approach of selecting a location by the matching of company needs with community characteristics is universally accepted, as is the axiom that the selection process is one

of elimination: The site seeker starts with a universe of locations and systematically eliminates those with the greatest disadvantages and the fewest advantages for the project, until the single location with the most advantages and the fewest disadvantages emerges. It is this location that is selected for the new operation.

Companies seeking a location use a myriad of criteria to evaluate locations; some have lists of hundreds, but for most, the list is usually less than 50. These factors are divided into three basic categories: operating costs, operating conditions, and quality of life. Operating costs include such items as labor costs, utility costs, occupancy costs, tax costs, and transportation costs, in the case of manufacturing. Operating conditions include quality of the work force, dependability of utilities, attitude of local officials, and executive travel times. Quality-of-life factors may include cultural activities, education capabilities, sporting opportunities, and housing availability and cost.

Site location is a dynamic process, not a static approach. At each level of screening, the site location criteria are different, as is the relative importance of each criterion.

Location criteria are different for different business sectors and different companies within any sector, as well as at different stages of the site search. This greatly complicates any effort to discern causal relationships between any given location criterion, such as tax levels, and economic activity or growth. Indeed, what might be a direct relationship for one situation or set of studied circumstances might be quite different for another—and in fact for most others.

Site selection is a dynamic process, not a static approach. The "art" of geographic elimination requires a set of screens that systematically eliminate the least favorable locations. At each level of screening, the site location criteria are different, as is the relative importance of each criterion. This is exceedingly important to recognize when trying to evaluate the effect of taxation, or any other location criterion, on economic development.

The Location Process: Initial Screening

The initial stages of the screening process are commonly described as "defining the area of search," that is, identifying the broad region and the individual states that comprise that region. At this level, the relative importance of each location factor or criterion will be different for each individual project. The focus typically is on macro wage differentials, usually at the state level, transportation variations (in the case of manufacturing facilities), and key "fatal flaw" criteria as developed by the company/consultant; for example, right-to-work state, proximity to a university with an engineering school, port facilities, available buildings, and so on. Taxes will be brought into the analysis, but only on a comparative basis. Usually, no detailed tax evaluation will be made at this level of screening.

In terms of taxation, the analysis usually consists of a series of tables showing the following for each state under consideration: corporate income tax (rate, federal deductibility, formula); personal income tax (rate); unemployment tax (rate, payroll); and workers' compensation (code, experience rating). If any state is not reasonably competitive with the others based upon these general tax inputs, it will probably be eliminated at this stage. For example, if most states in the defined area of search have corporate tax levies of 5 or 6 percent but one has a 10 percent levy, the latter state may be eliminated, even though actual corporate income taxes for the project have not been calculated. A state's taxes must appear reasonably competitive when compared with other areas for the area to remain under consideration for the next step in the screening process.

The Location Process: Community Selection

The next step in the location screening process is community selection. The general area of search has been defined and could represent a geographic region, a number of individual states, or a grouping of counties. It is now necessary to evaluate all potential locations within the search area. This could include as few as 15 or 20 communities, or as many as 50 or 100 or more. The focus at this stage is on preliminary operating costs. Areas with fatal flaws have already been eliminated, as have areas with noncompetitive characteristics. Now communities with reasonable operating costs that also meet other key location criteria must be identified. At this stage, tax evaluation is based on modeling actual tax costs for the specific

project under consideration, as well as actual costs for labor, transportation, utilities, and occupancy. A pro forma operating cost summary is prepared for each location under consideration.

Based upon a review of Fantus data bases for clients over the past five years, the relative importance of each cost factor in identifying specific communities within the defined search are as follows, for a typical manufacturing operation and for a back-office operation:

Cost Factor	Manufacturing (%)	Office (%)
Labor	36	72
Transportation	35	0
Utilities	17	8
Occupancy	8	15
Taxes	4	5
Total	100	100

It can be seen that taxes represent only a small proportion of "geographically variable operating costs," that is, costs that vary with geography. To argue a causal relationship at this level of screening between the level of taxation and a decision to locate in any of the communities under consideration would appear most difficult, given the low priority and minimum cost impact associated with taxation. In addition to a determination of "geographically variable operating costs," pertinent operating conditions and quality of life factors are also considered during this step, so that at its conclusion only a handful or even fewer locations remain.

The Location Process: Final Selection

The next level of screening is a direct and thorough comparison and ranking of the three to five locations that offer the greatest advantages and the fewest disadvantages for the proposed project. Now, all taxes and all tax abatements and incentives affecting the project are developed, evaluated, and compared, one finalist location against another. The evaluation includes the tax consequences of various forms of organization and reporting relationships, and the development of accounting procedures that will minimize the tax impact.

Corporate tax impact may be viewed company-wide and even worldwide. Incentives are evaluated against tax levies, and personal tax implications are determined for each individual likely to transfer to the new location. In addition to the impact of state taxes or county taxes, local taxes on real and personal property are calculated, as well as any unique taxes that would affect the operation, such as a local sales tax. Again, incentives reducing tax impacts are identified in order to arrive at a "net" tax for each of the finalist locations.

Pro forma operating costs are calculated for the operation at each community under consideration. Calculations are usually undertaken for 15 to 20 years into the future under various assumptions regarding production levels, profitability, inflation, and so on, in order to determine which community will have the most favorable cost structure for the company in the long term under the most likely of the scenarios.

At this level of the analysis, the "services" side of taxes is also carefully measured—what the company will receive for its tax dollars in the way of services, such as police protection, education capabilities, and the like. For our clients, education has been found to be the single most important service, greatly exceeding the value of all other services combined. A distant second is highway adequacy, followed by public safety and then infrastructure. (The second part of my comments discusses the importance of services in more detail.)

For our clients, education has been found to be the single most important service, with highway adequacy a distant second, followed by public safety and then infrastructure.

The value of education and highways should be self-evident but the ranking of public safety may be surprising. The companies' concern is not only the effect that crime levels have on the safety and security of people and property but also the effect on insurance rates. Effective crime prevention is important to companies considering locations.

All other operating conditions and quality-of-life factors important to the company and the specific operation are also generated, then evaluated and compared for each of the finalist locations. The conclusion of this process results in the selection of the specific community for the new facility.

Summary: Taxation and the Location Process

From a facility location standpoint, three key issues complicate any analysis of the effect of taxation on economic development. First is the lack of consistency among economic sectors, industry groups, and companies within the same group seeking to locate new facilities. To assume that any set of numbers provides a meaningful representation of tax elasticity from which to make generalized comparisons is questionable.

Second, in the site selection process, and hence in the economic development of any area, the role played by taxes and the kinds of taxes considered vary, depending upon the stage of the screening process. Tax implications are dynamic, and they change at each level of investigation from the general level of taxes to very specific calculations of the tax bill related to a specific project. A series of calculations at each step in the process is required to determine any meaningful elasticity coefficients.

The only case where taxes alone could sway a location decision is a company relocation within a relatively autonomous geographic area, such as a city or metropolitan area, where labor, transportation, and utility costs are consistent.

Finally, in the facility location process, taxes are not relatively important when compared with other cost factors such as labor, transportation, and utility and occupancy costs. The only case where taxes alone could sway a location decision is a company relocation within a relatively autonomous geographic area, such as a city or metropolitan area, where labor, transportation, and utility costs are consistent. Then tax variations, and frequently occupancy costs, can be the final determinant. This has been confirmed by literature on the subject.

In summary, site selection data do not suggest any correlation between low taxes and positive economic growth, or between high taxes and slow growth. The location requirements are too many, the process too complicated, and other factors too important to justify a strong relationship.

The Effects of State and Local Public Services

With many states and local governments focused on investment and job creation, and with ever greater competition for public funds, government units throughout the country are trying to determine how best they can spend public funds to maximize results. "Where can we get the greatest economic development impact for the dollars we spend?"

The importance of this question and the complexity of potential answers is indicated by the amount of attention and literature focused on this subject. But, as demonstrated by Ronald Fisher, more work needs to be done. He notes that even using similar approaches and methodologies well established in academic literature, researchers obtain inconclusive and occasionally conflicting findings. I would like to contribute a pragmatic view of the issue, based on the experience of Deloitte & Touche/Fantus Consulting in evaluating the benefits to specific companies of public service investments made by specific jurisdictions—one state against another, one city against another, one site against another.

Jurisdiction versus Jurisdiction

The use of state averages to determine any public expenditure as it relates to population, employment, income, or the number of firms is very misleading. Our experience in evaluating services provided by public funds indicates that differences among communities, even within the same state, are greater than differences among the states. And it must be remembered that in the final analysis companies choose specific communities in which to locate, not specific states. Any analysis is further complicated by the fact that they must select a specific site or building in which to locate, and the taxing jurisdiction and the services provided could be quite different even within the same city, let alone between locations in the same metropolitan area.

Highways and Transportation

From a practical standpoint, the most important highway characteristic as it relates to facility location is distance from an interstate highway or a limited

access highway. According to our data base, over 50 percent of our location clients want to be within 25 miles of an interchange to such a roadway. With just-in-time delivery the current watchword, more and more companies are shifting product from traditional rail to truck. In addition, information age companies use various forms of express service, also dependent upon highway systems, at least for pick-up and delivery. But most important, with tightening labor markets, companies must draw employees from ever-greater distances in order to satisfy labor requirements. Highways facilitate this process.

Recognizing the importance of highways and highway access to economic development, many states and local governments provide funding for highway improvements to industrial parks and to new companies locating in an area. It would seem that there is a direct relationship between funds spent in this fashion and changes in employment or new investment. The case appears much more difficult to substantiate regarding total spending for miles of new highway in an area, or highway spending as a fraction of personal income, especially when evaluated at the local level. The point made by Fisher, in which I concur, is that a fair appraisal is complicated by the interjurisdictional nature of highway impacts.

Public Safety

Companies are concerned about public safety as a location factor as it relates to people (employees, visitors, and so on), property, and insurance rates. These concerns are mostly focused at the local level since local governments usually are the delivering agencies for public safety services. Therefore, any analyses of public safety and economic development would probably be best focused at the local level.

Education

The single most important factor in site selection today is the quality of the available work force. Companies locate and expand in communities that can demonstrate that the indigenous work force has the necessary skills required by the company or that have the training facilities to develop those skills for the company.

The link between education and the availability of a qualified work force is difficult to analyze. The link between education and economic development appears even more difficult, as Fisher notes. Yet, practical location experience suggests a very strong link between the two. This is especially true in this age of broadened job content and technical skill emphasis and, in fact, a qualified work force may be the single most important determinant in the economic development success of any community.

Site selectors typically use a number of surrogates for determining the availability of a qualified work force in an area. Obviously, the existence of firms already having employees with similar skills is a positive. So are favorable secondary school statistics such as SAT/ACT scores, the percentage going on to post-secondary study, student/teacher ratios, classroom size, teachers' salaries, and a number of other traditional education measurements. However, based upon our practical experience, the single most important determinant of the potential labor quality in an area is the presence of post-high school educational facilities, along with the degree to which these institutions are working with local businesses to meet their recruitment needs.

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I do not know if any attempt has been made to formally determine the linkage between labor quality and post-high school opportunities locally, or between these local facilities and economic development, but I would suggest that such efforts could prove fruitful. A study using post-high school data at the local level, not the state level, might find a strong correlation between public spending on this form of education and economic development.

Further Comments

One major location factor not discussed in the literature covered by Fisher is the effect of direct public sector incentives to companies locating or expanding in an area. I would hypothesize that these incentives are positively associated with growth and

productivity. In many cases, public sector incentives substitute directly for funds that the company would pay for various infrastructure improvements. Has growth and productivity been greater for companies taking advantage of public sector funds than for firms not using such funds? What kinds of incentives seem to have the greatest impact on company-specific productivity?

Location factors vary from industry to industry and among companies within the same industry. Therefore, to attempt to model government spending in any macro sense could result in misleading or at best inconclusive results. It must also be recognized that the relative importance of location factors constantly shifts, depending upon the status of markets, resources, and technology.

Finally, I must emphasize again that differences among communities, even in the same state, are greater than differences among the states. This is true as it relates to the determinants of facility location as well as to various categories of public expenditures.