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On Local Finance and the Tiebout Model

By WALLACE E. OATES*

Much of the recent research on the local public sector takes as its point of departure the Tiebout model of local finance in which individual households seek out a community of residence that provides a fiscal bundle closely approximating their demands for local services. A central theme of this literature is the efficiency-enhancing properties of the Tiebout solution. In the "pure" case, it is a straightforward matter to show that a system, in which mobile consumers "shop" among a large group of local jurisdictions that offer a sufficiently diverse set of local public goods at a "tax-price" equal to marginal cost, will generate a Pareto-efficient outcome. The result is, in fact, a close analog to the private-market solution, for, as Charles Tiebout pointed out, "Spatial mobility provides the local public-goods counterpart to the private market's shopping trip... Just as the consumer may be visualized as walking to a private market place to buy his goods, the prices of which are set, we place him in the position of walking to a community where the prices (taxes) of community services are set" (p. 422).

The pure model, however, involves a set of assumptions so patently unrealistic as to verge on the outrageous. In particular, Tiebout assumed a world of footloose consumers, who move costlessly among local jurisdictions in response *solely* to fiscal considerations; the Tiebout household is unconstrained by travel costs to a location of employment or by any other nonfiscal ties to a given locality. Moreover, access to each local jurisdiction in the system must be available at a tax-price equal to the cost of servicing the marginal consumer.

While the model thus generates some appealing sorts of results, the demands it makes on the nature of consumer behavior and

institutional structure are formidable to say the least. The issue is whether or not the local sector in the real world is sufficiently "Tiebout-like" in its structure and operation to permit the use of the model for purposes of prediction *and* prescription.

This is a hard question. As the earlier quotation from Tiebout suggests, it is not too dissimilar from asking, "Is the private sector of the U.S. economy competitive?" As we know, there is not a simple answer to this query. For some analytical purposes (perhaps, for a broad view of the incidence of certain general forms of taxation) the answer may be yes; for others (as, for example, an antitrust investigation of a particular industry) the answer may well be no. Likewise, we are not likely to reach a definitive, general answer to the question of whether or not the local public sector is *sufficiently* Tiebout-like; the response will depend on the specific problem for which this query has relevance.

Nevertheless, there has been a considerable empirical (as well as theoretical) effort over the past fifteen years that explores the workings of the local sector from a Tiebout perspective. I wish in Section I to offer some brief observations on this work before proceeding in Section II to the issue of local production functions.

I

At the most basic level, we can simply look to see if, as a necessary condition for the operation of the Tiebout process, there exists enough diversity in the local sector to permit the kind of sorting out according to demands for local services that is envisioned in the model. Casual observation suggests an affirmative response, at least for most large metropolitan areas in the United States: a newly arriving household, for example, with a place of employment in the central city will typically have a wide range

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of suburban communities from which to select a residence. In a more systematic study of this issue, William Fischel presents a quite fragmented view of the typical suburban sector with a multitude of local jurisdictions exercising both fiscal and zoning powers, and in which the concentration ratio (the land area encompassed by the four largest suburban governments) is relatively low. Enough competitors appear to exist for the process to work; however, as Dennis Epple and Allan Zelenitz (among others) have argued recently, sheer numbers, while constraining the choice of local officials, are not sufficient to ensure competitive outcomes in the local sector.

Another strand of empirical work involves a long series of capitalization studies that have examined the impact of local amenities and taxes on property values. Although the studies vary widely in choice and definition of variables (for example, output versus expenditure measures of amenities) and specific findings, the results on balance suggest strongly that fiscal differentials across neighboring jurisdictions tend to become capitalized into property values. The interpretation of this apparently straightforward result has turned out to be quite complex. On one issue, there is a consensus: capitalization of fiscal differentials is consistent with the view that consumers "shop" among local communities. People (not surprisingly) appear willing to pay more to live in jurisdictions that provide, in particular, such amenities as superior schools and greater safety from crime. The empirical literature thus provides some support for the operation of the "demand side" of the Tiebout model.

On the supply side, matters are less clear. Several authors (Bruce Hamilton, 1976b; Matthew Edel and Elliott Sclar; Epple, Zelenitz, and Michael Visscher) have pointed out that *full*-Tiebout equilibrium would imply an absence of any capitalization: with a perfectly elastic supply of local communities, the benefits from higher levels of amenities would be precisely offset by the associated increase in local tax bills. However, this "strong version" of the Tiebout model surely stretches reality. If we introduce some re-

strictions on the supply of communities (see Mark Pauly or Mahlon Straszheim) or certain forms of voting behavior on the part of residents (John Yinger), a "modified" Tiebout equilibrium will, in most instances, exhibit capitalization. Moreover, in these latter "weak versions" of the Tiebout model, the outcomes are no longer so clearly efficiency enhancing. In short, there appear no clear, unambiguous inferences to be made from the findings of capitalization of fiscal differentials as regards the efficient functioning of the local sector.

Exploring another implication of the Tiebout hypothesis in a recent and provocative study of several hundred towns in Pennsylvania, Howard Pack and Janet Pack have concluded that individuals within communities exhibit far too much variation in their demands for local services to be consistent with a Tiebout-like process. This is a tricky issue. First, Pack and Pack use income as a proxy for the (unobservable) demand for local services; income is, no doubt, positively correlated with demand but not perfectly so—even if demand were perfectly homogeneous in a town, we would expect to find a nonzero variation in household income. Second, and more fundamental, is the nature of the test. How much variation is too much to be consistent with a Tiebout world? The problem is that the null and alternative hypotheses are unclear. We might pose as the null hypothesis that the intracommunity variance in demand is at least as large as the variance in the metropolitan population as a whole; the Tiebout hypothesis would surely pass this test at a high level of confidence. This is admittedly a rather weak test, but at least one with a sound conceptual basis.

The efficiency properties of the Tiebout model also depend on marginal-cost pricing: the marginal resident must pay a fee equal to the cost of extending the local service to include his consumption. Tiebout assumed, in this regard, that the local service is subject to costs of congestion. Empirical demand studies (see, for example, Theodore Bergstrom and Robert Goodman) have tended to support this result: these studies find, in general, that they cannot reject the

null hypothesis of a constant marginal cost for an additional consumer. While this is consistent with the Tiebout view, the mechanism of finance is more troublesome. Tiebout himself was not very explicit on this; he hardly mentions local taxation. However, most localities do not place a central reliance on user fees; they employ a variety of revenue sources, often relying heavily on property taxation. The introduction of property taxation links inextricably the issues of efficiency in local services *and* in housing markets. Hamilton (1975) has shown that the Tiebout model can be extended to a framework in which localities make use of property taxation *and* of a zoning ordinance that specifies a minimum level of housing consumption. While the Hamilton model generates a Pareto-efficient outcome, it makes even greater demands on reality than Tiebout: the Hamilton equilibrium entails communities that are homogeneous *both* in demands for local services and housing consumption.

Moreover, when we introduce further complications in terms of renters (who, many demand studies tell us, seem to believe that they pay lower taxes than owner-occupants), commercial-industrial property which assumes part of the local tax burden, and various intergovernmental grants, the precise link between the tax bill of the marginal consumer and the incremental cost of local services is broken. On this point, Pack and Pack cite a wide variation in housing values within communities, which they take as *prima facie* evidence that tax-prices vary substantially among residents; some of this variation may be offset through capitalization, but, if so, it comes at the expense of introducing inefficiencies into local housing markets (Hamilton, 1976a). In brief, it is unclear how closely the effective tax-price facing a potential resident reflects the marginal cost of local services.

II

While the Tiebout literature has at least addressed the issues examined in Section I, it has virtually ignored what I see as a central problem in local finance: the nature

of the production function for local services. As noted earlier, Tiebout envisioned the provision of local services to be subject to costs of congestion; more specifically, he postulated a U-shaped cost curve with respect to community size, the low point of which served to define optimal community size. Most of the subsequent literature has simplified matters even further by taking the cost per person of a given level of local services to be constant with respect to community size; by assuming identical production functions across communities and with an appropriate selection of units, output in each jurisdiction becomes identical with expenditure per capita. While this procedure simplifies the analysis, it overlooks an issue with quite profound and troublesome implications for public policy.

My contention is that, for certain key local services such as education, public safety, and environmental quality, the production function contains as arguments not only the usual direct inputs of labor and capital, but also the characteristics of the individuals who comprise the community. For public safety, for example, a given input of police services will be associated with a higher degree of safety on the streets the less prone are the members of the community to engage in crime. Likewise, the more able and highly motivated are the pupils in a certain school, the higher will be levels of achievement.

Somewhat more formally (following David Bradford, R. A. Malt, and Oates), let I represent a vector of direct inputs into the production of local services. For schools, for example, this vector could have as elements the number (and quality) of teachers, schoolrooms, and books. The vector I maps into a vector D of "directly produced" services. For education, D might consist of providing a given number of students with a certain kind of instruction (for example, a specified series of "standard" mathematical lessons). In the case of public safety, we might associate these directly produced services with particular levels of surveillance.

However, what concerns the residents of the community is not the elements of D , but

levels of final consumption: the quality of the schools in terms of student achievement, the degree of safety on the streets, and the physical attractiveness of neighborhoods. But these final outputs depend only in part on direct public inputs. For any given I vector, the quality of local schools will be better the more able are students; similarly, the level of public safety will be higher, *ceteris paribus*, the more law-abiding are residents.

In more formal terms, we can express the individual's utility function as $U = U(C_1, C_2, \dots, C_n, Z)$ where C_i is the level of consumption (final output) of the i th local service and Z is a composite private good. In turn, the production functions for the C_i are of the general form: $C_i = C_i(D_i, E)$ where D_i is the vector of directly produced services (a function of I) and E is a vector whose elements are the characteristics of the residents of the community.

My central concern here is with the role of the vector E in determining final outputs of local services. There is plenty of evidence of its importance. The Coleman report and subsequent empirical work attest to the overriding weight of the characteristics of pupils and their families in explaining levels of achievement in local schools. Likewise, population characteristics are typically the major explanatory variables in equations seeking to explain crime rates (see Oates). There is, I believe, little doubt over the moment of the elements of the E vector.

Moreover, this perspective on local production functions has two provocative policy implications. First, it points to an important role for local zoning ordinances as a means for regulating outputs of local services. The existing local-finance literature views the central function of zoning as basically that of excluding lower-income households that will not make a contribution to the local treasury commensurate with their share of budgetary costs. Exclusionary measures to this purpose constitute "fiscal zoning" (see Hamilton, 1975). The contention here is that local zoning regulations can also serve, if admittedly imperfectly, as a mechanism for controlling the composition of the local population so as to enhance the quality of

local services; this is "public-goods zoning." Moreover, it may well be the case that, for services like education and public safety, the variables comprising the E vector dwarf in importance the budgetary inputs of the I vector. There may be only a comparatively limited capacity to improve the quality of the most important local services through the public budget. From this perspective, it is not hard to understand the jealousy with which local officials regard their zoning prerogatives. Zoning may be the one policy instrument they have to exert some control over the more important variables determining final outputs of local services. While this view may raise some thorny issues of social justice with difficult, and perhaps uncertain, normative implications, I would suggest at the same time that it does possess some positive explanatory power.

The second implication of this formulation of local production functions concerns the efficiency properties of the Tiebout model (see the appendix to Oates). In particular, matters become a good deal more complicated. Note that, in this framework, residents of a community are *both* consumers of and inputs into the local services in their jurisdiction. *In consequence efficiency in consumption and in production become inseparable problems.* The sorts of issues that arise in this context are perhaps best suggested by a provocative example. The importance of peer-group effects in schooling are well documented. However, in an intriguing econometric study drawing on an unusually rich body of data, Vernon Henderson, Peter Mieszkowski, and Yvon Sauvageau found for their sample that the peer-group effect (as measured by the mean IQ of the class in which a particular student is placed) is not only extremely important in determining achievement, but is non-linear: "The achievement of individual students rises with an improvement in the average quality of their classroom situations, but the increment in achievement decreases with the level of average class quality" (pp. 97–98).

The implication of this result is that a mixing of weak and strong students will improve the performance of the overall student population. This will, however, run

counter to the interests of the more able students. Note also that it suggests an outcome that can easily be at variance with the sorting out of households according to demands for local services. There may, in this instance, be real tradeoffs both between efficiency in consumption and in production and also among the well-being of different individuals. More generally, the problem is that the efficient consumption of local services will typically require, along Tiebout lines, relatively homogeneous populations within each jurisdiction, while efficiency in production *may*, as in our example, point to considerably more heterogeneity.

The explicit recognition that the quality of local services depends on community composition as well as budgetary inputs admittedly complicates significantly the theory of local finance. However, the issues here have important implications both for the efficiency and equity aspects of public policy. In particular, I don't see how we can truly come to terms with such major concerns as the reform of school finance to provide equal educational opportunity from a perspective that focuses on variations in expenditure per pupil.

III

Both the literature surveyed in Section I and my discussion of local production functions in Section II suggest that the local public sector exhibits certain "imperfections" when measured against a standard of perfect economic efficiency. While this raises certain troublesome *and* intriguing issues concerning the actual workings of the local sector, we should be careful not to overreact to all this and effectively "throw out the baby with the bathwater." The Tiebout model does, I believe, generate some important *descriptive* insights; I have noted earlier the evidence supporting the operation of the demand side of the model—people appear to consider fiscal variables in their selection of a jurisdiction of residence. Moreover, in spite of the various imperfections of the system, the existence of choice among communities offering varying outputs of local services surely has some im-

portant efficiency-enhancing properties. Individual households not only have some discretion over their consumption of these services, but the competitive aspects of the provision of local services encourage a certain responsiveness to consumer tastes and put some pressure on local officials to seek out reasonably cost-effective techniques of production. While competition among local jurisdictions may not completely eliminate the potential for self-serving behavior among local officials, it surely does limit significantly the scope for such behavior (see Epple and Zelenitz).

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