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SESSION TOPIC: EVALUATION OF  
GOVERNMENT EXPENDITURES  
SESSION CHAIRMAN: CARL S. SHOUP\*

EFFECTS OF SUBOPTIMIZATION ON URBAN GOVERNMENT  
DECISION MAKING

DONALD C. SHOUP\*\*

RECENT WORK in the theory of the provision of public goods by local governments has generally started with the assumption that the decisions of each local jurisdiction are based only on the costs and benefits accruing to its own citizens.<sup>1</sup> Yet, the implications of this assumption for methods of conducting cost-benefit analysis by local governments have seldom been mentioned. This paper describes the ways in which this assumed suboptimizing behavior of local governments implies procedures of cost-benefit analysis at the local level which differ from many standard procedures that have been developed for federal-level decisions. In particular, the unique aspects of the cost side of the analysis will be stressed, since local government benefit evaluation problems have received relatively more attention by other authors.<sup>2</sup>

The institutional framework assumed here is that of an urbanized area in the United States, with local governmental powers divided among a set of fragmented local jurisdictions that are overlapped by the state and federal governments. Each unit of local government is assumed to be very small in relation to the national government, so that its own share of the cost of subsidies received from the federal government is negligible. Migration of individuals and firms among jurisdictions within the area is possible, and is assumed to take place in response to, among other things, perceptions of the benefits from local public services provided by each jurisdiction and of the costs of these services in terms of the local taxes required to finance them.<sup>3</sup> Finally, each local government unit is assumed to *suboptimize* rather rigorously in its evaluation of costs and benefits; transfers of income into or out of the community are treated as real benefits or costs by the local government, just as its decision process ignores any uncompensated real costs or benefits created by the community for citizens of other communities. The implications

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1. See, for example, Breton [1965], Hirsch *et al.* [1964], Weisbrod [1964], and Williams [1966].  
2. Weisbrod [1964], Williams [1966], Brainard and Dolbear [1967], Pauly [1970].  
3. The "other things" would include access to employment, land prices, natural amenities, etc.

of this institutional setting are explored for three important factors in the cost-benefit analysis: (1) the discount rate appropriate for local government investment projects, (2) the cost to the community residents of local government tax revenue, (3) and the limits on the amount of income redistribution that can be achieved by local government taxation and expenditure policies.

### I. THE DISCOUNT RATE FOR LOCAL GOVERNMENT INVESTMENTS

Are there any reasons why the interest rate used by a local government should be different from that used by the federal government to discount future costs and benefits? Certainly, for overall efficiency in the allocation of capital in the public sector, it is necessary that, apart from considerations of risk, all units of government (federal, state, or local) utilize the same discount rate. But there do appear to be important reasons for a local government, bent on suboptimizing in behalf of its own citizens, to use a discount rate different from the federal government's. These reasons are discussed under three headings: subsidies, risk, and migration.

#### *Federal Subsidies for Local Government Borrowing*

For its own goal of maximizing the net local benefit of investment projects, each local government is interested in what borrowing cost it faces in the capital market; it is not concerned with the opportunity cost of its borrowed capital in other units of government, in the corporate sector of the economy, or anywhere other than in the hands of its own citizens. For cost-benefit analyses of federal investments, it is, of course, appropriate to be concerned with the fact that the corporation income tax and other taxes drive a wedge between the before-and-after tax rates of return in the private sector. If investors equate their marginal rate of time preference with the marginal after-tax rate of return on investment, this individual rate of time preference is less than the marginal rate of return (to society) on investment, and the federal government must somehow consider one rate or the other (or both) in selecting its own discount rate for public investments.<sup>4</sup> But a local government has no incentive to calculate the opportunity cost of borrowed capital in the public or private sector *outside* its own jurisdiction, except as these affect its own borrowing rate. And there is, of course, good reason to believe that municipal borrowing rates understate the opportunity cost of capital borrowed by local governments.

Local government borrowing rates are subsidized by federal, and sometimes state, income tax exemptions of income from municipal bonds, and they thus enjoy an artificially low cost of capital as compared to the federal government or the private sector. But only the cost of capital to the local government is the relevant cost here, and the subsidy element can be considered a real gain

4. Although decision makers in the federal government are in a position to consider these factors that should enter into the choice of a discount rate for public projects, this does not mean they will. Indeed, a survey of actual discount rate practices found that of twenty-three selected federal agencies, only ten reported discounting future costs and benefits at all. An additional eight agencies reported that they "planned to do so in the future." Of the ten agencies that did use discounting procedures, the discount rates ranged between 3% and 12%. [Staats, 1968: pp. 212-228].

to the local community. Acting as a group, a community can, because of the subsidy element, borrow more cheaply than can each member individually.

In a sense, the local government may be viewed as a financial intermediary acting in the municipal bond market on behalf of its citizens to obtain for them certain tax advantages and perhaps economies of scale. As an indication of the value of the tax subsidy to local government borrowing, it has been estimated that in 1960 long-term yields on local government bonds would have been between 1.19 and 2.02 percentage points higher if the income from those bonds had not been tax exempt [Ott and Meltzer, 1963: p. 47]. Naturally, the cost of this tax advantage for local governments is ultimately borne by the taxpayers of the nation as a whole, but since any one local community is small relative to the whole nation, it can neglect the increase in its own taxes caused by the subsidy it receives. Thus, the tax treatment it receives is a motivating factor that could induce a local government to use a low discount rate in evaluating an investment.

The subsidy for borrowing raises an interesting question as to how far a local government should go in its borrowing to finance public investments. As long as the local government can borrow money at a marginal rate of interest lower than that of its citizens, taxpayers would presumably wish the local government to finance investment, or even current expenditures, by additional borrowing rather than by additional taxes. If there were no institutional restraints on such behavior, the government could borrow until its marginal cost of capital was pushed up as high as the marginal cost of capital to the median citizen. Naturally, the financial circumstances of citizens vary tremendously, and with these circumstances the ability to borrow and the borrowing rate also vary tremendously. Thus the government cannot equate its own marginal borrowing rate to that of all its citizens, but might borrow up to the point where a majority would wish it to go no further (i.e., the median rate).

#### *Local Government Treatment of Risk*

The fact that future benefits and costs of a policy decision are uncertain affects government at the local level just as it does at the federal level. Even if the expected values (probability-weighted averages of possible outcomes) of uncertain future costs and benefits are calculated correctly in a project analysis, there still remains the problem that the variance of possible outcomes may be considered a disadvantage or cost of the project to the citizens of the local community. If individuals are, in general, risk-averse, they will, given the expected value of outcome, require a higher rate of return on investments with greater variance of outcome.

Should government investments also bear a similar risk premium in relation to the expected variance of future costs and benefits? Several noted economists have argued that, for federal investment projects, risk aversion is irrelevant because the risks of a wide variety of dissimilar projects are pooled without transaction costs.<sup>5</sup> The government thus has the advantage of being in the position of an insurance company, for which each individual investment is

5. Arrow [1966], Samuelson [1964], Vickrey [1964].

one of a very large number of roughly independent investments. In this situation the government can count on the law of large numbers to ensure a realized outcome very close to the overall expected values of its portfolio of investments. For projects that are small in relation to its insurance pool, and uncorrelated with the rest of the pool with respect to outcome, the government can make an evaluation on the basis of present expected value alone, without penalizing future benefits and costs by a discount rate that includes a premium for risk aversion.

While the risk-pooling argument, based on the superior self-insurance capability of the government, has great appeal in regard to federal investments, it loses some of its force when applied to local governments. Local governments range from the very small (e.g., a school district) to the very large (e.g., New York City). For a small community, public investment projects might be infrequent, with no possibility of pooling the risks of a group of uncertain undertakings. However, there are numerous local governments that seem large enough to have some scope for risk pooling.

Unfortunately, even if we believe that the *size* of the pool is adequate, it is not necessarily true, or even likely, that the outcomes of the benefits and costs for individual local public investments are uncorrelated. But the assumption of independence is necessary to ensure that the overall realized outcome will closely match the sum of the individual expected outcomes. The outcomes of most local government investments may very well be correlated if all of the investments are somehow related to the growth in population or to local economic activity in the area. Worse still, it is likely that the outcome of many local government investments would be quite positively correlated with the value of the major private investment of many members of the community: owner-occupied real estate.

Because of this lack of independence among separate public investments or between public investments and other community investments, it is not appropriate to evaluate the costs and benefits of each local public investment project on a risk-free, expected value basis alone, with reliance on the law of averages to ensure that the overall outcome will closely approximate the sum of these expected values. In this sort of risk situation, an upper bound for the appropriate risk-inclusive discount rate is given by Hirshleifer's recommendation that each *public* investment be evaluated at the rate of return the private market requires of *private* investments of equivalent risk [Hirshleifer, 1966: p. 269; Hirshleifer and Shapiro, 1969: p. 525]. If the local government's pool of investments is small or correlated with private investments with respect to outcome, then Hirshleifer's recommendation of a risk premium incorporated into the discount rate does seem necessary. But then the risk inherent in *each* local public investment must be estimated before the appropriate discount rate can be determined. As a practical procedure for evaluating water resource projects, Bain, Caves, and Margolis [1966: p. 268] recommend a discount rate equal to the rate of return on private savings invested in real estate; perhaps a similar discount rate should also apply to many urban public investments.

*Migration and the Discount Rate*

A problem that arises in assigning benefits and costs to members of a local community is that the population of the community is usually changing all the time, with new residents moving in and old residents moving out. Only about half of the 1960 U.S. population resided in the same house as in 1955, and about one fifth of the 1960 population had moved to a different county since 1955 [U.S. Bureau of the Census, 1970: p. 34]. Given this mobility, some members of the community may very well place little weight on future benefits and costs, because of the possibility that they will not be around to experience them. Time discount of this sort is similar to Eckstein's time discount based on survival probabilities [Eckstein, 1961: p. 457]. For instance, if there is only an 80% chance that any one resident will still be in the same community five years hence, should he (and the local government acting on his behalf) thus reduce the value of benefits and costs accruing five years hence by a factor of 20%?<sup>6</sup>

As an analytical convention for dealing with the migration problem, the recommendation that only benefits and costs to members of the local community be counted may be taken to mean, not the specific members now residing in the community, but rather members of the community at any point in time, whoever they may be. Presumably property owners would be concerned about benefits and costs accruing even after their departure from the community, insofar as these subsequent benefits and costs would affect the sale or rental value of their property. But many citizens do not own real estate in their community, and such free agents would not have this link to the future of the community beyond the date of their own departure. Thus, to include in a decision analysis costs and benefits that will not accrue to some of the current residents of the jurisdiction implies a somewhat "organic" theory of the local community, with the welfare of "the community" defined as something apart from the welfare of its current residents. A practical solution to the problem of continual in-and-out migration is to finance all local investment projects by debt, so that, for each project, the costs and benefits to the community are closely matched in time. Indeed, the pervasiveness of urban migration is perhaps one of the reasons why local governments do rely so heavily on borrowing to finance capital improvements.<sup>7</sup>

## II. THE LOCAL COST OF LOCAL GOVERNMENT REVENUE

It is not only in its borrowing for capital expenditures that a local government receives subsidies from outside the community. There are also important ways in which current expenditures of local governments may be subsidized by non-residents.

6. As a matter of great practical importance, the preference for earlier rather than later consumption is likely to be reinforced in public affairs by the politician's natural and strong inclination to attach more importance to costs and benefits that accrue in the present than to those that will accrue in the future when he may no longer be around.

7. Though it would be difficult to arrange, one form of finance that would achieve intertemporal equity would be a pattern of debt repayment such that the ratio of benefits to costs is uniform for every year in the life of a project, or group of projects.

*Subsidies for Local Government Expenditures*

There are many types of direct intergovernmental grants available to local governments, and the reaction of local governments to the various forms of these grants has been explored by several writers.<sup>8</sup> In addition to direct intergovernmental grants, there are also important indirect methods of subsidy by which the burden of local taxation may be shifted outside the taxing jurisdiction. This exporting of tax burden occurs by two principal methods: (1) non-residents may actually pay the tax initially or have the burden of the tax shifted to them, and (2) local taxes paid by residents are deductible from gross income for federal income tax purposes. To illustrate these two methods of tax exporting, let

$\Delta T_R$  = incremental change in local tax revenue

$p_i$  = % of  $\Delta T_R$  paid by resident  $i$ ,  $0 \leq p_i \leq 1$

$t_i$  = marginal federal income tax rate for resident  $i$ ,  $0 \leq t_i \leq 1$

$\Delta T_L$  = incremental change in taxes paid by citizens of the local community

$N$  = population of the local community.

Neglecting federal taxes for the moment, the sum of residents' percentage shares,  $p_i$ , of a change in local taxes may be less than one if part of the tax is paid by non-residents of the community,

$$\sum_1^N p_i \leq 1.$$

For instance, if  $\Delta T_R$  represents a change in the property tax rate, any non-resident property owners would be liable for part of the tax increase, but their share of the tax increase would not be a cost to the residents of the local community unless the property tax paid by non-residents is somehow shifted to citizens of the local community, as, for instance, might happen with property taxes on rental property. Insofar as property taxes are capitalized into lower land values, however, and are incident on the landowner only, some local property taxes may very well be costs entirely external to the community. Note that  $p_i$  is a function of the particular way in which local taxes are increased: the fraction of tax increase paid by any local citizen would depend on which local tax (property, sales, income, or any other) is increased. Thus  $\sum p_i$  is also dependent on the form of local taxation; a community with considerable retail sales to non-residents would, for instance, export a greater fraction of its tax burden with a general sales tax than with a local income tax, and this consideration would presumably enter into its taxing decision.

Quite aside from local taxes that are paid by non-residents, an *indirect* federal subsidy for local public expenditures is provided by the deductibility of local tax payments from gross income for federal income tax purposes. The net cost to a citizen of an increase in his local taxes is thus the tax revenue collected *minus* any reduction in his federal income tax that would ac-

8. Mushkin and Cotton [1969], Teeple [1969], Sacks and Harris [1964], Gramlich [1968].

company the local tax increase. The amount of this "discount" from the local cost of local government revenues depends on the marginal income tax rates that local citizens face, on the distribution of the local tax liabilities among the citizens, and on whether the taxpayer "itemizes" deductions for his federal income tax.

If all local taxpayers itemize deductions and if all locally paid taxes result in a deduction for a resident, the net increase in taxes paid by residents of the taxing jurisdiction,  $\Delta T_L$ , for a given increase in local tax revenue,  $\Delta T_R$ , is:

$$\Delta T_L = \sum_1^N \Delta T_R p_i (1 - t_i),$$

and  $\sum p_i (1 - t_i)$  is the proportion of a given increase in local taxes which is paid by the citizens of the local community. Naturally, not all taxpayers do itemize deductions, and for those who don't the federal income tax reduction factor,  $(1 - t_i)$ , should not be included. However, in 1960 about 80% of total property taxes paid on owner-occupied residential property was claimed as deductions for federal income taxes, so for this form of local taxation the impact of deductibility on the local cost of local revenue is obviously important [Netzer, 1966: p. 48]. To give an idea of the magnitude of possible tax exporting, McClure estimated that, on the average, 20% of all state and local taxes collected in 1962 were exported to non-residents of the states in which the taxes were imposed. The range of this out-of-state tax exporting was from 15% to 35%.<sup>9</sup> These estimates are on the basis of tax exporting from *states*; the proportion of taxes exported from municipalities may be even greater because of the probability of tax exporting among jurisdictions *within* each state, in addition to the amount exported outside the state. Hirsch *et al.* [1964; p. 82] estimated that 48% of the real property tax in Clayton, Missouri, was exported to non-residents. Neenan [1970; p. 132] estimated that, for 1966, 45% of all Detroit's local taxes were exported to non-residents. If these figures are even approximately accurate, and if the marginal share of taxes exported is near the average share, such a sizeable reduction in the local cost of local tax revenue could, of course, make a significant difference in analyses of the local costs of local public activities.

For a given form of tax increase, with its attendant distribution of  $p_i$ , the proportion of an increase in local taxes which is a cost to the local community is inversely related to the marginal state and federal income tax rates,  $t_i$ , of the community's citizens. Since  $t_i$  is positively related to income, this implies that higher income communities receive a greater "discount" on their local expenditures than do lower income communities, whose citizens are in lower income tax brackets. This perverse effect on the relative cost of local public services in rich and poor communities is, of course, the natural consequence of aiding local communities by the indirect method of income tax deductibility of local tax payments. Richer communities receive more such indirect aid than poorer communities both because they generally have higher per capita local

9. McClure [1967]. These figures were long run estimates. In the short run, the average share of taxes exported was 25%. Musgrave and Daicoff [1958] estimated that 27.5% of Michigan's tax burden was exported to residents of other states.

taxes, and also because the fraction of each local tax dollar collected which is shifted to the federal level is higher in richer communities than in poorer.

Many studies of the determinants of local public expenditures have found a positive relationship between per capita income and per capita expenditure for local government services.<sup>10</sup> This relationship has usually been interpreted as a positive income elasticity of demand for local government services. But since the income-tax-related federal subsidy for local taxes is positively related to per family community income, the effective price of local public services in terms of local taxes is lower for higher income communities. Thus per capita expenditure differences among communities which have been related to income differences may also be interpreted as indirectly related to price differences as well.

As an indication of the importance of this "price effect" of the federal income tax on local cost of local government services, Table 1 shows Netzer's estimates of the property tax as a percentage of adjusted gross income, both before and after accounting for the federal income tax saving.

TABLE 1  
REAL ESTATE TAXES ON OWNER-OCCUPIED PROPERTY AND ADJUSTED GROSS INCOME,  
U.S. INDIVIDUAL INCOME TAX RETURNS FOR 1960

Adjusted Gross Income Class	Average Adjusted Gross Income within Class, Returns with Itemized Deductions (1)	Average Amount of Real Estate Taxes Deducted on Returns Claiming Deductions (2)	Column (2) ÷ Column (1) (3)	Column (3) Adjusted to Reflect U.S. Income Tax Savings (4)
\$ 3,000-\$ 4,000	\$ 3,523	\$ 157	4.46%	3.57%
4,000- 5,000	4,516	168	3.72	2.98
5,000- 6,000	5,504	184	3.34	2.67
6,000- 7,000	6,483	204	3.15	2.52
7,000- 8,000	7,481	230	3.07	2.46
8,000- 9,000	8,470	251	2.96	2.31
9,000- 10,000	9,472	274	2.89	2.25
10,000- 15,000	11,835	330	2.79	2.18
15,000- 20,000	17,087	463	2.71	1.90
20,000- 25,000	22,256	560	2.52	1.70
25,000- 50,000	33,541	716	2.13	1.21
50,000 and over	92,418	1,371	1.48	.52

Source: Netzer [1966: p. 49].

An additional consequence of the federal income tax deductibility of local taxes is an artificial incentive to channel expenditures through the local public sector. For instance, consider the alternatives of (a) financing municipal refuse collection from general tax revenue, or (b) permitting (or requiring) individuals to contract for privately supplied refuse collection. In the first case, the expense is a deductible item, and in the second case it is not, and there is a clear local incentive to opt for public rather than private provision of the service. Even for the decision to replace (deductible) tax finance of

10. This literature is reviewed in Mushkin and Cotton [1969: pp. 184-207] and Wilensky [1970].

some municipal services by a system of (non-deductible) user charges, there is an artificial inducement to opt for tax finance, even though user charges would be desirable on efficiency grounds. And one would naturally expect such considerations to be taken into account in any local-level cost-benefit analysis of such alternatives. It is important to note here that local government expenditure for *any* purpose receives a subsidy by means of the deductibility of local taxes required to finance it. That is, the subsidy is not conditioned on the existence of benefit spillovers to non-residents.<sup>11</sup>

It is also interesting that the federal income tax deductibility of local government taxes affects the relative cost of local public services among citizens *within* a single local jurisdiction as well as among different jurisdictions. That is, the net cost to an individual taxpayer of a dollar increase in his local government taxes is less for those in higher marginal income tax brackets. If this is recognized by all taxpayers in their own personal cost-benefit analyses of government activities, it should affect the relative willingness of individuals to vote for local public expenditures. In fact, examinations of survey material and voting behavior in referendums regarding municipal expenditures have shown a surprisingly consistent positive relationship between income and approval of expenditure proposals, either throughout the entire range of income classes or above a certain threshold.<sup>12</sup>

#### *"Excess Burden" and the Cost of Local Government Revenue*

Though transfers from outside the community (direct in the case of federal grants, indirect in the case of tax exporting) reduce the local cost of revenue, the "excess burden" associated with the principal methods of local government taxation can increase the local cost of revenues above the amount actually collected from community residents. Though its importance is difficult to quantify, excess burden is said to arise when "a tax or subsidy creates a divergence among rates of substitution, either in production or consumption, or between production and consumption. Producers or consumers are pressured by substitution effects of the tax into using what are for them inferior production techniques or inferior patterns of consumption" [C. S. Shoup, 1969: p. 29]. Vickrey [1963: p. 87] has defined the measure of the marginal cost of public funds as "the loss in consumers' surplus, the loss of producers' surplus of economic rent, the marginal costs of administration, and the marginal costs of compliance" resulting from an increment in tax revenue.

Since excess burden can arise with any tax other than a lump-sum tax or a tax on economic rent, this consideration is not unique to local government cost-benefit calculations. However, there is reason to believe that it is particularly important at the local level because of the heavy reliance of local governments on property taxes. In 1967, for all local governments in the United

11. Teeples [1969] has shown that when intergovernmental subsidies are not justified by benefit spillovers among units of local government, *all* local governments may be made worse off by the combination of the subsidy and the national taxes required to finance it. Buchanan and Pauly [1970] have shown that even if the existence of externalities do justify public subsidy, income tax deductibility of the expenditures for the external benefit-generating activity is an inefficient method of subsidy.

12. Baskoff and Zeigler [1964], Watson [1963], Wilson and Banfield [1964], Neenan [1970].

States property tax revenue comprised 86.6% of total tax revenue, 69.2% of general revenue from own sources, and 43.2% of total general revenue [U.S. Bureau of the Census, 1969: p. 27]. Property taxes are generally criticized as discouraging the construction and maintenance of housing and other real property, and the adverse efficiency effects of property taxes may well be greater than for most other forms of taxes, especially if levied at high rates. As one indicator of the magnitude of the property tax's importance, Gaffney has estimated that a 3% annual property tax levied on the market value of an improvement is roughly comparable, in present value terms, to an excise tax of 57% of market value, levied once, at the time of construction [Gaffney, 1964: p. 273]. According to Netzer, the property tax, if viewed as an excise tax on housing, "is higher in rate than any other generally used American consumption tax, except taxes on liquor, tobacco, and gasoline" [Netzer, 1966: p. 30].

Though the magnitude of property taxes suggests that an excess burden phenomenon may significantly add to the cost of locally collected revenue, there have been no empirical estimates, in terms of the marginal cost of local government revenue, of this cost.<sup>13</sup> This is clearly a worthwhile, though thorny, topic for research if we are to understand more fully the real costs of government expenditures, particularly at the local level where the unneutrality of taxation may be more important than at the federal level.

### III. INCOME REDISTRIBUTION AND INTRAMETROPOLITAN MIGRATION

In evaluating the costs and benefits of federal-level projects, it is sometimes recommended that effects on income redistribution be left out of the analysis. For instance, Eckstein says, "There is no logical way of incorporating distributive effects into the benefit-cost analysis, which must confine itself to the one dimension of benefit for the country as a whole" [Eckstein, 1958: p. 36]. More recently both the theoretical and practical importance of considering the distributional as well as the efficiency aspects of federal project analysis has been considered by several writers [Maass, 1966; Weisbrod, 1968; Bonnen, 1968]. Whatever the merits and demerits of neglecting distributional effects in cost-benefit analysis of federal-level projects, it is clearly important to consider them in the design and evaluation of local-level projects, because the incidence of benefits and costs on population subgroups within the local jurisdiction may induce migration into or out of the jurisdiction. This "voting with the feet" aspect of the open economy nature of local jurisdictions in a politically fragmented urban area greatly differentiates local from national public finance. For most federal-level cost-benefit analysis it may be safe to assume that the distributional effects of taxation and

13. Harberger has estimated that, taken together, all forms of taxation of income from capital in the United States have probably reduced the capital stock in the corporate sector by between  $\frac{1}{6}$  and  $\frac{1}{3}$ . He places the efficiency costs of this taxation between \$1 billion and \$3 billion per year for the period 1953-59 [Harberger, 1966: p. 114]. A separate estimate has not been made for the efficiency cost of local property taxes. Of course, retaining a strictly local view of the cost-benefit analysis, some of the excess burden of local taxes may be borne by non-residents, just as some of the taxes giving rise to the excess burden are exported.

expenditure will not alter the population composition of the decision-making jurisdiction (the nation). But this is not so when the decision-making jurisdiction is a local government that is only one of many in the same urban area. The incidence of costs and benefits of local government activities affects the *private* benefit-cost ratios of both residents and firms (who may move out if the overall ratio is sufficiently adverse) and also of potential residents and firms (who may move in if the ratio is sufficiently attractive) as a result of the local government's revenue and expenditure pattern.

The impact of migration on local public sector decision making was greatly illuminated by Tiebout's theory of local expenditures [Tiebout, 1956]. However, it is not clear how income redistribution as an "output" of local governments enters into his theory. For redistribution to take place, there must be both donors and beneficiaries within the same local jurisdiction; but attempts by individuals and firms to avoid the costs of the redistribution may lead to migration into jurisdictions where the burden of redistribution is less. The ultimate result of this migration could be increased stratification of jurisdictions according to income, with greater stratification than would be implied simply by tastes for public services and ability to pay for them.<sup>14</sup> Because of the potential migration response to income redistribution by local governments, it is usually recommended that all or most redistribution be undertaken by the federal government [Weisbrod, 1968]. Yet there is evidence that considerable redistribution does take place at the local level; Netzer [1966: p. 62] estimated that "benefits from expenditures financed by the (property) tax more than offset the tax burden for some income classes below \$7,000. For the lowest income class (under \$2,000), expenditure benefits are estimated to be one and a half to two times the tax burden. For the \$15,000-and-over class, the tax burden is estimated to be anywhere from two to seven times expenditure benefits accruing to people in this income group." This estimate is a national average, so there would be even greater redistribution in some local jurisdictions, especially since the property tax does little to redistribute income between higher and lower income jurisdictions. To the extent that the property tax on real estate is incident on occupiers rather than on landowners, such redistribution may well induce migration by individuals either to escape the burden of the tax or to reap the benefits financed by it.

Related to the problem of income redistribution by local governments is the concept of "fiscal residuum," which Buchanan [1950: p. 588] defined as "the balance between the contributions made and the value of public services returned to the individual."<sup>15</sup> Buchanan argued that, as an extension of the concept of "equal treatment for equals," federal transfer payments to state governments should be made such that the fiscal residua for individuals in similar circumstances should be the same in all areas of the country. Buchanan

14. Rothenberg [1970] and Ellickson [1970] have emphasized the importance of this factor.

15. Neenan [1970: p. 122] has suggested that the concept of fiscal residuum is more relevant to individual decisions if it is defined as the "difference between a person's perceived benefits and perceived tax liability," emphasizing that it is the citizen evaluation of public services, rather than the expense of providing them, which is important.

maintained that otherwise there would be a distortion of resource allocation if migration of both human and non-human resources took place in response to differences in fiscal residua among areas.

Of course, individuals and firms do not locate in an urban area solely according to the criterion of maximizing their fiscal residua; that is only one among several important variables in the location decision. And it may be that the size of the fiscal residuum for different income groups within each jurisdiction will affect other variables such as housing prices. For instance, Oates [1969] found in a two-stage least squares regression analysis of a sample of 53 New Jersey municipalities that (with public output held constant) an increase in local property tax rates from two per cent to three per cent reduced the market value of owner-occupied houses by an average of about \$1,500. Insofar as an unfavorable fiscal residuum in a jurisdiction is not offset by a compensating adjustment (such as lower housing prices) in other location variables, increased redistribution within the jurisdiction would tend to cause a migration response by the donors and recipients. Thus attempts at greater income redistribution *within* heterogeneous communities could lead to even greater concentration of upper income families in upper income communities, and thus greater stratification of communities into more homogeneous wealth and income classes. Williams *et al.* [1965, Ch. 2], in their study of the Philadelphia region, found evidence of pronounced differentiation among suburbs in terms of economic and social characteristics such as educational status, occupational status, and market value of residential property per household, though how much of this differentiation is due to fiscal influences is unclear. Burkhead [1961: p. 47] found that in the Cleveland area there is considerable and persistent skewness in the distribution of per capita expenditures and assessed valuation. Tax havens, in the sense of municipalities with high resource values and low expenditures, tended to disappear between 1940 and 1956, but communities with both high resources and high expenditures persisted. Haskell and Leshinski [1969], in a study of fiscal influences on residential choice in the New York region, found that the fiscal residuum for upper income residents is greatest in upper income communities. Thus fiscal considerations may already work to produce income stratification among communities in many areas.

The distributional effect of local taxes and expenditures on firms as well as on families must also be considered in cost-benefit analyses of local public activities. Due [1961] concluded that the influence of state and local taxes on location of industry was probably not of major importance because state and local taxes comprise such a small share of total costs for most firms. However, Due's conclusions referred chiefly to differences in tax levels among *states*, and a given tax differential may exert much greater influence on a firm's location decision among adjacent or nearby municipalities within the same urban area than it would among widely separated locations in different states.<sup>16</sup>

16. The potential mobility of firms would somewhat limit the ability to export local taxes incident on firm owners or customers. In this case, the tax base may be a function of the tax rate, and the

Because of the importance of the distributive effects of local tax and expenditure patterns on potential intra-urban migration, it is even more important at the local level than at the federal for a cost-benefit analysis to include information on the incidence of both costs and benefits on relevant subgroups of the local population. When potential migration is neglected in considering projects that redistribute income from one group to another, the cost of the project may be underestimated if additional service recipients enter the jurisdiction to take advantage of the new or increased local public service. And the tax rate necessary to finance the expenditure may be underestimated if donor firms or residents move out to escape the tax burden. The essential problem is that the population composition of each jurisdiction is a function of the incidence of benefits and costs on individual residents and firms within the jurisdiction. If the population composition is to remain unchanged, there has to be for each income class some overall *quid pro quo* relationship in the public expenditure and revenue package. This becomes particularly difficult to achieve when all a local government can do to raise revenue is to increase the *rate* of an existing tax (e.g., the property tax or sales tax rates); the incidence of costs is then almost entirely out of the local government's control, and the distribution of local government services among recipients may consequently be constrained. There is, of course, no requirement that the redistribution produced by a local jurisdiction's public sector be such that it induces no in or out migration, but the ability to redistribute is dependent on the continued presence of donors, and the per capita benefits to recipients are dependent on the size of the recipient population. In the extreme, if population migration is sufficiently responsive to differences in fiscal residua among jurisdictions, an increase in redistributive effort by some individual jurisdictions may actually in the long run lead to reduced per capita benefits for the intended recipients of the redistribution within those jurisdictions.

The possibility of migration in response to benefits and costs of local public activities makes it especially difficult to define the relevant "community" on whose behalf local governments are assumed to maximize net benefits. The conceptual problem would be less complex in a world where Buchanan's recommended form of federal fiscal equity prevailed; federal transfer payments would at least assure that individuals' location decisions would not be affected by variations of fiscal capacity among units of local government. In such a world the Tiebout model of registering the demand for local public services by moving to the most preferred jurisdiction would have greater appeal, though the problem of benefit and cost spillovers among communities would remain. But that is not our world. Given the existing incentives to migrate in response to local public sector activities, it may not be appropriate, as mentioned in the discount rate discussion, to count all benefits and costs to any individual who is resident in the community, regardless of whether he is resident in the community at the time the decision to undertake the project is made. In the discussion of the discount rate it was assumed that migration was exogenously determined; in this case, the number and character of mi-

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marginal share of any local tax borne by local residents may be higher than the average share if some firms leave the jurisdiction in response to an increase in the tax rates.

grants may be influenced by the project itself, and so are endogenously determined. Thus there is an even greater difficulty than usual in separating efficiency from equity in the analysis, and it is clearly inappropriate to recommend for local projects, as Eckstein [1958: p. 17] does for federal projects, that "one of the criteria on which a project must be judged, and which benefit-cost analysis disregards altogether, is the redistribution of income which a project brings about." Since the redistribution of income brought about by a project may in turn affect both the costs and benefits, this interaction must, if possible, be considered in the analysis itself. If possible, the benefits and costs of each project should be presented in tabular form, with data on which groups benefit and which groups will bear the cost [Lichfield and Margolis, 1963].

It is, of course, true that the redistributive effect of any one project may be negligible, but this is not necessarily true for an entire group of projects being analyzed over a period of time. The long-run effects of local income redistribution on intra-urban migration may be particularly important for some older central cities that are increasingly concerned about the tax base necessary to continue financing welfare-type services to a growing proportion of the nation's lower income population. Public policies that attempt to "lure middle income groups back to the central city" are evidence of concern about migration's effect, not only on the tax base, but also on the benefits that may accrue from greater diversity of population within the city and, especially, within city schools. Another example of local decision makers' apparent sensitivity to migration is the practice in some suburban communities of restrictive large-lot zoning to keep out new lower income residents. This latter example is a case where, if benefits to future in-migrants to the jurisdiction were considered in a cost-benefit analysis of zoning changes, it might be true that aggregate benefits would exceed aggregate costs, but the zoning change would be politically impossible if enough existing residents failed to receive an excess of benefits over costs as a result of the change.

#### IV. CONCLUSION

This paper has concentrated on the "partial" and "open" nature of decision-making jurisdictions in a politically fragmented urban area. In this context, suboptimization in the evaluation of costs and benefits by each unit of local government can lead to rather large discrepancies between the total and the local costs and benefits of local public expenditures; in particular, the discrepancies between total and local costs are produced in many cases by federal tax considerations. Thus, assumptions commonly made about the behavior of local government decision makers imply some cost-benefit analysis procedures at the local level that are distinctly different from those at the federal level. At the local level, the criterion for project feasibility is clearly not that "the benefits, to whomsoever they accrue, are in excess of the estimated costs."<sup>17</sup>

The worm's eye local view, examined here, presents a sometimes alarmingly narrow picture compared to the bird's eye national picture usually

17. From the Flood Control Act of 1936, Section 1, as quoted in Eckstein [1958: p. 2].

recommended in works on cost-benefit analysis; yet the quantitative importance of this worm's eye view is attested to by 1966-67 local government total general expenditures of \$59.1 billion, or 27.2% of total general expenditures by all levels of government [U.S. Bureau of the Census, 1969: p. 27].

The problems related to suboptimization by local governments may in some minds cause doubt that the contribution to be made by cost-benefit analysis in promoting efficiency in the local public sector is entirely positive. It could be argued that an analyst's providing information on local versus total costs and benefits may simply better enable, or perhaps even encourage, decision makers to disregard all costs and benefits external to their own communities.<sup>18</sup> On the positive side it could be argued that the explicit pointing out of existing incentives faced by local government is a first step toward changing these incentives so that local-level suboptimization more nearly corresponds to national welfare.

To end on an optimistic note, it is worth offering one reason to believe that worthwhile analyses of costs and benefits may be more feasible for public programs at the local than at the national government level. When actually performing a cost-benefit analysis, it often becomes immediately apparent that the greatest need for knowledge lies in the typically unknown relationship between inputs and outputs in public services. That is, even if inputs and outputs can be valued in physical or dollar terms, one may not know how expenditure really affects the public program output (except that, presumably, but by no means necessarily, greater input means greater output). The hardest part of the analysis may not be in measuring costs and benefits themselves or in discovering their incidence, but in measuring the effect of input on output—that is, measuring the production functions for public services. It may well be that an important difference between cost-benefit analysis at the federal and local levels of government is that there are more opportunities at the local level for discovering the underlying public production functions than there are at the federal level.

Much of the early theoretical work on cost-benefit analysis dealt with federal water resource projects in which evaluations were made of large scale investment projects whose benefits extended long into the future. The estimate of output for such investments must rely on highly uncertain predictions of input-output relationships and on numerous assumptions about future demand. By contrast, the input-output relationship for urban public services may be much easier to observe because for many of these services the output is not so distant in time; indeed, for many urban government services, the relationship is more nearly a continuously variable production process in which it is possible to vary the input level temporarily in order to observe the resulting contemporaneous or lagged effect on output.<sup>19</sup> The possibility of observing the effect of marginal changes is important because, in relating costs to bene-

18. McKean [1963] has also emphasized that large discrepancies can occur between individual costs (or benefits) as perceived by decision makers and the conception of total costs (or benefits) *within* a local community. This important problem has not been treated here.

19. An example of experimental variation in inputs in order to discover the effect on output in the field of traffic law enforcement is offered in Shoup and Mehay [1970: Ch. 3].

fits for most policy purposes, it is not necessary to know the full form of the public production function—that is, the resulting total output for every level of input. Rather a more limited and more easily discovered form of the production function will usually suffice—the *change* in output related to a *change* (either increase or decrease) in inputs. Also, in the process of investigating the relationship between inputs and outputs, the analyst may be able to suggest improvements in the production process so that greater output can be produced with existing inputs. In support of this view of the need for controlled experimentation to discover production relationships for urban public services, Ackoff [1963: p. 108] recommended that “. . . planners should develop a considerable experimental capability. Drawing boards and social surveys are not enough. If planning is to become scientific it has no alternative but to become experimental.” The examination of production functions for public services is particularly important because for many public services there is ignorance, often not so much about whether the services are socially valuable, but rather about what sort of results, if any, will follow from a particular allocation of resources. This is unfortunate because, consequently, much time is wasted arguing over the form of production relationships which are not known, but which could and should be known.

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