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Alternative Methods for Distributing State Aid to Local Governments in New York

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This paper simulates alternative distributions of general purpose state aid to local governments under different combinations of criteria: tax capacity, effort, and revenue needs. Revenue needs are based on Tobit estimates of the costs of providing average levels of 16 categories of services. Segmenting the sample into high and low population jurisdictions provided a more realistic set of cost estimates. Available revenues or capacity are determined by multiplying each jurisdiction's tax bases by standard tax rates. A Need-Capacity gap, the difference between needed revenues and available revenues, is used as a needs-based distribution strategy for general purpose aid. Finally an effort gap, based on above average tax efforts was added to the Need-Capacity gap to define a Need-Capacity-Effort strategy.

The State of New York has a long history of assistance to local governments. In 1946 a system of shared taxes was replaced with a general purpose aid system where the amount of general purpose aid was detached from specific revenue sources. The distribution of major portions of general purpose aid to local governments was and still is based on population and class of government. The level of per capita aid and, presumably, the level of service provided per capita is highest for cities, followed by towns outside villages, villages, and counties, in descending order. Further, the constant per capita amount to all jurisdictions within a class, villages for example, presumes that the same types of service are provided by all governments of the same class. The validity of the implicit assumptions of the aid formula was challenged when first implemented in 1946 and continues to be challenged today.

Numerous commissions, committees and studies have investigated the aid distribution system in New York (NYS Legislative Commission on State-Local Relations). Criticisms have been of two types: 1) the failure to use multiple criteria for the distribution of aid (for example, fiscal capacity and fiscal effort in addition to need), and 2) the inadequacy of measures currently used under the need criterion. The research reported here addresses both criticisms.

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The objective of this study is to develop and evaluate alternative methods of aid distribution based upon combinations of criteria, specifically, tax capacity, tax effort, and revenue needs. The development of a measure of need that accounts for differential service provision costs is a necessary first step. Cost functions for sixteen service areas are estimated for a sample of jurisdictions in the state. Given the estimated cost functions, a measure of need based on the cost of providing standard levels of each service is predicted for each jurisdiction in the state (except New York City). Alternative aid distribution methods are then simulated using estimated need along with measures of tax capacity and effort. Each step will be presented, in turn, preceded by a discussion of previous research on intergovernmental aid in New York and elsewhere.

The research reported here is the second phase of a research project funded under contract with the New York State Legislative Commission on State-Local Relations. Some of the data utilized for estimating the service area cost functions were collected in Phase One. A rather lengthy and comprehensive survey instrument, completed by local public officials, was administered in the Spring of 1984. For each service listed on the survey, local officials were asked whether or not they provided the service, how they produced it, how they financed it, and whether or not they thought the service was mandated.

Preliminary evaluation of the data from the sample of 240 New York jurisdictions (22 cities, 25 counties, 122 towns, and 71 villages) indicates that

the presumed homogeneity of functions and service structures within cities, towns, villages or counties does not exist (Hattery, *et al.}*. With service level defined as the number of services provided within a general service area category, such as law enforcement, the data exhibits considerable variability in the level of services provided within types of government. Further, the study did not reveal any clear-cut local government hierarchy of service provision as implied by the current formula. In fact, it was found that some villages provided higher levels of services than some cities, yet all cities receive higher amounts of aid per capita than all villages under the current aid formula.

Intergovernmental Aid

The literature on intergovernmental aid reveals a great variety of specific criteria or measures for distributing aid. These criteria are based on three major concepts: fiscal capacity, effort, and need. Fiscal capacity is conceived as the capacity to raise local revenues. It is sometimes referred to as tax capacity in recognition of the difficulty of measuring user fees especially when user fees bypass the local government accounting system and budget by going direct to a private producer. Often-suggested measures of fiscal capacity are per capita income, market value of assets, full value assessment, or capacity as measured by a representative tax system such as that used by the United States Advisory Commission on Intergovernmental Relations (1982). Fiscal effort is a concept similar to plant utilization in manufacturing. It is the ratio of revenues raised to fiscal capacity, or the utilization rate of fiscal capacity. Often suggested measures are effective property tax rate, effective sales tax rate, or locally raised revenues divided by fiscal capacity-Fiscal needs recognizes that not all services delivered by all units of government are essential, that some minimum level of service delivery is expected of all units of government, regardless of their fiscal capacity. Measures often suggested include minimum service levels perhaps as reflected by expenditures per capita; service needs for special populations reflected by such measures as percent poor, percent children, and percent elderly; higher costs of achieving specific levels of service output, e.g., higher input costs, especially labor costs in metropolitan areas.

These concepts can be used singly or in combination to represent quite different strategies or philosophies with respect to intergovernmental aid. But it is the combination strategies that appear most interesting in that they allow us to offer decision makers a variety of policy options and at the same time allow them to explore the effects of alternative weights or values on different segments of the American belief system. For example, a combination need-capacity or a need or capacity strategy could encourage the targeting of aid to the most needy jurisdictions. Addition of an effort-based bonus could reward those who make an extraordinary effort to help themselves.

The Massachusetts system, as described by Katharine Bradbury *et al.,* is an example of a combination strategy, more specifically a needs-capacity strategy. The heart of the Needs-Capacity (NQ strategy is the calculation of a gap. The gap i_s calculated by subtracting from the needed revenues, that level of revenues that would be available if a community taxed its tax base at some average or standard rate. Needed revenues could be defined as the cost of providing some average or standard level of services in the community. The gap between needed revenues and revenue capacity then becomes a measure of the need for intergovernmental aid. The need for intergovernmental aid, as distinguished from needed revenues, could be considered a needs-based distribution strategy for general purpose aid. If the gap is zero, the need for intergovernmental aid is zero. The key to this kind of needs-based aid strategy is a standard of comparison. Needed revenue is based not on the level of services provided by a jurisdiction but on expenditures required to provide some standard level of services.

The Needs-Capacity strategy does not provide a mechanism for rewarding high effort. If we can define an effort gap as the difference between some extraordinary effort and an average or standard effort, we could add the effort gap to the Need-Capacity gap to create a Need-Capacity-Effort Gap. Think for example of defining extraordinary tax effort as the difference between tax revenue when a community taxes its tax base(s) at some higher-than-average rate and that level of tax revenue it would receive if it taxed its tax base(s) at an average or standard rate. The use of the Need-Capacity-Effort gap strategy in addition to considering the need for intergovernmental aid would provide an effort bonus to those jurisdictions that made an extraordinary effort to help themselves. This strategy along with the Need-Capacity strategy are evaluated in this paper.

Estimation of Need

Both aid distribution strategies require estimates of need, defined here as the cost of providing a stan-

dard level of service. To predict need for all jurisdictions in the state we begin by utilizing the Phase One sample of 240 governmental units and estimate indirect cost functions (Q) for each of i — 1, . . ., 16 service areas. In general form,

$$(1) \quad C_i = C_i(w_1, \ldots w_n, q_i, S),$$

where the w_j, $j = 1, \ldots, n$, are input prices, q_i is output for service area i, and S is a vector of characteristics of the jurisdiction assumed to affect cost. This cost function assumes cost minimizing behavior and is convenient to use because, at least theoretically, it is a function of observable variables.

Certainly, costs (or expenditures), input prices, and jurisdiction characteristics are directly observable. However, obtaining output measures for services is problematic. As a proxy for service output or level we calculated service indices based upon responses to the Phase One survey. By intent, the survey was organized in a service hierarchy or category scheme that provided the basis for aggregation into sixteen service areas: law enforcement, fire prevention and control, animal control, health services, social services, services to the aging, recreation and culture, planning, highway, sewer, sanitation, water, public transportation, community development, economic development, and natural resources. With some exceptions, the index for service area i (IND_i), the service level, is a simple summed scale of the presence (= 1) or absence (= 0) of provision of each service included in the service category.

The empirical specification of the cost function for the ith service category is

$$\begin{aligned} C_i &= b_0 + b_1 LCOST + b_2 NLCOST \\ &+ b_3 DENTOV + b_4 POPTOV \\ (2) \quad &+ b_5 POPTOV^2 + b_6 INDj + b_7 INDPOPi \\ &+ b_8 TOWN + b_9 CITY + b_{10} VILLAGE \\ &+ b_{11} OTHREVi + \Sigma b_{(11+n)} S_n + U_j, \end{aligned}$$

where the variables are as described in Table I and the number of terms, n, in the summation depends upon service area. For example, MILEAGE would be included in S when estimating highway and perhaps other costs. Likewise, when estimating social service costs, the extent of poverty (POV) may be important. The values of these variables do not differ by service area, but whether they are included does differ by service area. It was not possible to determine labor and nonlabor cost by service area. Hence, LCOST and NLCOST, as well as the variables in S, are not subscripted. Note that OTHREVj is not included in S because we do observe it for each service area.

Because some service areas are not provided by some jurisdictions, the dependent variables are limited with a lower bound of zero. Thus, changes in the explanatory variables affect not only the cost level for jurisdictions providing services, but may also affect the number of jurisdictions that do or do not provide services. In such limited dependent variable cases. Ordinary Least Square (OLS) estimation yields inefficient estimates of the parameters and inaccurate estimates of the expected values of the dependent variable. Specifically, forecasts based on OLS estimates can be negative. Tobit analysis (Tobin, 1958) avoids these problems and is utilized for this study.[1]

Preliminary Tobit analyses yielded projected cost estimates that were particularly high for low population municipalities. This problem, encountered by others, has been resolved by segmenting the sample by population size when analyzing local government expenditures (Stinson and Lubov, 1982). Accordingly, we estimated cost functions for high and low population municipalities separately and were able to obtain a much closer correspondence between actual and projected values for both groups. The population thresholds for segmenting the sample were determined for each service by inspecting bivariate plots of total expenditures for the service versus population. The plots were examined for the presence of a point at which the relationship between expenditures exhibited a marked change. In general, a population level of 8,000 was used to sort municipalities into the low {< 8,000) or high (> 8,000) group.

The Tobit estimates of the cost functions for jurisdictions with populations of more than 8,000 and less than 8,000 are presented in Tables 2 and 3, respectively. A sequence of likelihood ratio tests were conducted to obtain the final specifications reported in the tables. For the set of jurisdiction-type dummy variables, F-tests were undertaken to determine whether the set should be included in the specification. If so, the coefficients are reported in the table. All other coefficients reported therein are significant at the 95 percent confidence level based on asymptotic t-statistics. The coefficients cannot be directly interpreted as marginal changes in total costs as would be the case if they were obtained from OLS. Note that for Health and Social Services, only counties were included because few towns, cities, or villages provided any of the services within the category. The state designates

[1] An anonymous reviewer pointed out that a more flexible alternative approach would be to utilize the Heckman-type two-step sample-selection correction procedure which involves estimating a logit or probit model for determining the probability of providing the service, calculating a bias-correction factor, and using that factor in OLS estimation of service costs.

Table 1. Variable Definitions

Variable		Definition
C_I	=	Jurisdiction operating cost of providing service area i in (FY 1984). [a]
LCOST	=	Labor cost per jurisdiction employee (FY 1984) including wages[b] and fringe benefits[3].
NLCOST	=	Nonlabor cost per jurisdiction employee (FY 1984). [c]
DENTOV	=	Density of jurisdiction. [d]
POPTOV	=	Population of jurisdiction.[11]
$POPTOV^2$	=	POPTOV x POPTOV
IND_I	=	Jurisdiction level of service index for service area i.
$INDPOP_i$	=	IND, x POPTOV
TOWN	=	1 if jurisdiction is a town, 0 otherwise.
CITY	=	1 if jurisdiction is a city, 0 otherwise.
VILLAGE	=	1 if jurisdiction is a VILLAGE, 0 otherwise (omitted category is COUNTY).
$OTHEREV_i$	=	Revenues from other municipalities for provision of services within service area i[a]
S	=	Jurisdiction characteristics including percent in poverty (POVERTY), percent over 65 years of age (ELDERLY), percent youth (YOUTH), education levels (ED), percent of housing with plumbing (PLUMBING), and road mileage (MILEAGE). [e]

[a] Source: New York State Comptroller's Bureau of Municipal Research and Statistics within the Division of Municipal Affairs.
[b] Source: New York State Public Employee Retirement System and Police and Firemen's Retirement System database.
[c] Calculated by subtracting labor cost from total operating cost and then dividing by the number of employees for each jurisdiction.
[d] Source: 1980 Census of Population and Housing. For towns with villages, the village population has been deducted from the total. Hence POPTOV and DENTOV reflect a town-outside-viilage (TOY) adjustment.
[e] Sources: The mileage data were obtained from the New York State Department of Transportation and the remaining variables from the 1980 Census of Population and Housing.

counties to administer most social services. A similar argument can be made for Health, although many towns, cities, and villages do provide some health services. For Planning, two equations were estimated, one for counties and one for towns, cities, and villages. No Planning index was calculated for counties due to inconsistencies in the survey instruments between counties and towns, cities, and villages. Therefore, town-city-village and county planning costs were estimated with and without an index term, respectively. For these services, the split by population size was not undertaken. Therefore, the results for these services are included in Table 2 but not Table 3. Because the primary purpose for estimating the cost functions is to forecast standard need levels for simulation purposes, only a general analysis of the Tobit results will be undertaken.

To determine whether jurisdiction types explain differences in service provision costs, dummy variables for municipal type (town, city, and village) were included in the cost function specifications, where appropriate. For high population jurisdictions, fourteen of the cost functions were specified with jurisdictional dummy variables. Table 2 shows that for seven of these fourteen services municipal types significantly affected costs. In Table 3, six of the thirteen service cost estimates for low population jurisdictions are significantly affected by the municipal-type variables. There is not an exact correspondence in terms of which service costs are significantly affected by municipal types between the two population size groups. Even within a size group the relative magnitudes differ a great deal across jurisdiction types and services.

Preliminary specifications of the cost functions included a number of variables (S) hypothesized to affect service provision costs depending upon the service area. As reported in the tables, the only two variables that significantly do so are MILEAGE and BELOWPOV. MILEAGE may be reflecting service level for those with positive coefficients among high population jurisdictions [Law, Highway, Sanitation, Water, Economic Development, and Natural Resources) and low population jurisdictions (Law, Fire, Highway and Sanitation). The negative coefficients of MILEAGE for the cost of providing Sewer and Trans-Dortation by high population jurisdictions may be reflecting some economics of size. With the ex:eption of BELOWPOV, which has a large effect 3n the cost of Community Development services for high population jurisdictions, none of the socioiemographic variables such as percent elderly were

Table 2. Tobit Estimates of Service Cost Functions for Municipalities with Population ≥ 8,000

SERVICE AREA	CONSTANT	LCOST	NLCOST	DENTOV	POPTOV	POPTOV^2	IND	INDPOP	TOWN	CITY	VILLAGE	OTHREV	MILEAGE	BELOWPOV	R^2
Law	-67.0			0.9	-134.5	0.130		7.34					19.6		.97
Fire	-3,019.6					-0.034		6.51	1,958.5	5.152.0	2,768.6				.79
Animar	31.0				1.4	-0.001									.30
Health"	46,224.0	-3,563.7	456.9	54.5				0.94	NA	NA	NA				.89
Social Services'[1]	134.340.0	-3,176.9	376.7		-466.7		•3,605.9	29.78	NA	NA	NA				.98
Aging	120.4				4.0			-829.3		-1,320.6	-4.839.9				.59
Recrealion & Culture'	-3,271.1				51.1	-0.012		-0.34	2,943.0	3,461.0	3,017.4				.79
Highway	3.3				46.2	-0.019		-2.13					8.0		.87
Sewer	-1,738.1				33.1	-0.009	452.0	-1.31					-6.0		.84
Sanitation	-3,967.4				31.7	-0.106		4.39	2,865.9	3,120.8	3,582.2	6.24	3.3		.92
Water	-7,416.7					-0.026		4.99	7.991.5	7,924.8	7.179.8		4.9		.%
Transportation	-2,082.3				36.7	-0.022		2.98					-9.0		.71
Planning (Co)[1]"	-507.6	28.3			0.9		NA	NA	NA	NA	NA				.60
Planning (TVCi)[d]	-94.8	2.3					3.6	0.20	NA						.71
Communily Development"	-90,007.5				26.6	-0.023		1.27	4.532.5	5,518.8	6.548.5			34,238.0	.53
Economic Development	-796.1					0.003							2.6		.70
Natural Resources	-60.1					0.003	46.98	-0.43	-220.9	-99.5	-143.57		0.6		.94

[J] Population cutoff is 5,750 rather than 8,000. [b] Includes all counties and no towns, villages, or cities.
[c] No index available. [d] Counties excluded.
NA = not applicable. This indicates that the variable was excluded from the specification.

Table 3. Tobit Estimates of Service Cost Functions for Municipalities with Population < 8,000[a]

SERVICE AREA	CONSTANT	LCOST	NLCOST	DENTOV	POPTOV	POPTOV2	IND	1NDPOP	CtTY[h]	VILLAGE[h]	OTHREV	MILEAGE	R-
Law	-291.6	16.8	-1.6					3.9	185.5	75.9	0.0014		.7
Fire	- 20.5	1.8	-0.2			1.07			148.3	4.7	0.0011		66
Animal[0]	-1.6	0.1	-0.1	-0.001	1.05								.3 9
Aging	-1.6	-0.2			2.20	-0.22	0.70		- 15.7	-2.9			.2 5
Recrealion & Culture"	-31.2	2.0	-0.2					0.5	36.1	13.0			.3
Highway	-12.1	3.7	-0.5					4.4	93.9	13.2	0.0015	3.1	.7
Sewer	-150.9			0.031		2.71	28.04						.7 3
Sanitation	-37.5	2.0	-0.3	0.008				3.3			1.5893		.6 2
Water	-246.6				33.14		40.53						.2 4
Transportation	-29.4						15.35						.1 5
Community Development	-20.6						3.05		4!. 7	8.7			.1
Economic Development	-5.2						1.39						.1
Natural Resources	-17.8	0.4			3.24	-0.38	2.50						.2 7

[a] **Only** thirteen of the sixteen services are reported here. As noted in the (exl the other three, Planning, Social Services, and Health are treated differently. The results for those services ure reported **in Table 2.**

[b] Only cify and village dummy variables are included. No counties were included in this population size group. Therefore, the omitted dummy variable is TOWN.

[c] Population cutoff is 5,750 rather than 8,000.

enificant. It may be the case that total population verwhelms differences in characteristics within the opulation in determining costs. Of particular interest is the fact that at least one f the two terms based on our calculated service •ndices (IND and INDPOP) is significant for eleven of thirteen and thirteen out of sixteen of the service areas provided by low and high population jurisdictions, respectively. The significance of these terms is important for two reasons. First, the significance of the service level indices suggests that we may have made a first step toward solving a problem that has plagued researchers for some time, the lack of a useful proxy for service level or output. Second, specific values of each service area index are used as proxies for the standard service levels in the simulations.

Calculating Standard Need

The cost function estimates provide the basis for predicting the cost of providing a standard level of each service for every jurisdiction in the state. To predict these costs, the weighted average of the service level index (AVEIND) and that average multiplied by actual population (AVE1NDPOP) replace IND and INDPOP for prediction purposes. The weights were used to correct for differences in distribution of municipal types in the sample compared to the state. Thus, AVEIND and AVEINDPOP, along with actual values for the remaining variables are multiplied by the corresponding estimated coefficients from Table 2 or 3 and transformed through the Tobit framework to obtain Cfj, the cost to the jth jurisdiction of providing a standard level of the ith service. The method by which these standardized costs are utilized for projecting needed revenues is described in the following sec-don on simulation.

Simulation

In the remainder of this paper we will be concerned with utilizing these cost estimates and other data from the financial accounting system to simulate the effects of alternative general strategies and specific policy options on the distribution of per capita state aid. The two general strategies to be investigated are combination strategies: a Need-Capacity gap and a Need-Capacity-Effort gap. The policy options will include alternative standard tax rates and alternative weights on Need-Capacity and Effort gaps.

It is assumed that all jurisdictions are held harmless at the current dollar amounts of per capita aid and the simulations are concerned only with possible changes in the formula for the distribution of appropriations above the hold harmless level. The appropriations to be distributed under the new alternatives are assumed to be at the $100 million level.

The general framework of taxation will be held constant. For example, only counties and cities will be allowed to levy a sales tax. City and county sales tax rates may change but the limit on local sales tax rates of 3 cents (with exceptions for a few jurisdictions) remains. All jurisdictions retain the right to levy a tax on real property but the tax rate will be allowed to vary. All other taxes and fees are assumed to be held constant at the FY1984 levels, i.e., only the rates on real property and county and city sales tax rates will be allowed to vary. New taxes are not considered.

In equations (3) through (7) below, the general procedure will be to: a) define and compute Needed Revenue (NR) and Revenue Capacity (RC) and use these calculations to compute a need-capacity gap (NCGAP) for each jurisdiction; b) calculate an effort gap (EGAP) for the jurisdictions making an extraordinary effort to raise revenues; and c) add the effort gap to the need-capacity gap to form a need-capacity-effort gap (NCEGAP) strategy. Needed Revenue is defined as

(3)

where: NRj = Needed Revenue in the jth jurisdiction,
CGGj = total operating cost of general government support activities in the jth jurisdiction,
C^s_{ij} = the total operating cost of providing the ith service at the sth standard level

the C^s_{ij} are calculated as described in the previous section.

It should be noted that an accounting system designed for maintaining accountability does not include depreciation on buildings or other investments. Also, while operating costs were estimated for average levels of service, alternatives such as a standard deviation unit above or below the average could be considered.

Revenue Capacity for jurisdiction j is defined as

(4) $RC_i = Bijt^s_1 + B_{2i}t^5_2 + K_i,$

where: B_{IJ} = the real property tax base at full value assessment in the jth juris diction
t^s_1 = the standard real property tax rate

B_{2j} = the county (or city) sales tax base
t^2_s = the standard county (or city) sales tax rate
Kj = other income to the government of jurisdiction j, included fees, user fees, other property taxes, federal and state aids and income derived from services performed for other governments.

Any analyst initiating work of this kind would be well advised to become acquainted with the idiosyncrasies of the state accounting system. In New York for example, county sales tax revenues may be distributed to cities, towns and villages via a sales tax credit against the property tax levied by the county in those jurisdictions. Thus county property tax revenues must be adjusted to include those sales tax credits before the revenue is divided by full-value assessment to obtain the property tax rate. Other states probably have a large number of pitfalls of this type.

Average tax rates were assumed as the initial definition of a standard tax rate. City sales tax rates were averaged over 61 cities including a zero for the 33 cities which chose not to levy a sales tax." County sales tax rates were averaged over 57 counties including a zero for four counties that chose not to levy a county sales tax.[3]

Property tax rates were averaged over all 1,606 jurisdictions. It might be argued that the property tax rate should be averaged within type of jurisdiction, that is within counties, cities, villages and towns. Note that cities typically levy higher tax rates than do other jurisdictions. To compute an average property tax rate for cities and to use that as the standard rate of utilization of the property tax base would appear to constitute a bias against cities. For example, for any given minimum level of service, the need-capacity gap would be smaller for cities (because of the higher tax rate for cities) and the amount of aid received by cities would be proportionately lower. Thus the standard property tax rates were derived from the average across all 1,606 jurisdictions.

The Need-Capacity gap is defined as

(5) $$\mathbf{NCGAP_j - NR_j - RC_j}$$
$$\mathbf{s.t. \quad NR_j > RC_j.}$$

As a first step in developing another strategy for the distribution of general purpose aid an effort gap is calculated as

(6) $$EGAPj = OSR_j - (B_{ij}t^s_1 + B_{2j}t^s_2),$$
$$\text{s.t.} \quad OSR_j > B_{ij}t^s_1 + B_{2j}t^s_2,$$

where: OSR_i = own source revenue or total rev enue less state and federal aids

$B_{2i}t^8_1$ = revenue from taxing the full value assessment of real property at standard rate

$B_{2i}t^5_2$ = revenue generated by a sales tax; when sales are taxed at a standard rate for that class of jurisdiction of which j is a part.

The Need-Capacity-Effort gap is defined as

(7) $$NCEGAP_i = a_iNCGAP_j + a_2EGAP_i,$$

where: a_1 = the weight to be attached to the need-capacity gap
a_2 = the weight to be attached to the extraordinary effort as measured by the effort gap.

Finally, within any particular strategy or policy option the distribution of general purpose aid to a jurisdiction is given by

(8) $$AID_j = \frac{GAP_j}{\sum_j GAP_j} * \text{Appropriations.}$$

Using standard spreadsheet software, the effects of alternative strategies and policy options on the distribution of per capita aid are simulated. Within the two general strategies, Need-Capacity and Need-: Capacity-Effort, the alternatives were limited to two different tax rates (average and one standard deviation unit below average) and alternative weights on need-capacity and effort gaps. The procedure can easily accommodate different standard levels of service, but the results using alternative levels of services are not presented here.

The results of eight simulations are presented in Table 4. As a means for interpreting these results, first consider the effect of adding effort as a criterion for distributing aid. Holding tax rates constant at the average level and then at one standard deviation below the average (low rate) implies comparing columns 1, 3, 5 and 7 of Table 4 for average rates and 2, 4, 6 and 8 for low tax rates. In each case adding an effort bonus shifts the distribution toward counties and cities and away from villages and towns. The shift is exaggerated as higher weights are placed on effort, compare for example columns 5 and 7 at average tax rates or columns 6 and 8 at low tax rates.

Lowering the standard tax rate shifts the distri-

[2] For the 33 cities **with no** sales tax, the authors estimated a sales tax base using data from 26 cities that have sales tax bases and are in counties with sales taxes.

[3] The State Department of Taxation and Finance provided estimates of sales tax yield at **a three** cent sales tax **level for four** counties that did not levy a sales tax. This allowed the **authors** to compute a sales tax base for those counties.

Table 4. Simulation Results for Alternative Aid Distribution Strategies: AVERAGE NEEDS

	(1) NC Avg. Rates	(2) NC Low Rates	(3) NCE Avg. Rates High Wt. onNC[a]	(4) NCE Low Rates High Wt. onNC"	15) NCE Avg. Rates Equal Weights	(6) NCE Low Rates Equal Weights	(7) NCE Avg. Rates High Wt. on Effort"	(8) NCE Low Rates High Wt. on Effort[b]	(9) Current Aid Distri-bution	(10) Current Expendi-tures[L]
					- - Average	Dollars - -				
County	604,843	624,622	786,603	747.693	851,893	796,960	905,979	840,085		
City	271,187	225,886	316,161	274,379	332,316	293,791	345,699	310,783		
Town	27,465	34,258	20,252	27,758	17,661	25,156	15,514	22,879		
Village	43,158	34,849	31,390	27,568	27,163	24,654	23,661	22,102		
					- - Percer	itages - -				
County	34	36	45	43	49	45	52	48	12	63
City	16	14	19	17	20	18	21	19	52	15
Town	25	31	19	25	16	23	14	21	27	16
Village	24	19	17	15	15	14	13	12	9	6

[u] **Weight on NC = 2, weight on E** = 1. [b] Weight **on** NC = 1, **weight on E = 2.**

[c] **Expenditures are total operating expenditures** for **16** services analyzed in **this report.**

bution of aid toward counties and towns and away from cities and villages when effort is not included as a criterion. In contrast if effort is included among the criteria, lowering the standard tax rate shifts the distribution toward towns only and away from counties, cities and villages. This shift in distribution takes place at all weights on effort considered in this analysis.

The final two columns of Table 4 allow some interesting comparisons with each other and with different aid distribution strategies. First, note that while counties currently make 63 percent of the actual operating expenditures for the sixteen services, they receive only 12 percent of the current aid distribution. In contrast cities currently make 15 percent of the expenditures for services but receive 52 percent of the current aid distribution. The gap strategies, providing between 34 and 52 percent of the aid to counties, represent a middle ground between the current distribution of aid and of expenditures. The gap strategies, providing between 14 and 21 percent of the aid to cities are more closely aligned with the distribution of expenditures than with the current distribution of aid.

In order to gain some insight into the distributional effects of the different strategies it is useful to define the most needy jurisdictions and compare on a per capita basis the distribution of aid to those jurisdictions with that to other jurisdictions. For example, define needy jurisdictions in terms of need-capacity where the need is defined as the costs of each of the services at a standard level plus the costs of general government support and the capacity is defined as the income generated by taxing the tax base(s) at the standard tax rate plus all other income including federal and state aid. Further, we define the most needy jurisdictions as those 10 percent with the largest gap between needed revenues and available revenues. Note that a large gap between needed revenues and available revenues could arise from either high costs of providing a standard level of services or lower available revenues resulting from lower tax bases. It is useful to make these comparisons on a per capita basis as shown in Table 5.

As expected all aid distribution strategies investigated here gave markedly more aid to the most needy of the counties, cities, villages and towns. But the ratio of aid for the most needy to that for the average jurisdiction was by no means uniform across strategies. For example, at average tax rates comparing columns 1, 3, 5 and 7 for counties, it is seen that the addition of an effort bonus lowers the ratio of the amount received by the most needy counties to that received by the average county and that tendency is exaggerated as the weight on effort increases. This statement is also true for cities towns and villages. Using a comparison of columns 2, 4, 6 and 8 reveals the same conclusions for l_o\v tax rates. Clearly if the objective is to give the most aid to the most needy governments of each typ$_e$ the need-capacity gap is the preferred strategy followed in order by need-capacity-effort with high weight on NC, NCE with equal weights and NCE with high weight on effort.

Making comparisons across types of governments, note that for all strategies, cities receive the largest per capita aid followed in order by villages counties, and towns. But the spread from top to bottom, cities to towns, is largest for NC strategies and decline as effort is added as a criteria and that decline in spread continues as effort receives a higher weight (compare columns 1,3,5 and 7 for average tax rates and 2, 4, 6 and 8 for low tax rates). Although cities and villages would receive higher amounts of aid than counties on a per capita basis, the higher population in counties would mean that the aggregate amount of aid going to counties would far exceed that going to any other type of jurisdiction.

Formulating the information on gainers and losers as shown in Tables 4 and 5 portrays the difficult political tradeoffs facing decision makers regarding intergovernmental aid. Table 5 clearly demonstrates that all the need-capacity and need-capacity-effort strategies analyzed here target aid distribution toward the most needy jurisdictions in contrast to the uniform rate per capita provided to each class of jurisdiction under the current per capita aid grant formulas. But on the other hand, compared to the status quo as reflected in column (9) of Table 4, all of the need-capacity and need-capacity-effort approaches involve substantial redistribution of aid away from cities with counties and villages being the major beneficiaries. Because of this major departure from the status quo, it seems likely that the adoption of any of these strategies would be feasible only if the program were designed as an increment to the current aid distribution.

This research provides a framework for designing alternative methods for distributing state aid to local governments in New York State. The particular strength of this innovative methodology is the fact that all suggested alternatives rest on a solid foundation of service cost estimation. This foundation could be further strengthened with additional research. The current estimation procedure, with a cost function estimated for each service category, presumes that there are no tradeoffs between services when cost conditions change. A joint estimation procedure, wherein all service cost functions are estimated at the same time, would allow for

Table 5. Comparison of Effect of Alternative Strategies on Aid Distribution Per Capita to the Most Needy Jurisdictions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	NC Avg. Rates	NC Low Rates	NCE Avg. Rates High Wt. on NC[a]	NCE Low Rates High Wt. onNC[a]	NCE Avg. Rates Equal Weights	NCE Low Rates Equal Weights	NCE Avg. Rates High Wt. on Effort[b]	NCE Low Rates High Wt. on Effort[b]
	- - - Do	liars per Capita						
Average 10% Most Needy Counties	30.40	23.54	16.66	14.55	11.72	10.95	7.63	7.80
Average All Counties	7.02	5.82	5.43	4.91	4.86	4.55	4.39	4.23
Average 10% Most Needy Cities	45.02	32.13	26.18	20.57	19.42	15.94	13.81	11.89
Average All Cities	15.78	12.46	12.25	10.54	10.99	9.77	9.94	9.10
Average 10% Most Needy Towns	23.41	19.11	13.25	12.09	9.60	9.29	6.58	6.83
Average All Towns	4.50	5.49	3.05	4.17	2.53	3.65	2.10	3.18
Average 10% Most Needy Villages	50.01	38.52	28.81	24.20	21.19	18.47	14.88	13.45
Average All Villages	8.48	7.48	6.66	6.24	6.00	5.74	5.46	5.30
					Ratios - -			
Aid to Most Needy Counties/ Aid for Average County	4.33	4.01	3.07	2.96	2.41	2.41	1.74	1.84
Aid to Most Needy Cities/ Aid for Average City	2.86	2.58	2.14	1.95	1.77	1.63	1.39	1.31
Aid to Most Needy Towns/ Aid for Average Town	5.20	3.48	4.34	2.90	3.79	2.55	3.13	2.15
Aid to Most Needy Villages/ Aid for Average Village	5.90	5.15	4.33	3.88	3.53	3.22	2.73	2.54

[a] Weight on NC = 2, weight on E = 1. [b] Weight on NC - 1, weight on E - 2.

interaction between services and is a logical next step for further research. This approach may add further insights into alternative methods for distributing state aid to localities in New York and elsewhere.

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