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Financing County Highways

KUMARES C. SINHA, KAREN L. PICKETT, AND JEAN E. HITTLE

Lack of adequate funding to undertake the needed maintenance of local roads and highways is one of the critical issues facing transportation officials throughout the country. This paper examines the problem of revenue shortfall in local highway maintenance and construction, in particular with reference to Indiana counties. A review of the projected needs is made to compare with the expected revenue levels under existing trends. Recommendations are then outlined for possible strategies in addressing the problem of county highway financing and administration.

From a historical perspective, one must conclude that modern technology for the movement of goods and services has all but overwhelmed many local road and street systems. Too many local road and street systems have not been designed and constructed to any specific engineering standard. Instead they have evolved from various stages of surface improvement without much (if any) consideration for base design or drainage. Although rural county roads are often lacking in structural capacity to support traffic loads, city streets are often lacking in traffic-volume capacity and traffic-safety design. In addition, the county road systems include great numbers of weak, narrow, obsolete bridges that are in critical need of replacement or repair.

And yet in the face of all these needs and deficiencies, through the structure and organization of local institutions and economy, we continue to impose great stress and strain on our local roads and bridges. We develop bigger school corporations that require bigger and heavier school buses, bigger and more-productive construction machinery to better serve the needs of industry, and bigger and more-productive farm machinery of all types to better serve the needs of our growing agricultural economy. All these vehicles must negotiate these weak, narrow roads and bridges. In addition, there is the impact of rail abandonment that started some five years ago after financial reorganization and consolidation of many railroad lines. The poor rail service plus the rail abandonment program have forced great quantities of grain and other commodities to be moved to and from grain elevators by truck, and these trucks, too, must negotiate these weak, narrow roads and bridges.

Again, modern technology, which has made commerce and industry more efficient and productive, has been racing along, whereas local road programs have been at a virtual standstill because of inadequate funding to carry on a planned program of roads and bridges built to standards that meet the needs of heavier, wider school buses, grain trucks, farm machinery, etc.

In addition to insufficient funding to meet current needs, however, local road and street programs are all too often plagued with weak and passive administration. Elected county commissioners, city mayors, and town boards have been slow to appreciate the need for technical advice and planning to upgrade management and use of the limited funds available to them. As a result, many local road and street programs have fallen into an "as-needed" maintenance operation that provides temporary relief but no lasting benefit. The extremely high cost of labor, materials, and equipment for maintenance begs for a different direction and dimension to local road administration.

This paper highlights problems in local highway finance related to the condition of county roads

under local control. The county road subsystem, although it does not generally account for more than an estimated 6 percent of national highway travel, allows for consumer and producer access to land, farms, shops, and highways of higher classification. Essentially, these county roads are necessary for the economic viability of this country: They provide for the transfer of raw goods to the processing centers or to the market. For example, in Indiana, the county road system is vital to the transportation of grain and other agricultural products. The thrust of today's problem is that local highways are providing lower levels of service year by year, for even if county roads were originally built to meet adequate design standards (and many were not), they are now deteriorating due to inappropriate funding. Inflation and erosion of the highway user-tax base have dramatically fueled highway funding problems at the local level. The trends of these factors that affect county highway finance will be discussed both on the national level and on the county level by using Indiana as a case in point. Sources of funds available for county highway operations are also included in this paper, as are the categorized uses of such funds. A general suggestion for change in the appropriation of funds is made in the conclusion to the discussion of the current problems in the area of county highway finance.

NATIONAL FACTS AND TRENDS

Historically, the majority of roadway funds in this country have been disbursed for capital expenditures for the nation's highways (1). Over the past few years, due to increasing maintenance and operational needs, the proportion of funds used for noncapital expenditures has been increasing, whereas funds used for capital expenditures have undergone a corresponding decrease. This has also been true for county highway spending to a certain extent; capital disbursements fell by nearly 5 percent over the period 1969-1977, and disbursements for maintenance rose by more than 3 percent during the same period (2). Despite these small changes, categorical levels of spending by counties for highways have remained fairly steady during this period, as shown in Table 1 (2).

Examination of Table 1 also reveals that counties have historically spent almost one-half or more of their available funds on maintenance of their highways. Coupled with the fact that maintenance needs are increasing relative to other types of spending, this may be evidence of a vicious cycle in county highway finance: Maintenance of roads never built to meet even low design standards gobbles up higher percentages of the available (albeit inadequate) highway funds, which leaves fewer portions of funds for reconstructing other highways on the county system to provide higher levels of service. This in turn leads to more deterioration of county roads at an accelerated rate because of neglect in their maintenance.

Estimated motor vehicle travel figures for the past 10 years show that the amount of local rural travel in the United States, based on total national travel, declined by more than 5 percent from 1970, when the proportion was 11.7 percent, to 6.1 percent in 1978 (2). In actual figures, local rural travel

Table 1. Functional percentages of disbursements by counties for highways.

Year	Percentage of Total Disbursement for		
	Capital Expenditures	Maintenance Expenditures	Other Expenditures
1969	30.0	49.4	20.6
1970	30.2	48.3	21.5
1971	30.0	48.2	21.8
1972	29.9	48.6	21.5
1973	29.9	48.8	21.3
1974	31.1	47.8	21.1
1975	29.8	49.2	21.0
1976	27.8	50.4	21.8
1977	25.3	52.8	21.9

was 130 739 000 vehicle miles of travel (VMT) in 1970 and fell to 94 553 000 VMT in 1978. These figures should be contrasted with those for estimated total VMT in the United States in 1970 and 1978, or 1 120 705 000 and 1 548 213 000, respectively, as total nationwide travel increased by 27.6 percent over the nine-year period. These figures are for all roads in the U.S. highway system, regardless of jurisdiction; hence, the category of local rural roads for which figures were quoted includes travel on rural highways other than those solely under county jurisdiction. However, this classification of local rural travel is sufficient to show the trend in use of county highways because the local rural system includes mostly the county highways.

Mileage counts by jurisdiction are more readily available than are travel data. Nationally, rural mileage under local control includes that of county roads, town and township roads, and other local roads. County road mileage accounts for the largest share, or about 77 percent, of rural highway mileage under local jurisdiction (2). The significant fact is that county road mileage as a proportion of total road and street mileage in this country averages about 46 percent in any given year. This means that, although the proportion of travel on local rural roadways and hence on county highways has declined since 1970 to account for only 6 percent of the nation's total VMT, 46 percent of the nation's highway system is subject to rapid pavement deterioration because highway fund-allocation formulas generally favor high-volume highways.

Two major factors have led to further problems in the area of county highway finance. The first of these relates to one of the sources of revenue for county highways. Total receipts available for all classifications of highway expenditures have risen markedly in the past 20 years. However, the federal and state governments raise 80 percent of their respective highway revenues by direct user charges in the form of motor-fuel taxes and registration fees (1). Because the largest share of county highway revenues comes directly from state funds based on motor-fuel tax revenues, change in this tax base affects the levels of revenue available to counties for their highway needs. Taxes imposed as a fixed amount per gallon lose their impact as gasoline and other prices rise because revenues so generated are not increasing to keep pace with inflation; the proportion of fuel taxes collected decreases as a proportion of the dollar volume of fuel sales. Currently, many states and the federal government levy gasoline taxes as a fixed amount per gallon. Due to high inflation rates, county revenues are suffering from the eroded tax base. In addition, as more fuel-efficient vehicles become part of the nation's vehicle fleet, fuel use per vehicle declines, and since highway revenues are proportional to fuel

consumption, they decline in absolute terms as fuel efficiencies improve.

The second factor of significance is that of inflation's effect on the economy and particularly its effect on the prices of highway-related materials and services. As shown in Figure 1 (3,4), the highway bid price indices at both national and state (Indiana) levels have continually outpaced the general inflation rate in the country. In 1978, when highway bid prices shot up dramatically but the consumer price index (CPI) maintained its steady growth rate over the previous year, highway-related prices nationally were 265 percent higher than they were in 1967 (3). Composite consumer prices were up 70 percent less than this level, or 195 percent of the 1967 price level (4). What this means is that highway financing is suffering even more than the general economy from inflation; rising prices of highway construction, maintenance, operation, and administration are rapidly reducing the real purchasing power of roadway dollars in an economy in which the purchasing power of the dollar is losing ground in every category of spending. Governments unwilling or unable to base appropriations for highway expenses on the associated accelerated price index are faced with a widening gap between their highway revenue needs and their sources of such revenue.

INDIANA COUNTY HIGHWAY FINANCE

The inflation problem is as apparent in Indiana as it is in the remaining sectors of the United States. Figure 1 shows that the Indiana highway bid price index has nearly paralleled the federal-aid highway bid price index since 1967, which indicates that the problems that Indiana county governments face in the area of highway finance are representative of the national scenario. Alternatively, the issues that have arisen due to rapidly rising highway prices on the national level are issues that should be of concern to state, county, and local governments in Indiana as well. By using 1967 constant dollars, the real value of Indiana county highway gross receipts fell from \$85 745 000 in 1969 to \$57 188 000 in 1979 [see Table 2 (2)]. Actual receipts rose by more than \$49 million over this time span. Figure 2 reveals the opposing trends of local highway receipts in Indiana from 1969 to 1979 in terms of actual and constant dollars (2). The fact that money spent in 1979 bought less than an equal sum did in 1969 is tantamount to other county highway financing concerns.

Due to escalating costs of materials and personnel, maintenance of and improvements to Indiana highways have lagged behind. The 1976 Indiana Highway Needs Study (5) assessed a "real need" of \$23 billion over the 20-year period until 1995 for Indiana highways; \$7 billion of this amount was needed for projects that have lagged behind scheduled initiation or completion to date. Real need, which is defined in the report as the amount needed "such that at the end of twenty years Indiana will have an adequate system to handle the expected traffic based on nationally recognized practices of capacity analysis and safety considerations," would demand that Indiana spend \$1 159 000/year (based on 1975 constant dollars) for highways, roads, and streets. When this figure is compared with the current actual level of spending for roadways in Indiana of approximately \$480 million/year, the wide gap between assessed needs and met needs is evident. Even if the minimum-need requirement said to be necessary to maintain Indiana's roadways at their present performance levels without further deterioration were imposed (about \$740 million annually), current

Figure 1. Highway bid and consumer price trends.

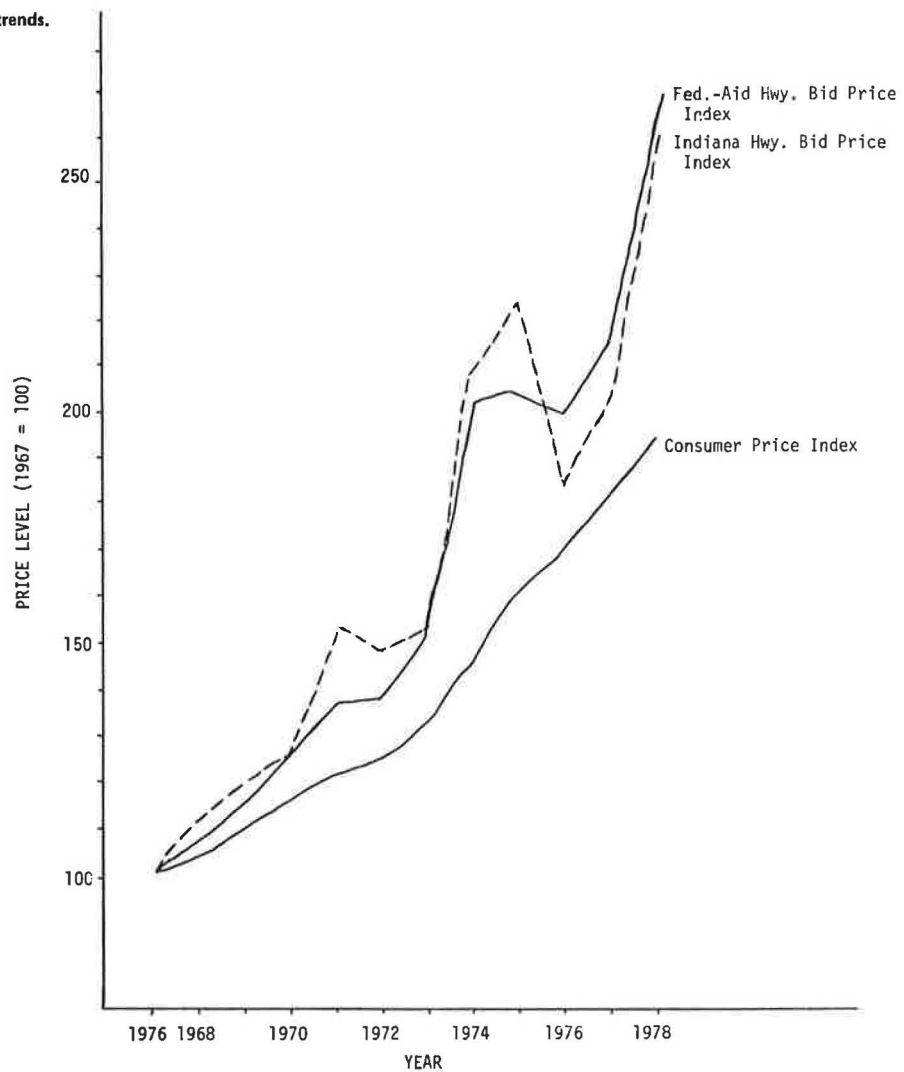


Table 2. Indiana county highway gross receipts.

Year	Actual Receipts (\$)	Real Value (1967\$)
1969	102 894 000	85 745 000
1970	121 624 000	96 527 000
1971	122 817 000	80 272 000
1972	130 050 000	87 872 000
1973	140 120 000	91 582 000
1974	139 011 000	66 512 000
1975	145 056 000	64 757 000
1976	160 846 000	87 416 000
1977	154 036 000	75 880 000
1978	151 416 000	58 462 000
1979	152 119 000	57 188 000

spending levels would still meet only 65 percent of such need.

Projected average annual real and minimum needs and total revenues for Indiana for the years 1976-1995 are shown in Figure 3 (5) disaggregated to state, county, and city levels. Focus on the county-system levels of these amounts reveals significant indications of the seriousness of Indiana's county highway financing problems. Revenues for county roads for the 20-year period on an annual basis rank second, or at nearly one-half of those predicted for state highways, whereas real needs (as previously defined) for county roads exceed by \$25

million those needs determined for state highways. The gap between average annual real needs and corresponding revenues for state highways is about \$200 million; for city and town streets it is more than \$180 million; for county roads this gap approximates \$340 million. County road finances also reveal the largest gap between projected average annual minimum needs and average annual revenues at the level of more than \$250 million.

Despite the fact that the dollar amounts of needs are based on design and maintenance standards that are generally higher than the current design and maintenance practices and thus may overestimate the extent of needs, the need study clearly reveals the relative degree of needs in various highway systems in Indiana. It is obvious that the projected revenue shortfall for county highways is severe; for the highway system that encompasses more than two-thirds of Indiana's highway miles, this means that county highways in Indiana face grave performance deficits.

Many miles of county highways and roadways are unsurfaced now, and it appears that they will remain unsurfaced indefinitely as counties attempt to maintain surfaced roads by using inflation-reduced highway revenues. Some existing paved county highways may even be degraded to gravel surfaces to diminish needed maintenance expenditures for their upkeep. Because Indiana has large agricultural and manufac-

Figure 2. Highway receipts for counties, cities, and towns in Indiana.

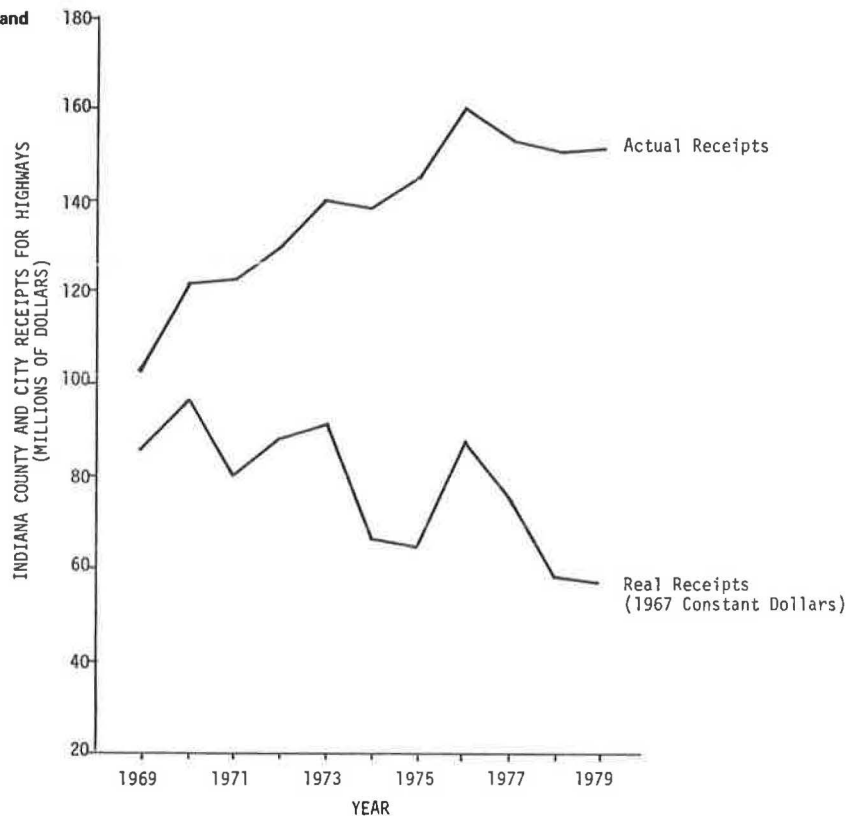
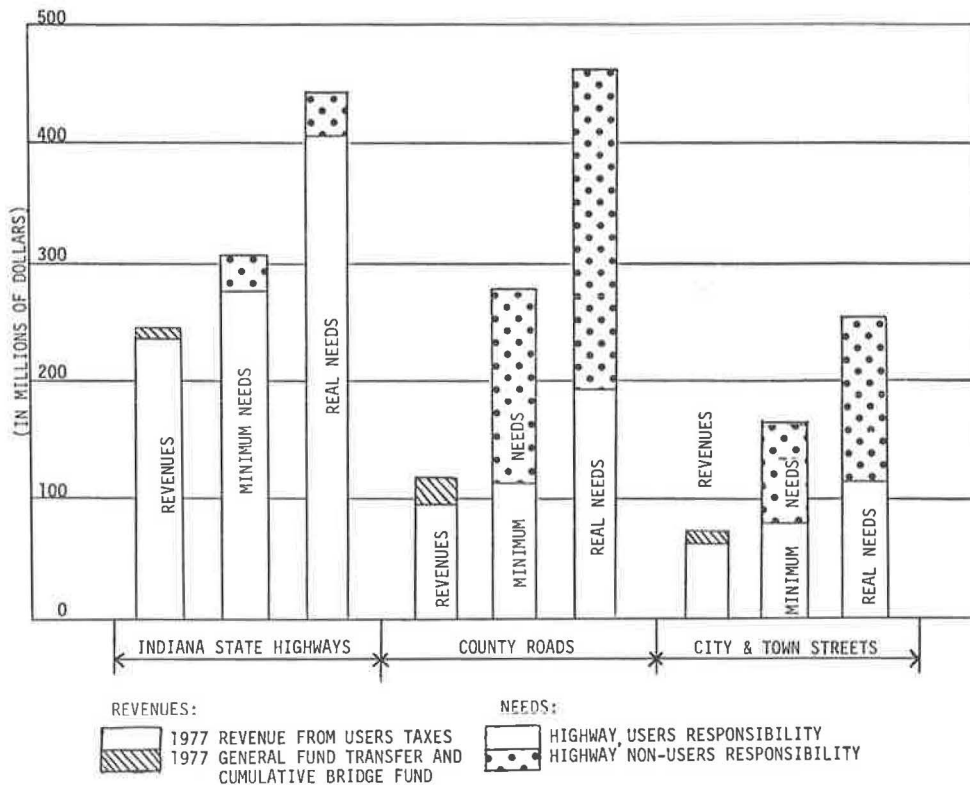


Figure 3. Average annual highway needs and revenues in Indiana (1975 prices).



turing sectors dependent on county roads for movement of goods and equipment, lower-grade roads will introduce some production inefficiencies. Not only will Indiana's economy bear higher prices from such

inefficiencies, but also, if it is assumed that other states are similarly affected within their respective counties from poorer roadway conditions, the entire U.S. economy will suffer.

As mentioned previously in this paper, state governments rely heavily on motor-fuel taxes for highway revenues, and Indiana is no exception. The state government has the major responsibility of providing revenues for county highway purposes in Indiana, and most of these revenues are disbursed from the Motor Vehicle Highway Account (MVHA) (6). This account, created in 1937, channels funds from a variety of sources into a single dedicated highway fund. Revenues collected are then apportioned to highway jurisdictions on the basis of the following distribution scheme: 53 percent for state highways, 32 percent for county highways and roads, and 15 percent for city streets. The county share is further divided among 92 Indiana county highway departments: a 5 percent equal share to each county, 30 percent based on county vehicle registration, and 65 percent based on county roadway mileage.

The major source of funds for the MVHA is from taxes collected on motor-fuel sales within the state. Prior to 1969, a fuel tax of \$0.06/gal was collected in Indiana. In 1969, the total amount collected per gallon was increased to \$0.08 pursuant to legislation passed by the Indiana General Assembly. The Highway, Road, and Street Fund is the recipient of revenues generated by the additional tax on motor-fuel sales within the state of \$0.02/gal. The money is further channeled into two accounts within the fund, specifically, the Primary Highway System Special Account and the Local Road and Street Account (LRSA) (6). LRSA is given 45 percent of the Highway, Road, and Street Fund to be used exclusively by cities, towns, and counties for engineering and land acquisition needs and for construction and reconstruction of arterial street and road systems. Counties receive funds from this account via a two-level distribution plan. On the first level, 92 countywide appropriations are made based on the ratio of county passenger car registrations. Second-level appropriations are made to county, city, and town units on the basis of each unit's population and roadway mileage. In 1979, LRSA appropriations amounted to slightly more than 17 percent of total distributions to county highway units within the state.

As of July 1, 1980, Indiana's fuel tax became an 8 percent tax on the pretax price of a gallon of gasoline (7). This action was an attempt by the 1980 state legislature to generate highway revenues that keep pace with inflation. On enactment, this tax was equivalent to an \$0.085/gal tax on gasoline sales, based on the statewide average pretax price of \$1.15/gal of fuel. Indiana may still be left facing a \$67 million shortfall in gasoline tax revenues for fiscal year 1980, however, for two reasons. First, fuel prices in the state stabilized near the time the tax change was enacted, which left prior estimates of revenues based on continually rising gasoline prices in excess of the amount that may actually be collected. Second, the state has experienced a 6 percent decline in gasoline consumption (predictably due to more fuel-efficient vehicles in use and increased conservation efforts), so motor fuel-tax revenues are declining at a higher rate than the new tax is increasing them because of lagging fuel sales.

CONCLUSIONS

The change in format of gasoline taxation in Indiana from a fixed rate per gallon to a percentage sales tax may somewhat increase revenues available to counties for their use in highway financing. As noted, however, even this change will not be adequate to meet projected highway needs. Higher gasoline tax rates, higher vehicle registration fees

(particularly for commercial vehicles), and increases in transfers from nonuser revenue funds could circumvent the problem of revenue shortfalls in Indiana. Similar changes in other states' and in the federal government's highway revenue sources may combat the problem nationwide. With the inflation squeeze now felt in every sector of the U.S. economy, however, strong opposition to increased tax rates, if proposed, can well be expected.

Unfortunately, no one solution can alleviate the serious county highway financial concerns. But as more county roads lack maintenance or improvement relief, changes to increase revenues for these purposes must be implemented. Instead of looking only to increasing revenues from various sources, the use of improved allocation schemes may benefit counties without necessarily overburdening taxpayers. Appropriations to governments (state, county, and city) from Indiana's MVHA, for example, could vary in proportion from year to year. A minimum percentage, based on historical need patterns and committed endeavors, could be allocated to each level of government for highway expenditures (say, 50 percent to state, 30 percent to counties, and 10 percent to cities); the remaining portion (i.e., 10 percent) would go to areas that demonstrate the greatest need in any given year. Need for increased revenue appropriations could also be worked into the LRSA appropriation scheme and the distribution of the MVHA at the county level. Conceivably, allocating funds to counties on the basis of actual needs may be desirable. The definition of needs, however, must be examined carefully.

At the same time, Indiana's county highway programs require stronger and more-consistent administration that provides for engineering and technical input so that available (though insufficient) road dollars can produce a more lasting benefit. When inadequate right-of-way, inadequate base, inadequate drainage, and inadequate pavement width are provided, scarce road dollars are soon wasted on the same old potholes. Therefore, in addition to addressing needs for additional highway funding, need for a better framework for administration of county highway programs should not be overlooked. Steps toward workable methods of efficient county highway financing and administration require immediate attention if a large part of the highway system in this country is to be spared from requiring costly replacement.

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Use of Revenue Sharing for Public Transportation in Rural Areas

ALICE E. KIDDER

The purpose of this study is to explore whether rural towns and counties use part of their revenue-sharing funds to support public transit operations or other aspects of public transportation such as road construction and maintenance. This is of interest because the current demonstrations of public transportation programs in rural areas are supported mainly by federal demonstration funds from the Federal Highway Administration, and they face possible funding termination unless sufficient local financial support is forthcoming. This study is also of interest because of the impact of new legislation that makes broader federal assistance available to public transportation in non-urbanized areas.

The purpose of the current study is to explore whether rural towns and counties use portions of their revenue-sharing funds to support public transit operations or other aspects of public transportation such as road construction and maintenance. This topic is of interest because the current demonstrations of public transportation programs in rural areas are supported principally out of federal demonstration funds from the Federal Highway Administration (FHWA) of the U.S. Department of Transportation and face the possibility of funding termination unless sufficient local financial support is forthcoming. In addition, the topic is relevant to discussions of the impact of new legislation that makes broader federal assistance available to public transportation in nonurbanized areas. The latter funds are dependent on the availability of local matching funds to undergird federally supported programs.

Several questions were of interest to the research team.

1. Is revenue-sharing money used for public transportation?
2. How much of the revenue sharing used for public transportation is spent on public transit compared with the funds spent for roads, streets, pavements, or other similar transportation needs?
3. What has been the trend in funding availability through revenue sharing as it appears in the budgets of rural towns and counties?
4. What are the characteristics of towns and counties in nonurban areas that use money for public transportation compared with those that do not?
5. Do political jurisdictions served by FHWA programs for public transit funded by Section 147 (Rural Transportation Demonstration Program) of the Federal-Aid Highway Act of 1973 spend more than the average rural area does on public transportation and in particular on public transit, defined as the movement of passengers?

RESEARCH METHODOLOGY

Revenue-sharing funds are received annually by local political jurisdictions such as towns, boroughs, counties, parishes, and the like, to be spent as locally generated revenue at the discretion of the locality. Minimal reporting requirements yield information on the broad categories for which the money is spent. These categories include not only public safety, environmental protection, health, recreation, libraries, social services for the aged or the poor, financial administration, education, social development, housing and community develop-

ment, and economic development, but also one additional category, which is of concern here--public transportation.

Researchers obtained a sample of randomly selected rural areas (jurisdictions within nonurbanized areas that contain fewer than 10 000 in population) that had previously been compiled by the Transportation Institute of the North Carolina Agricultural and Technical State University for a study of transportation in rural towns. The sample consisted of 350 rural towns that represented all parts of the United States and are listed in the Rand McNally Atlas as substate jurisdictions that have populations less than 10 000.

With the cooperation of the Office of Revenue Sharing of the U.S. Department of the Treasury, the research team obtained photocopies of the actual use reports filed annually by the jurisdiction that list the actual expenditures by category under the headings "Capital" and "Operating and Maintenance". In some cases, the town selected in the random sample was not a political entity that received revenue-sharing funds. In such a case, data on the revenue sharing of the county in which the town was located were substituted for missing town data. In other cases, the jurisdictions had not filed all successive reports, and data were recorded only for the available years. Consequently, the sample size fluctuates somewhat from year to year.

Data were gathered for 1973 through 1975. It was noted that expenditure patterns for 1973 were often small in comparison with the later years, ostensibly because the program was in an initiation phase. Frequently, rural jurisdictions simply carried funds over into 1974. The limited number of years weakens the possibility of establishing meaningful time trends. No actual use reports were available for 1976 or later, despite the fact that data had been gathered in the summer of 1978.

FHWA furnished several important data sources: the list of funded and active Section 147 demonstration projects; the quarterly reports of financial activity for those systems, for the most part as of spring 1978; and a list of liaison personnel at each operation. The researchers made telephone contact with the operations and learned the political jurisdictions served by FHWA demonstration projects.

Telephone calls were made to the Section 147 projects and to a nonrandom sample of 120 jurisdictions chosen from the first sample because they exhibited significant expenditures of funds for public transportation. The purpose of this survey was to find out whether any of these funds were being used to support public transit.

Data from the various sources were prepared in computer-ready format, analyzed statistically by means of the Statistical Package for the Social Sciences, and are available to interested researchers who may wish to use them.

FINDINGS

Use of Revenue-Sharing Funds for Public Transportation

Data are reported for four groups of jurisdictions:

1. Towns represented by the random sample for which National Association of Counties (NACO) data were available on county characteristics,

2. Other towns represented by the random sample of rural areas for which no NACO data on corresponding counties were available due to the small population of the counties,

3. Counties in which towns from the random sample were located and for which revenue-sharing reports were available for the county but not the town, and

4. Towns or counties served by the Section 147 demonstration projects.

It is evident from Table 1 that all groups have jurisdictions that spend revenue-sharing funds for the support of public transportation. In 1973, for example, 22.4 percent of the sample towns in large counties spent money for public transportation out of revenue-sharing funds. An even larger percentage of the counties participated: 42.4 percent of all counties in the study area reported use of revenue-sharing funds for public transportation. Districts served by Section 147 demonstration projects resemble the average pattern per county; 35.8 percent reported such use of funds.

Data for 1974 and 1975 show that even more jurisdictions began using the funds for transportation purposes in the later years. In 1975, 56.5 percent of the counties and 40.0 percent of the Section 147 demonstration jurisdictions used revenue sharing for public transportation purposes. The participation rate of the towns is somewhat lower but still represents an increase over the 1973 figures.

The average amount of such funds used for public transportation has also shown a general increase across the various groups. Table 2 shows the actual averages by group for operating and capital expenditures for 1973-1975 as well as the calculated growth indices. In 1973, the average outlay for operating costs in public transportation was \$18 396 for the sample counties and \$18 748 for the Section 147 demonstration areas, a difference not statistically significant. By 1975, the figures had climbed to an average annual outlay of \$41 841 for the sample counties and \$21 739 for the demonstration areas. Similar impressive growth patterns are noted for the capital expenses for public transportation; there was an enormous increase in county outlays (\$170 414) in 1974.

Use of Revenue-Sharing Funds for Public Transit in Rural Areas

The telephone follow-up survey revealed only one case of a rural community that used its revenue-sharing funds for public transportation in the form of public transit. As Table 3 illustrates, a much larger proportion of the Section 147 demonstration areas (3 out of 53 in 1974 and 6 out of 53 in 1978) used revenue-sharing funds for public transportation in the form of public transit. Nevertheless, as Table 4 suggests, by reviewing the quarterly reports filed by Section 147 agencies with FHWA from 1977 through 1978, it can be seen that revenue sharing is used by only 11.3 percent of the Section 147 demonstration areas, and other revenue sources are more

Table 1. Use of revenue-sharing funds for public transportation in selected U.S. rural areas, 1973-1975.

Year	Jurisdictions That Use Funds for Public Transportation				Jurisdictions That Do Not Use Funds for Public Transportation				Total			
	A	B	C	D	A	B	C	D	A	B	C	D
1973												
Number	37	26	28	19	128	65	117	34	165	91	203	53
Percent	22.4	28.6	42.4	35.8	77.6	71.4	57.6	64.2				
1974												
Number	60	37	130	22	120	56	86	31	180	93	216	53
Percent	33.3	39.8	60.2	41.5	66.7	60.2	39.8	58.5				
1975												
Number	59	24	113	6	111	34	87	9	170	58	200	15
Percent	34.7	41.4	56.5	40.0	65.3	58.6	43.5	60.0				

Note: A = sample towns in large counties; B = sample towns in small counties; C = counties in random sample; D = towns or counties served by Section 147 demonstration projects.

Table 2. Trends in revenue-sharing expenditures in selected U.S. rural areas, 1973-1975.

Use by Year	Avg Expenditure (\$)				Growth Index (1973 = 100)			
	A	B	C	D	A	B	C	D
Operation of public transportation								
1973	1 403	6 538	18 396	18 748	-	-	-	-
1974	2 912	11 803	44 125	25 905	208	181	240	138
1975	3 475	7 328	41 841	21 739	247	112	227	116
Total operating expenses								
1973	8 599	29 235	61 939	64 866	-	-	-	-
1974	14 153	57 425	137 476	268 166	165	196	222	413
1975	37 819	36 399	161 882	244 308	440	124	261	378
Capital expense for public transportation								
1973	2 147	9 412	39 881	25 420	-	-	-	-
1974	6 536	18 001	170 414	63 368	304	191	427	249
1975	4 958	28 321	96 308	NA	230	301	241	-
Total capital expenditures								
1973	18 254	35 786	133 851	117 868	-	-	-	-
1974	34 872	97 417	293 777	296 703	191	272	219	252
1975	39 910	87 309	380 554	171 849	219	244	284	146

Note: A, B, C, and D are as defined in Table 1.

Table 3. Revenue-sharing monies spent on public transportation and on passenger transportation.

Type of Telephone Survey	No. Cases Revenue Sharing Used for		B ÷ A (%)	B + A (%)
	A	B		
Random sample of U.S. rural towns (N=120)				
1973	37	1	2.7	0.8
1974	60	0	0	0
1975	59	0	0	0
Section 147 demonstration projects (N=53)				
1974	22	3	13.6	5.7
1978	NA	6	-	-

Note: A = public transportation; B = passenger transportation.

Table 4. Nonfarebox funding support for Section 147 projects, 1978.

Funding Source	Systems That Use Source		Systems That Do not Use Source	
	No. (N=53)	Percent	No. (N=53)	Percent
Comprehensive Employment and Training Act	31	58.5	22	41.5
Aging program, U.S. Department of Health, Education, and Welfare ^a	21	39.6	32	60.4
Community Services Act	15	28.3	38	71.7
State support	14	26.4	39	73.6
Education	9	17.0	44	83.0
Title 20, U.S. Department of Health, Education, and Welfare ^a	9	17.0	44	83.0
Revenue sharing	6	11.3	47	88.7
Regional agency support	5	9.4	48	90.6
Mental health	4	7.5	49	92.5
Headstart	2	3.8	51	96.2
Local tax support	0	0	53	100.0

^aNow the U.S. Department of Health and Human Services.

important. In general, one may conclude that revenue sharing is not now being used for the support of public transit in rural areas. The presence of federal demonstration monies is positively correlated with an increased probability of such use; however, in all cases there are very few jurisdictions doing so.

Revenue sharing is used principally for the construction and repair of rural streets and roads, for constructing sidewalks, for purchase of road-maintenance equipment, and for other nontransit purposes. More results from the survey are reported below.

Other Funding Support for Section 147 Demonstration Projects

The quarterly reports of the programs also showed that Comprehensive Employment and Training Act (CETA) funds were the most common form of non-FHWA support at the local level. Of the 53 systems, 31 (58.5 percent) reported use of this source. Programs on aging, mental health, etc., of the U.S. Department of Health, Education, and Welfare (now the U.S. Department of Health and Human Services) are also important sources of indirect support for the Section 147 demonstration programs. The anti-poverty Community Services Act (CSA) programs are tapped for support in 15 cases (28.3 percent).

None of the jurisdictions reported use of local tax revenues for support of the Section 147 demonstration projects; however, it should be noted that in-kind services (repairing facilities, for example)

are indirectly paid by local taxes. Six of the systems reported use of federal revenue-sharing funds. To some extent, diversion of revenue-sharing funds to public transit may have an upward pressure on local taxes, since funds from the two sources are theoretically interchangeable. No systematic attempt was made here to verify this hypothesis.

Trends in Funding of Public Transportation in Rural Areas

Table 2 indicates that three years (1973-1975) show generally upward movements in transportation financing between 1973 and 1974 but reductions on the average between 1974 and 1975. For example, the sample towns in large counties (column A) spent an average of \$2147 on capital outlay for public transportation in 1973, brought the figure to \$6536 in 1974, and dropped back to \$4958 in 1975. These numbers obscure the wide variations in reported amounts and are small in comparison with county data, which were \$39 881, \$170 414, and \$96 308 for the three years 1973-1975, respectively.

One reason for the generally upward pattern between 1973 and 1975 was the increase in overall funds for capital improvements. Rural jurisdictions in the sample of counties showed a steady increase from \$133 851 on the average in 1973 to \$380 554 in 1975, an increase of 184 percent. Except for rural counties, the growth indices in capital expenditures for public transportation actually exceeded the overall growth indices in capital expenditures. In rural counties, the index of growth (1973-1975) was 241 for capital expenditures for public transportation and 284 for total capital expenditures.

Jurisdictions do not have to spend the money in any given fiscal year, and carry-over of funds permits greater revenue availability in subsequent years. Thus, it is interesting to note in Table 5 (computed from the records of the Office of Revenue Sharing) that the total revenue-sharing funds available to the counties rose from \$475 154 in 1973 to \$723 823 in 1974 and declined slightly to \$707 065 in 1975. These amounts of monies are ample evidence of the potential capacity of rural counties to pick up federal demonstration projects if necessary.

Comparison of Section 147 Areas with Random-Sample Towns

Do jurisdictions served by Section 147 demonstration projects show similar patterns to the pattern of rural towns found in the random-sample survey? From Table 5, one notes that the revenue-sharing funds available in Section 147 areas, principally through the counties, differ little from the funds available to the average rural county, and from Table 6 one sees that the characteristics of Section 147 towns and random-sample towns are similar except for county population size and population density. For example, revenue-sharing funds available for Section 147 areas in 1975 were slightly more than \$642 000 and the average for the general sample counties was \$707 000. Given wide variations in reported funding availability among the counties, these differences are not statistically significant.

With respect to other comparisons measured in Table 6, one notes that the Section 147 areas have a somewhat lower-than-average county population, a somewhat slower growth rate (1960-1970), and have somewhat lower levels of county revenue from their own sources than that for the average. These characteristics may be linked to the lower population density. A larger-than-proportional number of Section 147 grants was given to outlying low-income communities, such as those represented by tribal

councils or community-action organizations, and this may reflect a special-need population to some extent. Despite this fact, the income differences between the Section 147 areas and the random sample of rural towns (\$3546 versus \$3207) should be discounted as the explanation for differing behavior in expenditure for public transit.

Comparison of Jurisdictions That Do and Do not Spend Revenue-Sharing Funds for Public Transportation

Only on the basis of population density are areas that spend money on public transportation out of revenue-sharing funds statistically different from those jurisdictions that do not. From Table 7, one notes that the 1974 data show an average of \$74 134 of total operating expenses from revenue sharing for those systems that do spend money on public transportation compared with a similar figure of \$70 736 for those systems that do not. In view of the large SDs on these variables, one may conclude that there is no statistically significant difference. There appears at first glance to be a higher level of capital expenditures overall for those systems that use funds for public transportation (\$172 847 compared with \$51 846), but again the very large variances prevent drawing such an inference. With respect to population density, however, the systems that use funds for public transportation tend to have significantly lower population densities (122.8 opposed to 268.0), which suggests that these lower-density areas have fewer revenue sources to devote to needed capital road improvements. It is noted that revenues from local (own) sources are less for the areas that spend money on public transportation

Table 5. Average revenue-sharing funds available in selected U.S. rural areas, 1973-1975.

Jurisdiction	Average Funds Available (\$)			Growth Index (1973 = 100)	
	1973	1974	1975	1974	1975
A					
Amount	53 529	78 537	75 988	147	142
SD	75 293	105 904	99 492		
N	163	179	166		
B					
Amount	152 160	239 421	207 061	157	136
SD	205 298	354 636	366 007		
N	90	92	57		
C					
Amount	475 154	723 823	707 065	152	148
SD	828 812	1 022 980	946 013		
N	203	214	199		
D					
Amount	542 458	700 404	642 437	129	118
SD	106 739	1 027 701	710 689		
N	53	53	15		

Table 6. Comparison of Section 147 areas with random-sample towns.

Item	Section 147 Areas (N=53)	Random-Sample Towns (N=180)
County population (avg)	64 849	104 461
Increase, 1960-1970 (%)	6.0	9.7
Nonwhite (%)	9.7	8.2
Elderly (65+ years) (%)	10.6	11.9
Density	104.6	249.9
Revenue from own sources (1974), county data (\$)	5 757 000	7 788 000
Per-capita income, county (\$)	3546	3207
Town population	4279 ^a	3193 ^b

^aN=8. ^bN=180.

(\$6 245 000 compared with \$7 952 000). Again the difference is not significant. For these other variables, these two types of jurisdictions are similar: percentage nonwhite in the population, percentage elderly in the total population, and per-capita income.

Table 8 presents information from telephone surveys made by the Transportation Institute of North Carolina Agricultural and Technical State University in August 1978 of areas that do not spend revenue-sharing funds for public transportation. Of the towns responding out of the 120 interviewed, 32.1 percent were served by privately owned intercity buses and another 8.9 percent were served by publicly owned intercity buses. A mere 1.8 percent (two localities) were served by a local bus; both systems were publicly owned. Much more important to local passenger transportation were the taxi companies, which were present and locally based in 23.2 percent of the cases and were based in other towns for 15.2 percent of the cases that reported. Nearly one-quarter (24.1 percent) of the responding jurisdictions provided service to special target groups (elderly or handicapped) in a special public transportation program.

Only 10 of the 120 systems contacted reported that local funds had been spent for public transpor-

Table 7. Comparison of study areas that do and do not spend revenue-sharing funds for public transportation.

Item	Jurisdictions That Use Revenue Sharing for Public Transportation		Jurisdictions That Do not Use Revenue Sharing for Public Transportation	
	Avg	SD	Avg	SD
1974 revenue sharing used for:				
Operating expenses, transportation (\$)	23 138 ^a	51 673	0	0
Total operating expenses (\$)	74 134	181 931	70 736	412 391
Capital expenses, transportation (\$)	55 309 ^a	220 621	0	0
Total capital expenses (\$)	172 847	671 044	51 846	86 219
1974 revenue-sharing funds received (\$)	195 675	624 696	113 769	304 122
1974 revenue-sharing funds available (\$)	236 901	455 275	211 691	612 553
County population	78 659	133 453	104 570	200 276
Increase, 1960-1970 (%)	8.5	15.4	9.12	17.17
Nonwhite, 1970 (%)	8.6	14.8	8.5	12.1
Elderly (65+ years), 1970 (%)	11.7	3.2	11.5	3.9
Density (000 000s)	122.8 ^a	196.9	268.0	102.6
Revenue from own sources (\$000 000s)	6.245		7.952	
Per-capita income (\$000 000s)	3.163		3.351	
Town population (\$000 000s)	3.526	2574	3.093	2334

^aStatistically significant difference at 0.05 level.

Table 8. Characteristics of study areas that spent revenue-sharing funds for public transportation, 1978.

Characteristic	No.	Percent
Served by privately owned intercity bus	36	32.1
Served by publicly owned intercity bus	10	8.9
Served by publicly owned local bus	2	1.8
Served by locally based private taxi	26	23.2
Served by private taxi from another town	17	15.2
Served by special public transportation (for client groups)	27	24.1
Spent local funds for support of public transportation prior to revenue sharing	10	15.9
Increased money for public transportation with advent of revenue sharing	6	31.6

Note: Total sample size = 120.

tation prior to the advent of revenue sharing, and only 6 of the Section 147 program systems indicated that revenue sharing had permitted an increase in funds to support passenger mobility. In general, however, it is safe to conclude that revenue sharing has not been tapped in most cases by the rural areas to finance public transit.

SUMMARY AND CONCLUSIONS

The purpose of the current study was to ascertain to what extent rural local communities are using their general revenue funds to support public transit operations in the jurisdictions. The study found widespread use of funds in support of public transportation, but further inquiry led to conclusions that in almost all cases the funds were being spent for road maintenance, road construction, sidewalks, or purchase of road-related capital equipment rather than for public transit. Only two systems of the 120 contacted were discovered to have a public transit program, and only one transit system in the randomly selected sample of rural areas had received revenue-sharing funds. By contrast, of the 53 systems interviewed, the areas (towns and counties) that had received FHWA transit demonstration funds under the Section 147 program were most likely to use revenue-sharing funds for public transit. Nonetheless, revenue sharing is a less widely practiced form of local support for Section 147 programs; it ranks behind funding sources from CETA, aging programs, and CSA.

Viewed in the context of the broader definition of public transportation (including roads), revenue-sharing funds are used for mobility purposes in nearly 40 percent of the rural towns, 56 percent of the counties, and 40 percent of the Section 147 projects (data are for 1975).

The average level of transportation expenditure out of revenue-sharing funds (including roads) for the counties is approximately one-fourth of the total revenue-sharing funds expended. Since available funds may be considerably more, the fraction of the total funds available that transportation represents may be closer to 15 percent. In general, the

trends in figures and the patterns for 1974 and 1975 are difficult to discern, since 1973 was a start-up year. In general, funds were up in all categories, and transportation expenditures kept pace with overall growth rates, except in the Section 147 demonstration program areas. Telephone surveys to jurisdictions that spent money for public transportation indicated that officials were satisfied that levels would not decline in the future.

Advocates of rural public transportation should pursue the question of why systems cannot be supported out of revenue-sharing funds, which appear to be mounting from year to year. An untapped local financial resource, revenue sharing may be looked to as an alternative to federal largesse as a means of financing passenger programs.

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Examination of Regional Transit Cost Allocation Among Towns: Five Case Studies

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The design and implementation of procedures now used to allocate regional public transit costs among towns are examined. The basis of this examination is a set of case studies of eight cost-allocation procedures being used in five New England regions—two in Maine and three in Massachusetts. These regions have different demographic and economic characteristics, types of transit service and regional organizations, and sizes of operations. The procedures examined employ variables such as passenger trips, passenger miles, vehicle trips, vehicle miles, and vehicle hours. The population served in the regions varies from 80 000 to 226 000. Three of the regions contain urbanized areas and all five regions include a large amount of rural area. Five of the eight procedures are used to allocate costs of demand-responsive services; the other three are for fixed-route services. The services in Maine are operated by private nonprofit agencies associated closely with human service agencies, whereas the services in

Massachusetts are provided by regional transit authorities under contract with private bus companies and private nonprofit corporations. The eight operating budgets range from approximately \$85 000 to \$580 000, and the local shares of the operating deficit range from \$16 000 to \$64 000. The issues involved in the decision to select a particular procedure are illustrated. Major issues were found to be geographic characteristics of the region, types of transit service provided, and concerns of participating towns regarding an equitable basis of allocation. In addition, the manner in which these issues affected the initial choice and subsequent changes in procedures is reviewed, and a description of the experience of the regional agencies in the implementation of their procedures is given. The results of these case studies provide insight into the process of designing and implementing a procedure to apportion costs to towns that participate in a regional transit program.

The emergence of transportation as a public service and especially the regional coordination and planning of such service necessitate the allocation of costs among the local participants. This allocation can be accomplished by using a number of different procedures. Some procedures are simple and employ a single variable, whereas other more-complex procedures use several variables. The procedure chosen for use in a given region will be the one considered to be acceptable by the participating members of the regional transit authority (RTA) or some coordinating body.

The purpose of this paper is to examine the design, adoption, and implementation of eight procedures currently used in five New England regions. This examination reviews each procedure and identifies the issues involved in the decision to select a particular procedure. In addition, the paper evaluates the manner in which these issues affected the initial choice and subsequent changes in a procedure. Finally, the experiences of the regional agencies in the implementation of their procedures are described.

ALLOCATING REGIONAL TRANSIT COSTS AMONG TOWNS

A variety of procedures are now being used to allocate regional transit costs among participating towns. These procedures can be evaluated with respect to (a) ease and cost of use and (b) equity of results. Ease and cost of use refer to the process of employing each procedure and include such criteria as simplicity, ease of understanding data requirements, and costs of data collection and processing. These criteria can be interrelated because in some cases simple procedures are likely to be less costly to employ because of their lower data requirements. Cost will be associated with the quantity of data collected, the frequency and method of data collection, and the type of data processing. A typical simple low-cost procedure is one that allocates costs based on the population of the town as a percentage of the total regional population. For example, if the total annual operating deficit (annual operating costs minus annual revenues) for a regionwide shared-ride demand-responsive service is \$100 000 and the population of town A totals 10 percent of the regional population, then town A would pay \$10 000. (Obviously, this assumes that no federal or state assistance is available to defray operating costs.) Such procedures require only readily available information, including population data from federal or state census sources and cost and revenue data from the operator's bookkeeping records. Because the operator and/or regional agency is not required to collect data, the costs to use this procedure are low. A disadvantage of such a procedure is that it bears little relation to the amount of service actually consumed by each town and as a result may be considered inequitable and unfair by some of the towns in the region.

Equity of results relates to the actual allocations produced. Broadly speaking, an equitable allocation to a particular town is one that is perceived to be fair to the town involved. This perception is important in order to retain the interest of a town to participate in the regional program.

Although no single universally accepted definition of equity exists, two definitions of equity have been used in allocating regional transit costs among towns (1). One deals with the town's ability to pay, measured, for example, in terms of each town's property valuation compared with all other participating towns' property valuations. The other definition of equity relates to the distribution of benefits received by the towns as a result of the

regional transit service. Since it has been recognized that such a distribution is not easy to measure, it has been suggested that benefits can accrue in different ways (2). One is by making transit service available to residents of a town. Even though all residents of a town do not necessarily benefit directly by riding the bus, they benefit indirectly because the service is available. The quantity of service available to a town might be measured, in the case of a fixed-route, fixed-schedule service, on the basis of the number of vehicle miles or vehicle trips through each town.

Another way benefits can accrue to a town is by actual use by the residents of the town. The distribution of such benefits would be described in terms of each town's relative level of use, possibly measured on the basis of the number of trips made by residents of each town as a proportion of all passenger trips.

CASE-STUDY REGIONS

The purpose of the case studies was (a) to review the procedure now used to allocate transit costs among towns in each region, (b) to identify the issues involved in the decision to select a certain procedure, (c) to evaluate the manner in which these issues affected initial choice and subsequent changes in a procedure, and (d) to describe the experiences of regional agencies in the implementation of their procedures. To achieve this objective, informal discussions were held with the regional transportation officials in five regions who participated in the design, adoption, and implementation of cost-allocation procedures. Two sets of discussions were carried out in each region. The aim of the first set was to obtain basic operating data and information regarding the procedure(s) in use. The second set of discussions focused on the implementation of the procedure(s). [Copies of the questionnaires used to obtain data for these discussions are available from the authors.]

The five case-study regions are located in New England. Two regions are in Maine and three in Massachusetts. Table 1 summarizes selected characteristics of these regions; they represent areas that have different demographic and economic characteristics, types of transit services and regional organizations, and sizes of operation. Although three regions have urbanized areas (Portland, Bangor, and Pittsfield), all five have a large population that lives in low-density rural areas. Demand-responsive service is provided in all five regions, and in two regions of Massachusetts, fixed-route, fixed-schedule service is operated. The services in Massachusetts are provided by RTAs under contract with private bus companies and private non-profit agencies. In Maine, the services are offered by private nonprofit agencies closely affiliated with human service agencies (HSAs). The operating budgets and local share of the operating deficit range from \$86 159 to \$579 136 and \$15 575 to \$64 435, respectively.

EXAMINATION OF PROCEDURES USED IN EACH REGION

In this section we review the procedures in use to allocate the costs of the various types of service in each case study site. Those allocation procedures employed with fixed-route services are presented first, followed by those procedures used with demand-responsive services. Emphasis is placed on identifying the issues involved in the selection of and changes in a specific procedure. In addition, the experiences of persons in each region who have executed these procedures are described.

Table 1. Selected characteristics of case-study sites.

Major City or Town	Regional Population		Number of		Area (mile ²)	Median Income (\$)	Type of Service	Type of Organization	Allocation Procedure	Total Operating Gross Cost (\$)	Local Share of Deficit (\$)
	Total	Elderly (%)	Towns	Counties							
Greenfield, MA	80 000	13	11	2	703	7 987	FR-FS DR shared-ride	RTA RTA	Vehicle hours, vehicle trips, passengers On-board-vehicle miles	298 061 ^a 114 372 ^a	22 468 ^a (est.) 16 000 ^a (est.)
Pittsfield, MA	148 563	-	32	1	947	11 235	FR-FS DR dedicated	RTA RTA	Vehicle hours, vehicle miles Vehicle hours	548 901 ^b 86 159 ^b	64 435 ^b 23 223 ^b
Barnstable, MA	126 481	26	15	1	394	9 242	DR shared-ride	RTA	Passenger miles, passenger trips	273 888 ^c	50 000 ^c
Portland, ME	206 500	14.7	23	1	860	13 305	DR shared-ride	HSA	Passenger miles	579 136 ^b	15 575 ^b
Bangor, ME	225 900	20	76	4	11 176	8 205	DR shared-ride	HSA	Passenger miles	240 469 ^b	48 145 ^b

Note: FR-FS = fixed-route, fixed-schedule service; DR = demand-responsive service; RTA = regional transit authority; HSA = human services agency.

^aFiscal year 1980.

^bFiscal year 1979.

^cFiscal year 1978.

Fixed-Route, Fixed-Schedule Services

Greenfield, Massachusetts

The Franklin Regional Transit Authority (FRTA) uses a procedure based on vehicle hours, vehicle trips, and number of passengers in allocating the deficit costs to towns. Revenues collected are credited to each town. Given the availability of federal (Section 18) and state aid, the local share is 25 percent of the total operating deficit. The portion of this local share to be paid by each town is estimated by using the following equation:

$$D_A = 1/4 \left(GC_T \left\{ \left[\frac{VH_A}{VH_T} + \frac{VT_A}{VT_T} + \left(\frac{P_A}{P_T} \right) \right] / 3 \right\} - R_A \right) \quad (1)$$

where

- D_A = local share of operating deficit allocated to town A,
- GC_T = total systemwide operating costs (excludes capital and RTA administrative costs),
- VH_A = vehicle hours within town A,
- VH_T = total systemwide vehicle hours,
- VT_A = vehicle trips through town A,
- VT_T = total systemwide vehicle trips through all towns,
- P_A = passengers that board in town A,
- P_T = total passengers that board systemwide, and
- R_A = revenue paid by passengers that board in town A.

The above procedure was adopted by FRTA member towns in 1979 when the service began on a permanent basis. Prior to this, the local share of the deficit was paid by the county because the county administered the program during its demonstration phase.

Although state law 161B requires the local share of the operating deficit of an RTA system to be allocated on some basis of level of service available to each town, the multivariable structure was chosen due to the different perceptions by the RTA members regarding the concept of equity. Some members felt that the allocation to each town should be based on the amount of service available, whereas others believed that costs should be allocated with respect to the amount of service each town actually uses or consumes. Consequently, the proportion of vehicle hours (VH_A/VH_T) and vehicle trips (VT_A/VT_T) was used to reflect availability, and the ratio of passengers to total passengers (P_A/P_T) was used to measure use or consumption. Other considerations made in the design of the procedure were the costs of data collection and processing. Because such costs were estimated to be relatively low, the procedure was considered to be viable. The

data required to determine vehicle hours and vehicle trips are obtained directly from route maps and schedules, and the number of passengers that board in each town is estimated periodically by means of an on-board survey. It has been estimated that 20-30 person-h are needed to obtain the necessary information from routes and schedules. The revenues generated within each town (R_A) are also estimated as part of the survey.

According to an FRTA official, the member towns are satisfied with the procedure. In 1981, the procedure was used for the first time. If some towns feel that their allocations are too high, the FRTA official believes that some changes in the procedures might be suggested.

Pittsfield, Massachusetts

The Berkshire Regional Transit Authority (BRTA) allocates the local share of the total operating deficit by using vehicle miles and vehicle hours. As in the case of the FRTA procedure, revenue is credited to each town as shown in the following equation:

$$D_A = 1/4 \left(GC_T \left\{ \left[\frac{VH_A}{VH_T} + \frac{VM_A}{VM_T} \right] / 2 \right\} - R_A \right) \quad (2)$$

where VM_A is vehicle miles within town A, VM_T is total systemwide vehicle miles, and the other terms are as defined in Equation 1.

This procedure is the first ever used in allocating costs of fixed-route, fixed-schedule services of BRTA and has been used for about five years. The impetus for adopting such a procedure was the state law (161B) mentioned previously. Consistent with the law, the allocations are based on two measures of the level of service available to each town—vehicle hours and vehicle miles. When this procedure was proposed to BRTA, it was considered fair. The procedure is relatively inexpensive to use, since the necessary data regarding vehicle miles and hours can be determined from route maps and schedules and revenues from periodic on-board surveys.

All participating towns are satisfied with the present procedure, although some staff members of BRTA have expressed the view that the procedure be made simpler. Some regional officials feel that a single-variable procedure probably will be adequate to satisfy state law as well as the views of RTA member towns with respect to the equity issue.

Demand-Responsive Services

Greenfield, Massachusetts

A fare-free, shared-ride service is provided to the

elderly and the handicapped by FRTA under contract with the Mt. Grace Regional Transportation Corporation. The contractual agreement has been in effect for about a year. Allocations to towns and HSAs are based on a measure called on-board vehicle miles (OBVM). The following hypothetical example (shown in Figure 1) describes measurement by the OBVM procedure. As shown in Figure 1, a van leaves the garage to pick up two residents of town A who want to travel to town C; on the way to town C the van picks up three residents in town B who are also going to town C; all five persons get off the vehicle in town C, and the vehicle returns to the garage. Given that the average systemwide operating cost per vehicle mile is \$1.25, the costs would be apportioned to each town as follows:

$$\begin{aligned} \text{Total operating cost} &= (1+6+4+5)\$1.25 = \$20.00, \\ \text{OBVM traveled by town A} &= 10, \\ \text{OBVM traveled by town B} &= 4, \\ \text{Average systemwide cost/OBVM} &= \$20 \div (10+4) = \$1.43, \\ \text{Cost to be paid by town A} &= 10(\$1.43) = \$14.30, \text{ and,} \\ \text{Cost to be paid by town B} &= 4(\$1.43) = \$5.72. \end{aligned}$$

As can be seen from the example, a town is charged for the number of miles its residents are on board a vehicle regardless of the number of riders. The motivation for this allocation procedure is to encourage better use of available vehicles by providing savings to a town whose residents share rides and to groups of towns who share the use of a vehicle. The procedure can be illustrated as follows:

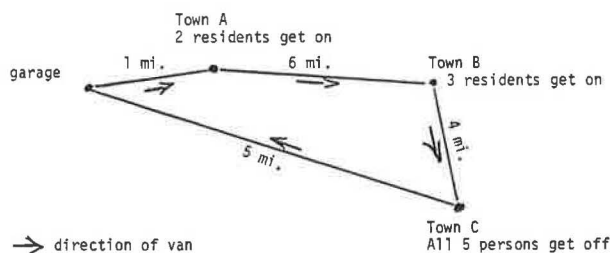
$$D_A = (1/4)[GC_T(OBVM_A/OBVM_T)] \quad (3)$$

where $OBVM_A$ is on-board vehicle miles traveled by residents of town A not eligible to receive HSA funding (costs to transport HSA clients are paid from various HSA sources, including Titles 3, 6, and 20) and $OBVM_T$ is total systemwide on-board vehicle miles.

The OBVM procedure is the second procedure used to allocate the costs of this type of service. The previous procedure, in use from the beginning of the service in 1975 until 1979, was based on the elderly population. The transportation service was then a small demonstration program under the direction of a private nonprofit board. FRTA was not yet created; as a result, state law 161B was not applicable. Those towns being served believed that this simple allocation procedure was fair.

Two major reasons were responsible for the change to the present OBVM procedure. The first was the concern of towns and HSAs for an allocation that reflected level of use. The second was the requirement of the HSA funding source as well as state law 161B. Another concern that influenced the choice of the current procedure is the need to encourage group

Figure 1. Example of use of on-board vehicle miles to allocate costs.



riding and not penalize towns that have high group-riding rates. As stated before, group riding also fosters efficient use of vehicles, and this means a more effective service as demand increases.

Considerations of simplicity and cost of using the procedure were of secondary importance in the decision to change to the current procedure because the procedure is definitely more complex and costs considerably more to use (2 percent of monthly budget) than the previous one based on elderly population. It is worth noting that the complexity is such that some board members of FRTA are not completely familiar with the working of the procedure. Although not completely satisfied, these members are prepared to reserve judgment, since it addresses their major concerns regarding equity, and they are prepared to work with the procedure in the hope that enough experience can be gained to make it better understood.

One major shortcoming of the procedure is that miles traveled by riders are determined from odometer readings. This penalizes riders on the vehicle if the driver has to make a diversion away from the direct route to their destinations. A solution envisioned by the FRTA staff is the development of a standard origin-destination distance matrix that represents the shortest distance between the towns being served.

Pittsfield, Massachusetts

Two different demand-responsive services are provided in Berkshire County, one by BRTA and the other by the Berkshire Community Action Council (BCAC). BRTA provides dedicated service to the elderly and the handicapped residing in its member towns. BCAC operates countywide services to the elderly and the handicapped as well as to low-income residents. Only BRTA allocates costs to its member towns. BRTA uses the following single-variable procedure:

$$D_A = (1/4)[GC_T(VH_A/VH_T)] \quad (4)$$

This procedure is the first ever used by BRTA in allocating costs of demand-responsive service to towns. The major impetus for the adoption of this allocation procedure is the requirement of state law 161B. The variable, vehicle hours, is used to measure the level of service available to each town. The procedure adopted was a simple one, which indicates that simplicity was also a concern. The towns are satisfied with this procedure, and therefore no changes are anticipated in the near future.

Barnstable, Massachusetts

The Cape Cod Regional Transit Authority (CCRTA) provides a countywide shared-ride service to the general public and also an exclusive-ride service to the elderly and the handicapped. The authority allocates the operating deficit of the shared-ride service by using the following equation:

$$D_A = 1/4 \{ GC_T [0.75(PM_A/PM_T) + 0.25(PT_A/PT_T)] - R_A \} \quad (5)$$

where PM_A is passenger miles traveled by residents of town A, PT_A is passenger trips traveled by residents of town A, and PM_T is total systemwide passenger miles.

The variables, passenger miles and passenger trips, are weighted to reflect the different costs associated with each. The costs of dispatching and the administrative costs, which were 25 percent of the total operating cost, were assigned to passenger trips, and all other costs were assigned to passenger miles. The overriding objective of CCRTA

members in selecting this procedure was to adopt what was referred to as a "pay-for-what-you-get" approach. Procedures based on population, or elderly population, were rejected because they did not measure the quantity of service consumed by participating towns. One factor in the decision to adopt a use-based procedure was the current existence of rider identification passes, which allowed for the ease in the collection of passenger data. A computerized system has been developed to use these data to allocate costs among towns as well as to monitor and evaluate system performance. The cost of this system is approximately \$700/month.

In determining how to measure consumption levels for cost-allocation purposes, CCTA decided that trip length should be incorporated into the procedure along with the number of passenger trips. Passenger trips alone, though easier to determine, were not viewed as an adequate consumption measure due to the extreme variability in trip length by residents of each town. The average trip length for town residents had been shown to range from 5.1 miles (Barnstable) to 21.2 miles (Bourne). This variability is caused by the elongated nature of the service area and the fact that many of the trips, regardless of origin, terminate in Hyannis, a major activity center. It was believed that many of the major costs of providing the service vary proportionately with trip length rather than being associated with the number of trips.

Although the procedure has been acceptable, two suggestions for improvement have been made. The first concerns a review of the weighting scheme to assure that cost elements (drivers' wages and benefits, fuel, oil, maintenance, etc.) are judiciously assigned to the two variables. The second suggestion is that a standard origin-destination matrix be developed from which passenger miles would be determined, instead of determining them from odometer readings. This is to prevent unfair charges to passengers taken on a circuitous route when the vehicle deviates to pick up additional passengers.

Portland, Maine

The Regional Transportation Program (RTP) of Portland provides fare-free, demand-responsive service to the elderly, the handicapped, and low-income residents throughout Cumberland County. RTP employs a single variable--passenger miles--as an allocation measure. The formula is represented as follows:

$$D_A = GC_T(PM_A/PM_T) \quad (6)$$

This procedure was adopted in 1973 in compliance with the requirement of Title 20 funding, which was then the sole funding source. Also, the argument of the towns supporting the transportation program was that the allocations should be based on use. The data required to employ this procedure are obtained from driver log forms without the use of a computer.

At present, no changes are anticipated because the procedure in use satisfies both the funding source requirements and the equity concerns of the participating towns. Issues of simplicity and cost of use were of secondary concern.

Bangor, Maine

The Eastern Task Force on Aging (ETFA) administers a fare-free, demand-responsive service similar to the RTP program in Portland (described above), and costs are allocated in an identical manner. This single-variable procedure was the first used by ETFA and was adopted in 1973 at the beginning of its transit program.

The main issue in the adoption of the program was the concern of ETFA board members for equitable allocation of cost based on some measure of service consumed by the elderly population in each participating town. The data are processed under contract with a private computer firm. The data-processing costs in 1978 were approximately \$9100. It should be noted that the data processing is required as part of other functions of ETFA that share these processing costs. Simplicity was not a consideration in the choice of the procedure, though the procedure is considered simple and easy to understand.

All participating towns are very satisfied with this allocation procedure, and no changes are anticipated in the near future.

CONCLUSION

Although the initial motive in considering a cost-allocation procedure might have been the need to satisfy the requirements of a funding source, the concerns of towns participating in the transit program are reflected in the structure of the procedure finally adopted.

The predominant concern in all cases was to allocate costs on the basis of availability of service, use, or both. It might even be argued that the motivation of all funding requirements and of state law governing allocation of transit cost has its basis in the need to satisfy equity as a way of encouraging the participation of different political jurisdictions in cooperative regional transit systems.

A pertinent observation about the choice of procedures in the case-study regions is that nearly half the procedures have only one variable. Although this is not necessarily an absolute measure of simplicity, it does indicate that simplicity was considered, even if as a secondary issue. An example of how complex a single-variable procedure may get is illustrated by FRTA's use of OBVM in allocating the costs of its service. The trade-off between simplicity and the need to assure equity is, however, very dependent on the particular procedure and the type of service to which it is being applied.

The fact that the fixed-route, fixed-schedule services of both FRTA and BRTA use multivariable procedures, whereas only one of the five demand-responsive services uses a multivariable procedure, might suggest that using a multivariable procedure within the context of shared-ride, demand-responsive service is a more complex proposition. This is certainly the case for demand-responsive, shared-ride service, which accounts for four of the five demand-responsive services. The process of applying these procedures, which includes data processing, is certainly more complex and more costly than that for fixed-route, fixed-schedule services for which necessary data can be culled largely from route maps and schedules.

The cost of using a procedure was not a primary concern in the design of the procedures in each region, since it was recognized from the outset that such costs could be kept to a small percentage of total costs so long as the procedures did not exceed a certain level of complexity and data requirements. Also, implicit in the choice of a single-variable procedure or a procedure in which the data collection and/or processing is necessarily performed as part of other functions is the cost savings involved.

For each case-study region, a satisfactory balance seems to have been reached between the main issues of equity, simplicity, and cost in the use of the current procedure. One major change did occur

in the procedure previously used by the Mt. Grace shared-ride service, and a number of suggestions to improve the procedures now being used in Barnstable and Pittsfield have been made.

The issues involved in the choice and implementation of cost-allocation procedures have been explored. Some or all of these issues might need to be considered by a transit system about to design and implement a cost-allocation procedure. It is hoped that the experience from these five case studies will be helpful in this design and implementation process.

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Minor Rural Roads: Finance Trends and Issues

THOMAS W. COOPER AND ANTHONY KANE

The local rural road problem is primarily one of finance. The purpose of this paper is to examine the sources and trends in local rural highway revenues and expenditures, to identify issues, and to explore solutions. Revenue for local rural roads (\$3.1 billion for 1979) is generated equally by the local jurisdictions and by state and federal grants-in-aid. Local jurisdictions rely almost entirely on property taxes and general revenues for local support for highways. However, road-user charges provide a substantial portion of the local road burden via shared state user-tax revenue. Because of the role of the local rural road, some claim that this shared financial burden (user and nonuser support) is justified. Others argue that users should cover all highway costs. County roads programs are oriented toward routine maintenance of conditions. In fact, local road maintenance has increased in real dollars since 1970, whereas capital road improvements have dropped by one-fourth. Consequently, local road conditions are judged to be declining. The conclusions reached are that (a) existing local rural road revenue sources are imperiled by energy conservation and voter demands for fiscal restraint, (b) local road programs are basically maintenance operations and user charges ought to cover the cost, and (c) revenue sources are available. Specifically, local governments should expand road-user tax revenues by redefining existing taxes as user fees and dedicating them to highway use and by exploring the creation of new user revenue instruments and mechanisms such as a local gasoline tax that piggybacks the state tax. Finally, local governments need to articulate the condition of local roads and what that means in terms of costs to government, local economy, and road user.

For the most part, local rural governments are responsible for the largest block of road mileage in America--some 2.2 million miles. The higher functional classes of rural mileage serve the important interregional and interstate movements of goods and people and to a lesser degree serve trips from farm to market. Local rural roads provide primarily private and public intracommunity and intracounty movement of people (via buses or private vehicles) and accommodate the movement of trucks that are critical to rural areas (1). Local rural roads are also profoundly affected by the recent changes in rural demographics and economics. Nonmetropolitan population growth has exceeded metropolitan growth

in the decade of the 1970s. This movement of people and industry to rural areas has altered the rural economic base and has placed added strain on local roads. Shippers complain about the condition of rural roads and bridges, which is dramatized by the revelation that about three-fourths of all rural bridges were constructed prior to 1935 and had a life expectancy of 50 years.

County and other rural governments control the greatest mileage of rural roads in America, 70 percent. However, these roads account for only 13 percent of all rural travel. Although our knowledge of the performance characteristics and the condition of local roads is lacking, the 1972 National Highway Needs Report stated that about one-half of the total mileage had been judged inadequate by reason of surface type and safety deficiencies, such as lane width or lack of shoulders (2). In addition, it has been estimated that 115 000 bridges off the federal-aid highway systems require replacing or rehabilitation (3).

The existence of an inferior road or bridge in rural areas could effectively isolate residents, communities, and economic activities. In some cases, school buses, service vehicles, and commercial trucks are rerouted to avoid inadequate facilities (particularly structures), which inconveniences residents, jeopardizes the security of rural communities, and adds an element of cost to goods moved over the highway network.

Because of their service nature, local rural roads are constructed to minimal design standards and for a variety of reasons have received minimal funding. While these practices may have been justified in the past, changing conditions raise the question of justification. For example, when truck travel increases rapidly, heavier loadings are permitted, larger school bus or farm equipment is

introduced, or urban growth spills over into formerly rural areas, how will these outdated local roads meet the need and how long will they hold up?

CURRENT REVENUE SOURCES

Local governments, rural and urban, obtain highway revenue from two basic sources--locally raised revenue (predominantly general revenue and property taxes) and grants-in-aid from state and federal governments.

According to the Federal Highway Administration (FHWA) publication Highway Statistics, locally raised revenue for highways (both urban and rural) totaled \$8.4 billion in 1979 or 23 percent of all highway revenue generated by all units of government. Local rural governments provided \$3.1 billion, slightly more than twice the amount raised in 1970. Local revenue has grown faster than federal and state sources, as shown by the fact that in 1970 local revenues only accounted for 18 percent of the total.

Local governments rely less on road-user tax revenue than do the state or federal governments. The state governments have historically relied on road-user taxes and tolls to finance highway programs. Highway-user income as a percentage of total highway income, by jurisdiction (excluding bond proceeds), is given below (traffic-fine revenue is excluded for local jurisdictions; if included, the percentage would be nearly doubled):

Year	Highway-User Income in Total Highway Income (%)			
	Federal	State	Local	Total
1970	86.2	92.9	10.0	77.1
1975	74.2	90.5	8.9	69.0
1979 (est. in part)	66.9	86.3	7.9	63.8

Road-user revenue provided 86 percent of state revenue in 1979. In 1956, the federal government earmarked highway-user revenue for highways; however, the user-charge share has dropped to 67 percent due to non-Title 23 (U.S. Department of Transportation) programs. Local governments obtained only 8 percent of tax revenue directly from users, and counties reported only 5 percent from users. Local governments rely predominantly on general revenue and property tax receipts to fund highway programs. These county sources totaled \$2.4 billion for 1979 (\$1.1 from property taxes and \$1.3 billion in general revenues) or about 80 percent of all revenue. The remaining receipts come from investment income, miscellaneous taxes, and bond proceeds.

Intergovernmental Transfers

Local governments, rural and urban, are heavily dependent on state and federal funds for financing highway programs. For 1979, counties received \$2.9 billion in net intergovernmental transfers for highway purposes.

States provided most of the grants to counties, and these are principally shared road-user tax revenue. Except for the few states that assume total responsibility for county roads, all states share a portion of their motor-fuel and/or motor-vehicle revenues with their subdivisions. Counties received \$2.2 billion from state road-user fees during 1979. The remainder of state grants came from such diverse revenues as sales-tax receipts, resource severance taxes, income taxes, and general fund appropriations.

Federal grants to local rural governments amounted to \$588 million for 1979. These receipts

consist of shared national forest timber sales, mineral leases, general revenue-sharing funds, and others.

Revenue from transfers accounts for nearly one-half of all revenue for counties, and the shared responsibility is relatively unchanged since 1965, as shown below:

Year	Net Intergovernmental Transfer in Total Highway Budget (%)		
	State	County	Municipal
1965	23.3	50.1	25.9
1970	16.7	49.6	29.1
1975	16.6	48.7	26.1
1979	18.6	49.4	26.9

In summary, financial support for local rural roads is shared equally by the local jurisdiction and by state and federal grants-in-aid. Road-user charges, although not widely employed by local governments, provide a substantial share of the local road burden (via state grants-in-aid, which are derived almost totally from user fees). The remainder comes from a mixture of revenue sources.

User/Nonuser Issue

The major revenue instruments used by local rural governments are the property tax and general fund appropriation. Some claim that this is entirely proper both from the ease of tax administration and benefits criteria. The role of the county road is to provide land access to the farms, forests, resource and recreation areas, and lesser commercial centers in rural areas. Travel on these roads can be classified as the beginning or ending of long trips, the movement of goods to market and supplies to farms, and short trips for social-welfare purposes (education, health care, etc.). It is true that road users benefit, but so do the land and the activity they support. Thus, some balance between users and nonusers seems appropriate and equitable. In the case of local rural highway finance, it has been shown that users pay for nearly half the local rural highway costs via shared state user-tax revenue. In addition, nonusers benefit and in turn must assume part of the cost of improved access.

Others argue that, in general, users should support the full costs of highways (4). Since governmental outlays have not kept pace with roadway deterioration, users should cover all governmental outlays; but even then they would be paying less than their rightful share of true governmental costs and nothing toward external and congestion costs. In addition, since benefits of highway services are fully captured by users and indirect benefits are passed through normal market processes, there are no nonmarket benefits and therefore nonusers should not contribute for highways.

Of course, general revenues would be justified to support the cost share of public vehicles such as police, fire, and mail vehicles and to partly cover common costs for which no vehicle class can be found to cause the roadway costs.

CURRENT EXPENDITURE AND ROAD-CONDITION TRENDS

Capital Versus Maintenance

More than half of all local rural road expenditures is for maintenance and operation of roads (5) (Figure 1). For 1979, \$3.2 out of \$5.8 billion expended by counties was for maintenance (for reference purposes, state maintenance accounted for only 20 percent of total state disbursements). Maintenance is defined here as routine roadway expenditures

(e.g., pothole repair, joint repair, sealing, blading, snow removal, grass cutting, etc.); overlays and reconstruction are included in the summaries of capital expenditures.

The commitment to preserve county roads and to maintain service is dramatically demonstrated by the willingness of local governments to allocate resources. Expenditures for highway maintenance have more than doubled since 1970, but, more importantly, disbursements have increased sufficiently to offset inflation. As shown in Figure 2 (data from Tables HF-10 and PT-5, Highway Statistics), local rural maintenance outlays have grown in real terms, albeit marginally.

Capital outlay on local rural roads is estimated at \$2236 million for 1979. Two-thirds of this will be expended by counties and the remainder is provided directly by state highway agencies. In contrast to local maintenance programs, capital improvement on local rural roads has declined by one-fourth in real dollars during the decade of the 1970s as shown in Figure 3 (from same sources as Figure 2).

Capital-Improvement Types

Data on the type of improvements made on local rural roads are not readily available. No national summary of improvement choices for these roads exists as is available for the higher functional systems, i.e., arterials and collectors. However, it seems reasonable that we might look to the improvement choices selected by state and local officials for the minor collectors for direction in determining local road improvement types (5). Minor collectors are off the federal-aid highway systems.

New construction is the lowest choice for minor collectors (6.5 percent of obligations) and the highest for principal arterials (35.4 percent) (Table 1). Reconstruction of existing highways is uniform among all rural classes (average, 27 percent); however, restoration, rehabilitation, and resurfacing account for the highest percentage on collectors.

Bridge replacement appears to be an exception. Approximately 12 percent of all rural obligations was for bridge replacement for the three-year period that ended in 1978. The percentage is larger for the lower functional classes; for minor collectors 21.5 percent was reported for bridges. This development is due to the expanded national bridge-replacement program, which is intended for facilities on and off federal-aid highway systems, and the poorer conditions of bridges on lower functional-class roads.

New construction and major widening add road capacity to the highway infrastructure. In the years 1976-1978, these improvement choices accounted for 44 percent of non-Interstate principal arterial obligations, 19 percent for minor arterials, 12 percent for major collectors, and only 8 percent for minor collectors. It is evident that when the federal interest is passive, the mileage is the greatest, and the resources are limited, maintenance of condition takes precedence over capacity expansion.

Highway Conditions

In examining the condition of low-level rural roads, it is easy to see why maintenance (in the broadest sense of the term) is emphasized. About 75 percent of rural collectors have fair or poor pavement condition, and the percentage has been increasing over time (5) (Figure 4).

Figure 1. Distribution of county highway disbursements, 1962-1979.

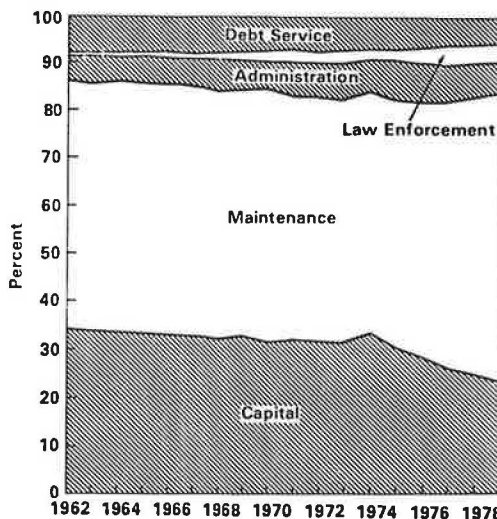


Figure 2. Local rural road maintenance expenditures, 1970-1979.

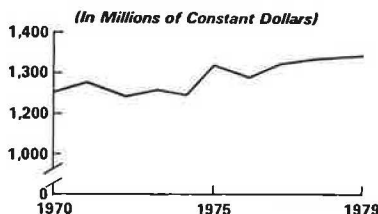
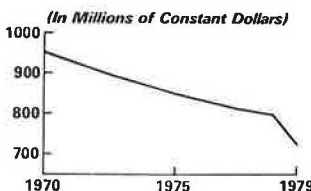


Figure 3. Local rural road capital outlay, 1970-1979.



LOCAL FINANCE DEVELOPMENTS

Property Taxes

The uncertainty of tax support because of measures such as California's Proposition 13 or Maryland's "TRIM" program in Prince George's County undermines investor confidence. It also may prohibit the placement of highway bonds or raise their debt-service costs and could undermine an increased level of highway support from local general fund receipts.

Shared State Revenue

State motor-fuel tax receipts have fallen below expectations in the last year or two due to more fuel-efficient automobiles in the motor vehicle fleet. Since local governments rely in part on these revenues, the national trend toward energy conservation will likely affect future county road programs.

Some Federal Actions

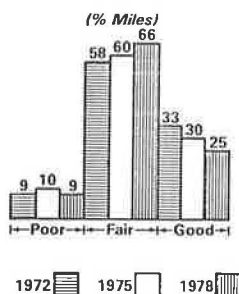
Functional Realignment

As a result of the functional classification of the

Table 1. Percentage of estimated rural highway obligations by improvement type and functional class.

Type of Improvement	Estimated Rural Highway Obligation (%)				
	Non-Interstate Principal Arterial	Minor Arterial	Major Collector	Minor Collector	Avg
New construction	35.4	14.4	9.7	6.5	19.8
Reconstruction	24.3	29.6	29.9	28.1	27.0
Major widening	8.6	5.0	2.5	1.5	5.2
Restoration, rehabilitation, and resurfacing	16.6	33.1	37.1	33.7	28.8
Bridges	7.9	11.9	15.7	21.5	12.3
Safety, other	7.2	6.0	5.1	8.7	6.9

Figure 4. Rural collector pavement condition, 1972, 1975, and 1978.



nation's highways and the realignment of federal-aid highway systems, the federal-aid secondary (FAS) system was reduced nearly by half. After July 1, 1976, the FAS system consisted of rural major collectors; this reduced the FAS system from 608 000 miles to less than 400 000 miles. For the most part, the mileage dropped is county roads. Realignment tightened the targeting of federal aid, but did not diminish the dollar level given to secondary roads.

Program Funding

Expenditures for capital improvements off the federal-aid highway systems increased throughout the 1970s. Federal funds have proved substitutive on the primary, secondary, and urban systems, which enabled states to increase other off-system improvements and to sustain their maintenance programs. The off-system capital program totaled \$4.6 billion in 1979 (Table 2), an increase of 50 percent since 1970, and accounts for a larger share of total capital expenditures.

Non-Title 23 Federal Aid

A very significant factor in the growth of off-system expenditures has been the impact of non-Title 23 federal-aid programs. General revenue-sharing (GRS) and community development block grant (CDBG) funds have become important sources of local highway financing. Revenue sharing was fully under way in fiscal year 1973, and community grants were initiated in fiscal year 1975. To put these in scale, from 1974 through 1978, GRS and CDBG funds (\$3.5 billion) equaled all federal-aid urban funds paid to states. In fiscal year 1979, revenue-sharing funds used for highways were estimated to exceed \$700 million and most will be allocated by local governments (states are also beginning to allocate these funds to highways).

REVENUE ALTERNATIVES

Given the above overview, what can local governments

do? Questions that must be addressed in the quest for more highway revenue include whether the local governments wish to place more or less reliance on highway-user charges, whether they should join the state governments to seek a combined solution, and what their real revenue needs are--what are the future maintenance requirements to either maintain or improve today's level of service?

County and municipal governments have several financial options available to them: (a) they can raise local tax revenues, (b) they can seek more state or federal aid, (c) they can prevail on others to assume the burden, (d) they can reduce the cost of the service, or (e) they can forego the service.

Local Revenue Alternatives

Despite the objections to and the shortcomings of the property tax, localities will likely continue to rely primarily on a single tax source--the property tax--and for some good reasons. First, enlightened tax administration has eliminated many of the more offensive (and regressive) aspects of the property tax, notably, the circuit-breaker feature for the poor and elderly homeowners. Second, the property tax keeps pace with inflation. Third, it is a rough measure of the ability to pay and is therefore equitable, and fourth, it is locally controlled and administered, which is not the case for most other local income.

Locally imposed road-user taxes can prove difficult, cumbersome, and expensive to administer. However, the administrative burden of a locally imposed user tax may be outweighed by the need for more revenue. To reduce administrative hurdles, localities might elect to piggyback state user-tax mechanisms. Examples of tax coordination include (a) a local penny add-on gasoline tax collected by the state from wholesalers and/or distributors in the area or (b) an add-on county motor vehicle registration or tag fee. Local governments might consider a gross receipts tax on motor fuel sales to be collected with the state sales taxes. Finally, increased use of locally imposed road and bridge tolls, parking fees, or perhaps even severance taxes could be used to target the tax burden and spare the general taxpayer.

State Aid

Local governments might seek a greater share of state user taxes or aid the state in expanding the scope of user-tax revenues. For the most part, states share a portion of state motor fuel taxes and/or motor vehicle fees with their subdivisions. Typically, states allocate a penny of the state motor fuel tax or a percentage of combined state highway funds to local governments. In addition to the typical user tax, there exists a gray area of motor vehicle taxation in which the user-charge concept is less clear. Here the statutory classification and disposition of revenue are clouded but

Table 2. Off-federal-aid system versus total highway system capital outlays.

Year	Capital Outlay (\$000 000 000s)			Off-System Percentage of Total
	Total	Federal-Aid System	Off-Federal- Aid System	
1980	15.094	10.418	4.676	31.0
1975	14.378	10.117	4.261	29.6
1970	11.568	8.632	2.936	25.4

may prove fruitful to the states and localities for expanding legitimate income for highways.

Many states levy personal property taxes, titling taxes, or sales taxes on motor vehicle and/or motor fuel sales and the receipts go to areas other than highways. Some may be considered an actual user charge and many may be considered a quasi-user charge. A local personal property tax that is applied only to automobiles should be clearly designated a user charge. These taxes are based on the value of the commodity (an ad valorem tax), which automatically adjusts for inflation. Until now, revenue from these taxes has not generally been earmarked for highways, but with the combined efforts of the state and local governments, they might be defined as user charges and earmarked for highways.

In most states, property taxes on motor vehicles are not linked to highway use, and the revenue is not available for highways. They are, however, closely associated with registration fees in application and in the cost of operating motor vehicles. Moreover, they make up a large portion of the total taxes paid on motor vehicles in some states; hence their inclusion as a possible alternative revenue source is justified on equity grounds.

Personal property taxes exceed registration fees in some states. They are ad valorem in nature and many piggyback the state motor vehicle tax (6). In 1973, about one-half of all states levied a personal property tax on motor vehicles that ranged from \$23 (medium-weight passenger car) to \$112 and averaged \$28/vehicle. The average registration fee was \$18.

In two states (California and Washington), the personal property tax has been replaced by an "in lieu" tax, which is collected at the state level rather than at the local level. This tax has the same characteristics as property taxes except that the levy and distribution of proceeds are not related to the jurisdiction in which they are collected and are considered a statewide road-user impost.

Federal-Aid Highway Program

The federal-aid highway program has also evolved as a source of local financing. Areas of federal interest include the secondary program, the bridge program, and the off-system program.

Evidence suggests that secondary funds substitute for state funds. Substitution may not necessarily have negative effects if freed monies are expended elsewhere on highways. Capital expenditures on off-system roads have increased (Table 4), and highway maintenance outlays have a positive trend. It is apparent that freed state and local monies add to their off-system fiscal capability.

The federal bridge rehabilitation and replacement program has local benefits since the funds may be used for bridges on and off the federal-aid highway systems. The bridge program departs from the systems orientation of the other major programs since 15-35 percent of authorized funds must be used for off-system bridges.

The current estimate to replace or rehabilitate all deficient bridges in the country is \$33 billion, and about \$15 billion of these needs are off federal systems and \$30 billion of the \$33 billion are in rural areas (3).

The Federal-Aid Highway Act of 1978 provided \$200 million a year (FY 1979 through 1982) for highways off the federal-aid highway systems. Perceived as a highway safety program (50 percent must be expended in safety improvement), the funds are intended for construction and restoration, rehabilitation, and resurfacing of off-system highways.

To summarize the federal actions, existing federal-aid programs will continue to aid off-system roads, either directly or indirectly. Direct assistance comes from the off-system and bridge replacement programs, and indirect assistance comes from freed state monies brought about by the higher authorizations for the primary and secondary systems and the higher federal share. Additional federal aid has occurred from non-Title 23 programs. The application of these funds is left to the local officials, and as road and street needs become a higher priority, it is likely that highways will garner a significant share of these monies. Non-Title 23 federal funds have become a prominent feature in some local programs, and since these monies generally carry fewer programmatic requirements and restrictions, local authorities will likely continue to allocate them for highway purposes in the future.

It is not clear what future federal legislative action will bring. Lower system-rural-road funding could come in the form of block grants, and federal-aid highway system designation could be dropped. Also, in the period of limited financial resources and federal disinvolvement from local issues, federal funds could be targeted to Interstate and primary facilities at the expense of local rural roads.

Cost Reduction

In addition to the above revenue-raising options, local governments can attempt to increase road building and maintenance productivity through better contracting procedures (e.g., competitive bidding, rejection of bids if costs are too high, and the readvertisement of those projects); pavement management systems to optimize life-cycle outlays; and the restriction of use by heavy vehicles to minimize roadway deterioration.

SUMMARY AND CONCLUSIONS

The major findings and conclusions reached are as follows:

1. Local government revenue sources are imperiled by emerging energy conservation interests and voter demands for fiscal restraint;
2. Local road programs are essentially maintenance operations, and it makes sense that, since it is users who bring about maintenance costs, user charges ought to be strongly considered to cover these costs;
3. Overall local road conditions are judged poor and probably declining;
4. Local governments have managed to maintain the level of maintenance efforts throughout the 1970s, but the outlook for the 1980s is not encouraging;
5. Revenue sources are available, but they must, however, be fully explored; fiscal and cost-allocation studies should be conducted in collaboration with state governments to arrive at a sound and equitable revenue structure for the future;

6. Innovative user sources are encouraged; these include both redefining certain existing taxes as user fees and dedicating them to highway use and the creation of new and expanded user charges;

7. Piggybacking onto state revenue instruments should be looked at carefully; and

8. Public relations work is sorely needed; local areas need to articulate the deterioration and condition of local roads and what that means in terms of both future governmental costs and road-user operating costs; these deficiencies must be shown to be sufficiently important to gain the support of the public and lawmakers.

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Principles of Highway Finance

MARSHALL F. REED, JR.

During its 60-year history, state highway funding has been guided by a set of principles. These are set forth for use by the general public, business, and industry in the evaluation of proposals to change highway funding plans. Also, because many state highway tax proposals include indexing schemes to keep tax revenues in pace with inflation, the eight indexed tax plans signed into law between 1977 and 1980 are examined for adherence to the principles of highway finance.

Many elements of society have encountered severe problems in meeting financial obligations. State highway agencies are no exception. Highway costs have risen sharply. Reduced travel and increased motor vehicle fuel efficiency have cut deeply into fuel-tax revenues. Governors and state legislatures have responded with tax increases, new taxes, and shifts in tax resources.

Highway users frequently are called on to supply highway finance proposals, some of which depart from long-standing practices. In order to develop and evaluate these proposals, it is helpful to remember seven basic principles of highway finance that have stood the test of time. A sound highway finance measure should

1. Assess highway needs clearly;
2. Incorporate funding levels that are adequate and affordable;
3. Involve the public (including business and the highway-user industry) in defining needs, funding levels, and taxes;
4. Provide funding levels that are predictable;
5. Provide for legislative review;
6. Maintain or establish an equitable tax structure; and
7. Be simple to administer and easy to understand.

Adherence to these principles will lead to highway programs that meet transportation needs of the general public, business, and industry. The principles have been followed successfully for 60 years, and they are as valid today as ever.

An indexed highway tax is one of the measures enacted in recent years to keep highway programs in step with inflation. In the final section of this paper, indexed highway taxes are evaluated for adherence to the finance principles. Some faults are found, the most important of which is that automatic changes in taxes caused by indexing may not be related to specific documented highway program needs.

BASIC PRINCIPLES

Assess Highway Needs Clearly

State highway funding plans must be based on up-to-date information and technically accurate evaluations of need.

Capital Program

The capital program--including rehabilitation of the existing highway system and construction of new highways to accommodate growth in population, motor vehicles, and travel--is the most expensive element of the highway program. It is therefore essential to develop this element of a program on a sound base. This calls for an engineering-needs analysis that identifies current and future deficiencies and estimates the cost to eliminate them. An engineering needs analysis should

1. Prepare and evaluate a statewide highway classification plan that is based on highway use and land development within the program period;
2. Apply accepted engineering design and performance standards to each highway class;
3. Assess highway and bridge conditions, characteristics, and performance;
4. Identify deficiencies and analyze improvement options; and
5. Determine improvement costs and priorities.

If state funds are to be provided for local road

programs, the needs assessment should include city, county, and town roads.

Standards used to identify highway deficiencies and to select improvement options are critically important to an effective highway-needs analysis. The standards enable officials to pinpoint mobility, safety, and structural deficiencies. The standards should also enable officials to identify potential cost-effective, environmentally acceptable improvements.

Other Program Needs

Although the capital program requires the largest share of state highway funds, money must also be reserved for other program categories such as maintenance and operations, highway safety, administration, and bond repayments. The future costs of these elements should also receive technically sound and realistic evaluation.

Incorporate Adequate and Affordable Funding Levels

Reversal of the trend of highway deterioration and keeping highway development in pace with growth should be prime objectives of state highway programs.

Most state highway programs face critical needs. The nation's highways have begun to decline after decades of improvement. It is essential that this trend be reversed, for, as in any industry, it is more economical in the long run to keep a facility in good operating condition than to put off needed repairs until much more expensive rehabilitation costs are required.

The rate of growth in population, motor vehicle registration, and travel is high in many parts of the United States. To accommodate this growth safely and efficiently, many state highways must be built or rebuilt.

The level of state highway program funding must also reflect the ability of motorists and the general public to pay the cost. The state legislature must decide the trade-off between adequacy and affordability based on sound technical information, including the benefits and consequences of various possible funding levels.

Involve the Public in Defining Needs, Funding Levels, and Taxes

Virtually all citizens use streets and roads or are otherwise affected by street and road conditions. An involved and well-informed public can help define highway needs, identify necessary action programs, and provide support for them. Conversely, the chances for positive action and public support are remote when the public is not involved.

State and metropolitan highway user groups will want to be involved in defining highway needs, goals, and funding. They can supply useful information and viewpoints because they represent a wide range of people, including interest groups directly affected by highway conditions and service. Because members of highway user groups pay a significant portion of highway taxes, they are concerned that these funds be used in the most effective manner. Furthermore, because they understand what is to be gained or lost, highway user groups are the best advocates of soundly conceived state highway programs and adequate yet affordable funding levels and taxes.

The general public's perception of competency is also an important element in generating public support. Highway agencies are considered competent when they are perceived as using tax resources effectively and responding to public needs.

Provide Predictable Funding Levels

Assured funding is essential to efficient administration of a state highway system. State highway construction and maintenance programs are complex and require more than 20 000 technical, clerical, and maintenance employees in some states.

State highway systems range up to 72 000 miles, and each mile must be kept in safe and efficient condition throughout the year.

In the largest states, as many as 500 projects may be under construction and 2000 in planning stages at a time. Many construction projects require several years from preliminary planning to completion. State highway administrators need assured funding during at least a five-year period to manage these large programs effectively.

Dedicated highway-user taxes, which provide 80 percent of state-collected highway program funds, are highly predictable revenue sources. Supplemented by stable general fund appropriations, a user-based tax plan that has revenues dedicated to the highway program has been the best and most common basis for assuring future highway funds.

Provide Legislative Review

State legislatures are responsible for setting highway program goals, providing adequate funds, and reviewing progress.

When conditions alter the amount of highway funds available or the purchasing power of highway funds, legislatures must reexamine funding objectives. In this era of rapid change, periodic legislative review is important, so that lawmakers may alter highway funding to meet established highway program objectives or alter objectives to fit funding realities.

Close legislative monitoring of highway funding was less necessary in the two decades before the 1970s. State highway funds increased then as motor vehicles, travel, and highway needs increased, mainly due to the fact that increased highway travel meant increased motor fuel consumption and motor fuel-tax revenues.

Inflation was a minor factor in highway construction and maintenance. Motor fuel was always available and at low cost. Motor fuel conservation was not a factor. When highway needs outpaced highway revenue, the legislature made small adjustments in motor fuel taxes, motor vehicle imposts, or general revenue appropriations.

But in the 1970s, three things happened to make closer monitoring and adjusting of highway revenue more important:

1. Inflation increased highway costs, which greatly reduced the effectiveness of highway revenues. Construction prices moved from annual increases of 3 or 4 percent in the 1960s to 6 and 7 percent in the early 1970s and to 17 percent by 1979.

2. The close relationship between travel, highway needs, fuel consumption, and motor fuel-tax revenues ceased due to fuel-conservation measures such as improved vehicle fuel efficiency. Although travel and highway needs have increased, fuel use and motor fuel-tax revenues have leveled off.

3. State highway program needs have mounted because state legislatures have been slow to react to less-than-anticipated highway revenues and reduced effectiveness of the revenues.

Continued monitoring of state highway program needs and adjusting of highway finance levels will remain important as long as high rates of inflation persist and highway travel needs grow. There is no

sure way to forecast inflation, but the National Transportation Policy Study Commission reported in 1979 that automobile and truck travel will increase by 80 percent and 142 percent, respectively, in the period 1975-2000. Increased travel demand has always led to increased highway program needs.

Maintain or Establish Equitable Tax Structure

In order to ensure fairness, highway tax proposals should be based on a thorough financial analysis of revenue sources.

A highway finance proposal that treats all taxpayers equitably will attract far greater support than a proposal that unfairly heaps tax burdens on one class of taxpayers to the benefit of others. Highway tax proposals should be able to pass several tests of fairness and balance.

First, user tax support and general fund tax support of the highway program should be balanced to reflect the relationship of benefits to motorists and benefits to the general economy of the state.

Second, tax revenues that result from motor vehicle ownership (such as registration fees) and tax revenues that result from highway use (such as motor fuel and motor carrier taxes) also should be balanced in accordance with their purposes. Motor vehicle taxes are a levy to support a basic highway system, regardless of use. Motor fuel taxes typify a levy to support costs associated with the amount of highway use.

And last, support should be balanced among the various classes of motor vehicles; the benefits received and the highway construction and maintenance costs incurred by each class should be considered.

Most state highway finance systems have balances acceptable to the majority of persons. State highway finance proposals should be evaluated to ensure that inequities will not be created.

Be Simple to Administer and Easy to Understand

Taxes paid by highway users in the form of pennies per gallon of motor fuel and motor vehicle registration fees have a long history in the United States. Each state is adept at collecting and administering these taxes and fees, which are well understood and accepted by the public. Proposals that would change established procedures or add new types of taxes should be examined carefully for their effect on the cost to both government and industry of collection and administration. And they should be examined for their ability to gain public understanding and acceptance.

For ease of administration and understanding, highway taxes should not be subjected to frequent change, certainly no more than once a year. Also to enhance understanding, all motor fuel taxes and motor vehicle registration fees should be clearly identified as taxes to be paid by highway users for support of their highway program.

INDEXED HIGHWAY TAXES

Three types of indexed tax measures have been adopted by eight state legislatures to keep state highway revenues in step with inflating highway costs. This section describes these measures and evaluates them in relation to the seven principles of highway finance.

Indexed Highway Taxes

The variable motor fuel tax, which changes the pennies-per-gallon tax rate periodically to equate

it (within prescribed limits) to a prescribed percentage of the wholesale or retail price of motor fuel, is the most widely used indexed highway tax measure. In 1977, Washington adopted a variable motor fuel tax. New Mexico enacted similar legislation in 1979, and Kentucky, Indiana, Massachusetts, and Nebraska did likewise in 1980.

The application of a state ad valorem sales tax to motor fuel is another type of indexed tax. Revenues change as the price of motor fuel changes. The District of Columbia and nine states--California, Georgia, Hawaii, Illinois, Indiana, Michigan, Mississippi, New York, and Virginia (northern counties only)--have ad valorem sales taxes on motor fuel. These taxes are in addition to the pennies-per-gallon motor fuel taxes. Georgia dedicates a portion of the ad valorem sales tax to the state highway program; the other states use it to increase either general revenues or revenues for nonhighway programs, such as transit.

A third type of indexing for highway purposes was adopted in 1977 in Texas, in which all money for highways comes from the general fund. There the legislature established a formula for annually adjusting general fund appropriations for highways according to variations in construction and maintenance cost indices.

Variable Motor Fuel Tax

The variable motor fuel tax has had six applications to date.

Washington

Effective July 1, 1977, the motor fuel-tax rate is reestablished semiannually at 21.5 percent of the computed weighted average retail price per gallon of motor fuel sold in Washington. The law specifies a tax floor of \$0.09/gal and a ceiling of \$0.12/gal. The maximum was reached January 1, 1979.

New Mexico

Effective July 1, 1979, the motor fuel-tax rate is reestablished annually based on a table that fixes the tax rate to the computed average wholesale price of motor fuel plus applicable federal tax. The law specifies a tax floor of \$0.07/gal and a ceiling of \$0.12/gal. The tax rate cannot increase by more than \$0.01/year. In addition, the law permits sale of severance tax bonds for highway improvements and dedicates 25 percent of motor vehicle titling taxes to the state road fund.

Kentucky

Effective July 1, 1980, the motor fuel-tax rate is reestablished quarterly at 9 percent of the computed weighted average per gallon wholesale tank wagon price of gasoline. The law specifies a \$1.00/gal floor and a \$1.50/gal ceiling for the computed average price of motor fuel. This is equivalent to a \$0.09/gal tax floor and a \$0.135/gal tax ceiling. The maximum average wholesale price change from fiscal year to fiscal year is 10 percent. In addition, the law establishes a 2 percent surtax on motor fuel sales to motor carriers of heavy equipment.

Indiana

Effective July 1, 1980, the license tax rate for motor fuel is to be reestablished semiannually at 8 percent of the computed weighted average retail price of gasoline. Maximum average weighted retail

price is \$1.50/gal for 1980, \$1.75/gal for 1981, and \$2.00/gal after 1981, which establishes maximum tax rates of \$0.12/gal, \$0.14/gal, and \$0.16/gal, respectively. A tax-rate floor is not specified. Also enacted was an increase in the vehicle registration fee of about 25 percent depending on the class of vehicle.

Massachusetts

Effective August 1, 1980, the motor fuel-tax rate is to be reestablished quarterly at 10 percent of the average wholesale price of motor fuel. No tax-rate floor or ceiling was enacted. The law lacks specificity, so the Massachusetts commissioner of revenue will suggest changes at the next session of the legislature.

Nebraska

Effective October 1, 1980, the motor fuel-tax rate is to include a surcharge of 2 percent of the average price the Nebraska state government pays for motor fuel computed on a pennies-per-gallon basis. The surcharge rate is to be effective through fiscal year 1981 and then is to be adjusted by the State Board of Equalization based on the additional state funds required to fund appropriation levels established by the legislature. In addition, the law establishes a \$0.01/gal increase in the motor fuel tax; the receipts are to be divided equally between cities and counties.

Evaluation of Indexed Highway Taxes

Indexed highway tax measures ought to be carefully evaluated prior to being enacted. Some fail to satisfy the reasons for their development. Typical problems are as follows:

1. Revenues do not relate to need,
2. Revenues are unpredictable,
3. Funding levels change without public or legislative review,
4. Tax structure is unbalanced, and
5. Tax rates are difficult to establish.

The most serious problem with indexed highway taxes is that they may automatically change tax levels without reference to specific documented highway needs.

When motor fuel taxes are indexed to the price of motor fuel, state highway programs are no longer related to needs but to prices of petroleum established by foreign governments.

In enacting indexed motor fuel-tax measures, state legislatures assume that motor fuel prices

change in direct proportion to the costs of the highway program. However, this has not been the case, particularly in 1980, when motor fuel prices were constant while highway program costs soared.

And there is no sure way to predict petroleum prices, especially with the instability that characterizes the world's petroleum supply. If highway taxes are indexed to unpredictable motor fuel prices, state highway administrators are unable to estimate future revenues. This difficulty is serious because motor fuel taxes produce two-thirds of highway revenues collected by the states.

With taxes tied to economic indices, the public and legislatures lose some control of highway program spending. Program justification is less necessary. Funding adequacy and tax affordability become irrelevant.

Another problem of indexed highway taxes is that they may be difficult to establish and understand. Taxes related to the price of motor fuel are difficult to establish because there is no agreed-upon average wholesale or retail price for the various types of motor fuel. Prices change daily and vary within each state. Depending on the law, distributors or dealers are required to submit records on price and sales volumes for each type of fuel so government officials can compute the prescribed average price per gallon needed to calculate the new tax rate. Distributors or dealers then must use the computed tax rate to calculate taxes due and the taxes to pass on to consumers. Added bookkeeping and confusion may result.

Indexed Motor Fuel-Tax Safeguards

To reduce problems, most indexed motor fuel-tax measures have incorporated safeguards. Establishing maximum and minimum limits for the tax rate provides some measure of legislative control of the tax and the highway program. Retaining the pennies-per-gallon tax basis ensures that the administrative burden of tax collection will not be enlarged. Limiting tax-rate changes to once a year will avoid confusion and keep the tax collection burden within reasonable bounds. Although none of the indexed highway tax measures calls for periodic legislative review, such a feature might help to ensure that revenues are related to needs and program objectives.

In summary, the above evaluation shows that indexed taxes are not a problem-free substitute for the traditional methods of highway finance, based on periodic assessment of highway needs and resources accompanied by legislative review, debate, and action.

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Abridgment

Transit Performance Measures and Local Objectives: State-Level Policy Considerations

DAVID J. FORKENBROCK

With increased involvement by the states in financing public transportation, the issue has arisen whether states should determine the standards by which

the quality of transit service is measured. Either the performance measures on which these standards are based can be used to define a minimum quality

level to qualify for state funds or they may actually constitute the basis for distributing state assistance. In this study, several possible criteria for distributing assistance at the state level are contemplated. Some of them are in conflict; it would not be possible to apply all of them simultaneously. The purpose of this analysis is to explicate the policy implications of alternative allocation criteria.

With increased involvement by the states in financing public transportation, the issue has arisen whether states should determine the standards by which the quality of transit service is measured. Either the performance measures on which these standards are based can be used to define a minimum quality level necessary to qualify for state funds or they may actually constitute the basis for distributing state assistance. The crux of the issue seems to be whether state-level objectives should be pursued through the disbursement of available resources or whether the local community should be allowed to provide the level and form of service it chooses and have the state act to facilitate the provision of this service.

In this paper we will contemplate several possible criteria for distributing assistance at the state level. The criteria call for quite different roles for the state. Some of these criteria are in conflict; it would not be possible to apply all of them simultaneously. The purpose of this analysis is to explicate the policy implications of alternative allocation criteria.

ALTERNATIVE ALLOCATION CRITERIA

A rather wide range of criteria that govern the allocation of transit assistance exists among the states (1-3). These divergent criteria are a manifestation of differing philosophies as to the purposes that should be served by this assistance. Five alternative allocation criteria will be discussed and then the implications of each will be assessed.

Efficiency Maximization

The strongest reason for implementing an allocation mechanism based on performance measures is to promote economic efficiency. That is, funds are distributed within the state so as to achieve the highest overall level of service, however defined, possible with a given pool of resources. Systems that perform better according to the criterion measures receive more funds; an incentive is thereby created to maximize the output of these measures. Unless the state assigns a different value for different sorts of passengers, the purest output measure for efficiency maximization is ridership (or passenger miles).

Uniform Service Quality

Just as the Interstate highway system aspires to provide coverage that is essentially uniform in similar types of locations, a possible criterion for allocating transit assistance is to move toward an equal quality of service (again, however defined) in all similar areas within the state. This means that service quality within larger urban areas would be consistent, as would quality within small urban areas or rural areas. Some attempt is necessary to reconcile these different service environments to achieve comparable quality among them. All else being equal, this criterion would involve distributing more funds where the costs of providing transit service are higher.

Equal Funding for Similar-Sized Areas

Until now the distribution of federal Section 5

operating assistance has been based on population and population density. A major reason for originally adopting population as the basis for allocating federal assistance was its political acceptability. The implication of this criterion is that similar-sized communities should be afforded the same opportunity to provide transit service. If among similar-sized communities (a) the demand for transit can be assumed to be uniform, (b) the costs of providing service are inherently similar, and (c) all systems are operated with equal efficiency, this criterion will result in both an efficient allocation of resources and a uniform quality of service. If, however, any of these conditions is not present, the allocation will not be efficient and service quality will vary among communities of similar size.

Meeting the Needs of the Transportation-Disadvantaged

A fourth criterion involves allocating available resources to provide the greatest amount of service to those that have the strongest need for transit. If need is defined as the inverse of opportunity (i.e., a lack of transportation options for trips important to the individual), this criterion implies that service is not configured to maximize ridership per se but to best serve the transportation-disadvantaged. Areas that have high incidences of poverty, for example, may receive more assistance than relatively affluent areas in which travel options are generally greater.

Responsiveness to Local Preferences

A final criterion for distributing state transit assistance is to maximize transit's ability to meet locally determined needs, desires, and preferences. This criterion is predicated on the reasoning that within a pluralistic society it is not realistic or desirable for state officials to determine the purposes for which transit is provided at the local level. Performance measures often favor the development of services that generate, for example, high ridership figures, regardless of whether these services contribute to local objectives for transit. Under this criterion greater emphasis is placed on the planning process than on service measures. The state may elect to issue planning guidelines to ensure the adequacy of transit planning at the local level. Available funds are awarded on the basis of locally determined needs and the community's willingness to contribute its share toward defraying the costs associated with providing the desired services.

EVALUATION OF ALTERNATIVE CRITERIA

The five different allocation philosophies call for quite different roles for the states regarding performance measures. If the objective is to maximize economic efficiency, then the state must use performance measures in distributing available funds. The principal advantage of this criterion is that the taxpayers may get the "biggest bang for the buck." Its greatest shortcoming is an almost complete insensitivity to differences in (a) environments within which the various systems that are competing for funds operate and (b) local desires, needs, and preferences for transit. To maximize the amount of state funding received, a community must concentrate on increasing the output of the performance measures dictated by the state, regardless of whether doing so promotes the local objectives for which transit is being provided.

Allocating transit assistance so as to achieve

uniform service quality, another criterion based on performance measures, has the advantage of taking into account the variations in cost that arise in different cities of similar population. More direct involvement by the state is needed with this criterion to ensure that endless funds are not poured into an extremely inefficient (or low-demand) transit system in the hope of elevating its service quality to some state-imposed standard. If state funds are limited, areas that have a strong demand for transit will be penalized, whereas areas that are less interested in transit will have it forced on them, to a degree.

As was noted earlier, distributing transit assistance on the basis of population is valid only if demand is uniform, costs are similar, and efficiency does not vary across the communities vying for state funds. Since all these conditions are highly unlikely, this sort of allocation criterion is of doubtful merit. Simply because of its service-area population, a poorly managed, low-quality, and rarely used system may receive more funds than a high-quality system that meets its community's needs.

If more socially oriented purposes for transit are the basis for resource allocation, then performance as such is less easily compared across systems. Distributing assistance on the basis of objective measures of need essentially involves replacing performance measures with demographic and socioeconomic measures. This criterion, although it appeals to the extent that transit is viewed as a service for the transportation-disadvantaged, ignores other factors that affect the cost of providing service (e.g., the physical configuration of the service area or how well the system is managed). Need measures also are imperfectly related to actual demand. It is possible that fewer trips may be generated in low-income areas, for example, than in middle-class areas in which there is heavy daily commuter traffic. Presumably, under this criterion a higher value is ascribed to transit trips by those who have no alternative means of conveyance.

At greatest variance with the use of performance measures to allocate transit assistance is a planning-oriented approach geared toward establishing transit service that satisfies local objectives. Contracted objectives growing out of an adopted plan become the basis for receiving state funds. This approach has the clear advantage of affording the opportunity to provide services that the local community feels are most important. It also enables the community to decide how much transit it is willing to pay for, given some state contribution. From the state's perspective, shortcomings include the possibility that service quality could vary considerably across the state and that an economically efficient allocation of resources is not assured.

RECONCILING ALTERNATIVE STRATEGIES: A POLICY RECOMMENDATION

In the current era of scarce funds, state legislatures are taking a good look at appropriations for all purposes. Being able to demonstrate that the method of distributing state transit assistance promotes an efficient use of limited resources is of great importance in winning legislative support. A totally discretionary approach, whereby local objectives are the basis for funding applications, provides less of a guarantee that funds will be used to do the most good from the state's perspective. On the other hand, legislators are loath to ignore political decisions made within their districts.

Both the foregoing evaluation and political considerations seem to speak for a balance between a

procedure that results in an efficient allocation of funds and one that enables transit to meet locally determined objectives. To enable both these attributes to be incorporated into a state assistance program, it is useful to distinguish between developmental funding and that for sustenance.

Developmental Funding

Roughly a dozen states have established transit development planning guidelines to specify the procedure to be followed in requesting funds for initiating or improving service. Guidelines developed for the state of Iowa (4,5) require that citizens be involved in the formulation and ranking of social objectives for transit. Several alternatives are then devised, all of which are geared toward attaining these objectives but which vary in scale and hence cost. Local decision makers must balance a desire for transit service with the costs to be borne locally when they make their selection. The chosen alternative becomes the basis for a grant application to the state. The application entails a request for capital assistance and the necessary operating funds to initiate new or to expand existing services.

Sustenance Funding

Regardless of the level of its transit development, a community's immediate concern is likely to be financing existing services. From the state's perspective, as noted earlier, it is desirable to award more funds to those systems that account for more output, such as ridership, revenue miles, or passenger miles. From the local perspective, it is essential that state funding be predictable; whatever the level of transit development, the community must be certain that sufficient assistance will be forthcoming each year to enable service to continue. Performance-based funding is perhaps the best single method of balancing these two perspectives. A system can accurately estimate the funding it will receive by examining its performance statistics, and the state can encourage operating efficiency.

CONCLUSION

A series of criteria for distributing transit assistance at the state level has been examined. Each of the criteria may have desirable characteristics, but in every case there are drawbacks. If we recognize the current need for efficiency in public expenditures and the importance of tailoring transit to meet locally derived social objectives, a two-component approach seems to be called for. To enable a transit system's development in line with local needs, desires, and preferences, a participatory planning process should be followed. The product of this process is a request for developmental assistance to allow the desired system to reach fruition. Transit systems at any level of development could be awarded sustenance funds on the basis of performance measures. As a system develops, its performance statistics improve, qualifying it for additional sustenance funds.

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Funding Dade County's Transportation Improvement Program: The Citizens' Role

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Metropolitan Dade County, Florida, is currently implementing one of the most ambitious public transportation improvement programs in the United States. This program, which consists of a 20.5-mile elevated rapid transit system, a downtown people mover, and more than 1000 buses, is being funded by using bond funds passed by the voters of Dade County long before the current resurgent interest in public transportation. In many ways the success of the county's transportation improvement program is founded on the strong role citizens have had in supporting public transportation financing in Dade County. The 1970s brought citizen participation for funding transportation projects in metropolitan Dade County to the forefront. Two key referenda and thousands of citizens' meetings have provided clear direction for the county's future transportation system. Public officials and planners in Dade County were confronted with the realities of the past both nationally and locally in regard to the public's involvement in the planning of the major transportation projects. In the light of the experiences in cities in which there had been major delays or financial losses due to citizen opposition to planned transportation projects, Dade County approached the 1970s with the reality that the public must be fully involved in making funding decisions for the county's balanced transportation system.

Recognizing the need for improved transportation facilities in order to accommodate its rapidly growing population, Dade County, Florida, began a series of planning studies aimed at identifying the type of transportation system the county needed. The Miami Urban Area Transportation Study (MUATS), which had begun in 1964 and was completed in 1969, culminated in the passage of two transportation bond issues (in November 1972) that totalled \$260 million. These two issues consisted of a unified transportation system that emphasized public transportation (\$132.5 million) and a street and safety improvement program (\$113.5 million) as part of 10 issues that involved a broad range of public improvement projects. The two transportation issues evolved from a series of public hearings conducted as part of the MUATS process in which citizens had an opportunity to express themselves on the various elements studied in MUATS.

Initially, the MUATS long-range transportation study focused on a major expansion of the county's highway network that would add nine new expressways and on the development of a medium-capacity transit system. In the late 1960s that plan was taken to the community in a series of public hearings in which strong opposition developed to the expanded expressway system. Strong support surfaced from almost every major citizen group in the county for the transit portion of the study and the need to improve the existing highway network to make better use of what currently existed. Thus, almost three years prior to a financing plan for the improved

transportation system, citizen involvement began molding Dade County's future transportation system.

Following the adoption of the Decade of Progress (DOP) bond issue in 1972, a second significant referendum was held in March 1978. Because a citizens' group called Stop Transit Over People (STOP) had gathered more than 10 000 signatures from registered voters, the repeal of the 1972 bond issue was placed on the ballot as a referendum at a time when the county was preparing the complete final design of portions of the rapid transit system and beginning construction. This repeal attempt was defeated by a narrow margin. However, this referendum was perhaps the most interesting example of the key role that citizens can play in getting funding for transportation programs passed.

PARTICIPANTS

Supporters

As the 1972 DOP referendum approached, it became clear that a strong grass-roots citizens' group was needed to help publicize the 10 bond issues being offered to the public by the county manager and commissioners. By mid-October, the County Committee, a group of citizens concerned about the future direction of Dade County, announced their formation and endorsed all 10 bond issues. Table 1 provides a breakdown of the issues endorsed by the County Committee. Members of the County Committee included prominent black leaders; representatives of the two leading newspapers in the community, the Miami Herald and the Miami News; industrialists and businessmen from throughout Dade County; and other individuals from key community groups. The League of Women Voters was the first group to officially endorse specifically the rapid transit provision in DOP. The league did not join the County Committee; however, it made its own effort, directed primarily at the rapid transit issue.

Support for DOP came from almost every area of the community. On October 29, 1972, the mayor of Miami announced support for the entire bond issue while at the same time the city of Coral Gables Times strongly endorsed the rapid transit bond issue, calling it the most important issue. The South Dade Chamber of Commerce unanimously supported all 10 proposals as did the Miami Herald, the Miami News, and local newspapers in Miami Beach and South Dade.

It became clear in 1972 that the supporters of

Table 1. DOP bond issues.

Bond Issue	Estimated Maximum Millage (mills/\$)	Amount per Issue (\$000 000s)		
		Proposed County Bonds	Eligible Federal or State Aid	Total Capital Improvements
Sanitary sewers	0.12	50.0	25.0	75.0
Solid-waste disposal	0.12	50.0	0	50.0
Unified transportation—rapid transit	0.31	132.5	673.0	805.5
Health-care facilities	0.21	88.6	15.5	104.1
Libraries	0.08	34.7	0	34.7
County buildings	0.17	70.9	7.5	78.4
Rehabilitation of homes	0.02	10.0	0	10.0
Parks, recreation, cultural facilities	0.18	75.8	30.5	106.3
Zoological park	0.02	8.0	0	8.0
Street and safety improvements	0.27	113.5	35.5	149.0
Total	1.50	634.0	787.0	1421.0

the bond issues were the major community leaders countywide. The same type of support surfaced during the 1978 recall referendum. In addition, a strong grass-roots citizens' effort evolved from the county's public involvement program implemented during the preliminary engineering program for the transit system. This group, called Citizens for Improved Transportation (CFIT), consisted of hundreds of citizens who had never been involved in referendum issues but were strongly supporting the rapid transit system. The County Committee was revived for the recall referendum and coordinated all activities with the citizens' effort. Again, every major newspaper and local elected official supported the rapid transit bonds and urged voters to reject the recall effort.

Opposition

In 1972, opposition to DOP formed early during county-held public hearings conducted in September to explain the issues. Interestingly, the first signs of opposition occurred in South Dade over the issue of whether too much bond money was being spent for arterial-road improvements. A leading citizen activist who had been successful in a drive to recall four county commissioners the previous spring announced his opposition to the entire program. Citizens in Miami Beach, led by a local activist who later spent eight years opposing the transit system, asked the county commission at a public hearing to defer the vote to give citizens a better opportunity to understand the \$634 million bond issue.

In mid-October, several civic associations, including the North Miami Beach Property Owners' Association, the Dade County Association of Unincorporated Areas, and the Miami Beach Taxpayers and Home Owners' Association, formed the Truth About the Bond Proposals Committee. This committee represented the traditionally anti-Metropolitan Dade County groups. The opponents focused on two issues: (a) Dade County was defrauding the people by misleading them on the amount of taxes necessitated by the bonds, and (b) there should be a 120-day delay in the referendum to give people a better chance to understand the issues.

In 1978 a single individual opposed to the rapid transit system organized the group called STOP in the effort to recall the bond issue passed in 1972. This group consisted primarily of the same individuals who opposed the DOP issues. In addition,

STOP appealed to those citizens and areas who felt they were not included in the direct benefits of the then-completed plans for the rapid transit alignment. (STOP focused its attention on Miami Beach, Northeast Dade County, and South and Southwest Dade.)

ELECTION STRATEGIES

The approach to winning the 1972 and 1978 referenda and the role citizen involvement played in those campaigns differed widely. In 1972 two strategies were employed by the County Committee. The first strategy emphasized, through newspaper advertisements and a speakers' bureau, the tremendous amount of matching dollars generated by the bond-issue proposal. By using an identification campaign, the committee targeted community leaders and purchased newspaper ads in the leader's community to show their support for the bond issue. The second strategy used an elaborate slide show that was taken by the committee to every civic and service organization in the county.

A great deal of the material produced and presentations arranged in the 1972 referendum was county-sponsored in an effort to explain a fairly complicated proposal. Very little of what would be called a grass-roots campaign was attempted. This was primarily due to the short time frame between September and November 7, 1972, which was when the Board of County Commissioners had agreed to five public hearings and the referendum. Mass media became the primary tool to communicate the importance of DOP. This strategy was obviously very successful, since the bond issues passed and transit passed by the widest margin of all issues.

The 1978 recall election was an excellent example of citizen involvement and the role citizens can play in supporting financing for transportation programs. A strong citizen base of support had developed between 1972 and 1978 for the county's rapid transit system, primarily through the implementation of a community involvement program during preliminary engineering and final design for the transit system. Over a five-year period the county held 2000 meetings at which more than 80 000 people participated. Upon notice of the recall referendum, active members from the community organized the CFIT committee.

It was recognized early in the 1978 referendum that a strong grass-roots effort would be vital in defeating the issue at the polls. Although the transit system was supported by most elected and public officials, the timing of this referendum was very important. "Proposition-13 fever" was spreading across the nation, and most political analysts in the county felt that rapid transit would become a target for taxpayers frustrated with perceived high taxes. In addition, the March referendum was a single-issue ballot that traditionally attracted low turnouts and high percentages of anti-Dade County voters. Finally, the same anti-Dade County coalition that had opposed the 1972 bond issue was sure to support recall of the bond issue in 1978.

The grass-roots election strategy for the recall referendum had four important dimensions. First, CFIT held a series of press conferences and issued news releases declaring who they were and why they were opposing the recall. CFIT used news releases throughout the campaign to publicize the broad base of support attracted to CFIT. Second, members of CFIT, the League of Women Voters, and other citizens ran a two-week phone bank aimed at getting out the protransit vote. This was very successful and served as the cornerstone of the citizens' effort. More than 200 people made calls each night for two weeks prior to the referendum. Not only was this an

effective way of adding a personal approach to the campaign effort, it helped unify a diverse range of citizens who were all working for a common purpose.

The third dimension of the citizen effort was the targeting of literature to special groups. In Dade County there are many large diverse groups such as the Latin community, the black community, the elderly, and the transit riders. An early strategy that evolved from this part of the citizen effort emphasized that each protransit group must be appealed to in a different fashion from the one standard campaign strategy used by the County Committee. Literature, radio, television, newspaper ads, bumper strips—all had to be aimed at the public that they were trying to reach. Again, the emphasis was to get the vote out, particularly in those areas that would be directly affected by the rapid transit and improved bus system.

Finally, the County Committee, by using professional political advisors, ran a sophisticated newspaper ad and personal-identification campaign. Through the County Committee, the grass-roots citizen effort was coordinated so as not to conflict with the professional approach to the referendum. Representatives of CFIT participated in all County Committee policy decisions. However, it was quite clear that if citizens were to have an impact on the referendum, a separate organization such as CFIT had to operate independently from the County Committee.

WHAT WAS LEARNED

A number of lessons were learned from both experiences with citizen participation in transportation-financing referenda:

1. Today it appears to Dade County as well as throughout the nation that it is much easier to mobilize citizen support for mass transit issues than for highway issues.

2. Local governments must aggressively seek, keep informed, and maintain open lines of communication with people in diverse vocations so they may turn to them in times that require community support for transportation funding. This can be done through the establishment of ongoing transportation committees. Dade County established several special-purpose committees, which included the citizen involvement program for MUATS, the Transit Preliminary Engineering Program, a citizens' transportation committee to oversee the schedule and budget for the transit construction program, and a committee for the elderly and the handicapped. Local governments can use their constituents as a strong

base of support for the policies adopted when the process includes citizen participation.

3. Each community in the county has numerous service and social organizations such as the League of Women Voters, Rotary Club, and Kiwanis Club. These groups must be kept informed of progress being made on transportation projects in their communities. Such groups can generate an enormous amount of influence and resources in the community either in favor of or opposed to financing for transportation projects. For this reason, a great deal of attention should be taken to keep them involved in the planning and implementation of major transportation projects.

4. Grass-roots efforts can be very effective in single-issue campaigns. Citizens can have a tremendous impact on the outcome of referenda sponsored by local governments. The public must perceive that funding for transportation programs is supported by a broad cross section of the community. Clearly, it is not enough to have elected local officials and public employees alone persuade the public that they should tax themselves for transportation improvements. Leading civic spokespersons, chambers of commerce, labor and minority leaders, and others must participate in efforts to secure favorable passage of transportation funding.

5. Perhaps one of the most important roles citizens have in getting transportation-funding measures passed is their ability to relate to their neighborhoods. No one is better equipped to assist in identifying what is needed to get issues across to the people than the people themselves. In both Dade County referenda, citizen volunteers were very effective at getting their neighborhood associations and neighbors out to vote.

A balanced campaign strategy is needed for passage of major transportation programs. A strong political base must be present, a professional political advisor and fund raiser are essential, and a strong grass-roots citizens' effort must augment these efforts. Citizens will continue to play a larger role in campaign efforts as it becomes more and more difficult to get the public's endorsement of new tax proposals for any government-sponsored project. The credibility citizens add to organized campaigns cannot be denied. We only need to look at the grass-roots nationwide thrust of the Proposition-13 movement to know that citizens can profoundly affect the outcome of important tax proposals.

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Partnership in Funding Public Transit: Seattle Metro

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The Seattle Metro transit system is financed by an interesting combination of partners that includes the transit rider, the service-area resident, and the state. Although the transit rider contributes via the fares paid, the contribution from the other two partners is made available to the transit system by way of taxes levied by the transit agency. Both taxes—the retail sales tax and the motor vehicle excise tax—are available on an ongoing basis without being subject to any state or local jurisdictional appropriation process. Yields from these taxes are driven by the local economy and are anticipated to rise at least with inflation. This combination of local revenues is available to support both the operating

and the capital needs of the system. This partnership in transit funding has proved to have been a very successful means of improving transit over the last decade. The combination of funding sources has provided both sufficient resources and sufficient flexibility to enable Seattle Metro to build a better-than-promised transit system. The reasons advanced a decade ago for the involvement of all three partners have become even more compelling. For this reason the Transit 1990 plan of Seattle Metro challenges each partner to provide the increased resources necessary to enable the system to continue to respond to the demand for transit service.

This paper presents one of the more unique and successful structures for funding mass transit at the local level. The funding structure that now supports the public transit function of the municipality of metropolitan Seattle, Metro, is the result of work done by citizens and community leaders as far back as the late 1950s and has been implemented since 1972. This paper will review the history of this structure, its performance over the last decade, and the direction foreseen for the decade of the 1980s.

The Seattle Metro transit system has outpaced other all-bus systems in the nation in terms of ridership growth since its inception in 1973. Ridership has grown from 29.4 million in 1973 to more than 60 million in 1980. This success can be attributed in part to changing environmental conditions, the energy crisis, and inflation and in part to farsighted decision making on the part of the elected officials who govern Metro and systematically implemented a plan for equipment acquisition and service expansion over the last decade. However, this success must also be attributed in large part to the existence of a sound financial base that provided the resources to finance both the operating and the capital programs of the Seattle Metro transit system.

The critical feature of Seattle Metro's financial structure is the concept of partnership--the concept of shared costs and benefits from a viable public transit system. The Seattle Metro partnership in transit involves the customer, the local service-area resident, and the state as a whole. In concert each of these partners contributes revenues that combine to provide for the cost of both operating expense and the local share of the capital program. The system is also dependent on the federal and state governments, primarily for construction grants, which have also been critical to the successful implementation of Seattle's transit program.

The movement to create a viable mass transit system on a regionwide scale dates back to the late 1950s when an effort was undertaken to create a regional form of government--called metropolitan municipal corporation--whose function was to perform regional public services that would be difficult for local governments alone to provide.

State law was enacted that authorized such entities to carry out six such functions: water-pollution abatement, public transportation, comprehensive planning, water supply, garbage disposal, and provision of parks and parkways. In 1958, a measure to establish a Metro that would have responsibilities for transportation, comprehensive planning, and water-pollution control in the Seattle-King County area was placed on the ballot. This measure did not receive the necessary level of voter approval, although a second ballot measure in the same year that proposed only the water-pollution control function did pass, which resulted in the successful launching of a program of regional sewage treatment.

In 1968 and 1970, bond issues that would have financed a regional bus-rail rapid transit system from the property tax failed to receive the required level of voter approval. (Property-tax increases require a favorable vote of 60 percent; the total number of persons that vote must equal 40 percent of the total number that voted in the last preceding general election.) Meanwhile, in 1969 and 1971, the Washington State Legislature passed the bills that provided for the transit-funding mechanisms to be described in this paper. Then, in 1972, King County voters authorized Metro to perform the public transportation function by taking advantage of the broader funding base made possible by the state

legislature. With this 1972 vote, the federation of local governments that had been created to undertake the required financing and capital programs of the regional sewage treatment system expanded its umbrella to provide the same resources for the cause of regional public transit.

FINANCIAL SUPPORT BY RIDERS

Farebox revenue was one of the three main sources of support upon which the Seattle Metro system was envisioned to rely for financing. State law (Revised Code of Washington, 25.58.240) expressly grants to metropolitan municipal corporations the power to "fix rates, tools, fares and charges" for the use of the transit system, thus giving the entity itself the authority to generate whatever portion of its total revenues from fares that it desires. The Metro council reduced fares in 1973, which reversed a trend of increasing fares and declining ridership; however, subsequent to this and as the system developed, fares were increased in 1976, 1979, and 1980 so that they would represent approximately one-third of total revenue.

The changing environmental and economic circumstances of the last decade have confused all prior theories regarding transit elasticity or the rider's responsiveness to transit pricing. However, the general direction of these changing circumstances has been toward making transit an ever-more-desirable choice. In this context, the feasibility that fares may eventually displace the need for tax subsidies is of some interest.

Even in the face of an apparently inelastic demand, i.e., ridership that will be maintained even with higher prices, the reality of public decision making indicates that fares will most likely continue to be a central but not the single source of transit financing in the future. The reluctance of local officials to raise fares to levels sufficient to fully finance the system relates to the fact that a core of transit ridership is transit-dependent by virtue of having a low income. Although a majority of the new ridership comes from the middle- to upper-income wage earners, the transit-dependent segment of the market continues to ride, which represents 24.1 percent of the Seattle Metro's system ridership.

Moreover, decisions to increase the fare are never made without extensive (at times exhausting) discussions of other dimensions of equity: the relationship of price and distance, price and ability to pay, price and jurisdiction of origin, etc. Washington state law explicitly speaks to an equity principle in the statute that grants the power to set fares (Revised Code of Washington, 35.58.240), which reads:

Provided, that classes of service and fares will be maintained in the several parts of the metropolitan area at such levels as will provide, insofar as reasonably practicable, that the portion of any annual transit operating deficit of the metropolitan municipal corporation attributable to the operation of all routes, taken as a whole, which are located within the central city is approximately in proportion to the portion of total taxes collected by or on behalf of the metropolitan municipal corporation for transit purposes within the central city and that the portion of such annual transit operating deficit attributable to the operation of all routes, taken as a whole, which are located outside the central city, is approximately in proportion to the portion of such taxes collected outside the central city.

This proviso mandates that there be a relationship between where the tax subsidy comes from (city versus county) and where it goes. Where the subsidy goes, i.e., where the operating deficit is located, is a function of both transit service distribution and farebox recovery in the respective areas of central city and noncentral city. The effect of this proviso has been pressure to not increase fares for long-haul trips that originate in suburban areas, since these areas are responsible for generating more of the total transit taxes than the central city does. Although this proviso has not caused any totally illogical fare policies, it adds yet another dimension of equity to an already difficult and complex issue.

The long-range projection for fares in the Seattle Metro system is that they will continue to rise over the decade of the 1980s at least to keep up with inflation. This will undoubtedly demand some creative solution to the problems of equity mentioned above. With such upward movement, however, the system will continue to rely on its customers for approximately one-third of its total revenue; that is, the customer will continue to be a significant contributor to the transit partnership.

FINANCIAL SUPPORT BY SERVICE-AREA RESIDENTS

The second source of support, another major partner in transit, is the group of local service-area residents, a majority of whom voted in 1972 to tax themselves for transit by means of a retail sales tax of three-tenths of 1 percent on all transactions in Seattle-King County subject to the state sales tax. Sales of food and drugs were subsequently eliminated as taxable transactions pursuant to state initiative. The state legislature provided the authority for entities within certain counties to levy this transit tax (Revised Code of Washington, 82.14.045). This tax was originally authorized up to three-tenths of 1 percent in 1971 and was expanded in the 1980 legislative session to six-tenths. The extent of the levy is determined by the local governing body subject to a one-time approval by a majority of the voters in the affected area. The willingness of the state legislature to allow this transit tax was the result of a broad-based citizen effort mounted in the late 1960s. This citizen effort initially developed plans for a major bus and rail rapid transit system as well as for a comprehensive package of local capital improvements that included urban arterial construction. The thrust of this plan for capital improvements was, among other things, to achieve a balanced transportation infrastructure. To this end, this citizens' group also supported an increase in the statewide gasoline tax to provide local jurisdictions and the state with funding for urban arterial improvements.

As mentioned briefly above, voters turned down the bond issue for the bus-rail rapid transit system in 1968, although they did approve the \$333.9 million companion package of other capital improvements called "Forward Thrust." With the support of this same citizens' group, the state legislature increased the gasoline tax by 1 cent, which provided a major source of revenue for urban arterials. With the second defeat of the bus-rail rapid transit system proposition in 1970, the citizens' group scaled down the transit system plan to an all-bus system and proposed the combination of funding sources discussed here (the customer, the service-area resident, and the state). Favorable response from the legislature to this proposal was in large part a result of the decision by those with highway interests not to oppose the transit legislation--a reward exchanged for prior transit activist support for

their successful efforts to increase highway funding.

The concept of a local-option sales tax has shown significant strength as a transit tax. As with farebox revenue, the governing body has the authority to levy this tax on an ongoing basis once it is sanctioned by a majority of the voters. These funds are not then subject to appropriation by any other jurisdiction, which provides a significant advantage in terms of stability. Although this tax is not directly transit-related, the rationale for its use has been that all service-area residents benefit from the availability of a viable transit system. Riders and nonriders benefit from reduced congestion, economic development, air-quality improvements, and energy conservation. These benefit criteria were those presented in the early 1970s, and they have become even more compelling in the decade of the 1980s. One argument against such a source of income for transit was the regressive impact on the population. Although this was true when the tax was initially proposed, changes in state law that removed the sales tax from food and drugs in Washington State have changed the sales tax from a regressive one to a tax that is almost equivalent to an income tax.

The advantage of the sales tax as a transit-funding mechanism has stemmed from the fact that the authority to levy and collect the tax rested with the transit entity--Seattle Metro--and has not been subject to interference by either the state government or any local governments within the Metro federation. Moreover, this source of income is tied to local economic activity and over the decade of the 1970s has provided yields that have increased each year because of inflation plus varying levels of real growth. The real growth in the sales-tax income has been invested in expanded transit service, whereas the increased income from inflation in sales-tax revenue has covered inflationary increases in transit operating expenses. Unfortunately, our expectations for the 1980s are that sales-tax income will more closely approximate increases in personal income, which are expected to be at the level of inflation only. The substantial increases in real growth experienced in 1977 and 1978 are assumed to be only a reflection of the "boom times" economic recovery in the Seattle-King County area in the late 1970s. Nonetheless, the sales tax is a stable and healthy source of transit income.

The long-range plan for the Seattle Metro transit program calls for aggressive expansion of the all-bus system financed by an expansion of the current partnership in transit funding. Accordingly, the 1990 financial plan calls for a doubling of the sales tax from the current rate of three-tenths of 1 percent to six-tenths of 1 percent. The Washington State Legislature was convinced of the soundness of such a plan and granted metropolitan municipal corporations the authority to seek voter approval of an increase in the sales tax levy up to six-tenths in the 1980 state legislative session. Those governing Seattle Metro elected to exercise this new authority and placed a referendum to increase the sales tax up to six-tenths of 1 percent on the September 1980 primary election ballot. This issue received a favorable vote of only 47 percent, which fell short of the required majority of 50 percent. However, the issue was resubmitted in the November 1980 general election and passed by a majority of 51 percent. Approval of this increase cemented the second source of transit funding.

FINANCIAL SUPPORT BY STATE

The third partner in transit funding has been the state government, which has contributed to local

transit funding by allowing transit agencies to keep approximately one-half of the taxes collected on the value of motor vehicles registered in the area served by the transit system. The mechanism for this type of transit funding is the motor vehicle excise tax, which is imposed statewide at the rate of 2.2 percent of the fair market value of all registered vehicles. In 1969 the legislature authorized metropolitan municipal corporations to levy for public transportation purposes a motor vehicle excise tax in their respective jurisdictions up to a maximum of 1.0 percent of the fair market value of registered vehicles. This local levy is credited against the amount of excise tax levied by the state, which results in a reduction of what would otherwise have represented state general-fund revenue. Thus, even with the imposition of the local levy for transit, the statewide rate at which the motor vehicle excise tax is levied remains 2.2 percent.

The successful passage of state legislation that permitted the diversion of state motor vehicle excise tax funds for transit occurred at a time when revenue from the motor vehicle fuel tax was considered inadequate to meet even the highway purposes to which it was restricted. Arguments in favor of the local levy of the motor vehicle excise tax for transit included the fact that it would be a move to enlarge the funding base of transportation needs rather than an attempt to raid the highway fund. Second, proponents demonstrated that the reduction in state general-fund revenue from the motor vehicle excise tax credit would be more than offset by revenue increases from the sales tax on the construction of transit facilities that the motor vehicle excise tax would make possible.

Although it responded favorably to these arguments, the legislature added a matching requirement to the motor vehicle excise tax that required the motor vehicle excise tax to be matched on a dollar-for-dollar basis by locally generated tax revenues other than the excise tax (revised Code of Washington, 35.58.273). At the time that this provision was enacted in 1969, the only source of local tax revenue available to the metropolitan municipal corporation was the property tax, which required approval by three-fifths (60 percent) of the voters. Seattle-King County voters did not approve this tax increase in 1968 or in 1970. Only after legislative authorization for the local-option sales tax in 1971 and voter approval in 1972 (majority of 50 percent required) was Seattle Metro in a position to take advantage of the motor vehicle excise tax.

The uniqueness of this particular mechanism lies in the fact that it represents a direct contribution by the state government; state revenues are in effect being used, and yet no appropriation process is involved. This unique concept has a long and controversial history; attempts have been made to subject it to the state appropriation process, to limit the amounts actually remitted to transit agencies (which did occur in 1973 and 1974), and to eliminate it entirely. The original legislation that authorized the local tax credit contained an expiration date of July 1981, after which the transit tax was no longer to exist.

The motor vehicle excise tax has survived these various attempts to remove or limit it, the most recent of which occurred in 1979. In the 1979 legislative session, the case for state benefit from a viable transit system was restated; emphasis was on state benefit from improved economic development, state benefit from more-efficient use of the existing highway network, and air-quality and energy-conservation benefits. With regard to energy conservation, state benefit was shown to result from

reduced oil consumption in urban areas that have a transit option, which makes the oil supply more plentiful to nonurban parts of the state in which transit is not an option. This struggle in 1979 succeeded in establishing the local motor vehicle excise tax as a transit tax for the future by removing the July 1, 1981, expiration date.

The same legislation that removed the expiration date for the motor vehicle excise tax also added a restriction to this revenue source related to the pledging of such funds as security for bonds. In 1973, Seattle Metro issued \$14 million in general-obligation bonds that pledged all three revenues (farebox, sales tax, and motor vehicle excise tax) to bondholders as security. Furthermore, language in the state statute read as follows (Revised Code of Washington, 35.58.279):

If any of the revenue from any such special excise tax shall have been pledged by any municipality to secure the payment of any bonds as herein authorized, then as long as that pledge shall be in effect the legislature shall not withdraw from the municipality the authority to levy and collect the tax.

Realizing that a bondholder's covenant that pledged the motor vehicle excise tax became a law more powerful than their own, the legislature in 1979 prohibited transit agencies from pledging the motor vehicle excise tax for bonding purposes in the future.

The motor vehicle excise tax has performed well as a source of transit funding. As noted above, it is available to the transit agency as an independent tax, free from any state or local appropriation process. It has yielded revenues that have grown in recent years above the rate of general inflation, and although it is not anticipated that this level of growth will be maintained in the future, the motor vehicle excise tax is expected to grow at about the level of general inflation. The trend of fewer vehicles per person is expected to be offset by the trend toward increased cost per vehicle. The effect of the constraint with regard to pledging the motor vehicle excise tax is at this point unknown, since no new bonds have been issued; however, it is expected to be reflected in the quality and security of any future transit bonds and therefore in the interest rate to be paid. Thus, the restriction on pledging the motor vehicle excise tax is not expected to destroy the transit agency's ability to borrow but rather to affect the cost of the borrowing.

As with the other two revenue sources discussed here, the motor vehicle excise tax is expected to play a significant role in the next decade's plan for Seattle Metro's transit system. The financial plan calls for an increase from 1.0 percent to 1.5 percent in the local motor vehicle excise tax. The transit share of the motor vehicle excise tax can only increase if the tax is raised from 2.2 percent to 2.7 percent or if the state general-fund revenue portion is reduced from 1.0 percent to 0.5 percent in those areas of the state that support a transit system. Since neither raising taxes nor raiding the state general fund is a popular issue, Seattle Metro may encounter more difficulty in securing this tax increase. If secured, the partnership will be renewed and the three partners will continue to contribute approximately the same share of total revenue as shown below:

<u>Revenue Source</u>	<u>1980 (\$)</u>	<u>Proposed 1990 (\$)</u>
Fares tax	30	30
Sales tax	41	49
Motor vehicle excise tax	29	21

The funding sources described above are those that have provided Seattle Metro's system with the resources to fund operating expense, debt service, and the local share of the capital program over the last decade. This combination of local revenues would not have been sufficient to do the job had not significant levels of federal funding been available for the capital program. Approximately 80 percent of the capital program, or \$140 million, was made available from the Urban Mass Transportation Administration to complete the 1980 plan. In addition, the state department of transportation contributed its federal and state funds to the construction of certain park-and-ride lots, high-occupancy-vehicle

lanes, and freeway flyer stops. The transit plan for the 1990s likewise envisions a significant infusion of both federal and state capital construction dollars in order to complete the capital improvements planned for the coming decade.

Only with this funding partnership--the customer, the local resident, and the state--can the agency finance a system that no one partner alone can fund. This funding partnership has allowed Metro to respond to ridership demands in the Seattle area and even to build a better-than-promised transit system.

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