Alternative Subsidy Techniques for Urban Public Transportation

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Subsidies for urban public transportation can be paid directly to transportation providers for supplying certain specified services or directly to transportation users in the form of discount transportation vouchers. These two subsidy mechanisms can be referred to as provider-side subsidies and user-side subsidies respectively. This paper discusses the likely advantages and disadvantages of three approaches urban communities can take to subsidizing public transportation: provider-side subsidies alone; user-side subsidies alone; and combined provider-side and user-side subsidies. Provider-side subsidies may be easier to administer than user-side subsidies, but they have often resulted in increased costs and in public dependence on a relatively small number of providers and services. User-side subsidies appear to offer more flexibility and efficiency; subsidized users can choose those providers and services that best meet their needs. The paper outlines a program of case studies and experiments designed to test hypotheses and fill major information gaps associated with these alternative subsidy approaches.

Subsidies for urban public transportation services have been advocated and in many circumstances provided on the basis of two social objectives:

1. Shifting some private automobile travel to high-capacity transit modes to reduce congestion, pollution, and fuel consumption and
2. Ensuring an acceptable level of mobility for those who are unable to use private automobiles, particularly the young, the elderly, the poor, and the handicapped.

But, although both of these objectives have gained wide acceptance within the United States, a great deal of debate exists over the way in which they can best be achieved. Of the approaches that have been suggested, a few have been implemented, a few others are on the verge of large-scale introduction, and still others have yet to be tried on a significant scale.

This paper is concerned primarily with the use of subsidies to achieve the second objective: ensuring adequate mobility for certain target groups. The various subsidy mechanisms that have been proposed are discussed under two general categories:

1. Provider-side subsidies, in which the subsidy is paid directly to the transportation provider (such as a transit authority or a taxicab operator) for offering certain specified services at fares that produce insufficient total revenues to cover the provider's costs; and
2. User-side subsidies, in which certain target group users are permitted to purchase transportation vouchers at a price substantially below the value of the vouchers to the transportation providers (users exchange these vouchers for transportation services, and the transportation providers then redeem the vouchers from the public agency at values agreed on in advance).

In the discussion that follows, the term user payment means the amount paid by the user for a trip, the term fare means the advertised price of the trip to a member of the general public, and the term cost means the cost of the trip to the provider. Under most provider-side subsidy schemes, the user payment is equal to the fare, and the average fare is well below the average cost. For most user-side schemes, however, the target group's user payment, in the form of discount vouchers, is less than the standard fare. In these cases, the average fare equals the average cost, including normal profit. Myers (6) suggests a user-side subsidy scheme in which the provider redeems the vouchers at a premium value well in excess of the cost of providing trips for the target group. The difference between the premium and the cost, the provider bonus, is used by the provider to cover other unprofitable services. Finally, where provider-side and user-side subsidy mechanisms are used in combination, there are both a target group user payment that is less than the standard fare and an average fare that is below the average cost.

Most subsidy mechanisms in widespread use at present are provider-side subsidies. Examples are direct capital and operating assistance provided under the Urban Mass Transportation Act of 1964 (as amended), direct operating subsidies provided by state and local governments, and contract arrangements between public agencies and transportation providers under which specified low-fare services are provided at a contract rate

Publication of this paper sponsored by Committee on Taxation, Finance, and Pricing.

per vehicle-kilometer or per vehicle-hour. Examples of user-side subsidies are the sale of taxicab tickets or tokens to the elderly and the sale of transportation ticket books to certain handicapped and elderly residents; the Transportation Remuneration Incentive Program (TRIP) in West Virginia is an example.

This paper discusses the kinds of subsidy mechanisms that have been applied or proposed in each of the two categories and gives examples to illustrate the application of those mechanisms separately and in combination. Attention is directed to user-side subsidies, and, to the extent that existing knowledge permits, the advantages and disadvantages of this category are discussed. The conclusion is reached that user-side subsidies have substantial promise and warrant further investigation through a program of empirical analysis.

PROVIDER-SIDE SUBSIDIES

Provider-side subsidies are currently paid to most large transit systems in the United States. Implicit in nearly all public policy regarding transit services is the notion that a desired level of transit service cannot be achieved by a private operation for profit. Deficits, therefore, are met by direct payments from governments to providers. The large private transit system is nearly extinct; large systems are typically owned and operated by a public agency. Taxicab and limousine services, on the other hand, are always private businesses operated for profit.

Provider-side subsidies can take a variety of forms. A government agency might contract for equipment or services provided by private operators, or the agency might own the transportation equipment and facilities and employ people to operate the system. Several intermediate versions are possible. For example, the government agency can own the equipment and facilities and contract with a management company to operate the service, or it may employ drivers but contract for maintenance. The government, in principle, sets the standards and seeks cost-effective methods to achieve them. There is a vaguely defined acceptable gap between revenues and costs, and the subsidy ensures that the desired service standards and fare levels are maintained.

Until very recently, capital grants funded under the Urban Mass Transportation Act were the major federally sponsored provider-side subsidies to urban public transportation. Currently, such grants are available to public agencies and require 20 percent local matching funds. The grants must be applied for and are subject to upper limits set for each state. These grants have been used primarily for buses, terminals, and storage facilities and, in those places with rail transit, for rail equipment and facilities. Taxicab and other privately operated systems cannot receive these grants directly, although a local government body can set up an agency to own vehicles and facilities and contract with private companies to operate them or lease vehicles and facilities to private operators at less than market rates. The intent of Congress in establishing this program in 1965 was to preserve and upgrade existing public transit services by improving the condition of the capital equipment operated by transit providers.

In 1974 the act was amended to provide somewhat more limited funds for operating expenses; it requires 50 percent local matching funds (8). Funds for operating assistance are allocated by formula to large urbanized areas and states. Operating subsidies have also been provided to transit operators for some time from various state and local budget sources. By and large, the source of these funds is property taxes, though some areas have adopted sales taxes for a portion of such subsidies (2, 3).

Other examples of provider-side subsidies are special services for handicapped or low-income people subsidized with funds from social service programs. The provider in these cases is often the social service agency itself rather than a transit authority or taxicab operator. Experience with reduced transit fares for the elderly has been relatively widespread. A New York system (1) reported that users of the reduced fares are predominantly white and do not have low incomes, suggesting that groups that already travel are more likely to use the reduced fare system than are the more seriously disadvantaged who do not travel much at present. Programs for the handicapped are most frequently offered through social service agencies, although in recent years special facilities for the handicapped have often been provided by transit systems and by private operators. These special programs and facilities sometimes include specially trained drivers who assist the handicapped rider in entering and leaving the vehicle and special vehicles with devices such as wheelchair ramps and lifts.

Some special transportation programs for disadvantaged areas have also been provided from various federal, state, and local sources. These programs are oriented to the welfare of low-income persons in particular areas. Some of these have been federally encouraged programs for limited periods, as in Model Cities demonstrations, while others have been locally based programs funded on a more or less permanent basis.

USER-SIDE SUBSIDIES

In a few scattered situations, subsidies have been given directly to the user. The mechanism can be a voucher, a token, a ticket, a coupon, or a credit card in which part of the fare is paid by a public agency. These user-side subsidies are passed on to the provider only when the user is served and have the advantage of acting as an incentive for the transportation provider to "subsidy hunt" rather than to take subsidy for granted. They also have considerable flexibility. They can be varied by income, age, mode, class of service, time of day, and so forth.

Some existing examples of user-side subsidy applications illustrate the range of mechanisms that can be used.

1. In Los Gatos, California, elderly and disabled residents can purchase up to 10 taxicab tickets per month from the city at 50 cents per ticket and use these tickets at the rate of one per trip for taxicab travel anywhere within the city limits. The taxicab operator is paid $2.10 for each ticket he turns in to the city.
2. In an experimental program in Arlington County, Virginia, certain elderly residents were allowed to make taxi trips anywhere within the county for a flat user payment of 15 cents. The taxicab operator computed each fare by means of a taxi meter, and billed the county for the total fare less the 15 cents paid by the user.
3. In Danville, Illinois, the three local taxicab companies are participating in a user-side subsidy experiment funded by the Urban Mass Transportation Administration. Elderly and handicapped residents purchase shared-ride taxicab services from the provider of their choice by paying 25 percent of the regular fare and signing a voucher for the remainder of the fare. The taxicab operator then submits the voucher to the city and is reimbursed for the amount shown on it.
4. In Raleigh, North Carolina, some social service agencies subsidize taxicab services for their clients by means of a two-part ticket. On completion of a taxicab ride, the driver records the fare on both halves of the ticket and gives one half to the rider. The driver obtains

the rider's signature on the other half and submits that half to the social service agency for reimbursement. In this example, the rider pays nothing toward the fare. The social service agency covers the full fare.

The sale of tickets to users at reduced rates does not in itself constitute a user-side subsidy scheme. In El Cajon, California, for example, users buy 50-cent tickets and use them to purchase taxicab rides costing around $1.50, but the taxicab operator is paid by the city according to the occupied taxicab-kilometers of service provided rather than according to the trips made by the riders. And, in Joplin, Missouri, the city purchases $5 and $10 taxicab coupon books from the taxicab operator and then makes them available to low-income residents at a 70 percent discount. Thus the taxi operator gets paid for the tickets regardless of whether they are used. Because the payment to the taxicab operator is not related directly to each person trip actually made in these examples, these subsidy techniques fall into the category of provider-side subsidies.

User-side subsidy schemes need not involve the use of tickets, coupons, or credit cards. In the Arlington County experiment, reimbursement to the taxicab operator depends directly on the person trips made, though no tickets are used. In this case, tickets were used at the beginning of the program, but after a short period of operation it was decided that adequate accounting could be maintained without the use of tickets.

EVALUATION OF SUBSIDY PROGRAMS

The brief discussion of provider-side and user-side subsidies points to a number of general advantages and disadvantages associated with each category. Provider-side subsidies are relatively easy to administer but do not generate strong incentives for the provider to seek out ridership or to operate efficiently. On the other hand, although user-side subsidies are more difficult to administer, they encourage providers to tailor their services carefully to meet the needs of the groups receiving subsidy and to deliver those services as efficiently as possible. Some hypotheses about the relative merits of different subsidy programs are presented below, and these hypotheses are examined in the light of experience to date with urban public transportation subsidies. Where there is insufficient experience to test some of the hypotheses, we recommend additional data gathering and experimentation to fill the information gaps.

A community that decides to subsidize public transportation can disburse the subsidies in one of the following ways:

1. Through user-side subsidies alone,
2. Through provider-side subsidies alone, or
3. Through combined provider-side and user-side subsidies.

The likely implications of each of these approaches are discussed.

User-Side Subsidies Alone

The primary advantage of user-side subsidies is that they promote efficient use of transportation resources. By placing the subsidy funds in the hands of the users and forcing transportation providers to seek out the subsidy, public bodies can ensure that services are tailored to meet the needs of the users and that costs are carefully controlled. As long as providers are relatively free to enter the market and to set their own service levels and fares, the user-side subsidy approach should lead to efficient use of the transportation modes. Buses would not be used when taxicabs could provide better service at lower cost, for example. The user-side approach also frees public bodies from much of the service and fare monitoring necessary with provider-side approaches; the providers design service levels and fares that best serve the demand, just as food suppliers, for example, design their products and prices to serve their markets.

The major disadvantage of the user-side subsidy approach is probably administrative. The user-side mechanism requires a system for identifying users and reimbursing providers. Considerable effort is required to handle the tickets in such a way as to minimize fraud. Where subsidies are provided to only a small subgroup of the population, however, it may be possible to administer a ticket system conveniently as a component of a broader social service program.

Considerations such as these lead to the following general hypotheses about a program of user-side subsidies alone:

1. Users will obtain high-quality services from the providers;
2. The various public transportation alternatives will be used in an efficient manner;
3. Providers will operate their services efficiently; and
4. Some administrative difficulty may be experienced in distributing tickets and in guarding against fraud.

More specific hypotheses could be developed about the relative merits of different user-side subsidy mechanisms, but the discussion is kept at a general level in this paper.

Provider-Side Subsidies Alone

Various types of provider-side subsidies account for nearly all the public transportation subsidy programs currently operating in the United States. They typically accompany public ownership of the provider or a contract between a public agency and one provider for certain specified services. This subsidy approach is relatively easy to administer, but whether it provides incentives for economic efficiency is questionable. Provider-side subsidies, almost without exception, have reduced the degree of competition between providers and, indeed, have often resulted in the dependence of the public on a single provider.

Certain provider-side mechanisms appear to have contributed directly to inefficiency in provision of service. An analysis by Tye (7) concluded that the capital grant mechanism encourages premature replacement of capital equipment and inadequate maintenance. Hilton (4) contends that public ownership of transit systems has resulted in higher wage rates and operating costs than would have existed under private ownership. Finally, Kirby and others (5) suggest that restriction of capital grants to publicly owned transit systems has led to the use of public bus operators for some services that could be provided more efficiently by taxicabs or other private providers.

The following hypotheses evolve from experience to date with provider-side subsidies:

1. Administration of the subsidy funds is relatively straightforward;
2. Competition between providers is reduced, and costs of service rise more rapidly than they might with other subsidy approaches;
3. Those providers receiving the subsidies may be

overutilized while other providers are underutilized; and

4. Transportation providers receiving the subsidies are less responsive to local transportation needs than they might be with other subsidy approaches.

Although cogent arguments can be made and illustrations can be given to support these hypotheses, the empirical evidence currently available leaves some uncertainty regarding their validity. Further analysis is needed to test these hypotheses more completely.

Combined Provider-Side and User-Side Subsidies

It is possible for a community to disburse part of its subsidy budget through a provider-side technique, such as capital grants, and part through a user-side technique, such as reduced user payments for tickets redeemed for full value by the providers. The Transportation Remuneration Incentive Program (TRIP) in West Virginia is an example of this approach. Of the $21.9 million to be expended on this program during fiscal years 1974 through 1977, $8.8 million will be used to cover the cost of providing transportation tickets to eligible users at 45 percent of face value, and $7.7 million will be used to cover capital and operating costs for certain transportation providers (9).

The use of combined provider-side and user-side subsidies will have some of the advantages and disadvantages of both approaches. The community will have to deal with the administrative problems of the user-side subsidies as well as the efficiency problems created by the provider-side subsidies. It should be noted in particular that, if certain providers are favored over others when the provider-side subsidies are disbursed, the favored providers will have a competitive advantage in setting fares and consequently may be overutilized by both recipients of user-side subsidies and others. (This problem might be alleviated to some degree by allowing providers not receiving provider-side subsidies to redeem user-side tickets at a higher value than the other providers. Such an approach might create additional administrative difficulties, however.)

The following hypotheses have been developed regarding the use of combined provider-side and user-side subsidies:

1. Many more providers can be involved than in provider-side subsidies only;
2. Administration of the user-side funds may be difficult;
3. Those providers receiving provider-side subsidies may lose some of their incentives for efficient operation; and
4. Users, whether subsidized or not, may overutilize those providers favored by the provider-side subsidy scheme and underutilize other providers.

As a statewide program, TRIP provides an interesting case study of the use of combined provider-side and user-side subsidies, and should provide some guidance on the validity of the hypotheses.

EXPERIMENTS AND CASE STUDIES

A comprehensive examination of the hypotheses outlined above requires a program of empirical analysis of existing subsidy forms and well-designed experimentation with untried subsidy techniques. Although a variety of provider-side subsidy schemes can currently be observed in U.S. cities and, with considerable additional data collection, analyzed, experience with user-side and combined provider-side and user-side schemes is quite limited. Examples of the former category are limited to a handful of subsidy programs using taxicabs, and TRIP is the only known example of the latter category. Further examination and comparison of the three subsidy approaches discussed in this paper depend, then, on the development of experiments involving user-side subsidy techniques.

Table 1. Experiments and case studies.

Location	1970 Population	Type of Test	Type of Subsidy Program
Charleston, W. Va.	300 000	Case study	Provider-side and user-side (e.g., TRIP)
El Cajon, Calif.	62 000	Case study	Provider-side (city contracts with taxicab operator)
Joplin, Mo.	39 000	Case study	Provider-side (city buys tickets from one taxicab provider)
Westport, Conn.	27 000	Case study	Provider-side (capital grants, operating assistance for mini-buses)
Danville, Ill.	43 000	Experiment	User-side (tickets with three taxicab providers, no bus providers)
Site to be selected		Experiment	User-side with minimal or no provider-side (tickets with taxicab and bus providers)
Pleasant Hill, Calif.	25 000	Case study	User-side (one taxicab provider)
Richland, Wash.	26 000	Case study	User-side (one taxicab provider)
Los Gatos, Calif.	23 000	Case study	User-side (one taxicab provider)
Arlington, Va.	174 000	Case study	User-side (one taxicab provider)

Under UMTA's Service and Methods Demonstration Program, a program of case studies and experiments is being designed and conducted to test the major hypotheses discussed. To date, these investigations have been confined to relatively small urban areas of less than 300 000 population where the costs of implementing and analyzing alternative subsidy schemes are not too great. Table 1 gives the areas currently being studied under this program.

Two experiments are being conducted; one (Danville, Illinois) has been in operation since November 1975, and the other is currently at the site selection stage. The Danville experiment provides an example of a user-side only program involving a number of taxicab providers; the second experiment will illustrate this approach by using bus as well as taxi providers. The case studies listed represent a variety of examples of the other two subsidy approaches.

Data from these experiments and case studies are being used to investigate the efficiency and administrative feasibility of these different subsidy approaches. These analyses will be combined with an overview of the various financing techniques available for public transportation to provide general recommendations for communities on the relative merits of alternative subsidy programs. Although these case studies and experiments are few in number and in some cases may not permit broad generalizations, they should contribute greatly to existing knowledge about public transportation subsidization and suggest ways in which broader conclusions could be obtained.

CONCLUSIONS

Provider-side and user-side subsidy mechanisms have been discussed and contrasted in this paper. Provider-side subsidies are likely to be easier and less costly to administer than user-side subsidies, but provider-side subsidies have often resulted in increased costs and in

the dependence of the public on a relatively small number of providers and services.

User-side subsidies appear to be more efficient; when subsidies are in the hands of the users, they can choose those providers and services that best meet their needs. User-side subsidies rely, of course, on the willingness and ability of providers to supply adequate levels of service. Where there is a single operator and the appropriate level of service can be readily specified and costed, it may be simpler to assist the provider directly through a provider-side subsidy. If, on the other hand, there is a desire to provide a given level of subsidy to selected users and to allow providers to tailor services and fares to the demand, the user-side subsidy will probably be preferable. In some locations, a combination of provider-side and user-side subsidies may be appropriate. More empirical analyses, including experiments in selected locations, are needed to draw more precise conclusions regarding the relative effectiveness of these different approaches for subsidizing urban public transportation.

Virtually all of the financial assistance currently provided for urban public transportation is disbursed through provider-side subsidies. This paper suggests, however, that user-side subsidies might be more efficient for many applications. If further research confirms this hypothesis, policy makers should consider revising current subsidy programs to encourage the distribution of more funds through user-side subsidies. Such a change should lead to a more efficient mix of public transportation providers and services and permit more effective use of subsidy funds in achieving public policy objectives in urban transportation.

ACKNOWLEDGMENT

The preparation of this paper was supported by the Service and Methods Demonstration Program of the Urban Mass Transportation Administration, U.S. Department of Transportation. Opinions expressed in the paper are those of the authors and do not necessarily reflect the views of the Urban Institute or the sponsor.

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