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COST CONSIDERATIONS IN USING PRIVATE TRANSIT PROVIDERS

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PREFACE

The American Public Transit Association (APTA) and the Urban Mass Transportation Administration (UMTA) are joint sponsors of the Transit Productivity Program. The purpose of this technical assistance program is to support the continuing efforts of the transit industry to improve operating and maintenance practices as well as to strengthen performance monitoring and evaluation, management control and information, and internal and external communications systems. The intent is to provide a broad perspective of productivity improvement, but, at the same time, focus on tested and workable examples of productive management and operating practices within the U.S. transit industry.

The session in which this paper is presented is one of a series of efforts prepared for the Transit Productivity Program. Prepared for presentation at the April 1984 Western Regional Conference of the American Public Transit Association in Portland, Oregon, this paper is intended to provide transit managers with a broad perspective on productivity improvement while focusing on tested and workable examples of productive management and operating practices within the U.S. transit industry.

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INTRODUCTION

As the level of public support diminishes or stabilizes, transit agencies are being faced with hard decisions concerning who will be served and how much service will be provided. In this era of resource limitations, it is imperative that transit agencies consider more than traditional means for providing service.

More than a few systems have been experimenting with innovative approaches—such as the use of private transit providers—to more cost-effectively offer local transportation. Others[1] have conducted research in this area and claim that the greater use of charter, taxi, and paratransit providers will not only address the issue of limited resources but, in a related way, the use of private operators may assist transit agencies in satisfying constituency requests for additional service.

With the use of private providers becoming more widespread and with even greater involvement of the private sphere being envisioned, one of the key issues centers around the amount of potential cost-savings that can be realized from such arrangements. In light of these considerations, the purpose of this paper is to provide guidelines for assessing the costs of using private enterprise to provide transportation service. Some of these principles were used during my tenure as Section Chief of Service Planning and Manager of Service Development for the

[1]See, for example, Making Better Use of Private Transportation Resources, Kenneth Orski, et al., May 1983.

Orange County (Calif.) Transit District. These guidelines are developed in this paper by reviewing some basic cost concepts and are reinforced by presenting several examples and/or applications of these concepts.

COST CONCEPTS

It is appropriate to review some fundamental cost concepts in order to better determine the viability of using private enterprise to provide transit service. Two basic cost concepts are presented—fully-allocated cost and incremental cost.

Fully-Allocated Cost

Fully-allocated cost generally refers to the total operating cost associated with the provision of transit service. Fully-allocated cost is a useful concept for the distribution of operating costs (and deficits) among service types (e.g., fixed-route and demand-responsive service) and within individual service types themselves (e.g., Route 1, Route 2, etc.). Fully-allocated cost is also applicable to the allocation of expenses between those services provided directly by the transit system itself and those operations provided indirectly by a private transit company. The application of fully-allocated costing to provide a more complete cost picture is often an instructive exercise. Overhead costs, principally those expenses related to the agency's administration of the contractor and the attendant service, can be significant and, in some cases, may range from 25 percent to 50 percent of direct service costs.

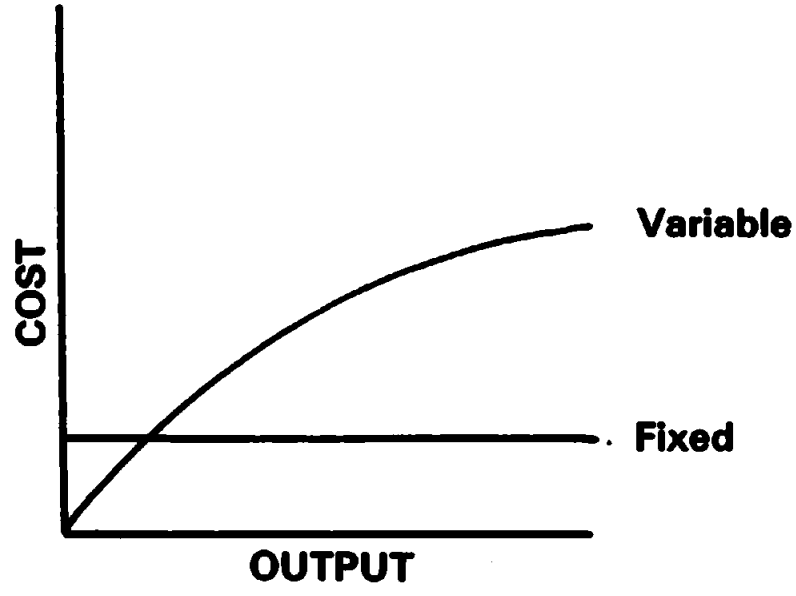
Fully-allocated costs can be categorized into fixed and variable costs (exhibit 1).

- Fixed costs are those which do not vary with the level of service provided. In most transit systems, such costs are unchanged with respect to the number of hours, miles, or vehicles operated. Fixed costs typically include such items as administrative salaries and building rents.

- Variable costs are those which vary with the amount of service provided. These expenses typically include fuel, driver wages, and a host of other operating costs.

The transit industry is relatively labor-intensive (particularly since other governmental agencies provide the bulk of funds for capital expenditures) and, for

EXHIBIT 1. FIXED AND VARIABLE COST



- *Fixed costs* **do not vary with the amount of service provided (e.g., administrative salaries)**
- *Variable costs* **change relative to the amount of service provided (e.g., drivers' wages)**

that reason, most costs tend to be variable. Typically, variable costs account for about 70 percent to 95 percent of total transit system operating expenses while fixed costs represent the remaining 5 percent to 30 percent of operating costs in most public transit agencies.

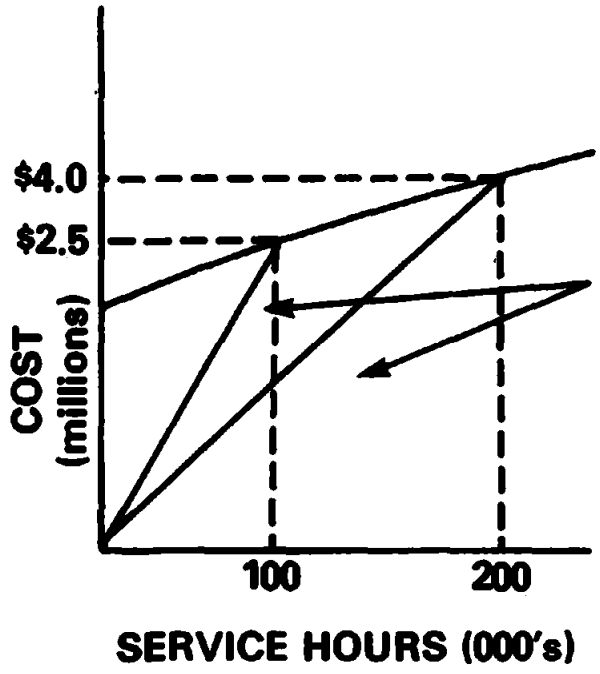
Some transit agencies are not cognizant of the differences between fixed and variable costs and, as a result, they use a fully-allocated cost approach to assess the costs associated with a change in service. Known as simple average costing, this method involves looking at total operating cost in comparison to the level of service offered (exhibit 2). As shown, average cost is merely the ratio of total operating costs to the number of miles, hours, or vehicles scheduled. Simple average cost is a relatively easy number to derive and apply, but

- it does not give consideration to the differences that may exist among the services offered by the agency. As shown in exhibit 3, the derived cost per hour for each route is considerably different because of the dissimilar operating speeds displayed by each of the lines. This disparity is also reflected in the cost estimates for providing new service. The range in the cost estimates—from $288 on Route A to $480 on Route B—seems illogical under the assumption that transit service is labor-intensive. This problem can be obviated somewhat by developing an equation which allocates costs on the basis of both the miles and hours of operation, but,

- use of average costing may still overstate the impact of a prospective change in operations since this technique overlooks the fact that transit systems have both fixed and variable costs. While most transit-related costs are variable, the use of average costing presumes that all costs vary with a change in the level of service provided. Since fixed costs remain unchanged and may represent from 5 percent to 30 percent of total system operating expenses, average costing will overstate the impacts of a prospective change in service by a commensurate amount.

Because of the problems in using average costing to forecast changes in the level of service, it is necessary to explore another cost concept which puts greater emphasis on only those costs which are likely to change with an increase or decrease in output.

EXHIBIT 2. AVERAGE COST



$$\text{Average Cost} = \frac{\$2.5\text{M}}{100.000 \text{ hours}} = \$25.00 \text{ per hour}$$

$$\text{or} \quad \frac{\$4.0\text{M}}{200.000 \text{ hours}} = \$20.00 \text{ per hour}$$

$$\text{Average Cost} = \frac{\text{Total Operating Cost}}{\text{Units of Output}}$$

EXHIBIT 3. AVERAGE COST AND CHANGES IN SERVICE

1. System cost:	$ 4 per mile
2. Speed:	
Route A =	9 mph
Route B =	15 mph
3. Cost per hour:	
Route A =	$ 4 per mile x 9 mph = $36
Route B =	$ 4 per mile x 15 mph = $60
4. Cost of adding 8 hours of service:	
Route A =	$36 per hour x 8 hours = $288
Route B =	$60 per hour x 8 hours = $480

Incremental Cost

While fully-allocated cost is useful in allocating the deficits of service, incremental cost is normally used when it is necessary to estimate the impacts of a change in service. This concept is also useful in assessing the changes in cost associated with contractor-provided service.

Incremental costs may be divided into two categories:

1. Those that vary continuously with a change in service (exhibit 4). Fuel cost is an example of a cost which varies continuously. For each additional mile operated, there is a corresponding increase in fuel cost.

2. Those that vary non-continuously in a step-wise fashion (exhibit 4). Supervision cost is an example of a cost which varies in a step fashion. Supervisory levels are normally fixed for a given range of service. Once that level of service is exceeded, another supervisor would be added.

The classification and use of incremental costing can sometimes pose problems for those responsible for preparing cost projections. For example:

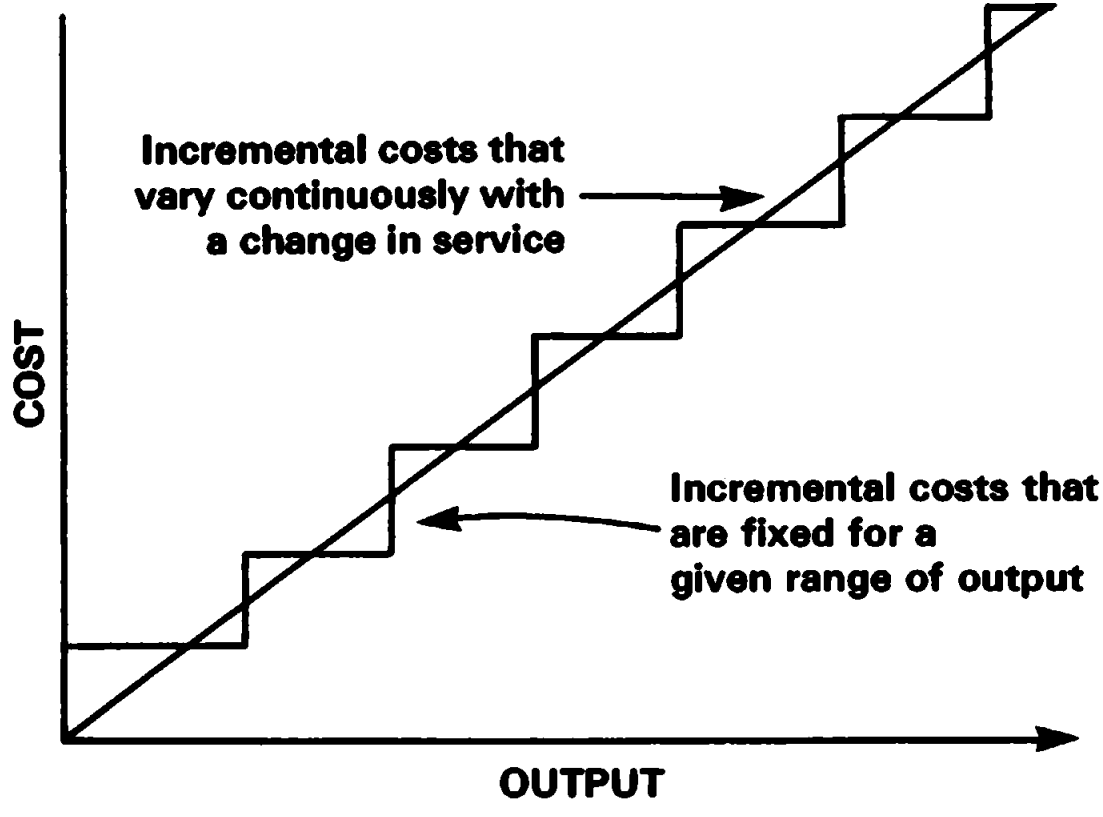
- Some costs cannot be easily classified as being either "continuous" or "step-wise" expenses. An example is driver expenses. A small increase or decrease in service may or may not influence driver costs depending on the labor agreement and the provisions governing pay to the agency's drivers.

- "Step-wise" costs are particularly difficult to examine when making forecasts, mainly because a typical agency cannot easily identify its position within a governing range of output (i.e., is the agency on the low, middle, or high end of the plateau?). In fact, it may be postulated that the range in output, itself, is changing in response to today's constrained operating environment (i.e., staff is being asked to handle an increasing workload).

Since the application of incremental costing is not exact, it is imperative that discretion and professional judgment be used in determining what costs and the level of such costs that should be included in evaluating the cost of a service change.

EXHIBIT 4. INCREMENTAL COSTS

1. Vary *continuously* with a change in service; or
2. Vary noncontinuously in a *step* fashion



A cost allocation technique that distinguishes between variable and fixed costs may be developed to assess the incremental costs associated with a change in service. As shown in exhibit 5, a relationship can be developed by assigning section 15 accounts to vehicle hours, vehicle miles, and peak vehicles. Then, the number of vehicle hours, vehicle miles, and peak vehicles can be determined and resultant cost coefficients can be derived.

EXAMPLES

Several examples follow which illustrate the use of incremental costing for assessing the merits of offering service using private transit providers. The first example involves a small change and a replacement of conventional service with contractor-provided paratransit service. The second example involves a major expansion in service and the possible use of private enterprise to offer the service in recognition of budgetary limitations faced by the agency.

Example One

In response to continuing financial concerns, a transit system wishes to reduce off-peak service on a lightly-utilized route and to offer contractor-provided paratransit service to supplement operations in the affected area. What is the cost saving associated with using a private transit firm to provide this supplemental service? (It is assumed that attrition will provide assignments for displaced transit workers and that a possible section 13(c) challenge will be successfully met by the transit agency.)

Solution to Example One

The solution to this example consists of proceeding through the following six steps:

1. Collect current and forecast prospective annual operating data for the affected route.

EXHIBIT 5. COST ALLOCATION TECHNIQUE

Section 15 Reporting System Level R	Basis for Assignment		
	Variable Cost Items		Fixed Cost Items
FUNCTION AND EXPENSE OBJECT CLASSES	VEHICLE HOURS	VEHICLE MILES	PEAK VEHICLES
501 LABOR			
010 Vehicle Operations	X		
041 Vehicle Maintenance		X	
042 Nonvehicle Maintenance	X		
160 General Administration			X
502 FRINGE BENEFITS			
010 Vehicle Operations	X		
041 Vehicle Maintenance		X	
042 Nonvehicle Maintenance	X		
160 General Administration			X
503 SERVICES			X
504 MATERIALS AND SUPPLIES			
010 Vehicle Operations		X	
041 Vehicle Maintenance		X	
042 Nonvehicle Maintenance		X	
160 General Administration			X
505 UTILITIES			X
506 CASUALTY AND LIABILITY COSTS		X	
507 TAXES			
010 Vehicle Operations		X	
041 Vehicle Maintenance		X	
042 Nonvehicle Maintenance	X		
160 General Administration			X
508 PURCHASED TRANSPORTATION		X	
509 MISCELLANEOUS EXPENSES			X
511-16 TOTAL RECONCILING ITEMS			X

	Current	Proposed	Change
Vehicle Hours	11,700	9,200	(2,500)
Vehicle Miles	151,600	119,000	(32,600)
Peak Vehicles	4	4	none

2. Develop a cost allocation technique that includes both variable and fixed costs.

$$C = \$20.00H + \$1.00M + \$25,000V$$

where:

C = Cost
H = Vehicle hours
M = Vehicle miles
V = Peak vehicles

3. Determine the incremental or avoidable cost of reducing off-peak service.

	Unit Cost	Change in Operating Statistic	Total Cost
Vehicle Hours	$ 20.00	(2,500)	($ 50,000)
Vehicle Miles	1.00	(32,600)	(32,600)
Peak Vehicles	25,000	none	
		Total	($ 82,600)

No changes in "fixed" costs are assumed to occur in this solution since the change is considered relatively minor and is expected to impact only those costs related to the hours and miles of service.

4. Develop a cost technique associated with contractor-provided service.

$$C = \$20.00\ H$$

where:

C	=	Cost
$20.00	=	Contractor rate per hour using agency-owned vehicles
H	=	Vehicle hours

5. Determine the added cost of contractor-provided service.

	Unit Cost	Change in Operating Statistic	Total Cost
Vehicle Hours	$ 20.00	3,000	$ 60,000

It was assumed that the form of paratransit service to be provided would require more hours than the service that would be replaced.

6. Determine the resultant cost saving using contractor service.

Cost avoided (agency service)	$ 82,600
Cost added (contractor service)	-60,000
Cost saving	$ 22,600

This example suggests that this transit agency could save an estimated $22,600 during the first year of operation by using a private transit firm to provide a partial replacement of off-peak service in the affected corridor. The cost saving projected is entirely attributable to the lower cost structure enjoyed by the private transit provider in this case.

Example Two

The same transit agency wishes to institute a system of peak period express service but, because of budgetary limitations, it is also considering the use of private transit providers. What are the costs of providing this service under both operating schemes?

Solution to Example Two

The solution to example two requires moving through the following six steps:

1. Collect current and forecast prospective annual operating data for the new express service system.

	Current	Proposed	Change
Vehicle Hours	none	15,300	15,300
Vehicle Miles	none	382,500	382,500
Peak Vehicles	none	20	20

2. Develop cost allocation technique that includes both variable and fixed costs.

$$C = \$20.00H + \$1.00M + \$25{,}000V$$

where:

C	=	Cost
H	=	Vehicle hours
M	=	Vehicle miles
V	=	Peak vehicles

3. Determine the transit agency cost of providing new express service.

	Unit Cost	Change in Operating Statistic	Total Cost
Vehicle Hours	$ 20.00	15,300	$ 306,000
Vehicle Miles	1.00	382,500	382,500
Peak Vehicles	12,500	20	250,000
		Total	$ 938,500

Some changes in "fixed" costs are envisioned because of the quantum increase in service to be offered. A thorough review of the agency's accounting system indicates that some overhead costs are likely to increase including marketing (both staff and promotion expenses) as well as operations planning (staff for service planning and scheduling). These additional costs are expected to total $250,000 during the first year of service.

4. Develop a cost technique associated with contractor-provided service.

$$C = \$20.00\ H + \$250,000$$

where:

C	=	Cost
$20.00	=	Contractor rate per hour using agency-owned vehicles
H	=	Vehicle hours
$250,000	=	Agency overhead expenses expected to accompany the new service

An increase in agency overhead expenses is anticipated even if service is to be operated by a private transit provider since overall administration of the new service will remain a responsibility of the agency.

5. Determine the contractor cost of providing new express service.

	Unit Cost	Change in Operating Statistic	Total Cost
Vehicle Hours	$ 20.00	15,300	$ 306,000
Fixed Costs	--	--	250,000
		Total	$ 556,000

6. Determine the resultant cost saving using contractor service.

Cost (agency service)	$ 938,500
Cost (contractor service)	-556,000
Cost saving	$ 382,500

Should the transit system decide to use private enterprise to operate the proposed express service system, this example suggests that the agency could save approximately $382,500 during the first year of service. Here again, the savings are primarily related to the lower cost structure enjoyed by the private transit provider. In this case, fixed costs are expected to increase regardless of the selected mode of operation.

CONCLUSIONS

Three conclusions emerge from the foregoing review of fully-allocated costing and incremental costing and their applications in assessing the viability of contract service:

1. Fully-allocated costing is the proper technique to employ in order to allocate the full costs (and/or deficits) of agency-operated service. In most instances, however, fully-allocated costing (or a related technique such as average costing) should not be used to estimate the costs associated with changes in service.

2. Incremental costing is the preferred technique to use in evaluating the costs accompanying a change in service. In this manner, it is important to determine the net costs that are likely to be incurred (or avoided) by an agency in continuing an existing service or providing a new service using private contractors.

3. Judgments and special analyses may be required to determine what costs and the level of costs that should be considered in assessing the resource impacts associated with a change in service.