AID TO PRIVATE TRANSPORTATION PROVIDERS
- A WORKING PAPER -

by

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Research Economist

(The opinions, findings, and conclusions expressed in this
report are those of the author and not necessarily those of
the sponsoring agencies.)

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Preface

This working paper on aid to private transportation providers in Virginia was prepared for the Public Transportation Division. Within the three-week period in which it was prepared, little more than a cursory examination could be made of the number of private providers operating in Virginia; however, it was possible to raise a number of pertinent questions about subsidizing them. The reader should be cautioned that the case for subsidizing private providers is not a strong one. Aside from the difficult questions raised in the section of the paper entitled Is There an Economic Case for Subsidizing Private Providers?, the problem of defining a "private provider" opens the granting agency to a great deal of criticism in any decisions it might make about excluding certain classes of operators from subsidies. Furthermore, it should be pointed out that the author has strong reason to believe that the inventory of private providers he was able to obtain is quite incomplete, and therefore underestimates by a large measure the number of potential recipients of subsidies.

2018

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This paper addresses the subject of state aid to private
transportation providers, where "private providers" is defined
to include subscription buses, vans, or other paratransit
firms which receive no subsidies of any kind and which operate
on either a profit basis or a break-even basis from the revenue
generated by fares. While the analysis presented is an initial
one the paper discusses major aspects of several key issues
surrounding its subject. These issues, which are addressed in
the order listed, are:

1. The appropriateness of considering state
   aid to private providers,

2. the number of private providers and the
   markets served in Virginia, and

3. the case for state aid to private providers
   from the standpoint of economic efficiency.

AID TO PRIVATE PROVIDERS AS A GOAL

This issue must be addressed first in order to establish
that the subject being examined is an appropriate concern of
the Virginia Department of Highways and Transportation. Several
reasons may be provided as support for an answer in the
affirmative. First, the creation of a Public Transportation
Division suggests a desire to foster group transportation
modes. Secondly, the Department is already providing adminis-
trative and planning assistance to localities (particularly
urban areas) that are attempting to enhance their local
transportation systems. Thirdly, the Department, through the

Public Transportation Division, has a responsibility to
promote group transportation statewide; this responsibility
includes examining previously unused methods of fostering
group transportation where traditional techniques may not be
the best in the long run. In the case at hand, the concern
about private providers is that they may be providing a worth-
while service but, due to cost crunches, will in the near
future cease to operate. The question which arises then is
twofold: Is there an alternative supplier? And if not, What
role will the Commonwealth play in the long term in assuring
that the goal of providing a balanced transportation system
statewide is met? More to the point, Might the cessation
of operations by some private providers in the long term
require the Commonwealth to assume a greater role in transit
assistance as compared to an early commitment to aid private
providers?

In light of the above, it is clearly appropriate to
examine the topics of aid to private providers.

THE IMPORTANCE OF PRIVATE PROVIDERS

Economically, the importance of private providers is
dependent on the number and kinds of markets that are being
serviced by them. Accordingly, in this section of the paper,
private providers are classified by the type of market served —
commuter market, freight market, intercity market, or a
combination of these.

Through telephone contacts, planning district commissions
(PDCs) were determined as being the most appropriate source
of information about private providers in Virginia localities.*
To the extent that the information was available, it is briefly
summarized in the immediately following text and is presented
in more detail in Table 1.

In the course of trying to develop an inventory of private
transportation suppliers, the author drew several conclusions
which he believes are important to any future policy consider-
ations about aid to private providers. First, the task of
developing the inventory is quite tedious and time-consuming.

*The SCC records are an alternate source; however, not all
 private providers are registered and some are registered
 but don't operate.

In fact, a number of the PDCs are working, along with consult-
ants, on developing transportation plans which include the
private market; however, their experience has been less than
satisfactory, largely due to a lack of cooperation on the part
of the parties being surveyed. Secondly, even among PDCs
that apparently provided good records, the author and some of
his colleagues were aware of operations which might be classi-
fied as private providers which were not included in the PDC
list. More to the point, the information in Table 1 has a
great probability of being inaccurate in the sense that only
the better known operators are included. Consequently, were
each PDC to complete an intensive inventory process, it is
quite likely that numerous single operators would be discovered,
thus rendering the policy question of how many might be affected
by state subsidies much broader than might be concluded from
the information in Table 1.

Nevertheless some summary notes based upon the contents
of Table 1 are in order. In the rural areas, the private
provider market appears to be largely intercity freight and
charter service with passenger hauls being subsidized by
freight revenue. Where passenger ridership is high, the market
being served is usually the commuter trips to work from the
outlying rural areas and suburbs to major employers in the major
city of a region. This type of commuter market is exhibited
in Northern Virginia, in the Danville/Martinsville region, in
Fredericksburg, and in Tidewater and Petersburg. Based only
upon the data available and the author's best judgement from
the trend of the data, the private supplier market appears to
be a highly specific, low capital budget, commuter work trip
market which is operating quite efficiently even in the
absence of aid.

Table 1

Private Provider Markets by State Planning District
To the Extent Information Is Available

District	Area Served	Number Companies*	Markets Served
1	Lee, Scott, and Wise Counties	1 - Bristol/Jenkins	2 routes - freight and charter only- No cummuters
2	Buchanan, Dickinson, Russell, and Tazewell Counties	4 - Trailways; Black & White Transit Clearfork Commun. Assoc. Bristol/Jenkins	Trailways - intercity B & W intercity & freight as well as charters passenger revenue very low - subsidized by freight largely intercity, very low local passen- ger revenue

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Table 1 (cont'd)

District	Area Served	Number Companies*	Markets Served
3	Washington, Smyth, Bland, Wythe, Carroll, and Grayson Counties	7	Not available (NA)
4	Floyd, Giles, Montgomery, and Pulaski Counties	2	Fixed route intercity
5	Alleghany, Botetourt, Craig, and Roanoke Counties	1 - Pendleton Lines	4 fixed local routes getting about $10,000 subsidy per year - very old equipment
6	Bath, Highland, Augusta, Rockbridge, and Rockingham Counties		NA
7	Clarke, Warren, Page, Shenandoah, and Frederick Counties		NA
8**	Loudoun, and Price William Counties	5 - Greyhound, Trailways, Gray Line, Colonial Transit, VIP Commuter Corporation-all operate subscription buses; 3 companies operate airport services; there are two van-pool operations; 1 shared-ride taxi prior to Sept. 1, 1978	largely commuter service from D. C. suburbs
9	Orange, Madison, Culpeper, Rappahannock, and Fauquier Counties		NA
10	Nelson, Buckingham, Fluvanna, Louisa, and Albemarle Counties, and Charlottesville		NA

Table 1 (cont'd)

District	Area Served	Number Companies*	Markets Served
11	Bedford, Campbell, Appomattox, and Amherst Counties	3 - bus: Greyhound, Trailways; Lynchburg bus service 1 new subscription co Billy's Transport Service	largely fixed route intercity little commuter except Billy's Transport
12	Franklin, Patrick, and Pittsylvania Counties, and Martinsville and Danville	2 - Private companies Danville Traction & Power Danville and Martinsville Bus Line (D and M)	Only D and M has a sizeable ridership - 2 routes 90 riders commuting to Dan River Mills
13	Halifax, Mecklenburg, and Burnswick Counties	NA	None
14	Charlotte, Lunenburg, Nottoway, Prince Edward, Amelia, Buckingham, and Cumberland Counties	NA	None
15	Powhatan, Goochland, Henrico, Charles City, Chesterfield, Hanover, and New Kent Counties, and Richmond	3 - Check VDHT files for details	Check VDHT files
16	Caroline, Spotsylvania, Stafford, and King George Counties, and Fredericksburg	Including Greyhound & Trailways, there are 5. Colonial, Andrews, and Way are the others	Andrews and Way serve specialized markets to commuter to FMC Corporation and Fort Belvoir. Colonial serves largely the commuter market to D. C. - 11 schedules and 6 schedules to Dahlgren Weapons Lab.

Table 1 (cont'd)

District	Area Served	Number Companies*	Markets Served
17	Westmoreland, Northumberland, and Lancaster Counties and Richmond	NA	NA
18	King William, Gloucester, Matthews, Middlesex, King & Queen, and Essex Counties	NA	NA
19	Dinwiddie, Sussex, Surry, Prince George, and Greensville Counties, Petersburg, Hopewell, Emporia, and Colonial Heights	There are 69 employee haulers registered with the SCC. They operate 85 vehicles	Commuter markets (largely vans - small buses)
20	Norfolk, Portsmouth, Va. Beach, Chesapeake, and Suffolk	18 employee haulers covering 25 routes - operate 27 buses, 9 vans, 1 wagon	Commuter to Shipyards
21	James City and York Counties, and Hampton and Williamsburg	NA	NA
22	Accomack and Northampton Counties	1	Commuter market to chicken processing factory

*Taxis are not included

**Because of the large number of subscription buses operating in Northern Virginia, an extensive listing is included in Appendix A.

IS THERE AN ECONOMIC CASE FOR SUBSIDIZING PRIVATE PROVIDERS?

In a 1976 issue of Traffic Quarterly, this author analyzed in detail the conditions necessary for an economic justification of transit subsidies.[1] The analysis presented there is applicable to the question of aid to private providers as well.

Arguments for subsidies in the transit market can be placed into five major classes: (1) arguments related to altering the distribution of income; (2) arguments based on "infant industry" considerations; (3) arguments based on emotional appeal; (4) arguments aimed at correcting inefficiencies in the transit market; and (5) arguments for external benefits.

Only those arguments falling in the last two categories can be proven to be sound economic justification for subsidies.[2] While those arguments are not reiterated here, it is useful to outline them briefly. In regard to correcting inefficiency in the transit market, economists have long recognized that by setting the price of each unit of output equal to the incremental cost of producing that output, each firm will not only maximize profits but will also produce that level of output consistent with the output demanded by society. In such cases, each firm is said to be operating efficiently. However, when an industry is characterized by increasing returns to scale (as is frequently the case with transit), the cost of supplying each successive unit of output is less than that of the previous unit. If efficiency is to be achieved, unit price must be set equal to the incremental cost of production; however, the firm won't be able to cover average production costs when it sets fares on that basis. The answer then is to subsidize the firm for the difference between average costs and prices consistent with an efficient level of output. Turning to the externalities argument, it is justifiable, on economic grounds, to subsidize forms of transit in order to reduce pollution and congestion, conserve energy, and reduce traffic accidents due to congestion; however, the externalities argument has been shown by this author an being weaker than arguments for subsidies based on efficiency grounds.[3]

Within the confines of these arguments, the case for aid to private providers, while a weak one, cannot be denied. A truer test of a case for aid to private providers requires, however, that one expand the discussion to the following questions:

1. Is the market for private providers of passenger transportation large enough to warrant raising the question of aid?

2. Are existing firms in such financial difficulty that they are likely to cease operation?

3. If, in fact, some forms of private providers did cease operations, would that cessation imply necessarily a long run reduction in the desired supply of group transportation?

By examining these questions, the author hopes to at least provide decision makers with relevant information with which to make an initial informed appraisal about aid to private providers. Now each question is taken in turn, the text being kept as brief as possible.

First, the inventory provided in Table 1 and summarized previously certainly indicates that private transportation providers are supplying a market that cannot be ignored. Considering that Virginia is not densely populated, it is in fact remarkable that private providers operate to the extent that has been shown. Second, regarding the question of the financial difficulty existing providers are experiencing, a well-founded answer is simply not available at this time. The information that is available is mixed; however, this writer must point out that while some providers have lost ridership, others (like Billy's in Lynchburg) have originated and grown under identical cost conditions. This market behavior suggests that where firms have failed, the market has not been available to support them. Furthermore, private providers have had no monopoly on loss of ridership and declining revenues — subsidized companies frequently have experienced the same difficulties. Third, and perhaps most importantly, would a cessation of some forms of private providers necessarily imply a long run reduction in the desired supply of group transportation? At best, the answer is not clear. If one will accept that the costs of private automobile ownership and particularly operating costs might reasonably be expected to rise relative to the costs of some of the recently initiated private provider programs, then new forms of private providers (where the demand exists) may take the place of the more traditional fixed route 40 passenger diesel buses.* The number of private employee haulers registered in the 19th PDC certainly attests to the fact that in some areas the market is strong enough to support a large number of haulers even though many operate only one vehicle.

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*As an excellent example, see Appendix C for a description of Billy's Transport Service in the Lynchburg area.

On the other hand, the inventory presented earlier clearly shows a wide variance in the demand for private providers across the state. In the areas of weak demand, it may well be the case that under a cost crunch the cessation of one private provider will actually reduce supply in the long run, because the market simply isn't large enough to initiate a new firm even though there are some who would be willing to pay for service. Where such market conditions can be identified, and where it is likely that in the long run the Commonwealth would become involved administratively either through helping to get federal grants or participating in providing services through a public company, it may indeed be prudent to provide aid to avoid such long run involvement. Furthermore, only where it can be ascertained that existing private service is significant or is financially floundering and unlikely to continue in the long run, and it is likely that the Department would become involved (along with federal participation) after the private company's demise, may financial assistance to keep the private company operating be reasonable public policy.

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References

1. G. R. Allen, "An Analysis of Sudsidy Issues in Public
    Transportation", <u>Traffic Quarterly</u>, Volume 30 no. 4
    (October 1976) pp. 595-614.   (See Appendix B)

2. <u>Ibid</u>. p. 598.

3. <u>Ibid</u>.

APPENDIX A

DETAILS OF PRIVATE PROVIDERS
IN NORTHERN VIRGINIA

SUBSCRIPTION BUSES
Monday-Friday (other than holidays)

NVTC
August, 1978

Company	Service From	Trips	Fares	One-way Trip Daily Ridership	Equipment	Remarks
GREYHOUND Mr. Brisebois 289-5130	Leesburg	1 inbound AM, 1 outbound PM	10-ride ticket, $19.75	60	46-pass. Intracity bus	To and from downtown DC with a few Northern Virginia stops.
TRAILWAYS Mr. Nicol 393-6670	Warrenton-Manassas-Kamp Washington (Fairfax City)	7 inbound AM, 6 outbound PM	10-ride ticket, $21/Warrenton $16.50/Manassas $9.75/Kamp Wash.	500	"	"
GRAY LINE 347-6000	Fairfax City	8 inbound AM, 7 outbound PM	$1.10 one way with tickets purchased from City outlets. $1.30 one way non-resident.	700	44-53 pass. city buses	"
	Greenbriar	1 inbound AM, 1 outbound PM	Unknown - up to bus committee	100	" "	" "
	Sterling Park/Sugarland	5 inbound AM, 5 outbound PM	" " " "	400	" "	" "
	Mantua (near Fairfax Circle)	2 inbound AM, 2 outbound PM	" "	200	" "	" "
VIP COMMUTER CORP. (703) 670-4705	Dale City	1 inbound AM, 1 outbound PM	10 rides $13.75	20	15-pass. minibus	To Pentagon and nearby Northern Virginia locations.
COLONIAL TRANSIT (Dumfries) Mr. Rider or Mr. Fitzhugh 380-8600	Fredericksburg-Pentagon	3 inbound AM, 3 outbound PM	10 rides $14.50-$15.70	190	148 bus fleet. 38-49 pass. buses	Picks up along Rt. 1 to Dumfries.
	Fredericksburg-Crystal City	1 inbound AM, 1 outbound PM	"	92	"	"
	Fredericksburg-Rosslyn	" "	"	78	"	"
	Woodbridge - Pentagon	5 inbound AM, 5 outbound PM	10 rides $9.60.	348	"	Nonstop.
	Dale City-Pentagon	9 inbound AM, 9 outbound PM	" "	738	"	"
	Lakeridge-Pentagon	4 inbound AM, 4 outbound PM	" "	324	"	"

Company	Service From	Trips	Fares	Daily Ridership	Equipment	Remarks
Colonial Transit-con't.	Lakeridge-Rosslyn	1 inbound AM 1 outbound PM	10 rides $9.60	98	148 bus fleet. 38-49 pass.buses	Nonstop
	Dale City-Rosslyn	" "	" "	70	" "	"
	Dale City - Crystal City	" "	" "	94	" "	"
	Lakeridge - Crystal City	" "	" "	106	" "	"
	Lakeridege-Dale City-Crystal City	2 inbound AM 2 outbound PM	" "	200	" "	"
	Dale City-Nasslf Bldg.-Arlington Hall.	1 inbound AM 1 outbound PM	" "	56	" "	"
	Manassas-Pentagon	" "	10 rides $11.00	98	" "	"
	Warrenton-Manassas-Pentagon	" "	10 rides $11.00-$13.65	94	" "	"
	Warrenton-Centre-ville-Pentagon	" "	10 rides $10.50-$11.00	46	" "	"
	Dale City-Wash-ington, D.C.	25 inbound AM 25 outbound PM	10 rides $11.00	1,936	" "	"
	Lakeridge-Wash-ington, D.C.	7 inbound AM 7 outbound PM	" "	700	" "	"
	Lake of the Woods-Washington, D.C.	3 inbound AM 3 outbound PM	10 rides $16.90-$21.75	286	" "	Picks up along Rt. 3.
	Servicetown (Fal-mouth)-Wash.,DC	" "	10 rides $16.20	252	" "	Nonstop.
	Reston-Pentagon	2 inbound AM 2 outbound PH	Up to bus captain	144	" "	"
	Reston-CIA-Wash., DC	" "	" "	144	" "	"
	Reston-Washington, DC	34 inbound AM 34 outbound PM	" "	2,448	" "	"
	Triangle-Wood-bridge-DC,via Rt.1	11 inbound AM 11 outbound PM	10 rides $11.15-$14.75	1,066	" "	Picks up along Rt. 1.

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AIRPORT SERVICES

Company	Service	Cost to User	Operating Hours	Equipment	Daily Ridership	Remarks
Greyhound, Airport Service Mr. Donahue, 783-3215	26 trips a day, Dulles to National. 27 trips a day, DC to Dulles. 48 trips a day, DC to National.	$4.25 one way, Dulles to Natl. or DC. $2.75 one way, DC to National.	Operating hours of airport.	47-pass. buses except DC-Natl. 11-pass. stretched limousines, DC to National.	182 Dulles-Natl. 248 DC-Dulles. 206 DC-Natl.	Ave. No. of passengers carried per Dulles-National trip=7. No. carried DC-Dulles=9. DC to National=4. 14 of the Dulles-National trips go through Rosslyn. Will soon start serving Rosslyn Metro Station.
Airport Limo, Inc. 243-5466	Demand service on 12 routes from Dulles & Natl. Serves motels that do not have own shuttle service, throughout No. Va. as far south as Dumfries.	From $1.-8.50, one way	"	14 11-passenger vans	200	
Grooms Transportation (Richmond) 804-222-7222	Provides limo & bus service between Richmond-Fredericksburg-National Airport.	$13 to Richmond $8 to Fredericksburg.	13 round trips a day Sun-Fri. 4 round trips on Saturday.	12 8-passenger stretched limos, 4 39-passenger buses.	90	

NVTC
August, 1978

VAN POOL PROGRAMS

Sponsor and ownership of van(s)	Service	Vans	Daily Ridership	Cost to User	Remarks
Reston Commuter Bus, Inc. Mrs. Anderson, 437-7800	Reston-Pentagon-Crystal City	2 12-pass.	20-22	Approx. $42/mo.	At one time operated an additional van to Bethesda. Dropped for lack of riders.
Alan M. Voorhees & Associated Mr. Capelle, 893-4310	Reston-McLean	1 12-pass.	10-12	Approx. $26/mo.	At one time operated 3 vans. Cut back due to lack of riders.

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APPENDIX B

AN ANALYSIS OF SUBSIDY ISSUES IN
PUBLIC TRANSPORTATION

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An Analysis of Subsidy Issues in Public Transportation

GARY R. ALLEN

Mr. Allen is a research economist with the Virginia Highway and Transportation Research Council. He received his B.A. degree in economics from Berea College and is now completing the doctoral program in the James Wilson Department of Economics at the University of Virginia. Mr. Allen is also an instructor in economics with the University of Virginia School of Continuing Education and is a lecturer at Piedmont Virginia Community College.

MOST economists agree that in the case of public goods government intervention in the market system is desirable. Where it is extremely costly to confine the benefits of the good to selected persons and therefore extract the necessary payment from them, the government can supply the good at a price equal to zero. The most often cited case fitting these characteristics is national defense. There are numerous other examples, as well: maintaining a police force, fire department, and other service agencies; cleaning and repairing streets; and operating school systems.

In addition to the public goods or near public goods case, there are situations in which the market system may not be able to extract from consumers a price high enough to cover costs of production. One of the most widely recognized examples is the public transit industry during the last decade. Ronald J. Fisher of the Urban Mass Transportation Administration has succinctly described this situation: "It is widely recognized that insufficient funds are being generated by the users of urban transit systems to cover operating expenses and capital improvements. Unless additional outside sources of funding are developed, urban transit systems will gradually disappear. If there is justification for continuing the existence of urban transit systems in American

cities, mechanisms are needed for implementing an operating expense subsidy." [1]

Although the proposal of offering operating subsidies [2] has received relatively little sympathy until recently, it is not unusual to find that allocations from construction and maintenance funds of state departments of transportation (DOTs) are frequently made in the form of capital grants to public transit firms and/or authorities. The 1974 National Mass Transportation Assistance Act (NMTA) [3] explicitly provides funds for operating subsidies. Of the $11.8 billion provided by the act, approximately $4 billion can be used for capital or operating programs. The state of Virginia is not atypical in this respect. For example, the legislature for the 1974-1976 biennium has enacted legislation that brought the total appropriation for mass transit in Virginia during the period July 1, 1974 to July 1, 1975 to $18 million.[4]

The growth in allocations from highway construction and maintenance funds in the various DOTs to provide for capital grants to public transit appears to be indicative of a continuing trend. It is to be expected that transit operating subsidies will receive increasing attention and application since the passage of the 1974 NMTA. Thus it is appropriate to analyze from both a theoretical and a practical standpoint the problems and prospects of mass transit subsidies.

SUBSIDY AND THE SUPPLY OF PUBLIC TRANSIT: HOW STRONG A CASE?

A logical first step in determining the extent to which a case can be made for transit subsidies of any type is to define what a subsidy is and to show how it alters the equilibrium price and output of the good or service to be subsidized.

Figure 1 represents the market supply and demand for a

1. "Issues in Public Transportation," *Special Report 144* (Washington, D.C.: Transportation Research Board, 1970), p. 30.

2. The purpose of this article is to discuss transit subsidies. However, another solution to the transit financing problem would be to increase (shift) the demand curve to a range where average costs may be closer to or below marginal costs.

3. Public Law 93-88 (stat. 1565).

4. *Virginia Highway Bulletin,* Office of Public Relations, Virginia Department of Highways and Transportation, Richmond, Virginia. March 1974, June 1974.
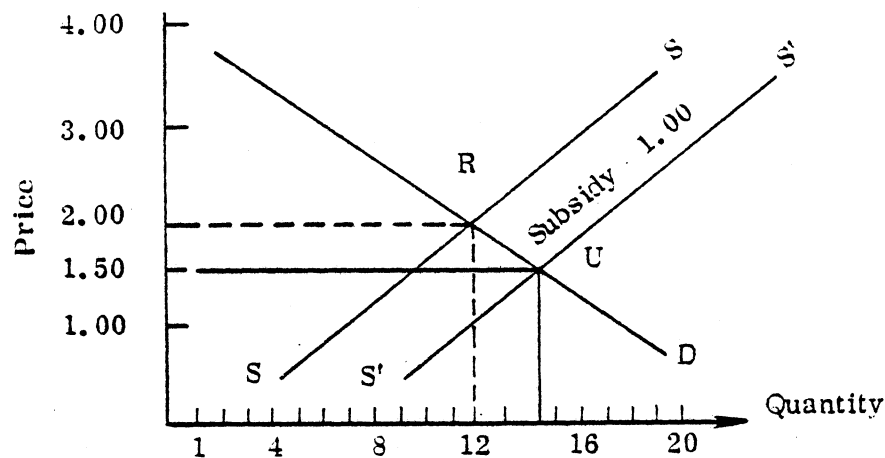
Figure 1. Effect of subsidy on price and quantity

The Effect of Subsidy on the Level of Supply and Output

good called widgets. If S (in Figure 1) is the supply curve and D the demand curve, then the market price is defined as equal to $P^\bullet = \$2.00$ and the quantity sold = 12 widgets. If the government deems it desirable to increase the number of widgets being sold to the public because they positively influence people's health, granting a per-unit subsidy to the widget producer could aid in achieving this end. A per-unit subsidy is defined as a fixed amount payable to a producer or consumer for each unit produced or purchased. The per-unit subsidy as shown in Figure 1 equals $\$1.00$, which means that for each unit of widgets sold the producer gets $\$1.00$ of added revenue from the government. In effect, this per-unit subsidy shifts the supply curve vertically downward from S to S' because at all levels of output the supplier of widgets is willing to accept a smaller price from the consumer. In other words, a given quantity will be supplied at a price lower than would have been necessary to call forth the same quantity prior to the subsidy. Also from Figure 1, at point U it can be seen that after the granting of the subsidy the buyer purchases a greater number of widgets (14) at a lower price ($\$1.50$ instead of $\$2.00$). It is important to note that the market price of the subsidized good is not reduced by the full amount of the sub-

sidy. Only in the special case where demand is perfectly inelastic would the price to the consumer fall by the amount of the per-unit subsidy.

Why Grant a Subsidy?

The description of how a subsidy alters the market price and output of a good or service is straightforward. Nevertheless, one may reasonably question whether there is any justification for subsidies. There are a number of reasons cited for using government money to bolster public transit firms that are in financial difficulty. Most, however, tend to be weak arguments based on less than purely economic grounds. One can classify arguments given by transit subsidy proponents into five major classes: (1) arguments related to altering the distribution of income; (2) arguments based on "infant industry" considerations; (3) arguments based on emotional appeal; (4) arguments aimed at correcting inefficiencies in the public transit market; and (5) arguments for external benefits.

Arguments Related to Altering the Distribution of Income. Frequently, subsidies to either transit riders or firms are suggested because increasing fares hit hardest the poor and elderly of inner cities. This alleged inequity is often reduced by providing discount rates for transit riding to worthy groups who have little access to other forms of transportation. According to some authors, a well-defined political consensus has been established on the desirability of such practices.[5] Such an argument raises some serious questions, however. First, who will define what a worthy group is and how will he do so? And second, even if it is decided that those below a certain level of income or above a certain age deserve to have money redistributed to them, it is doubtful that subsidizing their ridership on public transit is the best means of achieving such a redistribution. A stronger case can be made for simply increasing the income of the members of the group and allowing them to decide how they wish to spend the added income. In Canada, for example, where sub-

5. J. R. Meyer, J. F. Kain, and M. Wohl, *The Urban Transportation Problem* (Cambridge, Massachusetts: The Harvard University Press, 1966), p. 345.

sidization of urban public transport by municipal government has become a standard practice, empirical estimates of the general effect on the distribution of income show that income inequality is increased by the subsidies.[6]

Arguments Based on "Infant Industry" Considerations. Legislators in underdeveloped countries often push for high tariffs to protect their fledgling industries from severe competition from foreign imports. The argument says essentially that if the new industries can be protected long enough to become strong, then the protection can be lifted with no detrimental effects.

Frequently an analogous argument is posited for subsidizing public transit, particularly buses. This argument assumes that financial aid on an interim basis will enable many mass transportation systems to continue to provide vital service during the period required to overhaul and revitalize operations so as to establish themselves on a firm financial basis.[7]

Although such arguments appear to be acceptable on their surface, inspection shows them to be weak. In the case of "infant industries" the supporters of protection can cite examples of the profitable industries they are trying to emulate. In the case of public transit, however, there is little evidence to show that unprofitable transit operations, be they bus or rail operations, once subsidized become financially stable.[8] The tendency is for the subsidy to be a stepping stone to financial assistance that may be continued indefinitely.

A related argument suggests that the transit industry is simply in a temporary state of disequilibrium and therefore has profit potential. If such is the case, one may ask why an opportunistic entrepreneur does not take over and consolidate floundering firms; then they could be jointly turned into profit makers.[9]

Arguments Based on Emotional Appeal. This type of argu-

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6. Mark Frankena, "Income Distributional Effects of Urban Transit Subsidies," *Journal of Transport Economics and Policy*, 7, no. 3 (1973): 215-230.

7. For an example of this philosophy see: U.S. Congress, Senate, 92nd Congress, 1st session, 17 February 1971, Bill 3S. 870, Section 2, Paragraph 7.

8. Henry M. Peskin, *An Analysis of Urban Transit Subsidies*, Institute for Defense Analysis, Januaury 1973, p. 12.

9. *Ibid.*, p. S-4.

ment is by far the most difficult for the economic analyst to appraise. Two variants of the type are: (1) Public transit in years past has contributed substantially to America's growth and success and will be even more important in the future. (2) Public transit is the only means of mobility for certain captive transit riders such as the aged and disabled. Underlying these emotional arguments there may, in fact, be some sound arguments based on economic efficiency. However, as they stand, they are fraught with social and ethical value judgments which do not lend themselves to an economic assessment of their validity.

Arguments Aimed at Correcting Inefficiencies. The arguments based on efficiency are the only group from which sound justification for the subsidization of public transit can be drawn. First to clarify this was Harold Hotelling, who wrote:

> When a decision whether or not to construct a railway is left to the profit motive of private investors, the criterion used is that the total revenue, being the sum of the products of the rates (prices) for the various services by the quantities sold, shall exceed the sum of operating costs and carrying charges on the cost of the enterprise. If no one thinks that there will be a positive excess of revenue, the construction will not be undertaken . . . this rule is, from the standpoint of the general welfare, excessively conservative. A less conservative criterion is that *if some distribution of the burden among the population is possible such that everyone concerned is better off with than without the new investment, then there is a prima facie case for making the investment.*[10]

Hotelling was speaking about those industries characterized by economies of scale, of which the rail industry is a prime example. For industries not characterized by economies of scale, economists have long recognized that by setting the price of each unit of output equal to the incremental cost of producing the output each firm will not only maximize profits but will also produce the level of output consistent with the output demanded

10. Harold Hotelling, "The General Welfare in Relation to the Problems of Taxation and of Railway Rates and Utility Rates," *Econometrica*, 6, no. 3 (July 1938): 267 [with emphasis added].

TABLE I—COST SCHEDULES OF HYPOTHETICAL RAIL FIRM

1 Number of Passengers	*2* Assumed Total Cost (dollars)	*3* Average Cost (dollars)	*4* Change in Total Cost [a] (dollars)	*5* Marginal Average Cost (dollars)
100	2,000	20		
			1,000	10
200	3,000	15		
			600	6
300	3,600	12		
			400	4
400	4,000	10		
			300	3
500	4,300	8–3/5		

[a] Change in total cost is the true marginal cost.

by society.[11] In such cases, each firm is said to be operating efficiently.

When an industry is characterized by increasing returns to scale, the cost of each successive unit of output is less than that of the previous unit. Industries having cost schedules of this nature will have an efficient level of output if the unit price is set equal to the incremental cost of production; however, they will not be able to cover average production costs when pricing on that basis. To use rail transit as an example, consider a train hauling 10 passengers. Conceivably the cost of operating the train would be split equally among the 10 passengers if it were necessary for revenues to cover costs of operation; that is, total costs could be recovered if fares equal average costs. Obviously, if the train had unused capacity, the hauling of 10 more passengers would add almost nothing to costs. Since the incremental or marginal cost of each additional rider would be very slight, average costs—total costs divided by the number of riders—would fall. In such a case, where average costs decline, if each passenger is charged a fare equal to marginal cost the total revenue generated will not cover total costs. The hypothetical cost schedules shown in Table I are helpful in illustrating this point.

11. Two excellent discussions are found in George Stigler, *The Theory of Price* (New York: MacMillan and Company, 1966), pp. 154-155; and in Edward Mansfield, *Microeconomics, Theory and Applications* (New York: W. W. Norton and Co., 1970), pp. 412-440.
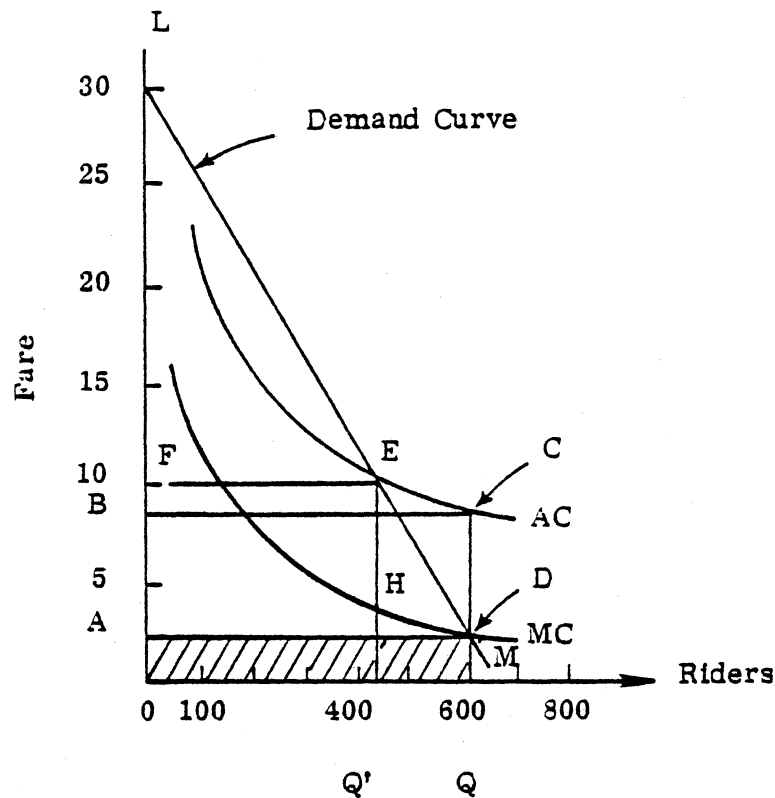
Figure 2. Marginal cost and average cost curves of hypothetical firm

As columns 1, 2, and 4 (of Table I) indicate, total costs do not increase proportionately with ridership. (This phenomenon characterizes mass transit firms because operating costs are relatively minor in comparison to total costs; that is, capital costs make up the bulk of total costs.) As column 5 shows, the incremental or marginal cost of each additional 100 passengers decreases. When 300 passengers are riding, the average marginal cost is $6. Setting the fare at $6 will yield $1,800 in total revenue, obviously not enough to cover the total costs of $3,600.

Total costs could be covered if fares were set equal to average costs; however, less than the socially desired level of output would result. A graphical depiction of the information given in Table I is presented in Figure 2 wherein LM represents the de-

mand for public transit service at various fares. AC is the plot of average costs as it varies with ridership and MC is a plot of the marginal cost of adding riders. Setting price equal to marginal cost in most markets leads to an optimal allocation of resources and the socially desirable level of output. (This assumes no external social costs or benefits and no "second best" problems.) In Figure 2, however, if price is set where MC intersects the demand curve, point D, then total revenues, $OADQ$, are less than total costs, $OBCQ$, and the firm operates in the red. On the other hand, if the firm sets price where average costs can be covered, point E in Figure 2, then the price riders are paying, $Q'E$, is greater than the cost, $Q'H$, of the resources being used to produce output OQ. This illustration suggests that ridership should be expanded and more resources shifted to the production of public transit services. A way, however, to attract more riders is to lower fares below price $Q'E = 10$; but when the fare is lowered below 10, the average cost is no longer covered by the fare paid by each passenger and total revenues fall short of total costs.

Thus the transportation planner in a congested urban area is faced with a rather sticky dilemma. He can either allow the transit authority to flounder with high fares, low ridership, and growing deficits that will result in added congestion, or he can suggest subsidization from the public sector. If public transit operations are generally characterized by cost configurations like those in Figure 2, by giving a subsidy equal to the difference between AC and MC (CD in Figure 2) fares can be reduced, ridership increased, and a movement made toward the optimum allocation of travel among various modes. In short, the subsidy serves to shift the cost curves vertically downward as was described in Figure 1.

A question that should be uppermost in the minds of those in the decision-making role is the extent to which the transit industry in their locality is characterized by increasing returns to scale. In other words, do the cost curves look similar to those in Figure 2? There is some evidence based on aggregate data that the rail rapid-transit industry is characterized by increasing re-

turns.[12] The empirical validity of scale economies in the bus transport industry is not well substantiated although Peskin and Mohring have suggested the existence of economies of scale.[13] It must be emphasized, however, that empirical verification of the cost curves for separate transit authorities is a desirable undertaking if subsequent subsidy decisions are to be based on firm economic grounds.

Arguments for External Benefits. Not unjustifiably, it has been argued that increasing the volume of riders on public mass transit modes is beneficial not only to the riders but to society as a whole.[14] That is, there are beneficial effects on individuals other than those who ride public transit. These external effects may take the form of reduced traffic congestion, reduced noise, cleaner air, conserved energy, and others. However, some external-effects arguments are not suitable as a basis for subsidizing transit. Among these are arguments such as, "The encouraging of additional riders will increase property values," or "The building of new facilities will create employment." These effects are pecuniary externalities; they alter the distribution of income but do not affect society's net welfare.

The possibility of reducing congestion, fuel consumption, and pollution (or increasing safety) by attracting riders away from automobiles to mass transit modes may justify subsidies in some sense. However, providing mass transit with an operating subsidy to reduce fares is not necessarily the best way of achieving a transfer of modes.[15] The extent to which a switch in modes

12. See Roger Sherman, "Club Subscriptions for Public Transport Passengers," *Journal of Transport Economics and Policy* 1, no. 3 (1967); and "Congestion Interdependence and Urban Transport Fares," *Econometrica* 39, no. 3 (May 1971).

13. Sherman, "Club Subscriptions for Public Transport Passengers" (1967). Also see Peskin, *An Analysis of Urban Mass Transit Subsidies,* p. 7, and Herbert Mohring, "The Benefits and Costs of Subsidizing Increasing Returns Activities," Mimeograph 1973.

14. For example, see the following: H. Mohring, "Optimization and Scale Economies in Urban Bus Transportation," *American Economic Review* (September 1972); Robert Strotz, "Principles of Urban Transportation Pricing," *Highway Research Record* 37; David Renshaw, "A Justification for Mass Transit Operating Subsidies," *Traffic Quarterly* 28 no. 2 (April 1974); A. A. Walters, "Subsidies for Transport," *Lloyds Bank Review* (January 1967) no. 83.

15. Peskin, *An Analysis of Urban Mass Transit Subsidies,* p. 9; Elbert Segelherst and Larry Kirkus, "Parking Bias in Transit Choice," *Journal of Transport Economics and Policy* (January 1973), pp. 58-70.

is achieved depends on the cross price elasticity of demand be-
tween transit fares and demand for the automobile as a mode
of travel. An alternative approach may be to properly price the
use of automobiles by taxes or tolls so the cost of traveling by
car includes the cost of penalties imposed on society, such as
pollution, noise, and congestion. If car users were to pay both the
private and social costs of driving, there would likely be a reduc-
tion in the cost curves for public transit. This could shift de-
mand for transit and thus make subsidization unnecessary.

JUDGING THE RELATIVE MERITS OF SUBSIDY SCHEMES

Criteria are needed to judge whether one subsidy scheme is
more suitable than another. For this analysis four criteria were
selected: (1) consistency with social goals (such as provision of
transportation for the carless and reduction in traffic congestion),
(2) cost of administering the subsidy, (3) promotion of efficient
transit operations, and (4) equity.

As an objective choice criterion, equity is extremely difficult
to apply because each decision maker has quite a different idea of
what is fair or equitable. While one may prefer that the subsidy
be neutral in terms of its effect on the distribution of income,
others may make an equally strong case for choosing a subsidy
mechanism that increases the real income of those persons in the
lowest one-third of the income distribution. Still better decisions
can be made if considerations of equity are explicitly separated
from other more objective ways of judging the relative merits of
particular subsidy schemes. It is important that decision makers
be aware of the fact that by choosing one subsidy scheme over
another, they are also choosing one income distribution as op-
posed to another. That is, they should know that the type of sub-
sidy scheme chosen will necessarily imply that certain income
groups will have a different real income after the subsidy. For
example, a subsidy scheme may result in increased ridership (be-
cause of reduced fares) by individuals who have an average in-
come of $10,000 but may be funded largely by taxes on individ-
uals with smaller average incomes. Another subsidy scheme may
make service more available to elderly, low-income individuals
and be funded by taxes largely from high-income families. Obvi-

ously, the two schemes involve two different income distributions and, therefore, two different judgments about what is equitable or fair.

DESCRIPTION AND COMPARISONS OF BASIC SUBSIDIES

Although there are numerous formulas that can be used to distribute public transit subsidies [16] only basic classes and their relative merits will be discussed here. Thus, an appropriate way of classifying transit subsidy schemes is by the purpose for which the funds are granted: (1) deficit related, (2) cost or input related, (3) output related, and (4) potential ridership related.

Deficit-related Subsidies

The most basic form of deficit-related subsidy covers the transit firm's operating deficit (or a percentage of it) without stipulating any changes in its management practices, the service it provides, or the fare structure. With such an open-ended agreement, transit firms can continue their current practices ad infinitum.

When the only social goal is to maintain existing service levels, this type of subsidy may achieve that end. However, while the subsidy would not penalize those transit firms that make service improvements,[17] it would tend to reduce their incentive to make such improvements. Further, firms operating efficiently, but at a loss, prior to the granting of the subsidy may cease their efficient practices when losses are covered from public funds.

Because little additional record keeping is necessary, the costs of administering a deficit-based subsidy program should be small. But the subsidy grantors would have little control over the management or efficiency of recipient firms so there is no assurance that the subsidy would promote improved transit service or equity in the transit fare structure.

It should be noted that deficit-based transit subsidies could be

16. *Alternate Formulas for a Federal Operating Subsidy Program for Transit*, Institute for Defense Analysis, Distributed by National Technical Information Service, U.S. Department of Commerce, 1971. Also see "The Feasibility of Federal Assistance for Urban Mass Transit Operating Costs," U.S. Department of Transportation, November 1971.

17. David R. Miller, "Financing Urban Transportation," *Special Report Highway Research Record 144*, p. 59.

eroded by labor unions because management's bargaining power may be reduced.

Cost- or Input-related Subsidies

Subsidies based on either covering capital costs or the purchase of other fixed-cost inputs have been in widespread use. Because many public transit improvements require substantial initial outlays of capital (such as for new equipment), fixed-cost subsidies have been attractive to legislators in their attempt to help solve the public transit problem.

Covering such fixed costs as for buses and garages will not assure, however, that transit firms in deficit positions will break even and continue to operate in the long run. Whether they do depends on their individual capital structure and the cities in which they operate. An important question the subsidy grantor must face is whether the capital grant will actually lead to the purchase of more productive capital and rolling stock or will just enter the revenue side of the ledger.

When capital-based subsidies do not take account of the source of a firm's financing, a substantial portion of funds may be funneled to firms that have financed their capital from sources other than their own equity or that already are in a profitable position. Bringing about such windfall gains to subsidy recipients is undesirable on the basis of what is equitable to the firms. Furthermore, the effect that a capital subsidy will have on the distribution of income of the riders is unpredictable because the fare structure may not be altered as a result of the subsidy.

If capital-based subsidies were to result in improved levels of service and better marketing of the service, and if these in turn would lead to increased ridership, society as a whole would likely gain through a reduction in externalities. However, capital grants to individual firms appear no more likely to promote efficiency in transit operations than do subsidies which are based on the firm's deficit position. But this statement should be qualified. If the granting agency wishes to provide inducements to innovations and efficiency in the provision of quality service, these can be provided through government control, but only by increasing administrative costs substantially. This, in fact, is

what a transit authority does—provides the desirable inducements to innovation and efficiency.

Subsidizing transit's operational deficits may be preferable to capital subsidies to the extent that many innovations, particularly in the bus-only mode, and increases in service levels are achieved through changes in variable costs (number of stops made, headways, personnel) rather than additions to the plant and rolling stock.

Output-related Subsidies

Output-related subsidies are tied in some sense to the product of public transit firms In other words, the amount of subsidy granted depends on the quantity of service the firm provides and only indirectly relates to its profit or loss situation. It is appropriate to consider several output-related subsidies rather closely because the relative merits and disadvantages of each are quite different.

One basic type of output-related subsidy is the *revenue passenger formula.* This type of subsidy either allocates money directly to paying passengers in the form of tokens, stamps, or other means by which fares are reduced, or allocates money directly to transit firms on the basis of the number of passengers carried. This was the type of formula implied by the legislation before the 92nd Congress proposing a federal subsidy to mass transportation.[18] Algebraically this formula may be written as:

$$X_F = S_P Q_F \tag{1}$$

where

X_F = the amount of subsidy to transit firms

S_P = uniform subsidy rate per passenger

Q_F = number of revenue passengers carried by the firm

A second category of output-related subsidy, the *vehicle miles formula,* allocates funds to transit firms based on the number of miles traveled. This differs from the *revenue passenger formula* only in that the subsidy allocation is based on vehicle

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18. "Collective Consumption Services of Individual Consumption Goods," *Quarterly Journal of Economics* 78 (August 1964), 471-77. Also see Sherman, "Club Subscriptions for Public Transport Passengers."

miles rather than paying passengers. Placed in algebraic form, the formula is

$$X_F = S_M M_F \tag{2}$$

where

X_F - the amount of subsidy to transit firm
S_M - uniform subsidy rate per mile
M_F - miles logged by the firm

For both formulas the subsidy rate per mile for an area or region could be calculated by dividing the dollar amount available for transit subsidy for the region by the number of vehicle miles traveled (or revenue passengers carried) by all transit firms in the region. Of course, variants of this could restrict the subsidy to certain firms or alter the rate on the basis of some measure of need.

In general, output-related subsidies are superior to deficit and input-related subsidies in helping to achieve the social goals of an area because the amount of the grant is linked directly with the firm's level of performance. The *revenue passenger formula*, in particular, could provide incentive for the transit firm to increase service levels and decrease fares since a larger subsidy can be obtained only through an increase in paying passengers. This relationship of price with ridership (assuming demand is relatively elastic) promotes efficient operations and optimal allocation of resources (as for subsidy in the amount of CD in Figure 2).

Output-related subsidies are not free from criticism, however. A uniform method of record keeping on ridership, miles logged, costs, and revenues by the recipient firms would be required in order to determine the amount of the subsidy. In addition, the subsidy-granting agency should monitor the finances and daily operations of the recipient firms. Without monitoring, fares may not be reduced and the subsidy could be added to revenue. This record keeping and continuous monitoring implies that a substantial amount of the money intended for aid would be spent on distributing the funds.

If, rather than giving the subsidy to the transit firm, the passengers themselves are given tokens which reduce their fare,

greater administrative costs and problems arise. The printing of the tokens involves additional costs but, even more important, two questions of equity must be faced: How is the grantor to decide who is eligible? and, Do all eligible recipients receive the same amount of subsidy?

Potential Riders Formula

Although formulas of the potential riders type have not received significant attention, some people have suggested that they might be feasible.[19] The foundation of such suggestions is that even though an individual does not use it, he may receive some positive benefit from the availability of public transit. The algebraic formula is similar to that for the *revenue passenger formula:*

$$X_F = S_N N_F \tag{3}$$

where

    X_F = amount of subsidy to the transit firm
    S_N = subsidy rate per potential rider
    N_F = the number of potential riders

In this case, the subsidy to the firm, X_F, is directly proportional to the number of potential riders, N_F, along the firm's routes.

A variant of this scheme is to grant a subsidy on the basis of the population in each firm's locality. Such a mechanism is the same as revenue sharing, except that the money must necessarily be used for the explicit purpose of aiding public transit.

One would expect that the implementation of the *potential riders formula* would result in increased quality of transit service and route-miles traveled in the more densely populated areas. Thus, formulas in this category could be the best in terms of social goal achievement and equity (if properly devised) but they are by far the most intricate and difficult to administer.

COMPARISON OF COSTS OF DIFFERENT SUBSIDY FORMULAS

Regardless of the formula chosen, the amount of the subsidy should be structured to the particular characteristics of the tran-

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19. Miller, "Financing Urban Transportation," p. 56.

TABLE II—COMPARISON OF DIFFERENT SUBSIDY MECHANISMS BASED ON 1973 DATA FOR THREE URBAN AREAS POPULATION 400,000 OR GREATER AND ONE AREA LESS THAN 50,000

Code Number, Type of Subsidy, and Results of Analysis

Name of Firm	Amount of Subsidy and Analysis Items	1 Subsidy = Total Deficit	2 Subsidy = 5 Percent Total Cost	3 Subsidy = 5 Percent Maintenance, Operations, Administrative Cost	4 Subsidy = Total Maintenance, Garage, and Equipment Cost	5 Subsidy = Total Fixed Cost	6 Subsidy = Depreciation Charges	7 Subsidy = $0.05 per Revenue Passenger	8 Subsidy = $0.05 per Vehicle Mile
A	Total subsidy (dollars)	389,336	258,934	225,000	55,912	500,000	132,166	878,255 d	261,367 e
	Percent reduction in deficit (percent)	100	66	58	15	129	34	226	68
	Profit (dollars)	0	0	0	0	110,664	0	599,983	0
B	Total subsidy a (dollars)		194,389	N.A.	N.A.	8,357	167,141	724,004 d	190,914 e
	Profit (dollars)	b	194,389	N.A.	N.A.	8,357	167,141	724,004	190,914
C	Total subsidy (dollars)		123,503	118,000 c	100,000 c	10,000	N.A.	178,988 d	149,884 e
	Profit (dollars)	b	123,503	118,000	100,000	10,000	N.A.	178,988	149,884
D f	Total subsidy (dollars)	62,639	11,868	10,000	N.A.	N.A.	N.A.	35,820	15,000
	Percent reduction in deficit (percent)	100	19	16	—	—	—	57	24

Sources: American Transit Association, *1973 Operating Report*; Northern Virginia Transportation Commission, *Express Bus Demonstration Project, Financial Summary.*

a Although a firm may be breaking even on the basis of operating costs, it may not have the funds to purchase necessary capital equipment. An interesting point of note is that published data may not indicate that profits are insufficient to finance needed expansion of service.

b Profits are positive based on operating cost and revenue, but less than $30,000. ($30,000 would not purchase one bus.)

c Estimated conservatively.

d The subsidy is an underestimate because it will affect miles traveled.

e The subsidy is an underestimate because it will affect number of passengers carried.

f Population of city is under 50,000.

N.A. Data not available.

sit firm or firms to be subsidized. This recommendation may appear to be quite obvious once it has been stated. However, its ramifications become clear when one compares the cost of subsidizing a bus company by several different mechanisms. As Table II shows, the profit or loss position of a transit firm can vary tremendously under different subsidy schemes. Furthermore, for a given subsidy mechanism the subsidized firms will not be affected in the same way. An examination of individual cells from Table II will clarify these points.

Table II shows the comparative costs of providing subsidies to several selected transit systems operating in the larger cities of the state of Virginia. The table was developed in the following manner: Financial data were gathered from the American Transit Association and the Northern Virginia Transportation Commission on the larger transit companies operating in Virginia in 1973. Several hypothetical subsidy schemes were applied to the data in an effort to show how the subsidy in question, if actually implemented, could be expected to affect the profit/loss position of several selected firms.

Column 1 of Table II assumes that the subsidy is set equal to total deficits. Firm A receives $389,336 under this scheme, there are no windfall profits, and the deficit is completely removed. Firms B and C receive no subsidy because they are earning a small profit. However, their profit may be too small to meet capital expansion costs. Such a scheme is not well suited to providing the incentive or the revenue for expansion of service levels.

Subsidies based on a percentage of total cost (column 2) would lead to profits for firms B and C, but would reduce only a portion of the deficit for firms A and D. Subsidies based on fixed costs (column 5) would be expected to result in profits for all firms for which data are available; obviously, the larger the fixed costs, the greater the profit. Furthermore, the ability of such a subsidy scheme to provide incentives to increase service levels is absent.

The revenue passenger subsidy (column 7) is quite interesting. Firms in the large urban areas (A, B, and C) would receive rather large profits because they are already carrying a large num-

ber of passengers. The small firm, D, in a city with population under 50,000, still does not break even under this scheme, even though it faces an incentive to increase ridership.

Two implications are apparent from the data developed and presented in Table II. First, no general statement can be made regarding what kind of subsidy mechanism requires the largest outlay of funds. Second, regardless of the scheme proposed, the effect on all firms will apparently not follow a general pattern; whereas one may receive huge profits, another may not break even after the subsidy.

CONCLUDING REMARKS

Two economically justifiable arguments can be used in support of subsidies: (1) arguments based on economic efficiency, and (2) arguments based on the contention that by subsidizing public forms of transportation significant reductions in such externalities as congestion and pollution can be achieved. The validity of these arguments depends on proof that significant economies of scale exist in the transit industry and that a mechanism can be devised which will provide the necessary incentives to cause firms to increase their ridership and service levels.

Although it is emphasized that no general statement regarding subsidies to firms can be made until the existence of economies of scale can be substantiated, four criteria for judging the relative merit of subsidy schemes are suggested in the event that a decision to provide a subsidy has been made:

1. Choose a mechanism which is effective in achieving social goals. This choice necessitates that the explicit goals be stated before the granting of any funds.

2. All other things being equal, choose a subsidy scheme that minimizes the cost of distribution and policing; that is, a mechanism that does not require that a substantial amount of resources be spent in distributing the funds and monitoring their use.

3. Although it is not really a choice criterion, decision makers should identify whether they are basing their judgment of the merits of a particular subsidy scheme on some consideration of equity. Equity is not an objective criterion on which to judge a

subsidy mechanism, but if one scheme is preferred over another solely on the basis of what the choosers consider to be fair, then this fact should be explicitly stated.

4. Above all, a subsidy scheme should be chosen that will stimulate the firm to operate efficiently and not be wasteful of resources. Obviously this criterion is closely tied with the criterion of effectiveness and can be achieved to a certain extent through regulation, but only at the expense of increasing distribution and policing costs.

Based on these criteria, it can be concluded that subsidies which are tied to some measure of output are preferred over deficit-related subsidies because the former can be expected to be more efficacious in achieving increases in service levels and the maintenance of low fares. However, regardless of the specific type of output formula designed, it will have to be scrutinized to ascertain its particular shortcomings and merits. Furthermore, even though there has been widespread use of capital cost subsidies which are designed to help defray operating costs or increases in output levels; their effect depends on the particular firm and the city in which it operates. On the other hand, subsidies which are designed to help defrae operating costs or variable costs, such as administration and personnel costs, are desirable to the extent that they are positive inducements to increase service levels and innovations.

Finally, this article should be placed in proper perspective. The purpose was to analyze transit subsidies. However, the problem of pricing in other forms of transportation deserves equal attention by transportation planners. This article should not be construed to imply that subsidies are the only answer to urban transportation problems.

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APPENDIX C

LYNCHBURG'S NEW PRIVATE
PROVIDER

(From <u>Lynchburg News</u>)

Energy Crisis Gives Birth
to Billy's Transport Service

By

Toni Anthony

Billy W. Lawrence, Sr. of Rustburg has capitalized on the nation's energy crisis.

His firm, Billy's Transportation Service, Inc., is now a bustling transit company, rolling merrily down area highways collecting passengers and compliments.

"It's a kind of bus pool," explains Lawrence, 45. "We just get together as one big group to save expenses on transportation and fuel."

A private, family owned and operated corporation, Lawrence's company is the only transit service of its kind in the area, and is licensed by the State and the Interstate Commerce Commission (ICC) to transport employees from outlying areas to local General Electric plants.

A 16-year GE employee himself, Lawrence said the idea for his bus service was sparked by the energy crisis in 1974 and the lack of public transportation from many areas into the city.

"My wife and I discussed it back in '74 when the price of gas went up, and the President started talking about rationing it," Lawrence recalls. "I thought, 'I have to go to work anyway. Why not drive something that can bring more people in from the counties'."

And so Billy's bus service was born and is operated from an office in Lawrence's home in Rustburg.

"The phone rings, and it's someone who needs a ride. They tell us where they want to get on, and my wife or one of the children gives them information on schedules and rates," explained Lawrence.

Lawrence is forced to turn down several requests each week because he is only licensed to transport GE employees.

Starting out with only one bus in 1974, his transit business has increased to three bus routes (from Appomattox, Brookneal and Piney River to local GE plants), serving nearly 100 passengers during winter peak months.

"I'm the only one running transportation in these areas," Lawrence noted. Each bus holds 40 passengers, and riders are charged from $5 to $8 weekly.

Painted white with the sign "Billy's Transp. Inc. - 332-6293" in black lettering on the side, Lawrence's buses start rolling shortly after 6:30 each morning; picking up passengers and discharging them at the Mountain View, Bradley Park and Timberlake plants by 7:10 each morning.

"We leave the plants when the whistle blows at 4 o'clock, and double back on the same route going home," said Lawrence.

What makes Billy's buses run? "Faith, prompt and alert drivers, and some mighty good passengers," says Lawrence with a smile.

Lawrence employs one driver and a substitute for each run, and holds an extra bus in reserve for breakdowns. On the Piney River run, Mrs. Avis Wiley and Phil Hartless are behind the wheel.

From Brookneal, the drivers are Carroll Marston, Randy Tuck and Lawrence; and from Appomattox, C. B. Rush and Sammy Motley drive the bus.

Gas is purchased by each driver at a service station along his route, and bus repairs are made by a licensed mechanic.

The business end of the company is handled by a bookkeeper, Lawrence's wife Peggy (who is a secretray in the Campbell County Recreation Department), and the Lawrence's three children — Debra Sue, 22, Cynthia Ann, 13, and Billy Jr., 10.

Asked if he would like to expand his family operation, Lawrence replied, "Yes, if I can get the passengers and a charter license."

"Our future plans include expansion to routes from Altavista, Gretna and Bedford if everything goes well," said Lawrence.

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