New Funding Sources for Public Transit: Who Pays?

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As financial crises have increasingly plagued transit systems, new and/or additional sources of funding have been sought. One issue that has not been well documented in this area is the question of who pays for each source. A number of potential household-based funding sources and their general impact on families at different income levels can be analyzed by using data published by the U.S. Bureau of Labor Statistics. Sixteen options (including fares) were examined and compared as to their relative regressivity (burdens). This was accomplished through a three-step process. First, relevant consumer expenditures by income levels were noted. Next, expenditures as a percentage of income were calculated. Finally, percentage expenditures by such income level relative to those of the highest income level were determined. The results can be used to compare the impact of one source versus another or to choose a source with negative distributional impacts. Subject to certain qualifications, it was found that most household-based sources were regressive. The most regressive were household (head) tax, cigarette tax, and transit fares. Prospective alternatives include parking, income, and stock transfer taxes. It is suggested that decreased federal funding will lead to the tapping of more regressive sources as well as to increasing reliance on business-based taxes, service cutbacks, and fare increases.

The financial problems of mass transit have become increasingly severe in recent years and are likely to get worse. Proposed budget cuts for the Urban Mass Transportation Administration (UMTA) could have significant consequences for transit systems. In particular, elimination of federal transit operating-assistance programs (Sections 5 and 18 of UMTA Act of 1964, as amended) has been anticipated. A recent survey by the American Public Transit Association (APTA) suggests that a majority of transit systems face reduced service, increased fares, and the need for new tax revenues and/or state and local assistance as a result (1).

Over the last dozen years, the financial condition of public transit has deteriorated markedly. In 1980, operating revenues of transit systems amounted to $2.6 billion versus operating expenses of $6.0-6.5 billion, a deficit of almost $4 billion. This compares with an operating deficit of less than $300 million in 1970 (operating revenue of $1.7 billion, operating expenses of only $2.0 billion) (2). In the past, this deficit has been largely closed by subsidies; the largest growth of these came from the federal government. With proposed reductions from this source, increased subsidies from other levels of government (state, regional, local), higher operating revenues (fares), or reduced operating costs (improved efficiency, reduced service) will be necessary.

There are a number of important issues that can be addressed in this area. For example, does transit offer benefit to nonusers to justify subsidies? Are the cities and suburbs being treated equally as far as transit benefits and costs are concerned? Are road versus transit funding being treated equitably? Should social considerations (e.g., taxes on cigarettes or alcohol) be involved? What funding sources are politically acceptable and substantial enough to offer short-term or long-term assistance? Should subsidies come from nontransportation users? Notably absent from most discussions of transit finance is the issue of how different income groups would be affected by the employment of different funding sources. While this may be due in part to the lack of information available, it is the purpose of this paper to consider the general differences in who pays from various financing alternatives and to hold the profile of who benefits constant for simplicity.

In economic terms, the differential tax incidence of one source will be compared with that of another...
source. Differential tax incidence examines distribu-
tional changes by holding total revenue and ex-
penditures constant while substituting one tax for
another. Musgrave and Musgrave (3) suggest that
this concept offers the best approach for tax policy
analysis, since actual tax policy decisions usually
involve issues such as comparing alternative ways of
raising revenue.

Incidence refers to who (ultimately) bears the
burden of a tax; that is, who pays. The initial
distribution of burdens can differ from the final
distribution if adjustments by consumers or firms
are made in response to tax changes. This is called
tax shifting. Unfortunately, there is serious dis-
agreement on the final incidence of taxes that might
be subject to significant tax shifting (e.g., prop-
erty tax, corporate income tax, payroll tax). The
final incidence of such business-based sources de-

depends on changes in wages, prices, and profits as a
result of the tax. Data on the shifting of tax
burdens are scarce and there is little consensus on
the result.

As a result, the funding sources analyzed in this
paper are taxes levied on households, where the
conventional wisdom (although it is not unanimous
(4)) suggests that the initial and final distribu-
tion of burdens would be the same. This burden can
be estimated by noting the expenditures or tax pay-
ments made by particular households. Most previous
studies have concluded that the general category of
sales and excise taxes tends to be regressive, whereas
income taxes range from proportional to
progressive depending on their structure (3, 5).

RELATIVE INCIDENCE OF ALTERNATIVE HOUSEHOLD-BASED
FUNDING SOURCES

Detailed spending patterns by U.S. families in dif-
ferent income brackets are required to examine the
incidence of taxes levied on households. The only
readily available and suitable data are provided by
the Consumer Expenditure Survey (CES) of the Bureau
of Labor Statistics (6), which is taken every 10-12
years, most recently during 1972-1973. This will
allow comparison of the following funding altern-
atives on households: sales tax, motor fuel tax,
cigarette tax, alcohol tax, automobile excise tax
(new and/or used vehicles), parking and towing tax,
(vacation) tolls, utility tax (electricity and/or
natural gas), vehicle registration fee, income tax,
title transfer fee, tickets and admissions tax,
mortgage tax, a household (head) tax, and transit
fares.

Calculating the relative incidence (burden) of
each tax or fee requires a three-step process.
First, expenditures on each item subject to tax or
each tax amount must be noted by income level. A
convenient breakdown available from the CES data is
to arrange families by income decile from the 10
percent of families with the lowest income (decile
1) to the 10 percent of families with the highest
income (decile 10). For four selected deciles (1,
4, 7, 10), gross expenditures are noted in Table 1.
Each figure represents the average expenditure (in
dollars) on an item by a family in a particular
decile. The table notes, for example, that a decile-
1 family spends $98 per year on gasoline, and this
expenditure increases with income up to $561 for a
decile-10 family.

The second step in this process is to calculate the
percentage of income represented by the expendi-
ture data in Table 1. The CES reports that the mean
incomes of families in deciles 1, 4, 7, and 10 are
$1559, $7063, $13 466, and $31 974, respectively.
Table 2 displays the results, which indicate, for
example, that spending on gasoline ranges from 6.3
percent of income in decile 1 to 1.8 percent of
income in decile 10.

The final step is to look at the relative expendi-
ture patterns by assigning an index number of 1 to
the percentage spent on an item by the decile-10
family and scaling the spending by the other deciles
accordingly. Since tax on the expenditure items
would be proportionate to spending, the relative
incidence for either expenditures or taxes on
expenditures by item will be the same. That is, comparing
total expenditures on an item as a percentage of
income for each population decile relative to that
of decile 10 will yield the same relative pattern as the
distribution of tax burdens applied to the item.
The calculations are displayed in Table 3. This
suggests, for example, that a decile-1 family pays a
3.5 times greater percentage of their income for
gasoline (and thus gasoline taxes) compared with a
decile-10 family.

DISCUSSION OF RESULTS

The funding sources considered in Table 3 can be
categorized as progressive (taking an increasing
percentage of income as income rises), regressive
(taking a decreasing percentage of income as income
rises), or proportional. Progressive sources have
rising relative-incidence values that fall as incomes
increase. Parking and towing fees and state and
local income taxes fit this description. Most of
the other sources are regressive; they have rela-
tive-incidence values that fall as incomes rise. The
degree of regressiveness differs significantly:
head (household) tax or a cigarette tax is seen to be
extremely regressive; a new car excise or admis-
sions tax is seen to be less regressive. Similar
results occur if an S-index of progressivity is
calculated (8).

Regressive taxes often carry a negative connota-
tion. This notion stems from the ability-to-pay
principle of taxation; those with greater ability
should bear a proportionately larger share of the
financing burden. This principle suggests that
knowledge of the redistributive impacts of a tax
could be used to select a particular funding source
prior to or to mitigate any adverse consequences for
the distribution of income a posteriori through
ongoing governmental tax or transfer programs. A
regressive tax would tend to place a heavier (per-
centage of income) burden on the poor and make the
distribution of income less equal. In this sense,
such a tax would violate the ability-to-pay princi-
ple. However, an alternative principle of taxation
is to tax in proportion to benefits received. This
principle excludes distributional considerations.
Recently, there seems to be an implicit swing toward
the benefit principle relative to federal transit
funding.

In fact, "progressive" and "regressive" are tech-

ical terms with no value judgment attached. This
classification, however, depends centrally on the
initial distribution of income. For example, there
is nothing inherently regressive about a sales tax.
It is regressive because income is distributed
unequally; the more unequal the distribution, the more
regressive it becomes. Comparison of different
taxes reflects the nature of these taxes in terms of
the distribution of income of the society within
which they are applied.

QUALIFICATIONS

Some qualifications need to be made to the above
analysis. The data reflect actual spending patterns
and thus incidence based on taxes and charges as
they existed in 1972-1973. If the distribution of
Table 1. Yearly expenditures on taxable goods and services and other sources.

<table>
<thead>
<tr>
<th>Item</th>
<th>Exp. ($) by Decile</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Taxable goods</td>
<td>1407</td>
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<tr>
<td>Taxable goods</td>
<td>8134</td>
</tr>
<tr>
<td>Gasoline</td>
<td>98</td>
</tr>
<tr>
<td>Parking and towing</td>
<td>1</td>
</tr>
<tr>
<td>Tolls</td>
<td>0</td>
</tr>
<tr>
<td>Alcoholic beverages</td>
<td>33</td>
</tr>
<tr>
<td>Cigarettes</td>
<td>57</td>
</tr>
<tr>
<td>Gas and Electric</td>
<td>125</td>
</tr>
<tr>
<td>Vehicle registration</td>
<td>10</td>
</tr>
<tr>
<td>State and local income taxes</td>
<td>7</td>
</tr>
</tbody>
</table>

Note: Data from Consumer Expenditure Survey (2).

a Goods subject to general sales tax, assuming that food purchased for home consumption and medicines and drugs are subject to sales tax. See paper b for more details.

b Assuming the items in footnote a are not subject to sales tax.

c Assuming $251 permeate fee.

Table 2. Yearly expenditures as percentage of income.

<table>
<thead>
<tr>
<th>Item</th>
<th>Exp. (%) by Decile</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Taxable goods</td>
<td>90.3</td>
</tr>
<tr>
<td>Taxable goods</td>
<td>52.8</td>
</tr>
<tr>
<td>Gasoline</td>
<td>6.3</td>
</tr>
<tr>
<td>Parking and towing</td>
<td>0.06</td>
</tr>
<tr>
<td>Tolls</td>
<td>0.02</td>
</tr>
<tr>
<td>Alcoholic beverages</td>
<td>2.1</td>
</tr>
<tr>
<td>Cigarettes</td>
<td>3.7</td>
</tr>
<tr>
<td>Gas and Electric</td>
<td>8.7</td>
</tr>
<tr>
<td>Vehicle registration</td>
<td>0.6</td>
</tr>
<tr>
<td>State and local income taxes</td>
<td>0.5</td>
</tr>
<tr>
<td>Title transfer fee</td>
<td>0.07</td>
</tr>
<tr>
<td>New car purchases</td>
<td>6.4</td>
</tr>
<tr>
<td>Used car purchases</td>
<td>4.7</td>
</tr>
<tr>
<td>Admissions and fees</td>
<td>0.7</td>
</tr>
<tr>
<td>New mortgage debt</td>
<td>11.5</td>
</tr>
<tr>
<td>Household tax</td>
<td>1.3</td>
</tr>
<tr>
<td>Public transportation fares</td>
<td>2.1</td>
</tr>
</tbody>
</table>

Note: Data rounded off.

Table 3. Relative incidence.

<table>
<thead>
<tr>
<th>Item</th>
<th>Incidence (%) by Decile</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Sales tax</td>
<td>3.3</td>
</tr>
<tr>
<td>Sales tax</td>
<td>2.5</td>
</tr>
<tr>
<td>Gasoline tax</td>
<td>3.5</td>
</tr>
<tr>
<td>Parking and towing fee</td>
<td>0.4</td>
</tr>
<tr>
<td>Tolls</td>
<td>1.9</td>
</tr>
<tr>
<td>Alcohol tax</td>
<td>2.7</td>
</tr>
<tr>
<td>Cigarette tax</td>
<td>8.3</td>
</tr>
<tr>
<td>Utility tax</td>
<td>6.4</td>
</tr>
<tr>
<td>Vehicle registration fee</td>
<td>4.3</td>
</tr>
<tr>
<td>State and local income tax</td>
<td>0.2</td>
</tr>
<tr>
<td>Title transfer fee</td>
<td>4.9</td>
</tr>
<tr>
<td>New car excise tax</td>
<td>2.0</td>
</tr>
<tr>
<td>Used car excise tax</td>
<td>3.7</td>
</tr>
<tr>
<td>Admissions tax</td>
<td>1.9</td>
</tr>
<tr>
<td>New mortgage tax</td>
<td>2.5</td>
</tr>
<tr>
<td>Household tax</td>
<td>20.5</td>
</tr>
<tr>
<td>Public transportation</td>
<td>8.2</td>
</tr>
<tr>
<td>fares</td>
<td>4.9</td>
</tr>
</tbody>
</table>

Note: Based on unrounded data from Table 2.

The use of a single year's income can be criticized as being unrepresentative of a longer-run view of income (2). Unfortunately, no data are readily available to correct this. Since national data were used, regional incidence could differ significantly from the reported figures due to local variations in tax rates, exceptions, expenditures, etc. The results should thus be viewed as a national aggregate. Some CES data are broken down by standard metropolitan statistical area and could give a limited picture of local incidence. In addition, data on alcohol expenditures, public transportation expenditures, and cigarette purchases suffer from serious underreporting (10). If the degree of underreporting was related to income, the reported figures could be biased. Due to the qualifications, it is difficult to ascertain the statistical significance of the results in Table 3. The results should be viewed as indications of regressivity or progressivity or the degree thereof rather than as statistically significant numbers.

Finally, a complete examination of equity would involve analysis of both who pays as well as who benefits. That is, the overall redistributive impact (or net fiscal incidence) of public transportation would consider the beneficiaries of the program as well as funding. The regressive nature of most funding sources could be countered by greater program expenditures (and benefits) that would accrue to lower-income families as major users. Social, legal, geographic, and fare-structure considerations similarly play an important role. The discussion above attempts to shed light on the who-pays groups by concentrating on differential tax incidence; it is recognized that this is only a portion of the total equity issue.

CONCLUSIONS AND IMPLICATIONS

The burden of increasing transit funding through a variety of sources has been examined by employing data provided by the U.S. Bureau of Labor Statistics. A number of potential subsidy sources as well as fares have been compared as to the income profiles of who pays from each potential source. The analysis suggests that choosing a new funding source or replacing one source with another has implications for the distribution of burdens. In addition, most sources are regressive; particular regressive...
sources include a household tax and the cigarette tax. Progressive alternatives include parking and income taxes. Of the sources studied, virtually all of them are less regressive than increasing fares. This is one factor to be aware of in the consideration of across-the-board fare changes.

In addition, choice of particular funding sources also affects the sectors of society who pay. A number of household-based alternatives (e.g., levies on motor vehicles and their operations) keep redistribution within the transportation sector, since automobile users are paying. Other sources involve nontransportation sectors of society; e.g., the general sales tax concerns all consumers. Higher fares and/or service cutbacks affect the user sector to the greatest extent.

Political realities play a large role in funding changes. Sources are typically sought that will maximize revenue and the likelihood of adoption and minimize controversy. Tax incidence frequently plays a minor role. The financial crises facing transit systems have led to consideration of a variety of funding options. For example, in the Chicago area, recent proposals included increased sales, liquor, tobacco, stock-transfer, property, income, and/or motor fuel taxes; a gross receipts tax on oil companies; a tax on professional services; and fare increases and service cutbacks. The size of the projected deficits has severely limited the number of options available. Many of the excise taxes on consumption would hit on such a small relative market that their total yield would be too small or the tax rate on these items would have to be prohibitively large. As can be deduced from Table 1, few consumer expenditures are large enough to raise reasonable sums through household-based taxes. The general sales tax: a specific excise tax on gasoline, utilities, motor vehicles, or new mortgages; and income taxes appear to be the only sources with adequate potential as revenue raisers. To avoid controversy, many of the politically favored sources are not levied on individuals, either as consumers (through higher prices), firm owners or stockholders (through lower profits), or workers (through lower wages).

Recent trends in federal financing suggest that more of the burden of transit financing will be shifted to state and local responsibility, who find themselves fiscally weak. This will likely result in a larger burden on the transit user, through increased fares and decreased service levels, as well as nonusers through higher subsidies. Federal general appropriation funding tends to be progressive; it relies principally on the income tax. State and local funding, on the other hand, tends to be regressive; it relies more on sales and property taxes. User charges (fares, services), as concluded above, are extremely regressive. This suggests that increased state and local user burdens would increase the inequality in the distribution of income.

The results presented above provide information relative to the burden of a number of household-based taxes that are frequently mentioned as subsidy sources. Further research into the incidence of business-based taxes would complement this analysis and improve the information relative to the who-pays question, which should play an important role in the decisionmaking concerning transit finance. An updating of expenditure patterns, when such data become available, would also be in order.

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