

A Preliminary Evaluation of Potential Sources of Revenue for Highway Finance

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There is a wide array of potential revenue sources for highway finance, including both governmental and private ones. User fees are the primary source of revenue at the state and federal levels, while general revenue forms the basis of finance at the county and municipal levels. Trends in the varying revenue sources are examined, and it is shown how user fees have declined as a share of total highway revenue from 80 percent in 1965 to 65 percent in 1985. The various types of revenue sources are examined individually. User fees include motor fuel taxes, registration fees, special motor carrier fees, tolls, and parking charges. Nonuser sources include sales and property taxes, income taxes, and severance taxes. Private involvement in financing is increasing, and options include donations, joint development, and private ownership. Criteria are suggested for evaluating each of the sources of revenue. Broad evaluations are made using the criteria of equity, economic efficiency, administrative ease, revenue potential, political and public acceptability, and applicability. Trade-offs must be made among the varying criteria for each of the potential revenue sources. Continued research and effort are needed to better quantify the various evaluation criteria, to develop implementable user fees in urban areas, and to better integrate land use and transportation control and financing.

AASHTO commissioned six papers for presentation at the national conference on highway revenue titled "Understanding the Highway Financing Evolution/Revolution" at Smugglers' Notch, Vermont, on August 16–19, 1986 (1–6). The papers discussed numerous aspects of the existing and several potential sources of highway revenue for consideration of state and local transportation administrators and policy makers. The purpose of this paper is to present trends in sources of highway revenue and to make a preliminary evaluation of these alternatives including their potential for raising vitally needed revenue for highway improvements.

The first section of this paper identifies the range of alternative revenue sources including a few salient points of each. This overview is followed by an examination of trends in highway finance with particular attention to nonuser sources. The next section presents suggested evaluation criteria and evaluates in a broad sense the various alternative highway revenue sources. This section is followed by a summary.

RANGE AND OVERVIEW OF ALTERNATIVE REVENUE SOURCES

The range of possible highway revenue sources is as follows:

1. Governmental revenue
 - a. User fees
 - (1) Motor fuel taxes
 - (2) Motor vehicle registration
 - (3) Other motor vehicle fees
 - (4) Motor carrier
 - (a) Weight-distance
 - (b) Other
 - (5) Driver license fees
 - (6) Tolls
 - (7) Parking charges
 - (8) Congestion tolls/fees
 - b. General revenue—nonuser sources
 - (1) General fund appropriations
 - (2) Sales taxes
 - (a) Earmarked general sales tax
 - (b) Motor vehicle titling and sales tax allocation
 - (c) Motor fuel sales tax
 - (d) Other dedicated sales taxes
 - (3) Property taxes and fees
 - (a) General, real and personal (motor vehicles)
 - (b) Special assessment
 - (c) Tax increment
 - (d) Impact fees (exactions)
 - (4) Severance taxes
 - (5) Income taxes
 - (6) Other taxes and fees (e.g., inspection fees, aviation taxes, tobacco, gambling, rents, royalties, and service charges)
2. Private sources
 - a. Donations
 - b. Joint development
 - c. Private ownership/operations
3. Other income issues
 - a. Debt: bonds and notes
 - b. Investment income

They are categorized as governmental sources (user fees and general revenue) and private sources. Debt and investment income are treated separately because they relate more to fiscal management of the basic revenue resources for highways.

Any evaluation of highway finance must address the concept and practice of user charges. Allen (1) traced the evolution of road user charges and their applications. Road user charges include direct charges as well as those where the payment of the tax and receipt of benefits is increasingly removed. The

most direct user charges are parking fees and tolls. According to Wuestefeld (6), toll road financing is the oldest form of user charge. Throughout history, toll roads and crossings have played an important part in transportation financing. The use of tolling is cyclic and is presently experiencing a rebirth. Tolls form the most direct user charge and are especially suited for high-traffic corridors where it is demonstrated that users are willing to pay a supplemental fee for highways. The payment of these charges and the benefit are felt immediately. Less direct but in line with usage are the motor-fuel tax and certain motor carrier taxes. Motor-vehicle registration fees are customarily paid annually, resulting in a distant relationship between payment and use.

These groupings loosely divide specific fees into classes that address the tax burden common to all vehicles (e.g., registration), those that relate to extent of usage (e.g., tolls and motor fuel), and finally to those on users that place an unusual burden on the highway (e.g., weight-distance fees). Allen's (1) economic rationale of private versus public goods provides a tool that will help decide the appropriate role of government and the form of revenue for the various types of road systems and whether the time-tested revenue source, user fees, has a place in today's and future funding plans.

The other major source of highway revenue is nonuser revenue for highways. Hovey (3), in addressing the role of nonuser fees in highway finance, stated that nonuser sourcing would likely come from three basic revenue taxes: property, income, and sales taxes. These account for the bulk of revenue in public financing. Other taxes identified are severance taxes and gambling receipts. In the paper, a sense of scale and magnitude of their yield was provided, as well as a caution that attempts to garner a portion of these revenues would encounter resistance from activities and functions that normally rely on these revenues. Nonetheless, Hovey (3) suggested and justified a few likely candidate revenues for tapping and described their potential for highway financing.

The benefit taxation rationale provided by Nichols (4) justifies the taxing of specific landowners and other beneficiaries of public improvements. This paper offers taxing mechanisms that target property taxation (mostly) of those who more clearly receive the benefits from public highway improvements, including impact fees, special assessments, and tax increment financing. Nichols (4) concludes that the principle of benefit taxation is fundamental to highway financing, whether it falls on the road users (e.g., motor fuel tax or tolls) or on property owners who realize gains in value because of government actions.

Departing from governmental revenue sources, Walton et al. (5) extended the challenge of highway financing with their paper on private participation. Private funding for highways is at the leading edge of "innovative financing," which is receiving extensive coverage at this time. The concept is not new but current applications have a modern cast. Private contributions include donations of money, real property, and services. A joint private-public responsibility may be formed where costs or profits are shared, impact fees are charged, or other considerations are negotiated benefiting private and public sectors. More formal arrangements are possible by special corporations or districts. These institutionalize private support for highways.

Last, complete privatization occurs when the private sector provides all aspects of transportation services including ownership and operation. Proposals for such private toll roads have recently been put forward in Colorado and Virginia.

TRENDS IN HIGHWAY FINANCE

The sum of receipts for highways for all units of government for 1985 totaled \$61.5 billion. The federal government accounted for \$14.8 billion of this amount. The states generated \$30.9 billion, whereas counties and municipalities provided the remaining \$15.8 billion (Table 1).

User Fees

Highway user fees supply the bulk of current income for highways. For 1985, road user imposts accounted for \$35.6 billion (net) out of \$55.0 billion raised for all highways (excluding \$6.5 billion in bond proceeds) (Table 2). Nearly all of these receipts were collected at the federal and state levels.

Two-thirds of all user imposts are from motor fuel taxes, which include gasoline, diesel, and gasohol taxes. Registration or tag fees account for 14 percent; other motor vehicle revenues including titling fees, operator licenses, and various other fees and charges for 9 percent; and the remainder is equally divided among other motor carrier (e.g., weight-distance and passenger-mile) taxes and tolls.

Road user charges represent the bulk of current highway revenue defined as total receipts less bond issue proceeds. At the federal and state levels, user charges are 78 and 84.6 percent, respectively. Local governments, on the other hand, rely predominately on nonuser revenues or general revenues derived from property taxes, general fund appropriations, and miscellaneous taxes and fees. Imposts on users (6 percent) are used sparingly by counties and cities.

State Highway User Revenue

In recent years, the states account for one-half of all money raised for highways. States look primarily to user fees to supply the funds for highway programs. The data compiled by FHWA report user revenues totaling \$23.3 out of \$27.5 billion of current income received by the states in 1985. For highway statistics publication purposes, FHWA defines road user charges as levies on motor vehicle ownership and operators because of their use of public highways; such levies are in addition to the support of general government. However, the lines between certain levies may be fuzzy, and any study of road user taxation inevitably reveals some anomalies in tax structures and interpretation. In such cases, the determination rests on examination of exemption provisions, prerequisites for registration, and constitutional and judicial rulings. In its simplest form, a road user charge should consist of levies imposed for the use of highways.

Historically, road user taxes have been divided into three major groups, the most important being fuel taxes. The second group, motor vehicle revenues, consists of registration fees and related fees, some of which are not paid annually (e.g., titling

TABLE 1 TOTAL RECEIPTS FOR HIGHWAYS, ALL UNITS OF GOVERNMENT—1985
(MILLIONS OF DOLLARS)

ITEM	FEDERAL GOVERNMENT				STATE AGENCIES AND D.C.	COUNTIES AND TOWNSHIPS	MUNICI- PALITIES	TOTAL
	FEDERAL HIGHWAY ADMINISTRATION		OTHER FEDERAL AGENCIES	TOTAL FEDERAL				
	HIGHWAY TRUST FUND	OTHER FUNDS						
RECEIPTS BY COLLECTING AGENCIES								
IMPOSTS ON HIGHWAY USERS 2/ MOTOR-FUEL AND VEHICLE TAXES TOLLS SUBTOTAL	11,571 - 11,571	- - -	- - -	11,571 - 11,571	21,310 1,973 23,283	250 50 300	250 195 445	33,381 2,218 35,599
OTHER TAXES AND FEES: PROPERTY TAXES AND ASSESSMENTS GENERAL FUND APPROPRIATIONS OTHER TAXES AND FEES SUBTOTAL	- - - -	- 465 - 465	- 1,420 82 1,502	- 1,885 82 1,967	- 1,354 1,451 2,805	1,880 1,875 110 3,865	1,420 4,870 200 6,490	3,300 9,984 1,843 15,127
INVESTMENT INCOME AND OTHER RECEIPTS	1,123	-	171	1,294	1,437	600	900	4,231
TOTAL CURRENT INCOME	12,694	465	1,673	14,832	27,525	4,765	7,835	54,957
BOND ISSUE PROCEEDS (PAR VALUE) 3/	-	-	-	-	3,404	2,145	1,000	6,549
GRAND TOTAL RECEIPTS	12,694	465	1,673	14,832	30,929	6,910	8,835	61,506
<p>1/ THIS TABLE SUMMARIZES AND CONSOLIDATES TOTAL RECEIPTS FOR HIGHWAYS. DATA FOR FEDERAL AND STATE AGENCIES ARE FINAL; THOSE FOR COUNTIES AND MUNICIPALITIES ARE ESTIMATES SUBJECT TO REVISION WHEN DATA FOR ALL LOCAL UNITS ARE AVAILABLE.</p> <p>2/ EXCLUDES AMOUNTS ALLOCATED FOR NONHIGHWAY PURPOSES. MOTOR-FUEL AND VEHICLE TAXES ARE ALSO NET AFTER REFUNDS AND COLLECTION EXPENSES. EXCLUDES MASS TRANSIT ACCOUNT OF HIGHWAY TRUST FUND.</p> <p>3/ ISSUE OF SHORT-TERM NOTES OR REFUNDING BONDS ARE EXCLUDED. PREMIUMS AND DISCOUNTS ON SALE OF BONDS ARE INCLUDED WITH "INVESTMENT INCOME AND OTHER RECEIPTS".</p>								

TABLE 2 USER FEES FROM ALL LEVELS OF GOVERNMENT

	Net Amounts (Millions) for 1985 ^{1/}				
	Federal	State	Local	Total	Percent
Motor fuel gallonage tax	\$ 9,801	\$12,914	280	\$22,995	64.6
Motor vehicle registration fees	-	5,054	-	5,054	14.2
Other motor vehicle fees ^{2/}	-	2,958	220	3,178	9.0
Other motor carrier fees ^{3/}	1,770	384	-	2,154	6.0
Tolls	-	1,973	245	2,218	6.2
TOTALS	\$11,571	\$23,283	745	\$35,599	100.0
Percent	32.5	65.4	2.1	100.0	

^{1/} Excludes collection costs and amounts allocated for nonhighway purposes.

^{2/} Including driver license fees, titling fees, permit fees, etc.

^{3/} Federal sales and use taxes; State weight-distance and passenger-mile fees.

fees, driver's license fees, and other revenues of minor importance). The third group, motor carrier taxes, has evolved from levies on for-hire carriers to measures that tax the volume and movements of commodities.

Motor Fuel

State motor fuel tax revenue includes taxes on gasoline, diesel, gasohol and other special fuel used on highways. Motor fuel used off highways is usually exempt from taxation or is refunded, thus making the levy a true user tax. For 1985, state motor fuel tax receipts totaled \$13.6 billion. After deducting collection costs (\$128 million) and \$615 million used for non-highway purposes, states realized \$12.9 billion for highways. State gasoline tax rates vary from 7 cents per gallon (Missouri) to 18.2 cents per gallon (Nebraska). Tax mechanisms also vary among the states; for example, 12 states index motor fuel tax rates. Diesel fuel rates are frequently higher than gasoline and gasohol is lower. On balance, the weighted average state tax on all motor fuel was 11.11 cents per gallon in 1985.

Motor Vehicle

Total motor vehicle revenue was \$12.4 billion in 1985, about \$1.2 billion less than motor fuel receipts. Motor vehicle receipts are subject to higher collection and administrative cost—\$1.6 billion, or 13 percent of revenue—than motor fuel revenue, and more diversion to nonhighway purposes occurs—\$2.4 billion, or 19 percent of revenue.

Registration revenue accounts for most of motor vehicle revenue, that is, \$8.1 billion for 1985; however, included in registration revenues, as reported in *Highway Statistics*, are fees in three states (Arizona, California, and Washington) that might be classified as nonuser revenues—more precisely, personal property taxes on motor vehicles. For 1985, these quasi user fees yielded \$1.7 billion. In addition, another 11 states

include the motor vehicle titling tax as a user fee; these raised \$1.6 billion in 1985. If motor vehicle revenue were restricted to registration or tag fees and other related revenues, the motor vehicle revenue total would be closer to \$8.7 billion for 1985. This revised amount also omits weight-distance taxes.

Motor Carrier

In 1985, 17 states charged a mileage, ton-mile, passenger-mile, or similar tax on motor carriers, totaling \$385 million. However, in only 9 states did this tax generate more than \$10 million. Graduated truck weight registration fees were not included in this category; total truck and trailer registration revenue amounted to \$3.2 billion and was included in the reported motor vehicle registration data.

Gross state road user revenue was slightly more than \$26 billion for 1985, including the questionable classification of the titling tax of \$1.6 billion and the \$1.7 billion from special property taxes on motor vehicles. After deducting cost of collection and funds diverted to nonhighway uses, states realized \$21.3 billion from road user taxes and fees exclusive of tolls in 1985.

Other State User Charges

Over half (27) of the states operated toll facilities that collected over \$2 billion in tolls in 1985. In some cases, surplus tolls were used to subsidize mass transit or other activities. When diverted tolls are deducted, net tolls amounted to \$1.973 billion.

The sum of user revenues from motor fuel, motor vehicles, and carriers, plus tolls, less skim-offs from collecting costs and diversions, was \$23.3 billion in 1985. The remaining receipts for state highway agencies totaling \$4.2 billion were drawn from nonuser sources consisting of general fund appropriation, other state taxes, investment income, severance taxes, and other receipts.

Local Government User Revenue

Road user imposts provided a minor share of locally raised revenues for counties and cities for roads and streets. However, through intergovernmental transfers, road user revenue accounts for a significant share of local expenditures, because state-shared road user revenue covers 32 percent of county and 17 percent of city highway expenditures.

Locally levied user charges average 6 percent of local current receipts. Local user taxes include local option motor fuel taxes in approximately 12 states. Equally pervasive are motor vehicle charges consisting of wheel taxes, local tag fees, or surcharges. Many local governments operate toll facilities, and all but a few are minor crossings. The exceptions are the toll road systems in Texas and Virginia and toll bridge and tunnel systems in the major cities, such as New York. The latter frequently raise revenues in excess of highway costs that are directed to other purposes—mostly mass transit. Parking fees seldom raise revenues in excess of costs to operate facilities or for collection. Excess parking revenues have not constituted a significant source of street financing for localities.

State General Revenue

The trend in the use of general revenues for highways has been increasing over the years. For all governments, the use of general revenues has increased from 20 percent in 1965 to 35 percent in 1985. Just before the Surface Transportation Assistance Act of 1982 was passed, the general revenue share climbed to over 40 percent. At the state level, road user charges accounted for 95 percent of all receipts in 1965; for 1985, the user share dropped to 85 percent. In other words, the nonuser share of state finance has tripled (from 5 to 15 percent) during the last 20 years.

In the order of yield, nonuser state revenue consists of general fund appropriations, investment income, selected sales taxes, and severance taxes and miscellaneous receipts. For 1985, state general fund appropriations totaled \$1.4 billion, as derived from state sales or income taxes placed in the state general funds.

State general fund appropriations may occur in varied forms. For example, in recent years, general fund appropriations for highways for one-fund states exceeded user charges until revision in user tax rates occurred. In one-fund states, all taxes and fees are deposited into a single fund and lose their identity. Appropriations for highways are made from commingled revenues. Louisiana and one-fund states such as Delaware, New Jersey, and Rhode Island are good examples. In other cases, allied highway functions financing (e.g., for the highway patrol) has been shifted from highway funds to general funds as was done in Arizona and Illinois. States have also supplemented road user revenues with general funds on occasion (e.g., Texas). On balance, these are not stable revenue sources for highway agencies because moods and priorities change. A more secure method is to dedicate a specific nonuser tax (or portion) to highways.

States have increasingly earmarked or dedicated certain consumption taxes to highways. One way to do this is by redefining a general revenue tax as a highway revenue source. The most likely candidate to apply is the sales tax from motor

vehicles and motor fuel; about one-half of the states dedicate one or both these tax revenues to highways. One reason for this pervasive practice may be due to the fuzzy line between user and nonuser charges, as in the case of the motor vehicle titling tax. These are deemed user charges by FHWA because the tax rate is slightly different from the general sales tax, or the state has no sales tax, or the act levying the tax is included in the motor vehicle code, or because of other minor criteria. Allen (1) says that these may be a form of first structure taxes. Hovey (3) believes that it is a user tax if the rate differs from the general tax rate. Nonetheless, nine other states identify and transfer similar amounts of general sales taxes on motor vehicles to highway accounts, but these are not considered user charges.

Motor fuel sales taxes have an equally cloudy cast. Currently, only 11 states apply the general sales tax (in addition to the excise tax) to motor fuel. In 5 states, the revenue is earmarked for highways, totaling \$296 million in 1985. Other fuel-related levies include motor fuel inspection fees and taxes on nonhighway fuel. Two states (Alabama and Tennessee) charge motor fuel inspection fees of 2 cents and 1 cent per gallon, respectively, and dedicate the revenue minus inspection costs to highways. These fees netted the states \$50 and \$33 million, respectively, in 1985. Aviation fuel and other off-highway fuels taxes were the source of funds for highways in other states (Florida received \$72 million).

The inclusion of motor fuel sales tax as a user fee rests on a narrow interpretation of legal language and practice. For example, Florida includes a sales tax component in its motor fuel tax; however, it is deemed a user charge because most off-highway motor fuel usage excluding aviation is exempt. West Virginia, on the other hand, permits no exemption; thus its tax is considered a nonuser tax.

State motor fuel sales taxes are consumption taxes. The bulk of the tax burden falls on the consumer and is in addition to state excise taxes on motor fuel. These taxes appear to be acceptable and their outlook for highways is promising.

Another category of nonuser revenue dedicated to state highways involves severance taxes. Severance taxes (oil, coal, and other) totaling \$239 million were expended for highways in nine states in 1985. Kentucky and Montana dedicate a share of coal tax receipts directly to state highways or coal impact roads. Others, such as New Mexico and Alabama, use severance tax revenues for debt service on state highway bonds. The outlook for these taxes is not bright, but for the few states endowed with such resources, these can be important.

The remaining group of general revenue sources presented in Table 1 is not frequently used for highways by the states. Real property taxes are predominately local government taxes. However, the states sometimes get involved in special property taxes on identified commodities such as motor vehicles. Personal property taxes on automobiles or fees in lieu of property taxes are levied in some states, and these taxes are significant revenue devices. In California and Washington, such fees have been interpreted by the courts as user fees. In recent years, Arizona dedicated about one-third of its similar taxes to state highways. Massachusetts oversees the administration of its tax, but the revenue is defined as a nonuser fee and is distributed to local governments for general purposes.

Gambling taxes are a recent entry in state highway finance. A few states assign minor portions to highways and mass

transit. Last, two states dedicate tobacco tax receipts to highways.

User taxes still supply most (85 percent) of the revenue for highways at the state level. Nonuser sources, while increasing, account for only 15 percent. For a few states, these nonuser sources yield more revenue than do user fees. Because the lines between user and nonuser fees are not always clear, a slight redefinition can move large amounts of dollars into highway accounts. For example, motor vehicle sales or titling taxes may be viewed as a form of first structure taxes. They are ad valorem (inflation sensitive) taxes and have outpaced registration fees and inflation over the last decade (7). The use of sales taxes on motor fuel is just emerging. The outlook for ad valorem taxes on motor vehicles and fuels is bright given its acceptance and close alliance to other user fees (8). Certain severance taxes may be acceptable. Where transporting heavy volume of resources over state or local highways occurs, a case can be made for charging a part of the cost of road maintenance to energy users. No similar justification or linkage under the benefits principle can be made for most other nonuser taxes earmarked for state highways.

Local Government Nonuser Revenue

Local governments fund highways and most other functions mainly from general revenues. General revenues consist of local sales taxes, income, and property taxes. Property taxes are the mainstay of local finance, providing 75 percent of local revenue. Special assessments target taxes to property within well-defined areas that directly benefit from public improvements, and dedicated taxes can be bonded. Further identification of benefits is achieved through tax increment financing that relates taxes to enhanced property values. Property taxes, including general and special assessments, raised \$3.3 billion for local road programs in 1985.

Local appropriated general funds compose the largest source of funds for roads and streets, which are estimated to total \$6.7 billion for 1985. The source of these funds cannot be identified but likely include property taxes, income taxes, sales taxes, and other taxes. Occasionally, local sales taxes are dedicated for roads and streets, as are franchise, business, and others. In total, they account for only 2 or 3 percent of local road funds.

Local governments look to dedicated property taxes and general funds for the majority of locally raised revenues. These, in combination with shared state revenues, supply 69 percent of total local highway funding. The remainder comes from highway construction bonds (approximately 14 percent), local user charges (3 percent), federal funds (6 percent), and others (8 percent).

In summary, highway finance at the local level is remarkably stable. The only detectable trend is toward greater reliance upon general revenues. For 1985, nonuser revenue accounted for 94 percent of current receipts, whereas these sources accounted for 91 percent in 1975. Recent years have recorded an increased interest in dedicating certain user and nonuser taxes for highways at the local level. For example, Florida has enacted a local option motor fuel tax for counties, and toll roads are being constructed by local governments in Texas and Virginia. Greater use of parking fees as revenue for roads and

streets is also a good prospect; however, these fees may be offset by the earmarking of sales tax revenue in areas like Phoenix because sales taxes have a far greater revenue potential. Despite limitations placed on property tax rates in some local jurisdictions and states, property taxes are inflation sensitive; hence they and shared state road user taxes will likely continue to be the mainstay of local highway revenue.

Private Sources

Significant localized contributions from the private sector are a recent addition to highway financing. Private participation can take the form of donations, joint private-public responsibility, or privatization of highways. Cooperative financing in the form of donations from private sources includes monetary contributions, transfer of real property, and services. In order to accelerate highway improvements, developers seeking access to areas that will benefit their interests or projects are willing to cover all or part of highway improvement costs. Another approach is to agree to joint responsibility when the private sector takes an active part in the planning and development process. Developers agree to share in construction and operating costs over a long time period. Other examples of joint responsibility include impact fees and profit sharing in which commercial ventures pledge specific revenues to local governments. Developers also may negotiate agreements with local governments to provide transportation facilities in return for operating permits, zoning, or regulation changes. In some high-growth areas, local governments are electing to demand concessions from developers in exchange for permission to build. These negotiated agreements stipulate developer financing and cost sharing of vital public facilities, including roads. Negotiated investments forge a link between public infrastructure improvements and private development. Private participation may be formalized into corporations or road districts. In one state (Texas) the legislature institutionalized the arrangement by permitting corporate bodies to be created to accept donations of land or services in return for access and tax deductions. Special districts have long been formed for specific public improvement purposes. Districts possess the power to assess charges or taxes that can be bonded, thereby providing the source of capital.

Orski (9) states that the intent is to shift more of the cost of transportation infrastructure from the general public to those who benefit from the public improvement. These methods may be viewed as "enlightened extortion," but no one denies that the negotiated agreements with developers have become an accepted part of the land development process and a rich source of funds at the local level (10, 11).

The last category of private financing involves private sector services under contract. Leasing or selling of unused land and air rights to private parties can establish a flow of funds for public agencies. In addition, certain highway facilities such as crossings may be suited to private ownership, for example, the Ambassador Toll Bridge in Detroit. These could also be franchised or leased by public agencies. Another type of private financing occurs when developers build facilities and lease them back to public agencies. As part of private returns, developers get depreciation tax advantages.

The range of revenue sources for highways given in the first section of this paper identifies many existing fiscal exactions in

use by state and local governments as well as other potential levies and revenue-raising mechanisms. For the states, user imposts constitute the majority of funds, but selected nonuser sources are growing. Highway finance at the local level is the opposite. Although some increases in user taxation are occurring, these increases will likely be offset by greater reliance on nonuser sourcing. The national extent (dollarwise) of private financing is unknown. In selected cases, however, private contributions might add significantly to local and (to some extent) state highway finance. Cervero (12) cites examples in assorted cities, such as a \$65 million contribution in Orange County, California, and a pooled developer effort in Germantown, Maryland, totaling nearly \$200 million. In Houston, Texas, between \$250 and \$500 million is being donated in land to construct the Grand Parkway, an outer ring road.

Bonds

Bonding and other debt instruments have provided capital funding for highways for decades. State and local government reliance on debt financing varies with jurisdictions and other factors such as interest rates. The recent drop in interest rates has spurred the use of bonding for infrastructure needs as well as for refinancing of debt issued during the peak interest rate period of the early 1980s. The delay in new fiscal year 1987 federal authorizations could also put pressure on the states to increase bonding. Highway bond sales totaled \$6.5 billion for 1985, an increase of \$3.4 billion over 1984. Bonding is expected to continue at this scale in the near term, considering the verdict at the election polls in which \$7.8 billion in infrastructure bonding was approved. The voter approval of bonding in November 1986 was the highest since World War II (13). Although highway financing represents only a portion of these bonds, the approval rate indicates a public awareness of infrastructure decay and a willingness to address the problem.

Bonding is not included as a current revenue source because it is not new money; rather, it pledges future revenue for repayment of funds advanced by the sale of debt. In short, to secure funds today, future revenue is encumbered. It is commonly assumed that capital expansion provided by the bond sale will generate increased usage and revenues that will equal or exceed the costs of servicing the debt. The assumed revenue comes from the sources identified earlier.

Another nontax source of funds for highways is investment income. These dollars result from the investment of idle highway funds. The clearest example in Table 1 is the federal Highway Trust Fund. In 1985, the highway account of the trust fund earned \$1.1 billion on a balance of over \$9 billion. The states realized about \$900 million from investments in 1985. In the last several years, all units of government have raised more funds for highways than was expended. This year-to-year imbalance should be invested and dedicated to highways in order to offset inflation, among other reasons. Income from investments could be an additional source of funds for the states that now deposit such amounts in general funds.

ALTERNATIVE REVENUE SOURCES

Assessment of given revenue sources must be time and place specific. In this section, a series of assessment criteria are suggested and applied in a broad way to the range of alternative

revenue sources. The criteria lend themselves to both qualitative and quantitative measurement, but even with revenue options specific to time and place, it is virtually impossible to have all the data and analysis tools necessary to fully evaluate the options. The important point is the necessity to assess options, even to a limited extent, in order to have decision makers more fully informed.

In this section, the suggested assessment criteria will be listed and described, then applied to the various revenue sources.

Criteria

The suggested criteria are as follows:

1. Equity
 - a. Fees in accordance with benefits received or costs occasioned
 - b. Ability to pay: distributional consequences
2. Economic efficiency
 - a. Short run—best utilization of existing transport facilities
 - b. Long run—optimizing investments
3. Administrative ease
 - a. Governmental collection costs
 - b. Evasion potential
 - c. Compliance costs
 - d. Legal issues
4. Revenue potential
 - a. Absolute
 - b. Stability over time
5. Political or public acceptability
 - a. Voter approval
 - b. Ease of dedication to highways
6. Applicability
 - a. Overall system versus project financing
 - b. State source versus county versus municipal
 - c. High-growth area versus low-growth area
 - d. New facility construction versus rehabilitation/maintenance
 - e. Ability to use with bonding

The first five criteria can be applied to each revenue source. The last criterion is really a sorting measure aimed at categorizing the revenue sources by the purposes for which they are suited.

Equity

Equity is usually mentioned by those assessing revenue options. It is an extremely difficult criterion in terms of both definition and quantification. Analysts and policymakers tend to have a variety of ways of judging the equity or fairness of a revenue-raising option. Economic theory focuses more on the efficiency objective with regard to pricing the roadway facilities. Equity comes then as a secondary measure to assess the relationship and distribution of costs and benefits.

Equity concerns are of two kinds. The first kind deals with the relationship of the revenue source to those who give rise to or benefit from roadway improvements and their costs. The

second kind is with regard to the distributional impact of alternative revenue sources among income groups and the progressivity or regressivity of a given tax, fee, or charge. The first kind of equity is sometimes labeled horizontal equity and the second, vertical equity (14, Appendix E).

Most of the state and federal highway cost allocation studies have concentrated heavily on the equity objective and have operationalized that objective by assessing fees in relation to the costs that various vehicle classes give rise to.

More recently, with the renewed emphasis on nonuser fees for the provision of new or expanded capacity in suburban growth areas, decision makers rationalize such fees, assessments, and donations on the criterion of benefits received.

The question of income distributional impacts is overlooked in a great number of revenue proposal analyses.

Economic Efficiency (14, Appendix E; 15)

Efficiency objectives deal with the maximization of societal benefits. In the short run, concern focuses on the pricing of highway facilities to allocate existing resources in an optimum fashion. In the long run, concern focuses on the best investment decisions to maximize benefits in relation to cost.

To meet the pricing objective, the revenue sources need to be fees related to highway use that track with the short-run marginal costs of road use. Such costs primarily include pavement damage and congestion (vehicle interference costs) and the more difficult to quantify externalities of accident costs, noise, and air pollution costs, although they are not as large as the first two mentioned.

In general, substantial trade-offs are made in devising user fees instruments to meet the efficiency objective because of extreme difficulty in being able to implement administratively efficient charges that vary by time of day. The coordination of fees across levels of government has generally proved infeasible.

The closer revenue sources are tied to a specific project, the better the long-run objective can also be partially satisfied by ensuring benefits and willingness to pay in relation to costs, at least for construction and rehabilitation.

Administrative Ease

Administrative ease focuses on the ability of governmental entities to raise the revenue with regard to collection costs, processing costs, enforcement costs, and evasion costs. Such measures as the ratio of administrative cost per taxpayer, per return, or per total revenue collected indicate the degree of difficulty of one source vis-à-vis another. In addition to governmental costs, the compliance burden on the payer of the fees (revenue source) also needs to be taken into account. The costs of recordkeeping, form preparation, and tax submission can be quite significant.

The criterion of administrative ease also includes the legal difficulties associated with a given revenue source. For example, does one type of motor carrier fee discriminate against interstate carriers vis-à-vis intrastate carriers? Or, can a given revenue source be used under the police powers of a jurisdiction or is statutory authority needed?

Revenue Potential

Both the absolute dollar amount of a revenue source and the stability of the revenue source over time must be taken into account. Past trends and forecasts of the future must be examined and decisions made regarding the revenue potential versus the criteria of equity, efficiency, and administrative ease.

Revenue sources that keep pace with highway investments, maintenance, and operation requirements would seem highly desirable.

Political or Public Acceptability

The closer the connection between who benefits from the use of the revenue source and who provides the revenue source, the easier it generally is to win support. This is obviously a rather difficult criterion to apply up front because the citizenry can easily reject a bond issue or the legislature reject a gasoline tax increase that appears to meet the test of relating the source and use of funds. It is extremely important that the need for a facility be clearly shown in terms of benefits exceeding costs in aggregate. The greater the degree to which this is also true for individual groups, the easier support can be achieved.

Applicability

Rather than being an evaluation criterion per se, this measure is more a screening device to judge whether the revenue source is even appropriate regardless of its costs to administer. Certain revenue sources are geared to funding specific projects, whereas others might be used to support an areawide program. Some can only be used at a state level, whereas others might only be used in a metropolitan environment. The economic growth rate of a given area affects whether or not a given source may be practical.

User Fees

In general, user fees meet the equity criterion quite well. One can argue whether each vehicle class pays an appropriate share, but the structure of state and federal user fees is in the direction of cost responsibility and benefits received.

The use of bonding with user fees as pledges (e.g., for toll facility construction) has an equitable appeal in that the users or beneficiaries of the investment will be paying off the bonds over the life of the facility.

With regard to their distributional impacts or vertical equity, increases in user fees tend to affect low-income households more than high-income households because of the higher proportion of household income dedicated to motor vehicle use in lower-income households. The impacts tend to be more sensitive to price increases although the share of total vehicle costs that user fees represent is so small that the impacts are slight (14, pp. VI 76–79).

With regard to the economic efficiency criterion, traditional user fees are far removed from short-run marginal cost (SRMC). Although many of the user fee instruments attempt to meet the governmental costs of road use, externalities are not charged for. Were SRMC used, more revenue could be collected for highways than is annually expended by all levels of

government. In 1985, user fees represented only \$35 billion of the \$55 billion in total current revenue. In addition, fees raised in urban areas would increase dramatically due to congestion charges. The current system of fees tends to overcharge rural users from a marginal cost perspective and undercharge urban users from an economic efficiency perspective. From a benefit perspective, however, one might argue that rural users get a break with regard to charges.

In addition to assessing the fairness and short-run pricing aspects of user fees, their macroeconomic impacts can be quite significant depending on the level of highway investment and increase, or lack thereof, in user fees. Consumer prices, labor productivity, and employment levels are all affected (16).

With regard to administrative ease, the major source of highway revenue, motor fuel taxes, is quite efficient, with collection costs under 1 percent of total revenue. Depending on the point of taxation, however, there can be serious evasion issues, particularly with diesel fuel.

Vehicle registration fees, which serve both a regulatory function and a highway revenue function, are far more expensive for the states to administer and costs average 13 percent of receipts. However, marginal returns may be higher because the regulatory portion of administrative costs is already in place.

For the federal user fees, the annual administrative cost of the heavy-vehicle use tax is about 1 to 2 percent of revenue and the sales taxes on tires and new trucks less than 0.1 percent of revenue (17).

Weight-distance taxes and tolls are significantly more costly in terms of collection costs. Weight-distance tax collection costs at the state level range from 2 to 11 percent of revenue (18, 19), and toll collection can consume on average 18 percent of revenue (6). An additional cost of toll collection is the cost of time delay from most toll collection systems, and the additional operating cost of decelerating, stopping, and accelerating associated with current toll collection procedures.

With regard to revenue potential, Table 2 illustrates the importance of motor fuel and registration fees.

The use of user fees is significantly absent at the local level. Given the rationale for user fees, effort ought to be given to developing administrative mechanisms for their implementation.

General Revenue

The large number of general revenue sources meet the evaluation criteria to varying degrees.

With regard to the equity criterion, there are a number of revenue sources that tie in with the notion of occasioned costs or benefits received. Dedicated motor vehicle and gasoline sales taxes and motor vehicle titling taxes can be considered by some to be an equitable way to finance highways. If the general sales tax rates on gasoline and motor vehicle titling are less than general product sales tax rates, then the taxes should not be considered user fees.

Special area assessments and impact fees for highways are clearly benefit-related and construed to be equitable ways of raising highway revenue. Similarly, severance taxes based on the costs imposed on roadways of mining or transporting vehicles stand the equity test in the political arena.

Equity issues are raised with impact fees regarding the level and timing of the fees; that is, are they collected at the time of

highway investment need or too far in advance (13)? However, given the price elasticities of demand and supply, impact fees will generally primarily pass through to the purchasers of the developed property (20).

The short-run economic efficiency criteria cannot be met with general revenue sources of revenue. Transport fees on property owners do tie in with a long-run efficiency objective by ensuring the value or benefit of the transport facility investment.

The ease of administration of general revenue sources ranges from relatively easy for sales and income taxes to difficult for complex tax increment finance schemes where developers, local officials, and state officials must tackle bonding and dedicated future revenue streams (e.g., property tax) in a consolidated package.

Impact fees can be implemented under broad police powers and generally meet judicial challenges if they are related to a need for and cost of new highway facilities, if the highway facilities benefit the development that is the source of funds, and if the expenditure of receipts is localized to the geographic area where the fees are collected (20).

The revenue potential of general revenue is large and growing. General fund appropriations are the lion's share of general revenue for highways, with property taxes and assessments second in magnitude but only about one-third of the general appropriations (Table 1).

The stability of sales tax receipts remains an issue. Revenue from sales taxes on the market price of motor fuel is the best example of a revenue source that performed in the direction opposite to that intended by the legislators. However, sales tax receipts on the purchase price of motor vehicles have, in general, risen with inflation over time (7). The acceptability of general revenue sources must be high given the declining share that user fees represent of overall highway revenue. The ability of local and state road officials to tie the general revenue sources to either highway costs or benefits has enabled certain sources to grow in importance.

Private Sources

Total ownership and operation of highway facilities by the private sector will continue to be a small part of the solution to the highway revenue issue.

Donations and joint development can be greatly enhanced by overcoming the governmental and institutional barriers by such concepts as nonprofit transportation corporations (21). Federal legislative proposals to allow private contributions to count as the state or local match on federal-aid highway projects could make this revenue option more desirable to local officials.

Equity issues are highly important for private contributions. The degree to which they distort sound governmental investment policy is currently a growing area of concern. Growth areas can easily win out over low- or no-growth areas.

SUMMARY

1. User fees are shown to be the major source of revenue for the state and federal government and are largely unused by local government.

2. General revenue sources have grown in terms of the share of total revenue at both the state and local levels. This trend needs to be closely examined in light of the criteria desired to be met by highway revenue sources.

3. The economic efficiency criterion can be partially met with user fees such as fuel taxes, weight-distance fees, tolls, and parking charges. Urban governmental units need to implement user fees that track with congestion costs in order to meet this criterion.

4. The administrative ease of the alternative revenue sources is quite variable. Many of the user fee instruments and general revenue sources that meet equity and economic efficiency criteria are the most difficult to administer.

5. The closer general revenue sources of income can be related to either the costs of highways or the benefits received from highways, the more acceptable they are likely to be perceived.

6. The various revenue sources are applicable for different purposes. For example, private sources of revenue are currently more applicable in growing urban areas and have application for specific projects rather than as a systemwide source of revenue.

7. Further research and study are needed to (a) better quantify the various assessment criteria so they can be applied in specific situations, (b) develop model legislation or regulations to allow better coordination of user fees and taxes across levels of government, (c) develop coordinated land use zoning and transport fees for suburban growth areas, and (d) develop project prioritization and programming tools that take into account public and private costs and public and private sources of revenue.

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