



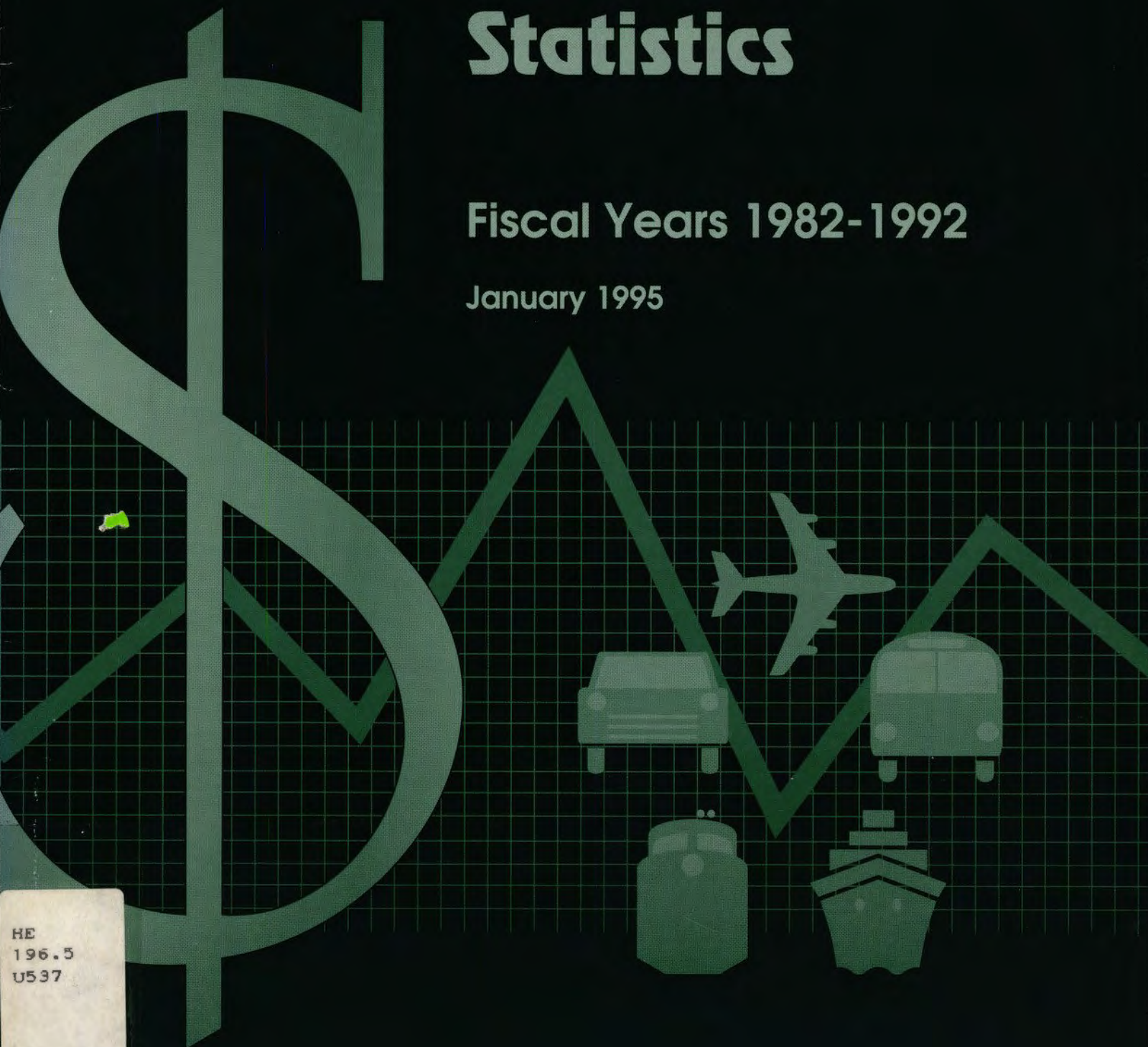
U.S. Department
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Bureau of
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Statistics

Federal, State and Local Transportation Financial Statistics

Fiscal Years 1982-1992

January 1995



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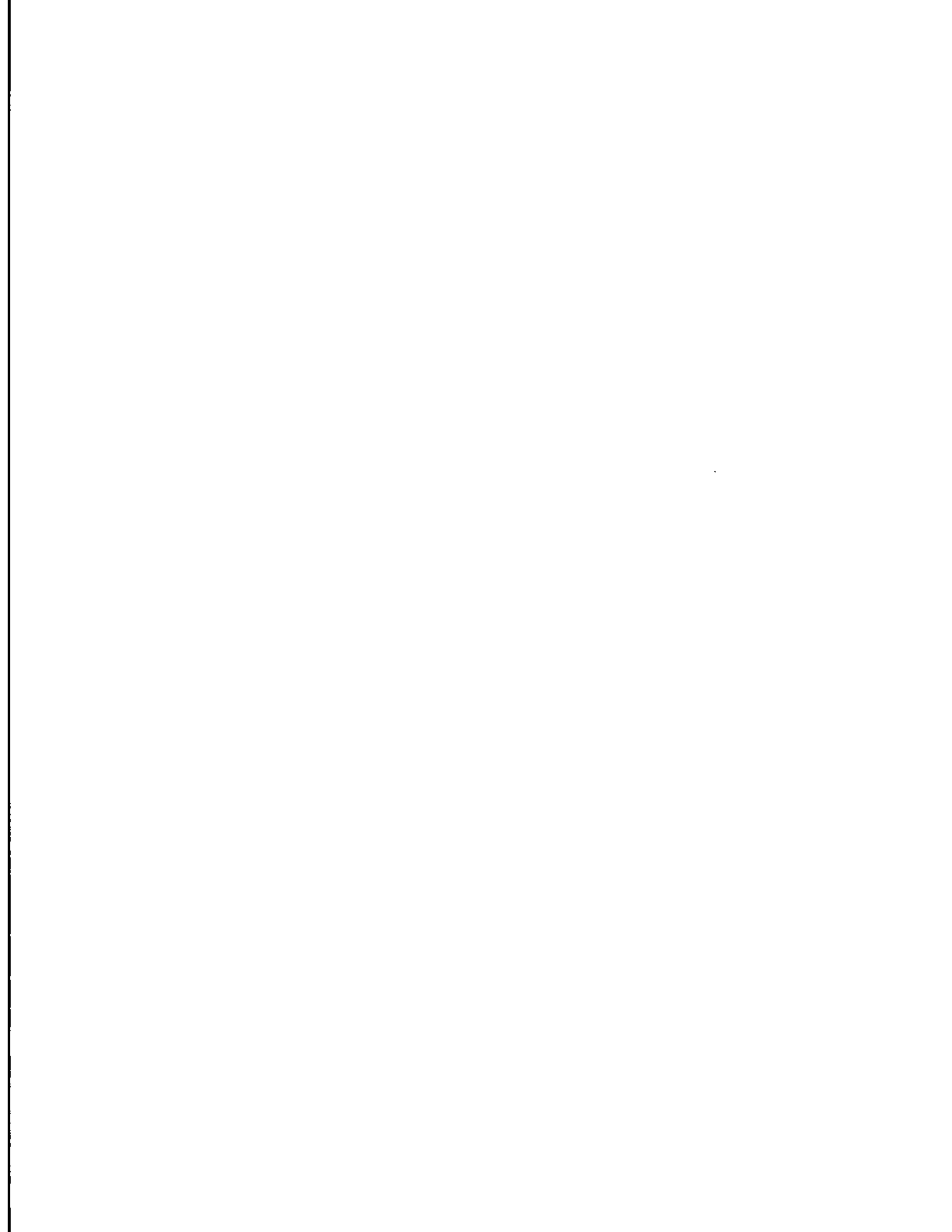
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PREFACE

T

**he Bureau of Transportation
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**Transportation Efficiency Act of 1991 and is the newest
operating administration of the U.S. Department of
Transportation. Its mission is to compile, analyze, and make
accessible information about the nation's transportation
systems; to collect information on intermodal transportation
and other areas as needed; and to enhance the quality and
effectiveness of the Department's programs through
research, the development of guidelines, and the promotion
of improvements in data acquisition and use. The BTS has
assumed responsibility for publication of this document,
which was formerly prepared by the U.S. Department of
Transportation's Office of Economics, Assistant Secretary
for Policy and International Affairs.**

Acknowledgments

This document was prepared under Project Plan Agreement KB503 between the Bureau of Transportation Statistics and the Research and Special Programs Administration's Volpe National Transportation Systems Center. Jean Wooster of the Volpe Center's Economic Analysis Division is the principal author. Michael Rossetti, also from the Volpe Center, is the Project Leader.

We thank recently retired Philip J. Barbato of the Office of Economics for producing this report annually since 1984. We appreciate his work over the years in constructing and maintaining this valuable database on transportation-related finances.

We also thank the following individuals who offered guidance, support, and special services during the course of the project: Henry Wulf, Chief of the Census of Government Division of the Census Bureau; Bruce McDowell, Director of the U.S. Advisory Commission on Intergovernmental Relations, Arthur Webster, Andrew Johnsen of the Volpe Center, Anne McEwan of EG&G Dynatrend and Carolyn Cook of Camber Corporation.

Because this publication is updated periodically, the BTS would appreciate being notified if any data errors or omissions are found. Any general comments about this report should be directed to Jean Wooster at (617) 494-2209.

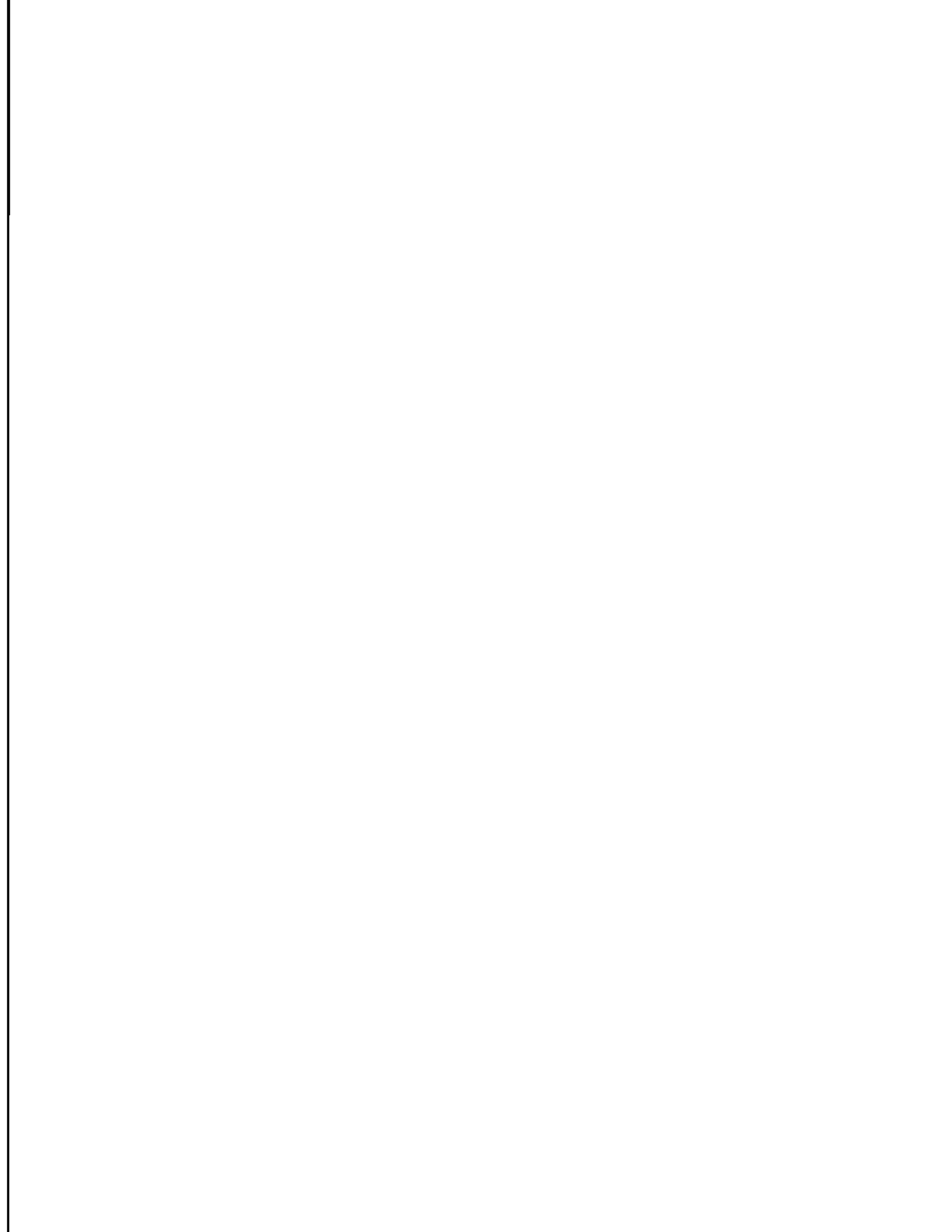
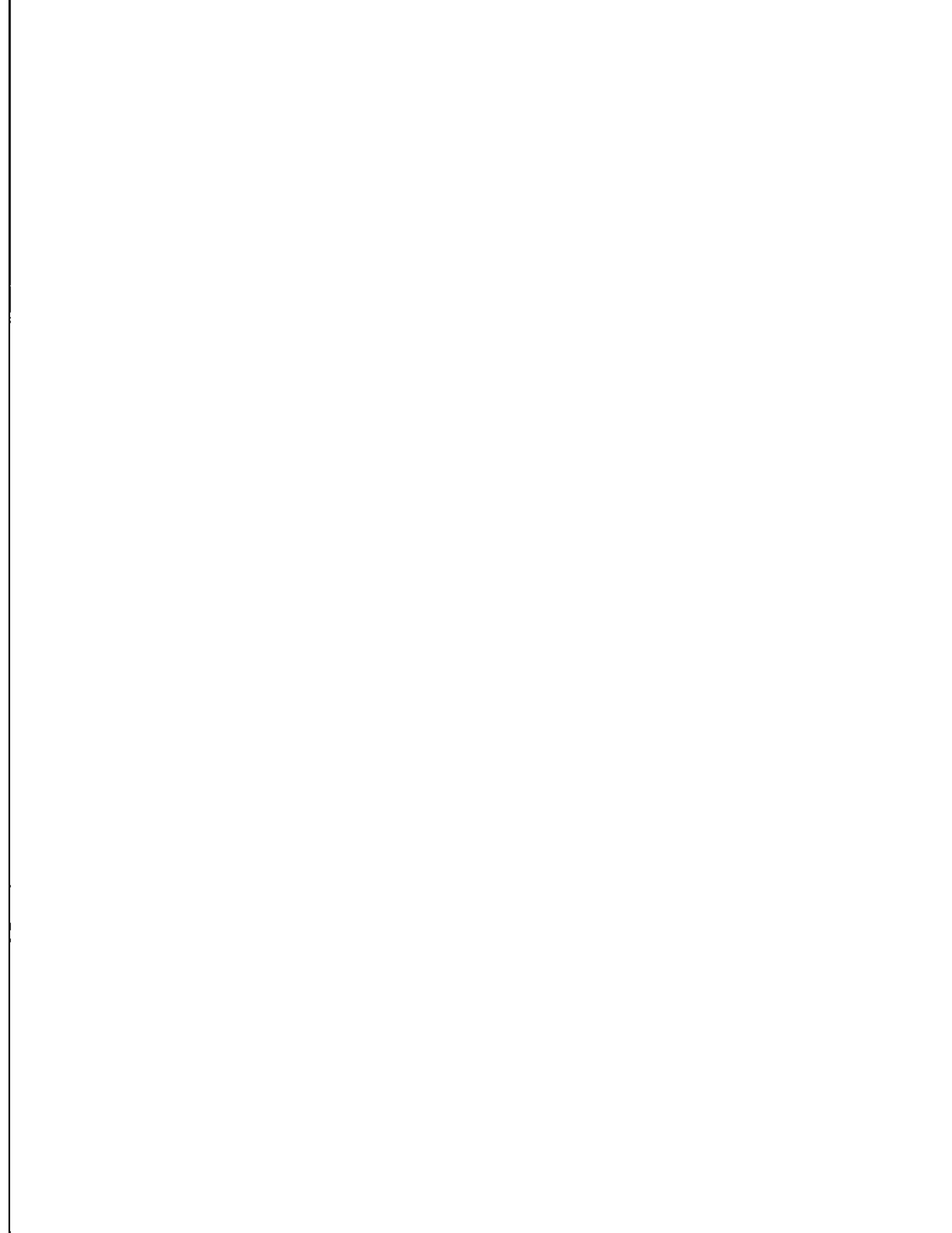


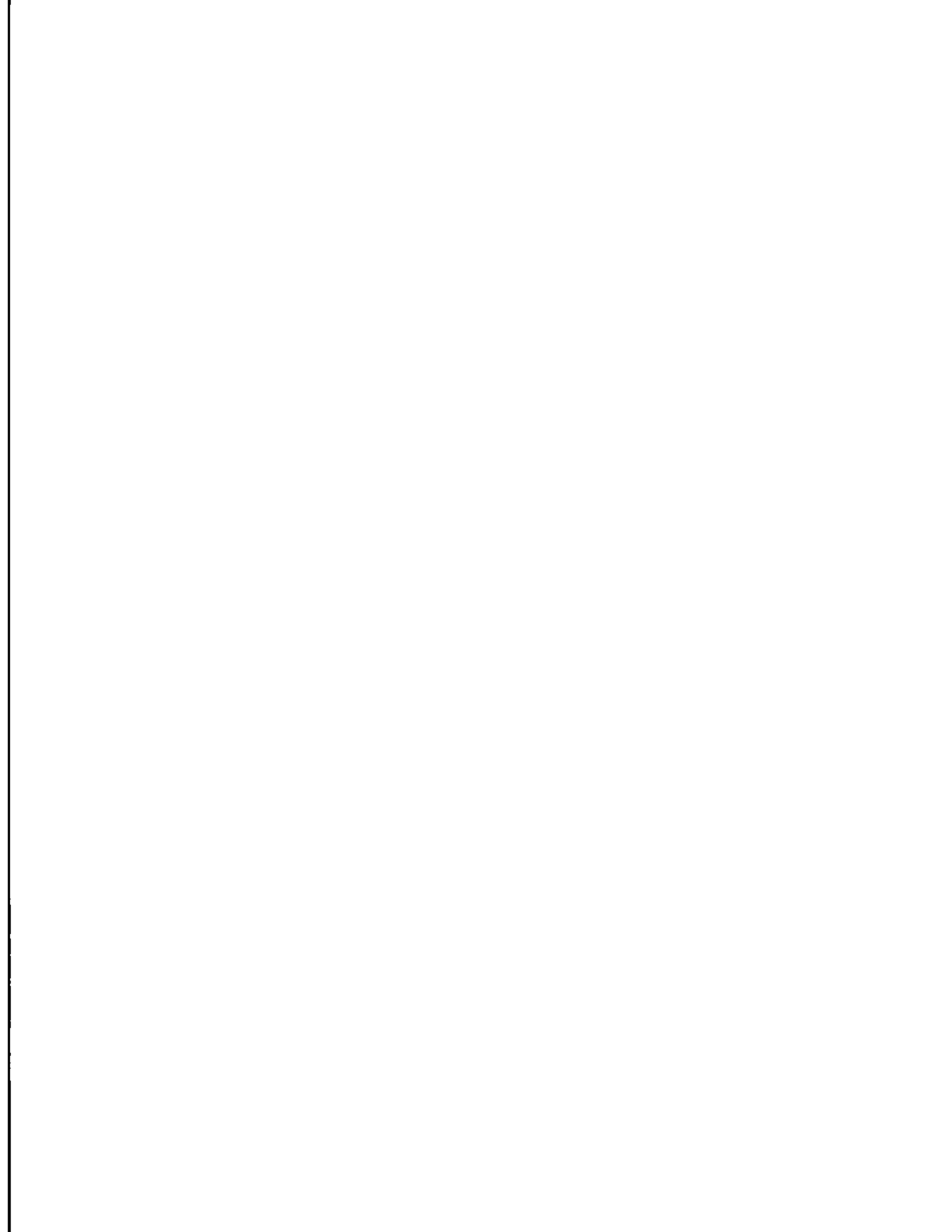
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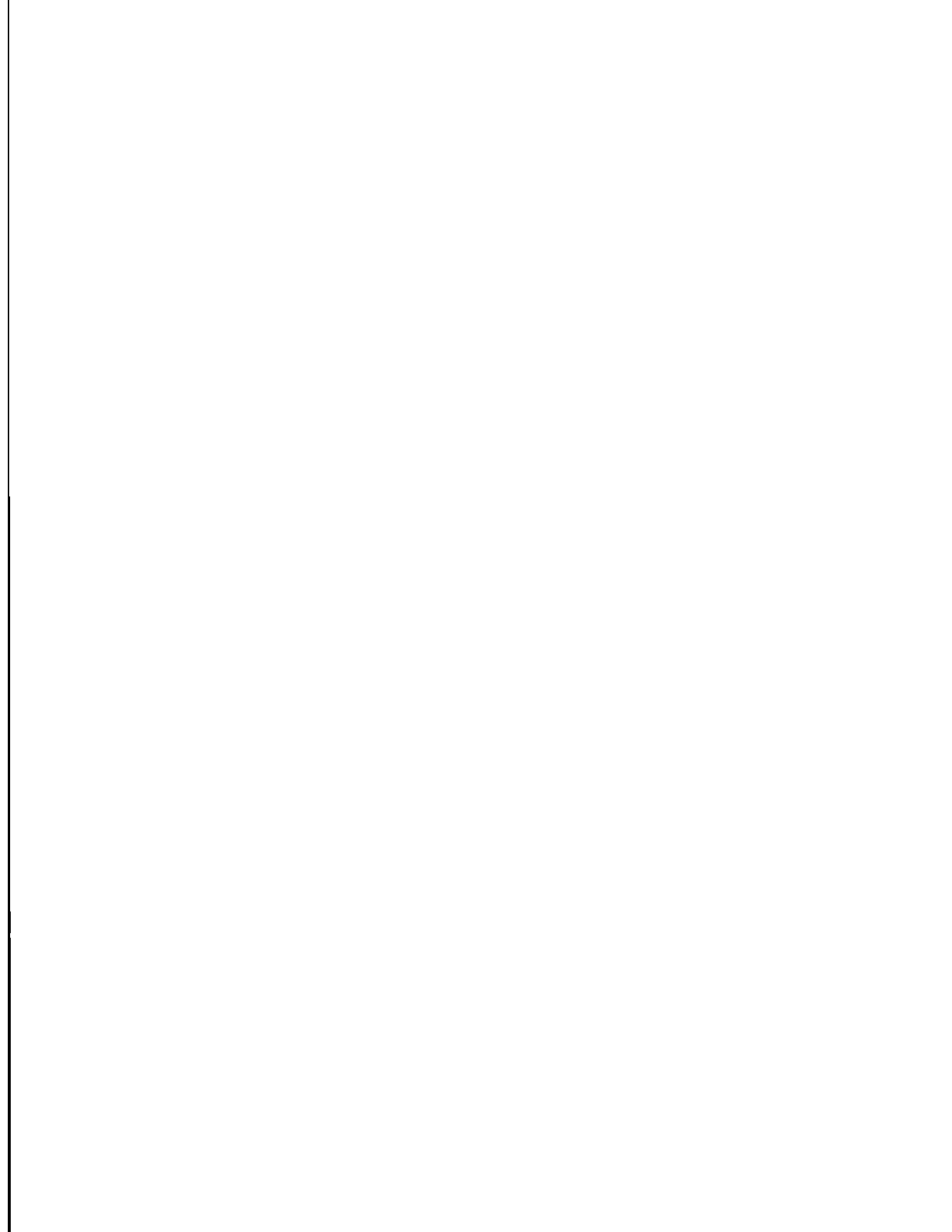
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EXECUTIVE SUMMARY

The public sector plays a significant role in providing our nation's transportation infrastructure by collecting tax revenues and expending funds for building, maintaining, and administering major portions of the transportation system. The public sector also plays a role in funding modal operating costs where there is an important public interest at stake.

Public transportation revenues are collected largely from user charges and, to a lesser degree, from general tax revenues. However, general funds are not included in this report. A considerable amount of funds are transferred among the three levels of government -- federal, state, and local. These intergovernmental transfers represent a substantial revenue source for state and local governments and significant expenditures for federal and state governments.

Scope of Report

This report is the eleventh in a series that identifies and details time-series data for federal, state, and local transportation-related revenues and expenditures for fiscal years. This time series has been extended through fiscal year 1992 with the addition of estimates. While the database begins in 1977 space limitations dictate that only data from 1982 through 1992 are displayed. This data set provides an opportunity to

recognize trends in public transportation financial activity over time. All years referred to are fiscal years.

General Trends In Government Finance of Transportation

Highlights of some trends emerging from these data include the following.

Although annual government transportation expenditures exceed revenues, the gap has been closing. Since 1982, total transportation revenues, in inflation-adjusted dollars, have been growing at 4.45% compound annual growth rate, while total transportation expenditures have been growing at an compound annual growth rate of 2.71%. In 1992, total government transportation revenues were \$80.2 billion, while total government transportation expenditures in 1992 were \$113.3 billion.

The growth in federal transportation revenues is driving the increase in total transportation revenues, while both state and local governments are the dominant

sources of transportation spending. From 1982-1992, federal revenues grew at a compound annual growth rate of 6.4 percent while federal spending grew at 0.63 percent. In contrast, state and local spending grew at a rate of 3.9 percent over the same period.

State and local governments' expenditures are greater than the amount they collect in transportation revenues. In 1992, states generated \$39 billion in revenues and spent \$46.5, after grant transfers. Local governments, after grant transfers, spent \$53.4 billion (the highest among all levels of government) and collected \$15.3 billion (the least amount) in revenues.

As a result of the closing gap between transportation revenues and expenditures, the degree to which total transportation government expenditures are "covered" (i.e., paid directly by users and transportation-related collection by government) has increased. Considering all public transportation revenues and expenditures, the "coverage ratio" in 1982 was about 60 percent. It increased to about 70 percent in 1984 and has remained close to this level since that time.

By order of magnitude, the highway, air, and transit programs generated the greatest share of public revenues. In 1992, highway programs collected \$56.8 billion in revenues, comprising 71 percent of total transportation revenues. Air collected \$11.8 billion, making up 14.7 percent of revenues, and transit collected \$7.6 billion that was 9.4 percent of transportation revenues.

States funded the largest share of the highway program, while local governments carried the burden for transit and water. Federal funding was the greatest source of revenues for the air and pipeline safety programs. On average, over the

1982-1992 time period states funded 64 percent of the highway program. Local governments funded 62 percent of transit and 48 percent of water. Fifty percent of funding for air was provided by the federal government while 100 percent of the identifiable funding for pipeline safety was provided by the federal government.

The highway program generated the most revenues and expenditures of all the modes and has been consistently and substantially user financed. The state motor fuel tax contributed the most toward highways, and out of all the modes the most grants went to highways. In 1992, the highway mode collected \$56.8 in revenues representing 71 percent of total transportation revenues. Spending for highways was \$67.4 billion, comprising 61 percent of total transportation expenditures. The average coverage ratio for highways was about 80 percent. The state motor fuel tax generated \$22.3 billion in revenues in 1992 that comprised 39.2 percent of highway revenues. Federal grants for 1992 were \$16 billion representing 75 percent of all federal transportation grants.

The air mode has also been consistently and substantially user financed. In addition, government revenues and expenditures for air have grown the fastest among all modes. The average coverage ratio for air has been approximately 80 percent. Using constant 1982 dollars, air revenues have grown at a compound annual growth rate of 7.5 percent, while expenditures have grown at 6.2 percent. Both represent the greatest growth among the modes.

The following two graphs represent transportation revenues and expenditures by level of government from 1982 through 1992 that reflect some of the above findings.

FIGURE ES-1

Transportation Revenues by Level of Government: 1982-1992
Constant 1982 Dollars

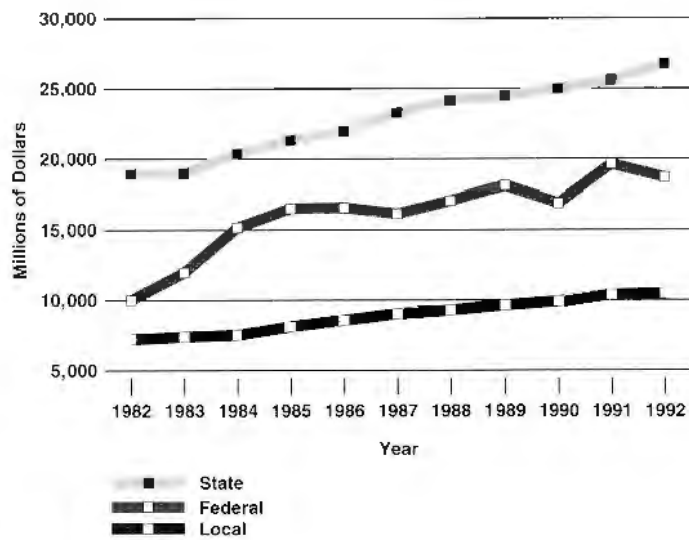
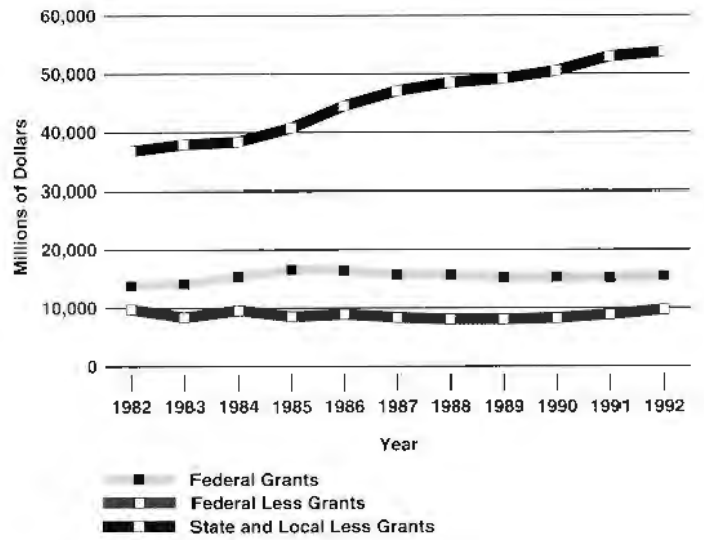
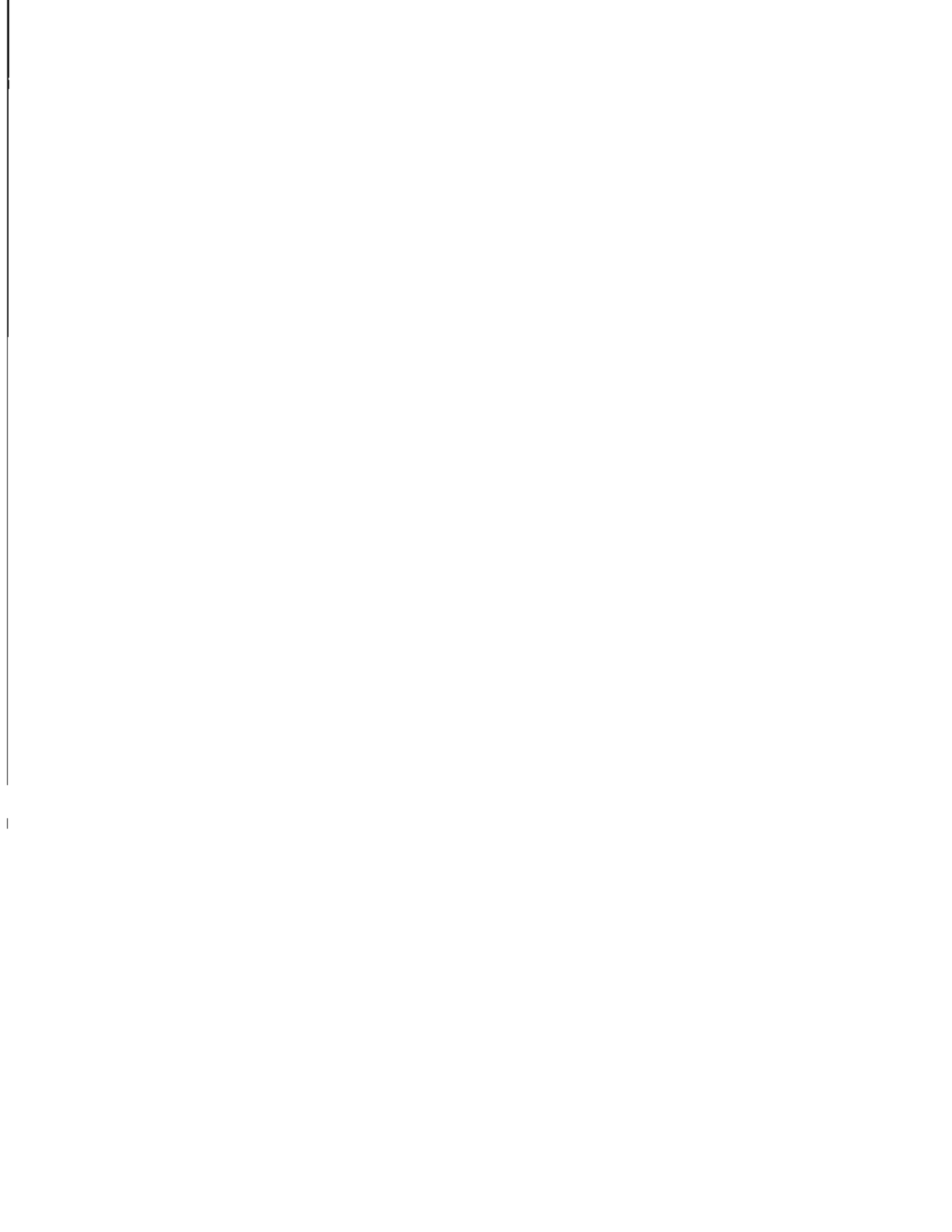


FIGURE ES-2

Transportation Expenditures by Level of Government: 1982-1992
Constant 1982 Dollars





INTRODUCTION

The purpose of this report is to identify financial trends through the presentation of time series data on government transportation-related program revenues and expenditures. Similar to previous editions of this report, this document displays revenues and budget expenditures for all federal transportation-related programs, including programs in federal agencies, and state and local agencies outside the Department of Transportation.

The report provides answers to questions frequently asked by members of Congress, the Administration, state and local governments, and the general public. For example:

- What has been the general trend in transportation-related revenues and expenditures for different levels of government?
- What are the changes in the distribution of transportation expenditures by each level of government?
- To what degree have government transportation-related budget revenues (taxes) covered government transportation expenditures? Is this coverage changing?
- What are the changes in the modal distribution of government transportation expenditures?

Background

This report is the eleventh in a series that presents time-series data on federal, state, and local government transportation-related expenditures and revenues. A related publication, *Federal Transportation Financial Statistics: Fiscal Years 1984-1994*, provides more detailed federal level information on receipts and expenditures and will be published by the BTS at a later date. That report also had previously been produced annually by the DOT's Office of Economics, Assistant Secretary for Policy. Estimates for this report have been added to extend this time-series through fiscal year 1992. Although the database begins in 1977, only 11 years of data are displayed in the tables (1982 - 1992). This helps to conserve space and makes the information easier to read. Readers who would like data

from these years can consult prior year publications, or contact either the author of this report or the BTS.

Through the years, adjustments have been made to the data to correct minor errors or omissions. For example, gas tax revenues of the mass transit account of the Federal Highway Trust Fund were originally reported as highway revenues. Beginning in 1983, they have been reported as transit revenues. Also, direct subsidies to privately operated transit systems by state and local governments were added to the data base as expenditures of these governments.

Future plans for this report call for an expanded data set in order to increase the scope of the report. In addition, the information contained in this report is expected to be released in electronic format during 1995.

Report Organization

In the chapters that follow, more detailed information is provided on public transportation financial statistics. Chapter II includes a list and detailed description of the data and sources. Included are the derivation of the data series, methodological caveats, and clarification of specific points of concern. Intergovernmental transactions, after the effects of government transfers, are discussed in Chapter III.

Chapter IV explores trends in government transportation finances. First, trends in transportation revenues, expenditures, and user coverage by level of government are presented. This is followed by revenues, expenditures, grants and user coverage by modes. The last part discusses expenditures by both level of government and mode.

The Appendix includes terminology and definitions used in this report.

PRINCIPAL DATA SOURCES *and* DESCRIPTION *of the* DATA

This chapter discusses the sources of data that are used for this report and explains why certain data sources have been omitted. The data are described in terms of transportation revenues and expenditures by level of government and by mode.

Data Sources

A variety of data sources were used to construct the database. A primary source of federal level information is the Budget of the United States. Expenditures and budget receipts for most federal programs, except as noted below, are from the Appendix to that document. Thus, the figures are consistent from year-to-year and adhere to the definitions required by the Office of Management and Budget (OMB). A primary

source of state and local data is the U.S. Bureau of the Census publication, *Annual Survey of State and Local Government Finances*. Additional information regarding state and local government revenues and expenditures were derived from unpublished data from the Government Division of the U.S. Bureau of the Census. These data contain more detail than is published in the *Annual Survey*.

Other statistics include waterway data obtained directly from the U.S. Army Corps

of Engineers. Data regarding federal expenditures for highways are from the Federal Highway Administration (FHWA) Highway Statistics publication. Other U.S. Department of Transportation data were obtained from individual Department sources, including the Federal Transit Administration (FTA), Federal Rail Administration (FRA) and the Office of Pipeline Safety (OPS).

Data Description

The database that provides information for this report includes all federal, state and local transportation-related programs for which data were available. The accuracy and completeness of state and local transportation revenues and expenditures are uncertain because the Census Bureau data are based on a sample survey of local governments and the annual Census survey of state finances. All units of government are included in the Census of Governments that is taken at five year intervals in years ending in "2" and "7." The federal figures in this report correspond to a fiscal year that begins in October, while the state and local data are for a fiscal year that generally starts in July. While this may create a small error in totals for any given year, we believe the data are suitable for illustrating trends in public transportation finance.

The Index of Government Purchases of Goods and Services (GPGS) for state, local and federal governments is used for adjusting some data for wage and price changes. This index adjusts for inflation by converting current dollars to constant dollars, thus reflecting average prices paid for goods and services procured. The source for the computation of the indices used is the *Economic Report of the President, 1993*.

Summary of Public and Private Roles In Transportation

Typically, the federal government's main focus in transportation spending is capital investments, while state and local governments carry most of the responsibility

for operating and maintenance obligations. These respective roles, however, have evolved and changed over time.

The federal government expanded its role in the post-World War II period by undertaking several transportation building programs: it began to tie the nation together with a safe, high-speed interstate freeway system; it developed a system of air travel to reduce transcontinental travel time; and, retained affordable mass transportation, which was previously privately provided. As federal fiscal strength began to falter in the late 1970s, reevaluation of the federal role began and continues in the 1990s. The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) delineated some of these changing public and private roles. ISTEA provided state and local governments more flexibility to determine transportation solutions, whether transit or highways. States were also given more responsibility for standards applying to highways. In addition, the private sector was increasingly tapped as a source for funding transportation improvements as illustrated in the relaxed restrictions on the use of federal funds for toll roads and the ownership of these facilities by private entities. These changing roles have also been evident in rail. Not only have support and interest been growing at the state and local levels of government for passenger rail, but many states have invested their own funds on rail freight preservation projects in recent years.

Specific Public and Private Roles in Transportation Financing

The following public and private roles for highway, air, and water are from *Fragile Foundations: A Report on America's Public Works* authored by the National Council on Public Works Improvement based on William G. Colman's *Provision for the Major Categories of Physical Infrastructure: the Question of Proper Roles*. The federal government plays the dominant role in planning, setting standards for, and providing capital financing of the Federal Aid Highway System. It also takes the lead in

operating and maintaining the nation's airways and harbors. In addition, the federal government also plays a major role in capital financing of mass transit and many smaller airports. The federal government regulates rail safety and plays a role in research and development. The main responsibility for pipeline safety is the role of the federal government. It administers the national regulatory program to assure the safe transportation of natural gas, petroleum, and other hazardous materials moving by pipeline.

State governments play a dominant role in the management of non-interstate federal-aid highways that are financed mostly with state motor fuel taxes. State governments also have had an increasing role in public transportation operations and in capital and operating spending. States also assume part or all of the intrastate regulatory and enforcement responsibility for pipeline safety.

Generally, local governments are dominant in providing the facilities and services for local roads, mass transit, and airports. The private sector shares some of these key local roles, i.e., funding, operating, and in some cases owning airports and water ports. At the local level, there are more opportunities for the private sector to supply niche type services, such as express bus, vanpools, and similar markets where a profit can be generated from such a service.

Terminal facilities at water ports and airports are funded and operated by private companies. Public transit agencies contract with private firms for some or all of their services. At sites they develop, developers usually build local roads, sewers, water lines, and storm drainage facilities. They then turn these facilities over to the public for operation and maintenance. The private sector also owns and manages the freight rail system. AMTRAK, the National Railroad Passenger Corporation, is a government-sponsored for profit corporation with all Board members effectively appointed by the Executive Branch of the Federal Government and is not an agency or instrumentality of the U.S. Government.

Transportation Revenues and Expenditures By Level of Government

Government Transportation Revenues

The transportation revenue estimates contained in this report consist of those funds identified as user charges, taxes or fees in the various data sources. They include transit fares from systems owned and operated by state and local governments, including those systems operated under contract by a private firm whenever the government maintains day-to-day financial oversight. Other funds exist which may properly be categorized as transportation-related revenues, for example, local governments spend some property taxes on transportation vehicles, equipment, and streets and some states spend income taxes to support rail and intercity bus services. However, since these funds are not identifiable, they are not included in this report.

Some general tax revenue is used to defray transportation infrastructure costs, for example some general treasury funds are used for waterway construction. However, general fund revenues are not included in this database and report. In addition, rail is not shown since it yields no revenues to federal, state and local governments. Parking is generally self-supporting, but it is a local function typically with no state or federal involvement.

Federal Level Revenues. At the federal level, transportation revenues generally consist of trust fund collections from user charges such as fuel taxes, vehicle taxes, registration and licensing fees, and air passenger ticket taxes. In addition to the trust funds, the general fund provides some funding to many transportation systems. However, federal revenues in this report do not include general funds allocated to transportation. The five transportation-related federal trust funds are highways, which includes highway and transit accounts; airports and airways;

aquatic resource, which are of interest because of the boat safety account; harbor maintenance, and inland waterways. There is also a pipeline safety fund, but it is not a trust fund. The status of these funds is reported annually in the Appendix to the Budget of the U.S. Government showing income, outgo and interest earnings.

The Federal Highway and the Airport and Airway Trust Funds are among the major Federal Trust Funds. The Federal Highway Trust Fund (HTF) revenues are derived from various excise taxes on highway users, i.e., motor-fuel, motor vehicles, tires, and parts and accessories for trucks and buses. The money paid into the fund is earmarked primarily for the federal-aid highway program. The highest individual source for the Highway Trust Fund receipts is the excise tax on gasoline. Effective 1979 the gasoline tax was 4.0 cents per gallon. It increased to 9.0 cents per gallon in 1983, to 9.1 cents in 1987, and to 14.1 effective December 1, 1990. Also, beginning with this last increase, 2.5 cents per gallon were distributed to the general fund for national debt reduction. Beginning October 1, 1993, the gasoline tax increased to 18.4 cents per gallon with a total of 6.8 cents per gallon towards deficit reduction. Starting October 1, 1995, however, 2.5 of the 6.8 cents will be dedicated to the HTF.

Effective in April 1983, one cent of the federal gasoline tax has been set aside for transit in the Mass Transit Account of the Highway Trust Fund. On December 1, 1990 this was increased to 1.5 cents per gallon. These funds are treated as transit budget receipts in calculating coverage ratios even though the taxes are paid by highway users.

Contributions to the Airport and Airway Trust Fund include a 10 percent passenger ticket tax and other taxes paid by airport and airway users on air cargo and general aviation fuel. Most of the fund is devoted to airport grants and capital improvements, such as new radar and traffic control towers. Within certain limits set by the Congress some of the remaining money

can be used to cover the Federal Aviation Administration's (FAA) operation and maintenance expenses. That portion of FAA's operation and maintenance expenses not paid from trust fund revenues must be financed from the general funds of the U.S. Treasury. In fiscal years 1981 and 1982 the authority for the Airport and Airway Trust Fund's receipt of revenue lapsed and most of the user fees were assigned to the general fund. These amounts were never credited to the Trust Fund. The Tax Equity and Fiscal Responsibility Act of 1982 allows that these taxes be transferred from the general fund to this Trust Fund.

The Pipeline Safety Program is funded by user fees assessed on a per-mile basis on each pipeline operator the Office of Pipeline Safety (OPS) regulates.

State and Local Level Revenues. Transportation revenues at the state and local levels are those funds generated by the operation of the various modal facilities, including fare revenue, plus taxes and other fees levied on users of the facilities. Most state transportation revenues are from highway user fees, i.e., motor fuel and motor vehicle taxes. Transit revenues include revenues from operations of public mass transportation systems (rapid transit, subway, bus, street railway and commuter rail services), such as fares, charter fees, advertising income, and other operations revenues. They exclude subsidies from other governments to support either operations or capital projects. Regular highway charges (revenues) include reimbursements for street construction and repairs; fees for street cuts and special traffic signs; and maintenance assessments for street lighting, snow plowing, and other highway or street services unrelated to toll facilities. Local governments finance local road and street programs with special assessments and property taxes that may be commingled with other local revenue in a general fund. Consistent with federal revenues, state and local revenues in this report do not include general funds allocated to transportation.

Government Transportation Expenditures

Some federal agencies have transportation-related expenditures that are not reported as separate items. The same is true at the state and local level. It is known, for example, that the states expend funds for intercity rail and bus services and pipeline safety programs, but there is no separate reporting of these outlays in the Census data for state and local governments.

Federal Expenditures. Expenditures are used for federal program data because they represent the final actual costs to the federal program for capital goods and operating services covered by the program. It is necessary to identify the year of payment when comparing data over a period of time.

Appropriations are authorized from the Highway Trust Fund to meet expenditures for Federal-aid highways and other programs. Most funds are apportioned to states in accordance with formulas that weigh population, area, mileage, relative costs (needs), and the percent share of prior apportioned funds. The comprehensive accounting from Federal Highway Administration's Highway Statistics data is used resulting in higher federal highway expenditures than those extracted from the Appendix to the Budget of the United States. Appropriations from the Airport and Airway Trust Fund are authorized for airport improvement grants, facilities and equipment, research, and part of operations.

The category "unalloc-fed" represents administrative and operating expenditures by the Department of Transportation, the Interstate Commerce Commission and the National Transportation Safety Board that are attributable to more than one mode, and, therefore, cannot be easily allocated to an individual mode. Similar expenditures for agencies such as the Federal Maritime Commission and the United States Railway Association are included in the federal expenditures for the air, water and rail modes, respectively.

State and Local Expenditures. The highway expenditures reported by the Census are generally slightly lower than those

reported in Highway Statistics for state and local governments because of a more complete accounting of highway programs and highway-related expenditures by the Federal Highway Administration (FHWA) in compiling the Highway Statistics data. The FHWA includes highway law enforcement and highway safety costs as well as interest on debt and debt retirement, none of which are included in the Census of Governments highway expenditures.

The funds disbursed under the federal rail grant program were used to estimate state spending on rail programs on the basis of matching ratios. The local rail freight assistance program began at 100 percent federal funding. However, this changed gradually over the years and the current 70-30 percent federal-state share began in 1982. Some states expend some funds for pipeline safety programs, but there is no separate reporting of these outlays in the Census data for state and local governments. In some state and local governments, regulatory or modal agencies expend funds and/or collect revenues for one or more of the modes. However, such funds are not identified in the Census of Governments, the source of state and local data, and therefore they are not included. In this report, the funds identified in the Census data as "direct subsidies" have been added to the data base as state and local expenditures. These funds are paid to operators of private systems.

Transportation Revenues and Expenditures By Mode

Air

Federal outlays consist of all Federal Aviation Administration expenses. They include costs for constructing, operating, and maintaining the national air traffic system; airport improvement grant program; safety regulation; and research. Those expenses of the National Aeronautics and Space Administration related to air transportation are also included. Budget receipts stem from the Airport and Airways Trust Fund that is derived from the passen-

ger ticket tax, the waybill tax, the non-commercial fuel tax and the international departure tax.

Highway

With the exception of miscellaneous trust funds, outlays for the Federal Highway Administration and the National Highway Traffic Safety Administration are as follows: motor carrier safety; highway safety; demonstration projects; construction and improvements on the National Interstate System and for urban and rural systems; bridge replacement and rehabilitation; emergency relief; research, analysis and development; right-of-way purchases; safety rule making and enforcement; and general operating and administration expenses. Most federal outlays for highways are financed from the Highway Trust Fund that is derived from user taxes. Federal highway outlays also include road construction activities managed by the Department of Interior's Bureau of Indian Affairs and the Department of Agriculture's Forest Service. However, maintenance expenditures by these latter two agencies are not included because it is not possible to extract these expenditures from the data contained in the Budget documents.

Rail

Federal outlays include expenses for rail safety enforcement; inspection and program administration; railroad research and development; financial assistance to states for planning, rail service continuation, rehabilitation and for providing substitute service; the Northeast Corridor Improvement Program, grants to Amtrak; the purchase of redeemable preference shares, and loan guarantee defaults for railroad rehabilitation and improvement and Conrail labor protection. Funds in the Conrail Labor Protection Program were provided for benefits to Conrail employees deprived of employment due to work force reductions and other actions. This program no longer exists since Conrail has been returned to the

private sector. In 1988, the unobligated balances available from this program were transferred to the U.S. Coast Guard and in 1990 they were returned to the U.S. Treasury.

Transit

Federal outlays include grants to states and local agencies for the construction, acquisition and improvement of mass transportation facilities and equipment and for the payment of operating expenses. Also included are Federal Railroad Administration commuter rail subsidies, research and administrative expenses of the Federal Transit Administration and federal interest payment contributions to the Washington Metropolitan Area Transportation Authority. The funds collected from the gasoline tax and credited to the Mass Transit account in the Highway Trust Fund are included as budget receipts for transit. From 1983 to 1990 the Mass Transit account received one cent per gallon. The amount increased to 1.5 cents per gallon on December 1, 1990.

Waterway and Marine

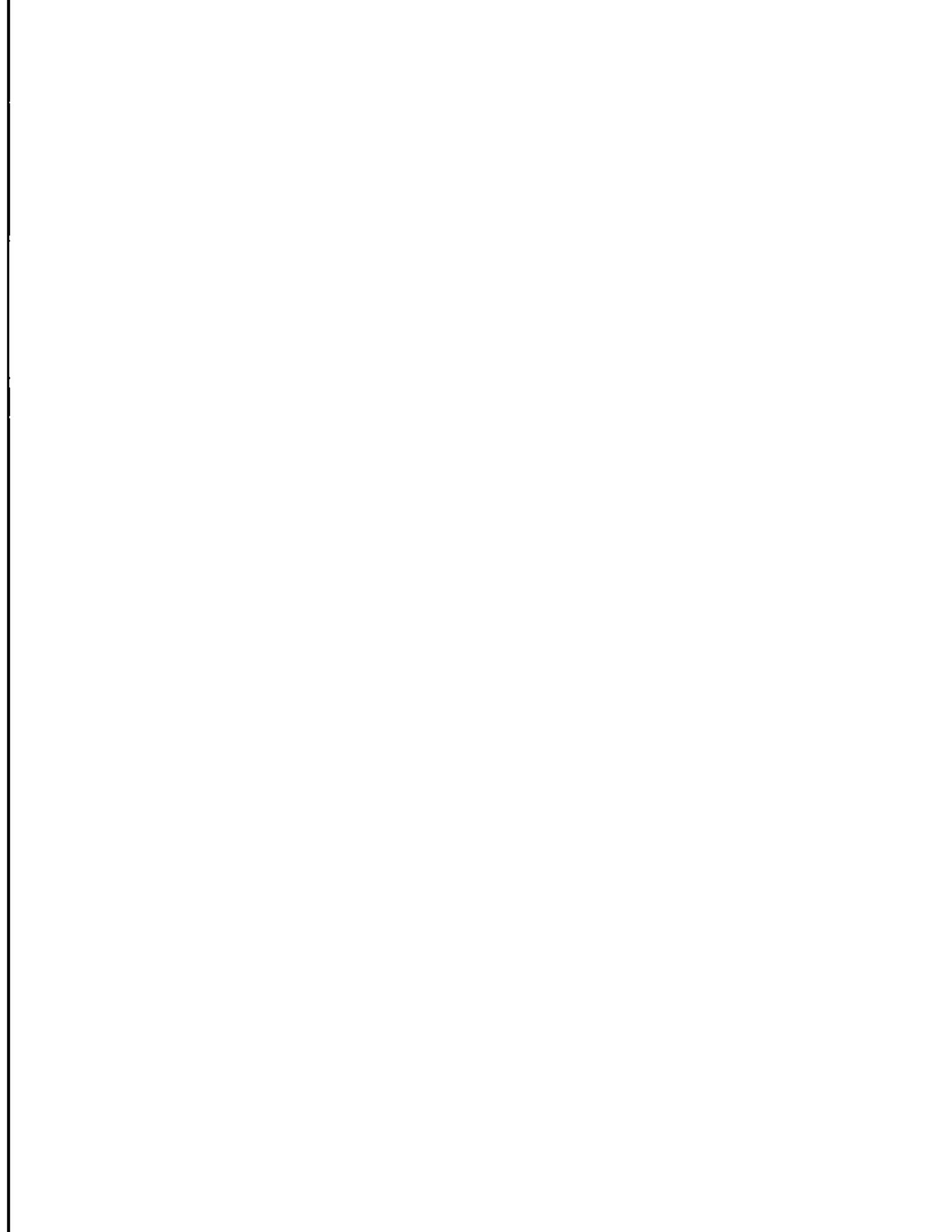
Federal outlays comprise those parts of U.S. Coast Guard's expenses that are transportation-related, such as aids to navigation, marine safety and marine environmental protection. All expenses of the Maritime Administration are included also, such as subsidies for construction and operation of vessels by American flag operators, research and development and training of ship officers. Also included are those expenses of the U.S. Corps of Engineers for construction and operations and maintenance of channels and harbors, locks, and dams and protection of navigation; the salaries and expenses of the Federal Maritime Commission, and the expenses of the Panama Canal Commission. Budget receipts encompass revenues from the Inland Waterways Trust Fund, the Harbor Maintenance Trust Fund, the Oil Spill Liability Trust Fund and tolls and other revenues of the Panama Canal Commission.

Pipeline Safety

The Office of Pipeline Safety (OPS) develops regulations and other approaches to assure safety in the design, construction, testing, operation, maintenance, and emergency response of pipeline facilities. The OPS also reimburses state agencies up to 50 percent of their costs to carry out the state's pipeline safety program. Federal outlays are for the enforcement programs, research and development, and grants for state pipeline safety programs. Budget receipts are derived from the Pipeline Safety Fund.

General Support

This item contains all federal outlays that cannot be directly allocated to a specific mode. All of the expenses of the Office of the Secretary of Transportation, the Office of the Inspector General, and all expenses of the Research and Special Programs Administration, except for the pipeline grants, are included. Outlays for the salary and expenses of the Interstate Commerce Commission and the National Transportation Safety Board are also included.



INTERGOVERNMENTAL TRANSACTIONS

A considerable amount of funds are transferred among the three levels of government. These intergovernmental transactions involve a transfer of monies from different levels of government to enable the receiving government to perform specific public functions. The flows of these funds represent grants-in-aid, the sharing of tax proceeds, as well as payments in lieu of taxes and amounts for services performed by one government for another on a reimbursable or cost-sharing basis. Intergovernmental transfers represent a substantial revenue source for state and local governments, as well as a significant expenditure for state and federal governments. This is true for other program areas as well as for transportation.

An example of an intergovernmental transfer is the federal tax on motor fuels, almost all of which is passed on to state governments. The tax receipts are shown as revenue to the federal government, with the grants to the states accounted for as intergovernmental expenditures. Similarly, states collect motor fuel taxes and pass a portion on to local governments.

Intergovernmental transactions can be shown as both revenues and expenditures and their effects must be netted out in calculating actual revenue and expenditure amounts for each level of government to avoid duplication. Own source revenues and own source expenditures exclude intergovernmental transfer payments. In

contrast, “revenues of final recipient” and “expenditures at final spending level” include these transfer payments.

Table 1 and Figures 1 and 2 below illustrate how intergovernmental transactions affect the revenue and expenditure picture for the different levels of government. Table 1 is a summary of revenues and spending for all government functions prior to and after intergovernmental transfers. Figure 1 is the graphic representation of the revenues from Table 1 while Figure 2 shows the expenditures. All years referred to are fiscal years.

The following points stand out when own source revenues and expenditures, before intergovernmental transfers, are

TABLE 1

Summary of Government Revenues and Expenditures for all Functions by Level of Government Before and After Transfers: 1992 (In Billions of Dollars)

Level of Government	Revenues				Expenditures			
	Own Source	% of Total	After Transfers	% of Total	Own Funds	% of Total	After Transfers	% of Total
Federal	1,256	55.5	1,081	47.8	1,516	61.0	1,341	53.9
State	574	25.4	540	23.9	532	21.4	497	20.0
Local	432	19.1	640	28.3	439	17.7	648	26.1
TOTAL	2,262	100.0	2,262	100.0	2,487	100.0	2,487	100.0

FIGURE 1

Federal, State and Local Government Revenues for all Functions: Fiscal Year 1992

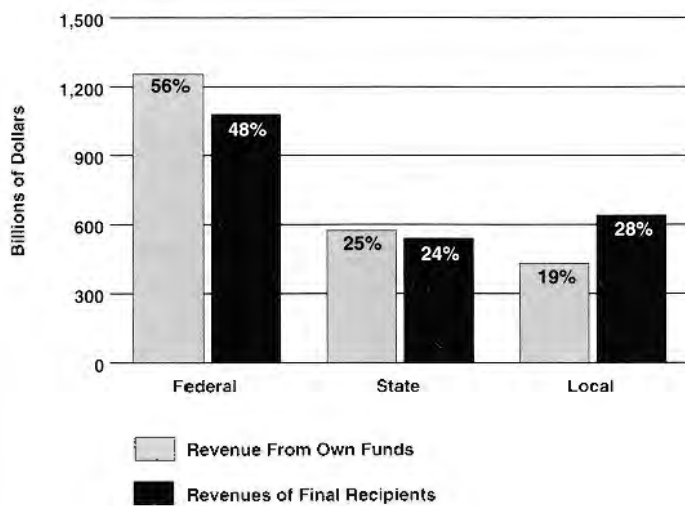
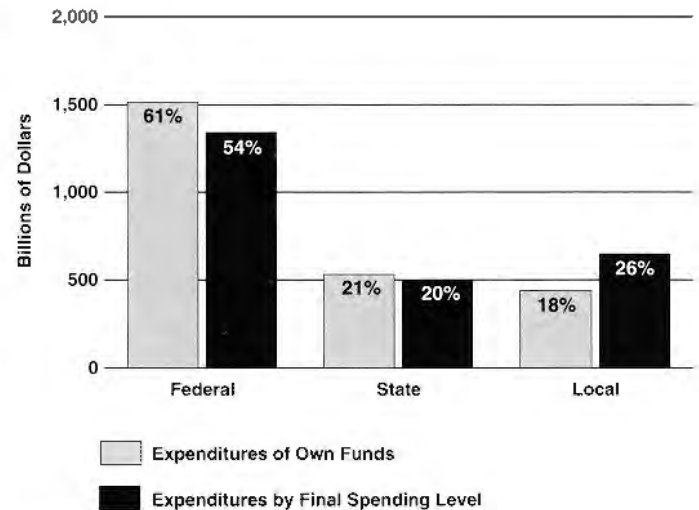


FIGURE 2

Federal, State and Local Government Expenditures for all Functions: Fiscal Year 1992



compared with those revenues and expenditures available after intergovernmental transfers. These revenues and expenditures represent financial activity for all functions of government.

Local governments are the primary beneficiaries of these intergovernmental transactions. In 1992, local revenues increased from 19.1 percent to 28.3 percent of total revenues and from 17.7 percent to 26.1 percent of total expenditures after intergovernmental transfers.

In contrast, although the federal government has the greatest revenues and expenditures, the amounts of each decline after intergovernmental transfers. After all transfers were considered, the federal share of total revenues dropped from 55.5% to 47.8%. Federal expenditures declined from 61 percent of total spending to 53.9 percent.

On the other hand, state revenues and spending did not change substantially after intergovernmental transfers. State

TABLE 2

Relationship of Government Transportation Finances to Government Finances, for all Functions Revenues From Own Sources, Expenditures After Transfers: Fiscal Year 1992 (In Billions of Dollars)

Level of Government	Revenue for all Functions	Transportation Revenues	% of Total	Expenditures for all Functions	Transportation Expenditures	% of Total
Federal	1,256	26	2.05	1,341	13	1.00
State	574	39	6.81	497	46	9.34
Local	432	15	3.55	648	53	8.25
TOTAL	2,262	80	3.55	2,487	113	4.56

revenues were 25.4 percent of total revenues, net transfers, and 23.9 percent after transfers. State spending declined to 20 percent of total public spending after transfers from 21.4 percent prior to transfers.

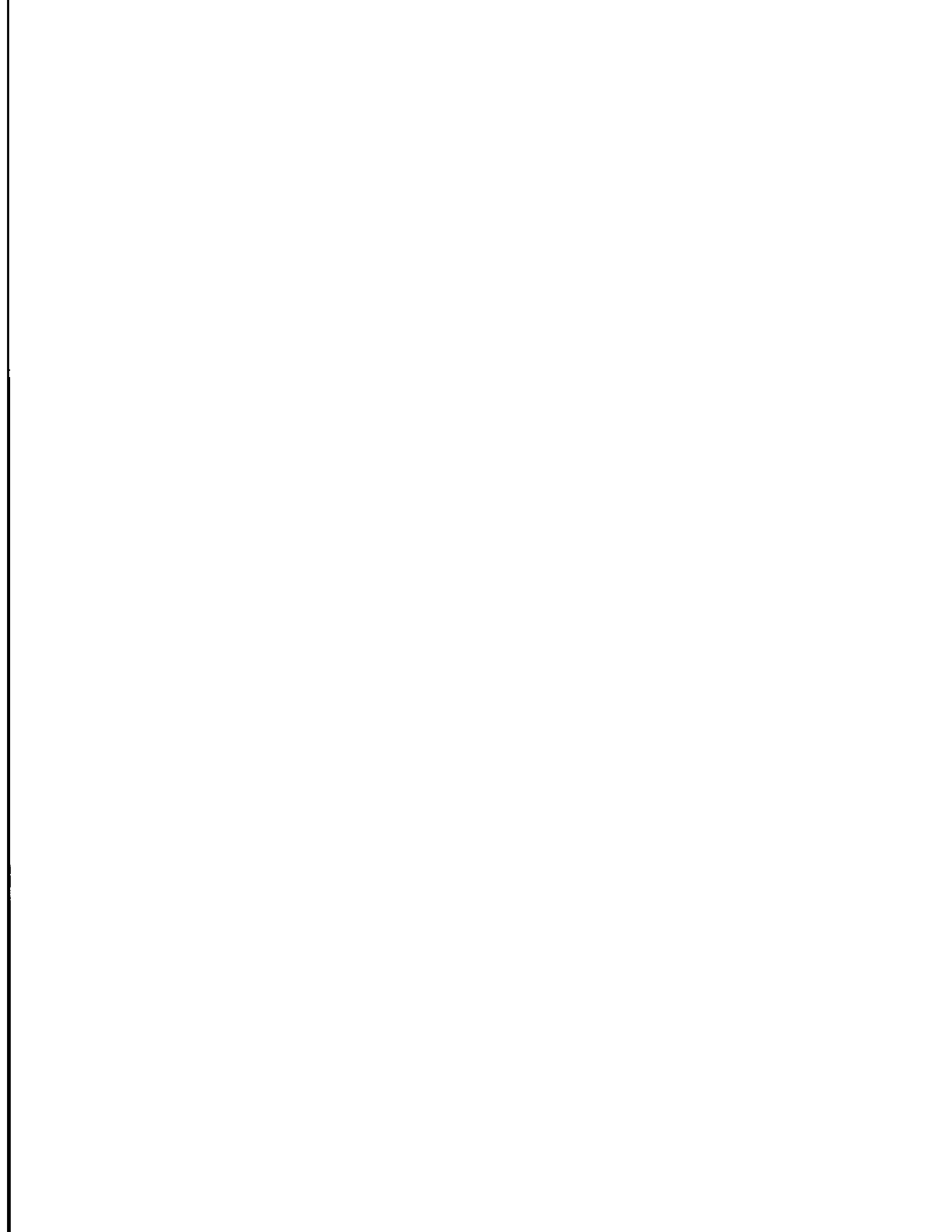
Table 2 displays the importance of intergovernmental payments in transportation. This table includes total revenues and expenditures for all government functions and revenues and expenditures for transportation. The revenues shown for each level of government are from their own sources, while the expenditures are those made by the final spending level of government. Part of the difference between revenues and expenditures for transportation is due to the use of funds from sources other than transportation user-related charges or taxes, such as general funds, but a significant portion of their expenditures is financed by the intergovernmental payments.

As is evident from Table 2, transportation financing is a relatively small proportion of total national government finance. It represents about 3.5 percent of revenues and less than 5 percent of expenditures. Some highlights from these data are the following.

Local governments are able to spend more than they collect in revenues for not only transportation but also for other local public spending. For example, in 1992 local governments' transportation revenues were 3.6% of all local revenues collected, while their transportation expenditures accounted for 8.3% of local expenditures for all functions.

In contrast, state governments' expenditures for all functions are less than their total revenues while their transportation expenditures are greater than their transportation revenues. Total state revenues for all functions are \$574 billion while expenditures are \$497 billion. Transportation revenues for state governments, however, are \$39 billion while expenditures are \$46 billion.

At the federal level, total spending exceeded total revenues for all government functions. In contrast, federal transportation expenditures are less than federal transportation revenues. For all government functions, total federal revenues are \$1.25 trillion and total federal spending is \$1.34 trillion. Transportation spending (\$13.3 billion) is roughly half of transportation revenues (\$25.7 billion).



TRENDS *in* FEDERAL, STATE *and* LOCAL TRANSPORTATION FINANCIAL ACTIVITY

This chapter discusses the growth and trends in transportation revenues and expenditures, including growth and user coverage over the 1982-1992 period. Data are displayed in both current and inflation-adjusted dollars. First, trends in transportation revenues and expenditures are presented by level of government, then transportation revenues and expenditures are presented by mode. The last part of this chapter displays transportation expenditures before and after intergovernmental transfers by both level of government and mode. All data are for fiscal years.

Transportation Financial Activity by Level of Government

Transportation revenues and expenditures, including the compound annual growth rate, are presented for federal, state, and local governments from 1982 through 1992. Total revenues and revenues by reve-

nue raising instruments for each level of government are then discussed. This is followed by a display of expenditures by level of government both before and after intergovernmental transfers. Finally, user coverage by level of government is presented to illustrate the degree to which transportation expenditures are paid di-

rectly by users and transportation-related collections.

Compound Annual Growth Rate in Expenditures and Revenues

Table 3 shows transportation revenues and expenditures in the aggregate and individually at the federal, state, and local levels. Table 3 also presents the compound annual growth rate over the 1982-1992 time period. The comparisons here are made with expenditures from own funds, prior to grant transfers. That is, state and local expenditures are net federal grants and, therefore, these grants are included in the federal spending numbers. The section on expenditures discusses the implications of federal grants on state and local spending.

The figures in Table 3 are shown in both current and inflation-adjusted dollars. Revenues and expenditures discussed below are in 1982 constant dollars and the growth comparisons reflect the compound annual growth rate derived from transportation revenues and expenditures in constant 1982 dollars.

The following trends emerge from these data.

Although total government transportation spending exceeds revenues, the gap is closing. Total transportation revenues in inflation-adjusted dollars, over the 1982-1992 time span, grew by an compound annual growth rate of 4.45 percent. Revenues in 1982 were \$36.1 billion and by 1993 they had reached \$55.9 billion. In contrast, total public transportation own fund expenditures grew from \$60 billion in 1982 to \$78.9 billion in 1992; a growth rate of 2.71 percent. As mentioned earlier, since expenditures are greater than revenues a substantial portion of the expenditures is paid from sources other than the user charges, usually general funds and some debt financing.

A force in closing this gap is the faster growth in federal transportation revenues and the slowdown in federal transportation expenditure growth. Federal transportation revenues grew at an compound annual growth rate of 6.44 percent,

while federal transportation expenditures, prior to grant transfers, grew at a much smaller rate of 0.63 percent. Federal transportation revenues were \$10 billion in 1982, peaked in 1991 with \$19.6 billion and declined to \$18.7 billion in 1992. In contrast, state and local transportation expenditures increased marginally over state and local transportation revenue growth. State and local transportation revenues grew at an compound annual rate of 3.59 percent, from \$26.2 billion in 1982 to \$37.2 billion in 1992 while state and local spending increased by an compound annual growth rate of 3.87 percent, from \$36.8 billion to \$53.7 billion.

The growth in total government transportation expenditures is driven by state and local spending. Over the same 11-year time span when federal transportation expenditures from own funds grew by \$1.6 billion. These expenditures grew from \$23.6 billion in 1982 to \$25.2 billion in 1992. State and local transportation spending, from own funds increased by \$17 billion. Their spending grew from \$36.8 billion in 1982 to \$53.7 billion in 1992. At the same time, state and local transportation revenues grew at 3.59 percent. Thus, state and local expenditures increased slightly more quickly than revenues.

Revenues by Level of Government

Transportation revenue collections reflected in these data can be attributed to users of the various modal facilities. However, transportation users are not the only source of funds for transportation. For example, local governments rely on the property tax and special assessments as a source of their revenue. Due to data limitations, this revenue is not included in these data. A more data detailed description of the data is in Chapter II, Principal Data Source and Description of the Data. Figure 3 illustrates the revenues, displayed in constant 1982 dollars, for each level of government from 1982 through 1992.

Both the Figure 3 graph and underlying data in Table 3 illustrate the following trends.

TABLE 3

Summary of Government Transportation Finances by Level of Government: 1982-1992 (In Millions of Dollars)

Current Dollars

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	Growth Rate
Revenues												
Federal	10,008	12,507	16,351	18,388	18,769	18,847	20,109	22,237	21,532	25,995	25,794	9.93%
State	18,935	19,806	22,320	24,355	25,917	28,501	30,850	32,529	34,629	36,585	39,097	7.52%
Local	7,228	7,716	8,243	9,294	10,112	11,058	11,862	12,813	13,740	14,832	15,306	7.79%
TOTAL S & L	26,163	27,522	30,563	33,649	36,028	39,559	42,712	45,342	48,369	51,417	54,402	7.60%
TOTAL	36,171	40,029	46,914	52,038	54,798	58,407	62,821	67,579	69,901	77,411	80,196	8.29%
Expenditures From Own Funds												
Federal	23,630	23,578	26,920	27,955	28,748	27,708	28,020	28,634	30,095	31,966	34,753	3.93%
State & Local	36,766	39,519	41,966	46,583	52,506	57,637	61,928	65,372	69,979	75,673	78,544	7.89%
TOTAL	60,396	63,098	68,886	74,539	81,253	85,345	89,948	94,006	100,074	107,630	113,297	6.49%
Expenditures After Transfers												
Federal	9,786	8,799	10,363	9,501	10,094	9,659	9,541	9,924	10,584	11,776	13,388	3.18%
State	23,112	24,407	27,143	31,600	34,704	36,348	38,685	40,572	42,342	44,938	46,467	7.23%
Local	27,499	29,892	31,380	33,437	36,433	39,338	41,723	43,511	47,148	50,922	53,441	6.87%
TOTAL S & L	50,611	54,299	58,523	65,038	71,137	75,686	80,408	84,082	89,490	95,860	99,908	7.04%
TOTAL	60,396	63,098	68,886	74,539	81,231	85,345	89,948	94,006	100,074	107,630	113,297	6.49%

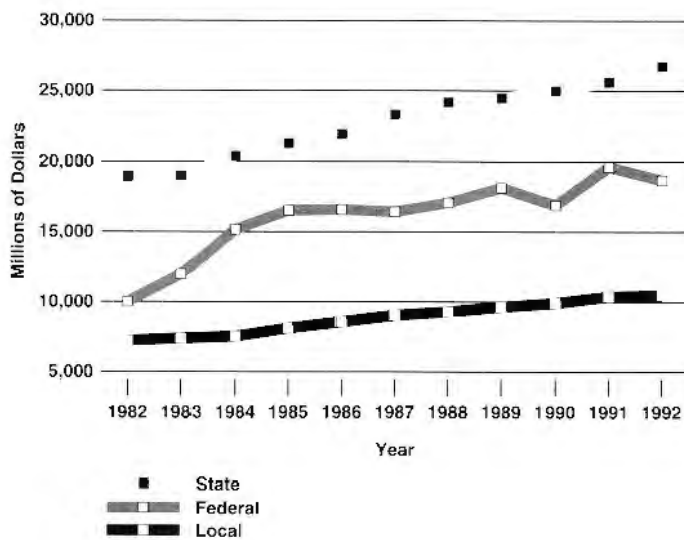
Constant 1982 Dollars

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	Growth Rate
Revenues												
Federal	10,008	11,971	15,167	16,529	16,580	16,416	17,071	18,135	16,896	19,620	18,676	6.44%
State	18,935	18,993	20,397	21,305	21,965	23,285	24,166	24,472	24,993	25,613	26,752	3.52%
Local	7,228	7,399	7,533	8,130	8,570	9,035	9,292	9,639	9,916	10,383	10,473	3.78%
TOTAL S & L	26,163	26,392	27,931	29,434	30,534	32,320	33,457	34,111	34,909	35,996	37,225	3.59%
TOTAL	36,171	38,363	43,098	45,963	47,115	48,736	50,528	52,246	51,805	55,616	55,901	4.45%
Expenditures From Own Funds												
Federal	23,630	22,568	24,970	25,128	25,395	24,134	23,787	23,352	23,615	24,127	25,162	0.63%
State & Local	36,766	37,896	38,352	40,748	44,499	47,090	48,509	49,180	50,506	52,978	53,744	3.87%
TOTAL	60,396	60,464	63,322	65,876	69,894	71,223	72,297	72,532	74,121	77,105	78,906	2.71%
Expenditures After Transfers												
Federal	9,786	8,422	9,613	8,540	8,916	8,413	8,099	8,093	8,305	8,888	9,693	-0.09%
State	23,112	23,404	24,805	27,642	29,412	29,697	30,303	30,522	30,560	31,460	31,795	3.24%
Local	27,499	28,664	28,678	29,249	30,877	32,139	32,682	32,733	34,028	35,650	36,567	2.89%
TOTAL S & L	50,611	52,068	53,483	56,891	60,289	61,836	62,985	63,255	64,588	67,110	68,362	3.05%
TOTAL	60,396	60,490	63,095	65,431	69,206	70,249	71,084	71,349	72,893	75,998	78,056	2.60%

Note: Different deflators for different levels of government are used. As a result, totals in constant dollars will not agree.

FIGURE 3

Government Transportation Revenues by Level of Government: 1982-1992, Constant 1982 Dollars



State governments are the greatest source of transportation revenues followed by federal and then local governments. In 1992, state revenues were \$39 billion (current dollars) while federal revenues were \$25.8 billion (current dollars) and local revenues were \$15.3 billion (current dollars). Although the proportions changed over the 1982-1992 time period, the ranks remained the same.

As a proportion of total transportation revenues, state transportation revenues have declined over the 1982 - 1992 time period, while federal transportation revenues have increased. As a percentage of total transportation revenues, state revenues have declined by 3 percentage points, from 52 percent in 1982 to 49 percent in 1992. Consequently, federal transportation revenues have increased from 28 percent of total revenues in 1982 to 32 percent in 1992. In 1982, state revenues were \$18.9 billion while federal revenues were \$10 billion and local revenues were \$7.2 billion. By 1992, state revenues were \$26.8 billion, federal revenues were \$18.7 billion and local revenues were \$10.5 billion -- all in 1982

constant dollars.

Local revenues have remained rather flat, as a percentage of total transportation spending. As a percentage of total transportation revenues, local revenues have remained fairly stable over the 1982-1992 time span. Local revenues of \$7.2 billion were 20 percent of transportation revenues in 1982 and by 1992 were \$10.5 billion or 19 percent of local revenues.

Revenue Raising Instruments by Level of Government

To gain another perspective, Tables 4 and 4A display revenues by level of government and revenue raising instruments in inflation-adjusted dollars and in current dollars. The growth rates discussed below are derived from data in constant dollars and are compound annual growth rates.

The following trends emerge from these data.

At the federal level, the Highway Trust Fund collects the greatest revenues and the Highway Trust Fund for Transit is the fastest growing source of federal transportation revenues. The Federal Highway Trust Fund (HTF) is the largest contributor to federal transportation revenues with \$16.6 billion in current dollars for 1992. However, in 1982 constant dollars the Federal HTF's compound annual growth rate over this period is the lowest of all federal transportation sources at 4.3 percent. As a percentage of transportation revenues at the federal level, the HTF fell from 78 percent in 1982 to 64 percent in 1992. The first year funds were designated for the Highway Trust Fund for Transit was 1983. Transit revenues grew from \$5 million in 1983 (in 1982 constant dollars) to \$1.3 billion in 1992 -- an 11.4 percent compound annual growth rate. However, the HTF for Transit is not a large contributor to federal transportation revenues. In 1983, HTF for Transit consisted of 4.2 percent of the total federal transportation revenues, rose to 12 percent in 1991, and declined to 7 percent in 1992. The Airport and Airway Trust Fund is the second largest source of both revenues and growth, with 1992 revenues of

TABLE 4

Transportation Revenues by Level of Government and Revenue Raising Instruments: 1982-1992 (In Millions of Dollars)

Constant 1982 Dollars

Level of Govt. and Instrument	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	Growth Rate	Average 1982-1992
Federal													
Fed Hwy Trust Fund	7,822	8,476	10,698	11,602	11,753	11,086	11,584	12,343	10,556	11,551	11,999	4.37%	10,861
Hwy Tr Fnd Transit	N/A	497	1,229	1,276	1,233	1,379	1,410	1,418	1,551	2,377	1,315	11.42%	1,244
Fed AP/AWY Trst Fund	1,711	2,582	2,825	3,234	3,149	3,432	3,465	3,812	3,880	4,684	4,285	9.61%	3,369
Tot Fed Water Receipts	474	416	415	416	446	512	605	555	900	1,000	1,067	8.45%	619
Pipeline Safety Fund	N/A	N/A	N/A	N/A	N/A	8	7	8	8	8	10	5.27%	8
SUBTOTAL	10,008	11,971	15,167	16,529	16,580	16,416	17,071	18,135	16,896	19,620	18,676	6.44%	16,097
State													
Motor Fuel Taxes	10,437	10,350	11,328	11,679	11,939	12,831	13,470	13,563	13,987	14,449	15,224	3.85%	12,660
Motor Veh Lic Tax	5,564	5,546	5,806	6,163	6,508	6,788	6,955	7,035	7,108	7,093	7,294	2.74%	6,533
Motor Veh Op Lic Tax	487	484	518	537	589	595	599	597	597	606	694	3.60%	573
Airport Charges	222	225	241	262	259	289	315	405	402	432	445	7.20%	318
Reg & Toll Hwy Charges	1,431	1,469	1,538	1,606	1,651	1,704	1,793	1,831	1,869	1,979	2,055	3.69%	1,721
Water Transp. Charges	299	272	288	293	275	272	275	259	256	268	269	-1.03%	275
Transit Charges	495	646	678	765	744	806	758	781	775	786	770	4.51%	728
SUBTOTAL	18,935	18,993	20,397	21,305	21,965	23,285	24,166	24,472	24,993	25,613	26,752	3.52%	22,807
Local													
Motor Fuel Taxes	125	143	146	250	265	366	452	461	479	474	475	14.29%	331
Motor Veh Lic Taxes	409	425	439	454	481	505	506	520	555	549	567	3.31%	492
Motor Veh Op Lic Tax	N/A	N/A	N/A	N/A	N/A	N/A	1	1	1	1	1	4.17%	1
Airport Charges	2,073	2,206	2,268	2,465	2,668	2,820	2,904	3,127	3,332	3,571	3,571	5.59%	2,819
Reg & Toll Hwy Charges	657	677	720	806	822	902	1,034	1,125	1,125	1,181	1,194	6.16%	931
Parking Charges	399	435	481	502	536	556	577	599	617	647	664	5.23%	546
Water Transp. Charges	672	674	693	706	768	793	832	806	818	807	843	2.29%	765
Transit Charges	2,893	2,840	2,787	2,947	3,030	3,091	2,976	3,000	2,989	3,154	3,159	0.88%	2,988
SUBTOTAL	7,228	7,399	7,533	8,130	8,570	9,035	9,292	9,639	9,916	10,383	10,473	3.78%	8,873
TOTAL	36,171	38,363	43,098	45,963	47,115	48,736	50,528	52,246	51,805	55,616	55,901	4.45%	47,776

current dollars and an compound annual growth rate of 9.6 percent computed with 1982 constant dollars. The Airport and Airway Trust Fund grew from 17 percent of total federal transportation revenues in 1982 to 23.9 percent in 1992.

Motor fuel tax is the greatest source of state revenues while airport charges are the fastest growing source of revenues. Motor fuel taxes contributed \$22.2 billion (current dollars) in 1992 toward state transportation revenues. These taxes remained a

stable source of transportation revenues over the 1982-1992 time period at about 55 percent of total state transportation revenues. The fastest growing source of state revenues was airport charges with an compound annual growth rate of 7.2 percent. It should be noted, however, that overall airport charges make a small contribution to state transportation revenues at approximately 1 percent of total state revenues.

On the local level, transit charges contribute the most revenues, followed closely

TABLE 4A

Transportation Revenues by Level of Government and Revenue Raising Instruments: 1982-1992 (In Millions of Dollars)

Current Dollars

Level of Govt. and Instrument	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	Growth Rate	Average 1982-1992
Federal													
Fed Hwy Trust Fund	7,822	8,856	11,533	12,908	13,304	12,727	13,645	15,134	13,453	15,303	16,572	7.80%	12,842
Hwy Tr Fnd Transit	N/A	519	1,325	1,420	1,395	1,583	1,661	1,738	1,977	3,149	1,816	14.93%	1,508
Fed AP/AWY Trst Fund	1,711	2,698	3,045	3,598	3,565	3,940	4,081	4,674	4,945	6,206	5,918	13.21%	4,035
Tot Fed Water Receipts	474	434	448	463	505	588	713	681	1,147	1,325	1,474	12.01%	750
Pipline Safety Fund	N/A	N/A	N/A	N/A	N/A	9	9	10	10	11	14	9.24%	11
SUBTOTAL	10,008	12,507	16,351	18,388	18,769	18,847	20,109	22,237	21,532	25,995	25,794	9.93%	19,140
State													
Motor Fuel Taxes	10,437	10,793	12,396	13,352	14,087	15,705	17,196	18,029	19,379	20,639	22,250	7.86%	15,842
Motor Veh Lic Tax	5,564	5,784	6,354	7,045	7,679	8,309	8,879	9,351	9,848	10,131	10,660	6.72%	8,146
Motor Veh Op Lic Tax	487	505	567	614	695	728	765	794	827	865	1,014	7.61%	715
Airport Charges	222	235	263	299	306	354	402	538	556	618	650	11.35%	404
Reg & Toll Hwy Charges	1,431	1,532	1,683	1,835	1,948	2,085	2,289	2,434	2,590	2,826	3,004	7.70%	2,151
Water Transp. Charges	299	284	315	335	324	333	351	344	355	382	393	2.79%	338
Transit Charges	495	673	742	875	878	986	968	1,039	1,074	1,123	1,126	8.56%	907
SUBTOTAL	18,935	19,806	22,320	24,355	25,917	28,501	30,850	32,529	34,629	36,585	39,097	7.52%	28,502
Local													
Motor Fuel Taxes	125	149	160	286	313	448	577	613	664	677	694	18.70%	428
Motor Veh Lic Taxes	409	443	480	518	568	618	646	692	769	784	828	7.30%	614
Motor Veh Op Lic Tax	N/A	N/A	N/A	N/A	N/A	N/A	1	1	1	2	2	7.72%	1
Airport Charges	2,073	2,300	2,482	2,818	3,148	3,452	3,707	4,156	4,617	5,101	5,219	9.67%	3,552
Reg & Toll Hwy Charges	657	706	788	921	970	1,104	1,320	1,495	1,559	1,687	1,744	10.27%	1,177
Parking Charges	399	453	526	574	632	681	737	796	854	924	970	9.29%	686
Water Transp. Charges	672	702	758	807	906	971	1,063	1,072	1,133	1,152	1,231	6.24%	952
Transit Charges	2,893	2,962	3,050	3,369	3,575	3,784	3,799	3,987	4,142	4,506	4,616	4.78%	3,698
SUBTOTAL	7,228	7,716	8,243	9,294	10,112	11,058	11,862	12,813	13,740	14,832	15,306	7.79%	11,109
TOTAL	36,171	40,029	46,914	52,038	54,798	58,407	62,821	67,579	69,901	77,411	80,196	8.29%	58,751

by airport charges, while motor fuel taxes are the fastest growing revenue source. On average, transit charges generated \$2.9 billion in 1982 constant dollars, representing the greatest source of revenues over the 1982-1992 time span. In 1982, transit charges contributed the most to local revenues with \$2.9 billion (current dollars) comprising 40 percent of total local revenues. Airport charges were the second greatest generator of local revenues with

\$2.1 billion (current dollars) making up 28.7 percent of local transportation revenues in 1982. However, by 1989 this position reversed. Airport charges became the greatest source of local revenues with \$4.2 billion and transit charges became second with \$4 billion (current dollars). Motor fuel taxes have been the fastest growing local revenue source at 14.3 percent. However, the motor fuel tax is not a large contributor to local transportation reve-

nues, comprising only 1.7 percent in 1982 and growing to 4.5 percent in 1992.

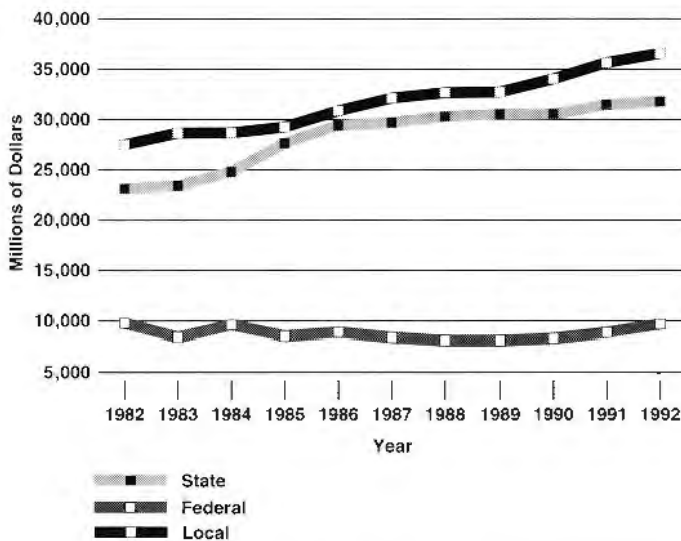
Expenditures by Level of Government

Figure 4 below displays transportation expenditure data at the three levels of government in constant dollars from 1982 through 1992. Expenditure data represent expenditures after government transfers. Therefore, expenditures at the federal level excludes grants, while the state and local expenditures include grants. These figures show the amount of federal transportation support to state and local governments.

The following are highlights from the data in Table 3 that is underlying the graph in Figure 4.

FIGURE 4

Government Transportation Expenditures by Level of Government: 1982-1992, Constant 1982 Dollars



Both state and local transportation spending are greater than federal spending, with local governments' expenditures slightly greater than state expenditures. In current dollars, local transportation spending in 1992 was \$53.4 billion while state transportation spending was \$46.5 billion.

Federal expenditures for 1992 were \$13.4 billion.

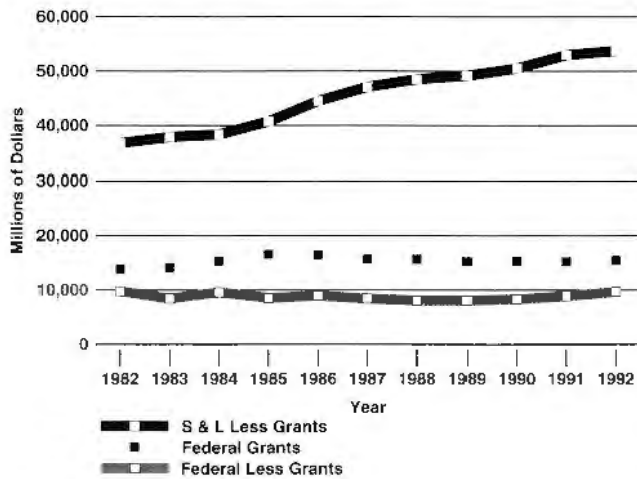
Federal spending has declined over the 1982-1992 time span. As noted above, these federal expenditures exclude grants. Federal expenditures in 1982 constant dollars have declined .09 percent over this time period. They began at \$9.8 billion in constant dollars in 1982 and declined to a low of \$8.1 billion in 1989. Federal expenditures have increased steadily since that time and reached \$9.7 billion in 1992. Also, federal spending, as a proportion of total transportation expenditures, began the period at 16 percent and declined until 1987 when it reached 11 percent. Spending remained at approximately 11 percent until 1992 when it increased slightly to 12 percent.

Over the 1982-1992 time period, state and local transportation expenditures have increased. State expenditures grew at a rate of 3.24 percent and local expenditures grew at a rate of 2.89 percent, in contrast to federal spending which declined by .09 percent over the 1982-1992 time period. State spending increased by 4 percentage points as a proportion of total transportation spending while local spending increased by 2 percentage points. State spending, as a proportion of total transportation spending, began at 38 percent in 1982 and increased until 1986. At that point, the proportion of state spending flattened at a high of 43 percent until 1989. It remained at this level until 1990 when it declined to 42 percent. Local spending comprised 46 percent of total transportation spending in 1982. During the 1982-1992 period, it reached a low of 45 percent in the mid-1980's, and a high of 47 percent in the early 1990s, of total transportation spending.

Another perspective on transportation expenditures is to look at federal, state and local expenditures and federal grants separately, as is shown in Figure 5. The data underlying this graph are in 1982 constant dollars. It is not possible to separate state and local expenditures from their own funds, due to the large number of state grant programs to local governments. Some of these programs are passthroughs of federal

FIGURE 5

Government Expenditures for Transportation: 1982-1992, Constant 1982 Dollars



funds and vary considerably from state to state. Due to the high degree of variability in these programs, they are beyond the scope of this study. However, the amounts of funds transferred are not believed to seriously distort the expenditure patterns reported here.

Figure 5 illustrates that the growth in total government transportation expenditures is largely a result of state and local spending.

User Coverage by Level of Government

Examining the “coverage ratio” adds another dimension to these figures. The “coverage ratio” illustrates the degree to which transportation expenditures are “covered” or paid directly by users and transportation-related collections. Figure 6 graphically displays the “coverage ratio” for revenues and expenditures in the aggregate and at the federal, state and local level. Expenditures represent own fund expendi-

tures. That is, state and local expenditures exclude federal grants while federal expenditures include these grants.

Figure 6 illustrates the increase in total transportation expenditures paid directly by users and transportation-related collections. This change was driven by the increase in the “coverage ratio” for the federal government. The “coverage ratio” over this 11-year time period for federal, state and local government combined increased from 60 percent to 71 percent. This increase is largely due to the greater increase in federal revenues relative to expenditures. Federal coverage increased from a 42 percent coverage ratio in 1982 to a high of 81 percent in 1991. The federal “coverage ratio” declined to 74 percent in 1992. It has remained at least at 70 percent since the late-1980’s. In contrast, state and local coverage remained somewhat stable over the 1982-1993 period at about 70 percent.

FIGURE 6

Ratio of User Revenues to Expenditures (Coverage Ratio) by Mode for Total, Federal, and State and Local Transportation Finances: 1982-1992

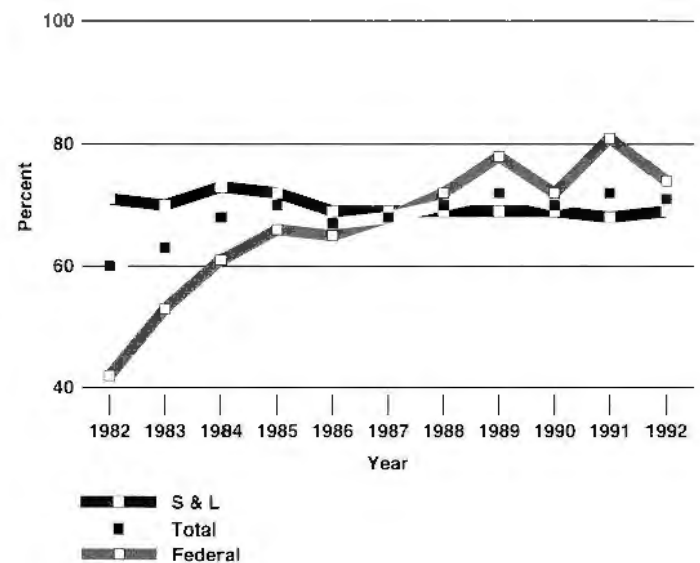


TABLE 5

Transportation Revenues by Mode: 1982-1992 (In Millions of Dollars)

Current Dollars

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	Growth Rate	Average 1982-1992
Highway	26,932	28,768	33,961	37,479	39,564	41,727	45,332	48,544	49,090	52,914	56,768	7.74%	41,916
Air	4,007	5,233	5,790	6,715	7,019	7,746	8,190	9,369	10,119	11,924	11,787	11.39%	7,991
Transit	3,388	4,154	5,117	5,664	5,848	6,353	6,428	6,764	7,193	8,778	7,558	8.35%	6,113
Water	1,445	1,412	1,520	1,605	1,734	1,882	2,127	2,097	2,635	2,860	3,099	7.93%	2,038
Parking	399	453	526	574	632	681	737	796	854	924	970	9.29%	686
Pipeline	N/A	N/A	N/A	N/A	N/A	9	9	10	10	10	14	9.74%	10
TOTAL	36,171	40,020	46,914	52,038	54,798	58,399	62,822	67,579	69,901	77,410	80,196	8.29%	58,750

Constant 1982 Dollars

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	Growth Rate	Average 1982-1992
Highway	26,932	27,554	31,211	33,140	34,121	35,051	36,756	37,827	36,752	38,350	39,837	3.99%	34,321
Air	4,007	5,012	5,321	5,938	6,054	6,507	6,641	7,300	7,575	8,642	8,272	7.52%	6,479
Transit	3,388	3,979	4,703	5,008	5,044	5,336	5,212	5,271	5,385	6,362	5,304	4.58%	4,999
Water	1,445	1,352	1,397	1,419	1,496	1,581	1,724	1,634	1,973	2,073	2,174	4.17%	1,661
Parking	399	434	483	507	545	572	597	620	640	670	681	5.49%	559
Pipeline	N/A	N/A	N/A	N/A	N/A	8	7	8	7	7	10	5.87%	8
TOTAL	36,171	38,332	43,116	46,012	47,259	49,055	50,937	52,659	52,332	56,104	56,278	4.52%	48,023

Percent Distribution

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	Growth Rate	Average 1982-1992
Highway	74.46%	71.88%	72.39%	72.02%	72.20%	71.45%	72.16%	71.83%	70.23%	68.36%	70.79%	-3.67%	71.47%
Air	11.08%	13.08%	12.34%	12.90%	12.81%	13.26%	13.04%	13.86%	14.48%	15.40%	14.70%	.62%	13.49%
Transit	9.37%	10.38%	10.91%	10.88%	10.67%	10.88%	10.23%	10.01%	10.29%	11.34%	9.42%	0.06%	10.41%
Water	4.00%	3.53%	3.24%	3.08%	3.17%	3.22%	3.38%	3.10%	3.77%	3.69%	3.86%	-0.13%	3.46%
Parking	1.10%	1.13%	1.12%	1.10%	1.15%	1.17%	1.17%	1.18%	1.22%	1.19%	1.21%	0.11%	1.16%
Pipeline	N/A	N/A	N/A	N/A	N/A	0.02%	0.01%	0.01%	0.01%	0.01%	0.02%	0.02%	0.01%
TOTAL	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	0.00%	100.00%

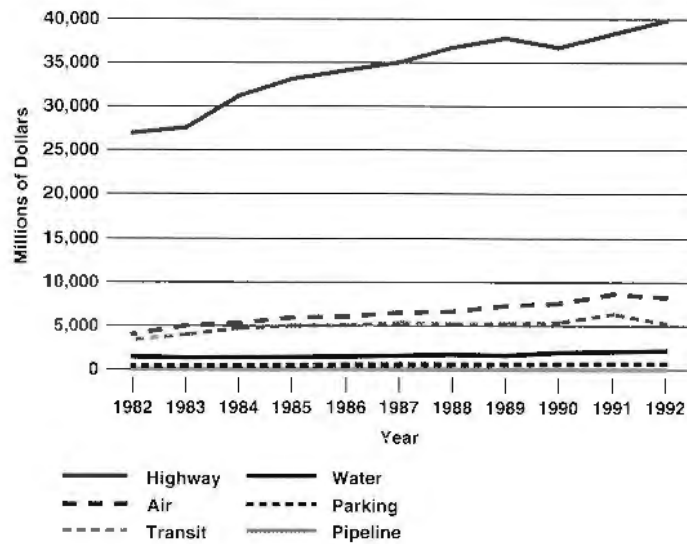
Government Transportation Financial Activity By Mode

This part of the report covers government revenues, expenditures, and federal grants by mode. User coverage by mode is also presented. The trends in modal share by revenues are shown in Tables 5 and 6 and Figure 7. Table 5 displays revenues by mode in current and constant dollars and by percent distribution. Figure 7 displays

these data graphically. Transportation revenues by mode and source of revenue are shown in Tables 6 and 6A. Table 7 presents transportation expenditures by mode and Table 8 displays federal grants by mode. Finally, user coverage by mode is shown in Table 9. The growth rate reflects the compound annual growth rate computed with constant dollars. Only government transportation revenues are included, therefore, rail is not included in any of the tables

FIGURE 7

**Transportation Revenues by Mode:
1982-1992, Constant 1982 Dollars**



reflecting revenues since rail does not generate any direct user revenues to the federal, state, or local governments.

Revenues by Mode

The trends emerging from these data include the following.

Highway collected the greatest revenues of all the modes, although its compound annual growth rate was the lowest. The highway mode collected \$56.8 billion in revenues in 1992, representing 71 percent of total transportation revenues. However, highway revenue growth was the lowest of all modes, growing at a compound annual growth rate of 4 percent (using constant dollars). Highway revenues, as a percentage of total revenues, declined nearly 4 percentage points between 1982 and 1992.

Air experienced the fastest rate of growth in revenues and generated the sec-

ond highest amount of revenue. The fastest growing source of revenues is from air that increased at a compound annual growth rate of 7.5 percent. The second highest modal revenue source is air. In 1992, air collected \$11.8 billion in revenues and comprised 14.7 percent of total transportation revenues; an increase of 4 percentage points from 1982.

The third highest revenue source was transit. Transit contributed \$7.6 billion in revenues in 1992 and comprised 9.4 percent of total transportation revenues. The proportion of revenues from transit remained fairly stable, growing at a 4.6 percent compound annual growth rate from 1982-1992.

Revenue Raising Instruments by Mode

Tables 6 and 6 A displays revenues by mode and revenue sources in constant 1982 dollars and current dollars. The growth rate is the compound annual growth rate.

The following points emerge from these data.

States funded the largest share of the federal-aid system, while local governments carried the burden for transit, water, and parking. Federal funding was the greatest source of government revenues for the air and pipeline safety programs. On average, over the 1982-1992 time period states funded 64 percent of the highway program. Local governments funded 62 percent of transit, 48 percent of water and 100 percent of parking. Fifty percent of funding for air was provided by the federal government while 100 percent of identifiable funding for pipeline was provided by the federal government.

Motor fuel taxes from states were the greatest source of highway revenues while the fastest growing source was the local fuel tax. State motor fuel taxes contributed an annual average of nearly \$13 billion, followed by the Federal Highway Trust Fund revenues of nearly \$11 billion. Local fuel tax experienced the greatest growth of all highway revenues with a compound annual growth rate of 14 percent. However, the local fuel tax was a very small source of highway revenues; by 1992 it comprised only 1.2 percent of highway revenues.

TABLE 6

Transportation Revenues by Mode and Revenue Raising Instruments: 1982-1992 (In Millions of Dollars)

Constant 1982 Dollars

Mode and Instrument	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	Growth Rate
Highway												
State Fuel Tax	10,437	10,350	11,328	11,679	11,939	12,831	13,470	13,563	13,987	14,449	15,224	3.85%
State MV Lic. Tax	5,564	5,546	5,806	6,163	6,508	6,788	6,955	7,035	7,108	7,093	7,294	2.74%
State MV Op. Lic. Tax	487	484	518	537	589	595	599	597	597	606	694	3.60%
State Reg/Toll Hwy Ch	1,431	1,469	1,538	1,606	1,651	1,704	1,793	1,831	1,869	1,979	2,055	3.69%
Local Fuel Tax	125	143	146	250	265	366	452	461	479	474	475	14.29%
Local MV Lic. Tax	409	425	439	454	481	505	506	520	555	549	567	3.31%
Local MV Op Lic. Tax	N/A	N/A	N/A	N/A	N/A	1	1	1	1	1	1	3.94%
Local Reg/Toll Hwy Ch	657	677	720	806	822	902	1,034	1,125	1,125	1,181	1,194	6.16%
Fed Hwy Trst Fnd	7,822	8,476	10,698	11,602	11,753	11,086	11,584	12,343	10,556	11,551	11,999	4.37%
HIGHWAY TOTAL	26,932	27,570	31,194	33,096	34,008	34,779	36,404	37,477	36,277	37,881	39,503	3.90%
Airport												
State Charges	222	225	241	262	259	289	315	405	402	432	445	7.20%
Local Charges	2,073	2,206	2,268	2,465	2,668	2,820	2,904	3,127	3,332	3,571	3,571	5.59%
Fed AP/AWY Trst Fnd	1,711	2,582	2,825	3,234	3,149	3,432	3,465	3,812	3,880	4,684	4,285	9.61%
AIR TOTAL	4,007	5,013	5,333	5,961	6,077	6,542	6,683	7,344	7,614	8,688	8,301	7.56%
Transit												
State Charges	495	646	678	765	744	806	758	781	775	786	770	4.51%
Local Charges	2,893	2,840	2,787	2,947	3,030	3,091	2,976	3,000	2,989	3,154	3,159	0.88%
Hwy Trst Fnd	N/A	497	1,229	1,276	1,233	1,379	1,410	1,418	1,551	2,377	1,315	11.42%
TRANSIT TOTAL	3,388	3,983	4,694	4,989	5,007	5,276	5,144	5,199	5,316	6,318	5,244	4.46%
Water												
State Charges	299	272	288	293	275	272	275	259	256	268	269	-1.03%
Local Charges	672	674	693	706	768	793	832	806	818	807	843	2.29%
Fed. Water Receipts	474	416	415	416	446	512	605	555	900	1,000	1,067	8.45%
WATER TOTAL	1,445	1,362	1,396	1,415	1,488	1,577	1,712	1,620	1,974	2,074	2,179	4.19%
Parking												
Local Charges	399	435	481	502	536	556	577	599	617	647	664	5.23%
Pipeline												
Pipelines Sfty Fnd	N/A	N/A	N/A	N/A	N/A	8	7	8	8	8	10	5.27%
TOTAL	36,171	38,363	43,098	45,963	47,115	48,737	50,528	52,246	51,805	55,616	55,901	4.45%

TABLE 6A

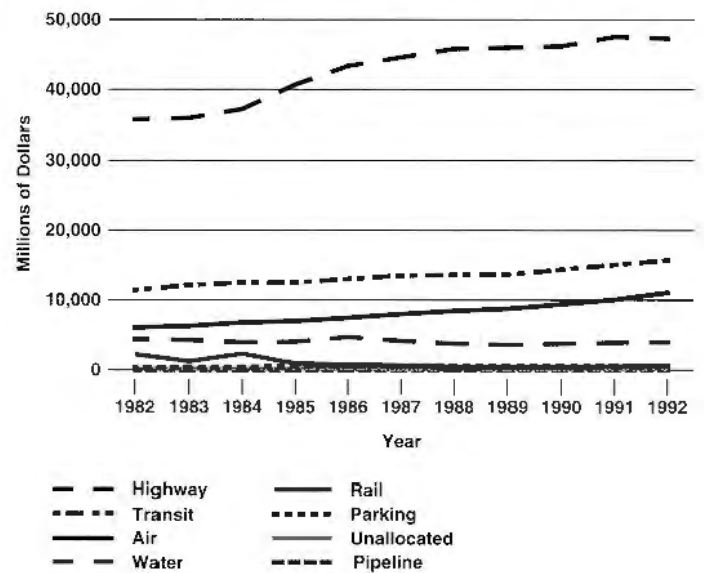
Transportation Revenues by Mode and Revenue Raising Instruments: 1982-1992 (In Millions of Dollars)

Current Dollars

Mode and Instrument	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	Growth Rate
Highway												
State Fuel Tax	10,437	10,793	12,396	13,352	14,087	15,705	17,196	18,029	19,379	20,639	22,250	7.86%
State MV Lic. Tax	5,564	5,784	6,354	7,045	7,679	8,309	8,879	9,351	9,848	10,131	10,660	6.72%
State MV Op. Lic. Tax	487	505	567	614	695	728	765	794	827	865	1,014	7.61%
State Reg/Toll Hwy Charges	1,431	1,532	1,683	1,835	1,948	2,085	2,289	2,434	2,590	2,826	3,004	7.70%
Local Fuel Tax	125	149	160	286	313	448	577	613	664	677	694	18.70%
Local MV Lic. Tax	409	443	480	518	568	618	646	692	769	784	828	7.30%
Local MV Op Lic. Tax	N/A	N/A	N/A	N/A	N/A	1	1	1	1	2	2	7.69%
Local Reg/Toll Hwy Charges	657	706	788	921	970	1,104	1,320	1,495	1,559	1,687	1,744	10.27%
Fed Hwy Trst Fnd	7,822	8,856	11,533	12,908	13,304	12,727	13,645	15,134	13,453	15,303	16,572	7.80%
HIGHWAY TOTAL	26,932	28,768	33,961	37,479	39,564	41,727	45,320	48,544	49,090	52,914	56,768	7.74%
Airport												
State Charges	222	235	263	299	306	354	402	538	556	618	650	11.35%
Local Charges	2,073	2,300	2,482	2,818	3,148	3,452	3,707	4,156	4,617	5,101	5,219	9.67%
Fed AP/AWY Trst Fnd	1,711	2,698	3,045	3,598	3,565	3,940	4,081	4,674	4,945	6,206	5,918	13.21%
AIR TOTAL	4,007	5,233	5,790	6,715	7,019	7,746	8,190	9,369	10,119	11,924	11,787	11.39%
Transit												
State Charges	495	673	742	875	878	986	968	1,039	1,074	1,123	1,126	8.56%
Local Charges	2,893	2,962	3,050	3,369	3,575	3,784	3,799	3,987	4,142	4,506	4,616	4.78%
Hwy Trst Fnd	N/A	519	1,325	1,420	1,395	1,583	1,661	1,738	1,977	3,149	1,816	14.93%
TRANSIT TOTAL	3,388	4,154	5,117	5,664	5,848	6,353	6,428	6,764	7,193	8,778	7,558	8.35%
Water												
State Charges	299	284	315	335	324	333	351	344	355	382	393	2.79%
Local Charges	672	702	758	807	906	971	1,063	1,072	1,133	1,152	1,231	6.24%
Fed. Water Receipts	474	434	448	463	505	588	713	681	1,147	1,325	1,474	12.01%
WATER TOTAL	1,445	1,421	1,520	1,605	1,734	1,891	2,127	2,097	2,635	2,860	3,099	7.93%
Parking												
Local Charges	399	453	526	574	632	681	737	796	854	924	970	9.29%
Pipeline												
Pipelines Sfty Fnd	N/A	N/A	N/A	N/A	N/A	9	9	10	10	11	14	9.23%
TOTAL	36,171	40,029	46,914	52,038	54,798	58,408	62,810	67,579	69,901	77,411	80,196	8.29%

FIGURE 8

Transportation Expenditures by Mode:
Constant 1982 Dollars



On average, over the study period, the federal Airport and Airways Trust fund was both the greatest and fastest growing source of revenues for airports. The majority of the air mode's annual average revenues of \$3.4 billion (constant dollars) consist of Federal Airport and Airway Trust Fund monies. This was followed closely by the annual average of \$2.9 billion in local airport charges. In 1982, local governments were the greatest source of airport revenues, contributing \$2.9 billion constant dollars. This changed in 1983 when the federal government became the greatest source of airport revenues with \$2.6 billion dollars compared to local airport charges of \$2.2 billion. In addition, the Airport and Airways Trust Fund experienced the greatest growth, with a 9.6 percent compound annual growth rate using constant dollars.

For transit revenues, local charges carried the greatest burden while the Federal Highway Transit Trust Fund was the fastest growing revenue source. Local charges were the greatest source of transit revenues, however, they experienced the slowest growth at 0.88 percent using constant dollars. In contrast, the HTF for Transit increased at a rate of 11.4 percent from 1983 through 1994. (The HTF for Transit began in 1983.) As the percentage of revenues from the HTF for revenues increased, local transit charges decreased. As a percentage of total transit revenues, local transit charges declined from 85 percent in 1982 to 61 percent in 1992. State charges were \$495 million in 1982 and climbed gradually to approximately \$750 million (constant dollars) in the mid-1980s before flattening.

Expenditures by Mode

Table 7 shows expenditures by mode in current and constant 1982 dollars and the compound annual growth rate. These data are displayed graphically in Figure 8. The category "Unalloc" represents administrative and operating expenditures by the Department of Transportation, the Interstate Commerce Commission, and the National Transportation Safety Board,

which are attributable to more than one mode, and, therefore, cannot be easily allocated to the individual modes

Table 7 and Figure 8 illustrate the following trends.

The highway program spends the most among the other modal programs, followed by transit and air. Spending for highways in 1992 were \$67.4 billion. On average, highway expenditure comprised 61 percent of total transportation expenditures and has remained stable during the 1982-1992 period. The second highest spending was transit at \$22.3 billion in 1992. Transit average 19 percent of total transportation spending and this proportion remained steady during this time.

Air experienced the greatest compound annual growth rate using constant dollars. Spending on air grew at a 6.23 percent compound annual growth rate. In addition, air ranked third among the modes in spending with expenditures of \$15.8 billion in 1992. As a proportion of total spending, the air mode averaged 12 percent.

The greatest percentage decline in spending is in the rail program. Govern-

TABLE 7

Transportation Expenditures by Mode: 1982-1992 (In Millions of Dollars)

Current Dollars

Mode	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	Growth Rate
Highway	35,731	37,509	40,481	46,044	50,285	53,095	56,521	59,027	61,730	65,630	67,417	6.55%
Transit	11,401	12,677	13,588	14,145	15,078	16,088	16,777	17,540	19,195	20,792	22,350	6.96%
Air	6,043	6,544	7,357	7,902	8,631	9,515	10,422	11,241	12,568	13,879	15,753	10.06%
Water	4,412	4,440	4,288	4,563	5,435	4,928	4,655	4,624	5,038	5,403	5,653	2.51%
Rail	2,250	1,301	2,522	1,075	915	791	587	606	541	783	905	-8.71%
Parking	395	460	504	614	712	782	815	787	785	850	898	8.56%
Unalloc	155	158	137	183	188	138	163	168	190	265	289	6.44%
Pipeline	9	10	9	12	8	8	9	15	27	28	32	13.07%
TOTAL	60,396	63,098	68,886	74,539	81,253	85,345	89,948	94,006	100,074	107,630	113,297	6.49%

Constant 1982 Dollars

Mode	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	Growth Rate
Highway	35,731	35,926	37,204	40,713	43,367	44,599	45,828	45,995	46,215	47,566	47,310	2.85%
Transit	11,401	12,142	12,488	12,508	13,004	13,514	13,603	13,667	14,371	15,069	15,684	3.24%
Air	6,043	6,267	6,762	6,987	7,444	7,993	8,450	8,759	9,409	10,059	11,055	6.23%
Water	4,412	4,253	3,941	4,035	4,688	4,140	3,775	3,603	3,772	3,916	3,967	-1.06%
Rail	2,250	1,246	2,318	951	789	665	476	472	405	567	635	-11.89%
Parking	395	441	463	543	614	657	661	613	588	616	630	4.79%
Unalloc	155	151	126	161	162	116	132	131	142	192	203	2.73%
Pipeline	9	10	8	11	7	7	7	12	20	21	24	9.85%
TOTAL	60,396	60,435	63,309	65,908	70,075	71,690	72,931	73,252	74,922	78,007	79,508	2.79%

Percent Distribution

Mode	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	Average 1982-1992
Highway	59.16%	59.45%	58.77%	61.77%	61.89%	62.21%	62.84%	62.79%	61.68%	60.98%	59.51%	61.06%
Transit	18.88%	20.09%	19.72%	18.98%	18.56%	18.85%	18.65%	18.66%	19.18%	19.32%	19.73%	19.14%
Air	10.01%	10.37%	10.68%	10.60%	10.62%	11.15%	11.59%	11.96%	12.56%	12.90%	13.90%	11.58%
Water	7.31%	7.04%	6.23%	6.12%	6.69%	5.77%	5.18%	4.92%	5.03%	5.02%	4.99%	5.78%
Rail	3.73%	2.06%	3.66%	1.44%	1.13%	0.93%	0.65%	0.64%	0.54%	0.73%	0.80%	1.40%
Parking	0.65%	0.73%	0.73%	0.82%	0.88%	0.92%	0.91%	0.84%	0.78%	0.79%	0.79%	0.81%
Unalloc	0.26%	0.25%	0.20%	0.24%	0.23%	0.16%	0.18%	0.18%	0.19%	0.25%	0.25%	0.22%
Pipeline	0.02%	0.02%	0.01%	0.02%	0.01%	0.01%	0.01%	0.02%	0.03%	0.03%	0.03%	0.02%
TOTAL	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

ment expenditures on rail have declined 11.9 percent over the 1982-1992 time span. In 1982 constant dollars, rail spent \$2.3 billion dollars in 1982 and reached a low of \$405 million in 1990. By 1992 it had increased to \$635 million. Public rail expenditures comprised only 1 percent, on average, of government transportation expenditures. It began the period with 3.7 percent and ended with 0.8 percent.

Grants by Mode

Table 8 reflects federal grants by mode from 1982 through 1992 in current dollars, constant dollars, and percent distribution.

This data also reflects the impact of federal assistance to state and local governments. The following are highlights from Table 8.

The highway mode received the most

TABLE 8

Federal Grants by Mode: 1982-1992 (In Millions of Dollars)

Current Dollars

Mode	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	Growth Rate
Highway	9,553	10,425	12,070	14,244	14,395	13,796	14,351	14,003	14,483	14,751	16,044	5.32%
Transit	3,894	3,848	3,755	3,381	3,358	3,311	3,277	3,552	3,794	3,881	3,632	-0.70%
Air	339	453	694	789	853	917	825	1,135	1,220	1,541	1,672	17.30%
Rail	56	49	34	36	21	21	23	15	10	8	10	-15.80%
Pipeline	2	4	5	4	4	4	5	5	4	5	7	11.27%
TOTAL	13,845	14,779	16,557	18,455	18,631	18,049	18,480	18,710	19,511	20,187	21,365	4.43%

Constant 1982 Dollars

Mode	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	Growth Rate
Highway	9,553	9,979	11,196	12,804	12,716	12,016	12,183	11,420	11,365	11,134	11,616	1.97%
Transit	3,894	3,683	3,483	3,039	2,966	2,884	2,782	2,897	2,977	2,929	2,629	-3.85%
Air	339	434	644	709	754	799	700	926	957	1,163	1,211	13.57%
Rail	56	47	31	33	19	19	19	12	8	6	7	-18.48%
Pipeline	2	3	3	4	4	4	4	4	3	4	5	7.73%
TOTAL	13,845	14,146	15,358	16,588	16,458	15,721	15,688	15,259	15,310	15,236	15,469	1.12%

Percent Distribution

Mode	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	Growth Rate
Highway	69.00%	70.54%	72.90%	77.18%	77.26%	76.43%	77.66%	74.84%	74.23%	73.07%	75.10%	74.51%
Transit	28.13%	26.04%	22.68%	18.32%	18.02%	18.34%	17.73%	18.98%	19.44%	19.23%	17.00%	20.21%
Air	2.45%	3.07%	4.19%	4.28%	4.58%	5.08%	4.46%	6.07%	6.25%	7.63%	7.83%	5.11%
Rail	0.40%	0.33%	0.20%	0.20%	0.11%	0.12%	0.12%	0.08%	0.05%	0.04%	0.05%	0.15%
Pipeline	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.03%	0.02%	0.02%	0.03%	0.02%
TOTAL	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

in grant funding. In constant dollars, federal grants for highways grew from \$9.6 billion, comprising 69 percent of total public transportation spending, to \$11.6 billion in 1992, comprising 75 percent of spending.

Grants for air have grown the fastest.

Grants to air have grown the most with nearly a 14 percent compound annual growth rate. The proportion of grants to air has changed from 2.5 percent in 1982 to 7.8 percent in 1992.

In contrast, federal grants for rail and transit have declined. As a percentage of all federal grants, grants for rail have been under 1 percent. In constant dollars, grants for rail were \$56 million in 1982 and declined to \$7 million in 1992, an 18.5 percent decline over this period. Grants for transit have declined 3.8 percent. As a pro-

portion of all federal grants, grants for transit began with a high of 28 percent in 1982 and decline to a low of 17 percent in 1992.

User Coverage by Mode

The user coverage or "coverage ratio" depicts the degree to which transportation expenditures are "covered" or paid directly by users and transportation-related collections. Table 9 displays the ratio of user revenues to expenditures, before transfers, by mode from 1982 through 1992.

The following trends emerge from these data.

Highway and air modes are consistently and substantially user financed when combining revenues and expenditures of all three levels of government.

TABLE 9

Ratio of User Revenues to Expenditures (Coverage Ratio) by Level of Government and Mode: 1982-1992

Level of Gov't and Mode	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	Average 1982-1992
Federal												
Highway	72.8%	78.5%	88.5%	84.5%	86.9%	86.6%	89.5%	101.3%	88.8%	99.1%	98.8%	88.7%
Air	48.0%	67.7%	68.2%	72.7%	68.2%	70.9%	69.2%	70.6%	67.7%	75.8%	63.6%	67.5%
Transit	N/A	13.3%	34.8%	41.4%	41.1%	47.2%	50.1%	48.4%	51.6%	80.4%	49.4%	45.8%
Water	15.9%	14.6%	15.1%	15.1%	13.6%	18.5%	25.3%	25.2%	37.4%	39.5%	38.9%	23.5%
Pipeline	N/A	N/A	N/A	N/A	N/A	211.5%	186.1%	95.2%	108.0%	118.6%	115.2%	139.1%
TOTAL FEDERAL	42.4%	53.0%	60.7%	65.8%	65.3%	68.0%	71.8%	77.7%	71.5%	81.3%	74.2%	66.5%
State and Local												
Highway	76.5%	75.9%	81.7%	79.8%	75.1%	75.5%	76.8%	75.8%	76.5%	74.9%	79.4%	77.1%
Air	92.6%	99.0%	95.0%	105.5%	101.5%	96.1%	90.8%	101.7%	98.3%	100.5%	91.1%	97.5%
Transit	45.5%	41.4%	38.8%	39.6%	38.1%	37.5%	35.4%	36.0%	34.0%	33.4%	30.7%	37.3%
Water	68.3%	67.7%	80.7%	76.5%	71.3%	74.7%	76.8%	73.6%	75.6%	74.9%	87.3%	75.2%
TOTAL STATE & LOCAL	71.2%	69.6%	72.8%	72.2%	68.6%	68.6%	69.0%	69.4%	69.1%	68.0%	69.3%	69.8%
Total Govt.												
Highway	75.4%	76.7%	83.9%	81.4%	78.7%	78.6%	80.2%	82.2%	79.5%	80.6%	84.2%	80.1%
Air	66.3%	80.0%	78.7%	85.0%	81.3%	81.4%	78.6%	83.3%	80.5%	85.9%	74.8%	79.6%
Transit	29.7%	32.8%	37.7%	40.0%	38.8%	39.5%	38.3%	38.6%	37.5%	42.2%	33.8%	37.2%
Water	32.8%	31.8%	35.5%	35.2%	31.9%	38.2%	45.7%	45.3%	52.3%	52.9%	54.8%	41.5%
Pipeline	N/A	N/A	N/A	N/A	N/A	114.6%	104.7%	67.7%	37.3%	36.0%	44.6%	67.5%
TOTAL COVERAGE	59.9%	63.4%	68.1%	69.8%	67.4%	68.4%	69.8%	71.9%	69.8%	71.9%	70.8%	68.3%

Both the highway and air modes average a coverage ratio of 80 percent. Highway users paid 84 percent of the costs in 1992, a high reached previously in 1984. However, in 1992, the air mode experienced a greater increase in expenditures than in revenues, resulting in a decline in user coverage to nearly 75 percent. This is the air mode's second lowest coverage ratio since 1982's 66 percent.

At the federal level, the user coverage is greater for the highway, transit, and pipeline programs. Using federal revenues and expenditures, highway has an average coverage ratio of 89 percent compared to 77 percent using state and local funds. Using state and local revenues and expenditures,

transit's average coverage ratio was 37 percent compared with 46 percent for federal funds. Pipeline has a ratio that exceeds 100 percent for several years. During the first two years of the Pipeline fund, 1987 and 1988, as the program was developed, receipts exceeded expenditures.

The remaining modes, air and water, experience greater user coverage with state and local revenues and expenditures. The air program's average user coverage is nearly 98 percent using state and local funds while it is almost 68 percent at the federal level. Water has a greater ratio at the state and local level, 75 percent, compared with the federal level, 23 percent.

TABLE 10

Transportation Expenditures From Own Funds by Level of Government and Mode: 1982-1992 (In Millions of Dollars)

Constant 1982 Dollars

Level of Govt. and Mode	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	Growth Rate
Federal												
Highway	10,740	10,796	12,092	13,723	13,526	12,796	12,947	12,182	11,893	11,657	12,144	1.24%
Air	3,564	3,812	4,144	4,447	4,617	4,839	5,005	5,402	5,732	6,179	6,743	6.58%
Transit	3,954	3,727	3,535	3,080	3,003	2,919	2,815	2,932	3,007	2,957	2,661	-3.88%
Water	2,991	2,854	2,745	2,760	3,277	2,773	2,388	2,203	2,409	2,532	2,745	-0.85%
Rail	2,225	1,224	2,325	951	802	682	489	488	419	588	652	-11.55%
Pipeline	2	3	3	4	4	4	4	8	7	7	9	14.30%
Unallocated	155	151	127	164	166	120	138	137	149	200	209	3.06%
SUBTOTAL	23,630	22,568	24,970	25,128	25,395	24,134	23,787	23,352	23,615	24,127	25,162	0.63%
State and Local												
Highway	24,991	25,152	25,082	26,922	29,640	31,376	32,328	33,169	33,614	35,134	34,654	3.32%
Air	2,479	2,455	2,641	2,585	2,885	3,235	3,545	3,473	3,799	3,985	4,407	5.92%
Transit	7,447	8,422	8,934	9,376	9,898	10,406	10,544	10,491	11,089	11,814	12,778	5.55%
Water	1,422	1,398	1,215	1,306	1,462	1,425	1,443	1,447	1,421	1,434	1,273	-1.10%
Rail	25	21	14	15	7	6	8	5	5	2	3	-19.29%
Parking	395	441	460	537	604	639	638	592	566	595	615	4.52%
Pipeline	7	6	5	7	3	3	3	3	12	13	13	6.79%
SUBTOTAL	36,766	37,896	38,352	40,748	44,499	47,090	48,509	49,180	50,505	52,978	53,744	3.87%
TOTALS	60,396	60,464	63,322	65,876	69,894	71,223	72,297	72,532	74,121	77,105	78,906	2.71%

Expenditures by Level of Government and Mode

This section displays transportation expenditures by level of government and mode before and after government transfers.

Expenditures From Own funds

Expenditures from own funds, before government transfers, by mode at the federal and state and local level are shown in Tables 10 and 10A in both constant 1982 dollars and current dollars. Federal expenditures from own funds include federal grants while state and local expenditures exclude them. The growth rate is a compound annual rate.

The following points stand out from the data.

Highways are the greatest source of expenditures, from own funds, at the federal, state, and local levels. On average, highway spending comprised about 50 percent of federal funding and 66 percent of state and local funding. Highway expenditures are greater at the state and local level than the federal level. In 1992, highway expenditures at the federal level were \$16.8 billion in contrast to \$50.6 billion at the state and local level.

Air has the second greatest revenues at the federal level and the fastest growing revenues at the state and local level. Air expenditures at the federal level in 1992 were \$9.3 billion and averaged 20.5 percent of federal expenditures. At the state and local level, 1992 expenditures were \$6.4

TABLE 10A

**Transportation Expenditures From Own Funds by Level of Government and Mode:
1982-1992 (In Millions of Dollars)**

Current 1982 Dollars

Level of Govt. and Mode	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	Growth Rate
Federal												
Highway	10,740	11,279	13,036	15,267	15,312	14,691	15,251	14,937	15,156	15,444	16,772	4.56%
Air	3,564	3,983	4,467	4,947	5,227	5,556	5,896	6,624	7,305	8,187	9,313	10.08%
Transit	3,954	3,894	3,811	3,427	3,399	3,351	3,316	3,595	3,832	3,917	3,675	-0.73%
Water	2,991	2,982	2,959	3,070	3,710	3,184	2,814	2,701	3,069	3,355	3,792	2.40%
Rail	2,225	1,279	2,506	1,058	908	783	576	599	534	779	900	-8.65%
Pipeline	2	4	3	4	4	4	5	10	9	9	12	18.05%
Unallocated	155	158	137	183	188	138	163	168	190	265	289	6.44%
SUBTOTAL	23,630	23,578	26,920	27,955	28,748	27,708	28,020	28,634	30,095	31,957	34,753	3.93%
State and Local												
Highway	24,991	26,230	27,445	30,778	34,973	38,404	41,270	44,090	46,574	50,185	50,645	7.32%
Air	2,479	2,561	2,890	2,955	3,404	3,959	4,526	4,617	5,263	5,692	6,440	10.02%
Transit	7,447	8,783	9,776	10,718	11,679	12,737	13,461	13,945	15,364	16,875	18,675	9.63%
Water	1,422	1,458	1,329	1,493	1,725	1,744	1,842	1,923	1,968	2,049	1,861	2.73%
Rail	25	22	16	17	8	8	10	7	7	4	4	-16.16%
Parking	395	460	504	614	712	782	815	787	785	850	898	8.56%
Pipeline	7	6	5	8	4	4	4	5	17	19	20	11.07%
SUBTOTAL	36,766	39,519	41,966	46,583	52,506	57,637	61,928	65,372	69,979	75,673	78,544	7.89%
TOTALS	60,396	63,098	68,886	74,539	81,253	85,345	89,948	94,006	100,074	107,630	113,297	6.49%

billion. Expenditures for air experienced the greatest compound annual growth rate for state and local governments at almost 6 percent, while the federal government experienced almost 7 percent growth.

Rail expenditures fell at both the federal and state and local level. Rail expenditures declined by almost 12 percent at the federal level and 19 percent at the state and local level. Rail comprised only 4 percent of federal transportation expenditures and less than 1 percent for state and local expenditures.

Expenditures After Federal Grant Transfers

The picture changes somewhat after federal grant transfers. Tables 11 and 11A show expenditures, by mode within each level of government, after government

transfers in constant dollars and current dollars. Federal expenditures do not include federal grant funds. These grants are included in the state and local expenditures.

The following are highlights from Tables 11 and 11A.

The impact of federal grants is evident when looking at highway expenditures. Highway expenditures at the state and local level have increased. Highway expenditures are the largest for the state and local governments both in 1992 and throughout the 1982-1992 period. In contrast, for the federal government highway expenditures, before transfers, ranked first with \$16.8 billion in 1992 (Table 10A) while after transfers it ranks fourth with \$728 million (Table 11A).

As with highway expenditures, expenditures for air at the state and local level increased while federal air expenditures

TABLE 11

**Transportation Expenditures by Level of Government and Mode After Transfers:
1982-1992 (In Millions of Dollars)**

Constant Dollars

Level of Govt. and Mode	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	Growth Rate
Federal												
Air	3,225	3,379	3,500	3,737	3,864	4,041	4,305	4,477	4,774	5,016	5,532	5.54%
Water	2,991	2,854	2,745	2,760	3,277	2,773	2,388	2,203	2,409	2,532	2,745	-0.85%
Rail	2,169	1,177	2,293	918	763	664	470	476	411	582	645	-11.43%
Highway	1,186	817	896	919	810	780	764	761	528	523	527	-7.79%
Transit	60	44	52	41	36	35	33	35	30	27	31	-6.31%
Pipeline	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4	4	3	4	-3.06%
Unallocated	155	151	127	164	166	120	138	137	149	200	209	3.06%
SUBTOTAL	9,786	8,422	9,613	8,540	8,916	8,413	8,099	8,093	8,305	8,888	9,693	-0.09%
State												
Air	346	319	353	414	385	389	355	382	459	532	659	6.67%
Highway	20,103	20,284	21,247	23,764	25,587	25,726	26,423	26,570	26,318	27,241	27,697	3.26%
Water	513	409	367	467	465	437	378	476	364	341	345	-3.89%
Transit	2,059	2,314	2,785	2,939	2,944	3,114	3,115	3,072	3,392	3,322	3,066	4.06%
Rail	81	69	45	47	24	24	26	17	12	8	10	-19.05%
Pipeline	9	10	8	10	7	6	7	7	16	17	19	7.44%
SUBTOTAL	23,112	23,404	24,805	27,642	29,412	29,697	30,303	30,522	30,560	31,461	31,797	3.24%
Local												
Air	2,472	2,571	2,923	2,861	3,223	3,595	3,836	3,946	4,221	4,532	4,892	7.06%
Highway	14,441	14,865	14,865	15,618	16,253	16,921	17,146	17,134	17,749	18,220	17,935	2.19%
Parking	395	441	460	537	604	639	638	592	566	595	615	4.52%
Water	909	989	848	839	998	987	1,065	971	1,057	1,093	928	0.22%
Transit	9,282	9,798	9,581	9,394	9,800	9,997	9,996	10,091	10,435	11,209	12,197	2.77%
SUBTOTAL	27,499	28,664	28,678	29,249	30,877	32,139	32,682	32,733	34,028	35,650	36,567	2.89%
TOTAL	60,396	60,490	63,095	65,431	69,206	70,249	71,084	71,349	72,893	75,999	78,057	2.60%

declined. For example, federal air expenditures, in 1992 before grant transfers, were \$9.3 billion (Table 10A). After the grant transfers, federal air expenditures were reduced to \$7.6 billion (Table 11A). The state and local expenditures, net grants, in

1992 were \$6.4 billion (Table 10A). After grant transfers, the state expenditure for air was \$963 million while the local expenditures were \$7.1 billion for a total of \$8.1 billion (Table 11A).

TABLE 11A

**Transportation Expenditures by Level of Government and Mode After Transfers:
1982-1992 (In Millions of Dollars)**

Current Dollars

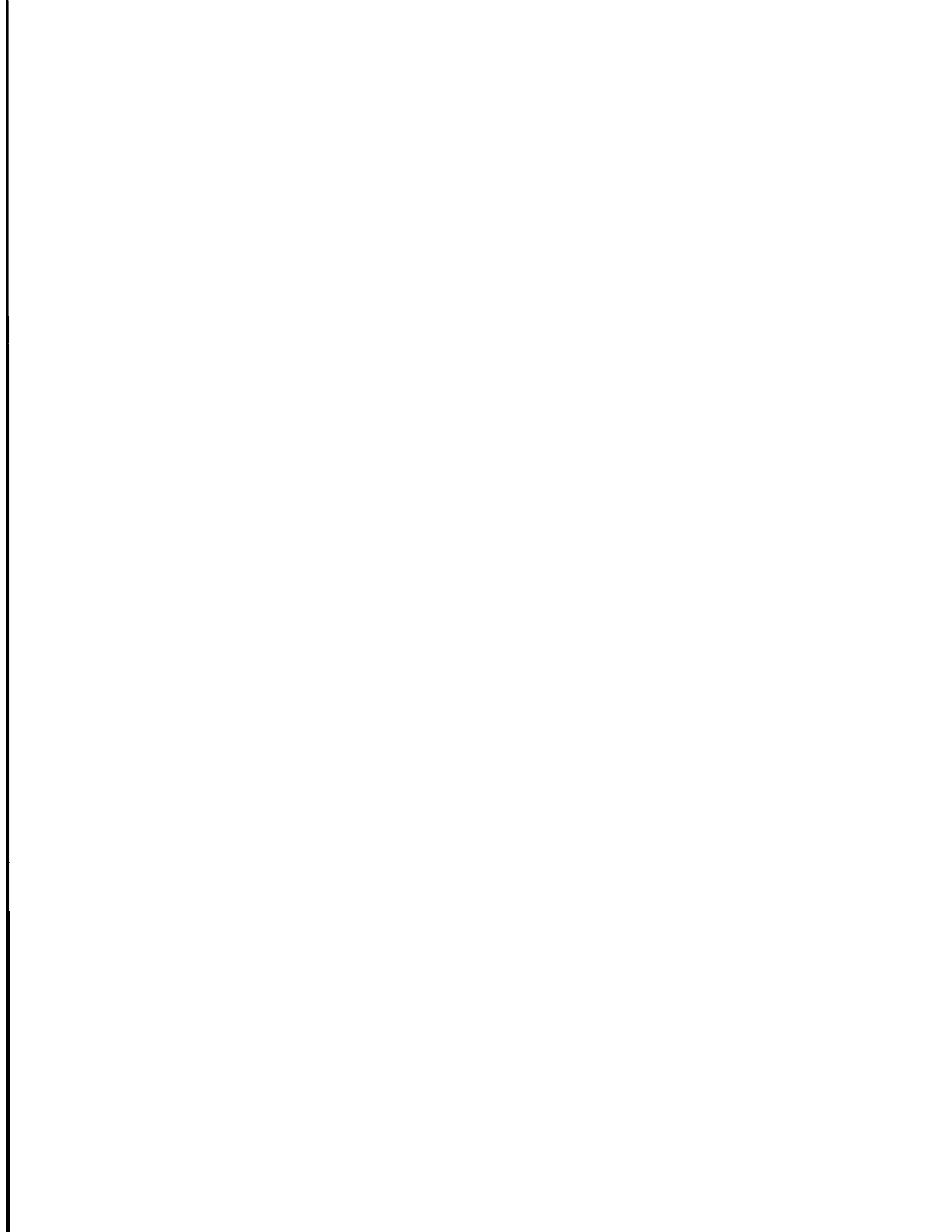
Level of Govt. and Mode	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	Growth Rate
Federal												
Air	3,225	3,530	3,773	4,158	4,374	4,639	5,071	5,489	6,084	6,646	7,641	9.01%
Water	2,991	2,982	2,959	3,070	3,710	3,184	2,814	2,701	3,069	3,355	3,792	2.40%
Rail	2,169	1,230	2,472	1,022	864	762	554	584	524	771	890	-8.52%
Highway	1,186	854	966	1,023	917	895	901	934	673	693	728	-4.77%
Transit	60	46	56	46	41	40	39	43	38	36	43	-3.24%
Pipeline	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5	5	4	6	0.87%
Unallocated	155	158	137	183	188	138	163	168	190	265	289	6.44%
SUBTOTAL	9,786	8,799	10,363	9,501	10,094	9,659	9,541	9,924	10,584	11,770	13,368	3.18%
State												
Air	346	333	386	473	454	476	454	507	635	759	963	10.79%
Highway	20,103	21,153	23,250	27,167	30,191	31,488	33,732	35,318	36,464	38,911	40,478	7.25%
Water	513	426	402	534	548	535	482	632	504	487	504	-0.18%
Transit	2,059	2,413	3,047	3,360	3,473	3,812	3,977	4,083	4,699	4,745	4,481	8.09%
Rail	81	71	49	54	29	29	33	22	17	12	14	-15.91%
Pipeline	9	10	9	12	8	8	9	9	22	24	27	11.17%
SUBTOTAL	23,112	24,407	27,143	31,600	34,704	36,348	38,685	40,572	42,342	44,938	46,467	7.23%
Local												
Air	2,472	2,681	3,199	3,271	3,803	4,400	4,897	5,245	5,848	6,474	7,149	11.20%
Highway	14,441	15,502	16,266	17,854	19,177	20,711	21,889	22,775	24,593	26,025	26,211	6.14%
Parking	395	460	504	614	712	782	815	787	785	850	898	8.56%
Water	909	1,032	928	959	1,177	1,209	1,360	1,290	1,464	1,562	1,357	4.09%
Transit	9,282	10,218	10,484	10,739	11,564	12,236	12,762	13,414	14,458	16,011	17,825	6.74%
SUBTOTAL	27,499	29,892	31,380	33,437	36,433	39,338	41,723	43,511	47,148	50,922	53,441	6.87%
TOTAL	60,396	63,098	68,886	74,539	81,231	85,345	89,948	94,006	100,074	107,630	113,297	6.49%

Summary Observations

Although annual government transportation expenditures exceed revenues, this gap has been narrowing. The faster growth of federal transportation revenues compared to its expenditures was a contributing factor in closing this gap. In contrast, the difference in growth of state and local transportation revenues and expenditures over this time span was marginal.

The closing of the gap between transportation revenues and expenses

contributed to the increase in the degree to which transportation-related expenditures are paid directly by user. Transportation-related public collection has increased from 60 percent since 1982 to about 70 percent in 1992. Regarding modal changes, over the 11-year time span, the highway program had the greatest revenues and expenditures and as a proportion of modal spending remained fairly stable. The fastest growth in both revenues and expenditures belonged to the air mode. Rail experienced the greatest percentage decline in government spending.



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APPENDIX: TERMINOLOGY *and* DEFINITIONS

The basic federal government data terminology and definitions are the same as those used in the *Budget of the United States Government, Fiscal Year 1991* and more fully described in *A Glossary of Terms Used in the Federal Budget Process*, January 1993. Other terminology and definitions are from the U.S. Census Bureau's *Government Finances, 1990-91*. The terminology and definitions are summarized here along with a discussion of additional measures and concepts used in this report.

Constant Dollars

A dollar value adjusted for changes in the average price level. A constant dollar is derived by dividing a current dollar amount by a price index. The resulting constant dollar value is that which would exist if prices had remained at the same average level as in the base period. To obtain constant dollars, each current dollar series was divided by the Government Index of Government Purchases of Goods and Services (GPGS).

Coverage Ratios

The ratio used to measure the degree to which expenditures are funded or "covered" by the various types of revenues. This ratio indicates the percent of expenditures that is funded by identifiable transportation-related tax receipts, fees, etc.

Current Dollars

The dollar value of a good or service in terms of prices current at the time the good

or service is sold. This contrasts with the value of the good or service measured in constant dollars.

Expenditure

All amounts of money paid out by a government, net of recoveries and other correcting transactions, other than retirement of debt, investment in securities, extension of credit, or agency transactions. Federal expenditures are also referred to as outlays.

Government Transportation Revenue

The transportation revenue estimates contained in this report consist of those funds identified as government transportation-related user charges, taxes or fees in the various data sources. Therefore, general revenue is not included.

Government Transportation Expenditures

Expenditures are the final actual costs for capital goods and operating services covered by the government transportation program.

Grants

A federal financial assistance award making payment in cash or in kind for a specified purpose. The federal government is not expected to have substantial involvement with the state or local government or other recipient while the contemplated activity is being performed. The term "grants-in-aid" is commonly restricted to grants to states and local governments.

Intergovernmental Revenue

Amounts received from other governments as fiscal aid in the form of shared

revenues and grants-in-aid, as reimbursements for performance of general government functions and specific services for the paying government, or in lieu of taxes. This revenue excludes amounts received from other governments for sale of property, commodities and utility services.

Own Source Revenue

All amounts of money received by a government from external sources, net of refunds and other correcting transactions, other than from the issuance of debt, liquidation of investments, and as agency and private trust transactions. The federal government's revenues are generally referred to as receipts.

Trust Fund

Trust funds are funds that are designated by law as trust funds, including trust revolving funds. They are usually financed by earmarked collections. A trust fund must use its income for the purposes designated by law, but it is not required to spend them all in the same period they are collected. The five transportation-related federal trust funds are highways, which includes highway and transit accounts; airports and airways; aquatic resource, which is of interest because of the boat safety account; harbor maintenance, and inland waterways. There is also a pipeline safety fund, however, it is not a trust fund.

User Charge or Fee

A fee charged to users for goods and services provided by the federal, state and local governments. User charges, either directly or indirectly, are paid on a periodic or occasional basis with license fees and excises. User charges are also paid at the time infrastructure services are consumed with the payment of fuel taxes and tolls. In the narrow budgetary sense, a toll for the use of a highway is considered a user fee since it is related to the specific use of a

particular section of highway. Highway excise taxes on gasoline are considered a form of user charge in the economic sense, but since the tax must be paid regardless of how the gasoline is used and since it is not di-

rectly linked with the provision of the specific service, it is considered a tax and recorded as a governmental receipt in the federal budget.



METRIC/ENGLISH CONVERSION FACTORS

ENGLISH TO METRIC

LENGTH (APPROXIMATE)

1 inch (in) = 2.5 centimeters (cm)
 1 foot (ft) = 3.0 centimeters (cm)
 1 yard (yd) = 0.9 meter (m)
 1 mile (mi) = 1.6 kilometers (km)

AREA (APPROXIMATE)

1 square inch (sq in, in²) = 6.5 square centimeters (cm²)
 1 square foot (sq ft, ft²) = 0.09 square meter (m²)
 1 square yard (sq yd, yd²) = 2.6 square kilometers (km²)
 1 acre = 0.4 hectares (he) = 4,000 square meters (m²)

MASS - WEIGHT (APPROXIMATE)

1 ounce (oz) = 28 grams (gr)
 1 pound (lb) = .45 kilogram (kg)
 1 short ton = 2,000 pounds (lb) = 0.9 tonne (t)

VOLUME (APPROXIMATE)

1 teaspoon (tsp) = 5 milliliters (ml)
 1 tablespoon (tbsp) = 15 milliliters (ml)
 1 fluid ounce (fl oz) = 30 milliliters (ml)
 1 cup (c) = 0.24 liter (l)
 1 pint (pt) = 0.47 liter (l)
 1 quart (qt) = 0.96 liter (l)
 1 gallon (gal) = 3.8 liters (l)
 1 cubic foot (cu ft, ft³) = 0.03 cubic meter (m³)
 1 cubic yard (cu yd, yd³) = 0.76 cubic meter (m³)

TEMPERATURE (EXACT)

$$[(x - 32)(5/9)]^{\circ}\text{F} = y^{\circ}\text{C}$$

METRIC TO ENGLISH

LENGTH (APPROXIMATE)

1 millimeters (mm) = 0.04 inch (in)
 1 centimeters (cm) = 0.4 inch (in)
 1 meter (m) = 2.2 feet (ft)
 1 meter (m) = 1.1 yards (yd)
 1 kilometer (km) = 0.6 mile (mi)

AREA (APPROXIMATE)

1 square centimeter (cm²) = 0.16 square inch (sq in, in²)
 1 square meter (m²) = 1.2 square yards (sq yd, yd²)
 1 square kilometer (km²) = 0.4 square mile (sq mi, mi²)
 1 hectares (he) = 10,000 square meters (m²) = 2.5 acres

MASS - WEIGHT (APPROXIMATE)

1 gram (gr) = 0.036 ounce (oz)
 1 kilogram (kg) = 2.2 pounds (lb)
 1 tonne (t) = 1,000 kilograms (kg) = 1.1 short tons

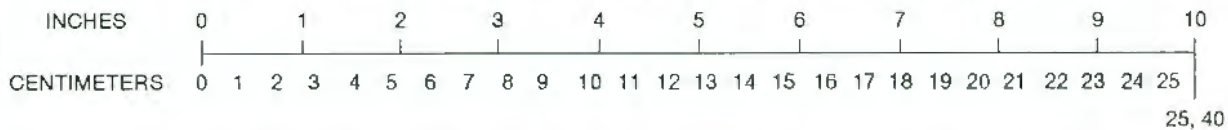
VOLUME (APPROXIMATE)

1 milliliters (ml) = 0.03 fluid ounce (fl oz)
 1 liter (l) = 2.1 pints (pt)
 1 liter (l) = 1.06 quarts (qt)
 1 liter (l) = 0.06 gallon (gal)
 1 cubic meter (m³) = 36 cubic feet (cu ft, ft³)
 1 cubic meter (m³) = 1.3 cubic yards (cu yd, yd³)

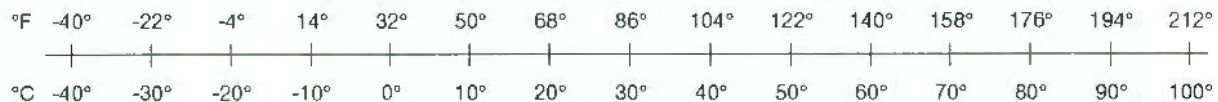
TEMPERATURE (EXACT)

$$[(9/5)(y + 32)]^{\circ}\text{C} = x^{\circ}\text{F}$$

QUICK INCH-CENTIMETER LENGTH CONVERSION



QUICK FAHRENHEIT-CELCIUS TEMPERATURE CONVERSION



For more exact and or other conversion factors, see NBS Miscellaneous Publication 286, Units of Weights and Measures. Price \$2.50. SD Catalog No. C1310286.

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