

Appendix B

Web Supplement to *Trends in Public Spending on Transportation and Water Infrastructure, 1956 to 2004*

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Identifying Infrastructure

This paper reports spending by the federal government and state and local governments on seven types of infrastructure: highways and roads, mass transit, rail, aviation, water transportation, water resources, and water supply and wastewater treatment. The basis for identifying public spending on infrastructure for inclusion in this paper was drawn from previous Congressional Budget Office (CBO) reports on infrastructure spending and the categories for which federal investment is reported annually by the Office of Management and Budget (OMB).¹ Those categories are all consistent with the ones used in research by both the Government Accountability Office and the Congressional Research Service.

Types of Spending

Capital and Operation and Maintenance

The determination of whether federal spending is for capital or for operation and maintenance is based on the classification scheme for Character Class data that are collected from federal agencies on OMB form schedule C (see Office of Management and Budget, *Circular No. A-11* (2006), section 84). Character Class data are divided into investment and noninvestment spending.

To obtain federal capital outlays, this paper includes all investment spending on physical infrastructure assets that is reported on schedule C. Federal investment in physical assets includes “amounts for the purchase, construction, manufacture, rehabilitation, or major improvement of physical assets regardless of whether the assets are owned or operated by the Federal Government, States, municipalities, or private individuals. Physical assets are land, structures, equipment, and intellectual property (for example, software) that have an estimated useful life of two years or more; and commodity inventories. The cost of the asset includes both its purchase price and all other costs incurred to bring it to a form and location suitable for its use.” See Office of Management and Budget, *Circular No. A-11*, (2006), section 84, p. 6.

To obtain federal operation and maintenance spending, this paper combines the remaining investment spending reported on schedule C (that is, investment in nonphysical infrastructure assets such as research and development and education) and all other noninvestment spending.

The determination of what constitutes state and local capital and operation and maintenance spending is given in Bureau of the Census, *Government Finance and Employment Classification Manual*, Chart 8-A: “Description of Character and Object Categories,” available at www.census.gov/govs/www/class_ch8_charta.html.

¹ See, respectively, Congressional Budget Office, *Trends in Public Infrastructure Spending* (May 1999) and *Budget of the United States Government, Fiscal Year 2007: Analytical Perspectives*, Table 6-2: “Federal Investment Budget Authority and Outlays—Grant and Direct Federal Programs,” pp. 56–58.

Table B-1 compares the definitions of capital and operation and maintenance spending from the sources listed above for federal, state, and local governments.

Table B-1. Definitions of Capital and Operations and Maintenance Spending by Federal, State, and Local Governments

Main Spending Categories	Federal	State and Local
Capital	<p>Construction and Rehabilitation: Amounts for construction and rehabilitation, including both grants and direct federal programs. Construction and rehabilitation means the design and production of fixed works and structures or substantial alterations to such structures or land. Includes new works and major additions, alterations, improvements to and replacements of existing works. Excludes preliminary surveys, maintenance, repair, administration of such facilities and other federal operating expenses.</p> <p>Purchase and Sales of Land and Structures: Amounts for purchase, including lease purchases, of land and structures for use by the federal government and sales of such land and structures. Includes office buildings and park and forest lands. Does not include land or structures acquired as temporary inventory, such as collateral on defaulted loans.</p>	<p>Construction: Production, additions, replacements, or major structural alterations to fixed works, undertaken either on a contractual basis by private contractors or through a government’s own staff (that is, force account).</p> <p>Purchase of Land and Existing Structures: Acquisition of these assets as such by outright purchase; payments on capital lease-purchase agreements or installment purchase contracts; costs associated with eminent domain (including purchase of rights-of-way); and tax or special assessment foreclosure. Covers all ancillary costs associated with the transaction such as legal and title fees, surveying fees, appraisal and negotiation fees, damage claims, and nonconstruction-related site preparation costs, including clearing, filling, leveling, and razing unwanted structures.</p>

Operations and Maintenance

Major Equipment: Amounts for identifiable items of major equipment, including information technology, vehicles, ships, machine tools, aircraft, tanks, satellites and other physical assets in space, and nuclear weapons. Excludes routine purchases of ordinary office equipment or furniture and fixtures. However, where there are major programs for acquisition of equipment, includes all equipment purchases.

Purchase of Equipment: Purchase and installation of apparatus, furnishings, motor vehicles, office equipment, and the like having a life expectancy of more than five years. Includes both additional equipment and replacements purchased outright or through capital lease or installment purchase contracts. Includes related expenditure necessary to place equipment in its intended state of operation (for example, transportation charges, installation fees, taxes, and so forth).

Conduct of Research and Development: Includes basic and applied research and development (the last defined as the systematic application of knowledge or understanding, directed toward the production of useful materials, devices, and systems or methods), including design, development, and improvement of prototypes and new processes to meet specific requirements.

Conduct of Education and Training: Programs whose primary purpose is education, training, and vocational rehabilitation.

Noninvestment Activities: For indirect federal spending, these are grant and loan subsidy amounts that are not classified as investment spending (for example, administrative expenses related to grant and loan subsidy programs). For direct federal spending, these are amounts for all other noninvestment activities, including

Current Operations: Direct expenditure for compensation of own officers and employees and for supplies, materials, and contractual services except any amounts for capital outlay (that is, for personal services or other objects used in force account construction of permanent

offsetting collections.

and for acquisition of property and equipment).

Offsetting collections are payments to the government that are credited to expenditure accounts and typically allow spending out of that account without an appropriation by the Congress. (Offsetting collections from the sale of physical assets are entered as negative amounts for the corresponding physical assets (that is, as negative physical investment)). This is a residual balancing entry to ensure that the sum of all items in schedule C equals total budget authority and outlays net of offsetting collections. Includes transactions related to credit liquidating accounts.

Sources

Definitions for federal outlays come from Office of Management and Budget, *Circular No. A-11* (2006), section 84, pp. 6–12. The capital outlays whose definitions are presented in this table are the major types of federal physical investment but do not include all capital infrastructure described in this paper. Definitions for state and local expenditures can be found under codes F (Construction), G (Purchase of Land and Existing Structures), K (Purchase of Equipment) and E (Current Operations) at www.census.gov/govs/www/class_ch8_charta.html.

Important Concepts for Federal Spending

Outlays, Budget Authority, and Obligations. With only a few exceptions, this paper reports federal infrastructure spending in the form of outlays. OMB defines an outlay as “a payment to liquidate an obligation (other than the repayment of debt principal). Outlays generally are equal to cash disbursements ... [and are] the measure of Government spending.” See Office of Management and Budget, *Circular No. A-11*, (2006), section, 20, p. 6. Outlays may reflect budget authority (that is, “the authority provided by law to incur financial obligations that will result in outlays”; see section, 20, p. 3) from both past and current years.

In a few instances, schedule C data are not sufficiently detailed to distinguish federal infrastructure expenditures from other types of outlays. That is the case for Coast Guard’s operations (which include policing and homeland security efforts as well as those that support water transportation) and the Department of Housing and Urban Development’s Community Development Block Grants (which include a number of types of community development grants in addition to those for water supply and wastewater treatment). This paper relied on the relevant chapters of the *Budget of the United States: Appendix* for various fiscal years to supply the necessary detail. In those cases, federal infrastructure spending is expressed as obligations, that is, “binding agreement(s) that will result in outlays, immediately or in the future” (see section 20, p. 6).

Outlay Measures for Federal Operations and Maintenance Spending. This report measures gross infrastructure spending, that is, the total amount spent by government. Any fees that a government charges for the use of public infrastructure are not netted out from gross spending.

Consequently, to calculate federal infrastructure spending, this paper excluded any budget accounts that were purely receipts accounts, that is, that served simply to account for federal receipts from infrastructure. The most notable example of such accounts are the trust funds that provide funding for surface transportation and aviation programs. However, that approach did not avoid all netting out of infrastructure receipts from gross federal infrastructure outlays. In particular, federal operation and maintenance outlays reported on schedule C do net out some user fees that are classified as offsetting collections (see Table B-1).² Offsetting collections are payments to the government that are credited to expenditure accounts and typically allow spending out of that account without an appropriation by the Congress. Whenever offsetting collections apply to a federal infrastructure budget account, the corresponding entry for federal direct operation

² Note from Table B-1 that sales of physical infrastructure assets are entered as negative capital spending outlays, which is appropriate because those sales reflect federal disinvestment in infrastructure capital.

and maintenance outlays will understate actual (or gross) direct spending from it.³ That outcome is a result of the schedule C data being collected for budgetary purposes—that is, for calculating the net outlays that determine the federal government’s budget deficit or surplus—rather than for purposes of economic analysis.

Understatement of federal spending does not appear to be a substantial problem, as the types of infrastructure that receive most federal funding are not susceptible to the netting-out effect. For example, in 2002 the Government Accountability Office found that “the federal funding approach for aviation and highways relied almost exclusively on assessments on users of the transportation systems ... (and) most of these collections were credited to trust fund accounts.” See Government Accountability Office, *Marine Transportation: Federal Financing and a Framework for Infrastructure Investments*, GAO-02-1033 (September 2002), pp. 3–4. This paper’s totals for federal infrastructure spending include federal infrastructure outlays made from trust fund accounts but does not net out the receipts—in the form of excise taxes and other fees—that fund those accounts.

Federal Grants, Loan Subsidies, and Other Federal Infrastructure Spending.

Similar to the handling of capital and operation and maintenance spending, this report relies on the Character Class data collected on OMB form schedule C to distinguish between federal grants and loan subsidies to states and localities, and other federal spending.⁴ Federal grants and loan subsidies “support state or local programs of government operations or provision of services to the public” (see Office of Management and Budget, *Circular No. A-11* (2006), section 84, pp. 2–3). Information on federal grants and loan subsidies generally—beyond what is reported in this paper—is also available in *Budget of the United States Government, Fiscal Year 2008: Analytical Perspectives*, Chapter 8: “Aid to State and Local Governments,” pp. 101–152. Information on individual grant and loan programs can be found in the *Catalog of Federal Domestic Assistance*, available at <http://12.46.245.173/cfda/cfda.html>.

Other federal infrastructure spending described in this paper includes any type of infrastructure spending by the federal government that is not a grant or a loan subsidy.

³ An illustration is provided by Office of Management and Budget, *Circular No. A-11* (2006), section 84, p. 4.

⁴ The Federal Credit Reform Act of 1990 requires that when federal direct loan or loan guarantee programs are established or modified, they receive budget authority to cover the credit subsidy that the government provides through them. The value of the estimated loan subsidies are entered as federal outlays on schedule C. When those loan subsidy estimates are reestimated, any difference between the original estimate and the reestimate (either positive or negative) is entered as an outlay. Credit subsidy reestimates for infrastructure loan subsidies are included in this report because they represent the degree to which the financial burden to the federal government from offering those subsidies in the past was overstated or understated.

Data Sources

Updating Federal Infrastructure Spending

Federal infrastructure outlays from 1998 to 2006 come directly from OMB's data collected on schedule C. Table B-2 (posted separately) provides a complete listing of the federal programs whose outlays for infrastructure have been included in this paper.⁵ That table also includes a list of programs that are intended to protect infrastructure—principally aviation—and whose spending has been noted by this paper. (Those outlays are not, however, considered to be infrastructure spending.) The federal infrastructure programs listed in Table B-2 account for most of such spending; other federal programs may also fund infrastructure projects but do so to such a small degree that they do not warrant inclusion in this paper.⁶

In a few instances, corrections to OMB's schedule C data—based on information from the President's budget—were required. Additionally, in order to obtain an accurate picture of federal infrastructure spending, it was necessary to make other additions or adjustments to OMB's data:

⁵ The identification of federal infrastructure spending in this and earlier CBO papers relies heavily on the budget subfunction assigned to each federal account (see the final column in Table B-2), which is based on the primary purpose served by that program. For public infrastructure included in this paper, the relevant budget subfunctions are these:

- for water resources, and water supply and wastewater treatment programs: 301 (Water Resources), 302 (Conservation and Land Management), 304 (Pollution Control and Abatement), 451 (Community Development), and 452 (Area and Regional Development);
- for highways and roads, mass transit and rail: 401 (Ground Transportation);
- for aviation: 402 (Air Transportation); and
- for water transportation: 403 (Water Transportation).

Note that not all federal programs classified under the budget subfunctions above are included in this paper, because their primary purpose may not be for public infrastructure as defined by this paper (notable examples are programs in subfunction 304 (Pollution Control and Abatement) and 452 (Area and Regional Development)). See Office of Management and Budget, *Circular No. A-11* (2006), Exhibit 79A, section 79, p. 9.

⁶ Water supply and wastewater treatment programs are a good example. See Government Accountability Office, *Freshwater Programs: Federal Agencies' Funding in the United States and Abroad*, GAO-05-253 (March 2005).

Rail

- Outlays for the Surface Transportation Board are assumed to apply entirely to federal rail spending;

Water Transportation

- The Coast Guard's operating expenses are in the form of obligations and are taken from that program's account in the *Budget of the United States: Appendix, Department of Homeland Security* for the following activities: search and rescue; marine safety, aids to navigation, and ice operations.

Note that Army Corps of Engineers' projects to support water navigation are included in the water resources category of infrastructure spending along with all other infrastructure spending by that agency.

Water Supply and Wastewater Treatment

- Community Development Block (or Formula) Grants (CDBG) for this infrastructure type are assumed to be purely capital spending and are in the form of obligations. They are calculated by multiplying the total obligations in the CDBG program account (taken from the *Budget of the United States: Appendix, Department of Housing and Urban Development*) by the share that "Water / Sewer Improvements" represent in total CDBG disbursements (available at www.hud.gov/offices/cpd/communitydevelopment/budget/disbursementreports/disbursements_all.xls);
- Rural Community Advancement grants and loan subsidies for this infrastructure type are either obligations or outlays and are taken from the *Budget of the United States: Appendix, Department of Agriculture*.

Projections of Federal Spending on Infrastructure, 2007 to 2009

For most types of infrastructure, CBO projected federal spending for the 2007–2009 period by applying to each infrastructure category the annualized growth of CBO's baseline estimate for the budget subfunction that corresponded most closely to it. To project federal spending for water supply and wastewater treatment infrastructure, CBO applied its baseline estimates for the two programs that account for most of such spending at the federal level: the Department of Agriculture's Rural Community Advancement program and the Environmental Protection Agency's State and Tribal Assistance Grant program.

Sources of Data on Federal Spending for Previous CBO Reports

CBO assembled most of the federal data for the 1980–1997 period from information collected by OMB on schedule C. In a few instances, OMB's data conflicted with those shown in various parts of the budget. In those cases, CBO used the data from the budget.

For years before 1980, CBO used primarily unpublished historical data from OMB and the federal budget for various years. OMB's historical data show federal outlays for individual budget accounts broken down into grant and nongrant spending. By definition, grant outlays are indirect spending; nongrant outlays can be either direct or indirect.

The historical data did not separate outlays into capital and operation and maintenance expenditures. CBO took the data on capital expenditures from the *Budget of the United States Government*, in particular the "Historical Tables," the "Special Analyses," and the "Appendix" for various years. Because of apparent inconsistencies in the principal data sources, CBO gathered spending data for both the aviation and rail categories from the federal budget's appendix and classified them by type of spending on an account-by-account basis.

State and Local Infrastructure Spending

All data on state and local expenditures are from the Census Bureau's Government Finances series (available at www.census.gov/govs/www/index.html). To obtain state and local spending net of federal grants and loan subsidies, the value of indirect federal spending for each type of infrastructure was subtracted from the corresponding total at the state and local level.

A definition of each type of infrastructure for which this paper reports spending by states and localities is provided below; examples of what is included and excluded in each category are provided at the Internet address for each entry:

Highways and Roads (Including toll roads)

Highways: www.census.gov/govs/www/classfunc44.html

- **Definition:** Maintenance, operation, repair, and construction of nontoll highways, streets, roads, alleys, sidewalks, bridges, tunnels, ferry boats, viaducts, and related structures.

Toll Roads: www.census.gov/govs/www/classfunc45.html

- **Definition:** Maintenance, operation, repair, and construction of highways, roads, bridges, ferries, and tunnels operated on a fee or toll basis.

Mass Transit: www.census.gov/govs/www/classfunc94.html

- **Definition:** Operation, maintenance, and construction of public mass transit systems, including subways, surface rails, and buses.

Aviation: www.census.gov/govs/www/classfunc01.html

- **Definition:** Provision, operation, construction, and support of airport facilities serving the public at large on a scheduled or unscheduled basis and the regulation of the airline industry.

Water Transportation: www.census.gov/govs/www/classfunc87.html

- **Definition:** Provision, construction, operation, maintenance, and support of public waterways and harbors, docks, wharves, and related marine terminal facilities and the regulation of the water transportation industry.

Water Supply and Wastewater Treatment

Water Supply: www.census.gov/govs/www/classfunc91.html

- **Definition:** Operation, maintenance, and construction of public water supply systems, including production, acquisition, and distribution of water to general public or to other public or private utilities, for residential, commercial, and industrial use.

Sewerage: www.census.gov/govs/www/classfunc80

- **Definition:** Provision, maintenance, and operation of sanitary and storm sewer systems and sewage disposal and treatment facilities.

The Bureau of the Census does not report state and local expenditures on freight rail (it lumps passenger rail into the mass transit category) and, after 1990, it has not reported water supply and wastewater treatment expenditures in a manner consistent with this paper's definition.

Data on current and historical expenditures are available at www.census.gov/govs/www/estimate.html. For example, selecting the 2004–2005 period produces the Web page at www.census.gov/govs/www/estimate05.html, at which it is possible to access data at various levels of aggregation. Two summary files (<http://ftp2.census.gov/govs/estimate/05slsstab1a.xls> and <http://ftp2.census.gov/govs/estimate/05slsstab1b.xls>) report data for the entire United States, for states and localities as two separate groups, or for specific states. Data on the breakdown by capital and operation and maintenance expenditures for each type of infrastructure by level of government are available in the file “State by Level of Government – Non-Delimited” (<http://ftp2.census.gov/govs/estimate/05statetypepu.zip>); documentation for that file is available by clicking an adjacent hyperlink (<http://www.census.gov/govs/www/05censustechdoc.html#itemcode>).

Finally, the raw data that generate the Bureau of the Census' estimates of state and local infrastructure expenditures in the files “Individual Unit File—Public Use Format” (<http://ftp2.census.gov/govs/estimate/05indunit.zip>) and the “Directory Information File—Individual Units” (<http://ftp2.census.gov/govs/estimate/fin05gid.zip>). Using the information in the corresponding technical documentation (www.census.gov/govs/www/05censustechdoc.html), those data can be read into a statistical program for further processing and calculations. However, because of the measures necessary to account for nonresponse and other issues related to sampling local governments in the annual survey,

spending totals generated by the Individual Unit File may not equal the numbers published by the Census.⁷

Additional details are provided by Bureau of the Census, *Federal, State, and Local Governments, Government Finance, and Employment Classification Manual*, available at www.census.gov/govs/www/class.html.

Other Issues in Calculating Public Spending on Infrastructure

Converting Nominal Spending into Real Values. CBO's estimates of real infrastructure spending uses two price indexes from the Bureau of Economic Analysis to convert constant-dollar (or nominal) spending into constant-dollar (or real) values: Table 3.9.4: "Price Indexes for Government Consumption Expenditures and Gross Investment," available at www.bea.gov/bea/dn/nipaweb/SelectTable.asp?Selected=N#S5. CBO applied the Federal Nondefense price index series to federal direct outlays and the State and Local price index to federal indirect outlays and state and local expenditures.

Costs as Financed Versus Current Resource Costs. The infrastructure spending reported by this paper for the federal government and state and local governments does not include payments of interest on debt issued to finance public infrastructure. The inclusion of interest payments would reflect the full capital cost of investment and thereby measure the costs of infrastructure as financed. By excluding interest payments, this paper measures the current resource costs of infrastructure. Current resource costs are the most appropriate gauge of infrastructure spending for analyses of how efficiently society currently chooses to allocate its resources. Costs as financed reflect the burden to society of past and current decisions (say, to obtain a given amount of infrastructure services over time).⁸

Making Fiscal Years Conform. Most state governments and many localities use fiscal years that start on July 1 and end on June 30 of the following year.⁹ The federal government followed that practice through fiscal year 1976. That fiscal year was followed by a transition quarter, after which the federal fiscal year began on October 1. That created a mismatch between the federal and the state and local fiscal years, which could cause errors in measuring state and local spending net of federal grant and loan

⁷ State-level expenditures are fully reported each year and results from the data in the Individual Unit File should equal the corresponding estimates by the Bureau of Census.

⁸ See also Congressional Budget Office, *Future Investment in Drinking Water and Wastewater Infrastructure* (November 2002). As part of its State and Local Finances series, the Bureau of the Census publishes data on interest payments by states and localities on debt issued for water and transit projects.

⁹ For details see Bureau of the Census, *State and Local Government Finances, Technical Documentation 2005*, available at www.census.gov/govs/www/05censustechdoc.html.

subsidies for a particular year. To make state and local expenditures more comparable with federal outlays after 1976, this paper—following the example of its predecessors—uses an alternative state and local fiscal year that begins on October 1 and ends on September 30 of the following year.

For example, of the infrastructure expenditures reported for states and localities during fiscal year 1977 as defined by this paper (and which is constructed to run from October 1, 1976, to September 30, 1977), 75 percent come from the actual state and local fiscal year of 1977 (July 1, 1976, to June 30, 1977) and the remaining 25 percent come from the following state and local fiscal year (July 1, 1977, to June 30, 1978).

That procedure reduces potential errors—particularly in the sequencing of federal grants and loan subsidies and their use by states and localities—caused by the inexact match between the two types of fiscal years. However, it means that although expenditure data from the Bureau of the Census' survey of State and Local Finances run through state and local fiscal year 2005, those data allow a match with federal outlays only through 2004.