

Estimates of Real Government Consumption Expenditures and Gross Investment by Function for 1959–2003

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THE Bureau of Economic Analysis presents, for the first time, estimates of real Federal Government and state and local government consumption expenditures and gross investment by function.¹ Previously, only estimates of current-dollar government spending by function were prepared.²

The new estimates of total real government spending grew at an average annual rate of 2.3 percent in 1959–2003. Spending for income security grew the fastest, and spending for national defense grew the slowest.

The estimates of current-dollar and real spending by function are consistent with the estimates of Federal Government and state and local government spending that are in the national income and product accounts (NIPAs) and that were prepared as part of the 2003 comprehensive NIPA revision and the 2004 annual revision. Their preparation meets a goal of *BEA's Strategic Plan for FY 2004–2008*.

NIPA estimates of government spending are mainly derived from data that are consistent with Federal,

state, and local government budgets. These budgets usually reflect expenditures by function or by program, such as defense, health, and education.³ As a result, BEA's estimates of government spending by function provide information on how governments allocate their funds that is useful to policymakers, business decisionmakers, and other data users. The estimates of current-dollar government spending show the relative size of each function, and the estimates of real government spending remove the effects of price changes over time and show the relative growth of each function.

Like estimates of real government spending to produce services that are included in estimates of real

3. BEA's estimates by function are based on the "Classification of the Functions of Government" (COFOG); see "Government Spending by Function: A New Presentation," *SURVEY 80* (June 2000): 18–23. COFOG is the international classification standard, which is cited in the *System of National Accounts, 1993* and the *Government Finance Statistics Manual, 2001*. BEA's classifications of functions differ from COFOG because they do not include an environmental category and because they include "space" in economic affairs. An environmental category is not shown because environmental activities in the relevant subfunctions (such as waste management, housing, and community services) cannot be identified in BEA's source data. Including "space"—mostly National Aeronautical and Space Administration programs. Under the COFOG standard, spending on space-related activities may be classified as part of research and development (R&D) within all the relevant COFOG functions.

1. In this article, government "consumption expenditures and gross investment" will be used interchangeably with government "spending."

2. These estimates are presented in "Newly Available NIPA Tables" in this issue of the *SURVEY OF CURRENT BUSINESS*.

A New Framework for Government Consumption Expenditures

As part of the 2003 comprehensive NIPA revision, BEA adopted a new framework for government consumption expenditures—both Federal and state and local—that explicitly recognizes the services produced by general government.¹ Under the new framework, the value of government services is measured by the cost of inputs: Compensation, consumption of fixed capital (CFC, a partial measure of the services of government fixed assets), and intermediate goods (durable and nondurable

goods) and services purchased. The value of general government consumption expenditures and gross investment does not change, because the value of the newly recognized services produced by government is equal to the cost of the inputs. However, the distribution of gross domestic product (GDP) by type of product is affected; services output increases, and goods output decreases.

The new framework permits the more consistent treatment of the production of services that are produced by both the public sector and the private sector. It also improves consistency between the NIPAs and international guidelines for national economic accounting, and it provides for the possible future development of direct measures of real government output.

1. See Brent R. Moulton and Eugene P. Seskin, "Preview of the 2003 Comprehensive Revision of the National Income and Product Accounts: Changes in Definitions and Classifications," *SURVEY 83* (June 2003): 30–31. See the presentation of the new framework in NIPA tables 3.10.1, 3.10.3, 3.10.4, 3.10.5, and 3.10.6.

gross domestic product (GDP), estimates of real government spending by function represent a measure of the changes over time in the real resources or inputs that contribute to the production of these services. Government services are difficult to measure because most of the services are not sold in the marketplace; however, the inputs to the provision of government services are relatively easy to measure, so these input-derived measures are used as proxies for the output of government services. This technique implicitly assumes that the ratio of inputs to outputs is fixed, and it ignores the possibility that output per unit of inputs may increase. Consequently, these estimates of real spending by function are not suitable for preparing productivity measures.

These estimates represent only expenditures by function that are classified as government consumption expenditures and gross investment and thereby constitute a portion of GDP. They exclude other types of government expenditures—such as social benefit payments, grants-in-aid, interest payments, and subsidies—that do not directly contribute to GDP; for example, the health function excludes payments for Medicare and Medicaid, both of which are classified in the NIPAs as government social benefit payments.⁴ They also exclude the services produced by government enterprises, but they include the investment

spending of these enterprises.⁵ In addition, government consumption expenditures by function are on a net basis, that is, gross output less sales and own-account investment; for example, the consumption expenditures for health represent the gross output of providing health care services less the revenues received as hospital charges and other health charges.

These new estimates of real government spending by function expand the information available in the NIPAs for broad categories of services such as health care and education.⁶ The current-dollar estimates of Federal Government expenditures in the Federal budget and the state and local government expenditures in the Census Bureau's *Government Finances* statistics differ from the NIPA estimates because of differences in coverage and timing.

A description of the methodologies that were used to prepare the estimates is presented in the next section, and then the trends in real growth are discussed. The article concludes with a discussion of BEA's plans to improve the estimates.

See the newly available NIPA tables that follow this article.

Methodologies

The methodologies used to prepare the estimates of real Federal Government and state and local govern-

4. Current expenditures for health and other functions in current dollars are presented in NIPA table 3.16. Measures of real expenditures are not prepared, because no price indexes or other suitable methods exist for transforming all of the expenditures, such as social benefit payments, into real expenditures.

5. For more information about the mixed treatment of government enterprises in the NIPAs, see "A Guide to the NIPAs," M-20 at <www.bea.gov/beatn/nipaguid.htm>.

6. Estimates of real personal consumption expenditures for medical care and education are presented in the NIPA tables 2.4.3–2.4.6.

Definitions of the Functions of Government

The functions of government presented in the tables in this article and in the NIPA tables are based on the international "Classification of the Functions of Government" (COFOG). They reflect the Federal and state and local government consumption expenditures and gross investment to produce the following services: General public services; national defense services; public order and safety services; economic affairs services, including transportation, space, and other services; housing and community services; health services; recreation and culture services; education services; and income security services.

The estimates in NIPA tables 3.15.1 (percent change), 3.15.2 (contribution to percent change), 3.15.3 (quantity index), 3.15.4 (price indexes), and 3.15.6 (chained 2000 dollars) reflect these functions. Table 3.15.5 presents additional detailed services by function.

In the detailed NIPA table 3.15.5, general public ser-

vice consists of detailed spending for executive and legislative services, tax collection and financial management services, and other services.

Public order and safety consists of police, fire, law courts, and prisons services.

Economic affairs consists of transportation, space, and "other economic affairs." Transportation consists of highways, air, water, and transit and railroad. "Other economic affairs" consists of general economic and labor affairs, agriculture, energy, natural resources, postal services, and other services.

Education consists of elementary and secondary education, higher education, and libraries and other services. For state and local governments, libraries and other services are shown separately.

Income security consists of disability, retirement, welfare and social services, unemployment, and other services.

ment spending by function are based on the integration of estimates of current-dollar government budget data by function with estimates of current-dollar intermediate goods and services purchased by government to produce services. The following sections elaborate on the specific methodologies for the Federal Government and for the state and local estimates. For Federal and state and local governments, the deflated compensation of employees, consumption of fixed capital (CFC), and intermediate goods and services purchased for each function were aggregated to the functional and total (Federal, state and local, and total) levels using Fisher index formulas; the indexes were chained together to produce a time series of real quantity and price measures.⁷

Federal government spending

Estimates of Federal consumption expenditures and gross investment by function in current dollars were prepared on the basis of functional classifications for each appropriation in the Federal Budget. The portions of spending for all appropriations that were estimated by BEA to be consumption expenditures and gross investment were summed by budget function and then aggregated into the COFOG functions (see table 1). Sales by appropriation were also assigned to budget functions and were subtracted from gross ex-

penditures. In addition, BEA estimated and added CFC to each function.

Previously, the only available estimates of real Federal consumption expenditures and gross investment were derived by type of expenditure (consumption or investment) and, for investment, by type of asset.⁸ Estimates of real defense consumption expenditures and gross investment represent a single function; as a result, estimates of real spending for the defense function required no additional estimation.

To derive estimates of real nondefense spending by function, first, estimates of current-dollar spending on nondefense compensation of employees, CFC, and intermediate goods and services purchased and sales by type of good and by type of service were allocated to current-dollar nondefense spending by function in the three steps that are described below. Then, the price indexes for compensation of employees, CFC, and intermediate goods, services, and sales were used to deflate the corresponding estimates of current-dollar nondefense spending by function.⁹

The estimates of nondefense compensation of employees, CFC, intermediate goods and services purchased, and sales were allocated in three steps. First, certain goods, services, and sales within nondefense spending were allocated to a single function; for example, the inventory change of the Commodity Credit Corporation (CCC) was allocated to agriculture, which is included in "other economic affairs." Thus, the price indexes for CCC inventory change were used to estimate the real measures for "other economic affairs," but they were not used to estimate any other functions.

7. See J. Steven Landefeld and Robert P. Parker, "BEA's Chain Indexes, Time Series, and Measures of Long-Term Economic Growth," *SURVEY* 77 (May 1997): 58-68; <www.bea.gov>.

Table 1. Shares of Consumption Expenditures and Gross Investment by Function for Selected Years in 1959-2003

	[Percent]					
	1959	1970	1980	1990	2000	2003
Government						
General public service.....	4.6	6.4	8.4	8.6	9.6	9.6
National defense	48.9	37.5	29.7	31.7	21.5	23.9
Public order and safety.....	4.0	5.0	6.7	8.5	11.4	11.4
Economic affairs.....	18.6	17.8	18.0	15.0	15.9	15.1
Housing and community services ...	2.5	2.4	2.8	2.2	2.0	2.0
Health.....	3.9	4.8	5.8	5.2	4.8	4.3
Recreation and culture.....	0.8	1.0	1.2	1.2	1.6	1.6
Education	15.7	23.4	24.7	24.8	29.7	28.2
Income security.....	1.0	1.7	2.8	2.7	3.6	4.0
Federal						
General public service.....	2.8	3.9	5.3	4.6	5.1	4.9
National defense	82.4	77.2	68.9	73.6	64.0	66.0
Public order and safety.....	0.5	0.7	1.4	1.9	4.3	4.2
Economic affairs.....	11.1	12.4	15.4	12.1	14.6	12.7
Housing and community services ...	0.1	0.3	0.2	0.2	0.2	0.2
Health.....	2.0	3.4	5.8	5.8	8.7	8.7
Recreation and culture.....	0.2	0.4	0.5	0.3	0.6	0.6
Education	0.4	0.8	0.6	0.5	1.0	0.9
Income security.....	0.6	0.9	1.9	1.0	1.5	1.8
State and local						
General public service.....	7.3	8.7	10.7	11.6	11.8	12.2
Public order and safety.....	9.1	9.0	10.8	13.5	15.0	15.4
Economic affairs.....	29.7	22.8	19.9	17.2	16.5	16.4
Housing and community services ...	6.0	4.3	4.7	3.8	2.8	3.0
Health.....	6.8	6.2	5.8	4.8	2.9	1.8
Recreation and culture.....	1.6	1.7	1.8	1.9	2.0	2.2
Education	38.1	44.8	42.9	43.1	44.2	43.7
Income security.....	1.5	2.5	3.5	4.0	4.7	5.3

8. Estimates by type of expenditure and, for investment, by type of asset are in NIPA tables 3.9.1-3.9.6, 3.10.1, 3.10.3-3.10.6, 3.11.1, and 3.11.3-3.11.6.

9. Deflation is the process of dividing current-dollar estimates by price indexes.

Acknowledgments

Brooks B. Robinson, Chief of the Government Division, supervised the preparation of the government spending by function estimates. Pamela A. Kelly directed the preparation of the Federal Government estimates, and Bruce E. Baker directed the preparation of the state and local government estimates. Peter G. Beall and Jay M. Rogers prepared the Federal Government estimates. Benjamin Cowan, Steven J. Andrews, and Andrew K. Strauss prepared the state and local government estimates. Michael Boehm and Mary Young operated the computer system that produced the measures of real spending by function. David F. Sullivan coordinated the production of the NIPA tables. Andrew K. Strauss prepared the charts and tables for this article.

Second, because the Federal budget contains data for each appropriation that BEA classifies as compensation of employees, these data can be allocated to a budget function and then to a COFOG function. These data were compiled from Federal budgets for selected years. Ratios of compensation by function were developed for selected years, and the ratios for intervening years were derived by interpolation. These ratios were then used to allocate current-dollar compensation to functions. In the derivation of the measures of real compensation, the same price index for compensation was used to deflate all nondefense functions.

Third, the remaining estimates of current-dollar CFC, intermediate goods and services purchased, and sales were allocated to the nondefense functions proportionally.

State and local government spending

Estimates of current-dollar state and local government consumption expenditures, sales, and gross investment were derived from the Census Bureau’s *Government Finances* data. The Census Bureau data were collected in surveys by function, and these functions form the basis for the NIPA estimates by function. In preparing the NIPA estimates, the Census Bureau data were adjusted to conform to NIPA accounting concepts of coverage, netting, and timing, and the data were sorted into COFOG-based functions. The Census Bureau data were also supplemented with data from other sources—particularly the data for computers and software. In addition, BEA estimated and added CFC to each function.

Estimates of current-dollar consumption expenditures, sales, and gross investment were allocated to commodities, using detailed data from BEA’s input-output accounts. These commodities were allocated to functions and to types of intermediate goods (that is, durable goods and nondurable goods) and services purchased, and to gross investment (structures and equipment and software). These commodities were matched with price indexes and were deflated to produce estimates of real government consumption expenditures and gross investment and of government spending by function.

Results

Current-dollar shares

The estimates of current-dollar spending show the relative share of each function to total spending.

For 2003, the largest shares of total government spending by function were education (28.2 percent), defense (23.9 percent), economic affairs (15.1 per-

cent), public order and safety (11.4 percent), and general public service (9.6 percent) (chart 1).

For 2003, the largest shares of Federal Government spending were defense (66.0 percent), economic affairs (12.7 percent), health (8.7 percent), general public service (4.9 percent), and public order and safety (4.2 percent) (chart 2).

For 2003, the largest shares of state and local government spending were education (43.7 percent), eco-

Chart 1. Shares of Total Government Consumption Expenditures and Gross Investment by Function for 2003

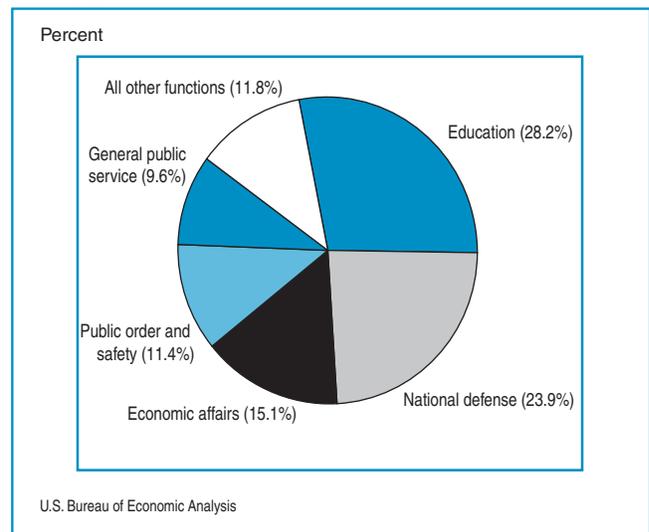
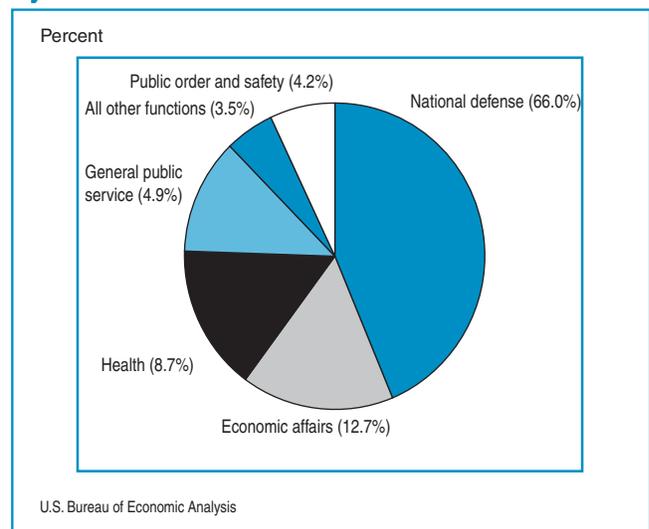


Chart 2. Shares of Federal Government Consumption Expenditures and Gross Investment by Function for 2003



conomic affairs (16.4 percent), public order and safety (15.4 percent), general public service (12.2 percent), and income security (5.3 percent) (chart 3).

These shares of total government spending reflect a notable change in spending since 1959. In the past 45 years, the share of total government spending for education has increased from 15.7 percent in 1959 to 28.2 percent in 2003 (table 1). The share of total spending for national defense decreased from 48.9 percent in 1959 to 23.9 percent in 2003.

At the Federal level, the share of spending for national defense decreased from 82.4 percent in 1959 to 66.0 percent in 2003. The share of spending for public order and safety increased from less than 1.0 percent to 4.2 percent, and the share of spending for health increased from 2.0 percent to 8.7 percent.

At the state and local level, the share of spending for education remained fairly consistent—ranging from 38.1 to 43.7 percent—from 1959–2003.¹⁰ The share of spending for economic affairs declined from 29.7 percent in 1959 to 16.4 percent in 2003, and the share of spending for health declined from 6.8 percent to 1.8 percent. In contrast, the share of spending for public

order and safety increased from 9.1 percent to 15.4 percent, and the share of spending for general public service increased from 7.3 percent to 12.2 percent.

Real growth for 1959–2003

In 1959–2003, total real government spending grew at an average annual rate of 2.3 percent (table 2).¹¹ Spending grew the fastest for income security (5.2 percent), public order and safety (4.0 percent), and general public service (3.9 percent). Spending grew the slowest for national defense (0.7 percent), housing and community services (1.9 percent), and economic affairs (1.9 percent).

At the Federal level, spending grew 1.3 percent at an average annual rate. Spending grew the fastest for public order and safety (6.0 percent), health (4.3 percent), and housing and community services (4.2 percent). Spending grew the slowest for national defense (0.7 percent), economic affairs (2.0 percent), and general public service (2.1 percent).

At the state and local government level, spending grew 3.2 percent. Spending grew the fastest for income security (5.9 percent) and for general public service (4.6 percent). Spending grew the slowest for health (1.7 percent), housing and community services (1.8 percent), and economic affairs (1.9 percent).

10. Both this relatively stable share of state and local government spending on education and the increased share of total government spending on education in 1959–2003 are explained by the increase in state and local spending as a share of total government spending over the period. In 1959, Federal Government spending accounted for 59.4 percent of total government spending, and state and local government spending accounted for 40.6 percent. In 2003, state and local government spending accounted for 63.8 percent of total government spending, and Federal Government spending accounted for 36.2 percent.

11. In table 2, the average annual rates of growth are derived from NIPA table 3.15.3.

Chart 3. Shares of State and Local Government Consumption Expenditures and Gross Investment by Function for 2003

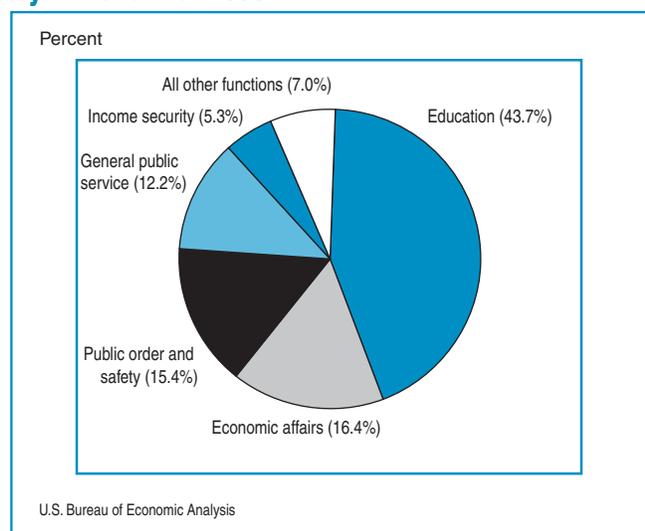


Table 2. Average Annual Growth Rates of Real Consumption Expenditures and Gross Investment by Function for 1959–2003
[Percent]

	1959–70	1970–80	1980–90	1990–2000	2000–2003	1959–2003
Government	3.2	1.0	3.2	1.2	3.5	2.3
General public service.....	5.9	3.9	3.3	2.2	3.9	3.9
National defense.....	1.2	-1.9	4.4	-2.5	6.9	0.7
Public order and safety.....	4.8	3.9	4.2	3.5	3.0	4.0
Economic affairs.....	3.0	1.5	1.6	1.6	2.0	1.9
Housing and community services....	3.7	1.3	1.9	-0.1	4.0	1.9
Health.....	5.2	3.1	4.0	0.7	1.1	3.1
Recreation and culture.....	6.3	2.8	2.3	2.9	4.2	3.6
Education.....	6.0	1.9	2.6	3.3	1.7	3.4
Income security.....	8.2	6.2	1.8	4.0	6.9	5.2
Federal	1.6	-0.4	3.7	-1.3	6.0	1.3
General public service.....	3.0	3.4	2.1	-1.1	4.8	2.1
National defense.....	1.2	-1.9	4.4	-2.5	6.9	0.7
Public order and safety.....	4.3	6.9	6.6	6.2	6.0	6.0
Economic affairs.....	2.6	3.2	1.6	0.7	2.0	2.0
Housing and community services....	16.4	-2.9	-0.4	4.9	-0.4	4.2
Health.....	5.6	5.4	3.1	2.5	6.4	4.3
Recreation and culture.....	7.9	4.0	-1.5	3.9	2.5	3.6
Education.....	9.0	-2.0	2.7	5.9	1.4	3.8
Income security.....	4.0	8.4	-3.5	1.7	13.0	3.3
State and local	5.1	2.1	2.8	2.8	2.2	3.2
General public service.....	7.3	4.2	3.7	3.1	3.7	4.6
Public order and safety.....	4.9	3.7	3.9	3.2	2.6	3.8
Economic affairs.....	3.2	0.6	1.6	2.1	2.0	1.9
Housing and community services....	3.2	1.5	2.0	-0.2	4.2	1.8
Health.....	5.0	1.7	4.9	-1.7	-8.4	1.7
Recreation and culture.....	6.0	2.5	3.0	2.7	4.4	3.6
Education.....	6.0	2.0	2.6	3.3	1.7	3.4
Income security.....	10.1	5.3	3.4	4.4	5.8	5.9

Real growth for selected periods

Considering real growth for selected periods, total government spending for income security grew the fastest, and spending for this function was strong in all periods except 1980–90 (table 2). The second fastest spending growth was for public order and safety, which showed stronger than total average growth in all but the most recent period. The slowest growth was spending for national defense; spending for this function for 1970–80 and for 1990–2000 declined.

At the Federal level, the growth in spending for all the functions except three decreased in at least one period. The growth in spending was positive for public order and safety (the fastest growing function over the entire period), for health (the second fastest growing function), and for economic affairs (one of the slowest growing functions, which showed weak, but not negative, growth).

At the state and local government level, the growth in spending for all functions was strong in 1959–70. In the remaining periods, the growth in spending for all functions except health and housing and community services was moderate but steady—ranging from just below 2.0 percent to just above 4.0 percent for most functions.

Spending for health decreased in 1993–98, increased in 1999, then decreased in 2000–2003; the decreases reflect substantial increases in sales of health services since 1993. Consequently, increases in gross government spending for health were more than offset by sales to other sectors (NIPA table 3.15.1). This offset is reflected in the quantity index for health, which declined in 1993–98, increased in 1999, then decreased in 2000–2003, and by the price index, which declined in 1989–93 and in 2002–2003 (NIPA table 3.15.4). The price declines reflect price increases for sales of state and local health services that exceeded the increases in prices for the inputs used to produce state and local government health services.

Real growth for 2003

In 2003, real total government spending increased 2.8 percent after increasing 4.4 percent in 2002 (NIPA table 3.15.1). As measured by the contributions to percent change in real spending (NIPA table 3.15.2), the 2003 increase was mainly accounted for by increases in

spending for national defense, for general public service, for income security, and for health. Spending for housing and community services and for education decreased slightly.

Real Federal Government spending increased 6.6 percent in 2003 after increasing 7.5 percent in 2002. The 2003 increase was more than accounted for by increases in spending for national defense, health, general public service, and income security. These increases were partly offset by decreases in spending for economic affairs and education.

Real state and local government spending increased 0.7 percent in 2003, after increasing 2.8 percent in 2002. The 2003 increase was more than accounted for by increases in spending for general public service, income security, public order and safety, and economic affairs. The increases were partly offset by decreases in spending for housing and community services and health.

Future Research

The release of the new estimates of real government consumption expenditures and gross investment by function represents an important improvement in the scope and the relevance of BEA's government estimates. These estimates will be updated each year after the annual revision of the NIPAs.

In addition, BEA recently began research to improve its estimates of real government output. This research focuses on the use of volume indicators to measure output, mainly for educational services.¹² For example, volume indicators for education might be measured by graduation rates and test scores rather than by the cost of books and teachers' salaries.

BEA plans to continue its collaborations with other nations to research improved measures of real government output using volume indicators, particularly the methods used to quality adjust the volume indicators, and to expand the research beyond educational services.

12. For a summary of these efforts and an analysis of the difficulties in using these indicators to measure real government output, see Barbara M. Fraumeni, Marshall B. Reinsdorf, Brooks B. Robinson, and Matthew P. Williams, "Price and Real Output Measures for the Education Function of Government: Exploratory Estimates for Primary and Secondary Education" (paper presented at the Conference on Research in Income and Wealth, Vancouver, British Columbia, Canada, June 29, 2004).