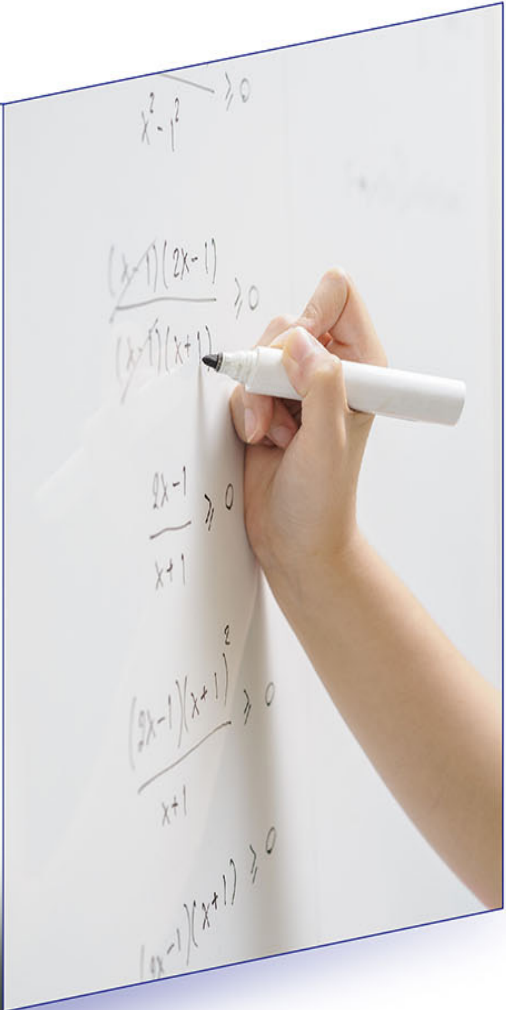
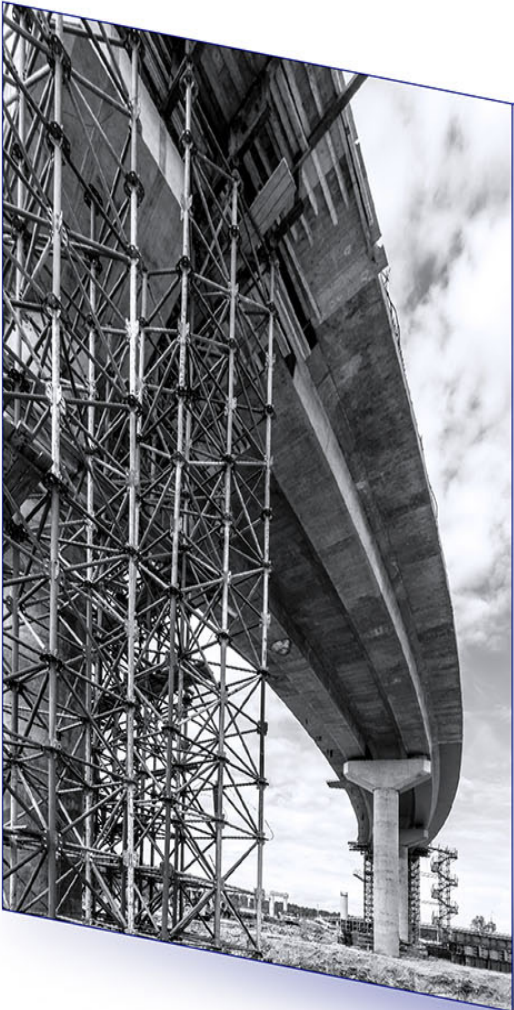


# CBO

## Federal Investment



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## Notes

Numbers in this document may not add up to totals because of rounding.

Unless otherwise indicated, the years referred to in this document are fiscal years, and dollar values are expressed in 2012 dollars, having been adjusted to remove the effects of inflation using the gross domestic product price deflator of the Bureau of Economic Analysis.

Values for federal investment do not include investment in higher education through student loan programs unless otherwise indicated.

The photographs on the cover, which come from Shutterstock, were taken by Gubin Yury (bridge), Armin Staudt (microscope), and S. Tiptanatoranin (whiteboard).

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## Introduction and Summary

The federal government pays for a wide range of goods and services that are expected to be useful some years in the future. Those purchases, called investment, fall into three categories: physical capital, research and development (R&D), and education and training. There are several economic rationales for federal investment. It can provide public goods that the private sector and state and local governments would not provide efficiently, such as national defense and basic scientific research. It can promote long-term economic growth—as education spending does by developing a skilled workforce, as R&D spending does by prompting innovation, or as infrastructure spending does by facilitating commerce. And it can support the work of the federal government by, for instance, providing the structures and equipment necessary to perform federal activities.

In 2012, the federal government spent \$531 billion on investment, representing 15 percent of federal spending and 3 percent of gross domestic product (GDP). Those shares have remained roughly stable over the past 20 years, though investment by the federal government approached 4 percent of GDP in 2010 and 2011 after the American Recovery and Reinvestment Act of 2009 (ARRA, Public Law 111-5) temporarily expanded

funding for a number of investment programs. Earlier, in the 1960s, federal investment represented more than 30 percent of federal spending and averaged nearly 6 percent of GDP. Nearly all federal investment takes place through discretionary spending, which is controlled by annual appropriation acts. Federal investment has gradually declined as a proportion of discretionary spending, from roughly 50 percent in the 1960s to about 40 percent today, and discretionary spending as a whole has fallen as a share of total federal spending since the 1960s. Caps on appropriations put in place by the Budget Control Act of 2011 will decrease future discretionary spending through 2021 relative to what it would have been if annual appropriations had grown at the rate of inflation after 2011.

Sixty percent of total federal investment in 2012—or \$318 billion, which represented 2 percent of GDP—was for purposes other than national defense. Of that nondefense investment, 40 percent provided funding for physical capital, another 40 percent for education and training, and 20 percent for R&D. (Some of the nondefense investment was the result of ARRA's funding increases for such activities as highway construction and elementary and secondary education, though the

resulting spending had started to abate by 2012.) Defense activities accounted for the remaining 40 percent of federal investment and totaled \$213 billion, which represented a little over 1 percent of GDP. About two-thirds of federal investment for defense purposes was devoted to physical capital and the rest to R&D.

### How Does the Federal Government Support Investment?

The federal government supports public and private investment through several different mechanisms. In many cases, it makes the investment directly, such as when the Army Corps of Engineers constructs a dam or when a federal agency purchases computer equipment from the private sector. In other cases, the federal government makes grants to individuals or private-sector organizations, which then use the funds to make investments. Examples include the Federal Pell Grant Program for postsecondary education and the National Science Foundation's research grants.

The federal government also invests through grants to state and local governments, which in 2012 represented 46 percent of its nondefense investment, or \$146 billion. Those grants accounted for nearly

two-thirds of federal investment in nondefense physical capital and for half of federal investment in education and training. State and local governments often have some latitude in determining how to spend the grant funds. Many federal grants require state and local governments to spend their own funds as well.

This report focuses on investment that the federal government makes either directly or through grants. However, the federal government also supports investment in other ways. One of them is through tax expenditures—credits or deductions that reduce the federal income tax liabilities of individuals and firms as a result of certain investments that they make or finance. Those credits or deductions can reduce the cost of investment for state and local governments as well. Defined narrowly, tax expenditures that support investment amounted to \$141 billion in 2012.<sup>1</sup> Of that sum, \$87 billion supported investment in physical capital, mostly by excluding from taxable income the interest on public-purpose state and local government bonds and by allowing tax filers to accelerate

the depreciation of equipment and therefore to take larger tax deductions earlier in the equipment's life. An additional \$42 billion supported investment in education and training, mostly through tax credits and deductions focused on higher education. The remaining \$12 billion, which supported investment in R&D, was split roughly evenly between the cost of a tax credit for increasing research and the cost of allowing firms to deduct the cost of research and experimentation immediately. A more expansive definition of tax expenditures that support investment would also include those that reduced the cost of private investment defined more broadly, including investment in intangible or financial assets. For instance, the tax credits and deductions offered for retirement savings accounts amounted to \$112 billion in 2012.

Other federal policies can also affect private investment. Tax policies, including individual and corporate income tax rates, can restrain or encourage economic activities by changing their relative prices. Regulatory policies influence investment by prohibiting or constraining certain activities, such as air pollution, or by necessitating others, as in the case of federal safety standards. And federal deficits (and surpluses) influence the amount of funds available for private investment and the cost of those funds. For example, when the federal government issues bonds to finance its deficits, the funds that investors use to buy those bonds are no longer available to finance private investment. In response to the increased federal borrowing, bond buyers may also demand higher interest rates from the government, which would generally raise interest rates throughout the economy and make it more

expensive for people and firms to borrow for investment purposes.

## What Does the Federal Government Invest In?

Observers define investment in different ways. In the view of the Congressional Budget Office (CBO), there are three broad areas in which the federal government invests:

- Physical capital includes structures, such as government buildings, transportation infrastructure, and water and power projects; major equipment, such as computers, machinery, and vehicles; and software. For spending on physical capital to qualify as investment, the physical capital must have an estimated useful life of at least two years. Most federal investment in physical capital for defense purposes is for purchases of major equipment, such as ships and aircraft. Investment in physical capital for non-defense purposes, by contrast, is dominated by transportation spending, which provides infrastructure that contributes to the functioning of the economy.
- Research and development has three components: basic research, which seeks to discover scientific principles; applied research, which attempts to translate those discoveries into more practical matters; and the development of new products and technology. Federal R&D spending supports a wide variety of work in government laboratories, universities, and the private sector, including health research studies, basic research in physics and chemistry, and the development of weapon systems. R&D

1. In calculating that figure, the Congressional Budget Office generally included credits or deductions for private investment in 2012 (for example, the deduction for higher education expenses) as well as for earlier investment (for example, the exclusion from taxable income of interest on public-purpose state and local government bonds). The figure does not include \$115 billion in housing-related tax expenditures for the deduction for mortgage interest on owner-occupied residences, the deduction for property taxes on real property, and the exclusion of capital gains on sales of principal residences. Also not included is \$146 billion in tax expenditures for reduced tax rates on dividends and long-term capital gains and for the exclusion of capital gains at death.

investment builds the stock of knowledge that helps expand the economy over time, and the academic research that it funds is essential to the training of future generations of scientists. Most of the R&D spending by the federal government that supports defense is focused on development, rather than on basic or applied research.

- Education and training includes early childhood, elementary, secondary, and postsecondary education, which help produce a skilled, capable workforce that contributes to the country's productivity. It also includes job training and vocational training for veterans and others, which likewise promote a productive workforce. Federal spending on education and training is thus an investment in the nation's human capital.

The Office of Management and Budget (OMB) includes the same three categories in its own analysis of federal investment.<sup>2</sup> The Bureau of Economic Analysis (BEA) includes in its calculation of federal investment most of what CBO identifies here, except for education spending. In particular, the investments in physical assets and R&D presented in this report are roughly comparable to two line items in BEA's tables of the national income and product accounts (NIPAs): gross federal

2. For OMB's discussion of federal investment, see Office of Management and Budget, *Budget of the United States Government, Fiscal Year 2014: Analytical Perspectives* (April 2013), Chapter 20, <http://go.usa.gov/WxkB>. OMB has treated physical capital, research and development, and education and training as investment since the publication of the President's budget for 1996.

government investment, which includes investments made directly by the federal government in structures, equipment, software, and R&D; and capital transfer payments, which are mostly grants to state and local governments for the purpose of investing in physical capital or R&D.<sup>3</sup> R&D spending was first included in BEA's definition of investment in July 2013, when the NIPAs were revised to count expenditures on intellectual property, including R&D, as investment.

In some cases, it is difficult to determine what qualifies as federal investment and what does not. For example, although this report regards spending on instruction and on the construction of school buildings as investment, it does not regard spending on health care and school lunch programs for children as investment, because those goods and services are promptly consumed. Yet keeping children healthy and nourished improves their ability to learn and produces a healthier and more capable workforce in the future.

3. For fiscal year 2012, BEA's totals for those two items were slightly smaller than the amounts reported here for investment in physical assets and R&D. Some differences remain among the measures of investment used by CBO, BEA, and OMB. For more information, see Office of Management and Budget, *Preparation, Submission, and Execution of the Budget*, Circular A-11 (July 2013), Section 84, <http://go.usa.gov/WxBW> (PDF, 8.11 MB); Bureau of Economic Analysis, *NIPA Handbook: Concepts and Methods of the U.S. National Income and Product Accounts* (updated November 2011), Chapter 9, <http://go.usa.gov/WxBR> (PDF, 191 KB); and Congressional Budget Office, *CBO's Projections of Federal Receipts and Expenditures in the National Income and Product Accounts* (May 2013), [www.cbo.gov/publication/44140](http://www.cbo.gov/publication/44140).

## How Does the Federal Government Account for Investment?

For accounting purposes, the federal budget treats most investment the same way it treats other spending: on a cash basis. That is, expenditures on investment are recorded as they are made, just as other expenditures are recorded as they are made and revenues are recorded as they are received. Two important advantages of that approach are that transactions are readily verifiable and that the sum of all transactions provides a close approximation of the government's annual cash deficit or surplus. However, accounting on a cash basis makes investment appear expensive relative to other government purchases, because many of the benefits associated with it do not arrive until well after the initial investment has been made. For example, building a highway takes a large initial investment, but its benefits last for decades. By contrast, the benefits of other federal spending occur closer to the actual expenditure—for example, when air traffic controllers safely direct flights. Therefore, the current budget system may provide incomplete information to policymakers as they decide how to divide federal resources between investment and competing priorities.

Some policymakers have proposed creating a capital budget for investments that would allocate current capital costs to the future, spreading them over the period when an investment's benefits occur. That approach, which relies more on accrual-based accounting than on cash-based accounting, would be similar to the one used in the private sector.<sup>4</sup>

4. See Congressional Budget Office, *Capital Budgeting* (May 2008), [www.cbo.gov/publication/41689](http://www.cbo.gov/publication/41689).

Adopting a capital budget for investments would not be likely to have a noticeable impact on the federal budget balance, because even though the cost of current investments would be spread out over future years, the federal budget would also have to show the depreciation of investments made in previous years. Nevertheless, the proponents of a capital budget argue that it would clarify the potential benefits of investment over time.

It is not certain, however, that a capital budget would provide better information to policymakers than they currently have. Several factors could make such a budget more complex and less transparent:

- The budget process would become sensitive to small changes in assumptions about the depreciation rates of assets within the capital budget and about how those rates should be adjusted over time to account for inflation and for changes in the assets' replacement cost. A system in which those valuations were not made transparently could encourage manipulation. And no depreciation schedule chosen would be likely to track changes in the economic value of an asset perfectly.
- Because so much government spending could be viewed as providing benefits over an extended period, it would be difficult to determine what to include in the capital budget. An overly narrow focus would, by leaving some investments out of the capital budget, make them appear relatively expensive and therefore less desirable. An overly broad focus could turn the capital budget into a device for understating the cost of federal spending. The capital

budgeting process could lead proponents of particular programs to try to have them classified as capital spending to lower their current costs and to advocate, too, for longer depreciation periods.

- Policymakers would have to decide whether to include within the capital budget assets that the federal government does not own but does help fund. Roads, airports, and mass transit systems, for example, are often paid for in part by the federal government and in part by the state and local governments or independent authorities that own them. Federal investments in those assets could be excluded from the capital budget because the federal government does not own them. However, excluding those investments would make them appear expensive relative to other federal investments that were included in the capital budget.

### What Are the Benefits of Federal Investment?

Most federal investment for nondefense purposes contributes to the economy on an ongoing basis by improving the private sector's ability to invent, produce, and distribute goods and services. Defense investment contributes to the production of weapon systems and other defense goods, but much of it is sufficiently separate from domestic economic activity that it does not typically contribute to future private-sector output; the exception is the small portion of defense investment that goes to basic and applied research.

Federal nondefense investment can contribute to private-sector productivity in various ways.

Without public highways, the cost to the trucking industry of delivering goods would be much higher; if the Internet had not initially been developed through government R&D, whole segments of the economy would not exist; if not for receiving a public education (funded in part by federal spending), many workers would have lower wages than they do. In CBO's view, the government has made higher productivity possible in those cases by making investments that the private sector would not have made on its own or would have made in smaller amounts than their broad public benefits would justify.

The result of that higher productivity is higher private-sector returns. However, the size and nature of those returns are subject to considerable uncertainty, and some of the factors that contribute to that uncertainty are important considerations for policymakers facing decisions about how—and how much—the federal government should invest:

- It can be difficult to know which outcomes to attribute to which investments. Scientific and technological discoveries often build on prior work, making it hard to determine how great a share of a new product to attribute to a particular earlier investment. Similarly, workers' skills are the product of education funded not only by the federal government but also by state and local governments, the private sector, and the workers and their families.
- Realizing the benefits of federal investment may take many years, and the timing varies for different types of investment. A new highway can improve transportation as soon as it is built, but it may take longer to realize the benefits of basic



research or elementary education—which may also complicate the already difficult task of identifying those benefits.

- The benefits of federal investment are unlikely to be distributed evenly. Firms located near highways will probably enjoy greater returns from those highways than will firms located farther away. Recipients of federal grants for R&D may acquire patents based on their work; though products and innovations based on those patents may benefit consumers, they may also earn returns for the patent owners that are not shared with the country as a whole.
- Federal investment may discourage investment by private entities or by state and local governments by raising the price of investment goods. If that happens, and if the discouraged investment would have had positive economic returns, then the overall returns to the federal investment will be lower. Further, state and local governments may use federal spending to fund investments that they would otherwise have made with their own funds. (In some cases, however, federal spending on investment could increase state and local investment,

because some grant programs require state and local governments to invest as well.)

Acknowledging those sources of uncertainty, CBO uses a range of returns when estimating the effect of federal nondefense investment on the private sector.<sup>5</sup> At the high end, CBO estimates that federal investment yields the same return as average investment completed by the private sector. At the low end, CBO estimates that federal investment has a rate of return of zero—that is, that it has no effect on future private-sector output. The actual

5. CBO has examined the returns on certain types of federal investment in some detail. In considering federal spending on R&D, CBO noted that “Federal spending in support of basic research over the years has, on average, had a significantly positive return, according to the best available research.” See Congressional Budget Office, *Federal Support for Research and Development* (June 2007), p. 15, [www.cbo.gov/publication/18750](http://www.cbo.gov/publication/18750). In a study of transportation and water infrastructure, CBO offered two conclusions about returns on those investments: “First, in the United States, investment in public capital projects generally yields returns that are positive. . . . Second, there is significant variation in the average return across different periods of time and in returns across individual projects at a given point in time.” See Congressional Budget Office, *Public Spending on Transportation and Water Infrastructure* (November 2010), p. 14, [www.cbo.gov/publication/21902](http://www.cbo.gov/publication/21902).

rate of return for a particular investment could lie outside that range; the project might have a negative return or, alternatively, yield a greater return than investment completed by the private sector.<sup>6</sup>

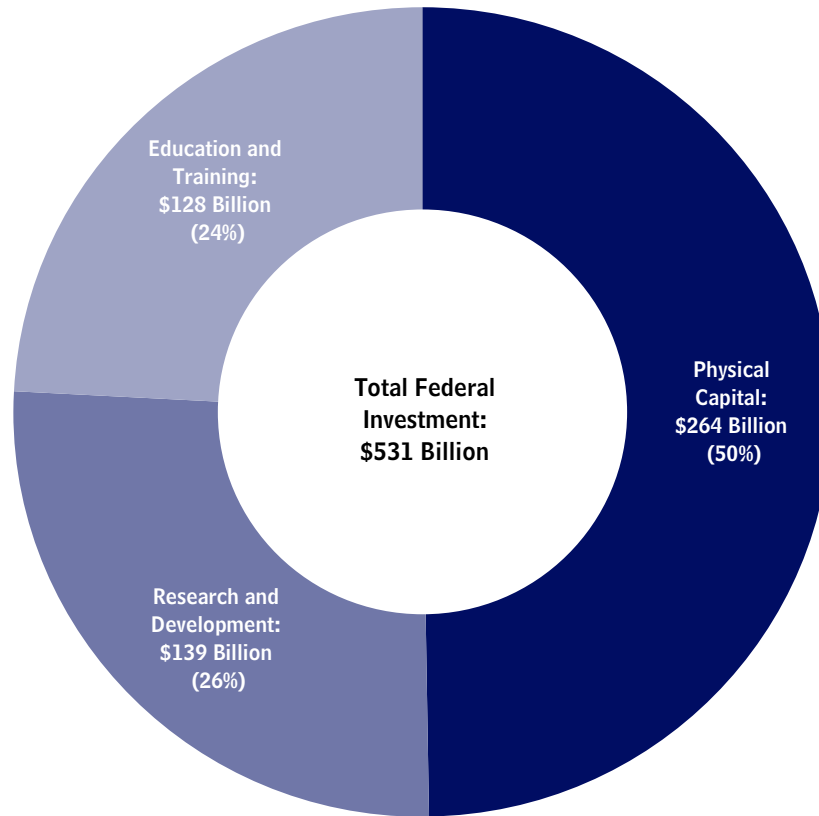
Sometimes, policymakers may support investments not to achieve the largest expected economic returns but to accomplish other federal goals, such as defending the country or reducing inequities. At other times, the federal government may rely on policies other than investment to reach particular ends. For example, instead of investing to expand capacity on busy highways, the federal government might encourage state and local authorities to manage the high demand with congestion pricing—that is, charging drivers higher tolls at busy times and places. Even if an investment’s benefits would have exceeded its cost, the alternative policy may produce comparable benefits at a lower cost, thus allowing policymakers to find other uses for the funds that would have paid for the investment. ♦

6. For example, see Congressional Budget Office, *Estimated Macroeconomic Impacts of the American Recovery and Reinvestment Act of 2009* (attachment to a letter to the Honorable Charles E. Grassley, March 2, 2009), [www.cbo.gov/publication/41163](http://www.cbo.gov/publication/41163).

# Federal Investment

**Exhibit 1.**

**Federal Investment, 2012**



Source: Congressional Budget Office based on data from the Office of Management and Budget and the American Public Transportation Association. For details, see the appendix.

Federal spending to support investment totaled \$531 billion in 2012. Half of those funds, \$264 billion, was spent on physical capital, which includes structures (such as government buildings, transportation infrastructure, and water and power projects), major equipment (such as computers, machinery, and vehicles), and software. Federal investment in physical capital for nondefense purposes is dominated by transportation spending, and such investment for defense purposes is mostly for purchases of major equipment, such as ships and aircraft. (For spending on physical capital to qualify as investment, the physical capital must have an estimated useful life of at least two years.)

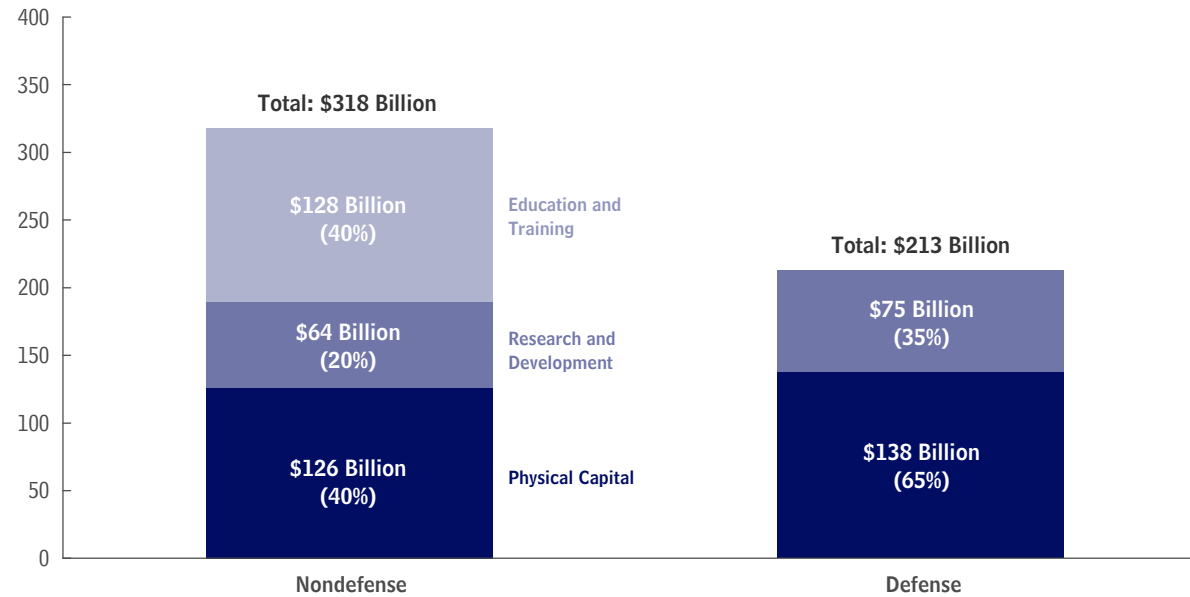
Research and development (R&D) accounted for an additional one-quarter of federal investment, or \$139 billion, in 2012. R&D includes basic research, which seeks to expand knowledge without regard to commercial application; applied research, which attempts to link that understanding to some practical purpose; and the development of new products and services. Federal R&D spending for nondefense purposes largely addresses health-related issues; most defense-related R&D spending goes to the development of weapon systems.

The last one-quarter of federal investment in 2012, \$128 billion, was spent on education and training, which help to develop a skilled, capable workforce. That \$128 billion was dedicated primarily to elementary and secondary education, mostly through grants to state and local governments, and to support for higher education, mainly through grants to individual students. (This exhibit and others in this report exclude investment in higher education through student loan programs unless otherwise indicated.) ♦

**Exhibit 2.**

**Federal Nondefense and Defense Investment, 2012**

(Billions of dollars)



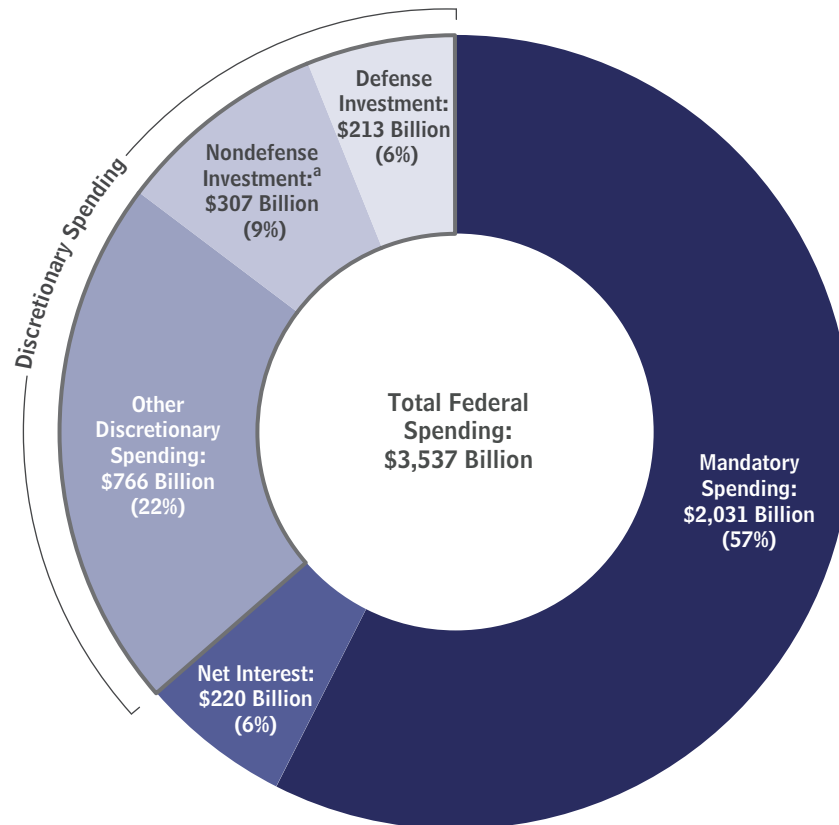
Source: Congressional Budget Office based on data from the Office of Management and Budget and the American Public Transportation Association. For details, see the appendix.

Federal investment for nondefense purposes totaled \$318 billion in 2012. Forty percent of that sum was spent on physical capital, such as highways and water infrastructure, and another 40 percent on education and training, such as support for postsecondary institutions and veterans. The remaining 20 percent was directed toward R&D, such as research about human health. Nondefense investment typically encourages economic growth.

Spending on defense-related investment in 2012 totaled \$213 billion, two-thirds of which was spent on physical capital, such as weapons and equipment. The remainder was spent on R&D, mostly on the development of weapon systems. The primary purpose of defense-related investment is not to promote economic growth but to protect the country, though some federal investments in R&D for defense eventually result in technologies that are used in commercial applications. ♦

**Exhibit 3.**

**Federal Investment as a Share of Total Federal Spending, 2012**



Source: Congressional Budget Office based on data from the Office of Management and Budget and the American Public Transportation Association. For details, see the appendix.

Note: Mandatory spending is provided for by laws other than appropriation acts and is primarily for benefit programs for which the Congress sets eligibility rules and benefit formulas. Discretionary spending is controlled by lawmakers through annual appropriations. Net interest is the government's interest payments on debt held by the public, offset by interest income that the government receives.

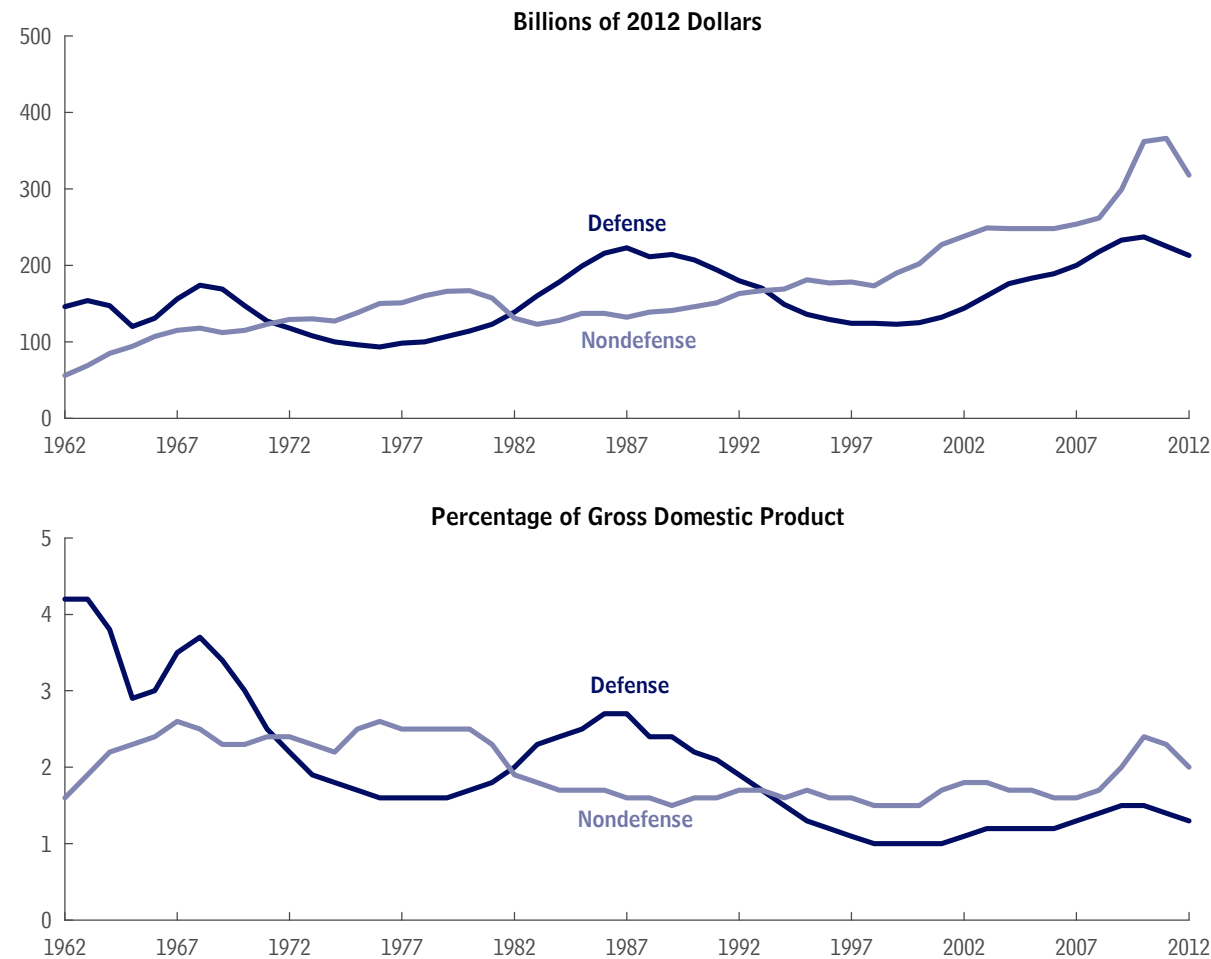
a. Not quite all federal investment takes place through discretionary spending; a very small portion takes place through mandatory spending for student loans and part of the Federal Pell Grant Program. Mandatory spending for student loans is included in this exhibit but excluded from the total nondefense investment shown in the previous exhibit. The difference between the \$307 billion in *discretionary* nondefense investment shown here and the \$318 billion in *total* nondefense investment shown in the previous exhibit is \$12 billion of mandatory investment in the Federal Pell Grant Program; that \$12 billion is included in mandatory spending in this exhibit.

In 2012, investment accounted for 15 percent of the federal government's \$3.5 trillion in total spending. Almost all of the investment was from discretionary funding, meaning that the spending was controlled by lawmakers through annual appropriations. Discretionary investment accounted for 40 percent of discretionary spending, with \$307 billion going for nondefense purposes and \$213 billion for defense purposes.

In addition, a very small portion of federal investment was from mandatory funding, meaning that the spending was provided for by laws other than appropriation acts, primarily for benefit programs. Lawmakers determine eligibility rules for those programs, and spending each year is determined by the number of people who participate and the amounts of benefits they receive under the rules. Mandatory investment in 2012 consisted of spending of \$12 billion for part of the Federal Pell Grant Program and savings of \$32 billion for the federal student loan program under the rules established by the Federal Credit Reform Act of 1990. The loan program's effect on the federal budget depends in part on the difference between the interest rate paid by borrowers from that program and the average rate at which the Treasury borrows money; that difference has been large in recent years. (Whether the student loan program generates costs or savings under budget accounting rules also depends on the extent of loan defaults and recoveries.) The budgetary impact of the federal student loan program is included in this exhibit but excluded from most other exhibits in this report. ♦

**Exhibit 4.**

**Federal Nondefense and Defense Investment, 1962 to 2012**



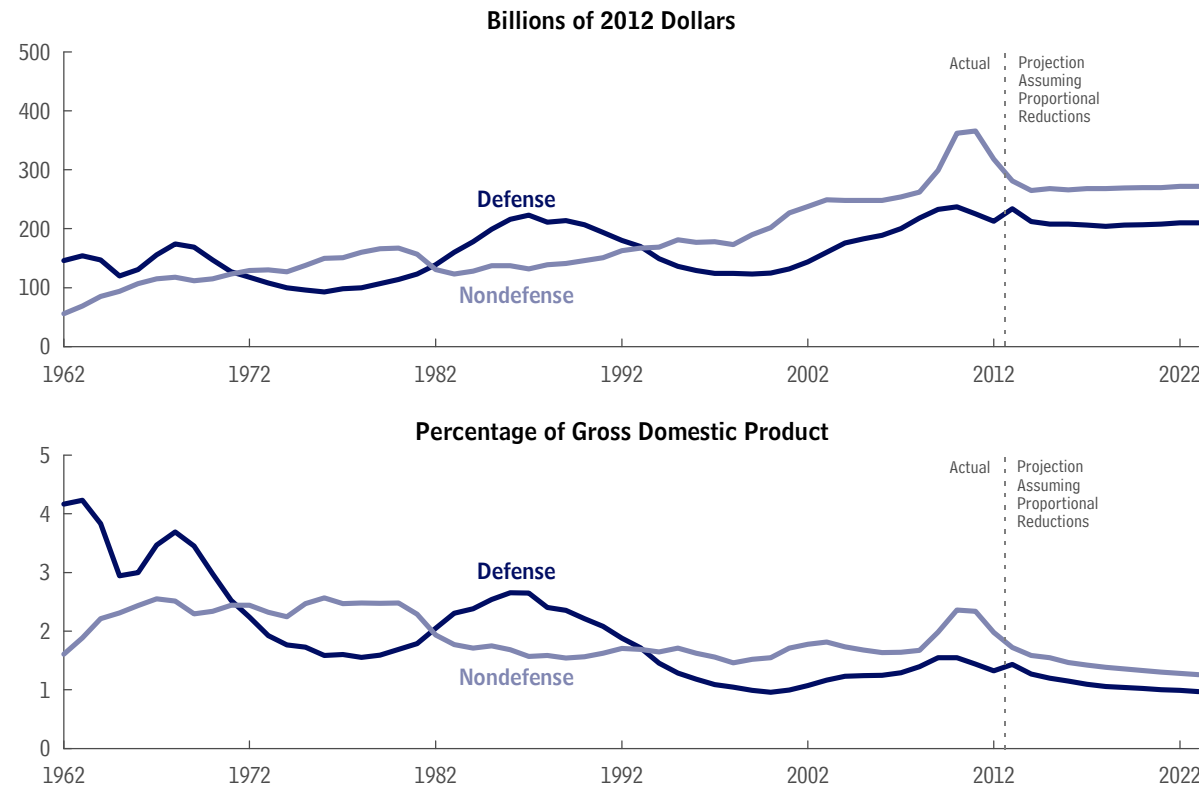
Source: Congressional Budget Office based on data from the Office of Management and Budget, the American Public Transportation Association, and the Bureau of Economic Analysis. For details, see the appendix.

In inflation-adjusted dollars, federal investment for nondefense purposes has risen over time, though there was a notable decline in the early 1980s and another in 2012, as the temporary spending increases of the American Recovery and Reinvestment Act of 2009 (ARRA) receded. Relative to the size of the economy, however, federal investment for nondefense purposes has generally not risen. It averaged about 2.4 percent of gross domestic product (GDP) in the 1970s; declined to an average of about 1.6 percent during the second half of the 1980s; and remained roughly steady until 2009, when it rose, in large part because of ARRA.

Defense investment has tracked the course of the country's international conflicts, both in inflation-adjusted dollars and as a share of the economy. It averaged 3.6 percent of GDP in the 1960s because of Vietnam War spending, declined in the 1970s, and then climbed to 2.7 percent in 1986, as the culmination of the Cold War approached. The decline thereafter was reversed following the terrorist attacks of September 11, 2001. ♦

**Exhibit 5.**

**Actual and Projected Federal Nondefense and Defense Investment, 1962 to 2023**



Source: Congressional Budget Office based on data from the Office of Management and Budget, the American Public Transportation Association, and the Bureau of Economic Analysis. For details, see the appendix.

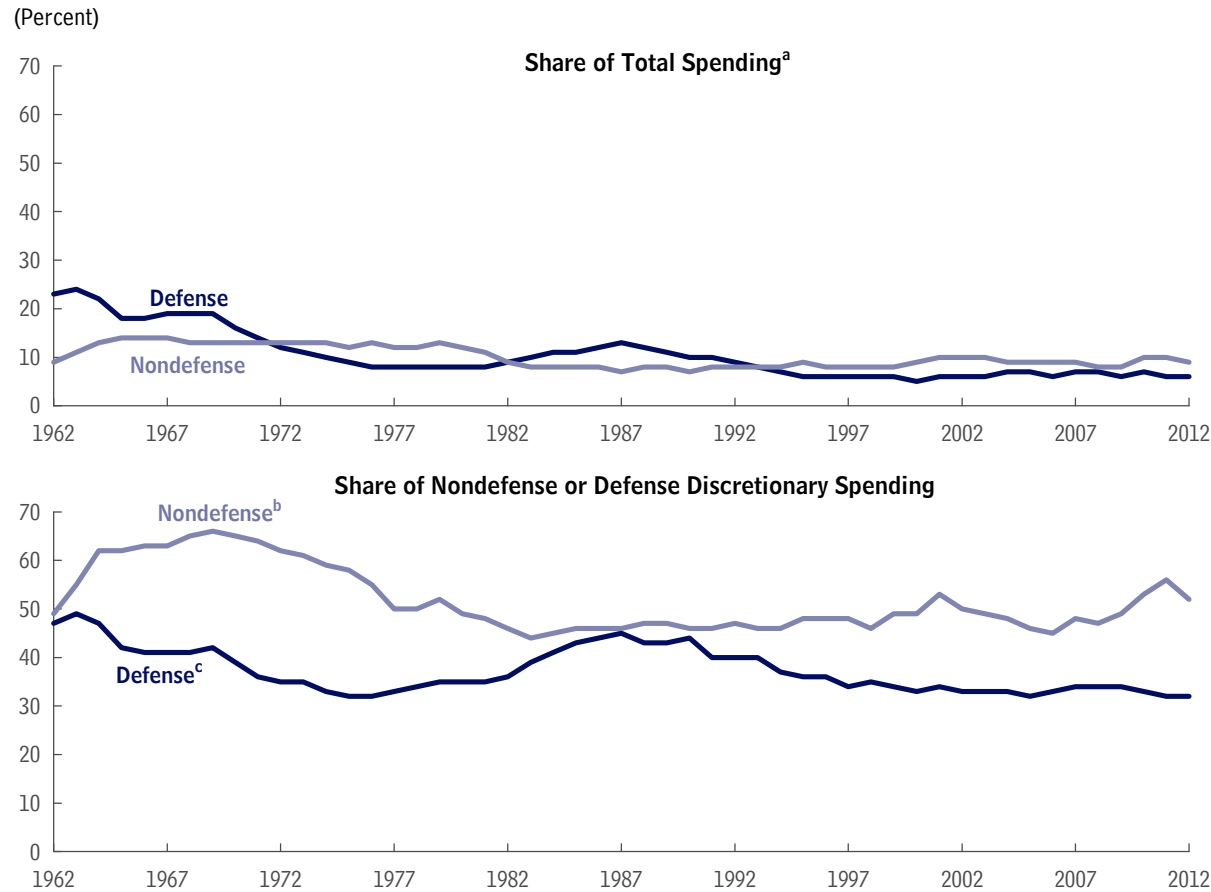
Note: The projected investment shown here is based on the historical average ratio of federal investment to discretionary spending, even though a very small portion of such investment takes place through mandatory spending. CBO's projections of discretionary spending assume compliance with the caps on appropriations that are in effect through 2021 (but do not include the effects of the Bipartisan Budget Act of 2013, which was being considered by the Congress when this report was completed); the projections also assume that appropriations will grow at the rate of inflation thereafter. However, certain types of discretionary appropriations are not constrained by the caps, and the projections assume that those appropriations will grow at the rate of inflation from the amounts of budget authority provided in 2013.

Future discretionary appropriations through 2021 are limited by caps established through the Budget Control Act of 2011 and modified in subsequent legislation. (The projections in this exhibit do not include the effects of the Bipartisan Budget Act of 2013, which was being considered by the Congress when this report was completed.) If total nondefense appropriations equaled the caps on such funding and investment for nondefense purposes remained at its historical average share of non-defense discretionary spending, such investment would stay fairly close to its current amount in inflation-adjusted dollars throughout the coming decade. Similarly, if total defense appropriations equaled the caps on such funding and investment for defense purposes remained at its historical average share of defense discretionary spending, such investment would stay fairly close to its current amount in inflation-adjusted dollars throughout the next 10 years.

Under those same assumptions, investment for both defense and nondefense purposes would decline relative to the size of the economy over the projection period, with defense investment as a percentage of GDP matching its historical low point and nondefense investment falling below its own low point. (Data on discretionary spending are available only since 1962.) By 2023, defense investment would be less than half, and nondefense investment less than two-thirds, of their average shares of GDP from 1962 to 2012. ♦

**Exhibit 6.**

**Federal Nondefense and Defense Investment Relative to the Budget, 1962 to 2012**



Total federal investment—that is, for both nondefense and defense purposes—declined as a share of total federal spending, from about 30 percent in the 1960s to about 15 percent in the 2000s. Most of that decline had occurred by the early 1980s; during the 30 years since, nondefense and (to a lesser extent) defense investment have both been a fairly consistent percentage of total spending.

Almost all federal investment takes the form of discretionary spending, which is determined by annual appropriations. As a share of total discretionary spending for nondefense purposes, nondefense investment peaked at more than 65 percent in the late 1960s, when the federal government spent substantial amounts on the space program and the development of the interstate highway system. During the 1970s, that share declined to about 50 percent, and it has ranged mostly between 45 percent and 55 percent for the past 35 years.

As a share of total discretionary spending for defense, investment for defense purposes rose to about 50 percent during the Vietnam War and to about 45 percent near the end of the Cold War. Since then, that share has declined, and it stood at just over 30 percent in 2012. ♦

Source: Congressional Budget Office based on data from the Office of Management and Budget and the American Public Transportation Association. For details, see the appendix.

Note: Only a very small portion of federal investment takes place through mandatory spending.

- a. Includes discretionary spending, mandatory spending, and net interest.
- b. Indicates nondefense investment as a share of total discretionary spending for nondefense purposes.
- c. Indicates defense investment as a share of total discretionary spending for defense purposes.





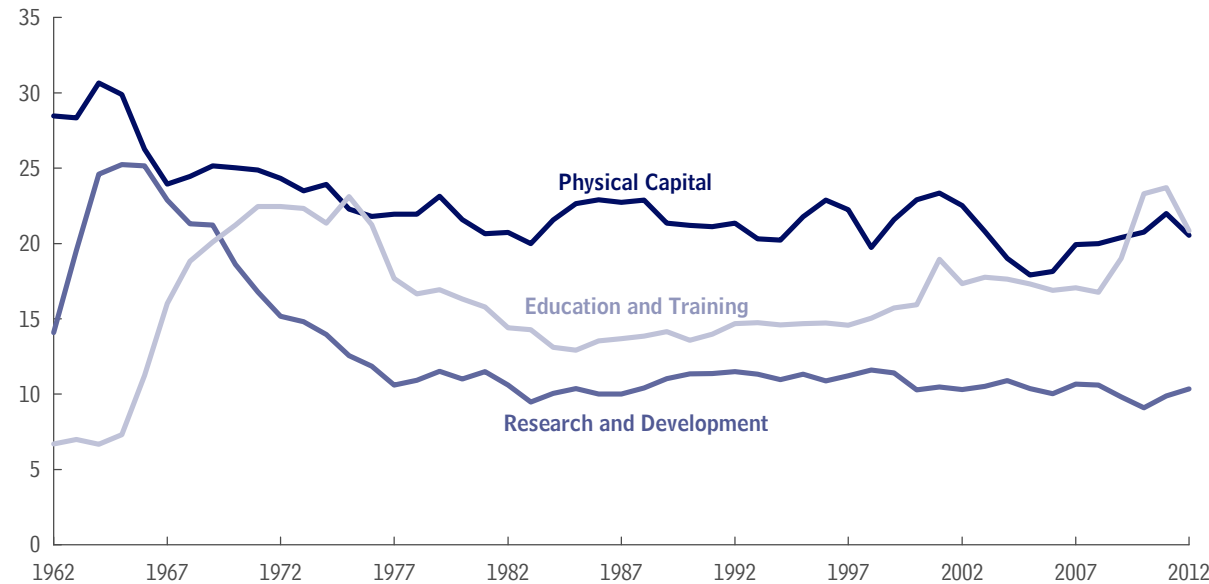
# Federal Nondefense Investment



**Exhibit 7.**

**Categories of Federal Nondefense Investment, 1962 to 2012**

(Percentage of federal nondefense discretionary spending)



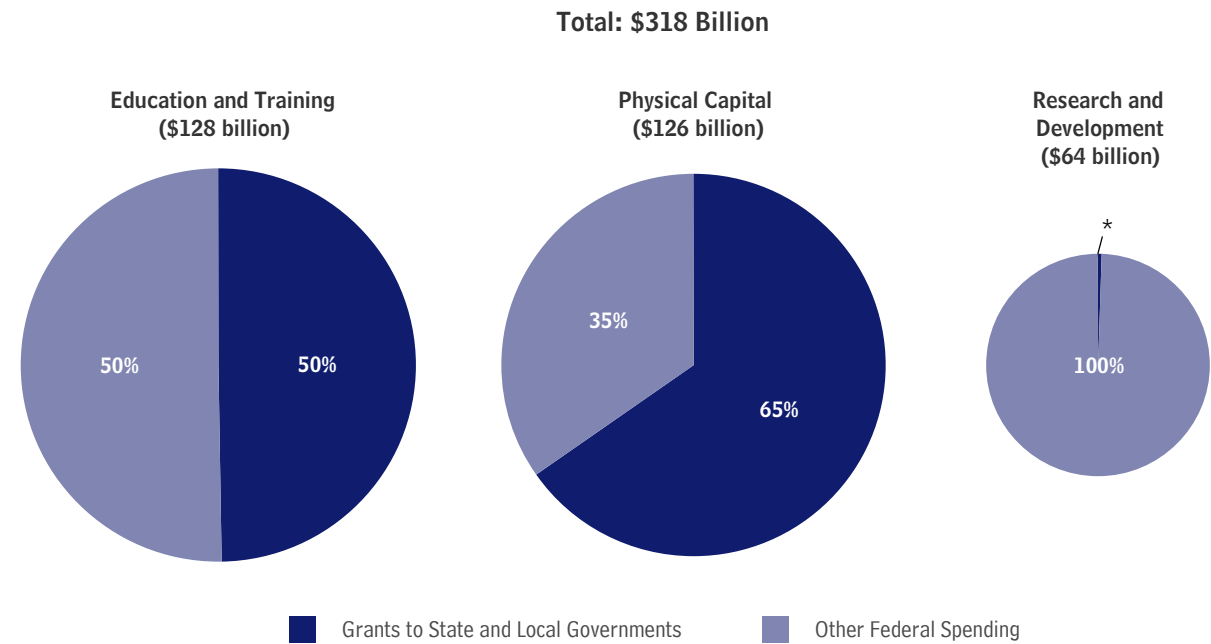
Source: Congressional Budget Office based on data from the Office of Management and Budget and the American Public Transportation Association. For details, see the appendix.

Of the three categories of federal nondefense investment—physical capital, education and training, and R&D—education and training was the largest in 2010, 2011, and 2012 (barely). The increase in such spending was primarily due to two factors: a large spending increase for Pell grants for higher education, and ARRA, which temporarily increased spending for primary, secondary, and vocational education. Investment in education and training represented a similar share of overall nondefense discretionary spending in the 1970s because of a large increase in spending on elementary, secondary, and higher education (from \$5 billion in 1964 to more than \$20 billion in 1975) and because of growth in spending on education, training, and rehabilitation for Vietnam War veterans (from less than \$1 billion in 1964 to more than \$15 billion in 1975).

Since the 1980s, the shares of nondefense discretionary spending held by physical capital and R&D have remained fairly consistent at levels lower than their highs of the 1960s and early 1970s. During that earlier period, investment in physical capital included the construction of the interstate highway system, and investment in R&D reflected a focus on the space program and on the sciences in general following the Soviet Union’s launch of Sputnik in 1957. ♦

**Exhibit 8.**

**Grants to State and Local Governments as a Share of Federal Nondefense Investment, 2012**



Source: Congressional Budget Office based on data from the Office of Management and Budget and the American Public Transportation Association. For details, see the appendix.

Note: \* = less than 0.5 percent.

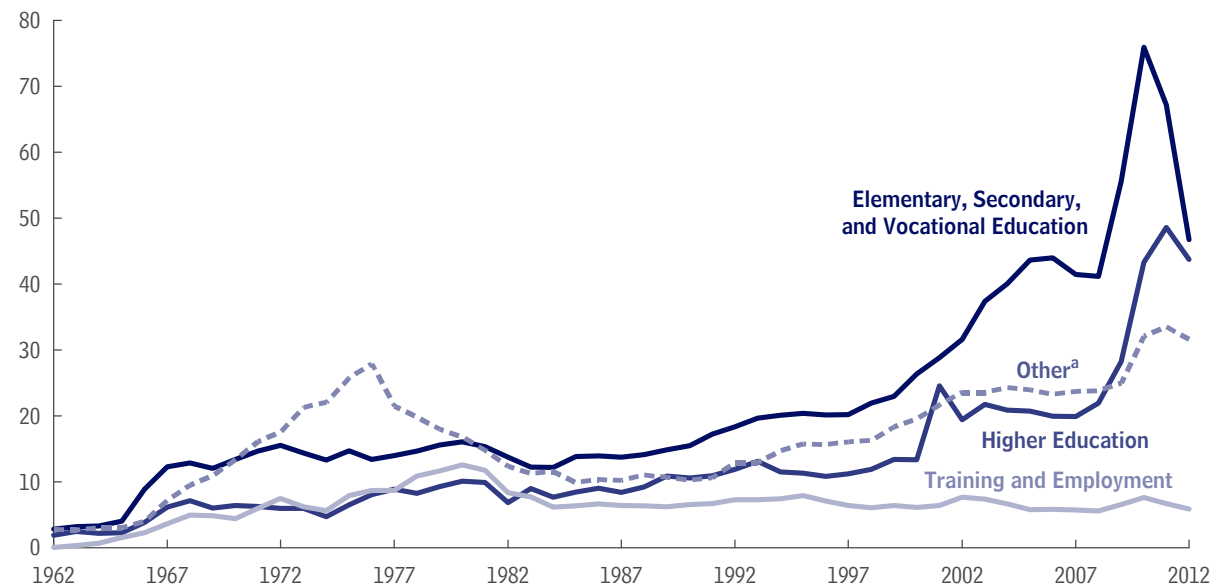
One way that the federal government invests is by providing grants to state and local governments. Those governments are likely to understand local conditions better than the federal government does; they may therefore allocate investment funds more effectively. However, because many grant programs offer state and local governments some discretion in how to use federal funds, the investments may not conform as closely to federal priorities as investments that the federal government undertakes directly.

In 2012, 50 percent of federal nondefense investment in education and training, amounting to \$64 billion, was funneled through grants to state and local governments. So was 65 percent of federal nondefense investment in physical capital, amounting to \$82 billion. The grants for education and training were generally for elementary, secondary, and vocational education, while most of the grants for physical capital were for transportation, primarily highways. The grants in both categories typically had requirements that states contribute funding. In contrast, almost no federal investment in R&D for nondefense purposes was done through grants to state and local governments. Instead, the federal government funded research at federal laboratories, universities, nonprofit organizations, and private firms. ♦

**Exhibit 9.**

**Education and Training: Federal Nondefense Investment by Activity, 1962 to 2012**

(Billions of 2012 dollars)



Source: Congressional Budget Office based on data from the Office of Management and Budget. For details, see the appendix.

a. Includes social services (such as early childhood education) and the education, training, and rehabilitation of veterans.

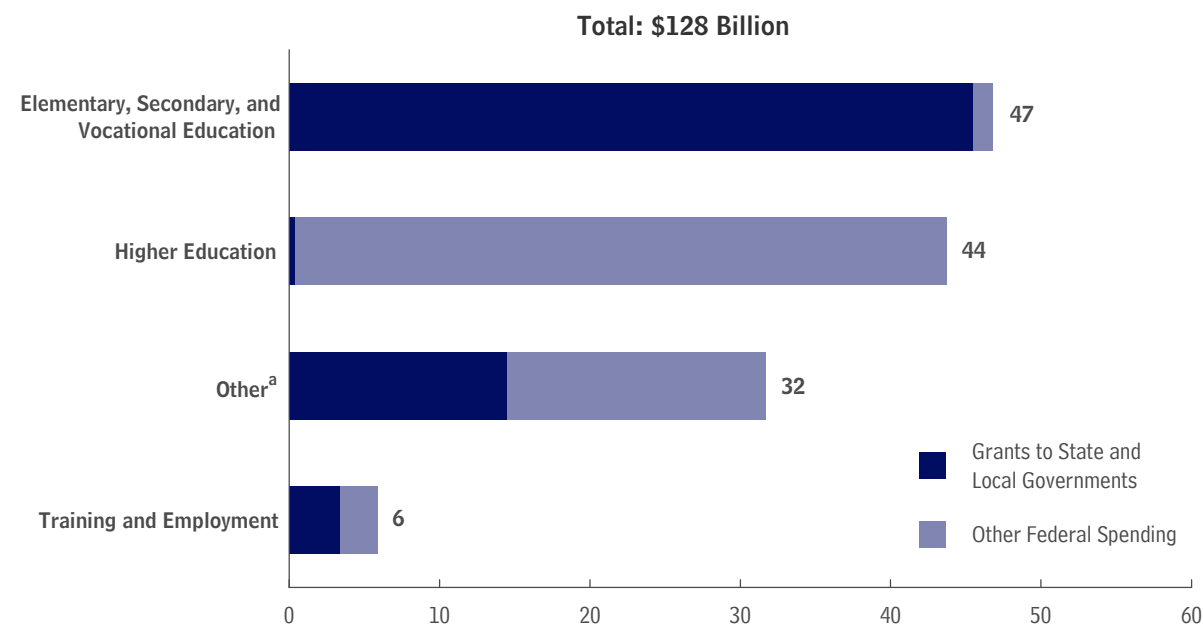
Federal investment in education and training has long been led by spending on elementary, secondary, and vocational education, primarily for disadvantaged children and students with disabilities. That spending increased sharply in the 2000s, and in 2010 it peaked at \$76 billion (in 2012 dollars)—nearly half of total federal investment in education and training. That temporary spike was largely because of ARRA, which distributed funds from 2009 through 2011 to help maintain state spending on education when the economy was weak and to increase spending for existing federal education programs, among other things. Spending then declined to \$47 billion in 2012.

Support for higher education also has been much higher in recent years than it was previously. Between 2000 and 2010, such support climbed from \$13 billion to \$49 billion (in 2012 dollars), with roughly 70 percent of the increase attributable to Pell grants, which are awarded to students with limited financial resources according to a formula specified by law. Both the number of students receiving the grants and the average grant amount increased dramatically in the second half of the decade. In 2012, federal spending on Pell grants declined because, even though the number of grant recipients continued to rise, the average grant amount fell. ♦

**Exhibit 10.**

**Education and Training: Federal Nondefense Investment by Activity, 2012**

(Billions of dollars)



Source: Congressional Budget Office based on data from the Office of Management and Budget. For details, see the appendix.

a. Includes social services (such as early childhood education) and the education, training, and rehabilitation of veterans.

In 2012, the federal government invested \$128 billion in education and training for nondefense purposes. About 37 percent of that amount, or \$47 billion, went to elementary, secondary, and vocational education—almost entirely in the form of grants to state and local governments.

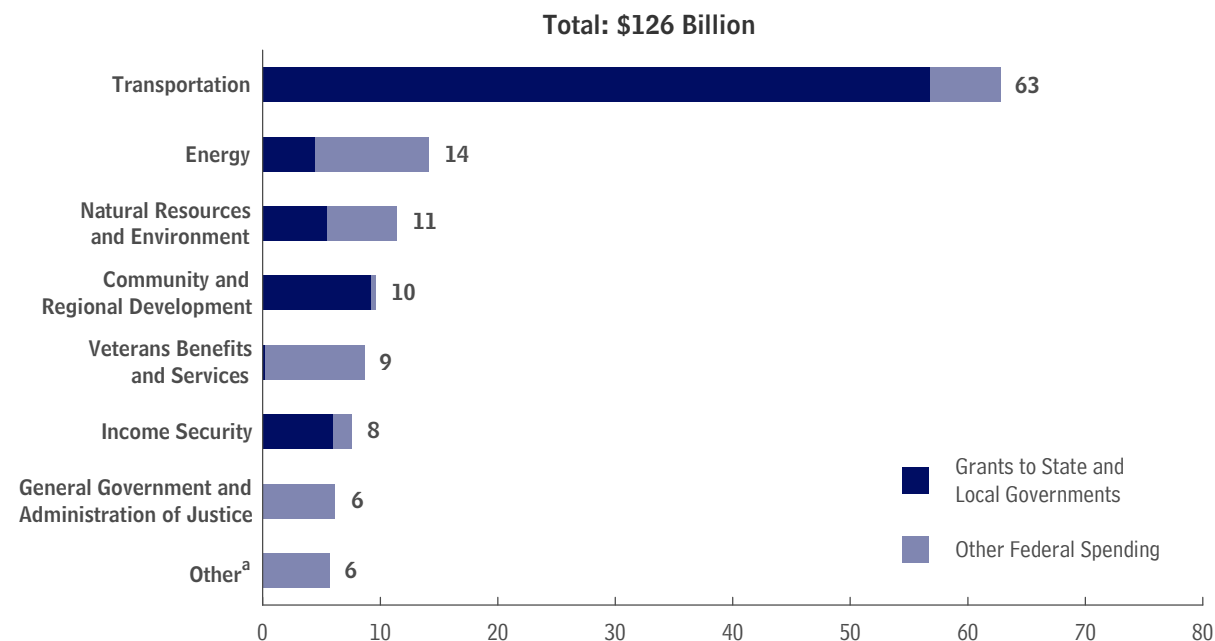
An additional 34 percent, or \$44 billion, went to higher education. But there, only a negligible share was distributed through grants to state and local governments. Instead, nearly all of that investment was made directly by the federal government, and most took place through Pell grants, which provide funds directly to students to pay for education at a variety of postsecondary institutions, including four-year colleges and universities, for-profit schools, two-year community colleges, and institutions that specialize in occupational training. Pell grants are awarded on the basis of financial need and academic course load.

Other types of investment, mostly for social services (such as early childhood education) and the education, training, and rehabilitation of veterans, accounted for 25 percent of the total, or \$32 billion; almost half of such spending was provided through grants to state and local governments. The remaining 5 percent of the total, or \$6 billion, went to training and employment programs, and a little more than half of those funds was channeled through grants to state and local governments. ♦

**Exhibit 11.**

**Physical Capital: Federal Nondefense Investment by Budget Function, 2012**

(Billions of dollars)



Source: Congressional Budget Office based on data from the Office of Management and Budget and the American Public Transportation Association. For details, see the appendix.

a. Includes the following budget functions: Commerce and Housing Credit; General Science, Space, and Technology; and International Affairs.

In 2012, the federal government invested \$126 billion in nondefense physical capital. Half of that amount, or \$63 billion, was for transportation. Of the transportation investment, 90 percent funded grants to state and local governments, mostly for the construction and rehabilitation of highways (\$44 billion), but also for mass transportation (\$10 billion) and airports (\$3 billion). The remaining 10 percent was invested directly by the federal government—above all, for major equipment for airports (\$3 billion), the Coast Guard (\$1 billion), and rail transportation (\$1 billion).

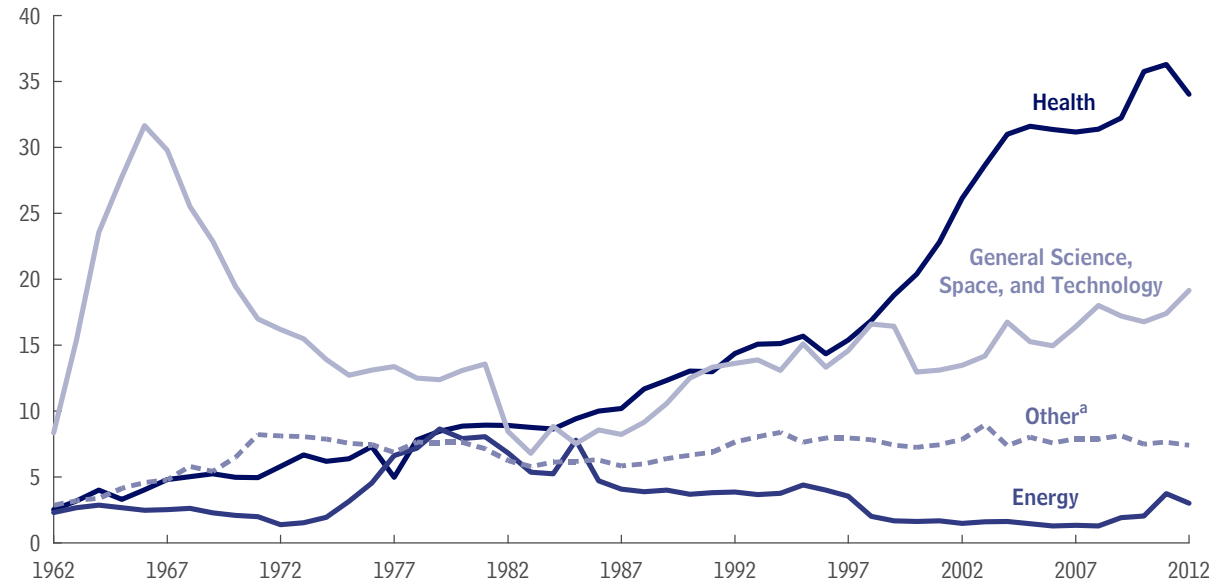
The federal government also invested \$14 billion in energy-related nondefense physical capital. More than one-third of that sum funded reimbursements for part of the cost of installing certain equipment (such as solar-energy equipment). More than one-quarter funded grants to state and local governments for energy efficiency and renewable energy programs.

Of the \$11 billion invested in natural resources and the environment, nearly three-fourths was for the construction and repair of pollution control facilities and water resources projects. Almost all of the \$10 billion invested in community and regional development was for block grants to state and local governments for construction and repair projects. Eighty percent of the \$9 billion invested in health care for veterans was for the construction of health-care facilities and the purchase of information technology. The \$8 billion invested in income security went to housing assistance, with three-fourths of that sum provided through grants to state and local governments. ♦

**Exhibit 12.**

**Research and Development: Federal Nondefense Investment by Budget Function, 1962 to 2012**

(Billions of 2012 dollars)



Source: Congressional Budget Office based on data from the Office of Management and Budget. For details, see the appendix.

a. Includes the following budget functions: Transportation; Agriculture; and Natural Resources and Environment.

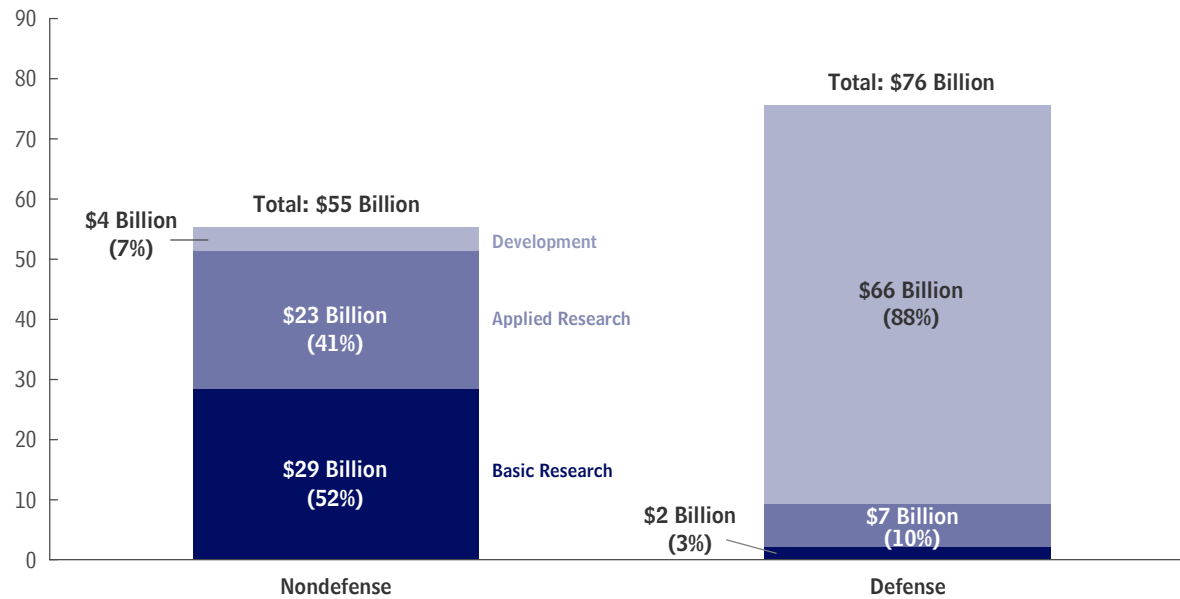
In inflation-adjusted dollars, federal spending on health research grew dramatically in the late 1990s and early 2000s, leveled off for several years in the mid- and late 2000s, and then bumped up further in 2010, 2011, and (to a lesser extent) 2012. By 2012, such spending accounted for more than half of the \$64 billion devoted to total nondefense investment in R&D. Most of the \$34 billion spent for health research was directed to the National Institutes of Health, for research on cancer, infectious diseases, and other health problems.

The second-largest component of federal nondefense investment in R&D during the past 15 years has been spending related to general science, space, and technology. In 2012, such spending was \$19 billion, with most of those funds going to the National Aeronautics and Space Administration (for such projects as observatories and space missions) and to the National Science Foundation (for research in such areas as physical sciences and engineering). Investment in nondefense R&D was dominated by this category in the 1960s because of the space race and the government’s goal of a manned trip to the moon.

Investment in R&D related to transportation, agriculture, and natural resources and the environment accounted for about 12 percent of nondefense R&D investment in 2012, or \$7 billion, while research at the Department of Energy (on energy efficiency and nuclear energy, for example) amounted to \$3 billion. Investment in energy-related R&D for nondefense purposes peaked in the 1970s with the energy crisis. ♦

**Exhibit 13.**

**Stages of Federal Research and Development Investment, 2012**



Source: Congressional Budget Office based on data from the National Science Foundation. For details, see the appendix.

Note: The amounts reported here differ from those reported elsewhere in this document because the National Science Foundation reports estimates of federal obligations rather than federal spending. An obligation is a legally binding commitment by the federal government that will result in spending, immediately or in the future.

There are three varieties of R&D. Basic research—for example, physics research on the properties of elementary particles—aims to expand scientific knowledge, regardless of its potential for commercial applications. Applied research, such as the discovery of new materials to administer drugs, seeks to connect scientific knowledge to some practical purpose and so is one step closer to commercial application. Development applies scientific knowledge to the creation of particular marketable products.

Federal obligations for investment in non-defense R&D totaled an estimated \$55 billion in 2012, most of it for basic and applied research. (By contrast, almost 90 percent of federal obligations for investment in defense R&D was devoted to development—in particular, the development of weapon systems.) One reason for the federal government’s large role in nondefense basic and applied research is that private firms invest less in it than its social benefits justify, both because of the difficulty of capturing the benefits of such research and because of the difficulty of predicting its commercial potential. The federal government plays only a small role in the development stage of nondefense R&D because private firms have strong incentives to create commercially viable products. (The development stage of defense-related R&D has much less potential to lead to products that are commercially viable apart from purchases by the federal government.) ♦





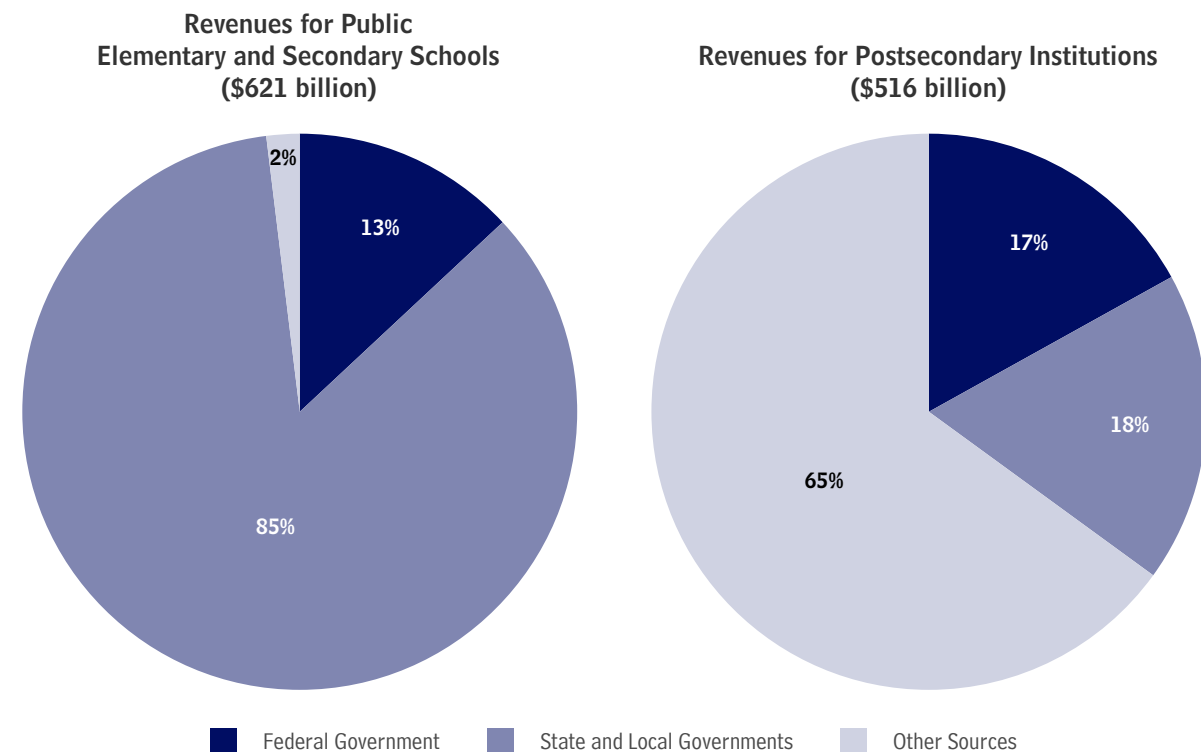
# **Federal, State, Local, and Private Nondefense Investment**



**Exhibit 14.**

**Educational Institutions: Sources of Revenues, 2009–2010 Academic Year**

(2012 dollars)



Source: Congressional Budget Office based on data from the Department of Education. For details, see the appendix.

Notes: The 2009–2010 academic year covers July 1, 2009, through June 30, 2010.

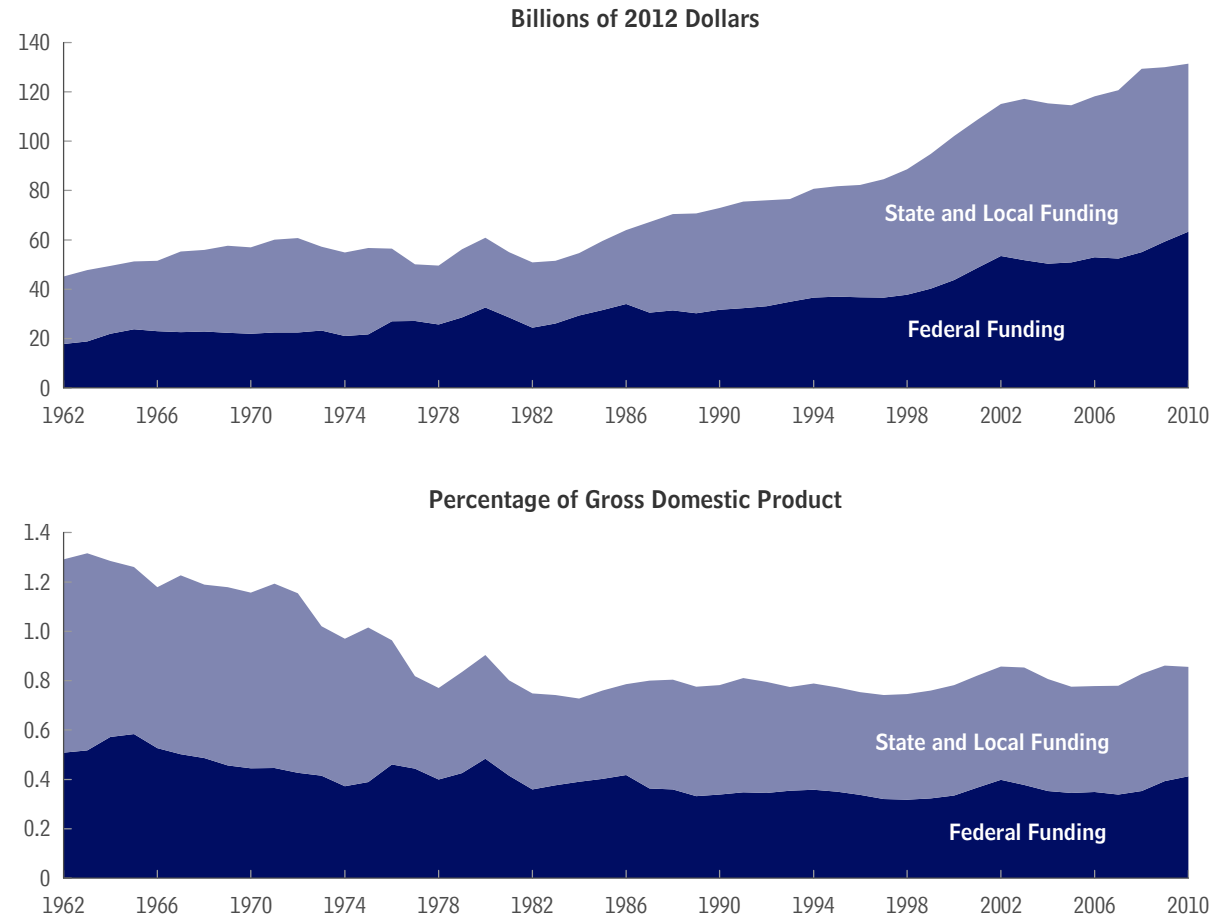
Data for private elementary and secondary schools, which account for 10 percent of total enrollment in elementary and secondary schools, are not available. The numbers shown for postsecondary institutions, however, do include private schools (both nonprofit and for-profit) as well as public ones. The postsecondary institutions' revenues include support for research and development. The postsecondary institutions' "other sources" of revenues include tuition and fees (financed in part by student loans), income from assets, revenues of hospitals operated by the institutions (including amounts appropriated by governments for the hospitals), payments for services provided by the institutions (such as food services and intercollegiate athletics), and contributions by private donors.

During the 2009–2010 academic year, the most recent for which complete data are available, public elementary and secondary schools had \$621 billion (in 2012 dollars) in revenues. Of that sum, \$81 billion, or 13 percent, came from the federal government, largely in the form of grants to state and local education agencies. (That amount was larger than usual because of temporarily greater federal spending under ARRA, which expanded funding beginning in 2009.) Most of the schools' revenues—\$528 billion, or 85 percent—came from state and local governments, which drew the funds from sales, income, and property taxes.

Also during the 2009–2010 academic year, postsecondary institutions received \$516 billion in revenues; federal spending represented 17 percent of the total. That \$88 billion was conveyed through different avenues, including R&D funding and grants to students, primarily those from lower-income families. Although the federal government also provides loans to students to pay for tuition, housing, and other costs, those loans are classified here not under federal spending but under tuition and fees (a component of "other sources"), because they are ultimately the responsibility of the students or their families. ♦

**Exhibit 15.**

**Transportation Infrastructure: Sources of Nondefense Investment, 1962 to 2010**



Transportation represents half of all federal investment in nondefense physical capital. In 2010, the federal government spent \$63 billion (in 2012 dollars), or 0.4 percent of GDP, on physical capital for transportation by highway, mass transit, rail, water, and air. That year, the most recent for which complete data are available, states and localities invested \$68 billion, also 0.4 percent of GDP, for the same purpose. Some of those state and local funds fulfilled matching requirements that accompanied federal grants. Because of greater federal spending under ARRA (which began in 2009 but has now largely tapered off), federal investment grew closer in size to state and local investment in 2009 and 2010 than it had been previously.

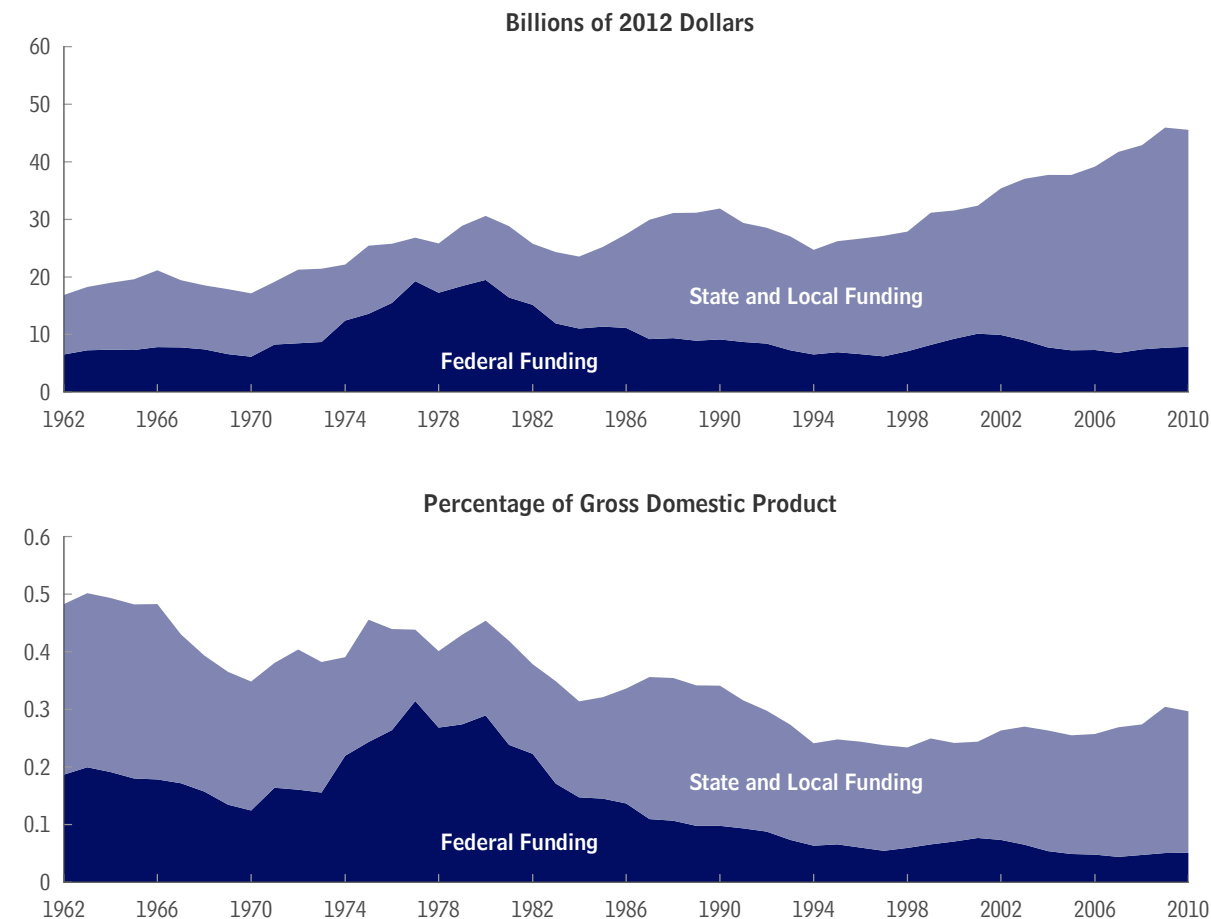
Since the early 1980s, investment in physical capital for transportation by both the federal government and state and local governments has generally climbed in inflation-adjusted dollars. It has been relatively stable, however, as a share of GDP. ♦

Source: Congressional Budget Office based on data from the Office of Management and Budget, the Census Bureau, and the Bureau of Economic Analysis. For details, see the appendix.

Note: Most state governments and many localities use a fiscal year that starts on July 1 and ends on June 30. CBO adjusted the data to report spending by those governments during the federal fiscal year, which begins on October 1 and ends on September 30.

**Exhibit 16.**

**Water Infrastructure: Sources of Nondefense Investment, 1962 to 2010**



Source: Congressional Budget Office based on data from the Office of Management and Budget, the Census Bureau, and the Bureau of Economic Analysis. For details, see the appendix.

Note: Most state governments and many localities use a fiscal year that starts on July 1 and ends on June 30. CBO adjusted the data to report spending by those governments during the federal fiscal year, which begins on October 1 and ends on September 30.

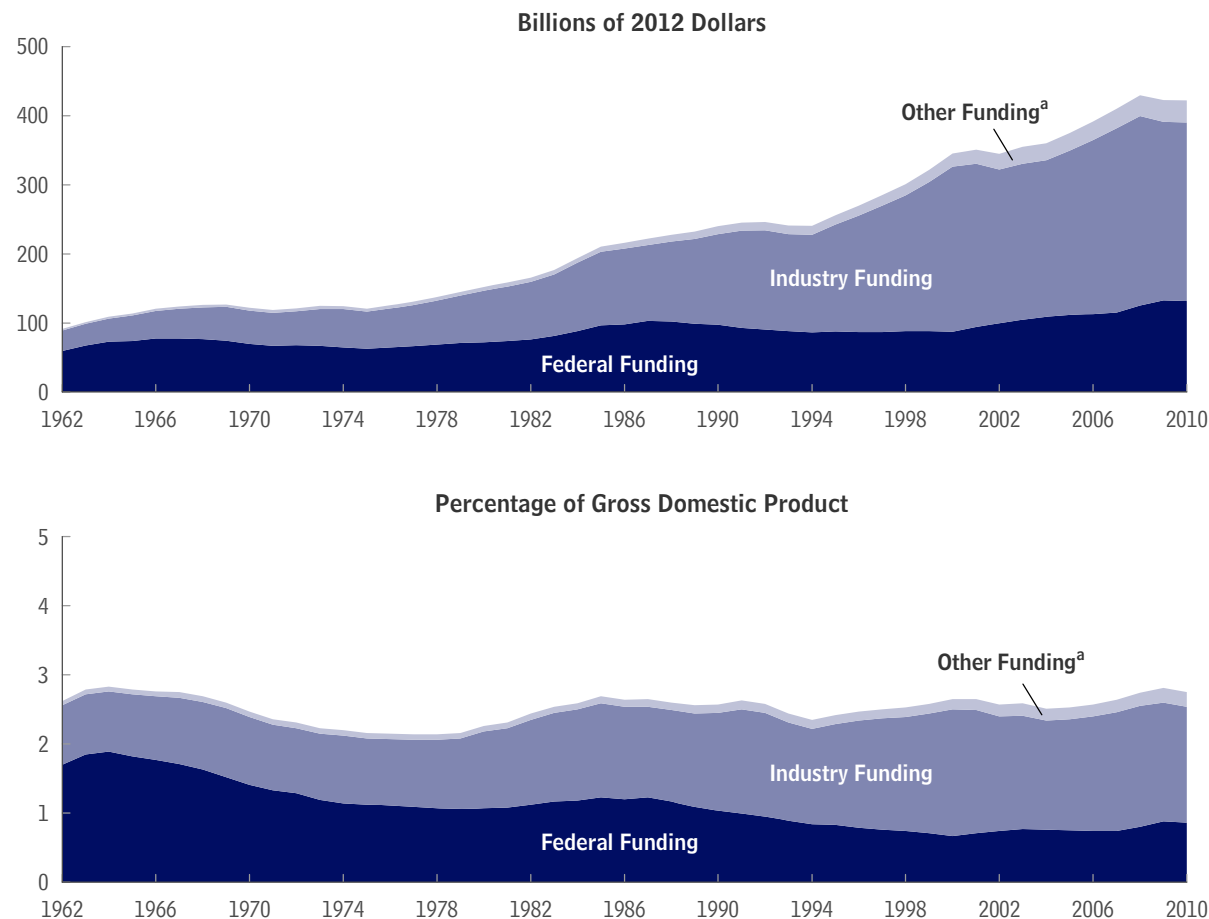
Water infrastructure—such as dams, levees, water distribution systems, and wastewater treatment facilities—accounts for a significant portion of federal investment in nondefense physical capital. In 2010, the most recent year for which complete state and local data are available, the federal government spent \$8 billion (in 2012 dollars), or less than one-tenth of 1 percent of GDP, on water infrastructure. State and local investment for the same purpose was roughly five times as large: \$38 billion, or one-quarter of 1 percent of GDP.

From the early 1960s through the early 1970s, federal investment in water infrastructure was, on average, about two-thirds the amount of state and local investment, but in the late 1970s, it climbed to more than two and a half times the state and local amount. That increase reflected provisions of the Clean Water Act that required and funded greater efforts to clean wastewater before discharging it into waterways. Similarly, the much smaller increase in federal investment in the late 1990s reflected amendments to the Safe Drinking Water Act to help local water utilities buy technologies to reduce contaminants.

Despite those increases, the federal role in water infrastructure has generally declined over the past few decades. However, increases in state and local funding have more than compensated, so that total investment in physical capital for water infrastructure, considered in inflation-adjusted dollars, has been climbing since the mid-1990s. As a share of GDP, total investment has likewise risen, but less steadily and dramatically. ♦

**Exhibit 17.**

**Research and Development: Sources of Investment, 1962 to 2010**



Source: Congressional Budget Office based on data from the National Science Foundation and the Bureau of Economic Analysis. For details, see the appendix.

a. Consists of support from universities, colleges, nonprofit organizations, and nonfederal governments.

In 2010, the federal government spent \$132 billion (in 2012 dollars) on defense and nondefense R&D, or 31 percent of the national total; that federally supported R&D was conducted both by federal agencies and by nonfederal entities, such as universities and private firms. Industry spent \$259 billion on R&D, or 61 percent of the national total, in 2010, the most recent year for which data are available. Universities, colleges, nonprofit organizations, and nonfederal governments accounted for the remaining 8 percent of national R&D spending, or \$32 billion.

With the exception of a dip in the 1970s, total spending on R&D has generally kept pace with growth in the economy since the early 1960s. However, industry spending outpaced federal spending during that period, and it has been the primary source of funds in every year since 1980. Federal R&D spending did grow noticeably in the 1960s, to support the space program; in the 1980s, to expand national defense; and in the 2000s, to promote both defense-related and health-related R&D.

Private industry and the federal government focus on different stages of R&D. In 2010, development accounted for 76 percent of industry-funded R&D; by contrast, research accounted for 56 percent of federally funded R&D. The federal government is the primary source of funds for research in the United States, and despite the federal government's diminished role in R&D spending as a whole, growth in research spending from all sources taken together has largely kept pace with economic growth since the 1980s. ♦



## Appendix: Sources and Methods

### Exhibit 1

The Congressional Budget Office's (CBO's) primary data sources for this exhibit were Tables 9.2, 9.7, and 9.9 in Office of Management and Budget, *Budget of the U.S. Government, Fiscal Year 2014: Historical Tables* (April 2013), [www.whitehouse.gov/omb/budget/Historicals](http://www.whitehouse.gov/omb/budget/Historicals).

CBO's dollar value for federal investment in physical capital does not match the value reported in Table 9.2 because the Office of Management and Budget (OMB) records as capital spending some expenditures that were in fact for the operation and maintenance of rail systems and mass transit. CBO made the adjustment for rail systems using Office of Management and Budget, *Budget of the U.S. Government, Fiscal Year 2014: Appendix* (April 2013), p. 932, "Federal Railroad Administration: Operating Subsidy Grants to Amtrak," [www.whitehouse.gov/omb/budget/appendix](http://www.whitehouse.gov/omb/budget/appendix). CBO made the adjustment for mass transit using Tables 58 and 63 in American Public Transportation Association, *2012 Public Transportation Fact Book* (March 2012), Appendix A: Historical Tables, <http://tinyurl.com/p7fz53b> (PDF, 2.03 MB).

CBO's dollar value for federal investment in education and training does not match the value reported in Table 9.9 because CBO's data exclude investment in higher education through student loan programs. CBO made the adjustment for student loans using data for the Department of Education and its Office of Federal Student Aid in Office of Management and Budget, *Budget of the U.S. Government, Fiscal Year 2014: Supplemental Materials* (April 2013), Public Budget Database, Outlays, <http://go.usa.gov/Wwy9> (XLS, 2.84 MB); the relevant account codes in the database were 0202, 0230, 0231, 0243, 4256, 4257, 7005, 022100, 271810, 271830, 278110, and 278130.

### Exhibit 2

CBO's primary data sources for this exhibit were Tables 9.4, 9.5, 9.6, 9.8, and 9.9 in Office of Management and Budget, *Budget of the U.S. Government, Fiscal Year 2014: Historical Tables* (April 2013), [www.whitehouse.gov/omb/budget/Historicals](http://www.whitehouse.gov/omb/budget/Historicals).

CBO's dollar value for nondefense investment in physical capital does not match the sum of the

values reported in Tables 9.5 and 9.6 because OMB records as capital spending some expenditures that were in fact for the operation and maintenance of rail systems and mass transit. CBO adjusted the data in OMB's Table 9.5 for the rail systems using Office of Management and Budget, *Budget of the U.S. Government, Fiscal Year 2014: Appendix* (April 2013), p. 932, "Federal Railroad Administration: Operating Subsidy Grants to Amtrak," [www.whitehouse.gov/omb/budget/appendix](http://www.whitehouse.gov/omb/budget/appendix). CBO adjusted the data in OMB's Table 9.6 for the mass transit systems using Tables 58 and 63 in American Public Transportation Association, *2012 Public Transportation Fact Book* (March 2012), Appendix A: Historical Tables, <http://tinyurl.com/p7fz53b> (PDF, 2.03 MB).

CBO's dollar value for federal investment in education and training does not match the value reported in Table 9.9 because CBO's data exclude investment in higher education through student loan programs. CBO made the adjustment for student loans using data for the Department of Education and its Office of Federal Student Aid in Office of Management and Budget, *Budget of the*

*U.S. Government, Fiscal Year 2014: Supplemental Materials* (April 2013), Public Budget Database, Outlays, <http://go.usa.gov/Wwy9> (XLS, 2.84 MB); the relevant account codes in the database were 0202, 0230, 0231, 0243, 4256, 4257, 7005, 022100, 271810, 271830, 278110, and 278130.

### Exhibit 3

CBO's primary data sources for this exhibit were Tables 8.1 and 9.1 in Office of Management and Budget, *Budget of the U.S. Government, Fiscal Year 2014: Historical Tables* (April 2013), [www.whitehouse.gov/omb/budget/Historicals](http://www.whitehouse.gov/omb/budget/Historicals).

CBO adjusted the dollar values reported by OMB for nondefense investment in Table 9.1 because OMB records as capital spending some expenditures that were in fact for the operation and maintenance of rail systems and mass transit. CBO made the adjustment for rail systems using Office of Management and Budget, *Budget of the U.S. Government, Fiscal Year 2014: Appendix* (April 2013), p. 932, "Federal Railroad Administration: Operating Subsidy Grants to Amtrak," [www.whitehouse.gov/omb/budget/appendix](http://www.whitehouse.gov/omb/budget/appendix). CBO made the adjustment for mass transit using Tables 58 and 63 in American Public Transportation Association, *2012 Public Transportation Fact Book* (March 2012), Appendix A: Historical Tables, <http://tinyurl.com/p7fz53b> (PDF, 2.03 MB).

Moreover, note that OMB's Table 9.1 reports total federal investment. This CBO exhibit, by contrast, distinguishes the portion provided through discretionary funds (which accounts for almost all federal investment) from the portion provided through mandatory funds. The portion provided

through mandatory funds, which is invested in student loans and part of the Federal Pell Grant Program, is recorded in this exhibit as part of the \$2,031 billion in mandatory spending.

### Exhibit 4

CBO's primary data sources for this exhibit were Table 9.1 in Office of Management and Budget, *Budget of the U.S. Government, Fiscal Year 2014: Historical Tables* (April 2013), [www.whitehouse.gov/omb/budget/Historicals](http://www.whitehouse.gov/omb/budget/Historicals), and Table 1.1.5, "Gross Domestic Product," in Bureau of Economic Analysis, *National Economic Data: GDP and Personal Income, Domestic Product and Income* (July 2013), [www.bea.gov/itable/index.cfm](http://www.bea.gov/itable/index.cfm).

CBO adjusted the dollar values reported by OMB for nondefense investment in Table 9.1 because OMB records as capital spending some expenditures that were in fact for the operation and maintenance of rail systems and mass transit. CBO made the adjustment for rail systems using data collected from *Department of Transportation: Federal Railroad Administration* (2003–2012), "Operating Subsidy Grants to the National Railroad Passenger Corp" on OMB form Schedule C. CBO made the adjustment for mass transit using Tables 58 and 63 in American Public Transportation Association, *2012 Public Transportation Fact Book* (March 2012), Appendix A: Historical Tables, <http://tinyurl.com/p7fz53b> (PDF, 2.03 MB).

CBO also adjusted the dollar values reported by OMB for nondefense investment in Table 9.1 to exclude investment in higher education through student loan programs. CBO made the adjustment

for student loans using data for the Department of Education and its Office of Federal Student Aid in Office of Management and Budget, *Budget of the U.S. Government, Fiscal Year 2014: Supplemental Materials* (April 2013), Public Budget Database, Outlays, <http://go.usa.gov/Wwy9> (XLS, 2.84 MB); the relevant account codes in the database were 0202, 0230, 0231, 0243, 4256, 4257, 7005, 022100, 271810, 271830, 278110, and 278130.

### Exhibit 5

CBO's primary data sources for this exhibit were Table 9.1 in Office of Management and Budget, *Budget of the U.S. Government, Fiscal Year 2014: Historical Tables* (April 2013), [www.whitehouse.gov/omb/budget/Historicals](http://www.whitehouse.gov/omb/budget/Historicals); Table 1.1.5, "Gross Domestic Product," in Bureau of Economic Analysis, *National Economic Data: GDP and Personal Income, Domestic Product and Income* (July 2013), [www.bea.gov/itable/index.cfm](http://www.bea.gov/itable/index.cfm); and CBO's baseline budget projections as of May 2013 in Congressional Budget Office, "CBO's Baseline Budget Projections, as of May 2013, With Percentages of Gross Domestic Product Updated to Reflect Recent Revisions by the Bureau of Economic Analysis" (September 2013), [www.cbo.gov/publication/44574](http://www.cbo.gov/publication/44574).

CBO adjusted the dollar values as reported by OMB for nondefense investment in Table 9.1 because OMB records as capital spending some expenditures that were in fact for the operation and maintenance of rail systems and mass transit. CBO made the adjustment for rail systems using data collected from *Department of Transportation: Federal Railroad Administration* (2003–2012), "Operating Subsidy Grants to the National Railroad Passenger Corp" on OMB form Schedule C.

CBO made the adjustment for mass transit using Tables 58 and 63 in American Public Transportation Association, *2012 Public Transportation Fact Book* (March 2012), Appendix A: Historical Tables, <http://tinyurl.com/p7fz53b> (PDF, 2.03 MB).

CBO also adjusted the dollar values as reported by OMB for nondefense investment in Table 9.1 to exclude investment in higher education through student loan programs. CBO made the adjustment for student loans using data for the Department of Education and its Office of Federal Student Aid in Office of Management and Budget, *Budget of the U.S. Government, Fiscal Year 2014: Supplemental Materials* (April 2013), Public Budget Database, Outlays, <http://go.usa.gov/Wwy9> (XLS, 2.84 MB); the relevant account codes in the database were 0202, 0230, 0231, 0243, 4256, 4257, 7005, 022100, 271810, 271830, 278110, and 278130.

### Exhibit 6

CBO's primary data sources for this exhibit were Tables 8.1, 8.5, and 9.1 in Office of Management and Budget, *Budget of the U.S. Government, Fiscal Year 2014: Historical Tables* (April 2013), [www.whitehouse.gov/omb/budget/Historicals](http://www.whitehouse.gov/omb/budget/Historicals).

CBO adjusted the dollar values reported by OMB for investment for nondefense purposes because OMB records as capital spending some expenditures that were in fact for the operation and maintenance of rail systems and mass transit. CBO made the adjustment for rail systems using data collected from *Department of Transportation: Federal Railroad Administration* (2003–2012),

“Operating Subsidy Grants to the National Railroad Passenger Corp” on OMB form Schedule C. CBO made the adjustment for mass transit using Tables 58 and 63 in American Public Transportation Association, *2012 Public Transportation Fact Book* (March 2012), Appendix A: Historical Tables, <http://tinyurl.com/p7fz53b> (PDF, 2.03 MB).

CBO also adjusted the dollar values reported by OMB for investment for nondefense purposes and for total mandatory spending to exclude investment in higher education through student loan programs. CBO made the adjustment for student loans using data for the Department of Education and its Office of Federal Student Aid in Office of Management and Budget, *Budget of the U.S. Government, Fiscal Year 2014: Supplemental Materials* (April 2013), Public Budget Database, Outlays, <http://go.usa.gov/Wwy9> (XLS, 2.84 MB); the relevant account codes in the database were 0202, 0230, 0231, 0243, 4256, 4257, 7005, 022100, 271810, 271830, 278110, and 278130.

### Exhibit 7

CBO's primary data sources for this exhibit were Tables 9.2, 9.5, 9.6, 9.8, and 9.9 in Office of Management and Budget, *Budget of the U.S. Government, Fiscal Year 2014: Historical Tables* (April 2013), [www.whitehouse.gov/omb/budget/Historicals](http://www.whitehouse.gov/omb/budget/Historicals).

CBO adjusted the dollar values reported by OMB for investment in physical capital because OMB records as capital spending some expenditures that were in fact for the operation and maintenance of

rail systems and mass transit. CBO made the adjustment for rail systems using data collected from *Department of Transportation: Federal Railroad Administration* (2003–2012), “Operating Subsidy Grants to the National Railroad Passenger Corp” on OMB form Schedule C. CBO made the adjustment for mass transit using Tables 58 and 63 in American Public Transportation Association, *2012 Public Transportation Fact Book* (March 2012), Appendix A: Historical Tables, <http://tinyurl.com/p7fz53b> (PDF, 2.03 MB).

CBO also adjusted the dollar values reported by OMB for investment in education and training to exclude investment in higher education through student loan programs. CBO made the adjustment for student loans using data for the Department of Education and its Office of Federal Student Aid in Office of Management and Budget, *Budget of the U.S. Government, Fiscal Year 2014: Supplemental Materials* (April 2013), Public Budget Database, Outlays, <http://go.usa.gov/Wwy9> (XLS, 2.84 MB); the relevant account codes in the database were 0202, 0230, 0231, 0243, 4256, 4257, 7005, 022100, 271810, 271830, 278110, and 278130.

### Exhibit 8

CBO's primary data sources for this exhibit were Tables 9.2, 9.6, 9.8, and 9.9 in Office of Management and Budget, *Budget of the U.S. Government, Fiscal Year 2014: Historical Tables* (April 2013), [www.whitehouse.gov/omb/budget/Historicals](http://www.whitehouse.gov/omb/budget/Historicals).

CBO's dollar value for federal investment in physical capital through grants to state and local governments does not match the value reported in



Tables 9.2 and 9.6 because the Office of Management and Budget records as capital spending some expenditures that were in fact for the operation and maintenance of mass transit. CBO made the adjustment for mass transit using Tables 58 and 63 in American Public Transportation Association, *2012 Public Transportation Fact Book* (March 2012), Appendix A: Historical Tables, <http://tinyurl.com/p7fz53b> (PDF, 2.03 MB).

CBO's dollar value for federal investment in physical capital through other federal spending does not match the value reported in Table 9.2 because the Office of Management and Budget records as capital spending some expenditures that were in fact for the operation and maintenance of rail systems. CBO made the adjustment for rail systems using Office of Management and Budget, *Budget of the U.S. Government, Fiscal Year 2014: Appendix* (April 2013), p. 932, "Federal Railroad Administration: Operating Subsidy Grants to Amtrak," [www.whitehouse.gov/omb/budget/appendix](http://www.whitehouse.gov/omb/budget/appendix).

CBO's dollar value for federal investment in education and training does not match the value reported in Table 9.9 because CBO's data exclude investment in higher education through student loan programs. CBO made the adjustment for student loans using data for the Department of Education and its Office of Federal Student Aid in Office of Management and Budget, *Budget of the U.S. Government, Fiscal Year 2014: Supplemental Materials* (April 2013), Public Budget Database, Outlays, <http://go.usa.gov/Wwy9> (XLS, 2.84 MB); the relevant account codes in the database

were 0202, 0230, 0231, 0243, 4256, 4257, 7005, 022100, 271810, 271830, 278110, and 278130.

### Exhibit 9

CBO's primary data source for this exhibit was Table 9.9 in Office of Management and Budget, *Budget of the U.S. Government, Fiscal Year 2014: Historical Tables* (April 2013), [www.whitehouse.gov/omb/budget/Historicals](http://www.whitehouse.gov/omb/budget/Historicals).

CBO's dollar value for federal investment in higher education does not match the value reported in Table 9.9 because CBO's data exclude investment in higher education through student loan programs. CBO made the adjustment for student loans using data for the Department of Education and its Office of Federal Student Aid in Office of Management and Budget, *Budget of the U.S. Government, Fiscal Year 2014: Supplemental Materials* (April 2013), Public Budget Database, Outlays, <http://go.usa.gov/Wwy9> (XLS, 2.84 MB); the relevant account codes in the database were 0202, 0230, 0231, 0243, 4256, 4257, 7005, 022100, 271810, 271830, 278110, and 278130.

### Exhibit 10

CBO's primary data source for this exhibit was Table 9.9 in Office of Management and Budget, *Budget of the U.S. Government, Fiscal Year 2014: Historical Tables* (April 2013), [www.whitehouse.gov/omb/budget/Historicals](http://www.whitehouse.gov/omb/budget/Historicals).

CBO's dollar value for federal investment in higher education does not match the value reported in Table 9.9 because CBO's data exclude investment in higher education through student loan

programs. CBO made the adjustment for student loans using data for the Department of Education and its Office of Federal Student Aid in Office of Management and Budget, *Budget of the U.S. Government, Fiscal Year 2014: Supplemental Materials* (April 2013), Public Budget Database, Outlays, <http://go.usa.gov/Wwy9> (XLS, 2.84 MB); the relevant account codes in the database were 0202, 0230, 0231, 0243, 4256, 4257, 7005, 022100, 271810, 271830, 278110, and 278130.

### Exhibit 11

CBO used data collected from federal agencies on OMB form Schedule C as the primary source for this exhibit. CBO's dollar values for transportation do not match the totals reported by OMB in those data because OMB records as capital spending some expenditures that were in fact for the operation and maintenance of rail systems and mass transit. CBO made the adjustment for rail systems using Office of Management and Budget, *Budget of the U.S. Government, Fiscal Year 2014: Appendix* (April 2013), p. 932, "Federal Railroad Administration: Operating Subsidy Grants to Amtrak," [www.whitehouse.gov/omb/budget/appendix](http://www.whitehouse.gov/omb/budget/appendix). CBO made the adjustment for mass transit using Tables 58 and 63 in American Public Transportation Association, *2012 Public Transportation Fact Book* (March 2012), Appendix A: Historical Tables, <http://tinyurl.com/p7fz53b> (PDF, 2.03 MB).

### Exhibit 12

CBO's data source for this exhibit was Table 9.8 in Office of Management and Budget, *Budget of the U.S. Government Fiscal Year 2014: Historical Tables*

(April 2013), [www.whitehouse.gov/omb/budget/Historicals](http://www.whitehouse.gov/omb/budget/Historicals).

### Exhibit 13

CBO's data sources for this exhibit were Tables 29, 40, and 51 in National Science Foundation, *Federal Funds for Research and Development: Fiscal Years 2010–2012* (July 2013), [www.nsf.gov/statistics/nsf13326](http://www.nsf.gov/statistics/nsf13326). Obligations for research and development related to defense are those of the Department of Defense, the National Nuclear Security Administration in the Department of Energy, and the Department of Homeland Security. Obligations for research and development not related to defense are those of all other agencies.

### Exhibit 14

CBO's primary data sources for this exhibit were from National Center for Education Statistics, *Digest of Education Statistics*, Advance Release of Selected 2012 Digest, <http://go.usa.gov/WVkw>. Data for public elementary and secondary schools were from "Revenues and Expenditures" in Chapter 2, "Elementary and Secondary Education" (Table 202). Data for postsecondary institutions were from "Revenue" in Chapter 3, "Postsecondary Education," and included data for public degree-granting institutions (Table 401); for private nonprofit degree-granting institutions (Table 405); and for private for-profit degree-granting institutions (Table 407). CBO also used data provided by Tom Snyder of the Department of Education on September 27, 2013, to distinguish between public degree-granting institutions' revenues attributable to grants and contracts from local sources, on the

one hand, and their revenues from other ("private") sources as reported in Table 401, on the other.

CBO adjusted the data for the revenues of private postsecondary institutions received from the federal government to account for the fact that it is optional for those institutions to include Pell grants to students in reporting those revenues. CBO believes that somewhere between one-half and three-quarters of private institutions do include Pell grants in their reports. CBO used the midpoint of that range to supplement the data from Tables 405 and 407 to account for the institutions that did not include Pell grants in their reports; it also used data from Table 18 in Department of Education, Office of Postsecondary Education, *Federal Pell Grants Program End-of-Year Report 2009–2010*, <http://go.usa.gov/ZaGY>.

CBO also adjusted the data for the revenues of private postsecondary institutions received from state governments to account for the fact that those institutions do not include state grants to students in reporting those revenues. To account for that omission, CBO supplemented the data from Tables 405 and 407 using information from Department of Education, National Center for Education Statistics, 2007–08 National Postsecondary Student Aid Study (NPSAS:08), available from *PowerStats: Version 1.0*, <http://nces.ed.gov/datalab/>.

### Exhibit 15

CBO used data on transportation infrastructure as explained in Congressional Budget Office, *Public*

*Spending on Transportation and Water Infrastructure* (November 2010), Appendix B, [www.cbo.gov/publication/21902](http://www.cbo.gov/publication/21902). Data for gross domestic product were from Table 1.1.5, "Gross Domestic Product," in Bureau of Economic Analysis, *National Economic Data: GDP and Personal Income, Domestic Product and Income* (July 2013), [www.bea.gov/itable/index.cfm](http://www.bea.gov/itable/index.cfm).

### Exhibit 16

CBO used data on water infrastructure as explained in Congressional Budget Office, *Public Spending on Transportation and Water Infrastructure* (November 2010), Appendix B, [www.cbo.gov/publication/21902](http://www.cbo.gov/publication/21902). Data for gross domestic product were from Table 1.1.5, "Gross Domestic Product," in Bureau of Economic Analysis, *National Economic Data: GDP and Personal Income, Domestic Product and Income* (July 2013), [www.bea.gov/itable/index.cfm](http://www.bea.gov/itable/index.cfm).

### Exhibit 17

CBO's data sources for this exhibit were Table 6 in National Science Foundation, National Center for Science and Engineering Statistics, *National Patterns of R&D Resources: 2010–11 Data Update*, NSF 13-318 (April 2013), Detailed Statistical Tables, [www.nsf.gov/statistics/nsf13318](http://www.nsf.gov/statistics/nsf13318), and Table 1.1.5, "Gross Domestic Product," in Bureau of Economic Analysis, *National Economic Data: GDP and Personal Income, Domestic Product and Income* (July 2013), [www.bea.gov/itable/index.cfm](http://www.bea.gov/itable/index.cfm).



## Related Work by the Congressional Budget Office

*The Pell Grant Program: Recent Growth and Policy Options* (September 2013), [www.cbo.gov/publication/44448](http://www.cbo.gov/publication/44448).

*Options to Change Interest Rates and Other Terms on Student Loans* (June 2013), [www.cbo.gov/publication/44318](http://www.cbo.gov/publication/44318).

*Total Factor Productivity Growth in Historical Perspective*, Working Paper 2013-01 (March 2013), [www.cbo.gov/publication/44002](http://www.cbo.gov/publication/44002).

*Federal Grants to State and Local Governments* (March 2013), [www.cbo.gov/publication/43967](http://www.cbo.gov/publication/43967).

*Long-Term Implications of the 2013 Future Years Defense Program* (July 2012), [www.cbo.gov/publication/43428](http://www.cbo.gov/publication/43428).

*Fair-Value Estimates of the Cost of Federal Credit Programs in 2013* (June 2012), [www.cbo.gov/publication/43352](http://www.cbo.gov/publication/43352).

*Fair-Value Accounting for Federal Credit Programs* (March 2012), [www.cbo.gov/publication/43027](http://www.cbo.gov/publication/43027).

*Response to Questions About the Effects of Government Spending on Economic Growth* (August 2011), [www.cbo.gov/publication/41146](http://www.cbo.gov/publication/41146).

*Spending and Funding for Highways* (January 2011), [www.cbo.gov/publication/25136](http://www.cbo.gov/publication/25136).

*Public Spending on Transportation and Water Infrastructure* (November 2010), [www.cbo.gov/publication/21902](http://www.cbo.gov/publication/21902).

*Costs and Policy Options for Federal Student Loan Programs* (March 2010), [www.cbo.gov/publication/21018](http://www.cbo.gov/publication/21018).

*Subsidizing Infrastructure Investment with Tax-Preferred Bonds* (October 2009), [www.cbo.gov/publication/41359](http://www.cbo.gov/publication/41359).

*Analysis of the Subsidy Costs of Direct and Guaranteed Student Loans* (July 2009), [www.cbo.gov/publication/20774](http://www.cbo.gov/publication/20774).

*Using Pricing to Reduce Traffic Congestion* (March 2009), [www.cbo.gov/publication/20241](http://www.cbo.gov/publication/20241).

*Issues and Options in Infrastructure Investments* (May 2008), [www.cbo.gov/publication/19633](http://www.cbo.gov/publication/19633).

*Capital Budgeting* (May 2008), [www.cbo.gov/publication/41689](http://www.cbo.gov/publication/41689).

*Federal Support for Research and Development* (June 2007), [www.cbo.gov/publication/18750](http://www.cbo.gov/publication/18750).



## About This Document

This Congressional Budget Office (CBO) report was prepared at the request of the Ranking Member of the Senate Committee on Health, Education, Labor, and Pensions. In keeping with CBO's mandate to provide objective, impartial analysis, the report makes no recommendations.

Sheila Campbell and Natalie Tawil of CBO's Microeconomic Studies Division wrote the report with guidance from Joseph Kile and Chad Shirley. Nabeel Alsalam, Paul Burnham, Wendy Edelberg, Pete Fontaine, Mark Hadley, Jeff Holland, Justin Humphrey, Sarah Jennings, Nathan Musick, Sarah Puro, Frank Russek, Robert Shackleton, and Philip Webre, all of CBO, provided useful comments, as did Chad Jones of Stanford University, Benjamin Mandel of the Bureau of Economic Analysis, and Valerie Ramey of the University of California, San Diego. (The assistance of external reviewers implies no responsibility for the final product, which rests solely with CBO.)

Benjamin Plotinsky edited the report, and Maureen Costantino and Jeanine Rees prepared it for publication. An electronic version is available on CBO's website ([www.cbo.gov/publications/44974](http://www.cbo.gov/publications/44974)).

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Director

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