CBO

The 2017 Long-Term Budget Outlook

Percentage of GDP

Federal Debt Held By the Public

Civil War

Great Depression

World War I

World War II
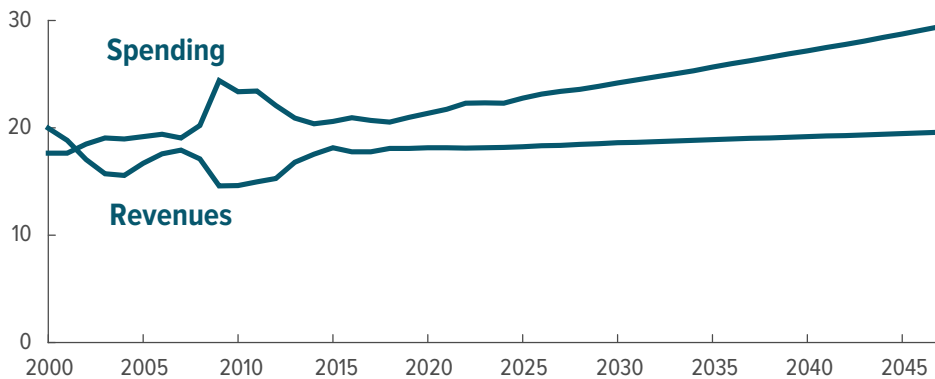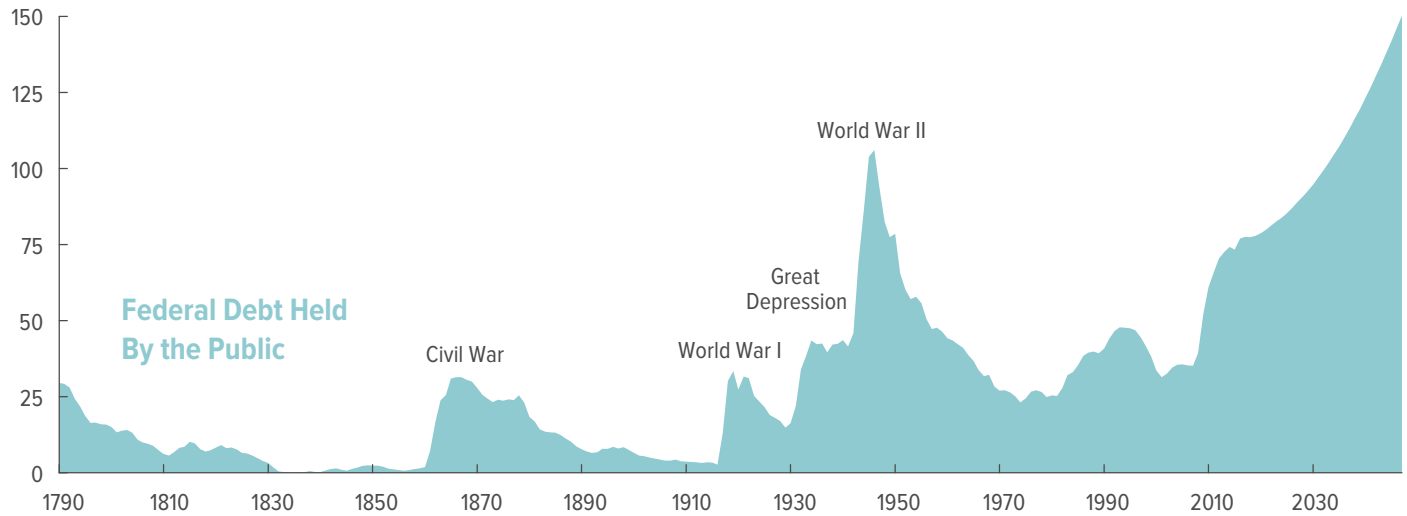
Spending

Revenues

Under current law, spending growth—driven by outlays for Social Security, the major health care programs, and net interest—is projected to outpace revenue growth.

MARCH 2017

Notes

The Congressional Budget Office's extended baseline shows the budget's long-term path under most of the same assumptions that the agency uses, in accordance with statutory requirements, in constructing its 10-year baseline. Both baselines incorporate the assumptions that current law generally remains unchanged but that some mandatory programs are extended after their authorizations lapse and that spending for Medicare and Social Security continues as scheduled even if their trust funds are exhausted. Unless otherwise specified, Medicare outlays are presented net of offsetting receipts, which reduce outlays for the program.

This report's projections are consistent with the 10-year budget and economic projections that CBO released in January 2017. They do not incorporate any effects of the Administration's executive orders or administrative actions since then.
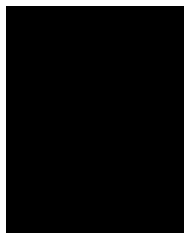
Unless otherwise indicated, the years referred to in this report are federal fiscal years, which run from October 1 to September 30 and are designated by the calendar year in which they end. Budgetary values, such as the ratio of debt or deficits to gross domestic product, are calculated on a fiscal year basis; economic variables, such as gross national product or interest rates, are calculated on a calendar year basis.

Numbers in the text, tables, and figures may not sum to totals because of rounding.

As referred to in this report, the Affordable Care Act comprises the Patient Protection and Affordable Care Act; the health care provisions of the Health Care and Education Reconciliation Act of 2010; and the effects of subsequent judicial decisions, statutory changes, and administrative actions.

Data and supplemental information files—the data underlying the figures in this report, supplemental budget projections, and the demographic and economic variables underlying those projections—are posted along with the report on CBO's website.

Contents

Summary

At 77 percent of gross domestic product (GDP), federal debt held by the public is now at its highest level since shortly after World War II. If current laws generally remained unchanged, the Congressional Budget Office projects, growing budget deficits would boost that debt sharply over the next 30 years; it would reach 150 percent of GDP in 2047. The prospect of such large and growing debt poses substantial risks for the nation and presents policymakers with significant challenges.

Why Are Projected Deficits Rising?

In CBO's projections, deficits rise over the next three decades—from 2.9 percent of GDP in 2017 to 9.8 percent in 2047—because spending growth is projected to outpace growth in revenues (see Summary Figure 1). In particular, spending as a share of GDP increases for Social Security, the major health care programs (primarily Medicare), and interest on the government's debt.

Much of the spending growth for Social Security and Medicare results from the aging of the population: As members of the baby-boom generation age and as life expectancy continues to increase, the percentage of the population age 65 or older will grow sharply, boosting the number of beneficiaries of those programs.

In addition, growth in spending on Medicare and the other major health care programs is driven by rising health care costs per person, which are projected to increase more quickly than GDP per capita (after the effects of aging and other demographic changes are removed). CBO projects that those health care costs will rise—although more slowly than they have in the past—in part because of the effects of new medical technologies and rising personal income.

The federal government's net interest costs are projected to rise sharply as a percentage of GDP for two main reasons. The first and more important is that interest rates are expected to rise from their current low levels, making any given amount of debt more costly to finance. The second reason is the projected increase in deficits: The larger they are, the more the government will need to borrow.

Mandatory spending other than that for Social Security and the major health care programs—such as spending for federal employees' pensions and for various income security programs—is projected to decline as a percentage of GDP, as is discretionary spending. (Mandatory spending is generally governed by provisions of permanent law, whereas discretionary spending is controlled by annual appropriation acts.) The projected decline in discretionary spending stems largely from the caps on discretionary funding that are set in law for the next several years.

The modest projected growth in revenues relative to GDP over the next three decades is attributable to increases in individual income tax receipts. Those receipts are projected to grow mainly because CBO anticipates that income will rise more quickly than the price indexes that are used to adjust tax brackets. As a result, more income will be pushed into higher tax brackets over time. Combined receipts from all other sources are projected to decline as a percentage of GDP.

What Might the Consequences Be If Current Laws Remained Unchanged?

Large and growing federal debt over the coming decades would hurt the economy and constrain future budget policy. The amount of debt that is projected under the extended baseline would reduce national saving and income in the long term; increase the government's interest costs, putting more pressure on the rest of the budget; limit lawmakers' ability to respond to unforeseen events; and increase the likelihood of a fiscal crisis, an occurrence in which investors become unwilling to finance a government's borrowing unless they are compensated with very high interest rates.

Summary Figure 1.

The Federal Budget Under the Extended Baseline
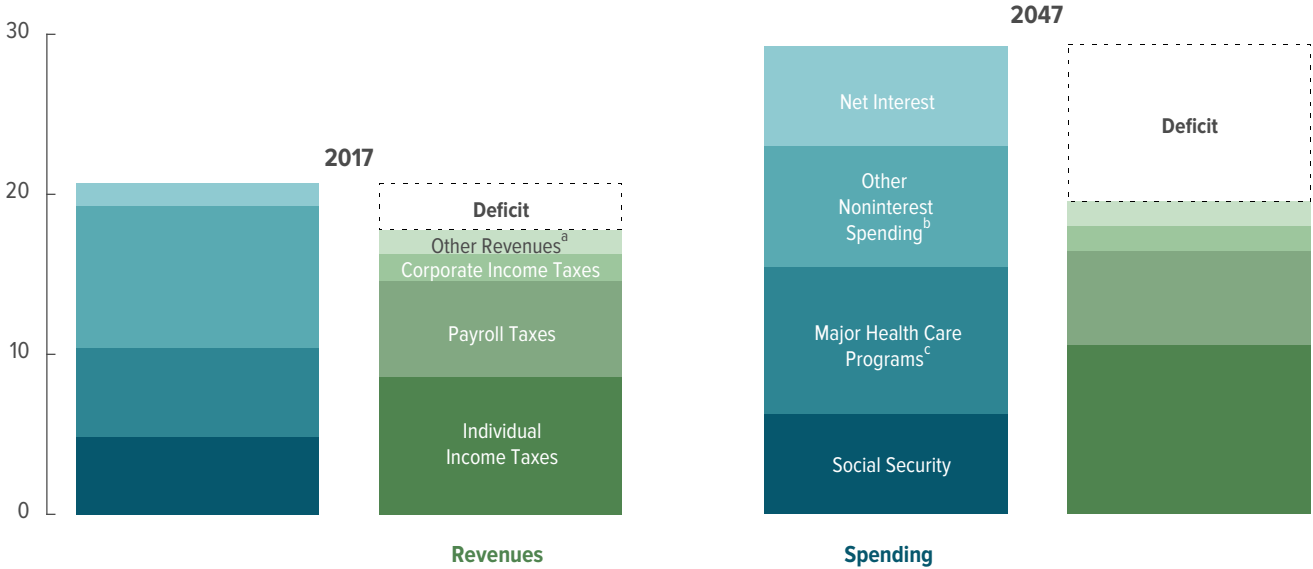
Percentage of Gross Domestic Product

Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2027 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

a. Consists of excise taxes, remittances to the Treasury from the Federal Reserve System, customs duties, estate and gift taxes, and miscellaneous fees and fines.

b. Consists of all federal spending other than that for Social Security, the major health care programs, and net interest.

c. Consists of spending for Medicare (net of premiums and other offsetting receipts), Medicaid, and the Children's Health Insurance Program, as well as outlays to subsidize health insurance purchased through the marketplaces established under the Affordable Care Act and related spending.

How Does CBO Make Its Long-Term Budget Projections?

CBO's long-term projections start with the agency's 10-year spending and revenue projections, which combine information about many spending programs and tax provisions with data about broader trends in the population and the economy. Those 10-year projections follow the assumptions that current laws governing taxes and spending will generally remain unchanged but that some mandatory programs will be extended after their authorizations lapse and spending for Medicare and Social Security will continue as scheduled even if their trust funds are exhausted. CBO makes those assumptions to conform to statutory requirements. Because current laws surely will change, CBO's projections are not predictions of what the agency thinks will actually happen. Rather, they give lawmakers a point of comparison from which to measure the effects of proposed legislation. They are therefore referred to as the agency's *baseline* projections.

CBO's detailed long-term projections, produced once each year, follow those assumptions as well. Because they extend the 10-year baseline for two more decades, they are referred to as the *extended baseline*. Some projections, such as those for Social Security spending and collections of individual income taxes, incorporate detailed estimates of how people would be affected by particular elements of programs or the tax code. Other projections reflect past trends and CBO's assessments of how those trends would evolve if current laws generally remained unchanged. Between the annual publications of the detailed analyses, CBO updates its long-term projections using simplified methods, as it did most recently in January 2017.

CBO's budget projections are built on its economic projections, which incorporate the effects of the fiscal policy projected under current law. CBO anticipates that if current laws generally did not change, real GDP—that is, GDP with the effects of inflation excluded—would

increase by 1.9 percent per year, on average, over the next 30 years. Over the past 50 years, the annual average growth rate of real GDP was roughly 1 percentage point higher. That slower economic growth in the future is attributable to several factors—notably, slower growth of the labor force, which is mainly a result of the aging of the population and the relative stability of women's participation in the labor force after decades of increases. In addition, the productivity of labor is projected to grow more slowly than its historical average. Projected output growth also is held down by the effects of fiscal policy under current law—above all, by the reduction in private investment that is projected to result from rising federal debt.

How Uncertain Are Those Projections?

If current laws governing taxes and spending remained generally the same, debt would nearly double as a percentage of GDP over the next 30 years, according to CBO's central estimate. That projection is very uncertain, however, so the agency examined in detail how debt would change if four key inputs—labor force participation, productivity in the economy, interest rates on federal debt, and health care costs per person—were higher or lower than their levels in the extended baseline. Other factors—such as an economic depression, a major war, or unexpected changes in fertility, immigration, or mortality rates—also could affect the trajectory of debt. Taking into account a range of uncertainty around CBO's central projections of those four key inputs, CBO concludes that despite the considerable uncertainty of long-term projections, debt as a percentage of GDP would probably be greater—in all likelihood, much greater—than it is today if current laws remained generally unchanged.

How Large Would Changes in Spending or Revenues Need to Be to Reach Certain Goals for Federal Debt?

CBO estimated the magnitude of changes that would be needed to achieve a chosen goal for federal debt. For example, if lawmakers wanted to reduce the amount of debt in 2047 to 40 percent of GDP, its average over the past 50 years, they might cut noninterest spending, increase revenues, or take a combination of both approaches to make changes that equal 3.1 percent of GDP each year starting in 2018. That amount would total about $620 billion in 2018. If, instead, policymakers wanted debt in 2047 to equal its current share of GDP (77 percent), the necessary measures would be smaller, totaling 1.9 percent of GDP per year (about $380 billion in 2018). The longer lawmakers waited to act, the larger the necessary policy changes would become.

How Have CBO's Projections Changed Over the Past Year?

CBO's long-term budget projections are generally similar to those the agency published in the past year. The previous edition of this volume, *The 2016 Long-Term Budget Outlook*, published in July 2016, showed projections through 2046. CBO now projects debt in 2046 that, measured as a share of GDP, is 5 percentage points higher than it projected last year. In addition, in January 2017 CBO released simplified long-term projections through 2047. The agency's current projection of debt in 2047 is 5 percentage points higher than it was in January.

The 2017 Long-Term Budget Outlook

At 77 percent of gross domestic product (GDP), federal debt held by the public is now at its highest level since the end of World War II. If current laws generally remained unchanged, the Congressional Budget Office projects, growing budget deficits would boost that debt sharply over the next 30 years. During that period, federal spending for retirement benefits and health care programs that benefit older people would increase substantially. In particular, as the population ages, outlays for Social Security and Medicare will rise as a percentage of GDP because of the increasing number of beneficiaries for those programs and because of rising health care costs per beneficiary. In addition, the government's interest costs would increase because of rising interest rates and higher federal debt.

The growth in spending would outpace growth in revenues, leading to larger budget deficits as a share of the nation's total economic output—its GDP. As a result, CBO projects, federal debt held by the public would increase, reaching 89 percent of GDP by 2027 (see Table 1). Two decades later, in 2047, debt would reach 150 percent of GDP—the highest level in the nation's history. Such high and rising debt would have serious budgetary and economic consequences.

In this report, CBO presents its projections of federal outlays, revenues, deficits, and debt for the next three decades and describes some possible consequences of those budgetary outcomes. This report's projections are consistent with the 10-year baseline budget and economic projections that CBO published in January 2017.[1] They extend most of the concepts underlying those projections for an additional 20 years, and they reflect the macroeconomic effects of projected fiscal policy over that period. All together, they constitute the agency's *extended baseline* projections.

CBO's 10-year and extended baseline projections are not predictions of budgetary outcomes. Rather, they represent the agency's best assessment of future revenues, spending, and deficits under the assumption that current laws generally remain unchanged.

The Budget Outlook for the Next 30 Years

CBO's extended baseline shows a substantial imbalance in the federal budget over the next three decades, with revenues falling short of spending by steadily increasing amounts. The growing budget deficits would lead to rising amounts of federal debt, which in turn would increase pressures on the federal budget and dampen economic growth.

Rising Budget Deficits

The 2007–2009 recession and the resulting policy responses led to large federal budget deficits, which peaked in 2009 at nearly 10 percent of GDP. Although the deficit declined steadily through 2015, last year it rose again in relation to the size of the economy. This year, CBO estimates, the deficit will be roughly 3 percent of GDP. Under current law, deficits would remain close to that level through 2020.

Later in the 10-year baseline period and in the following two decades, deficits would become notably larger as the gap between spending and revenues grew (see Figure 1 on page 4). If current laws generally remained unchanged, the deficit would reach 5 percent of GDP by 2027 and almost 10 percent by 2047.

CBO projects that the aging of the population will drive up spending relative to revenues because of increased outlays for Social Security and Medicare, programs that primarily benefit people over the age of 65. Rising per capita health care costs also would boost Medicare

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1. For information on CBO's recent baseline budget and economic projections, see Congressional Budget Office, *The Budget and Economic Outlook: 2017 to 2027* (January 2017), www.cbo.gov/publication/52370.

Table 1.

Key Projections in CBO's Extended Baseline

Percentage of Gross Domestic Product

	2017	Projected Annual Average		
		2018–2027	2028–2037	2038–2047
Revenues				
Individual income taxes	8.6	9.4	10.0	10.4
Payroll taxes	6.0	5.9	5.9	5.9
Corporate income taxes	1.7	1.6	1.6	1.6
Other[a]	1.5	1.3	1.3	1.4
Total Revenues	**17.8**	**18.2**	**18.7**	**19.3**
Outlays				
Mandatory				
Social Security	4.9	5.6	6.3	6.4
Major health care programs[b]	5.5	6.2	7.6	8.8
Other	2.6	2.6	2.4	2.2
Subtotal	13.0	14.3	16.2	17.4
Discretionary	6.3	5.6	5.3	5.4
Net interest	1.4	2.2	3.4	5.2
Total Outlays	**20.7**	**22.2**	**24.9**	**28.0**
Deficit	**-2.9**	**-4.0**	**-6.2**	**-8.6**
Debt Held by the Public at the End of the Period	**77**	**89**	**113**	**150**
Memorandum:				
Social Security				
Revenues[c]	4.6	4.5	4.5	4.5
Outlays[d]	4.9	5.6	6.3	6.4
Contribution to the Federal Deficit[e]	-0.3	-1.0	-1.7	-1.9
Medicare				
Revenues[c]	1.5	1.5	1.5	1.5
Outlays[d]	3.7	4.4	5.7	7.0
Offsetting Receipts	-0.6	-0.7	-1.0	-1.2
Contribution to the Federal Deficit[e]	-1.6	-2.1	-3.2	-4.2
Gross Domestic Product at the End of the Period (Trillions of dollars)	19.2	28.0	41.5	61.3

Source: Congressional Budget Office.

This table satisfies a requirement specified in section 3111 of S. Con. Res. 11, the Concurrent Resolution on the Budget for Fiscal Year 2016.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2027 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

a. Consists of excise taxes, remittances to the Treasury from the Federal Reserve System, customs duties, estate and gift taxes, and miscellaneous fees and fines.

b. Consists of spending for Medicare (net of premiums and other offsetting receipts), Medicaid, and the Children's Health Insurance Program, as well as outlays to subsidize health insurance purchased through the marketplaces established under the Affordable Care Act and related spending.

c. Includes payroll taxes for the program other than those paid by the federal government on behalf of its employees (which are intragovernmental transactions). Also includes income taxes paid on Social Security benefits, which are credited to the trust funds. Does not include interest credited to the trust funds.

d. Does not include discretionary outlays related to administration of the program.

e. The contribution to the deficit shown here differs from the change in the trust fund balance for the program. It does not include intragovernmental transactions, interest earned on balances, or outlays related to administration of the program.

outlays, in CBO's estimation. By 2047, under current law, federal spending for people age 65 or older who receive benefits from Social Security, Medicare, and Medicaid (the federal health care program for people with limited income and resources) would account for about half of all federal noninterest spending, compared with about two-fifths today.

Moreover, because interest rates are expected to rise from their current low levels and federal debt is projected to grow, interest payments on the government's debt would rise sharply. All told, under CBO's extended baseline, federal spending would increase from today's 21 percent of GDP to 23 percent in 2027 and to 29 percent by 2047. (Federal spending has averaged about 20 percent of GDP over the past 50 years.)

Meanwhile, if current laws generally remained unchanged, revenues would rise more slowly—from 17.8 percent of GDP this year to 18.4 percent in 2027. That growth would result from increased receipts of individual income taxes, which would be partially offset by a decrease in remittances from the Federal Reserve and, to a lesser extent, by decreases in payroll and corporate income tax receipts relative to GDP. Beyond the next 10 years, revenues would continue to grow faster than the economy, in part because of real bracket creep, which occurs as more income is pushed into higher tax brackets as people's income rises faster than inflation. In addition, revenues from a new excise tax on certain employment-based health insurance plans would grow rapidly in the following decades if it took effect, as scheduled, in 2020. All told, CBO projects, revenues would reach nearly 20 percent of GDP in 2047, which would be above the average of about 17 percent for the past several decades but would still fall short of spending.

The Accumulation of Federal Debt

Debt held by the public represents the amount that the federal government has borrowed in financial markets by issuing Treasury securities to pay for its operations and activities.[2] Measuring debt as a percentage of GDP is useful for comparing amounts of debt in different years because it accounts for changes in price levels, population, output, and income—all of which affect the nation's ability to finance the debt. The ratio of debt to GDP places the effects of potential adjustments to the budget within the context of the nation's resources. Examining whether debt as a percentage of GDP is increasing is therefore a simple and meaningful way to assess the budget's sustainability.

Federal debt held by the public has ballooned over the past decade: At the end of 2007, it stood at 35 percent of GDP. Deficits arising from the recession and the resulting policy responses caused debt to grow sharply over the next five years, however, and by the end of 2012, debt as a share of GDP had doubled to 70 percent. Since then, the upward trajectory has continued, and debt is projected to reach 77 percent of GDP by the end of this year—a very high amount by historical standards. For comparison, such debt has averaged 40 percent of GDP over the past 50 years. During only one other period in U.S. history—from 1944 through 1950, because of the surge in federal spending during World War II—has that debt exceeded 70 percent of GDP (see Figure 2 on page 6).

If current laws generally remained unchanged, federal debt as a percentage of GDP would reach unprecedented levels because the gap between spending and revenues would continue to widen. CBO projects that debt would rise to 89 percent of GDP by 2027, and eight years later, in 2035, it would surpass the peak of 106 percent recorded in 1946. By 2047, federal debt would reach 150 percent of GDP—significantly larger than the average of the past five decades—and it would be on track to grow even larger.

Consequences of a Large and Growing Federal Debt

The burgeoning federal debt over the coming decades would:

■ Reduce national saving and income in the long term;

■ Increase the government's interest costs, putting more pressure on the rest of the budget;

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2. When the federal government borrows in financial markets, it competes with other participants for financial resources and, in the long term, crowds out private investment, thus reducing economic output and income. By contrast, federal debt held by trust funds and other government accounts represents internal transactions of the government and does not directly affect financial markets. (Together, that debt and debt held by the public make up another measure: gross federal debt.) For more discussion, see Congressional Budget Office, *Federal Debt and Interest Costs* (December 2010), www.cbo.gov/publication/21960. Several factors not directly included in the budget totals also affect the government's need to borrow from the public. They include fluctuations in the government's cash balance as well as the cash flows of the financing accounts used for federal credit programs.

Figure 1.

Federal Debt, Spending, and Revenues

Percentage of Gross Domestic Product
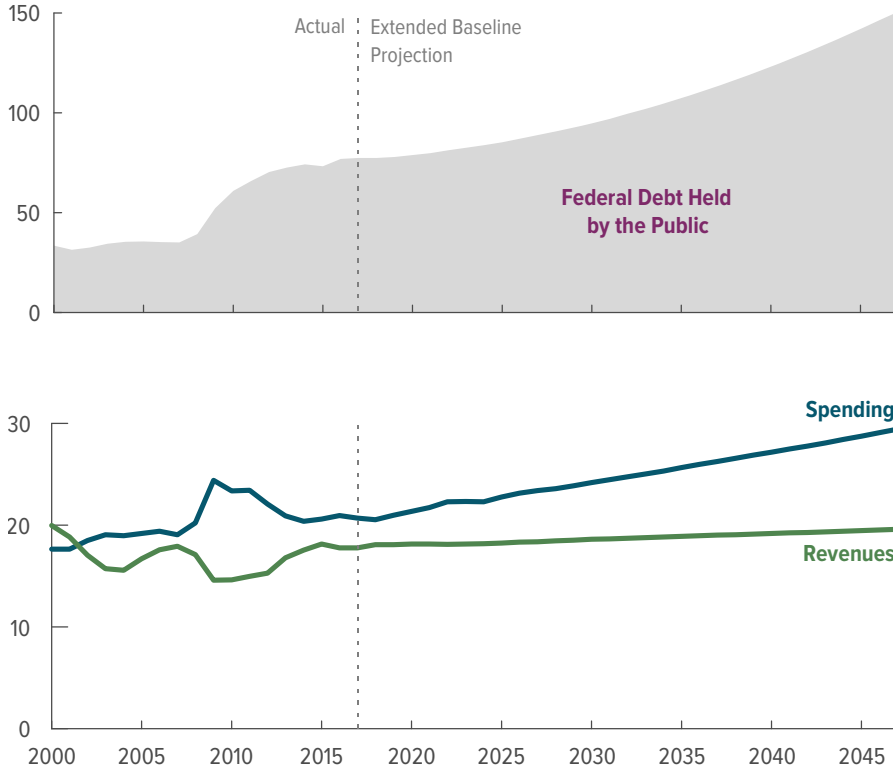
In CBO's extended baseline, **federal debt held by the public** rises . . .

. . . because growth in **total spending** outpaces growth in **total revenues,** resulting in larger budget deficits.

Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2027 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

GDP = gross domestic product.

Continued

■ Limit lawmakers' ability to respond to unforeseen events; and

■ Raise the likelihood of a fiscal crisis.

Less National Saving and Lower Income. Large federal budget deficits over the long term would reduce investment, resulting in lower national income and higher interest rates than would be the case otherwise. If the government borrowed more, more of people's savings would be used to buy Treasury securities, and thus private investment would be crowded out. Although both the government and private borrowers would face higher interest rates to compete for savings, and those rates would strengthen people's incentive to save, the increased government borrowing would exceed the rise in saving by households and businesses. Therefore, national saving—total saving by all sectors of the economy—would be

lower, as would private investment and economic output. (Private investment would be affected less than national saving because higher interest rates tend to attract more foreign capital to the United States and induce U.S. savers to keep more of their money at home.) With less investment in capital goods—factories and computers, for example—workers would be less productive. Because productivity growth is the main driver of growth in people's compensation, decreased investment also would reduce average compensation per hour, offering people less incentive to work. CBO's extended baseline incorporates the economic effects of rising deficits as well as the feedback to the budget from negative effects on the economy.[3]

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3. See Congressional Budget Office, *The 2016 Long-Term Budget Outlook* (July 2016), Chapter 6, www.cbo.gov/publication/51580.

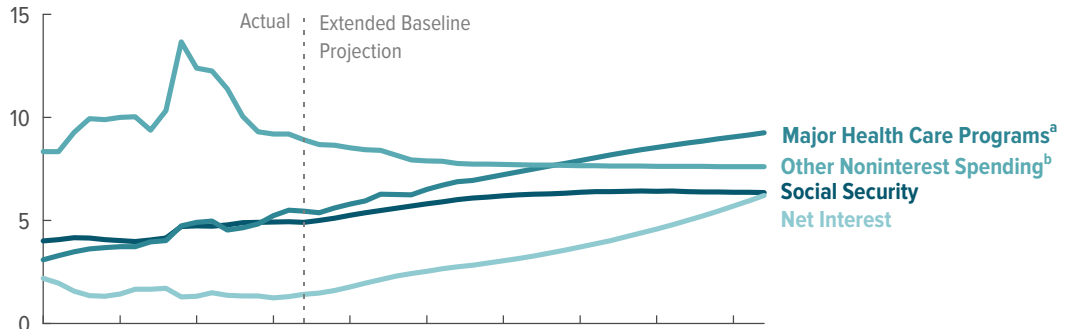Figure 1.   Continued

Federal Debt, Spending, and Revenues

Percentage of Gross Domestic Product

Certain **components of spending**—Social Security, the major health care programs, and net interest— are projected to rise in relation to GDP; other spending, in total, is projected to decline.

A projected boost in one **type of revenues**— individual income taxes— accounts for the rise in total revenues in relation to GDP. Receipts from all other sources, taken together, are projected to decline slightly.
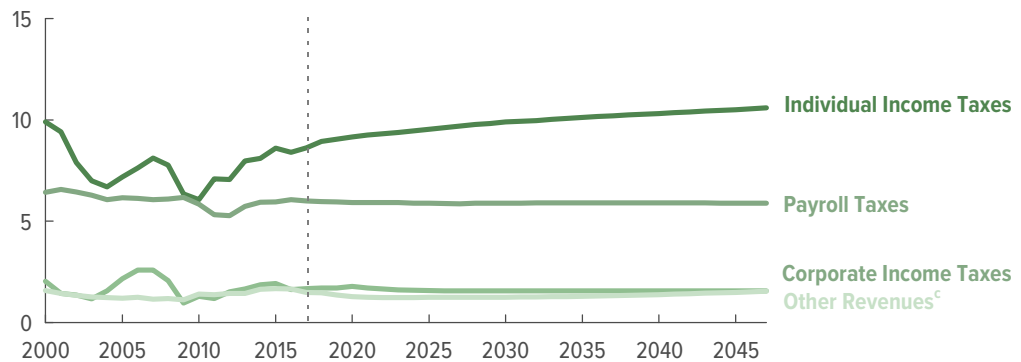
a. Consists of spending for Medicare (net of premiums and other offsetting receipts), Medicaid, and the Children's Health Insurance Program, as well as outlays to subsidize health insurance purchased through the marketplaces established under the Affordable Care Act and related spending.

b. Consists of all federal spending other than that for Social Security, the major health care programs, and net interest.

c. Consists of excise taxes, remittances to the Treasury from the Federal Reserve System, customs duties, estate and gift taxes, and miscellaneous fees and fines.

Pressure on the Budget Arising From Higher Interest Costs. Under CBO's extended baseline, rising interest rates and increased federal borrowing boost net interest costs substantially, such that by 2044 they surpass discretionary spending for the first time since 1962, the earliest year for which relevant data are available. (Current net interest costs are relatively small because interest rates have been so low.) As slack in the economy continues to diminish, CBO projects that the Federal Reserve will continue to reduce support for economic growth and that interest rates would rise to levels consistent with factors such as productivity growth, the demand for investment, and federal deficits. Interest costs under the extended baseline are much higher than they would be with smaller deficits and lower interest rates.

The higher the government's interest costs, the more difficult it would be to achieve any particular target for

lower budget deficits: Tax increases, spending reductions, or both would have to be greater. Such policy changes could affect the economy and people's well-being. If, for example, policy changes included an increase in marginal tax rates (the rates that apply to an additional dollar of income), the larger that increase, the more people's incentives to work and save would diminish.[4] Alternatively, if policy changes included a reduction in federal spending for investment, the greater that reduction, the more both output and income would be reduced.[5] In contrast, if reductions in benefits were used to lower spending,
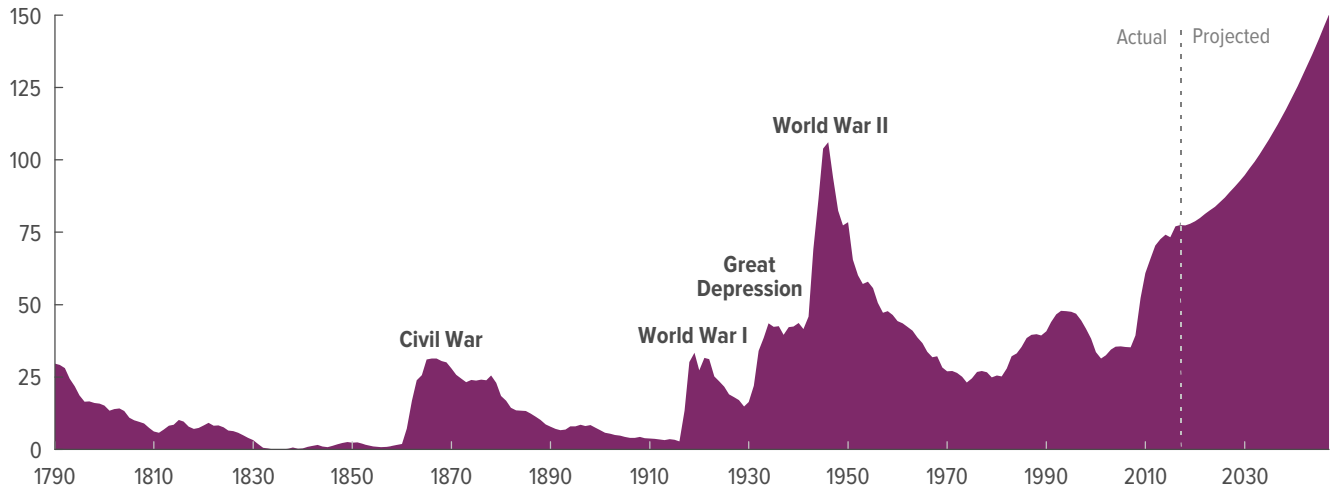
4. See Congressional Budget Office, *How the Supply of Labor Responds to Changes in Fiscal Policy* (October 2012), www.cbo.gov/publication/43674.

5. For more information, see Congressional Budget Office, *The Macroeconomic and Budgetary Effects of Federal Investment* (June 2016), www.cbo.gov/publication/51628.

Figure 2.

Federal Debt Held by the Public

Percentage of Gross Domestic Product

Source: Congressional Budget Office. For details about the sources of data used for past debt held by the public, see Congressional Budget Office, *Historical Data on Federal Debt Held by the Public* (July 2010), www.cbo.gov/publication/21728.

people might feel compelled to work more to replace lost income, thus increasing output.

Reduced Ability to Respond to Domestic and International Problems. When outstanding debt is relatively small, the federal government is better able to borrow money to cover unexpected costs, such as those that attend recessions, financial crises, natural disasters, or wars. By contrast, when outstanding debt is large, the government has less flexibility to address financial and economic crises.[6] A large debt also can compromise a country's national security by constraining military spending in times of international crisis or by limiting its ability to prepare for such a crisis.

At the outset of the 2007–2009 recession, when federal debt held by the public was below 40 percent of GDP, lawmakers had the flexibility necessary to respond to

the financial crisis. The recession resulted in lower output and income, which caused sharp declines in tax revenues and increases in mandatory spending.[7] The policy responses included increases in federal spending to stabilize the financial sector, boost infrastructure investment, and add to social safety-net programs, along with temporary cuts in business and payroll taxes. As a result, over the course of five years, federal debt as a percentage of GDP more than doubled from its 2007 level.

If federal debt stayed the same as it is today or increased further, the government might have a more difficult time undertaking similar costly actions to respond to recessions or fiscal crises, so such events could have larger negative effects on the economy and on people's well-being. Moreover, the reduced financial flexibility and increased dependence on foreign investors that would accompany high and rising debt could weaken U.S. international leadership.

Greater Chance of a Fiscal Crisis. A large and continuously growing federal debt would increase the chance of a fiscal crisis in the United States. Specifically, investors

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6.   See, for example, Carmen M. Reinhart and Vincent R. Reinhart, "After the Fall," *Macroeconomic Challenges: The Decade Ahead* (Federal Reserve Bank of Kansas City, 2010), http://tinyurl.com/lntnp6j (PDF, 1.6 MB); and Carmen M. Reinhart and Kenneth S. Rogoff, "The Aftermath of Financial Crises," *American Economic Review*, vol. 99, no. 2 (May 2009), pp. 466–472, http://dx.doi.org/10.1257/aer.99.2.466. Also see Luc Laeven and Fabian Valencia, *Systemic Banking Crises Database: An Update,* Working Paper 12/163 (International Monetary Fund, June 2012), http://tinyurl.com/p2clvmy.

7.   In general, spending for mandatory programs is determined by setting eligibility rules, benefit formulas, and other parameters. In that way, mandatory spending differs from discretionary spending, which is controlled by annual appropriation acts.

might become less willing to finance federal borrowing unless they were compensated with high returns. If so, interest rates on federal debt would rise abruptly, dramatically increasing the cost of government borrowing.[8] That increase would reduce the market value of outstanding government securities, and investors could lose money. The resulting losses for mutual funds, pension funds, insurance companies, banks, and other holders of government debt might be large enough to cause some financial institutions to fail, creating a fiscal crisis. An additional result would be a higher cost for private-sector borrowing because uncertainty about the government's responses could reduce confidence in the viability of private-sector enterprises.

It is impossible for anyone to accurately predict whether or when such a fiscal crisis might occur in the United States. In particular, the debt-to-GDP ratio has no identifiable tipping point to indicate that a crisis is likely or imminent. All else being equal, however, the larger a government's debt, the greater the risk of a fiscal crisis.

The likelihood of such a crisis also depends on conditions in the economy. If investors expect continued growth, they are generally less concerned about the government's debt burden. Conversely, substantial debt can reinforce more generalized concern about an economy. Thus, fiscal crises around the world often have begun during recessions and, in turn, have exacerbated them.

If a fiscal crisis occurred in the United States, policymakers would have only limited—and unattractive—options for responding. The government would need to undertake some combination of three approaches: restructure the debt (that is, seek to modify the contractual terms of existing obligations), use monetary policy to raise inflation above expectations, or adopt large and abrupt spending cuts or tax increases.

Demographic and Economic Trends That Underlie CBO's Long-Term Projections

Demographic and economic projections are key determinants of the long-term budget outlook. Through 2027,

the projections in this report are the same as those that underlie CBO's 10-year baseline; for later years, the agency projects conditions according to its assessment of long-term trends. (Appendix A describes CBO's demographic and economic projections.) In addition, the economic projections account for the effects that projected fiscal policies—increased federal borrowing and rising effective marginal tax rates—would have on the economy. Such effects would result in a smaller labor supply, a smaller stock of capital, and lower output than would otherwise be the case.
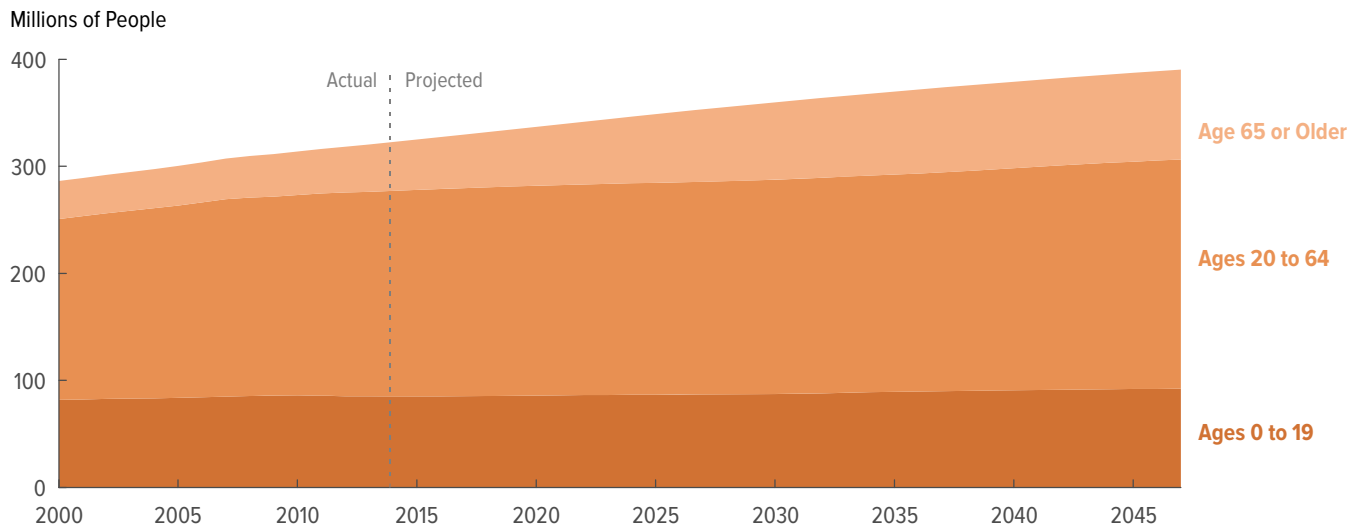
Demographic Projections

The size and age profile of the U.S. population affect both the federal budget and the nation's economy. For example, the composition of the population influences both the size of the labor force and the number of beneficiaries of Social Security and other federal programs. CBO projects that the U.S. population will increase from 330 million at the beginning of this year to 390 million in 2047, expanding by 0.6 percent per year, on average. That is slower than the 0.9 percent annual growth rate of the past 50 years. The population also will become older, on average, over the coming decades, maintaining a longstanding historical trend. By 2047, 22 percent of the population will be age 65 or older, CBO anticipates, compared with 15 percent today (see Figure 3).

To arrive at estimates of growth in the U.S. population, CBO projects rates of fertility, immigration, and mortality. In general, the total fertility rate tends to decline during a recession and rebound during a recovery. (The total fertility rate is the average number of children that a woman would have in her lifetime if, at each age of her life, she experienced the birth rate observed or assumed for that year and if she survived her entire childbearing period.) Instead of rebounding after the 2007–2009 recession, however, the fertility rate fell (in 2007 it was 2.1 births per woman), and since then it has remained below 1.9—the rate that CBO projects for the next 30 years.

Under current law, CBO projects, the rate of net annual immigration to the United States per thousand people in the U.S. population would rise from 3.2 in 2017 to 3.3 in 2047. Those rates, which account for anyone who either enters or leaves the United States in any year, are similar to average annual net immigration rates since the end of the 2007–2009 recession. CBO's projection of total net immigration for the next decade is informed by

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8. For more information, see Congressional Budget Office, *Federal Debt and the Risk of a Fiscal Crisis* (July 2010), www.cbo.gov/publication/21625. That report points out, for example, that during past fiscal crises, Argentina, Ireland, and Greece were forced to make difficult choices in the face of sharp increases in interest rates on government debt.

Figure 3.

Population, by Age Group

Millions of People

Source: Congressional Budget Office.

This figure shows actual data through calendar year 2014, the most recent year for which such data are available.

the agency's economic projections and by recent demographic trends, both of which have notable implications for projections of unauthorized immigration. On balance, CBO projects, under current law, the net annual increase in the number of unauthorized immigrants in the United States would be roughly constant over the next 10 years. Net annual increases in the number of other types of immigrants also are projected to be relatively steady over the next decade. Beyond that, CBO uses a simplified approach to arrive at its projections: After 2026, net immigration grows at an average rate that reflects the Census Bureau's projections for late in the coming decade.[9]

Mortality rates—the number of deaths per thousand people in the population—for specific age and sex groups are projected to improve over the next 30 years, on average, at the same rate that was recorded for each group from 1950 to 2013. CBO projects an average life expectancy at birth of 82.8 years in 2047, compared with 79.2 years in 2017.[10] Similarly, CBO projects that life expectancy at age 65 in 2047 will be 21.5 years, or 2.1 years longer than life expectancy at age 65 in 2017.

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9. See Census Bureau, "2014 National Population Projections: Summary Tables," Table 1, http://go.usa.gov/x9Jyh.

10. Life expectancy as used here is period life expectancy, which is the amount of time that a person in a given year would expect to survive beyond his or her current age on the basis of that year's mortality rates for various ages.

Economic Projections

The performance of the U.S. economy in coming decades will affect the federal government's spending, revenues, and debt accumulation. CBO makes its economic projections by projecting trends in such key economic variables as the size and composition of the labor force, capital accumulation, productivity, inflation, and interest rates. The agency also considers ways in which fiscal policy influences economic activity.

CBO projects that potential (maximum sustainable) growth in GDP in the future will be slower than it has been over the past 50 years. Under its extended baseline, CBO projects an increase in real (inflation-adjusted) potential GDP of 1.9 percent per year, on average, over the next 30 years, compared with 2.9 percent over the past 50 years. That slower economic growth is attributable to several factors, notably the slower growth of the potential labor force (the labor force adjusted for movements in the business cycle). In CBO's projections, the potential labor force grows by 0.4 percent per year, on average, for the next 30 years (see Figure 4); the average annual growth rate over the 1967–2016 period was 1.5 percent. That slower projected growth in the potential labor force is mainly a result of the aging of the population and the relative stability in the participation of women in the labor force after decades of increases.

Figure 4.

CBO's Estimates of Average Annual Growth of Real Potential GDP

Percent
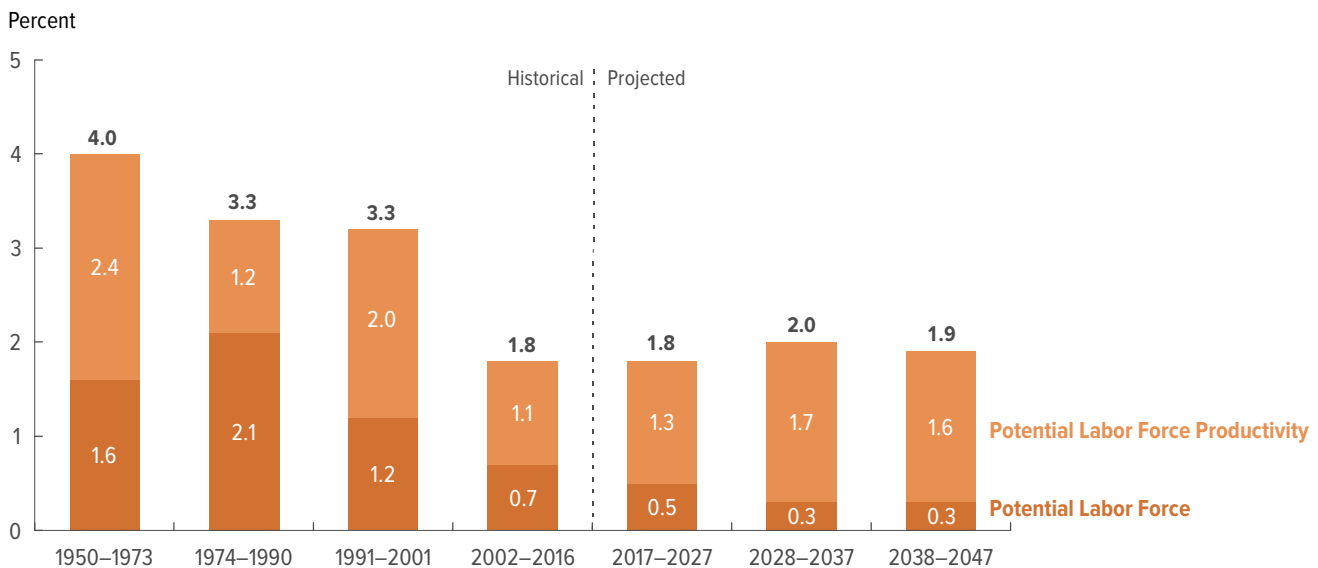
Source: Congressional Budget Office.

Real potential GDP is the maximum sustainable output of the economy adjusted to remove the effects of inflation. The two contributing factors are potential labor force productivity (the ratio of potential GDP to the potential labor force) and the potential labor force (the labor force adjusted for movements in the business cycle).

GDP = gross domestic product.

In CBO's projections, total factor productivity—the average real output per unit of combined labor and capital services—grows more slowly than its historical average, increasing by 1.2 percent per year, on average, from 2017 to 2047. That rate is slower than the annual average of 1.4 percent since 1950. Factors influencing that projection include slower productivity growth over the past several decades (with the exception of a period of rapid growth in the late 1990s and early 2000s), modest growth in labor quality (a measure of workers' skills), and a projected reduction in federal investment as a share of GDP.

CBO anticipates that interest rates will rise as the economy grows but still will be lower than the average of the past few decades. Over the long term, interest rates are projected to be consistent with factors such as labor force growth, productivity growth, the demand for investment, and federal deficits. According to CBO's projections, slower growth of the labor force and lower inflation will push interest rates down from their historical levels, and those factors are projected to outweigh the effects of rising federal debt and other factors that tend to push interest rates up. In CBO's latest 10-year economic projections, for example, the interest rate on 10-year Treasury notes rises from 2.1 percent at the end of 2016 to

3.6 percent in 2027. Under the extended baseline, the rate is projected to rise to 4.7 percent in 2047—about 1 percentage point below the 5.8 percent average recorded over the 1990–2007 period. (CBO uses that period for comparison because it was characterized both by fairly stable expectations for inflation and by a lack of significant financial crises or severe economic downturns.)

The average interest rate on all federal debt held by the public tends to be lower than the rate on 10-year Treasury notes. (In general, interest rates are lower on shorter-term debt than on longer-term debt, and since the 1950s, the average maturity of federal debt has been less than 10 years.) On the basis of projections of interest rate spreads and the term structure of federal debt, under CBO's extended baseline, the average interest rate on federal debt is about 0.3 percentage points lower than the interest rate on 10-year Treasury notes.[11] As a result, in CBO's projections, the average rate on federal debt rises to 4.4 percent in 2047.

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11. Term structure is the relationship between interest rates or bond yields and different terms of maturities.

CBO's economic projections incorporate the macro-economic effects of federal tax and spending policies. In particular, the agency projects that increased borrowing by the federal government under current law generally would crowd out private investment in productive capital in the long term. Furthermore, less private investment in capital goods would make workers less productive, leading to lower wages and a smaller supply of labor. Higher marginal tax rates on labor income also would reduce people's incentive to work, and the increase in the marginal tax rate on capital income would reduce their incentive to save. All told, less private domestic invest-ment and a smaller labor supply would result in lower economic output and income than would otherwise be the case.[12]

Projected Spending Through 2047

Spending for all of the government's programs and activi-ties, combined with net interest costs, is projected to account for a larger percentage of GDP in coming years than it has, on average, over the past 50 years. Over that period, federal outlays other than those for the govern-ment's net interest costs have averaged 18 percent of GDP. Since 2009, by contrast, noninterest spending has been above that average, both because of underlying demographic trends and because of temporary conditions in the economy (namely, the financial crisis, the ensuing weak recovery, and the federal policies that were created to address those circumstances). Noninterest spending spiked to 23 percent of GDP in 2009 but then declined to about 19 percent by 2014 as the economy recovered. Noninterest outlays have remained close to that percent-age since 2014 and, under current law, are projected to rise to 21 percent over the next decade. During that time, CBO projects, mandatory spending (which includes Social Security and the major health care programs, along with some smaller programs) would generally increase as a share of the economy, and discretionary spending would decrease.

After 2027, under the assumptions that govern the extended baseline, noninterest spending would continue to rise in relation to the size of the economy, reaching 23.2 percent of GDP by 2047. (Table 2 summarizes CBO's policy assumptions.) That increase would mostly

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12. For more information on how federal deficits affect private investment and the supply of labor, see Congressional Budget Office, *The 2016 Long-Term Budget Outlook* (July 2016), Chapter 6, www.cbo.gov/publication/51580.

result from larger outlays for the two largest mandatory programs: Social Security and Medicare (see Figure 5). All in all, total mandatory spending is projected to rise to 17.8 percent of GDP in 2047, 1.8 percentage points less than the total amount of projected revenues.

CBO also projects that, under current law, net interest costs would rise from 1.4 percent of GDP in 2017 to 2.7 percent 10 years from now as interest rates increase from their current low levels and as debt accumulates. By 2047, net interest costs would be 6.2 percent of GDP, raising total federal spending to more than 29 percent of GDP. Such spending constituted a larger share of the economy only for a single three-year period during World War II, when defense spending increased sharply. For those years, it exceeded 40 percent.

CBO projects that the growth in spending for Social Security, the major health care programs, and net interest would continue to reshape the spending patterns of the U.S. government, in the following ways:

■ Today, spending on Social Security and the major health care programs constitutes 54 percent of all federal noninterest spending, more than the average of 37 percent over the past 50 years. If current laws generally stayed the same, that figure would increase to 67 percent by 2047 (see Figure 6 on page 13). (Although Social Security spending alone would claim a larger portion of noninterest spending in 30 years than it does today, in CBO's extended baseline, that share peaks in 2028 and then declines as people in the baby-boom generation die.)

■ All other spending—including all discretionary spending and other mandatory spending—would fall from 46 percent of noninterest outlays today to 33 percent in 2047. In comparison, such spending averaged 63 percent of noninterest outlays over the past 50 years.

■ Net interest costs would account for a much greater portion of total federal spending over the next three decades if current laws stayed in place. In CBO's projections, rising interest rates and federal debt push net interest costs to 21 percent of total federal spending by 2047, up from 7 percent today and more than twice the average of 10 percent over the past 50 years.

Table 2.

Assumptions About Spending and Revenues Underlying CBO's Extended Baseline

<table>
<tr><td colspan="2" align="center">**Assumptions About Spending**</td></tr>
<tr><td>Social Security</td><td>As scheduled under current law[a]</td></tr>
<tr><td>Medicare</td><td>As scheduled under current law through 2027; thereafter, projected spending depends on the estimated number of beneficiaries and health care costs per beneficiary (for which excess cost growth is projected to move smoothly to an annual rate of 1.0 percent between 2028 and 2047)[a]</td></tr>
<tr><td>Medicaid</td><td>As scheduled under current law through 2027; thereafter, projected spending depends on the estimated number of beneficiaries and health care costs per beneficiary (for which excess cost growth is projected to move smoothly to an annual rate of 1.0 percent between 2028 and 2047)</td></tr>
<tr><td>Children's Health Insurance Program</td><td>As projected in CBO's baseline through 2027; remaining constant as a percentage of GDP thereafter</td></tr>
<tr><td>Subsidies for Health Insurance Purchased Through the Marketplaces Established Under the Affordable Care Act</td><td>As scheduled under current law through 2027; thereafter, projected spending depends on the estimated number of beneficiaries, an additional indexing factor for subsidies, and excess cost growth for private health insurance premiums (which is projected to move smoothly to an annual rate of 1.0 percent between 2028 and 2047)</td></tr>
<tr><td>Other Mandatory Spending</td><td>As scheduled under current law through 2027; thereafter, refundable tax credits are estimated as part of revenue projections, and the rest of other mandatory spending is assumed to decline as a percentage of GDP at roughly the same annual rate at which it is projected to decline between 2022 and 2027[b]</td></tr>
<tr><td>Discretionary Spending</td><td>As projected in CBO's baseline through 2027; remaining roughly constant as a percentage of GDP thereafter[c]</td></tr>
<tr><td colspan="2" align="center">**Assumptions About Revenues**</td></tr>
<tr><td>Individual Income Taxes</td><td>As scheduled under current law</td></tr>
<tr><td>Payroll Taxes</td><td>As scheduled under current law</td></tr>
<tr><td>Corporate Income Taxes</td><td>As scheduled under current law; remaining constant as a percentage of GDP after 2027</td></tr>
<tr><td>Excise Taxes</td><td>As scheduled under current law[d]</td></tr>
<tr><td>Estate and Gift Taxes</td><td>As scheduled under current law</td></tr>
<tr><td>Other Sources of Revenues</td><td>As scheduled under current law; remaining constant as a percentage of GDP after 2027</td></tr>
</table>

Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2027 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.
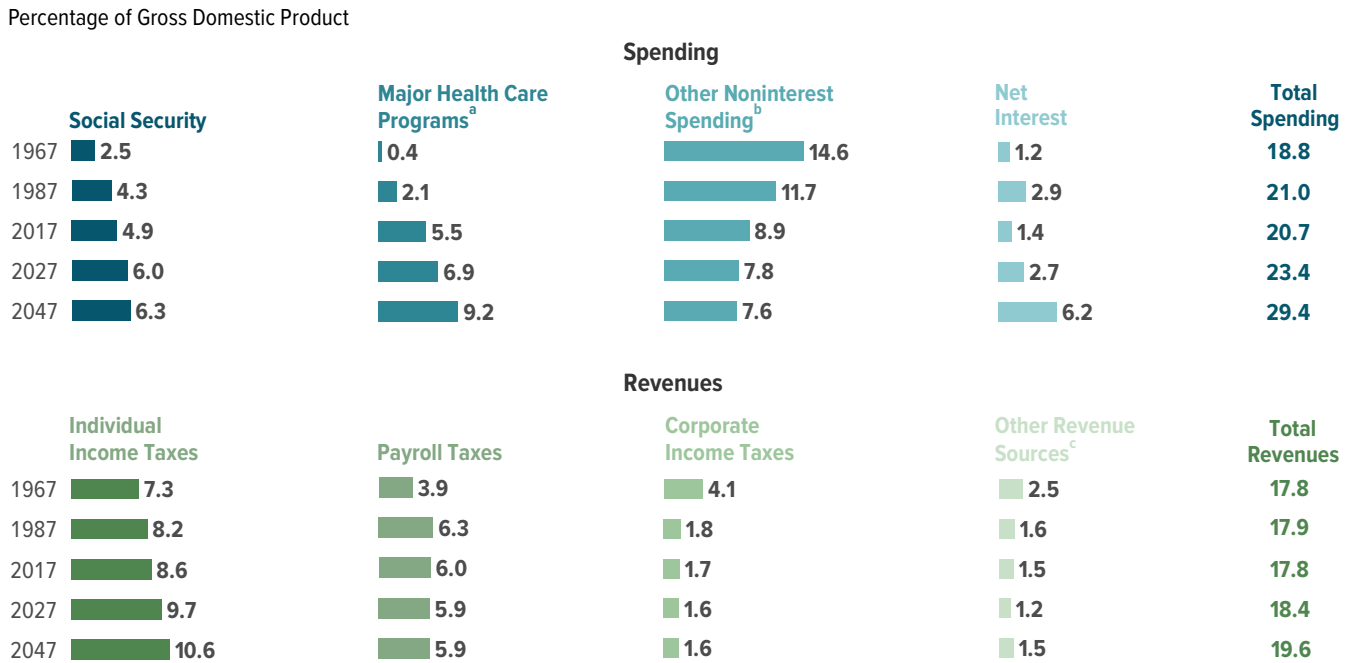
For CBO's most recent 10-year baseline projections, see Congressional Budget Office, *The Budget and Economic Outlook: 2017 to 2027* (January 2017), www.cbo.gov/publication/52370.

Excess cost growth refers to the extent to which the growth rate of nominal health care spending per capita—adjusted for demographic characteristics of the relevant populations—exceeds the growth rate of potential GDP per capita. (Potential GDP is the maximum sustainable output of the economy.)

GDP = gross domestic product.

a. Assumes the payment of full benefits as calculated under current law, regardless of the amounts available in the program's trust funds.

b. In that projection, GDP includes the macroeconomic effects of the policies underlying the extended baseline. If it did not, the rest of other mandatory spending after 2027 would decline at the same rate at which it is projected to decline between 2022 and 2027 (excluding the decline in spending for the Supplemental Nutrition Assistance Program).

c. In that projection, GDP includes the macroeconomic effects of the policies underlying the extended baseline. If it did not, discretionary spending after 2027 would remain the same (measured as a percentage of GDP) as projected for 2027.

d. The exception to the current-law assumption applies to expiring excise taxes dedicated to trust funds. The Balanced Budget and Emergency Deficit Control Act of 1985 requires CBO's baseline to reflect the assumption that those taxes would be extended at their current rates. That law does not stipulate that the baseline include the extension of other expiring tax provisions, even if they have been routinely extended in the past.

Figure 5.

Spending and Revenues in the Past and Under CBO's Extended Baseline

Percentage of Gross Domestic Product

Spending

	Social Security	Major Health Care Programs[a]	Other Noninterest Spending[b]	Net Interest	Total Spending
1967	2.5	0.4	14.6	1.2	18.8
1987	4.3	2.1	11.7	2.9	21.0
2017	4.9	5.5	8.9	1.4	20.7
2027	6.0	6.9	7.8	2.7	23.4
2047	6.3	9.2	7.6	6.2	29.4

Revenues

	Individual Income Taxes	Payroll Taxes	Corporate Income Taxes	Other Revenue Sources[c]	Total Revenues
1967	7.3	3.9	4.1	2.5	17.8
1987	8.2	6.3	1.8	1.6	17.9
2017	8.6	6.0	1.7	1.5	17.8
2027	9.7	5.9	1.6	1.2	18.4
2047	10.6	5.9	1.6	1.5	19.6

Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2027 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

a. Consists of spending for Medicare (net of premiums and other offsetting receipts), Medicaid, and the Children's Health Insurance Program, as well as outlays to subsidize health insurance purchased through the marketplaces established under the Affordable Care Act and related spending.

b. Consists of all federal spending other than that for Social Security, the major health care programs, and net interest.

c. Consists of excise taxes, remittances to the Treasury from the Federal Reserve System, customs duties, estate and gift taxes, and miscellaneous fees and fines.

Spending for Social Security and Major Health Care Programs

Mandatory programs have accounted for a rising share of the federal government's noninterest spending over the past few decades, exceeding 60 percent for the past several years. Much of the growth has occurred because Social Security and Medicare—the government's two largest mandatory programs—provide benefits mainly to people age 65 or older, a group that has been growing significantly. On average, federal outlays for Social Security and Medicare made up almost 40 percent of total noninterest spending during the past 10 years, compared with 16 percent 50 years ago.

Social Security. Social Security, which was created in 1935, is the largest single program in the federal budget. Its two components pay benefits to more than 61 million beneficiaries in all. The larger of the two, Old-Age and Survivors Insurance (OASI), pays benefits to retired workers, to their eligible dependents, and to some survivors of deceased workers. The smaller program, Disability
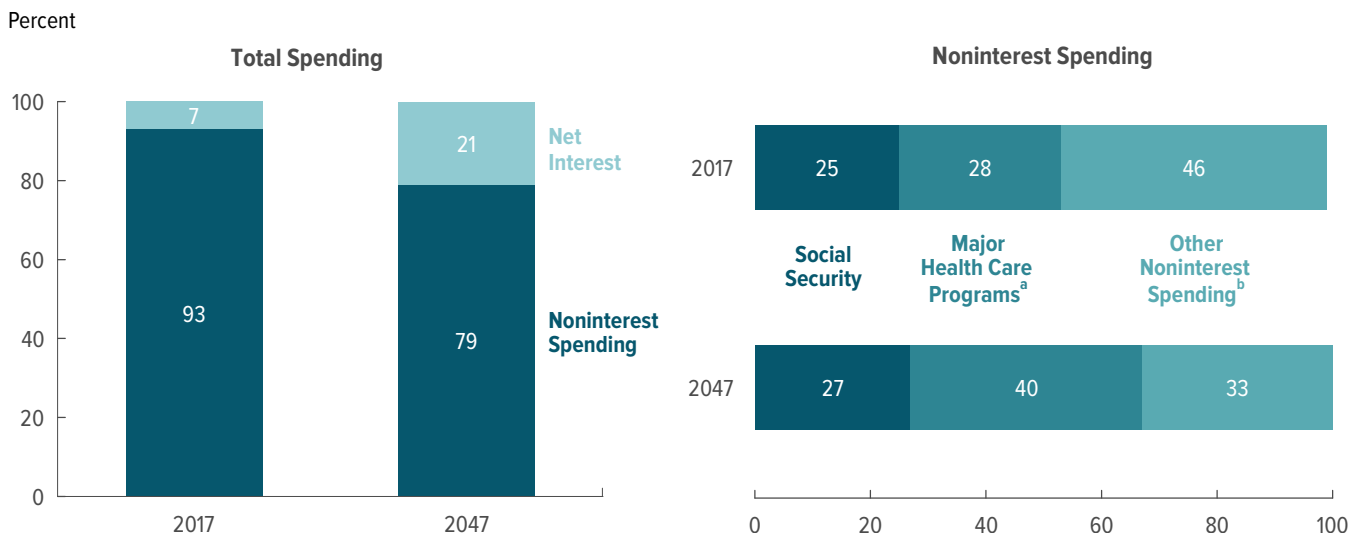
Insurance (DI), makes payments to disabled workers and to their dependents until those workers are old enough to claim full retirement benefits under OASI.

Under current law, CBO projects, spending for Social Security would increase noticeably as a share of the economy—from 4.9 percent of GDP in 2017 to 6.3 percent in 2047 (see Figure 5). In CBO's extended baseline projections, Social Security is assumed to pay benefits as scheduled under current law, regardless of the status of the program's trust funds.[13] That approach is consistent with

13. The balances of the trust funds represent the total amount that the government is legally authorized to spend for those purposes. For more about the legal issues related to exhaustion of a trust fund, see Noah P. Meyerson, *Social Security: What Would Happen If the Trust Funds Ran Out?* Report for Congress RL33514 (Congressional Research Service, August 28, 2014), available from U.S. House of Representatives, Committee on Ways and Means, *2014 Green Book*, Chapter 1: Social Security, "Social Security Congressional Research Service Reports" (accessed March 25, 2017), http://go.usa.gov/cCXcG.

Figure 6.

Composition of Federal Spending Under CBO's Extended Baseline

Percent

Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2027 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

a. Consists of spending for Medicare (net of premiums and other offsetting receipts), Medicaid, and the Children's Health Insurance Program, as well as outlays to subsidize health insurance purchased through the marketplaces established under the Affordable Care Act and related spending.

b. Consists of all federal spending other than that for Social Security, the major health care programs, and net interest.

a statutory requirement that CBO's 10-year projections incorporate the assumption that funding for such programs is adequate to make all payments required by law.[14]

The Social Security program is funded by dedicated tax revenues from two sources. Currently, 96 percent comes from a payroll tax; the rest is collected from income taxes on Social Security benefits. Revenues from the payroll tax and the tax on benefits are credited to the Old-Age and Survivors Insurance Trust Fund and the Disability Insurance Trust Fund, which finance the program's benefits.[15]

A common measure of the sustainability of a program that has a trust fund and a dedicated revenue source is its

estimated actuarial balance over a given period—that is, the sum of the present value of projected tax revenues and the current trust fund balance minus the sum of the present value of projected outlays and a year's worth of benefits at the end of the period.[16] For Social Security, that difference is traditionally presented as a percentage of the present value of taxable payroll over 75 years.[17]

Over the next 75 years, if current laws remained in place, the program's actuarial shortfall would be 4.5 percent

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14. Sec. 257(b)(1) of the Balanced Budget and Emergency Deficit Control Act of 1985 (Deficit Control Act), Public Law 99-177 (codified at 2 U.S.C. §907(b)(1) (2012)).

15. For more information, see Congressional Budget Office, *CBO's 2016 Long-Term Projections for Social Security: Additional Information* (December 2016), www.cbo.gov/publication/52298, and *The 2016 Long-Term Budget Outlook* (July 2016), Chapter 2, www.cbo.gov/publication/51580.

16. A present value is a single number that expresses a flow of past and future income (in taxes) or payments (in benefits) in terms of an equivalent lump sum received or paid at a specific time. The value depends on the rate of interest, known as the discount rate, used to translate past and future cash flows into current dollars at that time. To account for the difference between the trust fund's current balance and the balance desired for the end of the period, the balance at the beginning is added to the projected tax revenues and an additional year of costs at the end of the period is added to projected outlays.

17. Taxable payroll is the total amount of earnings (wages and self-employment income) for employment covered by Social Security that is below the applicable annual taxable maximum.

Table 3.

Financial Measures for Social Security

Projection Period (Calendar years)	Income Rate	Cost Rate	Actuarial Balance (Difference)
As a Percentage of Gross Domestic Product			
25 Years (2017 to 2041)	5.1	6.3	-1.1
50 Years (2017 to 2066)	4.8	6.3	-1.4
75 Years (2017 to 2091)	4.7	6.3	-1.5
As a Percentage of Taxable Payroll			
25 Years (2017 to 2041)	14.7	17.9	-3.3
50 Years (2017 to 2066)	14.0	18.1	-4.1
75 Years (2017 to 2091)	13.9	18.4	-4.5

Source: Congressional Budget Office.

These projections incorporate the assumption that spending for Social Security continues as scheduled even if its trust funds are exhausted. Through 2047, the projections incorporate macroeconomic feedback caused by rising federal debt and marginal tax rates. After 2047, they do not account for such feedback.

Over each projection period, the income rate is the present value of annual tax revenues plus the initial trust fund balance, and the cost rate is the present value of annual outlays plus the present value of a year's worth of benefits as a reserve at the end of the period, each divided by the present value of gross domestic product or taxable payroll. (The present value of a flow of revenues or outlays over time is a single number that expresses that flow in terms of an equivalent sum received or paid at a specific time. The present value depends on a rate of interest, known as the discount rate, that is used to translate past and future cash flows into current dollars.) The actuarial balance is the difference between the income and cost rates.

of taxable payroll, or 1.5 percent of GDP, CBO projects (see Table 3).[18] According to CBO's projections, therefore, it would be possible to pay the benefits prescribed by current law and maintain the necessary trust fund balances through 2091 only if payroll taxes were raised immediately and permanently by about 4.5 percent of taxable payroll, if scheduled benefits were reduced by an equivalent amount, or if some combination of tax increases and spending reductions of equal present value was adopted.[19]

Another commonly used measure of Social Security's sustainability is a trust fund's date of exhaustion. CBO projects that, under current law, the DI trust fund would be exhausted in fiscal year 2023 and the OASI trust fund would be exhausted in calendar year 2031. If their balances were combined, the OASDI trust funds would be exhausted in calendar year 2030, according to CBO's estimate.

Major Health Care Programs. Outlays for the major health care programs consist of spending for Medicare, Medicaid, and the Children's Health Insurance Program (CHIP), as well as subsidies for health insurance

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18. The 75-year projection period used here begins in calendar year 2017 and ends in calendar year 2091. The Social Security trustees have estimated that the program's 75-year actuarial shortfall (for the period 2016 through 2090) would be 2.7 percent of taxable payroll, 1.8 percentage points less than CBO's projection. For details on the trustees' projections, see Social Security Administration, *The 2016 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds* (June 2016), www.ssa.gov/oact/tr/2016. For a discussion of the factors leading to differences between CBO's projections and those of the trustees, see testimony of Keith Hall, Director, Congressional Budget Office, before the Subcommittee on Social Security of the House Committee on Ways and Means, *Comparing CBO's Long-Term Projections With Those of the Social Security Trustees* (September 21, 2016), www.cbo.gov/publication/51988.

19. The calculation of the actuarial balance excludes the effects of any macroeconomic feedback that would result from an increase in taxes or a reduction in benefits. The estimates of the actuarial shortfall do not account for revenues or outlays after the 75-year projection period. A policy that either increased revenues or reduced outlays by the same percentage of taxable payroll each year that would be required to eliminate the 75-year shortfall would not necessarily place Social Security on a permanently stable financial path. Because shortfalls are smaller earlier in the 75-year projection period than they are later on, such a policy would create surpluses in the next several decades but result in deficits later and leave the system financially unbalanced after calendar year 2091.

purchased through the marketplaces established under the Affordable Care Act and related spending.[20] Medicare, which provides health insurance to about 58 million people, most of whom are at least 65 years old, accounts for more than half of that spending.[21]

CBO projects federal spending for the government's major health care programs for 2017 through 2027 under the assumption that the laws governing those programs will, in general, remain unchanged. As with Social Security, CBO assumes that Medicare will pay benefits as scheduled under current law, regardless of the status of the program's trust funds. For projections beyond 2027, considerable uncertainty surrounds the evolution of the health care delivery and financing systems. That circumstance leads CBO to employ a formulaic approach: It combines estimates of the number of expected beneficiaries of the government's health care programs with mechanical estimates of the growth in spending per beneficiary.

Over the past five decades, spending for the major health care programs has steadily grown faster than the economy, and that trend continues in CBO's extended baseline. In 2017, net federal spending for the major health care programs will amount to 5.5 percent of GDP, CBO estimates. If current laws generally remained in place, net outlays for those programs would increase to 9.2 percent in 2047, distributed as follows:

■ Medicare spending, net of offsetting receipts (mostly premiums paid by enrollees), would increase from 3.1 percent of GDP today to 6.1 percent in 2047, and it would account for more than three-quarters of the increase in spending for major health care programs over the next 30 years (see Figure 7).

■ Spending on Medicaid and CHIP, combined with outlays for the marketplace subsidies and related spending, would rise from 2.4 percent of GDP today to 3.2 percent in 2047.[22]

Causes of Growth in Spending for Social Security and Major Health Care Programs

The aging of the population and excess cost growth are reasons for the sharp rise projected for spending on Social Security and the major federal health care programs over the next 30 years.[23] (Excess cost growth is the extent to which health care costs per capita, as adjusted for demographic changes, grow faster than potential GDP per capita.)

If, in developing its projections, CBO had set the shares of the population by age at today's proportions and had set excess cost growth at zero, spending on those programs as a share of GDP in 2047 would be 0.4 percentage points below the 11.0 percent estimated for 2017.[24] In the extended baseline, however, that spending reaches 16.9 percent of GDP by 2047 (see Figure 8). Aging accounts for an increase of 3.5 percentage points, or roughly 55 percent of the difference. Excess cost growth, at an increase of 2.9 percentage points, accounts for the rest.

The Aging Population. The retirement of the baby-boom generation and continued gains in life expectancy will increase the share of the population that is age 65 or older from 15 percent to 22 percent between 2017 and 2047.

Aging accounts for nearly all of the projected long-term increase in Social Security spending as a percentage of GDP.[25] Because of growth in the share of the population that is 65 or older, a larger segment of the population will consist of Social Security beneficiaries, and their benefits will require greater federal spending.

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20. Spending related to subsidies for insurance purchased through the marketplaces includes spending for subsidies for insurance provided through the Basic Health Program and spending for the risk-adjustment and reinsurance programs that were established by the Affordable Care Act to stabilize premiums for health insurance purchased by individuals and small employers.

21. For more on the major health care programs, see Congressional Budget Office, *The 2016 Long-Term Budget Outlook* (July 2016), Chapter 3, www.cbo.gov/publication/51580.

22. In CBO's projections, the outlays for subsidies for insurance purchased through the marketplaces and related spending are presented in combination with outlays for Medicaid and CHIP—all constitute federal subsidies for health insurance for low- and moderate-income households.

23. This analysis of causes of spending growth includes gross spending on Medicare.

24. Without aging or excess cost growth, spending on those programs would be lower in 30 years as a percentage of GDP mostly because of the scheduled increase in the full retirement age for Social Security.

25. Excess cost growth accounts for a small portion of the increase in spending for Social Security as a share of GDP in 2047, amounting to about 0.1 percent of GDP, because greater spending on federal health care programs leads to larger deficits, which in turn slow the growth of GDP.

Figure 7.

Federal Spending on the Major Health Care Programs, by Category

Percentage of Gross Domestic Product
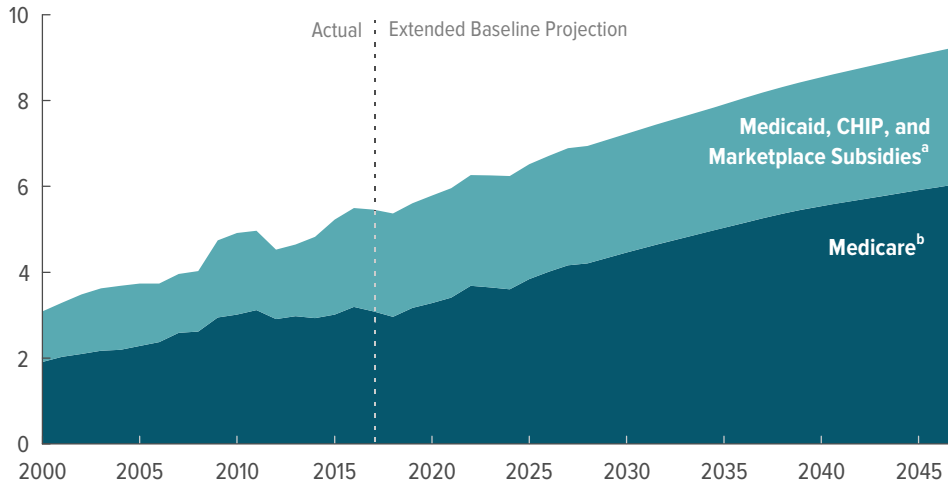
The projected rise in federal spending for the major health care programs results from the aging of the population and the expectation that health care costs per person will continue to grow more quickly than potential GDP per person.

Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2027 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

CHIP = Children's Health Insurance Program; GDP = gross domestic product.

a. "Marketplace Subsidies" refers to spending to subsidize health insurance purchased through the marketplaces established under the Affordable Care Act and insurance provided through the Basic Health Program and spending to stabilize premiums for health insurance purchased by individuals and small employers.

b. Refers to net spending for Medicare, which accounts for offsetting receipts that are credited to the program. Those offsetting receipts are mostly premium payments made by beneficiaries to the government.

Aging also contributes to the projected increase in the share of GDP taken up by spending for major health care programs, particularly Medicare, which is the largest such program. Most beneficiaries become eligible for Medicare at age 65, and as that group becomes larger and older, on average, Medicare spending will increase because the number of beneficiaries will rise and because people tend to require more health care as they age. In CBO's projections for the 2017–2047 period, aging explains 40 percent of the increase in spending for major health care programs as a share of GDP.

Rising Health Care Spending per Person. Even though growth in health care spending per capita, adjusted for demographic changes, has slowed recently, CBO projects that over the next 30 years it will still be faster than growth in potential GDP per capita. In CBO's extended baseline, excess cost growth accounts for 60 percent of the increase in spending for the major health care

programs as a share of GDP between 2017 and 2047. Such cost growth also leads to greater federal debt, which slows the growth of GDP and slightly raises projected spending as a share of GDP.

Other Noninterest Spending

In the extended baseline, total federal spending for everything other than Social Security, the major health care programs, and net interest declines to a smaller percentage of GDP than has been the case for more than 70 years. During the past 50 years, such spending has averaged 11 percent of GDP, but it has been as much as 15 percent (in 1968) and as little as 8 percent (in the late 1990s and early 2000s). CBO estimates that other noninterest spending in 2017 will equal 8.9 percent of GDP. Under the assumptions used for this analysis, that spending is projected to fall to 7.8 percent of GDP in 2027 and to 7.6 percent of GDP in 2047.

Figure 8.

Causes of Projected Spending Growth in Social Security and the Major Health Care Programs in CBO's Extended Baseline
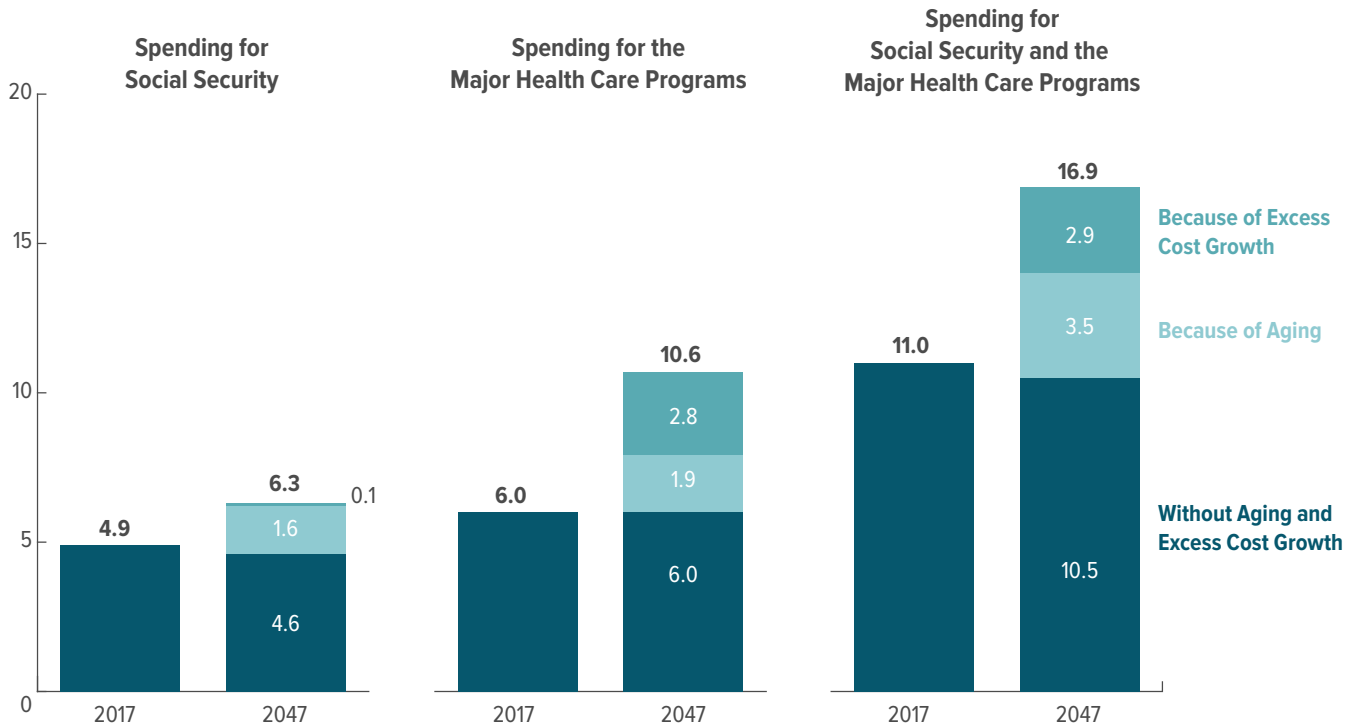
Percentage of Gross Domestic Product

Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2027 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

Outlays for the major health care programs consist of gross spending for Medicare (which does not account for offsetting receipts that are credited to the program), Medicaid, and the Children's Health Insurance Program, as well as outlays to subsidize health insurance purchased through the marketplaces established under the Affordable Care Act and related spending.

Excess cost growth refers to the extent to which the growth rate of nominal health care spending per capita—adjusted for demographic characteristics of the relevant populations—exceeds the growth rate of potential gross domestic product per capita. (Potential gross domestic product is the maximum sustainable output of the economy.)

This figure highlights the most important effects of aging and excess cost growth. Other effects, such as the effect of aging on the number of Social Security Disability Insurance beneficiaries, are smaller.

Discretionary Spending. Spending that occurs through the annual appropriation process is known as discretionary spending. About half is dedicated to national defense, and the rest is for an array of federally funded investments and activities, including education, transportation, housing assistance, veterans' health care, health-related research and public programs, administration of justice, and international affairs.

Over the past half century, discretionary spending has diminished markedly as a percentage of GDP: Between

1967 and 2016, it declined from 12.7 percent to 6.4 percent of GDP.[26] In CBO's baseline, discretionary outlays continue to decline over the next 10 years—falling to 5.3 percent of GDP in 2027—in part because of the constraints on discretionary funding imposed by the Budget Control Act of 2011 (as amended). After 2027, in CBO's extended baseline projections, discretionary

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26. For more discussion of the past 50 years of discretionary spending, see Congressional Budget Office, *The 2016 Long-Term Budget Outlook* (July 2016), Chapter 4, www.cbo.gov/publication/51580.

Figure 9.

Other Federal Noninterest Spending Under CBO's Extended Baseline

Percentage of Gross Domestic Product
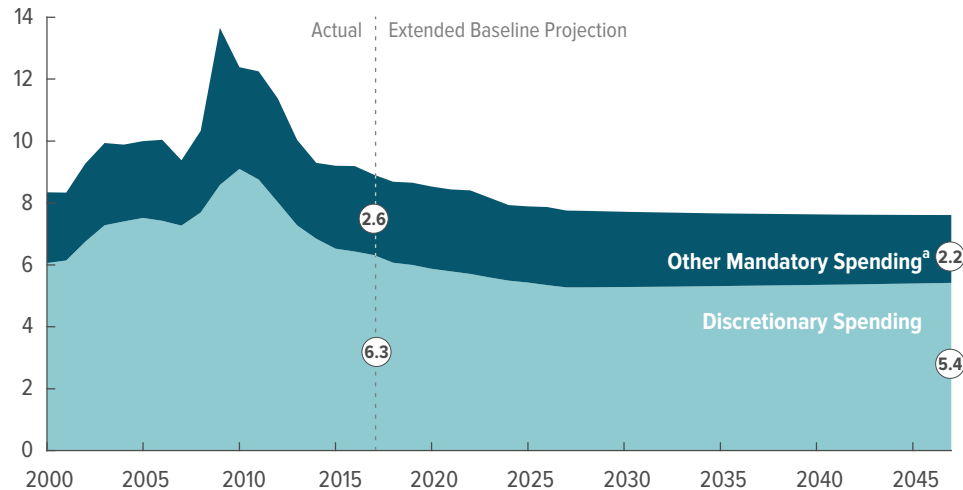
Measured as a percentage of economic output, other federal noninterest spending in CBO's extended baseline declines between 2017 and 2047. The majority of that drop stems from a projected decline in discretionary spending over the next decade.

Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2027 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

a. "Other Mandatory Spending" is all mandatory spending other than that for Social Security and the major health care programs. It includes the refundable portions of the earned income and child tax credits and of the American Opportunity Tax Credit.

spending remains roughly constant as a percentage of GDP (see Figure 9).[27]

Other Mandatory Spending. Since the mid-1960s, mandatory spending other than that for Social Security and the major health care programs has generally remained between 2 percent and 4 percent of GDP. (An exception was the spike to 5.1 percent in 2009 in response to the recession.) That category of mandatory spending includes, for example, retirement programs for federal civilian and military employees, certain veterans' programs, the Supplemental Nutrition Assistance Program (SNAP), Supplemental Security Income, unemployment compensation, and refundable tax credits.[28]

Other mandatory spending is projected to decline slightly as a share of the economy over the next 10 years. That category accounts for 2.6 percent of GDP today and, if

current laws generally remained unchanged, it would decline to 2.5 percent of GDP in 2027, CBO projects.[29] That small decline primarily reflects the effect of growth in average income on eligibility for some programs and refundable tax credits as well as reductions in the average payment per beneficiary for certain large programs when measured relative to average income.

In CBO's extended baseline, other mandatory spending is projected to fall to 2.2 percent of GDP by 2047. That decline in part reflects the effect of further growth in income on eligibility for refundable tax credits. It also reflects the assumption that other mandatory spending, excluding outlays for such tax credits, would decline

27. CBO assumed that after 2027 discretionary spending would remain constant as a percentage of GDP before the agency accounted for the effect on the economy of the fiscal policies projected under the extended baseline. CBO estimates that fiscal policy under the extended baseline would dampen economic growth, so its projection of discretionary spending does not grow at precisely the same rate as GDP.

28. Refundable tax credits reduce a filer's income tax liability overall; if the credit exceeds the rest of the filer's income tax liability, the government pays all or some portion of that excess to the taxpayer (and the payment is treated as an outlay in the budget). See Congressional Budget Office, *Refundable Tax Credits* (January 2013), www.cbo.gov/publication/43767.

29. Sec. 257(b)(2) of the Deficit Control Act, which governs CBO's baseline projections, makes exceptions regarding current law for some programs, such as SNAP, that have expiring authorizations but that are assumed to continue as currently authorized.

roughly in line with projections for such spending between 2022 and 2027.[30]

Net Interest Costs
The government's net interest costs are projected to nearly double as a share of the economy over the next decade—from 1.4 percent of GDP in 2017 to 2.7 percent by 2027—as currently low interest rates rise and as greater federal borrowing leads directly to greater debt-service costs. In the extended baseline, those costs reach 6.2 percent of GDP by 2047 (see Figure 5 on page 12). Under that projection, deficits and debt rise because spending growth outpaces revenue growth, and interest costs are a major contributor to spending growth: For example, more than half of the increase in spending as a percentage of GDP between 2017 and 2047 results from higher net interest costs. In large part, those rising interest costs would stem from increases in interest rates that reflect long-term economic trends, which CBO projects would occur even if debt did not rise beyond its current level. Greater federal borrowing would place additional upward pressure on interest rates and thus on interest costs. Moreover, growth in net interest costs and growth in debt reinforce one another: Rising interest costs would boost deficits and debt, and rising debt would push up interest costs.

Projected Revenues Through 2047
In CBO's extended baseline, revenues are projected to constitute a larger share of GDP than they have, on average, in recent decades. Over the past 50 years, the average has been about 17 percent, but it has fluctuated between 15 percent and 20 percent of GDP because of changes in tax laws and interactions between those laws and economic conditions.

CBO projects that, if current laws generally remained unchanged, revenues would increase as a share of GDP

over the coming decade—rising from 17.8 percent to 18.4 percent. The projected growth is mainly in the form of receipts from individual income taxes, partially offset by a decrease in remittances from the Federal Reserve and, to a lesser extent, by decreases in payroll and corporate income tax receipts.

For years beyond 2027, CBO's extended baseline is constructed under the assumption that the rules for all tax sources will evolve as scheduled under current law.[31] Revenues therefore would continue to grow faster than GDP beyond 2027, and two decades later, total revenues would be 19.6 percent of GDP. Increases in receipts from individual income taxes more than account for the projected rise of 1.8 percentage points in total revenues as a share of GDP over the next 30 years. All told, receipts from all other sources combined are projected to decline slightly as a share of GDP (see Figure 5 on page 12). CBO's extended baseline includes the following projections:

- Individual income tax receipts increase by 2.0 percentage points relative to GDP over the next 30 years, from 8.6 percent to 10.6 percent of GDP;

- Payroll taxes decline slightly from today's 6.0 percent to 5.9 percent of GDP in 2047;

- Corporate income tax receipts decline by 0.1 percentage point over the next 30 years, from 1.7 percent of GDP to 1.6 percent; and

- Receipts from all other revenue sources fluctuate slightly, but begin and end the period at 1.5 percent of GDP.

The projected increase in total revenues through 2047 reflects structural features of the income tax system, new and expiring tax provisions, demographic trends, changes in the distribution of income, and other factors.

Structural features of the income tax system are the largest contributor to the increase in revenues (see Table 4).

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30. For the years after 2027, mandatory spending excluding that for Social Security, the major health care programs, and refundable tax credits was not projected in detail because of the number of programs involved and the variety of factors that influence spending on them. Instead, CBO used an approximate method to project spending for those programs as a group. Except for the outlays for refundable tax credits, such spending was assumed to decline in relation to GDP (excluding any effect that fiscal policy may have on the economy) after 2027 at the same rate at which it is projected to fall between 2022 and 2027 (excluding the decline in spending for SNAP).

31. The sole exception to the current-law assumption during the baseline period applies to expiring excise taxes dedicated to trust funds. The Balanced Budget and Emergency Deficit Control Act of 1985 requires CBO's baseline to reflect the assumption that those taxes would be extended at their current rates. That law does not stipulate that the baseline include the extension of other expiring tax provisions, even if lawmakers have routinely extended them before.

Table 4.

Sources of Growth in Total Revenues, 2017 to 2047, in CBO's Extended Baseline

Source of Growth	Percentage of GDP
Structural Features of the Individual Income Tax[a]	1.1
New and Expiring Tax Provisions	0.7
Aging and the Taxation of Retirement Income	0.4
Changes in the Distribution of Income	0.1
Other Factors	-0.4
Total	**1.8**

Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2027 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

GDP = gross domestic product.

a. Includes real bracket creep, which occurs as more income is pushed into higher tax brackets because people's income rises faster than inflation.

CBO projects that, if current laws remained generally unchanged, real bracket creep would continue to gradually push up taxes relative to income over the next three decades. That phenomenon occurs because most income tax brackets, exemptions, and other tax thresholds are indexed only to inflation. If income grows faster than inflation, as generally occurs when the economy is growing, tax receipts grow faster than income.

Under current law, some new provisions of tax law will take effect and others will expire during the next decade. Specifically, a new tax on certain employment-based health insurance plans with high premiums is scheduled to take effect in 2020. Although the revenue raised by that tax would be modest initially, rapid growth in health care costs would cause revenues from that tax to rise rapidly over the decades after it took effect. In addition, some rules that allow businesses with large amounts of investment to accelerate deductions are scheduled to be phased out by the end of December 2019. All in all, those changes lead to higher tax revenues in the extended baseline.

As the population ages, distributions from tax-deferred retirement accounts (including individual retirement accounts, 401(k) plans, and traditional defined benefit pension plans) will tend to grow more rapidly than GDP. CBO projects that those rising taxable distributions

would boost revenues relative to GDP. Most of that increase would occur in the 2017–2027 period.

Over the next 10 years, in CBO's projections, earnings grow faster for higher-income people than for others, causing a larger share of income to be taxed at higher rates under the individual income tax. That increase would be partially offset by a projected decrease in payroll tax receipts, as a greater share of earnings would be above the maximum amount subject to Social Security payroll taxes. CBO projects no changes in the distribution of earnings after 2027.

Even if lawmakers enacted no changes in tax law, the effects of the tax system in 2047 would differ substantially from today's. Average taxpayers at every income level would pay more of their income in taxes than similar taxpayers do now, primarily because of real bracket creep. Effective marginal tax rates also would rise if current laws generally stayed in place, so a larger share of each additional dollar of income that households earn would go to taxes (see Table 5). The increase in the marginal tax rate on labor income would reduce people's incentive to work, and the increase in the marginal tax rate on capital income would reduce their incentive to save, thus dampening economic activity, in CBO's estimation.

Uncertainty in CBO's Long-Term Projections

Even if future tax and spending policies did not vary from those specified in current law, budgetary outcomes would undoubtedly differ from those in CBO's baseline projections because of unexpected changes in the economy, demographics, and other factors. To illustrate the uncertainty of its projections, CBO examined the extent to which federal debt as a percentage of GDP would differ from its extended baseline if the agency varied four types of economic and budgetary factors in its analysis:[32]

■ The labor force participation rate;

■ The growth rate of total factor productivity;

■ Interest rates on federal debt held by the public; and

■ Excess cost growth for Medicare and Medicaid spending.

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32. For additional details about this analytical approach, see Congressional Budget Office, *The 2016 Long-Term Budget Outlook* (July 2016), Chapter 7, www.cbo.gov/publication/51580.

Table 5.

Effective Marginal Federal Tax Rates Under CBO's Extended Baseline

Percent

	2017	2027	2047
Marginal Tax Rate on Labor Income	29.8	31.1	32.9
Marginal Tax Rate on Capital Income	15.5	18.1	19.1

Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2027 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

The effective marginal tax rate on labor income is the share of an additional dollar of such income that is paid in federal individual income taxes and payroll taxes, averaged among taxpayers, using weights based on each taxpayer's income. The effective marginal tax rate on capital income is the share of the return on an additional dollar of investment made in a particular year that will be paid in taxes over the life of that investment. Rates are calculated for different assets and industries and then averaged over all assets and industries with the shares of total asset values used as weights.

The degree of variation was based on historic movements and on possible future developments. The resulting estimates show that if CBO varied just one factor at a time, federal debt held by the public after 30 years would range from 41 percentage points of GDP below the agency's central estimate of 150 percent of GDP to 63 percentage points above it.[33]

If all four factors were varied simultaneously in a way that increased projected deficits, but were varied only by 60 percent of the amount of the variation in each factor individually, federal debt held by the public at the end of the period would be about 94 percentage points of GDP above CBO's central estimate. Conversely, if all four factors were varied in a way that lowered deficits but, again, by only 60 percent as much as in the individual cases, debt after 30 years would be 65 percentage points below the central estimate (see Figure 10).

Those calculations do not cover the full range of possible outcomes, nor do they address other sources of uncertainty in the budget projections, such as the risk of an

economic depression or a major war or catastrophe, or the possibility of unexpected changes in birth rates, immigration rates, or mortality rates.[34] Nonetheless, they show that the main implication of this report applies under a wide range of possible values for some key factors that influence federal spending and revenues. That is, in 30 years, if current laws remained generally unchanged, federal debt—which is already high by historical standards—would probably be at least as high as it is today and would most likely be much higher.

Policymakers could take uncertainty into account in various ways as they make choices for fiscal policy.[35] For example, they might design policies that reduced the budgetary implications of certain unexpected events. Or they might decide to provide a buffer against events with negative budgetary implications by aiming for lower debt than they would if such uncertainty did not exist.

Illustrative Changes to the Deficit

CBO examined, from several perspectives, the extent to which various changes in law would affect the long-term fiscal imbalance:

■ It estimated the magnitude of a change in spending or revenues that would be needed if lawmakers wished to achieve some specific level of federal debt held by the public.

■ It assessed the extent to which the size of policy adjustments would change if such deficit reduction was delayed, and it examined the effects on various generations of waiting to resolve the long-term fiscal imbalance.

■ It estimated how different deficit paths would affect debt and the economy in 2047.

■ It analyzed the effect of limiting Social Security benefits to amounts that were payable from dedicated funding.

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33. CBO's estimates of federal debt with each factor varied individually are presented in the supplemental data accompanying this report at www.cbo.gov/publication/52480.

34. For further discussion on sources of uncertainty, see Congressional Budget Office, *The 2016 Long-Term Budget Outlook* (July 2016), Chapter 7, www.cbo.gov/publication/51580.

35. See Alan J. Auerbach and Kevin Hassett, "Uncertainty and the Design of Long-Run Fiscal Policy," in Auerbach and Ronald D. Lee, eds., *Demographic Change and Fiscal Policy* (Cambridge University Press, 2001), pp. 73–92, http://tinyurl.com/p93enfp.

Figure 10.

Federal Debt Given Different Labor Force Participation Rates, Productivity Growth Rates, Federal Borrowing Rates, and Rates of Excess Cost Growth for Federal Spending on Medicare and Medicaid

Percentage of Gross Domestic Product
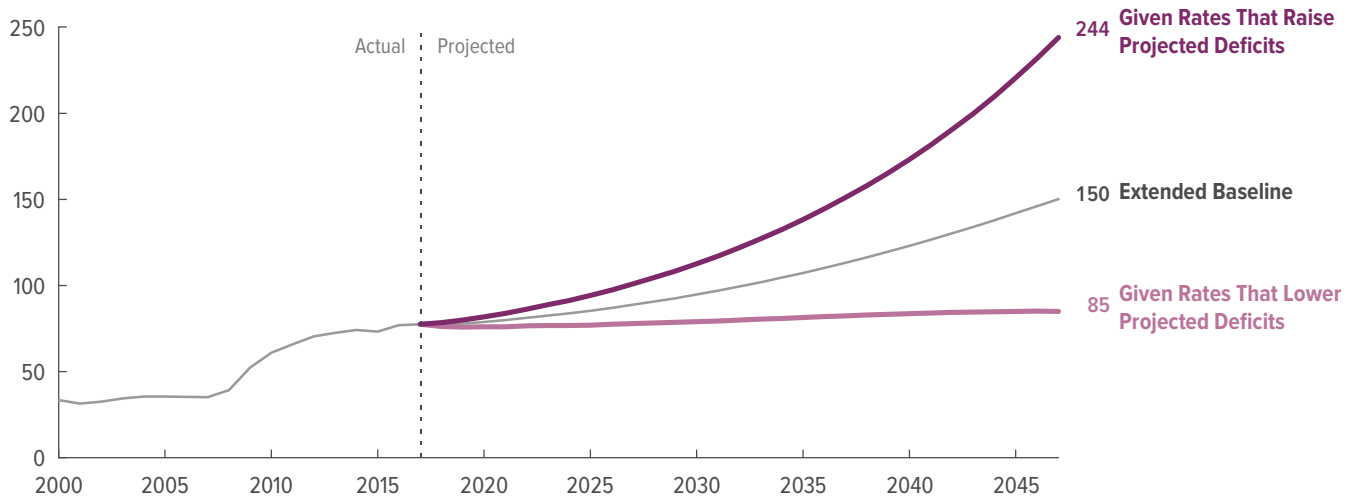
Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2027 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

Federal debt refers to debt held by the public. Values are CBO's central estimates from ranges determined by alternative assessments of two factors: how much deficits crowd out investment in capital goods such as factories and computers (because a larger portion of private saving is being used to purchase government securities), and how much people respond to changes in after-tax wages by adjusting the number of hours they work.

The labor force participation rate is the percentage of people in the civilian noninstitutionalized population who are age 16 or older and either working or actively seeking work.

Productivity growth is the growth of total factor productivity—that is, the growth of real (inflation-adjusted) output that is not explained by the growth of labor and capital.

The federal borrowing rate is the interest rate on the federal debt.

Excess cost growth refers to the extent to which the growth rate of nominal health care spending per capita—adjusted for demographic characteristics of the relevant populations—exceeds the growth rate of potential gross domestic product per capita. (Potential gross domestic product is the maximum sustainable output of the economy.)

For this figure, CBO used values for four factors with a deviation from the extended baseline that was about 60 percent as large as the deviation the agency used when it varied each factor separately. The alternative projections for the four factors begin in 2018.
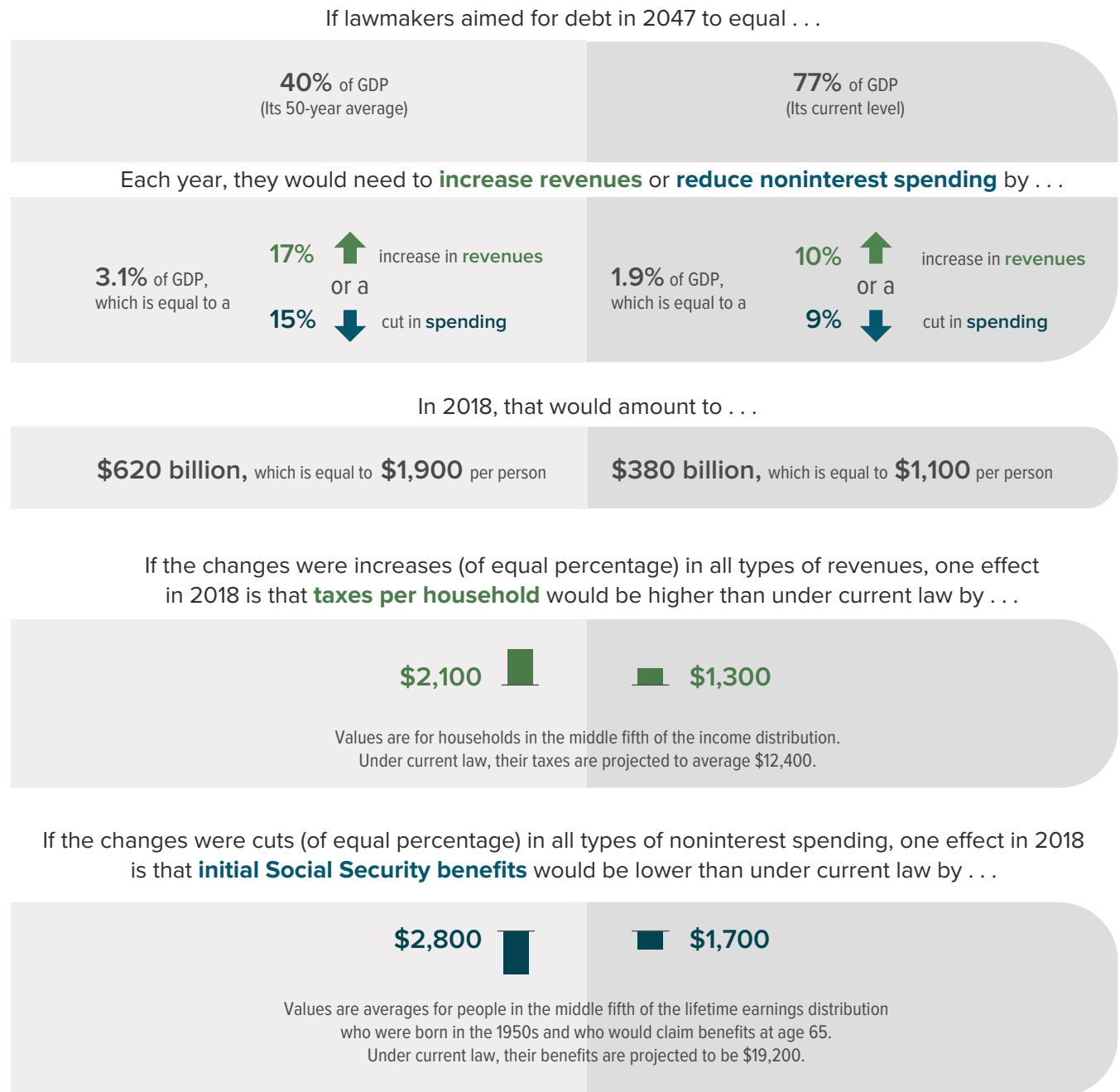
The Size of Policy Changes Needed to Meet Various Goals for Deficit Reduction

Suppose that lawmakers set out to ensure that debt in 2047 matched the current level of 77 percent of GDP. That result could be achieved by cutting noninterest spending or raising revenues, or both, in each year beginning in 2018, by amounts totaling 1.9 percent of GDP (see Figure 11). (In 2018, that 1.9 percent of GDP would be about $380 billion, or $1,100 per person.) If the changes came entirely from revenues or entirely from spending, they would amount, roughly, to a 10 percent increase in revenues or a 9 percent cut in noninterest spending in comparison with the extended baseline.

The projected effects of such actions on debt include both the direct effects of the policy change and the feedback to the federal budget that would be attributable to faster economic growth. Those economic effects reflect the reduction in the debt but do not reflect any assumptions about the specifics of the policy changes. Such changes, for example, could alter productivity growth and incentives to work and save, which would then affect overall economic output and have feedback effects on the federal budget.

Figure 11.

The Size of Policy Changes Needed to Make Federal Debt Meet Two Possible Goals in 2047

If lawmakers aimed for debt in 2047 to equal . . .

40% of GDP (Its 50-year average)	**77%** of GDP (Its current level)

Each year, they would need to **increase revenues** or **reduce noninterest spending** by . . .

3.1% of GDP, which is equal to a	**17%** ↑ increase in **revenues** or a **15%** ↓ cut in **spending**	**1.9%** of GDP, which is equal to a	**10%** ↑ increase in **revenues** or a **9%** ↓ cut in **spending**

In 2018, that would amount to . . .

$620 billion, which is equal to **$1,900** per person	**$380 billion,** which is equal to **$1,100** per person

If the changes were increases (of equal percentage) in all types of revenues, one effect in 2018 is that **taxes per household** would be higher than under current law by . . .

$2,100 ▮	▬ **$1,300**

Values are for households in the middle fifth of the income distribution.
Under current law, their taxes are projected to average $12,400.

If the changes were cuts (of equal percentage) in all types of noninterest spending, one effect in 2018 is that **initial Social Security benefits** would be lower than under current law by . . .

$2,800 ▮	▬ **$1,700**

Values are averages for people in the middle fifth of the lifetime earnings distribution
who were born in the 1950s and who would claim benefits at age 65.
Under current law, their benefits are projected to be $19,200.

Source: Congressional Budget Office.

In this figure, the indicated sizes of the policy changes are relative to CBO's extended baseline, which generally reflects current law, following CBO's 10-year baseline budget projections through 2027 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period. The projected effects of the policy changes on debt include the direct effects of the policy change and the feedback to the federal budget that would be attributable to faster economic growth. The effects on growth and the feedback to the federal budget reflect the positive economic effects of lowering the debt but do not reflect any assumptions about the specifics of the policy changes.

GDP = gross domestic product.

Increases in revenues or reductions in noninterest spending would need to be larger than 1.9 percent of GDP to reduce debt to the percentages of GDP that are more typical of those in recent decades. Suppose that lawmakers wanted to return the debt to 40 percent of GDP (its average over the past 50 years) by 2047. One way to achieve that would be to increase revenues or cut noninterest spending (in relation to current law), or to adopt some combination of those two actions, beginning in 2018 by amounts totaling 3.1 percent of GDP each year. (In 2018, 3.1 percent of GDP would be about $620 billion, or $1,900 per person.) Again, the projected effects on debt include both the direct effects of the specified policy changes and the resulting macroeconomic feedback to the budget. Those positive economic effects reflect the reduction in the debt but do not reflect any assumptions about the specifics of the policy changes.

If lawmakers wanted to meet that goal for deficit reduction either by increasing all revenues or by cutting all noninterest spending, the following changes would be necessary:

■ If collections of all types of revenues were increased by the same proportion, revenues would need to increase by about 17 percent each year in the 2018–2047 period. On average, that would result in federal taxes that were about $2,100 higher than they are under current law for households in the middle fifth of the income distribution in 2018.

■ If all types of noninterest spending were cut by an equal percentage, spending overall would need to decrease by about 15 percent in each of the next 30 years. For example, such cuts would lower initial annual Social Security benefits by about $2,800, on average, for people in the middle fifth of the lifetime earnings distribution who were born in the 1950s and who first claimed benefits at age 65.

The Timing of Policy Changes Needed to Meet Various Goals
The magnitude of the policy changes that would be needed to achieve a particular goal for federal debt depends, in part, on how quickly that goal was expected to be reached. Regardless of the chosen goal for federal debt, lawmakers face trade-offs when they are deciding how quickly to implement policies that are designed to put federal debt on a sustainable path. The benefits of

reducing the deficit sooner include a smaller accumulated debt, smaller policy changes required to achieve long-term outcomes, and less uncertainty about the policies lawmakers would adopt. However, if lawmakers implemented spending cuts or tax increases too quickly, people might have insufficient time to plan for or adjust to a new system.

Over the next few years, such policy changes also would dampen overall demand for goods and services, thus decreasing output and employment relative to CBO's projections under current law. However, that effect would be temporary, CBO expects, because of the response of prices and longer-term interest rates both to reductions in demand and to the resulting actions by the Federal Reserve. Those responses to changing demand would be stronger over the next few years than they had been in the past few years when the economy was weaker.
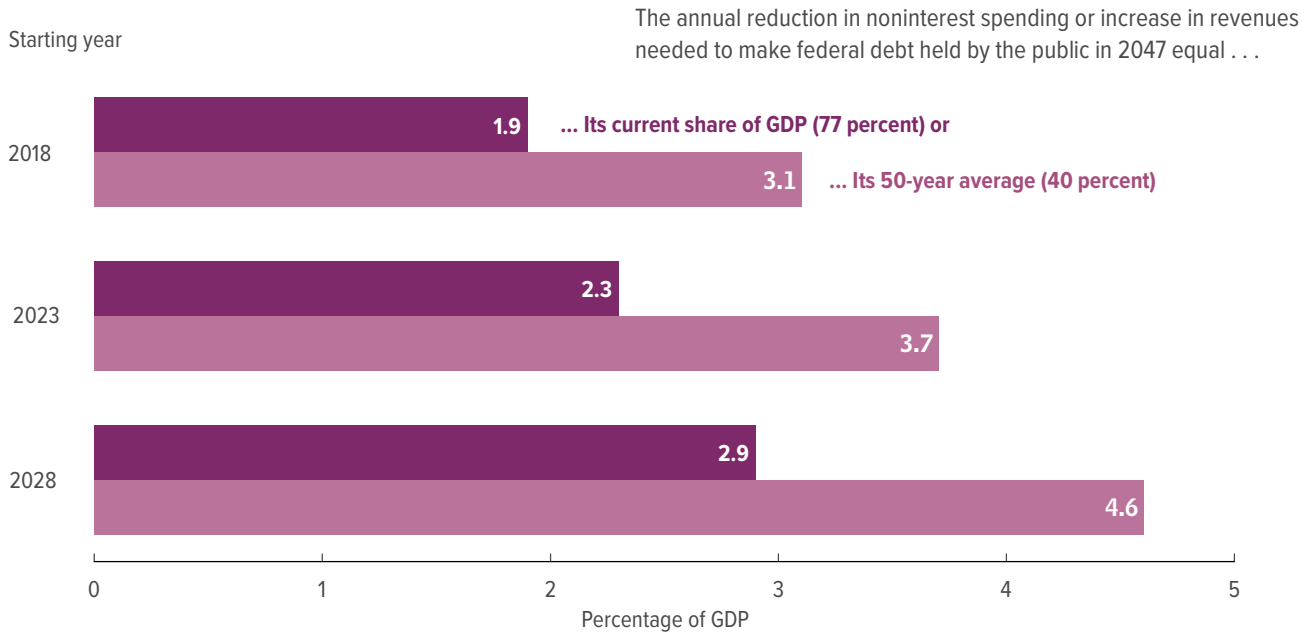
By contrast, if policymakers waited several years to reduce federal spending or increase taxes, more debt would accumulate over the long term, and that would slow long-term growth in output and income. Thus, reaching any chosen target for debt would require larger changes. Nonetheless, if policymakers waited several years to enact new policies, the economy probably would be affected less over the short term than would be the case if immediate changes were made.

Faster or slower implementation of policies to reduce budget deficits also would tend to impose different burdens on different generations. Reducing deficits sooner would probably require current older workers and retirees to sacrifice more but would benefit younger workers and future generations. Reducing deficits later would require smaller sacrifices from older people but greater ones from younger workers and future generations.

CBO has analyzed such a collection of trade-offs in two ways. First, it estimated the extent to which the size of policy adjustments would change if deficit reduction was delayed. For example, suppose that lawmakers sought to reduce debt as a share of GDP to its historical 50-year average of 40 percent in 2047. If the necessary policy changes did not take effect until 2023, the annual deficit reduction would need to amount to 3.7 percent of GDP rather than the 3.1 percent of GDP that would accomplish the same goal if the changes were made in 2018 (see Figure 12). If lawmakers chose to wait another five

Figure 12.

How Timing Affects the Size of Policy Changes Needed to Make Federal Debt Meet Two Possible Goals in 2047

Starting year

The annual reduction in noninterest spending or increase in revenues needed to make federal debt held by the public in 2047 equal . . .

2018
1.9 — **... Its current share of GDP (77 percent) or**
3.1 — **... Its 50-year average (40 percent)**

2023
2.3
3.7

2028
2.9
4.6

Percentage of GDP

Source: Congressional Budget Office.

GDP = gross domestic product.

years, even larger changes would be necessary; they would amount to 4.6 percent of GDP.

CBO also studied the effects on various generations of the U.S. population that would arise from waiting to resolve the long-term fiscal imbalance. In 2010, CBO compared economic outcomes under two policies.[36] One would stabilize the debt-to-GDP ratio starting in a particular year; the other would wait 10 years to do so. That analysis suggested that people in generations born after the earlier implementation date would be worse off under the second option. People born more than 25 years before the earlier implementation, however, would be better off

with delayed action—largely because they would partly or entirely avoid the policy changes needed to stabilize the debt. Generations born between those two groups could either gain or lose from delayed action, depending on the details of the policy changes.[37]

Even if lawmakers waited several years to implement policy changes to reduce deficits in the long term, making decisions about them sooner would offer advantages. With decisions reached sooner, people would have more time to prepare. Also, policy changes that reduced debt would hold down longer-term interest rates and could reduce uncertainty and enhance businesses' and consumers' confidence. Those factors would boost output and employment in the near term.

How Different Deficit Paths Would Affect Federal Debt

CBO also analyzed the effects of policies that would result in cumulative deficits (excluding interest payments

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36. See Congressional Budget Office, *Economic Impacts of Waiting to Resolve the Long-Term Budget Imbalance* (December 2010), www.cbo.gov/publication/21959. That analysis was based on a projection of slower growth in debt than CBO now projects, so the estimated effects of a similar policy today would be close, but not identical, to the effects estimated in that analysis. For a different approach to analyzing the cost of debt reduction for different generations, see Felix Reichling and Shinichi Nishiyama, *The Costs to Different Generations of Policies That Close the Fiscal Gap*, Working Paper 2015-10 (Congressional Budget Office, December 2015), www.cbo.gov/publication/51097.

37. Those conclusions do not incorporate the possible negative effects of a fiscal crisis or effects that might arise from the government's reduced flexibility to respond to unexpected challenges.

and macroeconomic feedback) that would be smaller or larger through 2027 by $2 trillion or by $4 trillion, compared with the amounts projected under CBO's extended baseline. After that year, deficits would be reduced or increased by the same percentage of GDP as they were in 2027.

How Smaller Deficits Would Affect Federal Debt. CBO estimates that—after accounting for the positive long-run economic effects of reducing debt—a deficit reduction of $2 trillion or $4 trillion over 10 years would lead to federal debt as a share of GDP that was still greater than the historical 50-year average: For the –$2 trillion path, federal debt would equal 104 percent of GDP in 2047, well above today's 77 percent (see Figure 13). The –$4 trillion path would result in federal debt amounting to 63 percent of GDP in 2047, which is lower than the current level but still above the historical average.

CBO also analyzed how those efforts at deficit reduction would affect the economy. One measure that can be used to assess economic effects is gross national product (GNP). Unlike the more commonly cited GDP, GNP includes the income that U.S. residents earn abroad and excludes the income that foreigners earn in this country. GNP is therefore a better measure of the resources available to U.S. households. Under both the –$2 trillion path and the –$4 trillion path to deficit reduction, real GNP per capita would be slightly lower over the next few years but higher in 2047 than under the extended baseline. Interest rates on federal debt would be lower in the long term.

How Greater Deficits Would Affect Federal Debt. CBO also assessed the effects of larger budget deficits so that cumulative deficits (excluding interest payments and macroeconomic feedback) would be $2 trillion or $4 trillion greater through 2027 than they would be under the extended baseline.

On those paths—after accounting for the economic effects of the increase in debt—federal debt would be substantially higher than CBO projects in the extended baseline. For the +$2 trillion path, federal debt would equal 202 percent of GDP in 2047; the +$4 trillion path would result in federal debt exceeding 250 percent of GDP in that year. For either path, real GNP per capita would be slightly higher over the next few years but lower

in 2047 than under the extended baseline. Interest rates on federal debt would be higher over the long term. The +$4 trillion path would have larger effects than the +$2 trillion path would on both real GNP and interest rates.[38]

How Limiting Social Security Benefits to Amounts Payable From Dedicated Funding Would Affect Federal Debt

The extended baseline reflects the assumption that the Social Security Administration will pay benefits as scheduled under current law, regardless of the status of the program's trust funds. However, if the trust funds' balance declined to zero and current revenues were insufficient to cover benefits specified in law, the Social Security Administration would no longer be permitted to pay beneficiaries the full amounts to which they were entitled when payments were due because other laws prohibit officials from making expenditures in excess of available funds. It would be left to the courts or to the Congress to resolve the potential conflict.[39]

Although it is unclear how much the payments for specific beneficiaries would be reduced if total benefits were limited to the amounts payable from dedicated funding, CBO estimated the amount of the total reduction in annual benefits that would be necessary for outlays to match revenues in each year after the trust funds were exhausted. The required reduction would amount to 28 percent in 2031 and greater percentages in later years in relation to the amounts in CBO's extended baseline.

Such reductions would lower federal deficits and debt, which would lead to greater output and lower interest rates than CBO projects under the extended baseline.

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38. Because CBO's model uses historical data as a basis for its estimates, in the agency's judgment the model cannot reliably estimate budget and economic outcomes after debt reaches 250 percent. For that reason, the results under the +$4 trillion path are not shown in Figure 13.

39. See Noah P. Meyerson, *Social Security: What Would Happen If the Trust Funds Ran Out?* Report for Congress RL33514 (Congressional Research Service, August 2014), available from the U.S House of Representatives, Committee on Ways and Means, *2014 Green Book*, Chapter 1: Social Security, "Social Security Congressional Research Service Reports" (accessed March 25, 2017), http://go.usa.gov/cCXcG.

Figure 13.

Federal Debt and Output per Capita Under CBO's Extended Baseline and Illustrative Budgetary Paths

Federal Debt Held by the Public

Percentage of Gross Domestic Product, by Fiscal Year

202 **Illustrative Path With 10-Year Deficit Increased by $2 Trillion**

150 **Extended Baseline**

104 **Illustrative Path With 10-Year Deficit Reduced by $2 Trillion**

63 **Illustrative Path With 10-Year Deficit Reduced by $4 Trillion**

Real Gross National Product per Capita

Thousands of 2017 Dollars, by Calendar Year

Illustrative Path With 10-Year Deficit Reduced by $4 Trillion

91 **Illustrative Path With 10-Year Deficit Reduced by $2 Trillion**
89
86
84 **Extended Baseline**

Illustrative Path With 10-Year Deficit Increased by $2 Trillion

2017   2022   2027   2032   2037   2042   2047

Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2027 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

The $2 trillion and $4 trillion changes in the illustrative paths represent cumulative changes in deficits relative to CBO's baseline between 2018 and 2027, excluding interest payments on federal debt and before macroeconomic feedback is taken into account.

The estimates of federal debt held by the public include macroeconomic feedback.

Real (inflation-adjusted) gross national product differs from real gross domestic product, the more commonly used measure of the output of the economy, by including the income that U.S. residents earn abroad and excluding the income that nonresidents earn in this country.

This figure displays only long-term effects. Results over the next few years are discussed in the text.

With those macroeconomic effects incorporated into its analysis, CBO projects, the debt-to-GDP ratio would stand at 111 percent in 2047, 39 percentage points below the current extended baseline projection—but still well above the current level.[40]

40. CBO's estimates of the macroeconomic and budgetary outcomes with payable benefits are based on the assumptions that people would not change their decisions regarding consumption, saving, or work in anticipation of receiving lower Social Security benefits and that they would not change their decisions about saving or work after such receipt.

Changes From Last Year's Long-Term Budget Outlook

The long-term projections of federal deficits and resulting debt presented in this report are generally similar to those the agency published in 2016.[41] This year's projections account for the effects of recent legislative and economic developments since last year as well as technical changes in CBO's projections. As a percentage of GDP, noninterest spending and, to a lesser degree, revenues are generally higher than projected last year. Net interest costs as a percentage of GDP are lower in most years than in last year's projections because of lower projected interest rates. (Appendix A describes the differences in demographic and economic projections from last year's report. Appendix B describes key revisions to the budgetary projections since last year.)

Under the extended baseline, CBO projects that debt would reach 146 percent of GDP in 2046, slightly higher than it projected last year. The projected deficits as a share of GDP in this year's report are smaller from 2018 through 2037 and larger thereafter than those in last

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41. See Congressional Budget Office, *The 2016 Long-Term Budget Outlook* (July 2016), www.cbo.gov/publication/51580.

year's report. Larger budgetary changes would be required to make federal debt 30 years from now equal either today's level or the 50-year historical average, as a share of GDP, than CBO projected last year.

The actuarial shortfall for the Social Security trust funds is projected to be smaller than CBO projected last year. CBO now estimates that, under current law, the 75-year actuarial deficit for Social Security would be 4.5 percent of taxable payroll, compared with the previous 4.7 percent. That change reflects several factors, including an increased projection of the share of wages that are taxable for Social Security and higher projected labor force participation rates. Partially offsetting those changes are some factors that increase the actuarial deficit. Applying lower interest rates in the present-value calculations increases the extent to which future years with larger deficits are weighted in the projections. In addition, a smaller projected population reduces the number of workers paying payroll taxes relative to the number receiving benefits, and a lower projection of productivity reduces projected wages and payroll tax receipts more than it decreases projected spending. As a percentage of GDP, the actuarial deficit would be 1.5 percent; last year's projection was 1.6 percent.
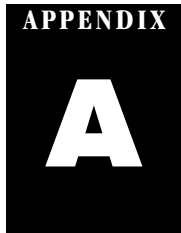
CBO's Projections of Demographic and Economic Trends

The Congressional Budget Office's long-term outlook for the federal budget is based on projections over the next three decades of trends in a host of demographic and economic variables. Through 2027, the projections presented in this report are the same as those that CBO published in January.[1] For the years beyond 2027, CBO's projections generally reflect historical trends and anticipated demographic changes. (Average values for 2017 to 2047, the period encompassed by CBO's extended baseline, as well as for shorter periods, are shown in Table A-1.[2] The table also provides historical data for comparison. A set of annual projections is included in the supplemental data that accompany this report, available online at www.cbo.gov/publication/52480.)

CBO anticipates that total economic output will be lower over the next three decades than it projected in last year's report. That adjustment is mainly the consequence of slower expected growth in productivity, which will modestly reduce returns on capital, interest rates, levels of investment, output per worker, and real (inflation-adjusted) income. The population is also expected to grow at a slower pace, mainly because CBO now projects a lower rate of immigration than it did last year. However, the agency has raised its estimates of labor force participation and therefore expects the labor force to grow more rapidly than it projected last year, in spite of slower population growth.

Demographic Variables
Both the size and composition of the U.S. population influence the overall growth of the economy and affect federal tax revenues and spending. Estimated rates of fertility, immigration, and mortality determine the population and thus the projected size of the labor force and the number of people receiving benefits from federal programs such as Social Security and Medicare. Because of revised projections of immigration and mortality rates, CBO now projects that the population will be slightly smaller in the future than it projected last year.

Population
CBO anticipates that the total population will increase from 330 million at the beginning of 2017 to 390 million in 2047 and that the annual growth rate of the U.S. population will gradually decline from 0.7 percent in 2017 to 0.4 percent in 2047. The population is projected not only to grow more slowly but also to become older, on average, than in the past. Over the 30-year projection period, the share of the population that is 65 or older grows, whereas the share that is of working age (defined as those between ages 20 and 64) shrinks. As a result, CBO projects, a growing portion of the population will receive benefits from the Social Security and Medicare programs while a shrinking portion will pay into the trust funds that support them.

Fertility
CBO projects a total fertility rate of 1.9 children per woman for the 2017–2047 period.[3] (That rate is the average number of children that a woman would have in her lifetime if, at each age of her life, she experienced the

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1. See Congressional Budget Office, *The Budget and Economic Outlook: 2017 to 2027* (January 2017), www.cbo.gov/publication/52370.

2. The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2027 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

3. In its long-term model, the likelihood that a particular woman will have a child depends on such factors as that woman's education, marital status, immigration status, and childbearing history.

Table A-1.

Average Annual Values for Demographic and Economic Variables That Underlie CBO's Extended Baseline

	1987–2016	2017–2027	2028–2037	2038–2047	Overall, 2017–2047
	Demographic Variables				
Growth of the Population (Percent)	0.9	0.7	0.6	0.4	0.6
Fertility Rate (Children per woman)	2.0	1.9	1.9	1.9	1.9
Immigration Rate (Per 1,000 people in the U.S. population)	3.8	3.2	3.2	3.2	3.2
Life Expectancy at Birth, End of Period (Years)[a]	79.1	80.5	81.6	82.8	82.8
Life Expectancy at Age 65, End of Period (Years)[a]	19.3	20.1	20.8	21.5	21.5
	Economic Variables (Percent)				
Growth of GDP					
Real GDP	2.5	1.9	2.0	1.9	1.9
Nominal GDP	4.8	3.9	4.0	4.0	4.0
Growth of the Labor Force	1.0	0.6	0.4	0.4	0.5
Labor Force Participation Rate	65.7	62.0	60.2	59.4	60.6
Unemployment					
Unemployment rate	6.0	4.8	4.9	4.8	4.8
Natural rate of unemployment	5.2	4.7	4.6	4.6	4.6
Growth of Average Hours Worked	-0.1	-0.1	-0.1	-0.1	-0.1
Growth of Total Hours Worked	1.0	0.4	0.3	0.4	0.3
Earnings as a Share of Compensation	81	81	81	80	81
Growth of Real Earnings per Worker	1.0	1.1	1.2	1.1	1.1
Share of Earnings Below the Taxable Maximum	85	81	79	79	80
Growth of Productivity					
Total factor productivity	1.2	1.1	1.2	1.2	1.2
Labor productivity	1.5	1.5	1.6	1.6	1.6
Inflation					
Growth of the CPI-U	2.6	2.4	2.4	2.4	2.4
Growth of the GDP price index	2.2	2.0	2.0	2.0	2.0
Interest Rates					
Real rates					
On 10-year Treasury notes and Social Security bonds	2.5	0.9	1.5	2.1	1.5
Nominal rates					
On 10-year Treasury notes and Social Security bonds	5.1	3.2	3.9	4.5	3.8
On all federal debt held by the public[b]	5.2	2.7	3.6	4.1	3.4

Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2027 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

CPI-U = consumer price index for all urban consumers; GDP = gross domestic product.

a. Life expectancy as used here is period life expectancy, which is the amount of time that a person in a given year would expect to survive beyond his or her current age on the basis of that year's mortality rates for various ages.

b. The interest rate on all federal debt held by the public equals net interest payments in the current fiscal year divided by debt held by the public at the end of the previous fiscal year.

birth rate observed or assumed for that year and if she survived her entire childbearing period.) The total fertility rate for the 1987–2007 period averaged 2.0 children per woman. Fertility rates often decline during recessions and rebound during recoveries. However, after the 2007–2009 recession, the U.S. fertility rate (which was 2.1 in 2007) dropped and has remained below 1.9. CBO's projected rate is consistent with the rate recommended by the Social Security Advisory Board's 2015 Technical Panel on Assumptions and Methods.[4]

Immigration

Under current law, CBO projects, net immigration to the United States (a measure that accounts for all people who either enter or leave the United States in any year) will grow by an average of 1.1 percent per year over the next decade. Thereafter, net immigration is projected to grow more slowly, at a rate of 0.6 percent per year. On the basis of those projections, CBO expects net annual immigration to rise from 1.1 million people in 2017 to 1.3 million people in 2047. Expressed another way, CBO projects that the rate of net annual immigration per thousand people in the U.S. population will rise from 3.2 in 2017 to 3.3 in 2047.

CBO's projection for total net immigration over the next decade is informed by the agency's economic projections and by recent demographic trends, both of which have particularly important implications for projections of net unauthorized immigration. CBO's projections for unauthorized immigration are the result of two offsetting effects, to which the agency gave equal weight in its analysis. On the one hand, in CBO's estimation, periods of moderate growth in the U.S. economy over the past two decades have been associated with increases in unauthorized immigration; consequently, CBO's projections of economic growth suggest growth in such immigration over the coming decade. On the other hand, although unauthorized immigration is very difficult to measure, historical estimates indicate that the number of unauthorized immigrants in the U.S. in 2014 was about the same as in 2005. The implication is that factors other than the strength of the economy have been more important recently and may continue to be in the future.[5]

CBO projects that there will be a net annual increase of unauthorized immigrants of roughly the same amount over each of the next 10 years. Increases in other types of immigration are projected to be relatively steady over the next decade.

For projections beyond the next decade, CBO employed a simplified approach: After 2026, the agency projects, net immigration will grow at an average rate that reflects the Census Bureau's projections for late in the coming decade.[6] That rate, 0.6 percent annually, is slightly faster than the overall average rate of population growth.

Mortality

The mortality rate, which is the number of deaths per thousand people, has generally declined in the United States for at least the past half century. For the most part, the mortality rate has improved more quickly for younger people than for older people during that period.[7] CBO projects that mortality rates for each five-year age group will decline at the average pace experienced from 1950 through 2013. After projecting average mortality rates for men and women in each age group, CBO incorporates differences in those rates on the basis of marital status, education, disability insurance status, and lifetime household earnings. CBO projects lower mortality rates and thus longer life expectancies for people who are married, have more education, are not on disability insurance, or are in higher-income groups.[8] (For people under 30, the mortality projections account for age and sex only.)

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4. See 2015 Technical Panel on Assumptions and Methods, *Report to the Social Security Advisory Board* (September 2015), p. 9, http://go.usa.gov/cJYR5 (PDF, 3.4 MB); and Congressional Budget Office, *The 2016 Long-Term Budget Outlook* (July 2016), www.cbo.gov/publication/51580.

5. See Jeffrey S. Passel and D'Vera Cohn, *Overall Number of U.S. Unauthorized Immigrants Holds Steady Since 2009* (Pew Research Center, September 2016), http://tinyurl.com/j45zwo5. Official data on unauthorized immigrants do not exist, so historical estimates are very uncertain.

6. See Census Bureau, "2014 National Population Projections: Summary Tables," Table 1, http://go.usa.gov/x9Jyh.

7. For more information about differences in the two age groups' mortality improvement, see Congressional Budget Office, *The 2016 Long-Term Budget Outlook* (July 2016), Appendix A, www.cbo.gov/publication/51580.

8. For more information about mortality differences among groups with different earnings, see Congressional Budget Office, *Growing Disparities in Life Expectancy* (April 2008), www.cbo.gov/publication/41681; and Julian P. Cristia, *The Empirical Relationship Between Lifetime Earnings and Mortality*, Working Paper 2007-11 (Congressional Budget Office, August 2007), www.cbo.gov/publication/19096.

CBO's projections result in an average life expectancy at birth of 82.8 years in 2047, compared with 79.2 years in 2017.[9] Similarly, CBO projects that life expectancy in 2047 will be 21.5 years at age 65, or 2.1 years longer than life expectancy at age 65 in 2017.[10]

Changes in Demographic Projections Since Last Year

CBO's projections of population growth have been adjusted downward relative to those published in last year's report, mainly because of revised projections of immigration but also because of changes in projected mortality rates. As a result, the share of the population that is of working age is smaller in the long term than CBO projected last year.

CBO has significantly reduced its projections of net immigration. Through 2026, the overall net rate of immigration per thousand people is projected to average 3.2, down from 3.9 last year. That reduction is primarily attributable to the agency's putting more weight on the evidence of low levels of unauthorized immigration in recent years. In later years, the total net immigration rate is projected to rise slightly, from 3.2 to 3.3, as the net number of immigrants grows more quickly than the population; in last year's projection, the expected rate of net immigration fell, from 3.9 to 3.7.

The life expectancies CBO now projects are a bit shorter than those reported last year, when life expectancy at birth was projected to be 83.0 years in 2046, 0.3 years longer than currently projected, and life expectancy at age 65 was projected to be 21.6 years, 0.1 year longer than currently projected. Recent data show higher mortality rates than CBO expected last year. Those data led CBO to increase its projection of mortality rates in the near term and to reduce rates of mortality improvement over the next three decades.

Economic Variables

The performance of the U.S. economy in coming decades will affect the federal government's tax revenues, spending, and debt accumulation. To estimate those effects, CBO projects business-cycle fluctuations over the short term. Over the long term, it projects trends in key economic variables that contribute to the growth of gross domestic product (GDP), such as the size and composition of the labor force, the number of hours worked, earnings per worker, capital accumulation, productivity, inflation, and interest rates. The agency also considers ways in which fiscal policy influences economic activity.

Gross Domestic Product

CBO expects total output in the economy to grow moderately over the 2017–2047 period but at a slightly slower pace than the agency projected last year, resulting in a lower projection of GDP.

Projections of GDP. CBO projects that continuing recovery in aggregate demand will spur slightly faster growth in real GDP over the next two years than the economy has experienced, on average, since the recession ended.[11] Thereafter, growth in real GDP is projected to transition to a pace that reflects the increases in the supply of labor, capital services, and productivity described below. That projected pace also takes into consideration the influences of the marginal tax rates and increases in federal debt that CBO projects in its extended baseline.[12]

Over the long term, total GDP is projected to be one-half of one percent below its potential (maximum sustainable) amount, as it has roughly been, on average, over past decades. Those projected outcomes reflect CBO's assessment that, during and after economic downturns, actual output has fallen short of potential output to a greater extent and for longer periods than actual output has exceeded potential output during economic booms.[13]

Projected GDP growth is significantly slower than the average annual rate of 2.5 percent recorded over the past three decades, primarily because of the anticipated slower growth of the labor force. Moreover, as the labor force

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9.   Life expectancy as used here is period life expectancy, which is the amount of time that a person in a given year would expect to survive beyond his or her current age on the basis of that year's mortality rates for various ages.

10. CBO projects that life expectancy in 2090 will be 86.9 years at birth and 24.3 years at age 65. CBO's projections of life expectancies are longer than those of the Social Security trustees (85.9 and 23.6 years, respectively) but shorter than the projections (88.3 and 25.3 years, respectively) recommended in the report of the 2015 Technical Panel on Assumptions and Methods, *Report to the Social Security Advisory Board* (September 2015), pp. 13–20, http://go.usa.gov/cJYR5 (PDF, 3.4 MB).

11. Aggregate demand is total purchases by consumers, businesses, government, and foreigners of a country's output of final goods and services during a given period.

12. The marginal tax rate is the percentage of an additional dollar of income from labor or capital that is paid in taxes.

13. See Congressional Budget Office, *Why CBO Projects That Actual Output Will Be Below Potential Output on Average* (February 2015), www.cbo.gov/publication/49890.

grows more slowly than the overall population, per capita real GDP is expected to increase at a slower pace than it has in the past—at an average annual rate of 1.4 percent over the 2017–2047 period, compared with 1.6 percent for the past 30 years.

Changes in GDP Since Last Year. CBO's projection of real GDP growth—an average annual rate of 1.9 percent over the 2017–2047 period—is slower than last year's projection for the 2016–2046 period. In CBO's current projections, GDP is about 2.5 percent lower in 2027 than the agency projected last year. By 2046, that gap grows to about 5 percent.

The Rate of Labor Force Participation

The size of the labor force is determined by the size of the population and the rate at which people participate in the labor market. CBO has significantly raised its projection of the labor force participation rate since last year.

Projections of the Labor Force Participation Rate. In CBO's projections, the rate of labor force participation— that is, the share of the civilian noninstitutionalized population age 16 or older that is either working or seeking work—declines from 62.8 percent in 2017 to 61.0 percent in 2027 and to 59.3 percent in 2047. The aging of the population is the most important factor driving down the overall participation rate over the next 30 years, while the effects of other factors roughly offset one another.

Because older people tend to participate in the labor force at lower rates than younger people, the aging of the population is expected to significantly dampen the rate of participation over the next 30 years. The share of people over the age of 65 is projected to increase from 15.2 percent in 2017 to 21.5 percent in 2047, and the share of the population ages 20 to 64 is expected to decline from 59.0 percent to 54.8 percent during that 30-year period. Without the effects of an aging population—that is, if the age-and-sex composition of the population remained the same as it is expected to be in 2017—the labor force participation rate would stay roughly constant over the next 30 years, in CBO's judgment.[14]

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14. That calculation includes an adjustment for age and sex, but the sex composition of the population is projected to change only slightly. Consequently, the decline in the labor force participation rate is attributable almost entirely to aging.

The effects of several other trends and fiscal policies roughly offset one another. Three trends put downward pressure on the participation rate. First, members of subsequent generations, who are replacing baby boomers in the labor force, tend to participate in the labor force at lower rates than their predecessors did at the same age. Second, the share of people receiving disability insurance benefits is generally projected to continue to rise, and people who receive such benefits are less likely to participate. Third, the marriage rate is projected to continue to fall, especially among men, and unmarried men tend to participate in the labor force at lower rates than married men.

CBO expects those forces to be mostly offset by three trends that are expected to increase participation. First, the population is becoming more educated, and workers with more education tend to participate in the labor force at higher rates than do people with less education. Second, the racial and ethnic composition of the population is changing in ways that, on net, increase participation. Consistent with patterns observed in the past, CBO expects Hispanic and non-Hispanic whites to participate at higher rates than the average. Like the Census Bureau, CBO expects that Hispanics will make up an increasing share of the population, which will increase the overall participation rate, and that non-Hispanic whites will make up a diminishing share, which will decrease the participation rate. The net result will be a modest increase in participation. Third, increasing longevity is expected to lead people to work longer.

In addition to those trends, CBO estimates that some fiscal policies projected in the extended baseline will tend to reduce incentives to work. Notably, rising federal debt and the increasing share of the population that is subject to higher marginal tax rates (attributable to growth in real income) will limit the growth of after-tax wages and reduce the supply of labor, as would people's responses to other fiscal policies.

Changes in the Labor Force Participation Rate Since Last Year. CBO's current projections of the labor force participation rate at the end of the first decade are slightly higher than those published last year, and the agency now projects a slower decline thereafter. Last year, the participation rate was projected to be 60.6 percent in 2026, compared with 61.1 percent in the current projections. The rate fell to 57.0 percent in 2046, a drop of

3.7 percentage points. In the current projection, that rate drops by just 1.8 percentage points.

The changes since last year result from revisions in the estimated effects of several factors that influence labor force participation and from adding race and ethnicity as a factor in the analysis. Revised estimates of the effects of education and the marriage rate account for most of the changes. CBO now projects that increasing educational attainment will have a larger positive effect on participation than it estimated a year ago and that the declining marriage rate will have a smaller negative effect. In addition, factoring in race and ethnicity increases the overall projected participation rate.[15]

When combined with CBO's projections of the population, the projected rates of labor force participation imply that the labor force will grow by 0.5 percent per year, on average, over the 2017–2047 period. That rate is higher than the 0.4 percent per year projected a year ago.

Other Labor Market Outcomes

Among the factors accounted for in CBO's labor market projections—in addition to the size of the population and the rate of labor force participation—are the unemployment rate, the average and total number of hours that people work, and various measures of workers' earnings.

The Unemployment Rate. CBO projects that the unemployment rate will decline from 4.8 percent at the end of 2016 to 4.4 percent in 2018, gradually rise again to 5.0 percent by 2021, and then remain at that level, on average, through 2027. In the meantime, the natural rate of unemployment (the rate that results from all sources other than fluctuations in overall demand related to the business cycle) will gradually decline from over 4.7 percent to slightly below that rate, reflecting projected changes in the composition of the labor force.[16] From 2021 onward, the unemployment rate is expected to remain about one-quarter of one percentage point

above the natural rate, consistent with the historical average relationship between the two measures and with the projected gap of one-half of one percent between actual and potential GDP.

After 2027, both the actual and the natural rates of unemployment are projected to decline gradually as the labor force ages and becomes increasingly more educated. Older and more educated workers tend to have lower actual and natural rates of unemployment, so those rates are expected to decline as the workforce ages and becomes more educated. By 2047, the natural rate is projected to be slightly less than 4.6 percent, and the actual rate is projected to be about 4.8 percent. Those rates are similar to the projections CBO published last year.

Average Hours Worked. Different subgroups of the labor force work different numbers of hours, on average. Men tend to work more hours than women do, for example, and people between the ages of 30 and 40 tend to work more hours than people between the ages of 50 and 60. In CBO's estimation, those differences among groups will remain stable. However, the agency also expects that over the long term, the composition of the labor force will shift toward groups that tend to work less (such as older workers). As a result, the average number of hours worked by the labor force as a whole is expected to decline slightly. By 2047, the average number of hours that people work is expected to be about 2 percent less than it is today.

Total Hours Worked. On the basis of projections of the size of the labor force, average hours worked, and unemployment, CBO anticipates that total hours worked will increase at an average annual rate of 0.3 percent between 2017 and 2047.

Earnings as a Share of Compensation. Workers' total compensation consists of taxable earnings and nontaxable benefits, such as employers' contributions to health insurance and pensions. Over the years, the share of total compensation paid in the form of earnings has declined—from about 90 percent in 1960 to about 81 percent in 2016—mainly because the cost of

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15. For more details on CBO's long-term projections of the labor force and on changes from last year, see Congressional Budget Office, "CBO's Long-Term Projections of Labor Force Participation," *CBO Blog* (January 13, 2017), www.cbo.gov/publication/52365. For a discussion of CBO's 10-year projections of the labor force, see Congressional Budget Office, "Labor Market Projections," *CBO Blog* (February 2, 2017), www.cbo.gov/publication/52393.

16. That decline reflects the decreasing share of younger workers and the rising share of older workers in the working-age population: Older workers have lower unemployment rates than younger ones do, so the changing shares will reduce the overall rate.

health insurance has risen more quickly than total compensation.[17]

CBO expects that trend in health care costs to continue, which, by itself, would further decrease the proportion of compensation that workers receive as earnings. However, under current law, a new excise tax on certain employment-based health insurance plans that have premiums above specified amounts is scheduled to take effect in 2020. Some employers and workers are expected to respond by shifting to less expensive plans, thereby reducing the share of compensation consisting of health insurance premiums and increasing the share that consists of earnings. CBO projects that the effects of the tax on the mix of compensation will roughly offset the effects of rising costs for health care until the effects of rising costs outweigh those of the excise tax late in the projection period.[18] As a result, the share of compensation that workers receive as earnings is projected to remain close to 80 percent through 2047.

Growth of Real Earnings per Worker. Trends in prices, nonwage compensation (such as employment-based health insurance), average hours worked, and labor productivity (discussed below) imply that real earnings per worker will grow by an average of 1.1 percent annually over the 2017–2047 period.

Share of Earnings Below the Taxable Maximum. Social Security payroll taxes are levied only on earnings up to a maximum annual amount ($127,200 in 2017). Below that amount, earnings are taxed at a combined rate of 12.4 percent, split between the employer and employee (self-employed workers pay the full amount); no tax is paid on earnings above the cap. The taxable maximum has remained a nearly constant proportion of the average wage since the mid-1980s, but because earnings have grown more for higher earners than for others, the portion of covered earnings on which Social Security payroll taxes are paid has fallen from 90 percent in 1983 to

82 percent now.[19] CBO anticipates that the unequal growth in earnings will continue for the next decade and then stop. The portion of earnings subject to Social Security taxes is projected to fall to 79 percent by 2027 and to remain at that level thereafter.

Changes in Other Labor Market Outcomes Since Last Year. The most important change since last year in the labor market outcomes discussed in this section is to the projected share of earnings below the taxable maximum. Reflecting a reexamination of recent trends, that share is expected to be about 2 percentage points higher, on average, over the 30-year period than CBO estimated last year. Data for the past few years show smaller-than-expected increases in the share of wages and salaries received by higher earners. In response, the agency made a downward revision to projected increases in that share over the next decade. With a smaller share of wages and salaries received by higher earners, a larger share will be received by people whose annual earnings are below the maximum amount subject to Social Security payroll taxes.[20]

Capital Accumulation and Productivity

In addition to growth in the labor force and the number of hours worked, two other important factors affect the growth in output. One is the accumulation of capital, including physical structures, equipment, land, and inventories used in production, along with intangible capital such as computer software. The accumulated stock contributes a stream of services to production. The second is the growth of total factor productivity (TFP), which is the growth of real output per unit of combined labor and capital services, or the growth of output that is not explained by the growth of labor and capital. The growth rates projected for the labor supply, the capital stock, and TFP result in CBO's projection of the average growth of labor productivity (output per worker). This year, CBO projects slightly lower rates of capital accumulation and productivity than it did last year.

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17. For more details, see Congressional Budget Office, *How CBO Projects Income* (July 2013), www.cbo.gov/publication/44433.

18. CBO anticipates that the effects of the excise tax on the taxable share of compensation will diminish over time, both because the agency expects that most people will continue to want a significant amount of health insurance and because the Affordable Care Act set minimum amounts of coverage for health insurance plans. Therefore, the number of additional people moving to less expensive insurance plans will eventually dwindle.

19. Covered earnings are those received by workers in jobs subject to Social Security payroll taxes. Most workers pay payroll taxes on their earnings, although a small number—mostly in state and local government jobs or in the clergy—are exempt.

20. The revision also implies that households with lower individual income tax rates will earn a larger share of total income than CBO projected last year, so that total income tax revenues will be lower than previously projected.

Capital Services. Over the longer term, in CBO's view, growth in the nation's stock of capital will be driven by private saving, federal borrowing, and international flows of financial capital. Private saving and international capital flows tend to move with the after-tax rate of return on investment, which measures the extent to which investment in the stock of capital results in a flow of income. That rate is affected both by tax rates and by the growth of TFP. Capital services are expected to expand slightly more slowly than output after 2027 because of rising federal borrowing and increasing effective marginal tax rates.

Total Factor Productivity. The annual growth of TFP is projected to increase from about 1.1 percent in 2017 to about 1.2 percent in 2023 and then to remain at that rate through 2047, yielding an average annual growth rate of roughly 1.2 percent from 2017 to 2047. That projected average rate is about 0.3 percentage points slower than the average annual rate of nearly 1.5 percent observed since 1950 and about 0.1 percentage point slower than the average rate recorded since 1990.

The projected path for TFP reflects several considerations that, in CBO's judgment, suggest growth in coming decades will be slower than the long-term historical average. For example, with the exception of a period of rapid growth in the late 1990s and early 2000s, productivity has tended to grow more slowly in recent decades than it did during the 1950s and 1960s. The long-term trend suggests that projections for the next few decades should place greater weight on more recent, slower growth than on the relatively rapid growth of the more distant past. Thus, although CBO's projections include an acceleration in the growth of TFP from its unusually slow recent growth, the agency anticipates that TFP will return to a growth rate that is slower than its long-term average.

Some developments in particular support such projections for TFP. One important such development is the anticipated growth in labor quality, a measure of workers' skills that accounts for educational attainment and work experience that, in CBO's framework, is implicitly a part of TFP. Following a relatively rapid rise during the 1980s and 1990s, growth in labor quality slowed after 2000. In CBO's judgment, that change results both from a gradual and persistent slowdown in the increase in average educational attainment and from the burgeoning retirement of a relatively large and skilled portion of the workforce—the baby-boom generation. In coming decades, however, the slowdown in the growth of labor quality is expected to be partly offset by the aging of those remaining in the labor force, especially as better health and longer life expectancy lead people to stay in the workforce longer than did members of previous generations. (An older workforce generally has a larger proportion of more highly educated workers because they tend to remain in the labor force longer than do workers with less education.) Nevertheless, CBO anticipates slower growth in labor quality than in the past.

Another factor that is projected to slow the growth of TFP relative to its long-term average is the expected reduction in spending for federal investment. Under the assumptions used for CBO's baseline, the government's nondefense discretionary spending is projected to decline over the next decade to a much smaller percentage of GDP than it has averaged in the past. About half of nondefense discretionary spending from the 1980s onward consisted of federal investment in physical capital (such as roads and other infrastructure), education and training, and research and development—all of which, in CBO's judgment, contributed to TFP growth. Consequently, lower nondefense discretionary spending as a percentage of GDP would mean less federal investment, causing TFP to grow more slowly.

Labor Productivity. Taken together, the projections of labor supply, capital services, and TFP result in labor productivity that is expected to grow by 1.6 percent annually over the 2017–2047 period.

Changes in Capital Accumulation and Productivity Since Last Year. CBO's projection of growth in capital services is below the rate it projected last year, largely because the agency has lowered its projection for the growth of TFP relative to the rate of growth in recent decades. With TFP projected to grow more slowly relative to its historical average, the rate of return on capital and incentives to invest is dampened.

CBO's projection for average TFP growth is about 0.1 percentage point slower than projected last year. Part of the revision reflects the agency's reassessment of the relative contributions of labor and capital services to output in history and in the projection and has essentially no

net effect on the projected growth of GDP.[21] However, the revision also reflects updated information that indicates relatively weak recent growth in comparison to recent decades.

In addition, the revision reflects three improvements in CBO's method of estimating growth of potential, or trend, TFP. First, CBO has changed the primary measure of labor market slack that it uses to measure the effects of business-cycle fluctuations when estimating underlying trends in key economic variables: Rather than using the unemployment gap (the difference between the actual and natural unemployment rates), the agency now uses the employment gap (the difference between the actual and potential employment rates). Second, in assessing the slow growth of TFP since 2007, CBO now attributes it less to cyclical weakness and more to underlying trends, resulting in an estimate of slower growth in potential TFP during the 2000s. Those changes reduce the projected growth of TFP in ways that directly affect GDP growth. A third, minor methodological change involves the way CBO accounts for the acceleration of TFP growth in the late 1990s and early 2000s. CBO now estimates that less of that acceleration reflected temporarily strong economic conditions and more of it reflected stronger growth in potential TFP. That change slightly boosts projected potential TFP growth and partly offsets the negative effects of the other two changes.

Inflation

CBO projects rates of inflation for two categories: prices of consumer goods and services and prices of final goods and services in the economy.[22] Those rates influence nominal levels of income and interest rates and thereby influence tax revenues, various types of federal expenditures that are indexed for inflation, and interest

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21. The agency also reassessed the relative contributions of labor and capital services to output, aligning them more closely with recent trends in income shares and with estimates by other leading researchers. That change increased the estimated historical and projected contribution of capital services to output, but also had the offsetting effect of reducing the estimate of historical and projected TFP, leaving the projection of GDP essentially unchanged.

22. Final goods and services are those purchased directly by consumers, businesses (for investment), and governments, as well as net exports.

payments on federal debt. CBO's projections of inflation this year are essentially unchanged.

Prices of Consumer Goods and Services. Consumer price inflation is measured by the annual rate of change in both the consumer price index for urban wage earners and clerical workers and the consumer price index for all urban consumers (CPI-U). Over the 2017–2047 period, CBO projects, inflation in both measures will average 2.4 percent. That long-term rate is slightly less than the average rate of inflation since 1990, when growth in the CPI-U averaged 2.5 percent per year.

Prices of Final Goods and Services. After 2018, the annual inflation rate for all final goods and services produced in the economy, as measured by the rate of increase in the GDP price index, is projected to average 0.4 percentage points less than the annual increase in the consumer price indexes. The GDP price index grows more slowly than the consumer price indexes because it is based on the prices of a different set of goods and services and a different method of calculation.

Changes in Inflation Since Last Year. Inflation in both measures of consumer prices is projected to be the same as the rates CBO projected last year for the 2016–2046 period. The projected gap between the CPI-U and the GDP price index also remains unchanged from last year's estimate.

Interest Rates

CBO makes projections of the interest rates, both real and nominal, that apply to federal borrowing, including the rate on 10-year Treasury notes and special-issue Social Security bonds. It also projects the average nominal interest rates on federal debt held by the public and on the bonds held in the Social Security trust funds. Those rates influence the evolution of the trust funds and the cost of the government's debt burden.

After considering a number of factors, including slower growth of the labor force, CBO expects real interest rates on federal borrowing to be lower in the future than they have been, on average, over the past few decades. The real interest rate on 10-year Treasury notes (calculated by subtracting the rate of increase in the consumer price index from the nominal yield on those notes) averaged

roughly 3.1 percent between 1990 and 2007.[23] That rate has averaged 0.9 percent since 2009 and is projected to be 1.2 percent in 2027. In CBO's projections, the rate continues to rise thereafter, reaching 2.3 percent in 2047, 0.8 percentage points lower than its average over the comparison period, 1990 to 2007. CBO's projections for interest rates in this year's long-term budget outlook are generally lower than last year's.

Factors Affecting Interest Rates. Interest rates are determined by a number of factors. CBO projects interest rates by comparing how the values of those factors are expected to differ in the long term relative to their average values in the past. However, conclusions from such analyses depend strongly on the period considered: Real interest rates were low in the 1970s because of an unexpected surge in inflation. In the 1980s, when inflation declined at an unexpectedly rapid pace, real rates were high.[24] Interest rates fell sharply during the financial crisis and recession that began in 2007.

To avoid using any of those possibly less representative periods, CBO considered average interest rates and their determinants for the 1990–2007 period and then judged how different those determinants might be over the long term.[25] That period was chosen for comparison because it

featured fairly stable expectations of inflation and no severe economic downturns or financial crises.

Some factors reduce interest rates; others increase them. In CBO's assessment, over the 2017–2047 period, several factors will reduce interest rates on government securities relative to their 1990–2007 average:

- The labor force is projected to grow much more slowly than it has for the past few decades. Excluding associated changes in the behavior of other variables (including the unemployment rate), that slower growth in the number of workers will tend to increase the amount of capital per worker in the long term, reducing the return on capital and, therefore, also reducing the return on government bonds and other investments.[26]

- The share of total income received by higher-income households is expected to be larger in the future than it has been during the past few decades. Higher-income households tend to save a greater proportion of their income, so the difference in the distribution of income is projected to increase the total amount of saving available for investment, other things being equal. As a consequence, the amount of capital per worker is projected to rise and interest rates are expected to fall.

- TFP will grow more slowly in the future than it has in recent decades, CBO projects. For a given rate of investment, lower productivity growth reduces the return on capital and results in lower interest rates, all else being equal.

- The risk premium—the additional return that investors require to hold assets that are riskier than Treasury securities—will probably remain higher in the future than its average over the 1990–2007 period. Financial

23. Between 1970 and 2007, the real interest rate on 10-year Treasury notes averaged 3.2 percent; the average from 1953 to 2007 was 2.9 percent. Historical inflation rates are taken from the consumer price index, adjusted to account for changes over time in the way that the index measures inflation. See Bureau of Labor Statistics, "CPI Research Series Using Current Methods (CPI-U-RS)" (updated April 13, 2016), www.bls.gov/cpi/cpiurs.htm.

24. CBO calculates real interest rates by subtracting expected rates of inflation from nominal interest rates. Borrowers and lenders agree to nominal interest rates after accounting for their expectations of what inflation will be. However, if inflation ends up being higher than was expected when the rates were agreed to, real interest rates will turn out to be lower than anticipated. If inflation ends up lower than expected, the opposite will occur. CBO's approach is based on an assumption that the actual consumer price index, adjusted to account for changes over time in the way that the index measures inflation, is a useful proxy for expectations of inflation. One drawback is that if trends in inflation are fluctuating rapidly over time, changes in expectations may lag behind changes in actual inflation. Although CBO's approach could mismeasure expectations of inflation and real interest rates in some years, the way inflation has varied over time suggests that CBO's approach yields useful measurements of 30-year averages.

25. A Bank of England study identified a similar set of determinants that account for the decline in real interest rates over the past 30 years. See Rachel Lukasz and Thomas D. Smith, *Secular Drivers of the Global Real Interest Rate*, Staff Working Paper 571 (Bank of England, December 2015), http://tinyurl.com/z6zqnb7 (PDF, 1.8 MB).

26. For more information about the relationship between the growth of the labor force and interest rates, see Congressional Budget Office, *How Slower Growth in the Labor Force Could Affect the Return on Capital* (October 2009), www.cbo.gov/publication/41325.

markets were already showing less appetite for risk in the early 2000s, resulting in higher risk premiums than in the 1990s. The demand for low-risk assets was further strengthened by the economic fallout from the financial crisis, the slow subsequent recovery, and financial institutions' response to increased regulatory oversight. Moreover, in the past several years, the perception that investments in emerging market economies were riskier than investments in the United States probably contributed to the increased demand for U.S. assets (particularly federal debt) that are considered to be relatively risk-free. The rise in demand for Treasury securities from those sources contributed to lower returns (that is, to lower interest rates). CBO expects the risk premium to gradually decline over the next three decades but to remain above its average level during the comparison period from 1990 to 2007.

At the same time, in CBO's assessment, several factors will tend to boost interest rates on government securities relative to their average over the 1990–2007 period:

■ Under CBO's extended baseline, federal debt is expected to be much larger as a percentage of GDP than it was before 2007—reaching 90 percent by 2027 and 150 percent by 2047. The latter figure is more than three-and-a-half times the average over the 1990–2007 period. Higher federal borrowing tends to crowd out private investment in the long term, reducing the amount of capital per worker and increasing both the return on capital and interest rates over time.

■ Net inflows of capital from other countries will be smaller as a percentage of GDP in the future than they have been, on average, in recent decades, CBO projects. In the 1990s and early to middle 2000s, rapid economic growth and high rates of saving in various nations with emerging market economies led to large flows of capital from those countries to the United States. Recent weakness in the outlook for global economic growth suggests demand for investment abroad will be somewhat restrained and, therefore, flows of capital into the United States will remain strong for the next several years. Beyond the next decade, however, as foreign economies continue to grow, their consumption will probably increase relative to saving because markets for their debt will develop and because average citizens will tend to receive more of

the gains from economic growth. Consequently, their demand for domestic investments will rise. That increased demand is projected to gradually reduce capital flows to the United States relative to those in the 1990s or early 2000s, decreasing domestic investment and the amount of capital per worker and boosting rates of return. (Those developments are consistent with CBO's projection that the U.S. trade deficit, the gap between its imports and exports, will be narrower in the future as a percentage of GDP than it has been for the past few decades.)

■ The capital share of income—the percentage of total income that is paid to owners of capital—has been on an upward trend for the past few decades. CBO projects that the share will decline somewhat over the next decade from its current, elevated level but remain higher than its average over recent decades. The factors that appear to have contributed to its rise (such as technological change and globalization) are likely to persist, keeping it above the historical average. In CBO's estimation, a larger share of income accruing to owners of capital will directly boost the return on capital and, thus, interest rates.

■ The retirement of members of the baby-boom generation and slower growth of the labor force will reduce the number of workers in their prime saving years relative to the number of older people who are drawing down their savings, CBO projects. As a result, the total amount of saving available for investment will decrease (all else being equal), which will tend to reduce the amount of capital per worker and thereby push up interest rates. (CBO estimates that this effect will only partially offset the positive effect on saving of increased income inequality, leaving a net increase in savings available for investment.)

CBO also has considered other influences on interest rates but has concluded that they will have relatively small effects.

Some factors mentioned above are easier than others to quantify. For instance, the effect of labor force growth and rising federal debt can be estimated from available data, theoretical models, and estimates in the literature. The extent to which other factors will affect interest rates is more difficult to estimate. A shift in preferences for low- rather than high-risk assets is not directly observable, for

example. And although the distribution of income is observable, neither models nor empirical estimates offer much guidance for quantifying its effect on interest rates.

In light of those sources of uncertainty, CBO relies not only on economic models and findings from the research literature to guide its assessments of the effects of various factors on interest rates over the long term, but also on information from financial markets. The current rate on 30-year Treasury bonds, for example, reflects market participants' judgments about the path that interest rates on short-term securities will take 30 years into the future. That market forecast informs CBO's assessment of market expectations for the risk premium and for investment opportunities in the United States and abroad, and it points to considerably lower interest rates well into the future relative to those of recent decades.

Projections of Interest Rates. The estimates and assumptions that underlie CBO's extended baseline projections suggest a real interest rate on 10-year Treasury notes that averages about 1.5 percent over the 2017–2047 period. In 2047, the rate is projected to reach 2.3 percent. The nominal interest rate on those notes is projected to average 3.8 percent over the 2017–2047 period and to reach 4.7 percent in 2047.

The average interest rate on all federal debt held by the public tends to be somewhat lower than the rates on 10-year Treasury notes because interest rates are generally lower on shorter-term debt than on longer-term debt and because Treasury securities are expected to mature, on average, over periods of less than 10 years.[27] In combination, CBO's projections of interest rates for assets of different maturities and estimates of the average maturity of federal debt for the period beyond the agency's 10-year baseline lead to a 0.3 percentage-point difference between the rate on 10-year Treasury notes and the effective rate on federal debt over the 2028–2047 period. That difference is projected to average 0.6 percentage points over the next decade. The difference is larger over that period than is projected for later years because a significant portion of federal debt that was outstanding during that period was issued at the very low interest rates prevailing in the aftermath of the 2007–2009 recession. (The average interest

rate on all federal debt is projected to rise more slowly than the 10-year rate because only a portion of federal debt matures each year.) Thus, CBO projects, the average nominal interest rate on all federal debt held by the public will be about 3.4 percent for the 2017–2047 period, reaching 4.4 percent in 2047.

The Social Security trust funds hold special-issue bonds that generally earn interest at rates that are higher than the average rate on federal debt. CBO projects an interest rate on bonds newly issued to the trust funds that averages 3.8 percent for the 2017–2047 period and reaches 4.7 percent in 2047. The corresponding real rates are 1.5 percent, on average, over the full period and 2.3 percent in 2047. Because interest rates on newly issued bonds are expected to increase in coming years, CBO projects that the average interest rate earned by all bonds held by the Social Security trust funds will be slightly lower over the next decade. That rate, which is used to calculate the present value of future streams of revenues and outlays for those funds, averages 3.6 percent for the 2017–2047 period.[28]

Changes in Interest Rates Since Last Year. CBO's projections for interest rates in this year's long-term budget outlook are lower than last year's. The real rates on 10-year Treasury notes and the Social Security bonds are projected to average 1.5 percent over the 30-year projection period and to be 2.3 percent in 2046. Last year, CBO projected both rates to average 1.9 percent over the 30-year period and to be 2.3 percent in 2046.

CBO's downward revisions to its projections of interest rates are rooted in a number of factors. Relative to the growth that occurred during the 1990–2007 period, CBO now projects that TFP will grow more slowly over the 2017–2047 period than the agency anticipated last year for the 2016–2046 period. Slower growth in TFP implies lower returns on capital and, in turn, lower interest rates. All told, the average projected interest rate on 10-year Treasury notes over the 2016–2046 period is 0.5 percentage points lower than that projected a year ago.

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27. In particular, from 2017 to 2027, the difference between the rate on 3-month Treasury bills and the rate on 10-year Treasury notes shrinks from 1.5 percentage points to its longer-run level of 0.8 percentage points.

28. A present value is a single number that expresses a flow of future income or payments in terms of an equivalent lump sum received or paid at a specific point in time; the present value of a given set of cash flows depends on the rate of interest—known as the discount rate—that is used to translate them into current dollars.

Over the next decade, CBO anticipates, investors' appetite for risk will be lower (and, consequently, the demand for Treasury securities will be higher) than the agency previously projected. CBO also expects foreign economic growth to be slower and, therefore, that both foreign and domestic demand for U.S. Treasury securities (relative to foreign securities) will be higher than previously estimated. CBO's revisions to both of those factors imply higher prices for Treasury securities and, therefore, lower interest rates for them.[29]

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29. After the release of last year's long-term projections, CBO revised its projection of the interest rate on Treasury securities over the next 10 years. The bulk of those revisions occurred last summer and are discussed in Congressional Budget Office, *An Update to the Budget and Economic Outlook: 2016 to 2026* (August 2016), www.cbo.gov/publication/51908. CBO subsequently made additional but smaller downward revisions to projected interest rates on Treasury securities in the near term. Those revisions are discussed in Congressional Budget Office, *The Budget and Economic Outlook: 2017 to 2027* (January 2017), www.cbo.gov/publication/52370.

Beyond the next decade, CBO expects the effects of lower appetite for risk and slower foreign growth to dissipate, but at a slower pace than previously projected. CBO anticipates that investors' appetite for risk will increase (and thus will reduce their demand for Treasury securities) as they gain confidence that the economy will continue to grow at a moderate pace with low inflation. CBO also projects that as foreign economic growth improves, the demand for U.S. Treasury securities (on the part of both foreign and domestic investors) will diminish. Relative to last year's projection, CBO expects the waning effects of those factors to be more gradual, which implies that interest rates will rise more slowly over the long term while the effect on rates in 2046 is roughly unchanged. CBO's downward revisions to interest rates are consistent with signals from financial markets that participants appear to have lowered their long-term expectations for interest rates since the agency released its previous long-term projections.

Changes in Long-Term Budget Projections Since July 2016

The 30-year projections of federal spending and revenues presented in this report differ from the projections that the Congressional Budget Office published in 2016 because of certain changes in law, revisions to some of the agency's assumptions and methods, and the availability of more recent data.[1] (Changes in demographic and economic variables are described in Appendix A.) CBO bases its long-term projections on the most recent 10-year budget projections available. This year, those projections are from the report published in January 2017; historically, however, the projections in *The Long-Term Budget Outlook* have been consistent with CBO's spring baseline.[2] Because most projections in the 2016 report ended in 2046, CBO compares projections through that year.

Federal debt held by the public is projected to rise from about 77 percent of gross domestic product (GDP) this year to 146 percent in 2046 under the extended baseline; last year, CBO projected that debt would rise from 76 percent of GDP in 2017 to 141 percent of GDP in 2046 (see Figure B-1).[3] As a percentage of GDP, revenues and noninterest spending are generally higher than CBO projected last year. Those differences stem primarily from lower projected GDP; projections of revenues and noninterest spending themselves were revised only modestly. (See Appendix A for details about CBO's projections of GDP.) The increase relative to GDP is larger for projected noninterest spending than for projected revenues.

Net spending for interest measured as a percentage of GDP is lower in most years compared with last year's projection, primarily because of lower projected interest rates. The resulting deficits are smaller from 2018 to 2037 than CBO projected a year ago; thereafter, they are larger than last year's projections.

In January 2017, CBO published less detailed long-term budget projections than those in this volume.[4] Those projections were not a full update but rather were based on a simplified approach that the agency uses between full updates.[5] Differences between the projections presented here and those published in January result from fully incorporating new budget, economic, and demographic projections into CBO's long-term model.

Changes in Spending and Revenues Under the Extended Baseline Since July 2016

In CBO's extended baseline, both total outlays and noninterest spending exceed revenues throughout the projection period. The difference between revenues and total spending (the deficit) is smaller, relative to GDP, than last year's projection for about two-thirds of the projection period, whereas the difference between revenues and noninterest spending is greater in nearly all years than last year's projection (see Figures B-1 and B-2). The discrepancy between the two differences stems primarily from lower projected net interest costs. Because of lower

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1. See Congressional Budget Office, *The 2016 Long-Term Budget Outlook* (July 2016), www.cbo.gov/publication/51580.

2. See Congressional Budget Office, *The Budget and Economic Outlook: 2017 to 2027* (January 2017), www.cbo.gov/publication/52370. CBO typically publishes 10-year budget projections three times per year: in winter, spring, and summer.

3. The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

4. See Congressional Budget Office, *The Budget and Economic Outlook: 2017 to 2027* (January 2017), www.cbo.gov/publication/52370.

5. For additional information about that simplified approach, see Congressional Budget Office, *Budgetary and Economic Outcomes Under Paths for Federal Revenues and Noninterest Spending Specified by Chairman Price, March 2016* (March 2016), pp. 13–15, www.cbo.gov/publication/51260.

Figure B-1.

Comparison of CBO's 2016 and 2017 Projections of Federal Debt Held by the Public and the Deficit Under the Extended Baseline
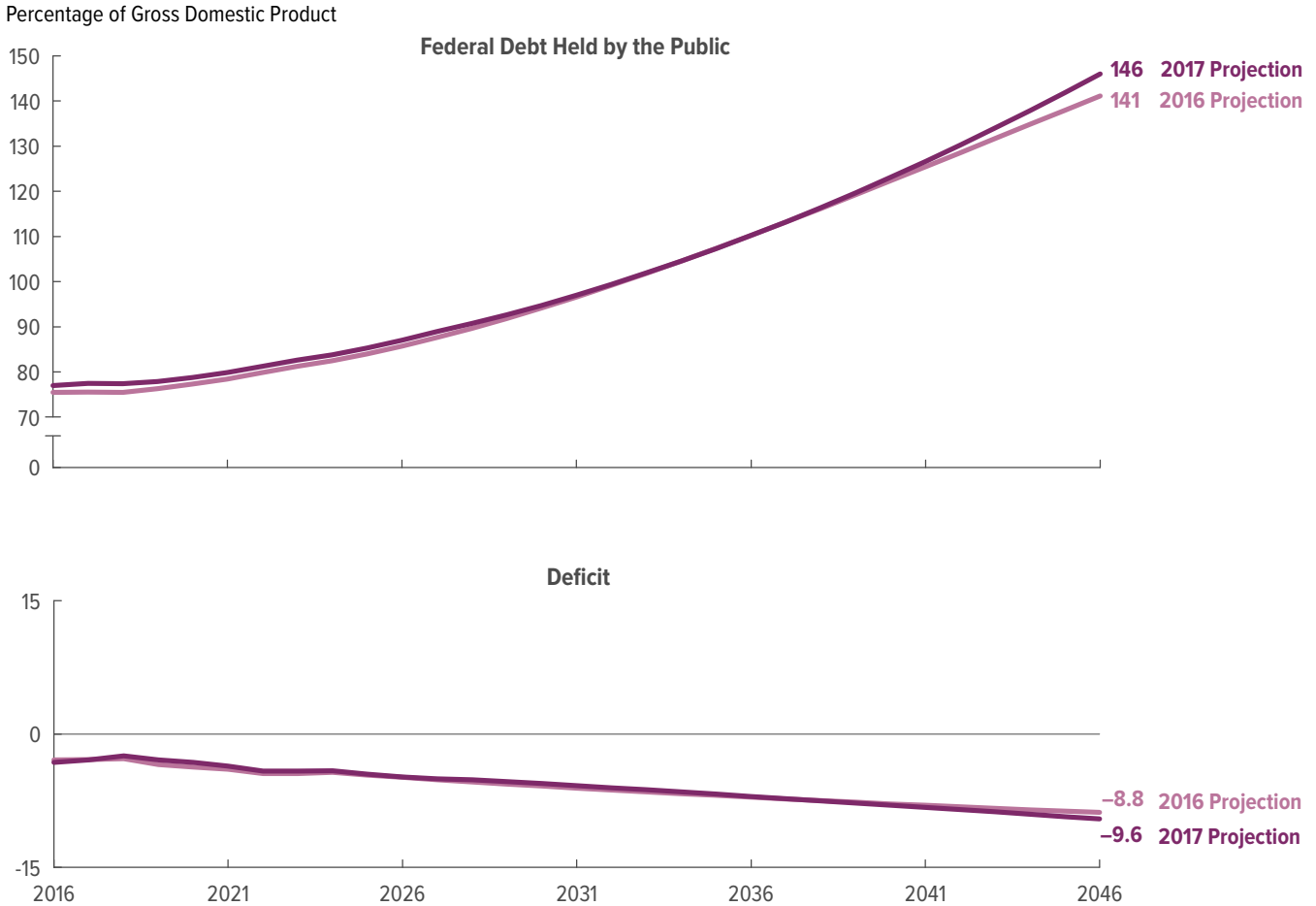
Percentage of Gross Domestic Product

Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

projected interest rates, net interest costs as a percentage of GDP are smaller in most years than CBO projected last year.

Noninterest Spending

Noninterest spending as a share of GDP is projected to be lower in 2017 and higher afterward compared with last year's projections. This year, noninterest spending is projected to equal 19.3 percent of GDP in 2017; last year's projection was 19.4 percent. For 2046, noninterest spending is projected to reach 23.1 percent of GDP; last year's projection was 22.4 percent.

After 2017, spending for Social Security and for the major federal health care programs—Medicare,

Medicaid, and the Children's Health Insurance Program, as well as outlays to subsidize health insurance purchased through the marketplaces established under the Affordable Care Act (ACA) and related spending—and other non-interest spending are projected to be slightly higher as a share of GDP than the amounts CBO projected last year. Those changes result mainly from the decrease in pro-jected GDP; in dollar terms, noninterest spending projec-tions were revised only modestly.

Social Security Spending. Relative to GDP, outlays for Social Security will be slightly higher in most years, CBO projects, compared with the amounts projected in 2016, even though those projections have declined in dollar terms. The changes to Social Security spending reflect

Figure B-2.

Comparison of CBO's 2016 and 2017 Projections of Spending and Revenues Under the Extended Baseline
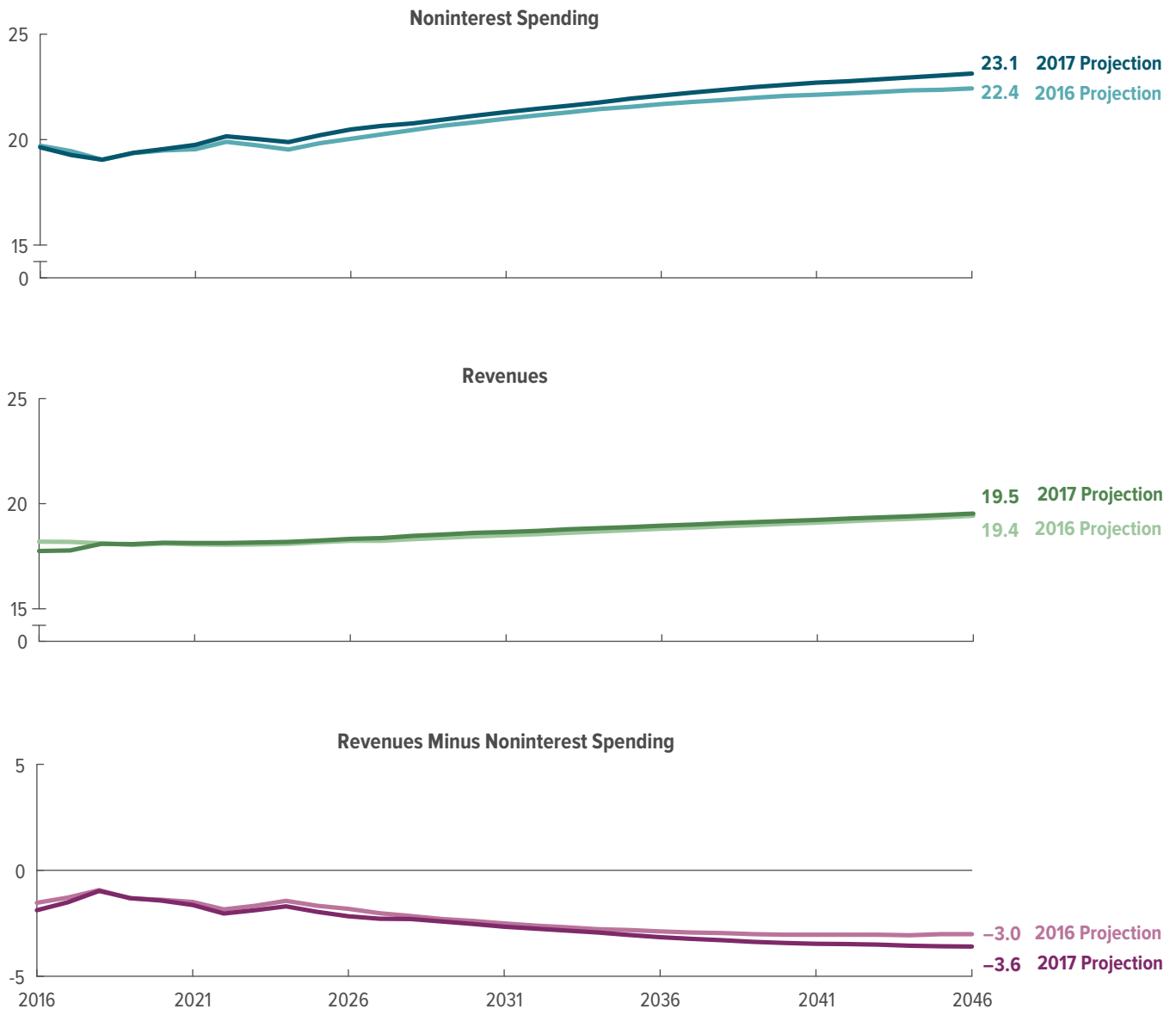
Percentage of Gross Domestic Product

Noninterest Spending

23.1 **2017 Projection**
22.4 **2016 Projection**

Revenues

19.5 **2017 Projection**
19.4 **2016 Projection**

Revenues Minus Noninterest Spending

−3.0 **2016 Projection**
−3.6 **2017 Projection**

Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

several developments: a lower estimate of the number of eligible beneficiaries resulting from downward revisions to population projections, a reduction in the projected number of disability insurance caseloads reflecting recent trends in disability prevalence, and lower projections of wage growth and, over the next decade, cost-of-living adjustments.

Major Federal Health Care Spending. CBO's current long-term projection of federal spending for the major health care programs, measured relative to GDP, is slightly higher than last year's projection. Projected health care spending was revised downward by less than projected GDP was reduced, in part because excess cost growth for Medicare is slightly faster in this year's

projection.[6] Spending for Medicare net of offsetting receipts is now projected to amount to 6.0 percent of GDP in 2046, or about 0.3 percentage points higher than CBO projected last year. Outlays for Medicaid and the Children's Health Insurance Program, combined with spending to subsidize health insurance purchased through the marketplaces established under the ACA and related spending, are projected to total 3.2 percent of GDP in 2046, similar to the sum projected last year.

To project spending for the major health care programs, CBO used the same method it used last year. Namely, CBO combined estimates of the number of people who are projected to receive benefits from those government health care programs with fairly mechanical estimates of the growth of spending per beneficiary (adjusted to account for demographic changes to the beneficiaries in each program). CBO has estimated such growth by combining projected growth in potential GDP per capita with projected excess cost growth for each program. (From 2017 to 2026, potential GDP per capita is projected to grow at an average rate of about 3.1 percent per year, down from the 3.2 percent estimated last year; from 2017 to 2046, the average growth rate is projected to be about 3.4 percent per year, down from last year's estimate of 3.5 percent.)

For each category of spending, CBO used the excess cost growth rates implicit in the 10-year baseline projections through 2027. For 2028, the rate equals the average rate from 2023 to 2027 (the last five years of the baseline projection).[7] The rates of excess cost growth for Medicare, Medicaid, and private health insurance all differ in 2028. After 2028, the rate for each category moves linearly, by the same fraction of a percentage point each year, from that category-specific rate to a rate of 1.0 percent in 2047.[8]

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6. Excess cost growth is the extent to which health care costs per capita, as adjusted for demographic changes, grow faster than potential GDP per capita. (Potential GDP is the maximum sustainable output of the economy.)

7. To better account for the volatility of health care spending, CBO extended the period over which the average excess cost growth rate is calculated for the 11th year from three years to five years.

8. For more information about CBO's method, see Chapter 3 of *The 2016 Long-Term Budget Outlook* (July 2016), www.cbo.gov/publication/51580.

For Medicare, the average annual rate of excess cost growth implicit in CBO's baseline projections is about 1.1 percent from 2018 through 2027, up from last year's average of 0.7 percent from 2017 through 2026. The excess cost growth rate for 2028 is 1.2 percent, an increase of 0.2 percentage points from last year's estimate. Excess cost growth is projected to average 1.1 percent over the full projection period, an increase of 0.1 percentage point from last year's estimate but lower than the historical average of 1.4 percent from 1985 to 2014.

For Medicaid, the average annual rate of excess cost growth implicit in CBO's baseline projections for the federal share of such spending is 1.3 percent over the 10-year period, down by 0.1 percentage point compared with last year's estimate. The rate for 2028 is 0.7 percent, similar to last year's estimate. The rate of excess cost growth is projected to average 1.2 percent over the full projection period, which is 0.1 percentage point lower than last year's estimate and 0.2 percentage points higher than its 1985–2014 average.

For private health insurance premiums over the 10-year period, the average annual rate of excess cost growth implicit in the agency's baseline projections is about 2 percent, which is similar to last year's estimate. The rate for 2028 is also about 2 percent, again similar to last year's estimate. The rate of excess cost growth is projected to decline from 2028 to 2047 and to be lower in 2047 than its historical 30-year average.

Other Noninterest Spending. In this year's projections, total federal spending on everything other than Social Security, the major federal health care programs, and net interest is slightly higher as a percentage of GDP than the share CBO projected last year. Although that projected spending has declined in dollar terms, as a percentage of GDP, it is generally slightly higher than last year's estimate because this year's projections of GDP are lower.

Over the coming decade, other noninterest spending relative to GDP is revised only slightly. Other mandatory spending is lower in dollar terms; the largest reductions stem from projected outlays for the Supplemental Nutrition Assistance Program, the refundable portion of the earned income and child tax credits, and higher education programs. The decline in other mandatory outlays is partially offset by an increase in projected discretionary

spending, chiefly stemming from additional appropriations thus far in 2017 for overseas contingency operations and activities designated as emergency requirements.

Beyond 2027, other noninterest spending is projected to be higher as a share of GDP than CBO projected last year. Discretionary spending measured as a share of GDP after 2027 is projected to be slightly higher than it was in last year's projections, reflecting the increase in the projection of such spending at the end of the coming decade. Beyond the next decade, CBO projects, discretionary spending will remain roughly constant as a share of GDP. The agency projects that other mandatory spending will decline in relation to GDP (excluding any effects that fiscal policy may have on the economy) after 2027 at the same rate by which it is projected to fall between 2022 and 2027. That rate of decline is slightly lower than CBO projected a year ago. After 2027, other mandatory spending as a share of GDP is slightly higher in the current extended baseline.

Interest Costs
Because CBO projects lower interest rates over the 30-year projection period, net interest costs as a percentage of GDP are projected to be lower for most years. Net interest costs for the coming decade are projected to average 2.1 percent of GDP; last year, the projected average was 2.5 percent. From 2017 to 2046, net outlays for interest are projected to average 3.4 percent of GDP, 0.3 percentage points lower than the amount CBO projected last year (see Figure B-3).

Revenues
Federal revenues relative to GDP are projected to be lower in 2017 and 2018 and slightly higher thereafter compared with CBO's 2016 projections. In 2027, revenues are projected to equal 18.4 percent of GDP, an increase of 0.1 percentage point over last year's estimate; by 2046, they rise to 19.5 percent of GDP, also 0.1 percentage point higher than last year's estimate.

An increase in projected payroll taxes accounts for most of the increase in total revenues relative to last year's projection. Although the share of total wages and salaries received by high earners is projected to increase over the next decade, CBO has reduced the extent of that increase relative to last year's projection. As a result, CBO now expects that a greater share of wages will be subject to Social Security payroll taxes throughout the projection

period. Largely as a result of that revision, payroll taxes are projected to be higher than they were in last year's projection. Projections of individual income taxes have changed only slightly, on net, reflecting several offsetting effects. On the one hand, the revision to the share of total wages received by high earners pushes down individual income tax revenues slightly. On the other hand, an upward revision to distributions from retirement accounts boosts individual income taxes.

Social Security's Finances
A common measure of the sustainability of a program that has a trust fund and a dedicated revenue source is its estimated actuarial balance over a given period—that is, the sum of the present value of projected tax revenues and the current trust fund balance minus the sum of the present value of projected outlays and a year's worth of benefits at the end of the period.[9] When that balance is negative, it is a deficit. The 75-year actuarial deficit currently projected for Social Security is 1.5 percent of GDP (slightly smaller than the 1.6 percent estimated last year) or 4.5 percent of taxable payroll (also smaller than last year's estimate of 4.7 percent).

Greater rates of labor force participation boosted the number of earners paying Social Security taxes but also increased the projected number of people who will later receive Social Security benefits. Over the 75-year period, the net effect of that change was to reduce the actuarial deficit. An increased projection of the share of wages taxable for Social Security also reduced the actuarial deficit. Offsetting those changes were factors that increased the actuarial deficit. Lower interest rates increased the extent to which future years with larger deficits are weighted in the projections. The 75-year period of analysis, which ends in 2091, includes an additional year of deficits. In addition, changes to the projected population reduced the ratio of workers paying payroll taxes to people receiving benefits, and a lower projection of productivity

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9.   A present value is a single number that expresses a flow of past and future income (in taxes) or payments (in benefits) in terms of an equivalent lump sum received or paid at a specific time. The value depends on the rate of interest, known as the discount rate, used to translate past and future cash flows into current dollars at that time. To account for the difference between the trust fund's current balance and the balance desired for the end of the period, the balance at the beginning is added to projected tax revenues, and an additional year of costs at the end of the period is added to projected outlays.

Figure B-3.

Comparison of CBO's 2016 and 2017 Projections of Net Spending for Interest Under the Extended Baseline
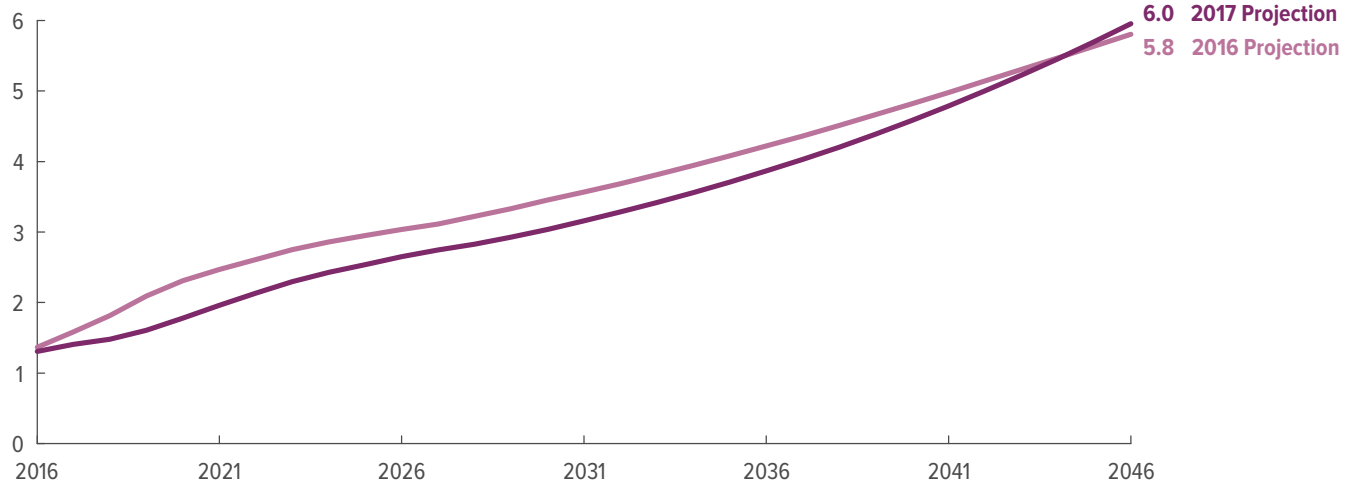
Percentage of Gross Domestic Product

Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

reduced projected wages and payroll tax receipts more than it decreased projected spending.

Another commonly used measure of Social Security's sustainability is a trust fund's date of exhaustion. CBO projects that, under current law, the Disability Insurance (DI) trust fund would be exhausted in fiscal year 2023 and the Old-Age and Survivors Insurance (OASI) trust fund would be exhausted in calendar year 2031. The combined OASDI trust funds are projected to be exhausted in calendar year 2030. Last year, those exhaustion dates were one year earlier.

Changes in Long-Term Budget Projections Since January 2017

CBO published updated long-term budget projections in January 2017, but those projections were not a full update of CBO's July 2016 results. Instead, those projections followed the January 2017 baseline

projections from 2017 to 2027 and then, for years after 2027, incorporated long-term economic projections that had been updated on an interim basis and applied those to estimates of spending for Social Security and net interest. For other components of the budget, CBO adopted a simplified approach that it uses regularly between full updates—in this case, by incorporating the growth rates for such components from the extended baseline in *The 2016 Long-Term Budget Outlook*. The current report, by contrast, fully incorporates new budget, economic, and demographic projections into CBO's long-term model.

Federal debt held by the public is now projected to reach 150 percent of GDP in 2047; in January, CBO projected it would reach 145 percent in that year. That change primarily reflects higher projected total outlays toward the end of the 30-year period.

List of Tables and Figures

About This Document

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