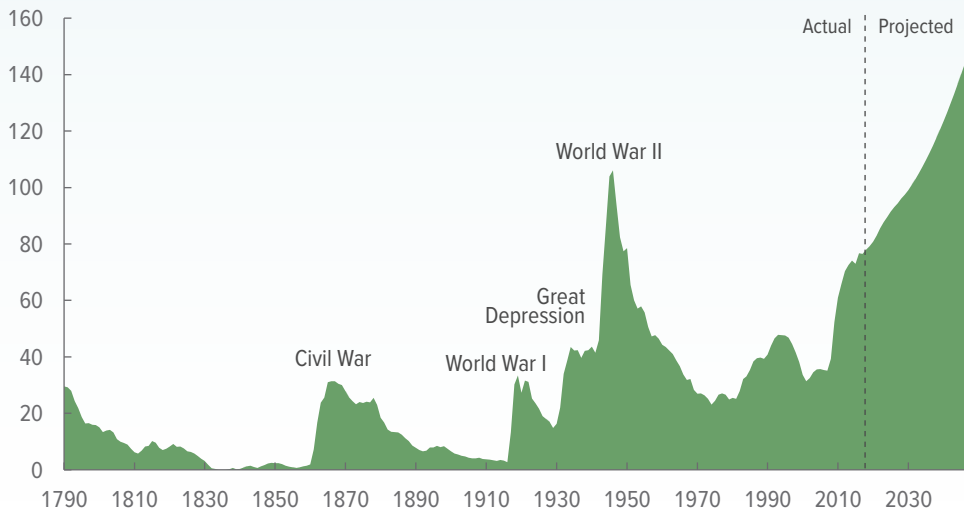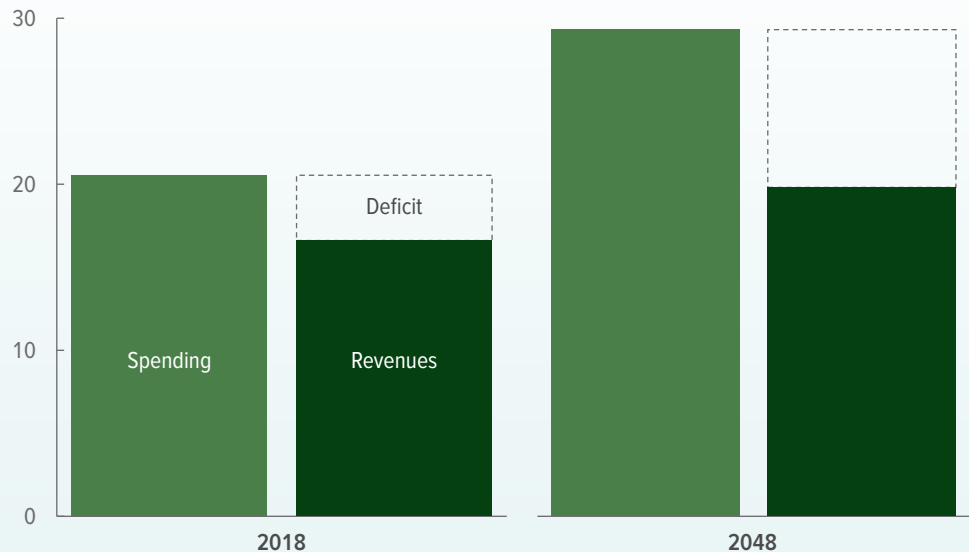# CBO

The 2018 Long-Term Budget Outlook

Percentage of GDP

Under current law, federal debt held by the public is projected to increase sharply over the next 30 years…

Percentage of GDP

…as spending grows more quickly than revenues do. Driving that spending growth are interest payments on the debt, major health care programs, and Social Security.

JUNE 2018

At a Glance

Each year, the Congressional Budget Office issues a set of long-term budget projections—that is, projections of what federal spending, revenues, deficits, and debt would be for the next 30 years if current laws generally did not change. This report is the latest in the series.

- In CBO's projections, the federal budget **deficit**, relative to the size of the economy, grows substantially over the next several years, stabilizes for a few years, and then grows again over the rest of the 30-year period, leading to federal **debt** held by the public that would approach 100 percent of gross domestic product (GDP) by the end of the next decade and 152 percent by 2048. Moreover, if lawmakers changed current laws to maintain certain policies now in place—preventing a significant increase in individual income taxes in 2026, for example—the result would be even larger increases in debt.

- The federal government's **net interest costs** are projected to climb sharply as interest rates rise from their currently low levels and as debt accumulates. Such spending would about equal spending for Social Security, currently the largest federal program, by the end of the projection period.

- **Noninterest spending** is projected to rise from 19 percent of GDP in 2018 to 23 percent in 2048, mainly because of increases in spending for Social Security and the major health care programs (primarily Medicare). Much of the spending growth for Social Security and Medicare results from the aging of the population. Growth in spending for Medicare and the other major health care programs is also driven by rising health care costs per person.

- **Revenues,** in contrast, are projected to be roughly flat over the next few years relative to GDP, rise slowly, and then jump in 2026. Thereafter, revenues would continue to rise relative to the size of the economy—although they would not keep pace with growth in spending. The projected growth in revenues is largely attributable to increases in individual income tax receipts.

- **Compared with last year's projections,** debt as a percentage of GDP is larger, but only modestly so, through 2041 and then lower thereafter. Deficits are higher as a percentage of GDP through 2025 and lower thereafter. That change is largely driven by changes in revenues and net interest costs. Revenues are initially lower as a share of GDP, but ultimately are higher because individual income taxes are now projected to grow more quickly as a result of provisions of Public Law 115-97 (originally called the Tax Cuts and Jobs Act and called the 2017 tax act in this report).

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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 this report indicates otherwise, the years that it refers to 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.

Unless the report specifies otherwise, Medicare outlays are presented net of offsetting receipts, which reduce outlays for the program.

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.

The 2018 Long-Term Budget Outlook

Summary

At 78 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 approach 100 percent of GDP by the end of the next decade and 152 percent by 2048 (see Table 1). That amount would be the highest in the nation's history by far. Moreover, if lawmakers changed current law to maintain certain policies now in place—preventing a significant increase in individual income taxes in 2026, for example—the result would be even larger increases in debt.[1] The prospect of large and growing debt poses substantial risks for the nation and presents policymakers with significant challenges.

In this report, CBO presents its projections of federal spending, 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 the spring of 2018.[2] 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 30-year 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 spending, revenues, deficits, and debt under the assumption that current laws generally remain unchanged. They also give lawmakers a point of comparison from which to measure the effects of proposed legislation.

Why Are Projected Deficits Rising?

In CBO's projections, the federal budget deficit, relative to the size of the economy, would grow substantially over the next several years, stabilize for a few years, and then grow again over the rest of the 30-year period. In total, deficits would rise from 3.9 percent of GDP in 2018 to 9.5 percent in 2048. (Adjusted to exclude the effects of timing shifts that occur because fiscal year 2018 began on a weekend, the budget deficit in 2018 would be higher, at 4.2 percent of GDP).[3] Those large budget deficits would arise because spending would grow steadily under current law, and revenues would not keep pace with that spending growth (see Figure 1).

In particular, over the next 30 years, spending as a share of GDP would increase for Social Security, the major health care programs (primarily Medicare), and interest on the government's debt. In CBO's projections, most of the spending growth for Social Security and Medicare results from the aging of the population: As members of

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1. CBO will analyze the effects of alternative fiscal scenarios in a forthcoming report.

2. CBO bases its long-term projections on its most recent 10-year budget projections. Typically, those projections are from the *Budget and Economic Outlook*; however, CBO made a number of relatively small changes to its baseline projections since the publication of that report in April. As a result, the long-term budget projections in this report are based on CBO's adjusted April 2018 baseline. For information on those underlying budget projections, see Congressional Budget Office, *An Analysis of the President's 2019 Budget* (May 2018), www.cbo. gov/publication/53884. For information on CBO's most recent economic projections, see Congressional Budget Office, *The Budget and Economic Outlook: 2018 to 2028* (April 2018), www. cbo.gov/publication/53651.

3. When the first day of the fiscal year (October 1) falls on a weekend, certain monthly payments (mostly for mandatory benefit programs such as Medicare, Supplemental Security Income, and certain programs for veterans) normally made on that day are shifted to the preceding fiscal year. Accordingly, for those benefit programs, only 11 months of payments will be made in that fiscal year rather than the usual 12, and the previous year will have one more payment. October 1 fell on a weekend in 2017, and that will happen again in 2022, 2023, and 2028. The resulting shifts in payments noticeably boost projected spending and deficits in 2022 and 2028; they reduce spending and the deficit in 2018 and 2024.

Table 1.

Key Projections in CBO's Extended Baseline

Percentage of Gross Domestic Product

	2018	**Projected Annual Average**		
		2019–2028	**2029–2038**	**2039–2048**
Revenues				
Individual income taxes	8.2	8.9	10.1	10.7
Payroll taxes	5.9	5.9	6.0	6.0
Corporate income taxes	1.2	1.5	1.4	1.4
Other[a]	1.4	1.2	1.3	1.5
Total Revenues	**16.6**	**17.5**	**18.8**	**19.5**
Outlays				
Mandatory				
Social Security	4.9	5.5	6.2	6.3
Major health care programs[b]	5.2	6.0	7.4	8.7
Other	2.6	2.5	2.3	2.1
Subtotal	12.6	13.9	15.9	17.2
Discretionary	6.3	5.7	5.4	5.5
Net interest	1.6	2.7	3.6	5.3
Total Outlays	**20.6**	**22.4**	**24.9**	**27.9**
Deficit	**-3.9**	**-4.9**	**-6.1**	**-8.4**
Debt Held by the Public at the End of the Period	**78**	**96**	**118**	**152**
Memorandum:				
Social Security				
Revenues[c]	4.4	4.5	4.6	4.5
Outlays[d]	4.9	5.5	6.2	6.3
Contribution to the Federal Deficit[e]	-0.4	-1.0	-1.6	-1.9
Medicare				
Revenues[c]	1.4	1.5	1.6	1.6
Outlays[d]	3.5	4.3	5.7	6.8
Offsetting Receipts	-0.6	-0.8	-1.0	-1.3
Contribution to the Federal Deficit[e]	-1.5	-2.1	-3.0	-3.9
Gross Domestic Product at the End of the Period (Trillions of dollars)	20.1	29.8	44.1	65.0

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 2028 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 all 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. Excludes interest credited to the trust funds.

d. Excludes 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 because it excludes intragovernmental transactions, interest earned on balances, and outlays related to administration of the program.

Figure 1.

The Federal Budget in CBO's Extended Baseline

Percentage of Gross Domestic Product

If current laws generally remained unchanged, the federal budget deficit would grow substantially over the next 30 years. Those large budget deficits would arise because spending would grow steadily and revenues would not keep pace with that spending growth.
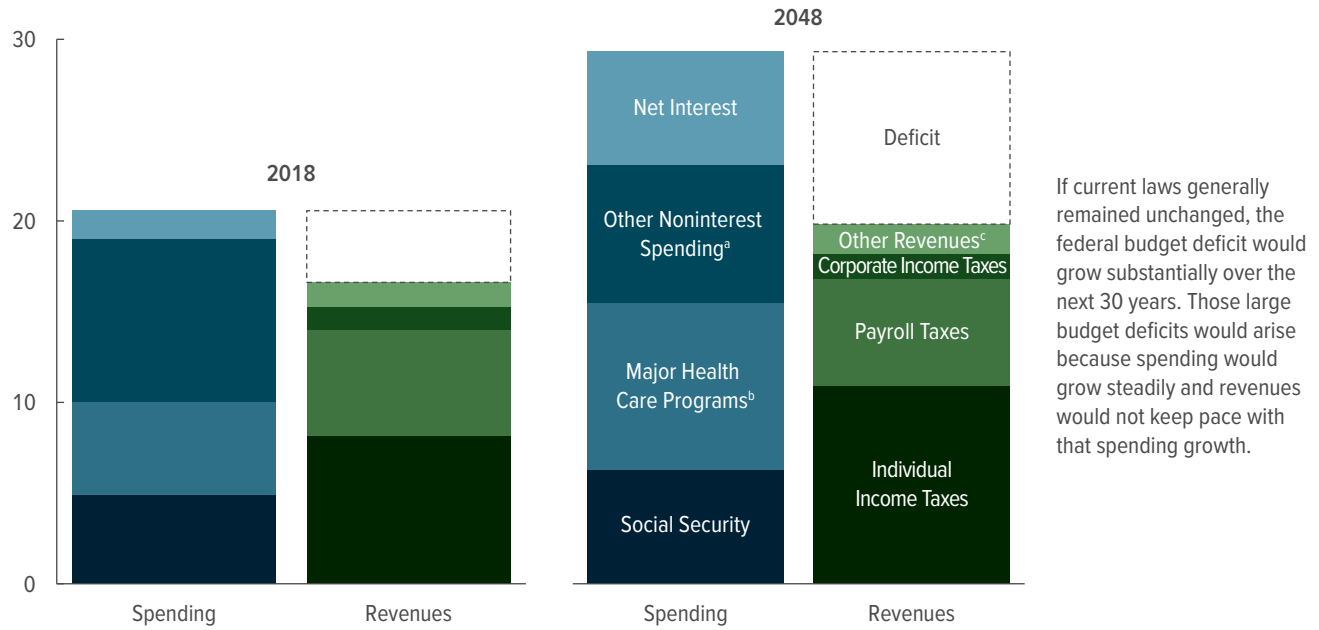
Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2028 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

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

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

the baby-boom generation (people born between 1946 and 1964) age and as life expectancy continues to rise, the percentage of the population age 65 or older will grow sharply, boosting the number of beneficiaries of those programs. Growth in spending on Medicare and the other major health care programs is also driven by rising health care costs per person. In addition, the federal government's net interest costs are projected to climb sharply as a percentage of GDP as interest rates rise from their currently low levels and as debt accumulates.

That spending growth would be only partially offset by declining spending for other programs. 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 decrease as a percentage of

GDP. Discretionary spending is projected to decline in most years over the next decade and then roughly stabilize as a percentage of GDP. (Mandatory spending is generally governed by provisions of permanent law, whereas discretionary spending is controlled by annual appropriation acts.)

Revenues, in contrast, would take a different path. They are projected to be roughly flat over the next few years relative to GDP, rise slowly, and then jump in 2026. Revenues would sharply increase that year because most of the provisions of Public Law 115-97 (originally called the Tax Cuts and Jobs Act and called the 2017 tax act in this report) that directly affect the individual income tax rate are set to expire at the end of calendar year 2025. (The 2017 tax act lowered individual income taxes beginning in 2018.) Thereafter, revenues would continue

to rise relative to the size of the economy—although they would not keep pace with spending growth.

The projected growth in revenues beyond 2028 is largely attributable to increases in individual income tax receipts. Those receipts are projected to grow mainly because income would rise more quickly than the price index that is used to adjust tax brackets and other parameters of the tax system. As a result, more income would be pushed into higher tax brackets over time. (Because of provisions of the 2017 tax act, the effect of real bracket creep in this year's projections is slightly greater than the effect that CBO projected in prior years.) Combined receipts from all other sources are projected to increase slightly as a percentage of GDP.

What Might Happen 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. (In that event, investors would become unwilling to finance the government's borrowing unless they were compensated with very high interest rates.)

How Does CBO Make Its Long-Term Budget Projections?
CBO's extended baseline, produced once a year, shows the budget's long-term path under most of the same assumptions that the agency uses in constructing its 10-year baseline. Both baselines incorporate these assumptions: current laws will generally remain unchanged, 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.

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 by the tax code. Other projections reflect past trends and CBO's assessments of how those trends would evolve if current laws generally remained unchanged.[4]

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4. For more information about how CBO makes long-term projections about the economy and federal budget, see

CBO's budget projections are built on its demographic and economic projections. CBO estimates that the population will grow more slowly than it has in the past and will be older, on average. CBO also anticipates that if current laws generally did not change, real GDP—that is, GDP with the effects of inflation removed—would increase by 1.9 percent per year, on average, over the next 30 years. That rate is nearly 1 percentage point lower than the annual average growth rate of real GDP over the past 50 years. That expectation of slower economic growth in the future is attributable to several factors—most notably, slower growth of the labor force. Projected growth in output is also held down by the effects of changes in fiscal policy under current law—above all, by the reduction in private investment that is projected to result from rising federal deficits.

How Uncertain Are Those Projections?
If current laws governing taxes and spending remained generally the same, debt would rise as a percentage of GDP over the next 30 years, according to CBO's central estimate (the middle of the distribution of potential outcomes). That projection is very uncertain, however, so the agency examined in detail how debt would change if four key factors were higher or lower than their levels in the extended baseline. Those four factors are labor force participation, productivity in the economy, interest rates on federal debt, and health care costs per person. Other factors—such as an economic depression, a major war, or unexpected changes in rates of fertility, immigration, or mortality—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 size 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 2048 to 41 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

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Congressional Budget Office, *An Overview of CBOLT: The Congressional Budget Office Long-Term Model* (April 2018), www.cbo.gov/publication/53667.

that equaled 3.0 percent of GDP each year starting in 2019. (In dollar terms, that amount would total about $630 billion in 2019.) If, instead, policymakers wanted debt in 2048 to equal its current share of GDP (78 percent), the necessary changes would be smaller (although still substantial), totaling 1.9 percent of GDP per year (or about $400 billion in 2019). The longer lawmakers waited to act, the larger the policy changes would need to be to reach any particular goal for federal debt.

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

Compared with last year's projections, CBO's current projections of debt as a share of GDP are higher through 2041 and lower thereafter. CBO now projects that debt measured as a share of GDP would be 3 percentage points lower in 2047 than it projected last year. (The previous edition of this volume showed projections through 2047.)[5] The increase in debt through 2041 stems primarily from tax and spending legislation enacted since then that boosted projected deficits through 2025—especially the 2017 tax act, the Bipartisan Budget Act of 2018 (P.L. 115-123), and the Consolidated Appropriations Act, 2018 (P.L. 115-141). In particular, the budgetary effects of the tax act are expected to peak during the middle of the next decade. In later years, the effects are expected to be modest, although their precise magnitudes are uncertain.

Deficits are smaller after 2025 than CBO projected last year because of lower projections as a share of GDP of noninterest spending and because of projections of revenues that are the same or higher than CBO estimated last year. The smaller deficits result in lower debt as a share of GDP after 2041 than CBO projected last year.

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. 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

If current laws generally remained unchanged, the federal budget deficit would grow substantially over the next few years. It would rise to 4.2 percent of GDP this year (up from 3.5 percent last year) and then climb to 5.1 percent

by 2022 (adjusted to exclude shifts in timing). The deficit would then continue to rise in dollar terms but stabilize as a percentage of GDP for the rest of the 10-year baseline period—although it would remain much higher than its 50-year average of 2.9 percent. In the following two decades, deficits would become notably larger again relative to the size of the economy as the gap between spending and revenues grew (see Figure 2). As a result, the deficit would rise from 4.8 percent of GDP in 2028 (adjusted to exclude shifts in timing) to 9.5 percent in 2048.

CBO projects that mandatory spending would rise significantly as a percentage of GDP under current law, driving up spending relative to revenues. The aging of the population will lead to increased outlays for Social Security and Medicare, mandatory programs that primarily benefit people 65 or older. Medicare outlays would also climb as a result of rising health care costs per person, in CBO's estimation. By 2048, under current law, federal spending through those two programs as well as Medicaid—the federal health care program for people with limited income and resources—for people age 65 or older would account for about half of all federal noninterest spending, compared with about two-fifths today. Moreover, because federal debt is projected to grow and interest rates are expected to rise from their currently low levels, 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 2028 (adjusted to exclude shifts in timing; that spending would be 24 percent if timing shifts were included) and to 29 percent by 2048. (Federal spending has averaged 20 percent of GDP over the past 50 years.)

Meanwhile, if current laws generally remained unchanged, revenues would remain near 16.6 percent of GDP for a few years (their current level), rise steadily to 17.5 percent by 2025, and then increase sharply in 2026 following the scheduled expiration of many provisions of the 2017 tax act.[6] Revenues are projected to increase to 18.1 percent of GDP in that year and then rise to 18.5 percent by 2028. Beyond 2028, revenues would grow faster than the economy but more slowly

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5.   See Congressional Budget Office, *The 2017 Long-Term Budget Outlook* (March 2017), www.cbo.gov/publication/52480.

6.   That law made many significant changes to the individual and corporate income tax systems. Those changes, on net, lowered taxes owed by most individuals and businesses beginning in calendar year 2018. Nearly all of the changes to individual income taxes are set to expire at the end of calendar year 2025.

Figure 2.

Federal Debt, Spending, and Revenues
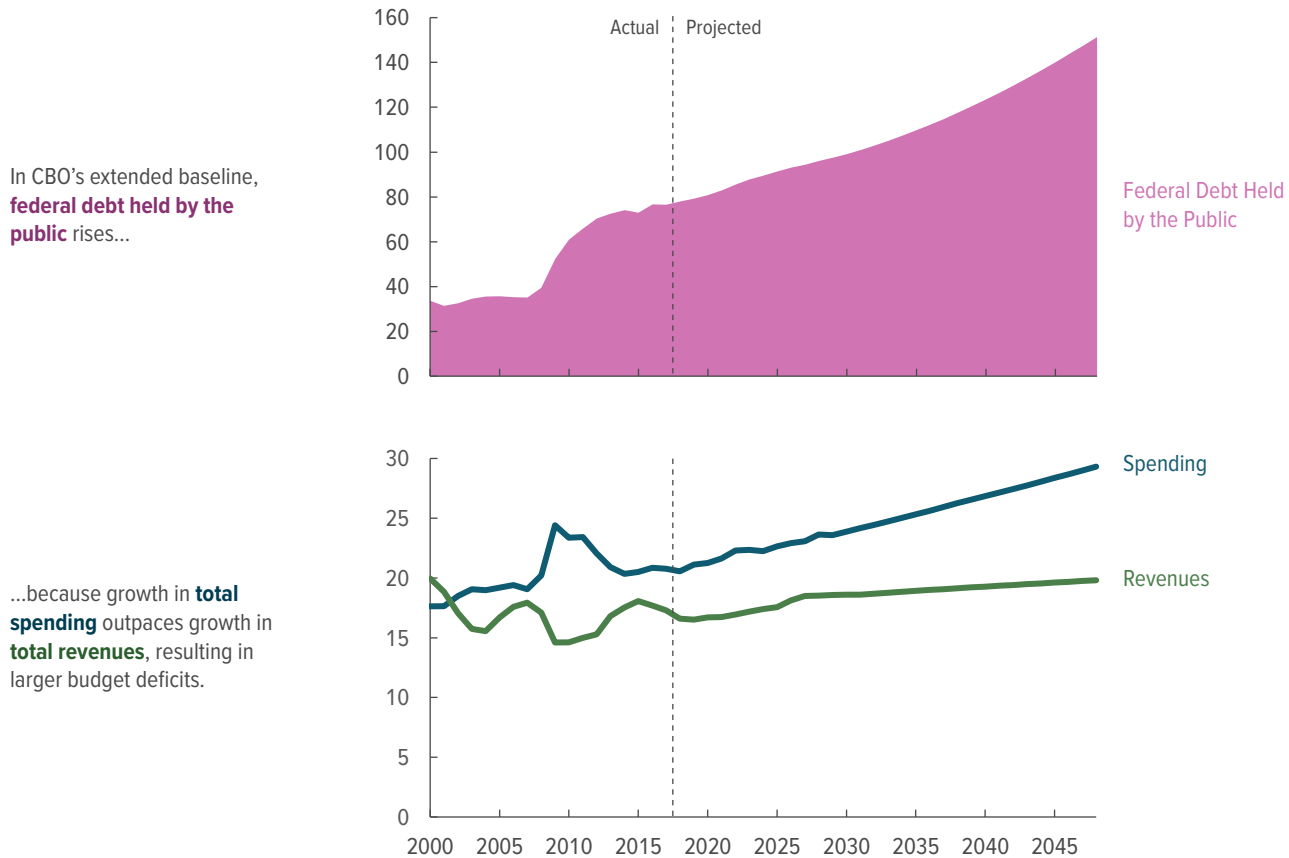
Percentage of Gross Domestic Product

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 2028 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

GDP = gross domestic product.

than spending. In part, revenues would rise because of real bracket creep, which pushes more income into higher tax brackets as people's income rises faster than inflation. In addition, revenues would grow rapidly from a new excise tax on certain employment-based health insurance plans if that law took effect, as scheduled, in 2022. All told, CBO projects, revenues would reach 19.8 percent of GDP in 2048. Although that share would exceed the 50-year average of about 17 percent, it would still fall short of projected spending.

Greater 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.[7] Measuring debt as a percentage of GDP is useful for comparing amounts of debt in different

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7. 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 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 2.   Continued

Federal Debt, Spending, and Revenues

Percentage of Gross Domestic Product

Spending on certain components of the budget—Social Security, the major health care programs, and net interest—is projected to rise relative to GDP; other spending, in total, is projected to decline.

Major Health Care Programs[a]
Other Noninterest Spending[b]
Social Security
Net Interest
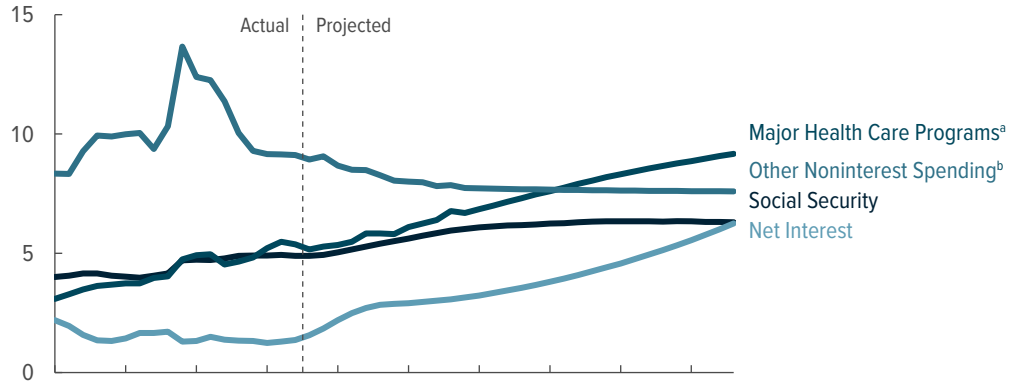
Increases in individual income taxes account for most of the rise in total **revenues** relative to GDP. Receipts from all other sources, taken together, are projected to be slightly higher in 2048 than they are today.
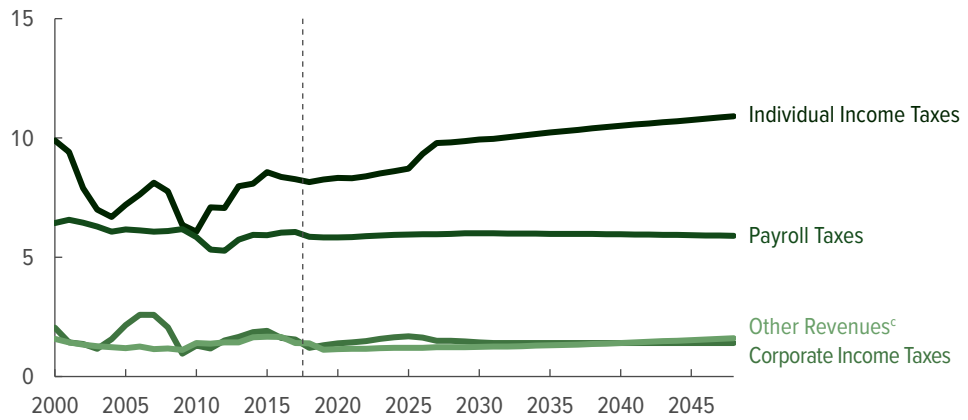
Individual Income Taxes

Payroll Taxes

Other Revenues[c]
Corporate Income Taxes

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.

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, that debt stood at 35 percent of GDP, but deficits arising from the 2007–2009 recession and the resulting policy responses caused it to grow sharply over the next five years. By the end of 2012, debt as a share of GDP had doubled to

70 percent. Since then, the upward trajectory has generally continued, and debt is projected to reach 78 percent of GDP by the end of this year—a very high amount by historical standards. (For comparison, such debt has averaged 41 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 3).

If current laws generally remained unchanged, the gap between spending and revenues would grow substantially through 2022, stabilize for a few years, and then continue to widen. As a result, federal debt as a percentage of GDP would reach unprecedented levels. CBO projects that debt

Figure 3.

Federal Debt Held by the Public

Percentage of Gross Domestic Product
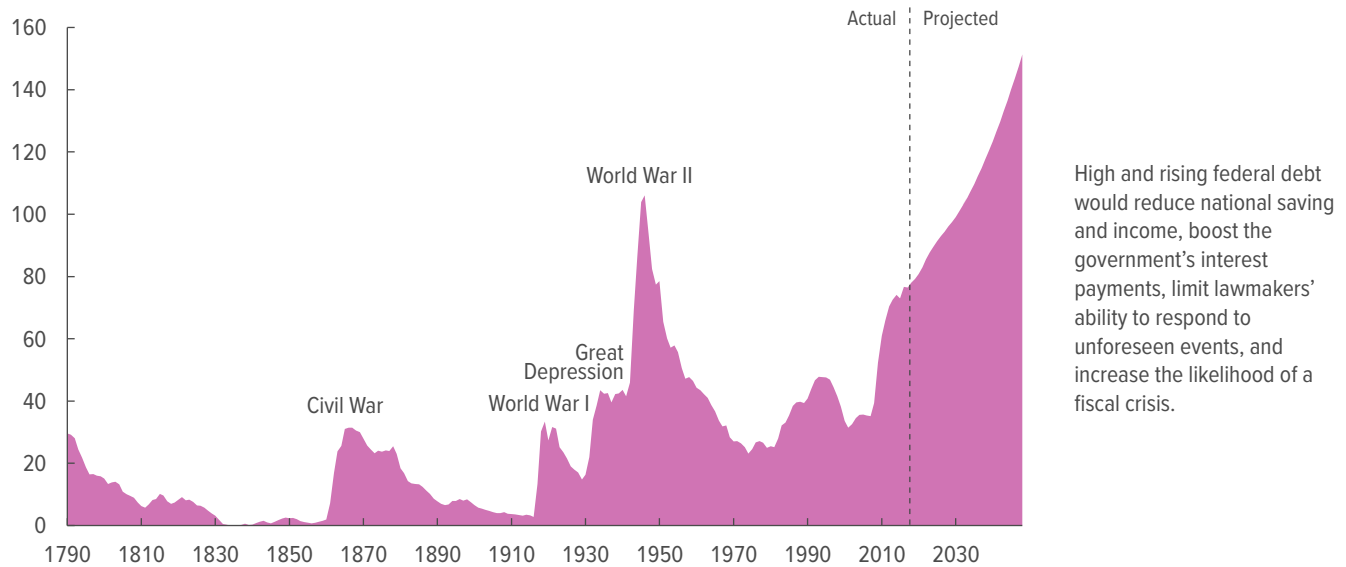
High and rising federal debt would reduce national saving and income, boost the government's interest payments, limit lawmakers' ability to respond to unforeseen events, and increase the likelihood of a fiscal crisis.

Source: Congressional Budget Office.

would rise to 96 percent of GDP by 2028, and six years later, in 2034, it would surpass the peak of 106 percent recorded in 1946. By 2048, federal debt would reach 152 percent of GDP—significantly larger than the average of the past five decades—and would be on track to grow even larger. Moreover, if lawmakers changed current laws to maintain certain policies now in place—preventing a significant increase in individual income taxes in 2026, for example—the result would be even larger increases in debt.

Consequences of a Large and Growing Federal Debt

The burgeoning federal debt over the coming decades would have these effects:

- 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, a situation in which the interest rate on federal debt rises abruptly, dramatically increasing the cost of government borrowing.

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 otherwise be the case. If the government borrowed more money, a greater amount of household and business saving would be used to buy Treasury securities, thus crowding out private investment. Both the government and private borrowers would face higher interest rates to compete for savings. Although those higher rates would strengthen the incentive to save, the increased government borrowing would exceed the rise in saving by households and businesses. As a result, total saving by all sectors of the economy (national saving) 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—such as factories and computers—workers would be less productive. Because productivity growth is the main driver of growth in people's real compensation, decreased investment also would reduce average compensation per hour, making people less inclined to work. CBO's extended baseline incorporates those economic effects as well as the feedback to the budget from negative effects on the economy.

Greater Pressure on the Budget From Higher Interest Costs

Current net interest costs are relatively small because interest rates have been so low. Under CBO's extended baseline, however, rising interest rates and increased federal borrowing boost net interest costs substantially. By 2045, those costs would surpass discretionary spending for the first time since 1962 (the earliest year for which relevant data are available).

Over the next few years, the unemployment rate is expected to decline and inflation is projected to rise. CBO expects the Federal Reserve to respond to those developments by continuing to raise the federal funds rate to keep inflation close to the central bank's long-term goal.[8] In addition, long-term interest rates are projected to rise gradually relative to short-term rates as the term premium (the premium paid to bondholders for the extra risk associated with holding longer-term bonds) moves up from its recent low levels. The term premium is projected to rise as investors gain more confidence in global economic growth, the demand for long-term Treasury securities as a hedge against unexpected declines in inflation dissipates, and the Federal Reserve reduces its holdings of long-term assets. CBO projects that interest rates would eventually settle at levels consistent with factors such as productivity growth, the demand for investment, and federal deficits. Under the extended baseline, interest costs are much higher than they would be if deficits were smaller and interest rates were lower.

The higher the government's interest costs, the more difficult it would be to achieve any particular target for deficit reduction. That is because, in order to reduce the deficit, 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), people's incentives to work and save would diminish as tax rates rose.[9] Alternatively, if policy changes included a reduction in federal spending for investment, both output and income would be lower than they would

have been if that spending had not been reduced.[10] In contrast, if reductions in, say, Social Security benefits were made to lessen spending, people might feel compelled to work more to replace that lost income, thus increasing output.

Reduced Ability to Respond to Unforeseen Events

When outstanding debt is relatively small, the federal government is able to borrow money at lower rates to cover unexpected costs, such as those that arise from 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. A large debt also can compromise a country's national security by constraining military spending in times of international crisis or by limiting the government's ability to prepare for (or respond to) 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. The policy responses included increases in federal spending to stabilize the financial sector, boost investment in infrastructure, and add to income security programs, along with temporary decreases in business and payroll taxes. As a result, by 2012, federal debt as a percentage of GDP had doubled from its 2007 level.

If another recession or fiscal crisis occurred and if federal debt was at its current level or higher, the government might have a more difficult time implementing similar costly actions in response. As a result, 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 growing federal debt would increase the chance of a fiscal crisis in the United States—a situation in which it would become increasingly difficult to finance federal borrowing and investors would have to be compensated with continuously increasing interest

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8. The federal funds rate is the interest rate financial institutions charge each other for overnight loans of their monetary reserves.

9. See Congressional Budget Office, *How the Supply of Labor Responds to Changes in Fiscal Policy* (October 2012), www.cbo.gov/publication/43674.

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

rates.[11] Those concerns could perpetuate a cycle: Higher interest rates would increase concerns over repayment, which would continue to raise interest rates even further. Even in the absence of a full-blown crisis, such risks would lead to higher rates and borrowing costs for the U.S. government and the private sector.

In a fiscal crisis, dramatic increases in Treasury rates would reduce the market value of outstanding government securities, and the resulting losses—for mutual funds, pension funds, insurance companies, banks, and other holders of government debt—could be large enough to cause some financial institutions to fail. Because the United States currently benefits from the U.S. dollar being the world's reserve currency and because the federal government borrows in dollars, it is less likely that a sudden fiscal crisis would lead to a catastrophic financial crisis similar to those that befell Argentina, Greece, or Ireland. As one example, in the event of a dramatic increase in interest rates, the Federal Reserve could buy Treasury securities and thereby limit losses to bondholders. However, such moves, if extensive, would ultimately lead to high inflation, a sharp depreciation in the value of the dollar, or both.[12] Those developments would reduce the value of U.S. assets.

No one can accurately predict whether or when a fiscal crisis might occur in the United States or how it would unfold. In particular, the debt-to-GDP ratio has no identifiable tipping point to indicate that a crisis is likely or imminent. Nonetheless, a large and rising federal debt would almost certainly increase the risk of a fiscal crisis.

The likelihood of a fiscal crisis also depends on economic conditions. If investors anticipate continued economic growth and low interest rates, they are generally less concerned about the government's debt burden. Conversely, substantial debt can reinforce a more generalized concern about the 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 limited—and unappealing—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 implement 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 2028, 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 take into account the effects that projected fiscal policies—in particular, 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 the federal budget and the nation's economy. For example, the composition of the population influences the size of the labor force and the number of beneficiaries of Social Security and other federal programs. In CBO's projections, the U.S. population increases from 332 million at the beginning of this year to 392 million in 2048, expanding by 0.6 percent per year, on average. That annual rate of growth is slower than the rate of the past 50 years (0.9 percent). The share of the population age 65 or older also rises over the coming decades, maintaining a long-standing historical trend. By 2048, 22 percent of the population would be age 65 or older, compared with 16 percent today (see Figure 4).

To estimate growth in the U.S. population, CBO projects rates of fertility, immigration, and mortality. The total fertility rate is calculated as the sum of fertility rates for women between 15 and 49 in a given year and represents the average number of children that a woman would have in her lifetime.[13] In general, that rate tends to decline during recessions and rebound during recoveries. Instead of rebounding after the

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11. 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, Greece, and Ireland were forced to make difficult choices in the face of sharp increases in interest rates on government debt.

12. Over time, such currency debasement would erode the status of the U.S. dollar as the world's reserve currency.

13. The total fertility rate can also be defined as the average number of children that a woman would have if, in each year of her life, she experienced the birth rates observed or assumed for that year and if she survived her entire childbearing period.

Figure 4.

Population, by Age Group

Millions of People
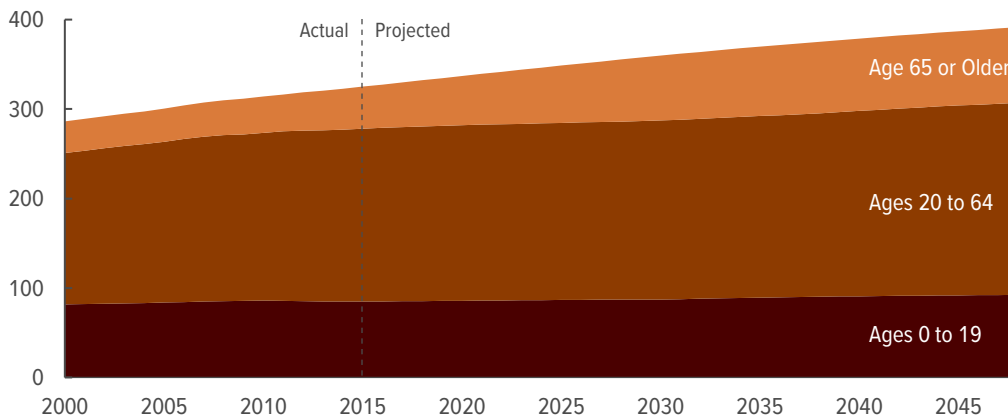
The share of the population age 65 or older is projected to rise over the coming decades, maintaining a long-standing historical trend.

Source: Congressional Budget Office.

This figure shows actual data through calendar year 2015, the most recent year for which such data are available.

2007–2009 recession, however, the fertility rate fell. In 2007, the rate was 2.1 births per woman, but it declined to 1.9 by 2010 and has remained below that point since then. CBO expects the total fertility rate to be 1.9 for the next 30 years.[14]

Under current law, the rate of net annual immigration to the United States is expected to rise slightly over the next three decades. CBO projects that rate would inch up from an average of 3.1 per thousand people in the U.S. population over the next decade to 3.2 in 2048. That rate, which accounts for anyone who either enters or leaves the United States in any year, is slightly higher than the average net annual immigration rates since the end of the 2007–2009 recession. On balance, CBO projects that the increase in net annual immigration over the next decade would be mostly driven by higher numbers of legal permanent residents. The annual increase in the number of legal temporary and unauthorized immigrants is projected to be relatively steady over the next 10 years. Beyond 2028, the annual average rate of growth is the same for different categories of immigrants in CBO's projections. Using that simplified approach, CBO projects that net annual immigration would grow at an average rate of 0.6 percent annually through 2048,

slightly faster than the average rate of growth in the U.S. population overall.[15]

Mortality rates are projected to improve over the next 30 years, on average. Those rates, which measure the number of deaths per thousand people in the population, are projected to decline at the same rates that were recorded for each age and sex group from 1950 to 2014. Improved, or lower, mortality rates mean higher life expectancy. CBO projects an average life expectancy at birth of 82.8 years in 2048, compared with 79.2 years in 2018.[16] Similarly, CBO projects life expectancy at age 65 in 2048 to be 21.7 years, or 2.2 years longer than life expectancy at age 65 in 2018.

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 key economic

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14. Recent data show that low total fertility rates have persisted since the recession, remaining below 1.9. See Brady E. Hamilton and others, *Births: Provisional Data for 2017*, Vital Statistics Rapid Release Report 4 (National Center for Health Statistics, May 2018), www.cdc.gov/nchs/nvss/vsrr/reports.htm.

15. That rate is based on the Census Bureau's projections for late in the coming decade. See Census Bureau, "2014 National Population Projections: Summary Tables," Table 1, https://go.usa.gov/xQAbu. The Census Bureau has recently released a new set of projections, but information from those projections has not been incorporated in this analysis. In those projections, the population is slightly smaller than the Census Bureau projected in 2014.

16. 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.

Figure 5.

Average Annual Growth of Real Potential GDP in CBO's Extended Baseline

Percent

Growth in potential GDP is projected to be slower than it has been in the past, driven mostly by slower growth of the labor force.
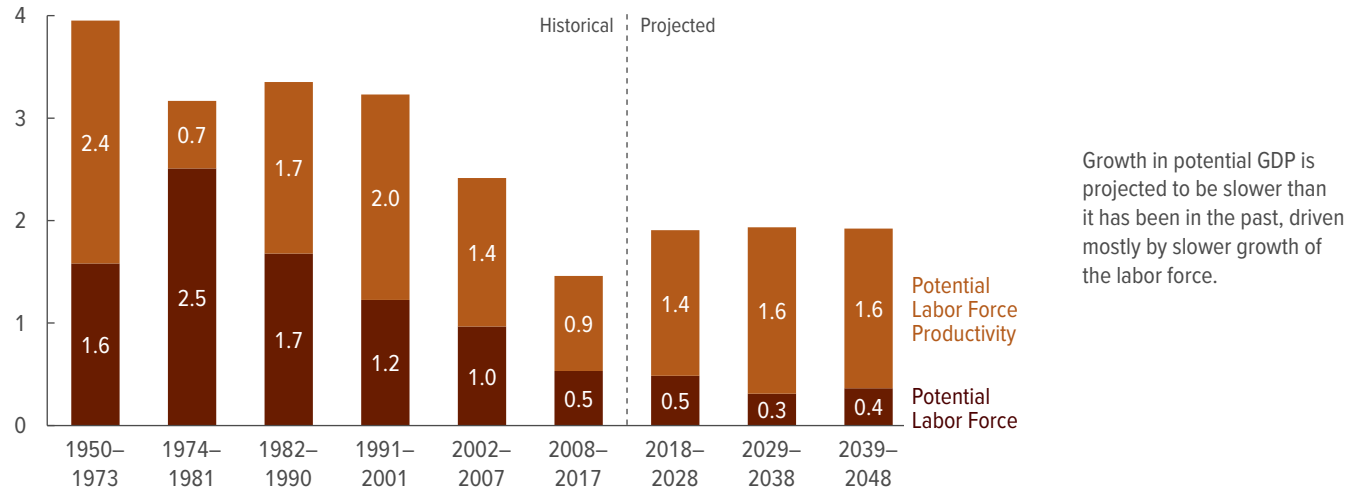
Source: Congressional Budget Office.

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 ups and downs in the business cycle).

GDP = gross domestic product.

variables, such 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.

In CBO's projections, growth in potential (maximum sustainable) GDP in the future is slower than it has been over the past 50 years. Under its extended baseline, CBO projects an increase in real potential GDP of 1.9 percent per year, on average, over the next 30 years, compared with its historical growth rate of 2.8 percent. That slower economic growth is attributable to several factors—most notably, slower growth of the potential labor force (the labor force adjusted for ups and downs in the business cycle). In CBO's projections, the potential labor force grows by 0.4 percent per year, on average, through 2048 (see Figure 5); the average annual growth rate over the 1968–2017 period was 1.5 percent. That slower projected growth of the potential labor force mainly results from the aging of the population and the relative

stability (after rising for decades) in the share of women participating in the labor force.[17]

In CBO's projections, total factor productivity grows more slowly than its historical average, increasing by 1.2 percent per year, on average, from 2018 to 2048. That rate, which measures the average real output per unit of combined labor and capital services, is slower than the annual average of 1.5 percent since 1950. Factors influencing that projection include slower productivity growth over the past several decades (except during 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. Potential labor productivity—defined as real potential output per potential hour of labor—is likewise projected to grow more slowly than it has in the past, reflecting less

17. For more details about how CBO projects labor force participation rates, see Joshua Montes, *CBO's Projection of Labor Force Participation Rates,* Working Paper 2018-04 (Congressional Budget Office, March 2018), www.cbo.gov/publication/53616.

private investment in capital goods. Since 1950, labor productivity has expanded by 1.7 percent per year, on average; through 2048, that growth rate is projected to average 1.5 percent per year (see Figure 5).

Interest rates, in CBO's projections, rise as the economy continues to expand but remain lower than they have been historically. Slower growth of the labor force and lower inflation 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 economic projections, the interest rate on 10-year Treasury notes rises from 2.4 percent at the end of 2017 to 3.7 percent in 2028. That rate is projected to rise to 4.8 percent in 2048—1 percentage point below the 5.8 percent average recorded over the 1990–2007 period. (That period is used for comparison because it was characterized 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. (Interest rates generally are lower on shorter-term debt than on longer-term debt, and the average term to maturity of federal debt has been less than 10 years since the 1950s.) Based on projections of interest rate spreads and the term structure of rates on federal debt, the average interest rate on federal debt is projected to be about 0.4 percentage points lower than the interest rate on 10-year Treasury notes after 2028.[18] As a result, in CBO's projections, the average interest rate on federal debt rises to 4.4 percent by 2048.

CBO's economic projections incorporate the macroeconomic 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 some private investment in productive capital in the long term. Less private investment in capital goods would make workers less productive, leading to lower wages and a smaller supply of labor. Furthermore, the extended baseline incorporates the economic effects of higher marginal tax rates. As more income is pushed into higher tax brackets over time, labor and capital

income face higher tax rates. Higher marginal tax rates on labor income would lessen 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 investment and a smaller labor supply would result in lower economic output and income than would otherwise be the case.

Projected Spending Through 2048
Spending for all of the government's programs and activities, 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. From 1968 to 2017, federal outlays other than those for the government's net interest costs averaged 18 percent of GDP. The percentage was higher over the past decade, when noninterest spending averaged 20 percent of GDP, because of underlying demographic trends and because of temporary conditions in the economy (namely, the financial crisis, the weak recovery, and the federal policies that were created to address those circumstances). Under current law, noninterest outlays are projected to rise from 19 percent in 2018 to 20 percent in 2028 (adjusted to exclude shifts in timing; the share would be 21 percent if timing shifts were included). Over the next decade, mandatory spending (which includes spending on Social Security and the major health care programs, along with many smaller programs) is generally projected to increase as a share of the economy, and discretionary spending is generally projected to decrease.

After 2028, under the assumptions that govern the extended baseline, noninterest spending would continue to rise relative to the size of the economy, reaching 23 percent of GDP by 2048. (For a summary of CBO's assumptions about spending and revenues, see Table 2.) That increase would mostly result from larger outlays for the two biggest mandatory programs: Social Security and Medicare (see Figure 6).

Under current law, net interest costs would rise from 1.6 percent of GDP in 2018 to 3.1 percent in 2028, CBO projects, as debt accumulates and as interest rates increase from their currently low levels. By 2048, net interest costs would equal 6.3 percent of GDP, boosting total federal spending to 29 percent of GDP. Spending has exceeded that amount only once, for a three-year period during World War II. For those years, when

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

Table 2.

Assumptions About Spending and Revenues Underlying CBO's Extended Baseline

Assumptions About Spending

Social Security	As scheduled under current law[a]
Medicare	As scheduled under current law through 2028; 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 a rate of 1.0 between 2029 and 2048)[a]
Medicaid	As scheduled under current law through 2028; 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 a rate of 1.0 between 2029 and 2048)
Children's Health Insurance Program	As projected in CBO's baseline through 2028; constant as a percentage of GDP thereafter
Subsidies for Health Insurance Purchased Through the Marketplaces Established Under the Affordable Care Act	As scheduled under current law through 2028; 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 between 2029 and 2048)
Other Mandatory Spending	As scheduled under current law through 2028; 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 2023 and 2028[b]
Discretionary Spending	As projected in CBO's baseline through 2028; roughly constant as a percentage of GDP thereafter[c]

Assumptions About Revenues

Individual Income Taxes	As scheduled under current law
Payroll Taxes	As scheduled under current law
Corporate Income Taxes	As scheduled under current law
Excise Taxes	As scheduled under current law[d]
Estate and Gift Taxes	As scheduled under current law
Other Sources of Revenues	As scheduled under current law through 2028; constant as a percentage of GDP thereafter

Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2028 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, *An Analysis of the President's 2019 Budget* (May 2018), www.cbo.gov/publication/53884.

Excess cost growth refers to the extent to which the growth rate of nominal health care spending per person—adjusted for demographic characteristics of the relevant populations—exceeds the growth rate of potential GDP per person. (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 2028 would decline at the same rate at which it is projected to decline between 2023 and 2028 (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 2028 would remain the same (measured as a percentage of GDP) as the amount projected for 2028.

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 6.

Spending and Revenues in the Past and in 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
1968	2.6	0.7	15.3	1.2	**19.8**
1988	4.2	2.1	11.4	2.9	**20.6**
2018	4.9	5.2	8.9	1.6	**20.6**
2028	6.0	6.8	7.9	3.1	**23.6**
2048	6.3	9.2	7.6	6.3	**29.3**

Revenues

	Individual Income Taxes	Corporate Income Taxes	Payroll Taxes	Other Revenue Sources[c]	Total Revenues
1968	7.6	3.2	3.8	2.4	**17.0**
1988	7.8	1.8	6.5	1.5	**17.6**
2018	8.2	1.2	5.9	1.4	**16.6**
2028	9.8	1.5	6.0	1.2	**18.5**
2048	10.9	1.4	5.9	1.6	**19.8**

Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2028 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.

defense spending increased sharply, total federal spending topped 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 (see Figure 7). Spending for net interest would account for a much greater portion of total federal spending by 2048 than it does today, and spending on Social Security and the major health care programs would account for a much larger share of all federal non-interest spending.

Spending for Social Security and the Major Health Care Programs

Mandatory programs have accounted for a rising share of the federal government's noninterest spending over the past few decades. Most of the growth has occurred because Social Security and Medicare provide benefits mainly to people age 65 or older, a group that has been growing significantly.

Social Security. Created in 1935, Social Security is the largest single program in the federal budget. Its two components pay benefits to 62 million people in all.

Figure 7.

Composition of Federal Spending in CBO's Extended Baseline

Percent

Total Spending

Noninterest Spending

Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2028 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

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

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.

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, continuing the trend of the past five decades. That spending would increase from 4.9 percent of GDP in 2018 to 6.3 percent in 2048 (see Figure 6 on page 15), and the number of beneficiaries would rise from 62 million to nearly 99 million. 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.[19] That approach

is consistent with a statutory requirement that CBO's 10-year baseline projections incorporate the assumption that funding for such programs is adequate to make all payments required by law.[20]

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.

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

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19. The balances of the trust funds represent the total amount that the government is legally authorized to spend for those purposes. For more details 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 April 19, 2018), http://go.usa.gov/cCXcG.

20. 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) (2016)).

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.[21] For Social Security, that difference is traditionally presented as a percentage of the present value of taxable payroll over 75 years.[22]

Over the next 75 years, if current laws remained in place, the program's actuarial shortfall would be 1.5 percent of GDP, or 4.4 percent of taxable payroll, CBO projects (see Table 3).[23] 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 2092 if payroll taxes were raised immediately and permanently by about 4.4 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.[24]

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 (2018 to 2042)	5.1	6.2	-1.0
50 Years (2018 to 2067)	4.8	6.2	-1.4
75 Years (2018 to 2092)	4.7	6.2	-1.5
As a Percentage of Taxable Payroll			
25 Years (2018 to 2042)	14.6	17.5	-2.9
50 Years (2018 to 2067)	14.0	18.0	-4.0
75 Years (2018 to 2092)	13.9	18.3	-4.4

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 2048, the projections incorporate macroeconomic feedback caused by rising federal debt and marginal tax rates. After 2048, 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 expresses that flow as a single amount 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.

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21. A present value expresses a flow of past and future income or payments as a single amount 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 a 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.

22. 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 ($128,400 in 2018).

23. The 75-year projection period used here begins in calendar year 2018 and ends in calendar year 2092. The Social Security trustees have estimated that the program's 75-year actuarial shortfall would be 2.8 percent of taxable payroll, which is about 1.6 percentage points less than CBO's projection. For details on the trustees' projections, see Social Security Administration, *The 2018 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds* (June 2018), www.ssa.gov/oact/tr/2018.

24. 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. Estimates of the actuarial shortfall do not account for revenues or outlays after the 75-year projection period. Because shortfalls are smaller earlier in the 75-year projection period than they are later, 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 2092. Additionally, 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.

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 2025 and the OASI trust fund would be exhausted in calendar year 2032. If their balances were combined, the OASDI trust funds would be exhausted in calendar year 2031, according to CBO's estimate.
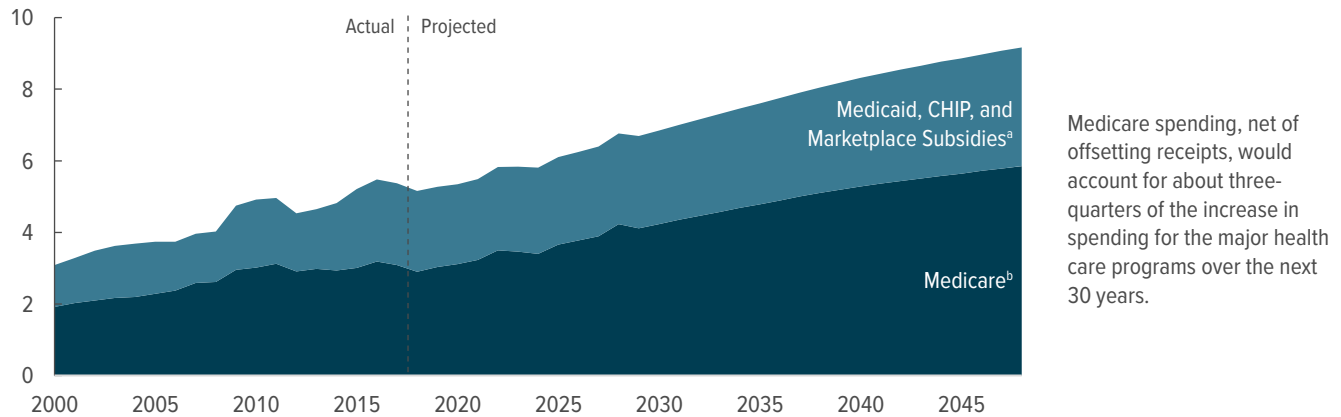
The Major Health Care Programs. Outlays for the major health care programs consist of spending for Medicare, Medicaid, and the Children's Health Insurance Program (CHIP), as well as outlays to subsidize health insurance purchased through the marketplaces established under the Affordable Care Act (ACA) and related spending.[25] Medicare, which provides health insurance to about

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25. 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 ACA to stabilize premiums for health insurance purchased by individuals and small employers.

Figure 8.

Federal Spending on the Major Health Care Programs, by Category

Percentage of Gross Domestic Product

Medicare spending, net of offsetting receipts, would account for about three-quarters of the increase in spending for the major health care programs over the next 30 years.

Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2028 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, as well as 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 premiums paid by beneficiaries to the government.

59 million people (most of whom are at least 65 years old), accounts for more than half of that spending.

CBO projects federal spending for the government's major health care programs for 2018 through 2028 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 amounts in the program's trust funds. For longer-term projections, considerable uncertainty surrounds the evolution of health care delivery and financing systems. That uncertainty leads CBO to employ a formulaic approach for its projections beyond 2028: 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 2018, net federal spending for the major health care programs is estimated to equal 5.2 percent of

GDP, CBO projects. If current laws generally remained in place, net outlays for those programs would increase to 9.2 percent in 2048, with Medicare spending, net of offsetting receipts (mostly premiums paid by enrollees), growing by about 3 percent of GDP, and spending on Medicaid and CHIP, combined with outlays for marketplace subsidies and related spending, growing by about 1 percent of GDP (see Figure 8).[26]

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

The aging of the population and rising health care costs per person are reasons for the sharp rise in projected spending for Social Security and the major federal health care programs over the next 30 years. The extent to which health care costs per person, adjusted for demographic changes, grow faster than potential GDP per person is known as excess cost growth.

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26. 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. Most of those outlays constitute federal subsidies for health insurance for low- and moderate-income households.

Figure 9.

Spending Growth in Social Security and the Major Health Care Programs in CBO's Extended Baseline

Percentage of Gross Domestic Product
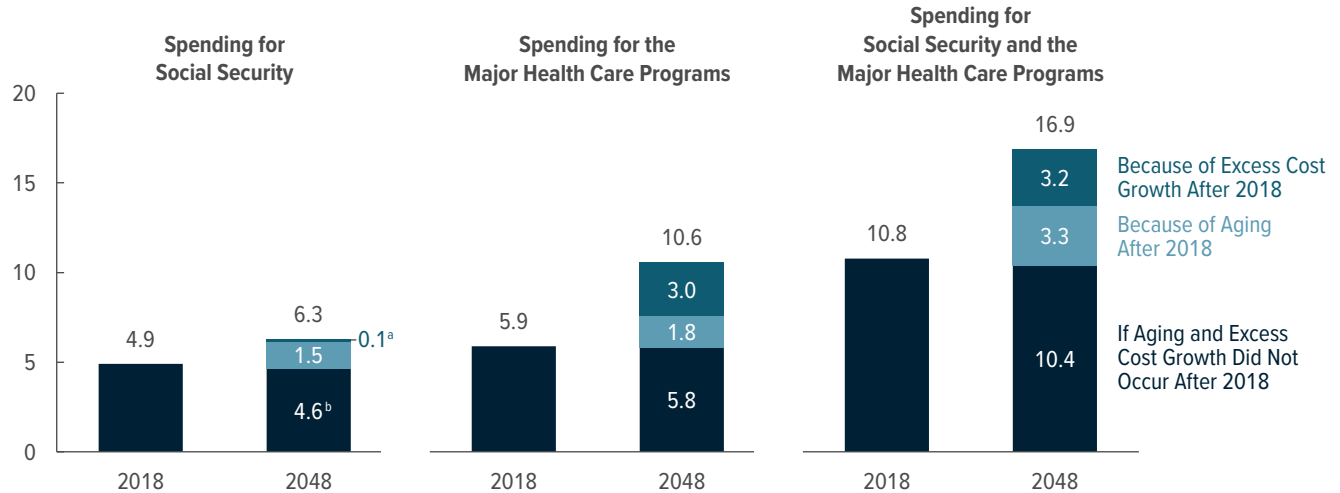
Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2028 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. Those outlays have been adjusted to exclude the effects of shifting payments from one fiscal year into another so that those payments are not made on a weekend.

Excess cost growth refers to the extent to which the growth rate of nominal health care spending per person—adjusted for demographic characteristics of the relevant populations—exceeds the growth rate of potential gross domestic product per person. (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.

a. Excess cost growth accounts for a small portion of the increase in spending for Social Security as a share of GDP in 2048 because greater spending on federal health care programs leads to larger deficits, which in turn slow the growth of GDP.

b. If aging and excess cost growth did not occur after 2018, spending on Social Security as a share of GDP would be lower in 30 years, mainly because of the scheduled increase in the full retirement age for Social Security.

In developing its projections, if 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 2048 would be 0.4 percentage points below the 10.8 percent estimated for 2018 (adjusted to exclude shifts in timing).[27] In the extended baseline, however, that spending reaches 16.9 percent of GDP by 2048 (see Figure 9).[28] Aging accounts for an

increase of 3.3 percentage points, or roughly half of the difference. Excess cost growth, at an increase of 3.2 percentage points, accounts for the other half.

The Aging Population. In CBO's projections, the aging of the baby-boom generation and continued gains in life expectancy increase the share of the population that is age 65 or older from 16 percent to 22 percent between 2018 and 2048.

Aging accounts for nearly all of the projected long-term increase in Social Security spending as a percentage of

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27. Excluding aging and excess cost growth, spending on those programs as a percentage of GDP would be lower in 30 years, mainly because of the scheduled increase in the full retirement age for Social Security.

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

GDP.[29] 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.

Aging also contributes to the projected increase in the share of GDP taken up by spending for the major health care programs, particularly Medicare, which is the largest such program. Most beneficiaries qualify for Medicare at age 65. 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 2018–2048 period, aging explains about one-third of the increase in spending for the major health care programs as a share of GDP.

Rising Health Care Costs per Person. Even though growth in health care costs per person has slowed recently, over the next 30 years it is projected to still be faster than growth in potential GDP per person. In CBO's extended baseline, excess cost growth accounts for about two-thirds of the increase in spending for the major health care programs as a share of GDP between 2018 and 2048. 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 high as 15 percent (in 1968) and as low as 8 percent (in the late 1990s and early 2000s). Other noninterest spending in 2018 is estimated to equal 8.9 percent of GDP. Under the assumptions used for this analysis, that spending is projected to fall to 7.9 percent of GDP in 2028 and to 7.6 percent of GDP in 2048.

Discretionary Spending. About half of all discretionary spending 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 1968 and 2017, it declined from 13.1 percent to 6.3 percent. In CBO's baseline, discretionary outlays remain at about that level through next year before decreasing again, to 5.4 percent of GDP by 2028.

Through 2021, most discretionary funding is limited by caps on annual discretionary appropriations that were originally specified in the Budget Control Act of 2011 (P.L. 112-25, as amended). The Bipartisan Budget Act of 2018 increased limits on discretionary funding that otherwise would have been in place for 2018 and 2019. The subsequent decline in discretionary outlays relative to GDP reflects lower statutory limits on discretionary funding in 2020 and 2021 and the assumption (required by law) that discretionary funding will grow at the rate of inflation—which is slower than projected growth in GDP—beginning in 2022. After 2028, in CBO's extended baseline projections, discretionary spending is assumed to remain roughly constant as a percentage of GDP (see Figure 10).[30]

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 because of higher spending in response to the severe recession.) That category of mandatory spending includes retirement programs for federal civilian and military employees, certain veterans' programs, the Supplemental Nutrition Assistance Program (SNAP), Supplemental Security

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29. Excess cost growth accounts for a small portion of the increase in spending for Social Security as a share of GDP in 2048, 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.

30. CBO assumed that discretionary spending after 2028 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. Because CBO estimates that fiscal policy under the extended baseline would dampen economic growth, its projection of discretionary spending would not grow at precisely the same rate as GDP.
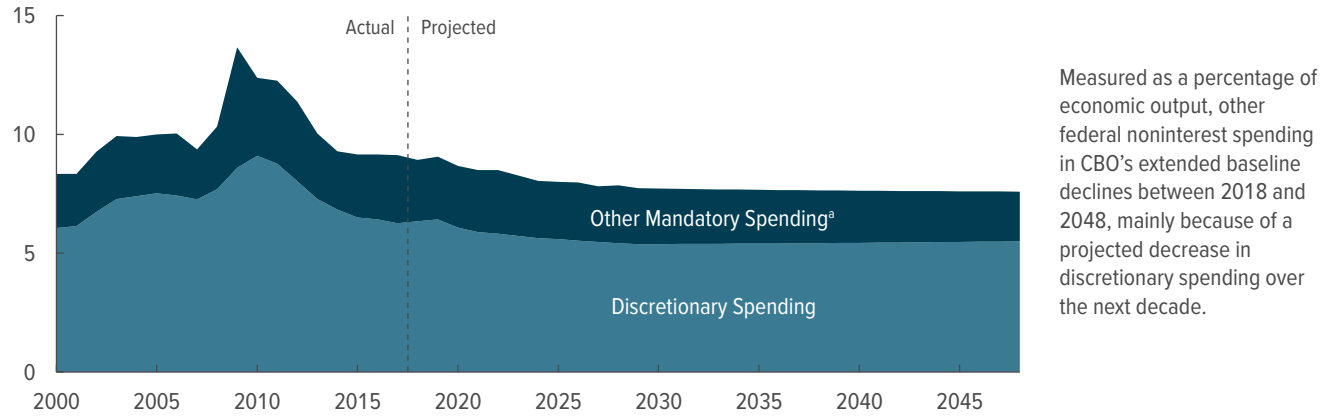
Although discretionary spending would decline relative to GDP from 2018 to 2028 in CBO's projections, historical evidence suggests that such a decline is unlikely to persist: Discretionary spending has historically been a larger share of economic output than it is projected to be in 2028. For that reason, CBO did not assume that the share would decline further.

Figure 10.

Other Federal Noninterest Spending in 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 2018 and 2048, mainly because of a projected decrease 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 2028 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.

Income, unemployment compensation, and refundable tax credits.[31]

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 2.4 percent of GDP in 2028, CBO projects.[32] That small decrease primarily reflects the effects of growth in average income on eligibility for some programs and refundable tax credits as well as reductions in the average payment per beneficiary (when measured relative to average income) for certain large programs.

In CBO's extended baseline, other mandatory spending is projected to fall to 2.1 percent of GDP by 2048. In

part, that reduction reflects the effects 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 roughly in line with projections for such spending between 2023 and 2028.[33]

Net Interest Costs

Over the past 50 years, the government's net interest costs have averaged 2.0 percent of GDP, although they have been as high as 3.2 percent and as low as 1.2 percent. In CBO's extended baseline, net interest costs are projected to roughly double as a share of the economy over the next decade—from 1.6 percent of GDP in 2018 to 3.1 percent by 2028—as greater federal borrowing boosts debt-service costs and as currently low interest

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31. Refundable tax credits reduce a filer's overall income tax liability; 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.

32. 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.

33. For the years after 2028, 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 is assumed to decline relative to GDP (excluding any effects that fiscal policy may have on the economy) after 2028 at the same rate at which it is projected to fall between 2023 and 2028 (excluding the decrease in spending for SNAP).

rates rise. In the extended baseline, those costs reach 6.3 percent of GDP by 2048, a higher amount than has ever been experienced (see Figure 6 on page 15). Those costs would exceed mandatory spending other than that for Social Security and the major health care programs in the next few years, exceed all discretionary spending by 2045, and be about equal to spending for Social Security by 2048.

In CBO's projections, deficits and debt rise because of the growing gap between spending and revenues, and higher interest costs are a major contributor to that growing gap. Between 2018 and 2048, more than half of the increase in spending as a percentage of GDP results from higher net interest costs. In large part, those rising interest costs 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. But greater federal borrowing places 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 2048

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

If current laws generally remained unchanged, revenues would increase as a share of GDP over the coming decade, CBO projects. Revenues would remain near 16.6 percent of GDP through 2021, rise steadily to 17.5 percent by 2025, and then increase sharply in 2026—to 18.1 percent of GDP—following the scheduled expiration of many temporary provisions of the 2017 tax act. By 2028, revenues are projected to total 18.5 percent of GDP.

For years beyond 2028, revenues are projected following the assumption that the rules for all tax sources will evolve as scheduled under current law.[34] Thus, under

CBO's extended baseline, revenues would continue to grow faster than GDP beyond 2028 and, two decades later, would total 19.8 percent of GDP. Increases in receipts from individual income taxes account for most of the projected rise of 3.2 percentage points in total revenues as a share of GDP over the next three decades. All told, receipts from all other sources combined are projected to increase slightly as a share of GDP (see Figure 6 on page 15).

The projected increase in total revenues through 2048 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 total revenues (see Table 4). If current laws remained generally unchanged, real bracket creep would continue to gradually push up taxes relative to income over the next three decades, CBO projects. That occurs because most income tax brackets, exemptions, and other tax thresholds are indexed only to inflation. When income grows faster than inflation, as generally happens during economic expansions, tax receipts grow faster than income.[35]

Under current law, some provisions of tax law will expire and others will take effect during the next decade. In total, those changes lead to higher tax revenues in the extended baseline. The most significant change is the expiration, after calendar year 2025, of nearly all provisions in the 2017 tax act that affect individual income taxes. The expiration of those provisions boosts individual income tax receipts relative to GDP by 0.7 percentage points, CBO projects. In addition, a new tax on certain employment-based health insurance plans with high premiums is scheduled to take effect in 2022. Although the revenues raised by that tax would be small initially, rapid growth in health care costs would cause revenues from that tax to rise rapidly over subsequent decades. Also, some rules that allow businesses to accelerate

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34. The sole exception to the current-law assumption during the baseline period applies to expiring excise taxes dedicated to trust

funds. The Deficit Control Act 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.

35. The 2017 tax act changed the measure of inflation used to index many parameters of the tax system to an alternative measure that grows more slowly. Consequently, the effect of real bracket creep is slightly greater than CBO projected in prior years.

Table 4.

Reasons for Growth in Total Revenues in CBO's Extended Baseline, 2018 to 2048

Percentage of Gross Domestic Product

Reason for Growth	2018–2028	2029–2048	Total, 2018–2048
Structural Features of the Individual Income Tax[a]	0.5	0.9	1.4
New and Expiring Tax Provisions	0.8	0.4	1.2
Aging and the Taxation of Retirement Income	0.2	0.1	0.3
Changes in the Distribution of Income (Effect on individual income taxes)	0.1	0.1	0.2
Changes in the Distribution of Income (Effect on payroll taxes)	-0.1	-0.1	-0.2
Other Factors	0.4	-0.1	0.3
Total Growth in Revenues Between 2018 and 2048	**1.9**	**1.3**	**3.2**

Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2028 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

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

deductions for investment expenses are scheduled to be phased out by the end of December 2027, increasing revenues as a result.

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. Those rising taxable distributions would also boost revenues relative to GDP, mainly between 2018 and 2028, CBO projects.

Earnings are projected to grow faster for higher-income people than for other people over the next 30 years. That trend would cause a larger share of income to be taxed at higher rates under the individual income tax, pushing up revenues relative to GDP by nearly 0.2 percentage points. That increase would be largely offset by a projected decrease of nearly the same amount in payroll tax receipts, as a greater share of earnings would be above the maximum amount subject to Social Security payroll taxes.

As a result of those factors, the effects of the tax system in 2048 would differ substantially from the effects today, both because of the changes in tax rules scheduled under current law and because of structural features in the tax code that gradually push up taxes relative to income. Average taxpayers at every income level would pay more of their income in taxes in 2048 than similar taxpayers do now, primarily because of real bracket creep. Effective marginal federal tax rates also would rise if current laws

generally stayed in place, so a larger share of each additional dollar of income that households earned would go to pay 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.[36] (For a discussion of the long-term economic effects of the 2017 tax act, see Box 1 on page 26.)

Uncertainty of 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 the amounts in its extended baseline if the agency varied four key factors in its analysis:[37]

- The labor force participation rate,[38]

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36. Even though the marginal tax rate on capital income is projected to rise under current law, it would still be lower than in recent years.

37. 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.

38. 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.

Table 5.

Effective Marginal Federal Tax Rates in CBO's Extended Baseline

Percent

	2018	2028	2048
Marginal Tax Rate on Labor Income	27.2	30.8	32.4
Marginal Tax Rate on Capital Income	14.7	16.5	17.0

Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2028 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, with weights proportional to their labor 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. The before- and after-tax rates of return used to calculate that effective tax rate are weighted averages of the rates for every combination of asset type, industry, form of organization, and source of financing; the weights used are the asset values of each combination.

- 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.

The degree of variation was based on historical movements and on possible future developments. The resulting estimates show that if CBO varied one factor at a time, federal debt held by the public after 30 years would range from 42 percentage points of GDP below the agency's central estimate—152 percent of GDP—to 60 percentage points above it.[39]

If all four factors were varied simultaneously such that projected deficits increased, federal debt held by the public in 2048 would be about 96 percent of GDP above CBO's central estimate.[40] Conversely, if all four

factors were varied such that projected deficits decreased, debt after 30 years would be 67 percentage points below the central estimate (see Figure 11).

Those calculations do not cover the full range of possible outcomes, and they do not 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 rates of birth, immigration, or mortality. Nonetheless, they show that the main implications of this report apply under a wide range of possible values for some key factors that influence federal spending and revenues. 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 that uncertainty into account in various ways as they make choices for fiscal policy.[41] 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 in the absence of such uncertainty.

The Size and Timing of Policy Changes Needed to Meet Various Goals for Deficit Reduction

CBO estimated the size of changes in spending or revenues that would be needed if lawmakers wanted to achieve some specific targets for federal debt held by the public. CBO also assessed the extent to which the size of policy adjustments would change if such deficit reduction was delayed, and it examined the effects of waiting to resolve the long-term fiscal imbalance on different generations of the U.S. population.

The Size of Policy Changes Needed to Meet Various Goals for Deficit Reduction

If lawmakers set out to ensure that debt in 2048 matched its current level of 78 percent of GDP, they could achieve

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39. 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/53919.

40. When CBO varied all factors simultaneously, it varied each factor by only 60 percent of the amount of variation in each factor individually. The agency used only part of the full range for each

of the four factors because the chances of federal debt being above or below the estimates when all four factors are at the high or low ends of their ranges are much smaller than when each individual factor is at the high or low end of its range.

41. 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 11.

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

Percentage of Gross Domestic Product
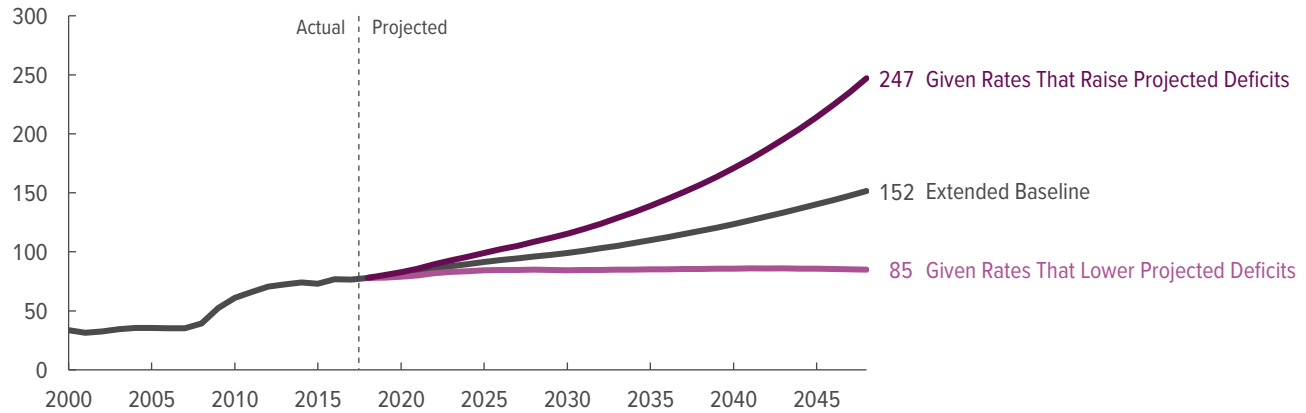
Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2028 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 person—adjusted for demographic characteristics of the relevant populations—exceeds the growth rate of potential gross domestic product per person. (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 2019.

that result by cutting noninterest spending or raising revenues (or both) in each year beginning in 2019 by amounts totaling 1.9 percent of GDP (see Figure 12 on page 28). (In 2019, 1.9 percent of GDP would be about $400 billion, or $1,200 per person.) If the changes came entirely from revenues or entirely from spending, they would amount, roughly, to an 11 percent increase in revenues or a 10 percent cut in noninterest spending (in comparison with amounts in the extended baseline).

Increases in revenues or cuts 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. If lawmakers wanted

to lower the debt to 41 percent of GDP (its average over the past 50 years) by 2048, they could achieve that outcome by increasing revenues or cutting noninterest spending (relative to amounts under current law) or by adopting some combination of those two actions beginning in 2019 by amounts totaling 3.0 percent of GDP each year. (In 2019, 3.0 percent of GDP would be about $630 billion, or $1,900 per person.)

If lawmakers wanted to lower debt to its average over the past 50 years by increasing all revenues or by cutting all noninterest spending, the following changes would be necessary:

Box 1.

Effects of the 2017 Tax Act on the Long-Term Budget Outlook

The Congressional Budget Office's extended baseline generally reflects current law, including the economic and budgetary effects of changes to legislation enacted over the past year—notably, the 2017 tax act (Public Law 115-97, originally called the Tax Cuts and Jobs Act). Those long-term projections are consistent with CBO's prior estimates of the 2017 tax act's effects on the U.S. economy—including higher investment, employment, and output—over the 2018–2028 period.[1]

Because various provisions of the 2017 tax act expire by the end of 2026, the economic and budgetary effects of the act as a whole are expected to peak during the early to middle part of the next decade. Beyond 2028, the effects of the major permanent provisions are expected to be modest, although their precise magnitudes are highly uncertain. CBO has not performed a detailed, quantitative analysis of the long-run effects of the 2017 tax act but is able to describe the qualitative effects of its most significant provisions.

Major Provisions of the 2017 Tax Act
The 2017 tax act has temporary and permanent provisions. For the next eight years, the major individual income tax changes are lower rates, a larger standard deduction, limits on the deductibility of mortgage interest and state and local taxes, elimination of personal exemptions, expansion of the child tax credit, changes to the treatment of "pass-through" business income, changes to the individual alternative minimum tax, and increases in the tax exemptions for property transferred at death and for certain gifts. For the next five years, the act allows businesses to immediately deduct the full cost of their investments for eligible equipment and software; that bonus-depreciation provision then phases out over the subsequent five years.

Following the expiration of most of the individual provisions at the end of 2025 and the phaseout of bonus depreciation by the end of 2026, the major permanent provisions of the act that continue are these:

- Lower corporate income taxes (a single rate of 21 percent);

- Higher thresholds for deducting the cost of a tangible asset in the year it is placed in service under section 179 of the tax code;

- Amortization of spending for research and experimentation;

- Limitations on net interest deductions and the use of net operating losses;

- Changes in the inflation adjustments for most tax parameters, including for income tax brackets;

- Elimination of the penalty for not having health insurance; and

- Changes in the taxation of foreign income and measures to reduce profit shifting.

Budgetary Effects Without Macroeconomic Feedback
The 2017 tax act has significant direct effects on CBO's budget projections. Those direct effects do not take into account any changes to the aggregate economy.

Budgetary Effects for 2018 to 2028. Before incorporating macroeconomic feedback, CBO estimated that the tax act would increase the primary deficit (that is, the deficit excluding the costs of servicing the debt) by a cumulative $1.843 trillion from 2018 to 2028 as a result of higher deficits through 2026. Once the temporary provisions have expired and scheduled changes to certain business provisions have taken effect, the permanent provisions are projected to reduce, on net, the primary deficit in 2027 and 2028. Because of the increased deficits, debt-service costs are higher in every year by growing amounts, totaling $471 billion over the period. The total direct effect on the deficit through 2028 would be $2.314 trillion.

Budgetary Effects for 2029 to 2048. After 2028, CBO estimates, the permanent provisions of the act would continue to reduce the primary deficit, on net, over the next 20 years. In particular, the change in the inflation indexing of tax parameters and elimination of the penalty for not having health insurance (which causes fewer people to enroll in health insurance programs subsidized by the federal government) would reduce the deficit by more than the revenues lost through lower corporate taxes.

Economic Effects of the 2017 Tax Act
The largest effects on investment, employment, and output are estimated to occur in the early to middle part of the 2018–2028 period, when both individual and corporate income tax rates are lower and when other temporary provisions and investment incentives (notably, full bonus depreciation) are in place. Most of the tax act's positive effects on the growth of real (inflation-adjusted) gross domestic product (GDP) would occur in the first few years of CBO's projection period. The positive effects on the economy would diminish over the following several years and are expected to be modest after 2028.

Economic Effects for 2018 to 2028. The 2017 tax act would boost the level of real GDP by 0.7 percent, on average, through 2028, with a peak effect of 1.0 percent in 2022. By lowering the corporate income tax rate, the act would give businesses

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1.   See Congressional Budget Office, *The Budget and Economic Outlook: 2018 to 2028* (April 2018), Appendix B, www.cbo.gov/publication/53651.

Box 1.   Continued

Effects of the 2017 Tax Act on the Long-Term Budget Outlook

incentives to boost investment, and by decreasing individual income tax rates through 2025, it would give people incentives to increase their participation in the labor force and work more hours, expanding the labor supply and employment. Although some provisions of the tax act would deter residential investment, the overall effect on investment is estimated to be positive. However, private investment gains would be partially crowded out by higher federal deficits. Altogether, the largest positive effects on the economy would occur from 2022 to 2024 (before the individual income tax provisions expire at the close of 2025).

The effect of the tax act on real GDP is more modest over the following few years, and by 2028, real GDP would be 0.5 percent higher than it would have been otherwise. Between 2026 and 2028, investment would be boosted by the permanent reduction in the corporate income tax rate. However, the permanent change to amortization of research and experimentation expenses (instead of immediate expensing) would reduce the incentive for that type of investment.

The effects on the supply of labor are projected to be mixed. Marginal personal income tax rates would be higher after 2025 than under prior law because of the change in how various parameters of the tax system, including income tax brackets, are adjusted for inflation. That change would tend to reduce the supply of labor, as more income is pushed into higher tax brackets for a given amount of income growth because the new measure of inflation is expected to rise more slowly than the measure it replaced. In contrast, the permanent elimination of the penalty for not having health insurance would tend to increase the supply of labor, in part because under prior law the penalty rose as household income grew, causing it to act as a tax on income.

From 2026 to 2028, the pattern of the economic effects of the act reflects the transition from all the major provisions of the tax act being in place to only the permanent provisions remaining in effect. As a result, the positive effects on labor, investment, and real GDP would diminish. Nonetheless, those positive effects would be boosted by the reduction in the budget deficit by 2027 that results from the tax act, which makes additional resources available for private investment.

Furthermore, the tax act's international provisions are expected to change the reported location of profits in a way that boosts GDP through 2028, without changing the location of labor or capital. As a result, the provisions are expected to raise total factor productivity slightly over time.

Economic Effects for 2029 to 2048. In CBO's assessment, the various permanent provisions of the act would continue to boost the level of real GDP, on net, for a few years after 2028; over the longer term, the economic effects of the different provisions are expected to be modest, but the net effect is uncertain. The accelerated bracket creep resulting from the change in the indexing of tax parameters for inflation and the permanent change to amortization of research and experimentation expenses would tend to lower output by modestly reducing the supply of labor and capital, respectively. Elimination of the penalty for not having health insurance is expected to partially offset the negative effect on labor, and the permanent reduction in the corporate income tax rate and lower federal deficits would tend to increase output modestly by boosting investment.

The tax act's international provisions are expected to increase GDP slightly over the long term, although their overall economic effects are uncertain. Those effects would depend on how companies adjusted their international business structures and transactions and how foreign governments changed their tax rules in response.

Overall, the net impact on output would depend on the balance of all those effects. Individually and collectively, the effects become increasingly uncertain over the last 20 years of the projection period.
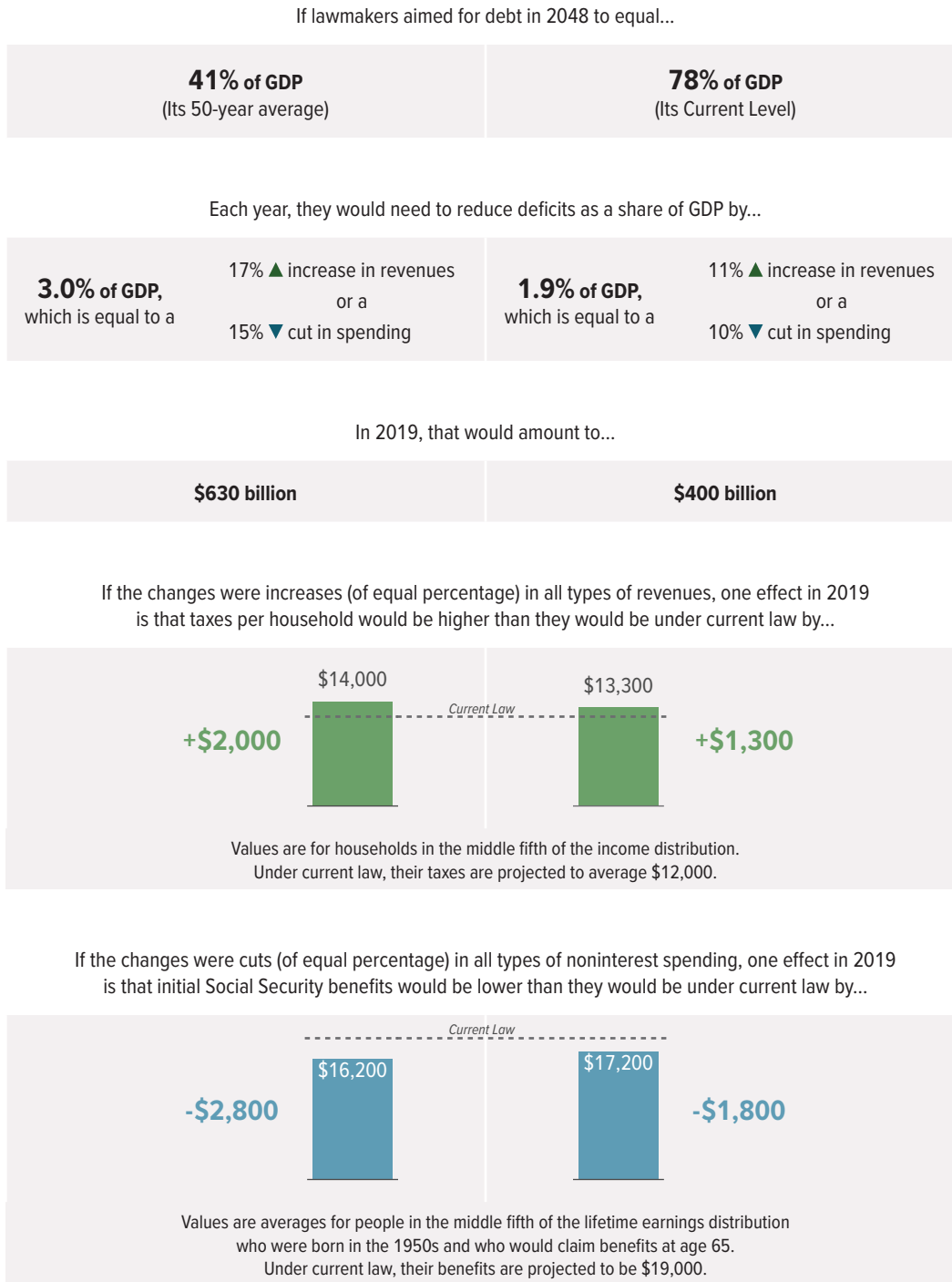
Budgetary Effects With Macroeconomic Feedback

CBO estimates that macroeconomic feedback from the tax act—that is, the ways in which the act would affect the budget by changing the overall economy—would subtract a total of $571 billion from primary deficits over the 2018–2028 period. That reduction would mainly result from the act's boost to taxable income, which would increase revenues. With that macroeconomic feedback incorporated, CBO projects that the act would increase primary deficits by $1.272 trillion through 2028. Incorporating the act's effects on debt-service costs from changes in federal borrowing and changes in interest rates would push the deficit to an estimated $1.854 trillion over the 2018–2028 period.

The net effects of the tax act on real GDP and other economic variables are expected to be modest after 2028 but the magnitudes are uncertain (in part because a number of factors tend to offset each other). As a result, the macroeconomic feedback to federal spending and revenues is also expected to be small but uncertain in those years. Despite that uncertainty, the overall effects of the permanent provisions of the act, including their macroeconomic feedback, are projected to reduce the primary deficit somewhat from 2029 to 2048.

Figure 12.

The Size of Policy Changes Needed to Make Federal Debt Meet Two Possible Goals in 2048

If lawmakers aimed for debt in 2048 to equal...

41% of GDP	**78% of GDP**
(Its 50-year average)	(Its Current Level)

Each year, they would need to reduce deficits as a share of GDP by...

3.0% 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	11% ▲ increase in revenues or a 10% ▼ cut in spending

In 2019, that would amount to...

$630 billion	**$400 billion**

If the changes were increases (of equal percentage) in all types of revenues, one effect in 2019
is that taxes per household would be higher than they would be under current law by...

$14,000 $13,300   *Current Law*

+$2,000   +$1,300

Values are for households in the middle fifth of the income distribution.
Under current law, their taxes are projected to average $12,000.

If the changes were cuts (of equal percentage) in all types of noninterest spending, one effect in 2019
is that initial Social Security benefits would be lower than they would be under current law by...

Current Law

$16,200 $17,200

-$2,800   -$1,800

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 $19,000.

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 2028 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 changes 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 specific details of the policy changes.

GDP = gross domestic product; n.a. = not applicable.

- If collections of the various types of revenues were increased proportionally, total revenues would need to rise by about 17 percent each year over the 2019–2048 period. On average, that adjustment would result in federal taxes that were about $2,000 higher than they are under current law for households in the middle fifth of the income distribution in 2019.

- 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.

In all of those examples, the projected effects on debt include both the direct effects of the policy changes and the feedback to the federal budget that would result from faster economic growth. Those economic effects reflect the reduction in debt but do not reflect any assumptions about the specific details of the policy changes. For example, such changes could alter productivity growth and people's incentives to work and save, which would then affect overall economic output and have macroeconomic feedback effects on the federal budget.

The Timing of Policy Changes Needed to Meet Various Goals for Deficit Reduction

The size of the policy changes that would be needed to achieve a particular goal for federal debt would depend, in part, on how quickly that goal was expected to be reached. Regardless of the chosen goal for federal debt, lawmakers would face trade-offs in deciding how quickly to implement policies designed to put federal debt on a sustainable path. The benefits of reducing the deficit sooner would 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 the new system.

Over the next few years, such policy changes would dampen overall demand for goods and services, thus decreasing output and employment relative to CBO's

projections under current law. However, that dampening effect would be temporary, CBO expects, because of the response of prices and interest rates to the 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 would be if 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, which 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 deficit-reduction policies, the economy probably would be affected less over the short term than would be the case if immediate changes were made.
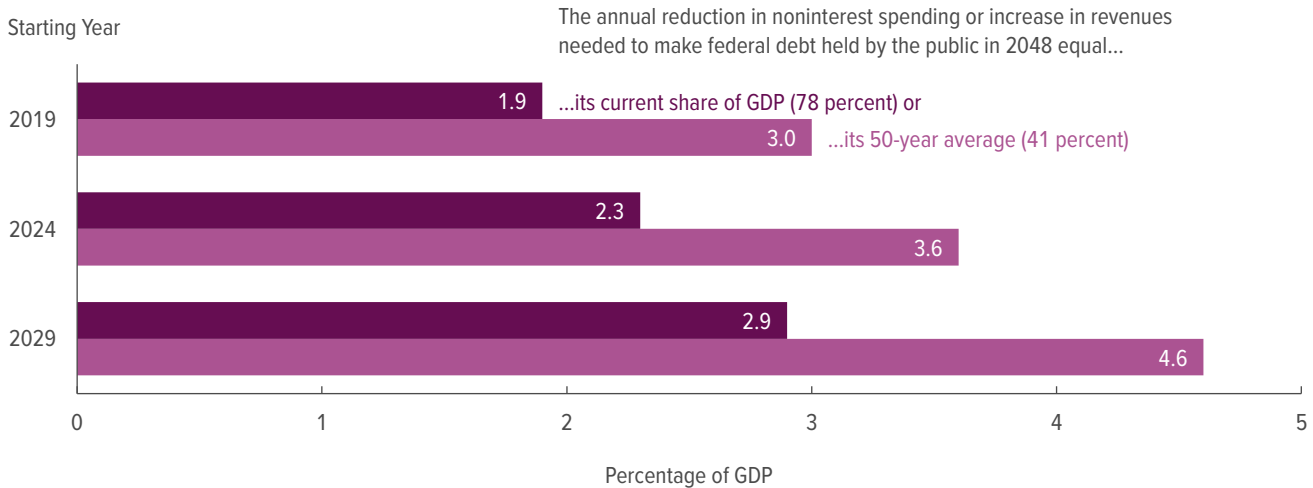
Faster or slower implementation of policies to reduce budget deficits would tend to impose different burdens on different generations. Reducing deficits sooner would probably require older workers and retirees to sacrifice more but would benefit younger workers and future generations. Reducing deficits later would require smaller sacrifices from older people but greater ones from younger workers and future generations.

CBO has analyzed those 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, if lawmakers sought to reduce debt as a share of GDP to its historical 50-year average of 41 percent in 2048 and if the necessary policy changes did not take effect until 2024, the annual deficit reduction would need to amount to 3.6 percent of GDP rather than the 3.0 percent that would accomplish the same goal if the changes were made in 2019 (see Figure 13). If lawmakers chose to wait another five years to implement the policies (having them take effect in 2029 instead), even larger changes would be necessary; the required annual deficit reduction in that case would amount to 4.6 percent of GDP.

Second, CBO studied the effects on various generations from waiting to resolve the long-term fiscal imbalance. In 2010, CBO compared economic outcomes under two policies. One would stabilize the debt-to-GDP ratio starting in a particular year; the other would wait

Figure 13.

How Timing Affects the Size of Policy Changes Needed to Make Federal Debt Meet Two Possible Goals in 2048

Starting Year

The annual reduction in noninterest spending or increase in revenues needed to make federal debt held by the public in 2048 equal...

Starting Year	...its current share of GDP (78 percent) or	...its 50-year average (41 percent)
2019	1.9	3.0
2024	2.3	3.6
2029	2.9	4.6

Percentage of GDP

Source: Congressional Budget Office.

GDP = gross domestic product.

10 years to do so.[42] That analysis suggested that people in generations born after the earlier implementation date would be worse off under the second option. However, people born more than 25 years before the earlier implementation date would be better off if action was delayed—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.[43]

Even if lawmakers waited several years to implement policy changes to reduce deficits in the long term,

making decisions about them sooner would offer two main advantages. First, people would have more time to prepare. Second, policy changes that reduced the debt would hold down longer-term interest rates and could lessen uncertainty—thus enhancing businesses' and consumers' confidence. Those factors would boost output and employment in the near term.

Changes From Last Year's Long-Term Budget Outlook

Compared with last year's projections of federal debt, those presented in this report are higher through 2041 and slightly lower thereafter. Most of the increases in debt through 2041 stem from larger projected deficits through 2025 that arise from tax and spending legislation enacted since last March: the 2017 tax act, the Bipartisan Budget Act of 2018, and the Consolidated Appropriations Act, 2018. After 2025, deficits are smaller as a share of GDP than CBO projected last year because of lower projected noninterest spending and similar or higher projected revenues. Those lower deficits ultimately result in lower projected debt as a share of GDP. (Appendix A describes the differences in demographic and economic projections between last year's report and this year's, and Appendix B describes key revisions to the budgetary projections since last year that are summarized in this section.)

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42. 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 costs 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.

43. 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.

As a percentage of GDP, noninterest spending is generally lower than the amount projected last year. That slowdown is driven by lower projected spending as a share of GDP for Social Security, the major health care programs, and other mandatory spending. Those declines are partially offset by increases in discretionary spending. Revenues are lower as a share of GDP through 2026, largely unchanged for most of the next two decades, and slightly higher by 2048. Those changes reflect provisions of the 2017 tax act.

Under the extended baseline, CBO projects that debt would reach 148 percent of GDP in 2047, which is lower than the amount the agency projected last year. Projected deficits as a share of GDP in this year's report are larger from 2018 through 2025 and smaller thereafter than those in last year's report. The budgetary changes needed to make federal debt 30 years from now

equal either today's level or the 50-year historical average (as a share of GDP) are similar to the changes CBO projected would be required in last year's report.

The 75-year actuarial deficit currently projected for Social Security is 1.5 percent of GDP (the same amount that CBO estimated last year) or 4.4 percent of taxable payroll (slightly smaller than last year's estimate of 4.5 percent). The projected actuarial deficit declined since last year because CBO boosted its projection of the share of earnings that are subject to Social Security payroll taxes over the next 30 years and because CBO projects slightly smaller benefits relative to GDP and taxable payroll and, over the next two decades, higher interest rates. Offsetting those changes is an adjustment to the 75-year period of analysis, which ends in 2092 in this report and thus includes an additional year of deficits.

CBO's Projections of Demographic and Economic Trends

The Congressional Budget Office's assessment of the 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 2028, the economic and demographic projections presented in this report are the same as those that CBO published in April.[1] For the years beyond 2028, CBO's projections generally reflect historical trends and anticipated demographic changes. (Average values for 2018 to 2048, 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 this report's supplemental data, available online at www.cbo.gov/publication/53919.)

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. Rates of fertility, immigration, and mortality determine the population and thus the size of the labor force and the number of people receiving benefits from federal programs such as Social Security and Medicare. CBO projects the population to be about the same in the future as it projected last year.

Population

In CBO's projections, the total population increases from 332 million at the beginning of 2018 to 392 million in 2048, and its annual growth rate gradually declines from 0.7 percent in 2018 to 0.4 percent in 2048. The population is projected not only to grow more slowly but also to become older, on average, than in the

past. In the agency's projections, over the 30-year 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 2018–2048 period.[3] (That rate, which represents the average number of children that a woman would have in her lifetime, is calculated as the sum of fertility rates for all ages between 15 and 49 in a given year.)[4] The total fertility rate for the 1988–2007 period averaged 2.0 children per woman. Fertility rates often decline during recessions and rebound during recoveries. However, the U.S. fertility rate did not recover after the 2007–2009 recession; the rate (which was 2.1 in 2007) dropped and has remained below 1.9.[5] CBO's projected rate is consistent with the rate recommended to the Social Security Advisory Board by its 2015 Technical Panel on Assumptions and Methods, the board's most recent panel.[6]

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1. See Congressional Budget Office, *The Budget and Economic Outlook: 2018 to 2028* (April 2018), www.cbo.gov/publication/53651.

2. The extended baseline generally reflects current law, following CBO's 10-year baseline projections through 2028 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

3. In CBO's 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.

4. The total fertility rate can also be defined as the average number of children that a woman would have in her lifetime if, in each year of her life, she experienced the birth rates observed or assumed for that year and if she survived her entire childbearing period.

5. Recent data show that total fertility rates have remained below 1.9. See Brady E. Hamilton and others, *Births: Provisional Data for 2017*, Vital Statistics Rapid Release Report 4 (National Center for Health Statistics, May 2018), www.cdc.gov/nchs/nvss/vsrr/reports.htm.

6. See 2015 Technical Panel on Assumptions and Methods, *Report to the Social Security Advisory Board* (September 2015), p. 9, https://go.usa.gov/cJYR5 (PDF, 3.4 MB).

Table A-1.

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

	1988–2017	2018–2028	2029–2038	2039–2048	Overall, 2018–2048
Demographic Variables					
Growth of the Population (Percent)	0.9	0.7	0.5	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)	3.7	3.1	3.2	3.2	3.2
Life Expectancy at Birth, End of Period (Years)[a]	79.1	80.5	81.7	82.8	82.8
Life Expectancy at Age 65, End of Period (Years)[a]	19.4	20.2	20.9	21.7	21.7
Economic Variables (Percent)					
Growth of GDP					
Real GDP	2.5	1.9	1.9	1.9	1.9
Nominal GDP (Fiscal Year)	4.7	4.1	4.0	4.0	4.0
Growth of the Labor Force	1.0	0.5	0.4	0.4	0.4
Labor Force Participation Rate	65.6	62.1	60.3	59.6	60.7
Unemployment					
Unemployment rate	5.9	4.4	4.8	4.7	4.6
Natural rate of unemployment	5.1	4.6	4.5	4.5	4.5
Growth of Average Hours Worked	-0.1	*	-0.1	-0.1	*
Growth of Total Hours Worked	1.0	0.5	0.3	0.4	0.4
Earnings as a Share of Compensation	81	81	81	81	81
Growth of Real Earnings per Worker	0.9	1.5	1.2	1.1	1.2
Share of Earnings Below the Taxable Maximum	85	81	81	80	81
Growth of Productivity					
Total factor productivity	1.2	1.1	1.2	1.2	1.2
Labor productivity[b]	1.5	1.4	1.6	1.6	1.5
Inflation					
Growth of the CPI-U	2.6	2.4	2.4	2.4	2.4
Growth of the GDP price index	2.1	2.1	2.0	2.0	2.0
Interest Rates					
Real rates					
On 10-year Treasury notes and Social Security bonds	2.3	1.4	1.6	2.1	1.7
Nominal rates					
On 10-year Treasury notes and Social Security bonds	4.9	3.8	4.0	4.5	4.1
On all federal debt held by the public[c]	5.0	3.1	3.6	4.1	3.6

Source: Congressional Budget Office.

The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2028 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; * = between -0.05 percent and 0.05 percent.

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 measure of labor productivity reported here is the ratio of real output to hours worked in the economy. Note that elsewhere CBO reports different measures of labor productivity, such as the ratio of potential real output to the potential labor force.

c. 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.

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) would grow by an average of 0.7 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 2018 to 1.3 million people in 2048. Expressed another way, the rate of net annual immigration per thousand people in the U.S. population would rise from an average of 3.1 over the next decade to 3.2 in 2048.

CBO's projection of 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 of 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 United States in 2015 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.[7]

CBO projects that the increase in net immigration over the next decade would be mostly driven by increases in the number of legal permanent residents. The annual increase in the number of legal temporary and unauthorized immigrants is projected to be relatively steady over the next 10 years.

For projections beyond the next decade, CBO employed a simplified approach: After 2028, under current law, the agency projects that net immigration would grow at an average rate of 0.6 percent annually, slightly faster than the overall average rate of population growth.[8]

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 dropped more quickly for younger people than for older people during that period. Mortality rates for each five-year age group are projected to decline at the same average pace each group experienced from 1950 through 2014. 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, do not receive benefits through the Social Security Disability Insurance (DI) program, or are in higher-income groups.[9] (For people under 30, the mortality projections account for age and sex only.)

CBO's projections result in an average life expectancy at birth of 82.8 years in 2048, compared with 79.2 years in 2018.[10] Similarly, CBO projects life expectancy at age

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7. For the most recent estimates, see Jens Manuel Krogstad, Jeffrey S. Passel, and D'Vera Cohn, *As Mexican Share Declined, U.S. Unauthorized Immigrant Population Fell in 2015 Below Recession Level* (Pew Research Center, April 2017), https://tinyurl.com/mn5zbb5. For more details, see Jeffrey S. Passel and D'Vera Cohn, *Overall Number of U.S. Unauthorized Immigrants Holds Steady Since 2009* (Pew Research Center, September 2016), https://tinyurl.com/j45zw05. Official data on unauthorized immigrants do not exist, so historical estimates are very uncertain.

8. That rate is based on the Census Bureau's projections for late in the coming decade. See Census Bureau, "2014 National Population Projections: Summary Tables," Table 1, https://go.usa.gov/xQGwc. The Census Bureau has recently released a new set of projections, but information from those projections has not been incorporated in this analysis. In those projections, the population is slightly smaller than the Census Bureau projected in 2014.

9. For more information about mortality differences among groups with different earnings, see Tiffany Bosley, Michael Morris, and Karen Glenn, *Mortality by Career-Average Earnings Level*, Actuarial Study 124 (Social Security Administration, April 2018), https://tinyurl.com/yct5qdew (PDF, 301KB); 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.

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.

65 to be 21.7 years in 2048, or 2.2 years longer than life expectancy at age 65 in 2018.[11]

Changes in Demographic Projections Since Last Year
CBO's projections of population growth in most years are very similar to those published in last year's report, except for small changes to CBO's projections of net immigration and mortality rates. Net immigration was projected to grow, on average, more quickly in the decade following 2017 in last year's report than it is projected to grow in the decade following 2018 in this year's report. That is because last year's projections included growth in 2017 that was higher than in the rest of the 10-year period. The average growth in net immigration over the decade following 2018 in this year's report does not include that year of higher growth.

The life expectancies CBO now projects are only slightly different from those reported last year. Life expectancy at birth is projected to be 82.7 years in 2047, 0.1 year shorter than CBO projected last year, and life expectancy at age 65 is projected to be 21.6 years, 0.1 year longer than in last year's projection. Those changes reflect recent data that show higher mortality rates than CBO expected last year for people ages 15 to 74 and lower mortality rates than expected last year for people 75 or older. Those data led CBO to increase its projection of mortality rates for people ages 15 to 74 in the near term and to reduce their rates of mortality improvement over the next three decades, which reduced CBO's projection of life expectancy at birth. In contrast, for people 75 or older, CBO decreased its projection of mortality rates and increased the rate of mortality improvement, which increased CBO's projection of life expectancy at age 65 throughout the 30-year period.

Economic Variables
The performance of the U.S. economy in coming decades will affect the federal government's tax revenues, spending, and debt accumulation. In CBO's analysis, the long-term effects depend on key economic variables such as the growth of gross domestic product (GDP), the size and composition of the labor force, the number of hours worked, earnings per worker, capital accumulation, and productivity. Over the short term, the effects also depend on variables that fluctuate over the business cycle, such as 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 2018–2048 period. In the agency's projections, real GDP growth over that period averages 1.9 percent per year, about what was projected last year for the 2017–2047 period. However, the pattern of that growth is different in this year's projections; CBO now projects that real GDP grows faster over the next few years. As a result, the level of real GDP remains higher over the projection period.

Projections of GDP. CBO anticipates that recent changes to the tax code, changes in discretionary spending, and continuing increases in aggregate demand will spur a pickup in the growth of real GDP over the next few years (see Box 1 on page 26 for details on the effects of the recent changes to the tax code).[12] Thereafter, growth in real GDP is projected to make a 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.[13]

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.[14]

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11. CBO projects life expectancy in 2090 to be 86.9 years at birth and 24.4 years at age 65. CBO's projections of life expectancies are longer than those of the Social Security trustees (85.8 and 23.5 years, respectively) but shorter than the projections (88.3 and 25.3 years, respectively) recommended by the 2015 Technical Panel on Assumptions and Methods in *Report to the Social Security Advisory Board* (September 2015), pp. 13–20, https://go.usa.gov/cJYR5 (PDF, 3.4 MB).

12. 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.

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

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

Projected real GDP growth over the next three decades is slower than the average annual rate of 2.5 percent recorded over the past three decades, primarily because the labor force is anticipated to grow more slowly in the coming years. Moreover, with the labor force growing 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 2018–2048 period, compared with 1.6 percent for the past 30 years.

Changes in Projections of GDP Since Last Year. In CBO's current projections, the level of real GDP is about 1.4 percent higher in 2027 than the agency projected last year. That gap shrinks over the next two decades; by 2047 real GDP is 0.7 percent higher than it was last year. The higher level of real GDP in this year's projections stems primarily from three factors: revisions to historical data, changes in federal fiscal policy, and improvements in analytical methods.

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 slightly 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 2018 to 61.0 percent in 2028 and to 59.5 percent in 2048. The aging of the population is the most important factor driving down the overall participation rate over the next 30 years; 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 16 percent in 2018 to 22 percent in 2048, and the share of the population ages 20 to 64 is expected to decline from 59 percent to 55 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 2018—the

labor force participation rate would stay roughly constant over the next 30 years, in CBO's judgment.[15]

The effects of several other trends and fiscal policies roughly offset one another. Three trends put downward pressure on the participation rate:

- Men of the generations that followed the baby boomers tend to participate in the labor force at lower rates than male baby boomers did at the same age. (The participation of women from generations following the baby boomers has remained relatively constant.)

- The share of people receiving DI benefits is generally projected to continue to rise, and people who receive such benefits are less likely to work.

- 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 two trends. As the population becomes more educated, labor participation rates are expected to increase because workers with more education tend to participate in the labor force at higher rates than do people with less education. Second, increasing longevity is expected to lead people to continue working to increasingly older ages.[16]

In addition to the effects of those demographic trends, recent changes in tax law, combined with economic and budgetary trends, would also affect the labor force:

- CBO estimates that, under current law, lower tax rates on labor would increase participation in the labor force over most of the next decade because individuals would see a greater return on their labor. However, the lower tax rates are scheduled to expire

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

16. The agency recently updated its methods for projecting labor force participation to more adequately account for recent trends in educational attainment and aging. See Josh Montes, *CBO's Projection of Labor Force Participation Rates*, Working Paper 2018-04 (Congressional Budget Office, March 2018), www.cbo.gov/publication/53616.

at the end of 2025, reducing the incentive to work, which would in turn reduce participation in the labor force toward the end of the decade.

- In addition, major tax legislation enacted in 2017 adopted an alternative measure of inflation for the tax code that grows slightly more slowly than the inflation measure used previously. Tax brackets, which are set to increase with inflation, will increase more slowly because of this new measure. Consequently, real income growth in the future will cause an increased share of labor income to be pushed into higher tax brackets. Over time, under an assumption that current laws remain unchanged, that bracket creep would reduce incentives to work.

- Rising federal deficits are projected to slow growth in the stock of private capital and limit the growth of after-tax wages, also reducing the supply of labor. However, recent changes to the tax code provide greater incentives to invest, mitigating some of the effects of higher deficits on the stock of private capital.

Changes in Projections of the Labor Force Participation Rate Since Last Year. CBO's current projections of the labor force participation rate through 2025 are higher than its projections last year because of the enactment of individual tax provisions that raise after-tax wages during the next several years. Last year, CBO projected the participation rate would be 61.3 percent by 2025. This year, CBO projects the participation rate to be 61.7 percent in 2025.

Beyond 2025, participation rates over the next three decades are slightly higher than the rates published last year. Last year, the participation rates were projected to be 61.0 percent in 2027 and 59.3 percent in 2047. In the current projections, those rates are 61.2 percent and 59.5 percent, respectively.

When combined with CBO's projections of the population, the projected rates of labor force participation imply that the labor force grows by 0.4 percent per year, on average, over the 2018–2048 period. That rate is slightly less than the 0.5 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 agency has changed its projections of those variables over the past year because of updates to historical data and reexamination of recent trends.

Unemployment. In CBO's projections, the unemployment rate, which was 4.1 percent at the end of 2017, declines to 3.3 percent in 2019, gradually rises to 4.8 percent by 2024, and then remains at that level, on average, through 2028. 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) is projected to remain at 4.6 percent from 2018 to 2028. From 2024 onward, the unemployment rate is expected to remain about one-quarter of one percentage point above the natural rate, a difference that is consistent both 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 2028, 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.) By 2048, the natural rate of unemployment is projected to be slightly less than 4.4 percent, and the actual rate is projected to be about 4.7 percent.

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, over the long term, the composition of the labor force is projected to 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 2048, the average number of hours that people work is expected to be about 1 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, total hours worked are estimated to increase at an average annual rate of 0.4 percent between 2018 and 2048.

Earnings as a Share of Compensation. Workers' total compensation consists of taxable earnings and non-taxable 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 2017—mainly because the cost of health insurance has risen more quickly than total compensation.[17]

CBO expects that trend in health care costs to continue, which 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 2022. 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. In CBO's projections, the effects of the tax on the mix of compensation 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. As a result, the share of compensation that workers receive as earnings is projected to remain close to 81 percent through most of the 2018–2048 period.

Growth of Real Earnings per Worker. Projections of prices, nonwage compensation (such as employment-based health insurance), average hours worked, and labor productivity (discussed below) imply that real earnings per worker grow by an average of 1.2 percent annually over the 2018–2048 period. That rate is higher than the average annual growth—0.9 percent—of real earnings per worker over the last 30 years.

Distribution of Earnings. Over the past several decades, earnings have grown faster for higher earners than for lower earners. In CBO's projections, the unequal growth in earnings continues for the next three decades. The

distribution of earnings affects revenues from income taxes and payroll taxes, among other things. Income taxes are affected by the earnings distribution because of the progressive rate structure of the income tax; people with lower earnings pay a smaller share of their earnings than people with higher earnings.

Social Security payroll taxes are also affected by the earnings distribution. Those taxes are levied only on earnings up to a certain annual amount ($128,400 in 2018). 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 83 percent in 2016.[18] The portion of earnings subject to Social Security taxes is projected to fall to about 81 percent by 2028 and to fall below 80 percent by 2048.

Changes in Projections of Other Labor Market Outcomes Since Last Year. Projections of most other labor market outcomes are similar to what CBO projected last year. For example, CBO's long-term projection of the natural rate of unemployment is only slightly lower than its projection a year ago because of updates to historical data and trends.

An important change since last year in the labor market outcomes discussed in this section is to the projected distribution of earnings. 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. As a result, in this year's projections, households with lower individual income tax rates earn a larger share of total income than CBO projected last year, and total income tax revenues are lower than would otherwise be the case.

Additionally, with a smaller share of wages and salaries received by higher earners, a larger share is received by

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

18. 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.

people whose annual earnings are below the maximum amount subject to Social Security payroll taxes. Thus, the share of earnings below the taxable maximum is expected to decline more slowly than CBO projected last year. In last year's projections, the share of earnings below the taxable maximum declined until 2027 and then remained at roughly that level through the end of the projection period. In this year's projections, the share of earnings below the taxable maximum declines gradually through 2048. By 2027 that share is 1.4 percentage points higher than in last year's projections, and declines to roughly the same level in 2047 as CBO projected last year. Over the 30-year period, that share is about half of a percentage point higher, on average, than CBO estimated last year.

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—that is, the growth of output that is not explained by the growth of labor and capital. Combined, the growth rates projected for the labor supply, the capital stock, and TFP result in a projection of the average growth of labor productivity (output per worker).

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. Recent reductions in statutory tax rates on corporations permanently increase incentives to invest in capital and consequently raise the level of capital services.

Total Factor Productivity. The annual growth of TFP is projected to increase from about 0.9 percent in 2018 to about 1.2 percent in 2022 and then to remain at that rate through 2048, yielding an average annual growth rate of roughly 1.2 percent from 2018 to 2048. That projected growth rate is about 0.3 percentage points

slower than the average annual rate of 1.5 percent observed since 1950 and slightly slower than the average rate recorded since 1990.

The projected path for TFP reflects several considerations that, in CBO's judgment, suggest slower growth in coming decades 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 projects an acceleration of TFP growth from its unusually slow recent rate, the agency anticipates it to return to a rate that is slower than its long-term historical average.

A number of developments support slow-growth projections for TFP. One is the anticipated slowing of growth in labor quality, a measure of workers' skills that accounts for educational attainment and work experience that, in CBO's analysis, 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 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 projected 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 has 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.

In contrast, changes to the tax code are projected to raise productivity by discouraging multinational corporations' profit-shifting strategies that historically have reduced official estimates of TFP. Because TFP is a component of GDP, CBO projects an increase in GDP as tax incentives encourage firms to claim as domestic production the services of intellectual property that were previously claimed as production abroad. CBO has slightly increased its projections of TFP to account for this anticipated increase in output, which is not matched by an increase in production inputs.

Labor Productivity. Taken together, the projections of labor supply, capital services, and TFP result in labor productivity that is expected to grow by 1.5 percent annually over the 2018–2048 period.[19]

Changes in Projections of Capital Accumulation and Productivity Since Last Year. CBO projects roughly the same average TFP growth that it projected last year. However, CBO's projection of capital services is above the level it projected last year, largely because of stronger investment incentives in the tax code that cause businesses to raise investment.

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.[20] Those rates influence nominal (current year) levels of income and interest rates and thereby influence tax revenues, various types of federal expenditures that are indexed for inflation, and interest payments on federal debt.

Prices of Consumer Goods and Services. One measure of consumer price inflation is the annual rate of change in the consumer price index for all urban consumers (CPI-U). Over the 2018–2048 period, inflation in that measure averages 2.4 percent in CBO's projections. That long-term rate is slightly less than the average rate of inflation since 1990 of 2.5 percent per year. CBO projects that, under a chained measure of inflation, prices grow at a rate 0.25 percent less than the annual increase in the consumer price index.[21]

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 Projections of Inflation Since Last Year. Inflation in both measures of consumer prices is projected to be roughly the same as the rates CBO projected last year for the 2017–2047 period.

Interest Rates

CBO projects 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 cost of the government's debt burden and the evolution of the trust funds.

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

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19. The measure of labor productivity reported here is the ratio of real output to hours worked in the economy. Note that elsewhere CBO reports different measures of labor productivity, such as the ratio of potential real output to the potential labor force.

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

21. The chained CPI-U tends to grow more slowly than the standard CPI-U because it uses a formula that better accounts for households' tendency to substitute similar goods and services for each other when relative prices change and because, unlike the CPI-U, it is little affected by statistical bias related to the sample sizes that the Bureau of Labor Statistics uses in computing each index. Historically, inflation as measured by the chained CPI-U has been 0.25 percentage points lower, on average, than inflation as measured by the CPI-U. CBO's projections reflect that average difference between the two measures.

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 2.9 percent between 1990 and 2007.[22] That rate has averaged 1.0 percent since 2009 and is projected to be 1.4 percent in 2028. In CBO's projections, the rate continues to rise thereafter, reaching 2.4 percent in 2048, 0.5 percentage points below its average over the 1990–2007 period. CBO's projections of interest rates this year are higher than last year's.

Factors Affecting Interest Rates. Interest rates are determined by a number of factors. CBO projects the 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 greatly on the period being considered, as some recent decades show: 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.[23] 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 over the 1990–2007 period and then judged how different those determinants might be over

the long term.[24] That period was chosen for comparison because it featured fairly stable expectations of inflation and no severe economic downturns or significant financial crises.

Some factors reduce interest rates; others increase them. In CBO's estimates for the 2018–2048 period, several factors tend to reduce interest rates on government securities relative to their 1990–2007 average:

- The labor force is projected to grow much more slowly than it did from 1990 to 2007. That slower growth in the number of workers would 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.[25]

- The share of total income received by higher-income households is expected to be larger in the future than during the 1990–2007 period. 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 be lower.

- TFP is projected to grow more slowly in the future than it did from 1990 to 2007. For a given rate of investment, lower productivity growth reduces the return on capital and results in lower interest rates, all else being equal.

- CBO expects investors' preferences for Treasury securities relative to riskier assets to remain elevated compared with inclinations over the 1990–2007 period. Investors began to have less appetite for risk

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22. Between 1970 and 2007, the real interest rate on 10-year Treasury notes averaged 2.8 percent; the average from 1954 to 2007 was 2.6 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)" (March 28, 2018), www.bls.gov/cpi/cpiurs.htm.

23. CBO calculates real interest rates by subtracting expected rates of inflation from nominal interest rates. In general, 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 uses the actual consumer price index, adjusted to account for changes over time in the way that the index measures inflation, as a proxy for both what expectations of inflation have been in the past and what they will be in the future. One drawback is that if inflation fluctuates 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 is a useful proxy over long periods, on average.

24. 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), https://tinyurl.com/z6zqnb7 (PDF, 1.8 MB).

25. 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.

in the early 2000s, and the demand for low-risk assets was 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 preferences for Treasury securities relative to riskier assets to gradually decline over the next three decades but to remain above their average levels from 1990 to 2007.

At the same time, in CBO's estimates, several factors 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 projected to be much larger as a percentage of GDP than it was before 2007—reaching 96 percent by 2028 and 152 percent by 2048. The latter figure is more than three and a half times the average over the 1990–2007 period. Greater federal borrowing tends to crowd out private investment in the long term, reducing the amount of capital per worker and increasing both interest rates and the return on capital over time.

- CBO anticipates that emerging market economies will attract a greater share of foreign investment in coming decades than they did in the 1990–2007 period. As economic and financial conditions in those economies continue to improve, they will become increasingly attractive destinations for foreign investment. CBO projects that development to put upward pressure on interest rates in the United States.

- 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. The share is projected to decline 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 the rise in income for owners of capital (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 would 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, in CBO's estimates, the total amount of saving available for investment decreases (all else being equal), which tends to reduce the amount of capital per worker and thereby push up interest rates. (CBO estimates that this effect only partially offsets the positive effect of increased income inequality on saving, leaving a net increase in savings available for investment.)

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 but also on information from financial markets to guide its assessments of the effects of various factors on interest rates over the long term. 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—the premium paid to investors for the extra risk associated with holding longer-term bonds—and for investment opportunities in the United States and abroad, and it points to considerably lower interest rates well into the future than those of recent decades.

Projections of Interest Rates. CBO anticipates considerable movement in long-term interest rates over the first 11 years of the projection. For the next few years, CBO

projects interest rates to rise as GDP expands beyond its potential and the Federal Reserve tightens monetary policy. Beginning in late 2021, CBO expects long-term interest rates to decline as GDP growth slows and the economy moves back towards its historical relationship with potential output. Beginning in 2024, long-term interest rates in CBO's projections gradually rise in response to increases in the ratio of debt to GDP.

The nominal interest rate on 10-year Treasury notes is projected to average 4.1 percent over the 2018–2048 period and to reach 4.8 percent in 2048. The real interest rate on 10-year Treasury notes is projected to average about 1.7 percent and, at the end of the period, to be 2.4 percent.

The average interest rate on all federal debt held by the public tends to be 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.[26] CBO projects a 0.4 percentage-point difference between the rate on 10-year Treasury notes and the effective rate on federal debt over the 2029–2048 period. That difference is projected to average 0.6 percentage points over the next decade. The difference is larger over the coming decade than for later years because a significant portion of federal debt that will be outstanding during the next 10 years 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 changes more slowly than the 10-year rate because only a portion of federal debt matures each year.) Thus, in CBO's projections, the average nominal interest rate on all federal debt held by the public is about 3.6 percent for the 2018–2048 period and reaches 4.4 percent in 2048.

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. In CBO's projections, the nominal interest rate on bonds newly issued to the trust funds averages 4.1 percent over the

2018–2048 period and reaches 4.8 percent in 2048. The corresponding real rates are 1.7 percent, on average, over the full period and 2.4 percent in 2048.

Because interest rates have been low for much of the past decade, CBO projects the average interest rate earned by all bonds held (both new and previously issued) by the Social Security trust funds to be slightly lower than the interest rate on newly issued bonds over the next decade. The average interest rate on all bonds, which CBO uses to calculate the present value of future streams of revenues and outlays for those funds, is projected to average 3.8 percent for the 2018–2048 period.[27]

Changes in Projections of Interest Rates Since Last Year. CBO's projections of interest rates this year are higher than last year's. The real rates on 10-year Treasury notes and the Social Security bonds are projected to average 1.7 percent over the 2018–2048 period and to be 2.3 percent in 2047. Last year, CBO projected both rates would average 1.5 percent over the 2017–2047 period and would be 2.3 percent in 2047.

The path of interest rates is higher in this year's projections than in last year's. Long-term interest rates are poised to end the first half of 2018 roughly half a percentage point higher than CBO projected last year. The higher rate probably reflects the expectation of tighter monetary policy (in response to a stronger labor market and greater inflationary pressure) as well as reduced demand for long-term Treasury bonds. Both trends are expected to continue over the next several years. In addition, CBO projects greater federal borrowing to push up interest rates. The upward revision to 10-year Treasury rates is anticipated to peak at 1 percentage point in 2020. The upward revision is predicted to be smaller in later years, as economic growth returns to its historical relationship with potential output growth and downward revisions to projected deficits gradually reduce the upward revision to the stock of debt. From 2023 to 2047, the 10-year Treasury rate is roughly unchanged in this year's report compared to last year's projection.

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26. In particular, from 2018 to 2028, the difference between the rate on 3-month Treasury bills and the rate on 10-year Treasury notes shrinks from 1.2 percentage points to its longer-run level of 1 percentage point.

27. A present value is a single number that expresses a flow of past and future income or payments 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, that is used to translate past and future cash flows into current dollars at that time.

Changes in Long-Term Budget Projections Since March 2017

The 30-year projections of federal spending and revenues presented in this report differ from the projections that the Congressional Budget Office published in 2017 because of certain changes in law, revisions to some of the agency's assumptions and methods, the availability of more recent data, and changes to the agency's projections of demographic and economic variables.[1] For the same reasons, CBO's 10-year projections have also changed since 2017, and they serve as the foundation for the 30-year projections. The 10-year projections are typically published in *The Budget and Economic Outlook*; however, since the publication of that report in April, the agency has adjusted them.[2] As a result, the long-term projections in this report are based on those adjusted projections (see Table B-1).

This appendix compares CBO's current long-term budget projections with those published last year. Because most of the projections in the 2017 report ended in 2047, the appendix compares projections only through that year.

Measured as a percentage of gross domestic product (GDP), federal debt held by the public is now projected to be higher through 2041, and lower thereafter, than CBO projected last year. Under the extended baseline, debt is projected to grow from about 78 percent of

GDP this year to 148 percent in 2047; last year, CBO projected that it would rise from 77 percent of GDP in 2018 to 150 percent in 2047 (see Figure B-1).[3] The revised projections of debt resulted from changes in both spending and revenue projections, all of them presented here as a percentage of GDP:

- Projected noninterest spending is lower than CBO anticipated last year, though the difference shrinks toward the end of the 30-year projection period. The main cause is downward revisions to outlays for Social Security and the major health care programs in CBO's projections, though those reductions in mandatory spending are partially offset by increases in discretionary spending.[4]

- Net spending for interest is projected to be higher through the late 2030s than it was in last year's projections and lower thereafter. The initial difference results from higher projected interest rates and greater projected levels of debt held by the public than CBO projected last year. That relationship reverses later in the projection period as deficits become smaller than projected a year ago, a change that leads to lower interest costs and slower accumulation of debt.

- Projected revenues are lower through 2026 than they were in last year's projections, similar for most of the following two decades, and then slightly higher by the end of the 30-year projection period. Those changes reflect provisions of Public Law 115-97, which is referred to here as the 2017 tax act.

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1. See Congressional Budget Office, *The 2017 Long-Term Budget Outlook* (March 2017), www.cbo.gov/publication/52480. The changes in demographic and economic projections are described in Appendix A of this report.

2. In total, the adjustments reduced the projected deficit for 2018 by $12 billion and reduced projected deficits over the 2019–2028 period by a cumulative $17 billion. For the April report, see Congressional Budget Office, *The Budget and Economic Outlook: 2018 to 2028 (*April 2018), www.cbo.gov/publication/53651. For the adjusted projections, see Congressional Budget Office, *An Analysis of the President's 2019 Budget* (May 2018), www.cbo.gov/publication/53884.

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. Mandatory spending is generally governed by provisions of permanent law, whereas discretionary spending is controlled by annual appropriation acts.

Table B-1.

Comparison of CBO's Adjusted April 2018 Baseline and January 2017 Baseline

Billions of Dollars

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
					Adjusted April 2018 Baseline						
Revenues	3,339	3,490	3,680	3,829	4,016	4,232	4,448	4,667	5,003	5,301	5,520
Outlays	4,131	4,463	4,683	4,947	5,290	5,505	5,693	6,020	6,324	6,616	7,047
Deficit	-793	-973	-1,003	-1,118	-1,275	-1,273	-1,245	-1,352	-1,321	-1,314	-1,527
Debt Held by the Public at the End of the Year[a]	15,676	16,743	17,804	18,970	20,290	21,609	22,904	24,310	25,687	27,058	28,642
					January 2017 Baseline						
Revenues	3,604	3,733	3,878	4,019	4,176	4,346	4,527	4,724	4,931	5,140	n.a.
Outlays	4,091	4,334	4,562	4,816	5,135	5,346	5,554	5,890	6,228	6,548	n.a.
Deficit	-487	-601	-684	-797	-959	-1,000	-1,027	-1,165	-1,297	-1,408	n.a.
Debt Held by the Public at the End of the Year[a]	15,416	16,092	16,845	17,704	18,721	19,776	20,858	22,078	23,430	24,893	n.a.
			Difference Between Adjusted April 2018 Baseline and January 2017 Baseline								
Revenues	-265	-243	-199	-190	-160	-114	-79	-57	72	161	n.a.
Outlays	40	129	121	132	155	158	139	130	96	68	n.a.
Deficit[b]	-305	-372	-320	-322	-315	-272	-217	-187	-24	93	n.a.
Debt Held by the Public at the End of the Year[a]	260	650	959	1,266	1,569	1,832	2,046	2,232	2,257	2,165	n.a.

Sources: Congressional Budget Office; staff of the Joint Committee on Taxation.

n.a. = not applicable.

a. The net amount that the Treasury borrows is determined primarily by the annual budget deficit. In addition, several factors—collectively labeled "other means of financing" and not directly included in budget totals—also affect the government's need to borrow from the public.

b. Negative numbers indicate that CBO's projection of the deficit has grown.

Over most of the coming decade, the decrease relative to last year's projections, measured as a share of GDP, is larger for revenues than for noninterest spending (see Figure B-2). The result is that projected deficits through 2025 are now markedly larger than previously projected. Beginning in 2026, however, they are smaller than previously projected.

Changes in Projected Spending

In CBO's extended baseline, noninterest spending as a percentage of GDP is slightly lower than anticipated last year, mainly because the agency's projections of outlays for Social Security and the major health care programs have fallen. CBO's projections of discretionary spending, by contrast, are higher than they were a year ago. Projections of net interest costs are higher than previously projected through the late 2030s and then lower.

Noninterest Spending

As a share of GDP, noninterest spending—that is, spending for Social Security, spending for the major federal health care programs, and other noninterest spending—is projected to be about the same in 2018 as projected last year and lower thereafter. Specifically, it is projected to equal 19.0 percent of GDP in 2018 and to reach 23.0 percent of GDP by 2047 (0.2 percentage points lower than in last year's projection).
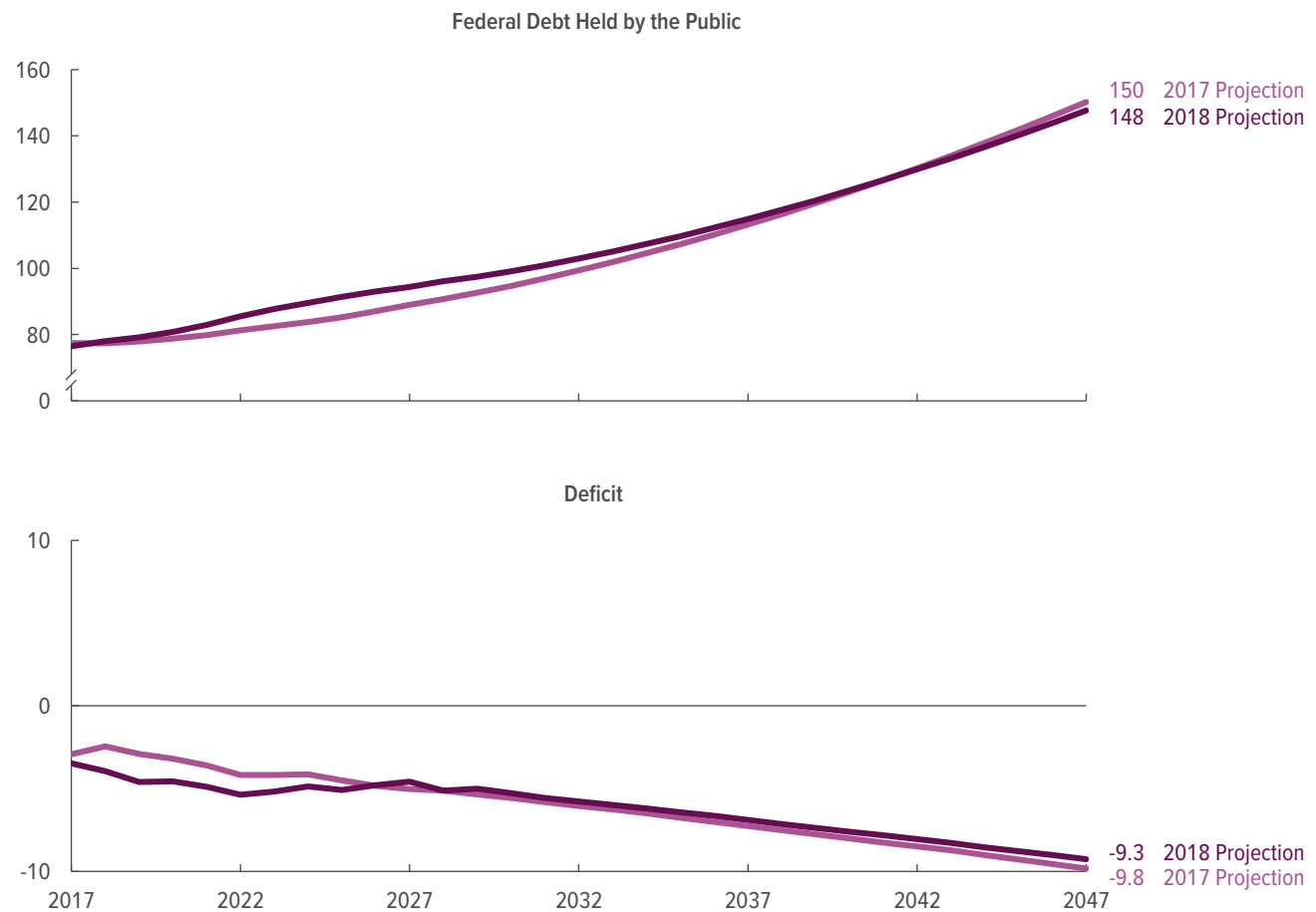
Social Security Spending. CBO projects that outlays for Social Security as a percentage of GDP will be slightly lower than the agency anticipated last year. That change reflects slightly lower projections of nominal outlays over the next 10 years and higher projections of GDP.

The revisions to nominal outlays over the next 10 years include a downward adjustment of projected spending

Figure B-1.

Comparison of CBO's 2017 and 2018 Projections of Federal Debt Held by the Public and the Deficit in the Extended Baseline

Percentage of Gross Domestic Product

Federal Debt Held by the Public

150 2017 Projection
148 2018 Projection

Deficit

-9.3 2018 Projection
-9.8 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.

on Disability Insurance (DI), which is a component of the Social Security program, and lower projections of average wage rates through 2020. The DI projections are lower mainly because caseloads have been lower than anticipated over the past year, which led CBO to reduce its projection of the number of DI beneficiaries initially as well as projections of growth in the number of beneficiaries over the next several years. The projections of average wage rates are lower because of downward revisions to historical data. (Lower projections of average wage rates reduce projected spending on Social Security benefits because the earnings on which initial benefits are

based are indexed to growth in average wages. When that growth is lower, the resulting benefits are also lower.)

Major Federal Health Care Spending. CBO's current long-term projection of federal spending for the major health care programs, measured as a percentage of GDP, is lower than last year's projection. Spending for Medicare net of offsetting receipts (that is, premiums paid by beneficiaries) is now projected to equal 2.9 percent of GDP in 2018 (0.1 percent of GDP lower than projected last year) and then to rise steadily to 5.8 percent of GDP in 2047 (0.3 percent of GDP

Figure B-2.

Comparison of CBO's 2017 and 2018 Projections of Spending and Revenues in the Extended Baseline
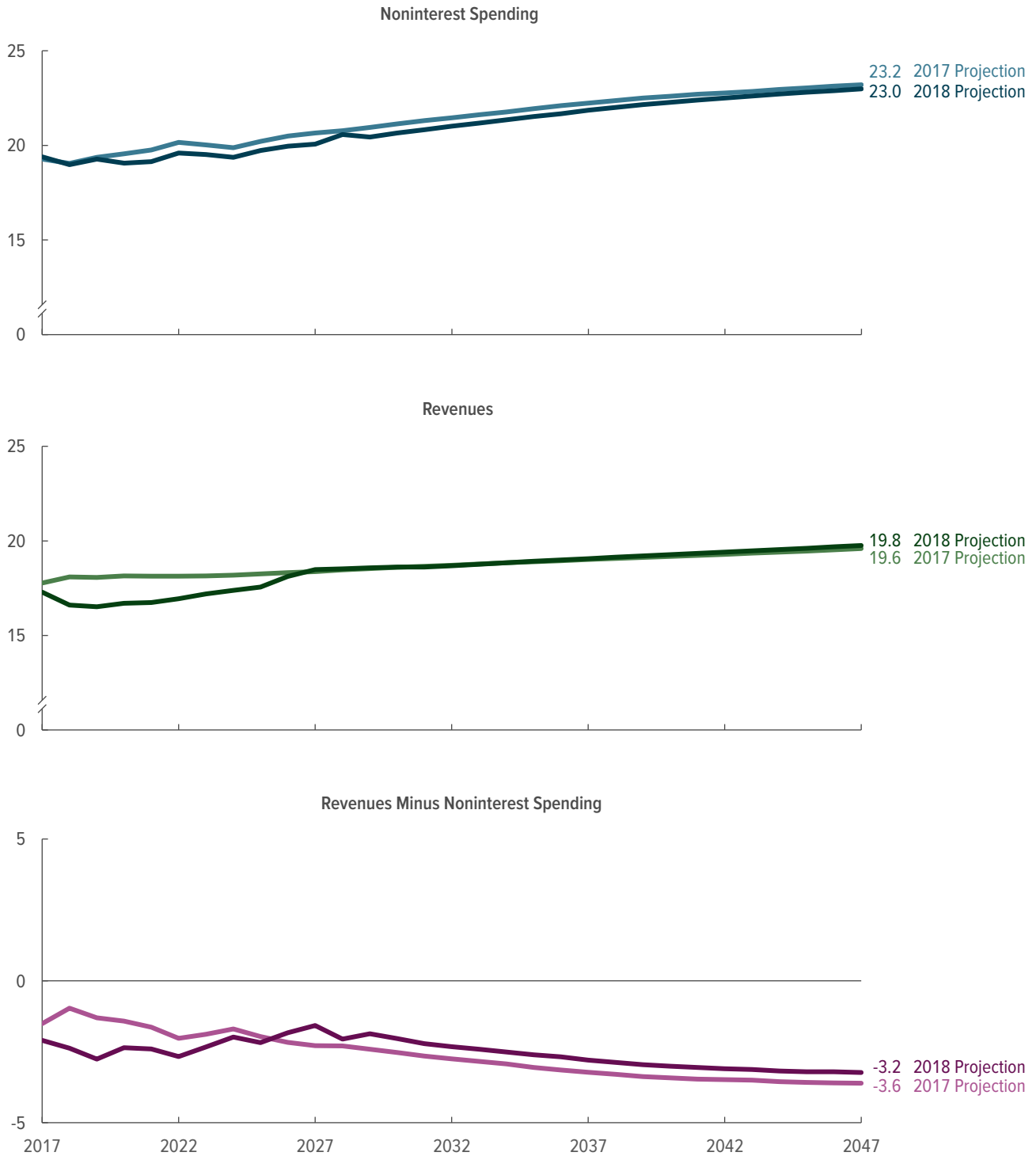
Percentage of Gross Domestic Product

Noninterest Spending

23.2   2017 Projection
23.0   2018 Projection

Revenues

19.8   2018 Projection
19.6   2017 Projection

Revenues Minus Noninterest Spending

-3.2   2018 Projection
-3.6   2017 Projection

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 and then extending most of the concepts underlying those baseline projections for the rest of the long-term projection period.

lower than projected last year). That reduction occurred mostly because CBO has increased its projections of GDP. Outlays for Medicaid and the Children's Health Insurance Program (CHIP), combined with spending to subsidize health insurance purchased through the marketplaces established under the Affordable Care Act and related spending, are projected to be lower than previously anticipated through the late 2030s and higher thereafter, totaling 3.3 percent of GDP in 2047, slightly larger than the sum projected last year. That larger ultimate amount results from faster growth of Medicaid spending in the second and third decades than projected a year ago.

To project long-term spending for the major health care programs, CBO used the same method that it used last year. Namely, it combined estimates of the number of people who are projected to receive benefits from those 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 person with projected excess cost growth for each program.[5] (From 2018 to 2027, potential GDP per person is projected to grow at an average rate of about 3.4 percent per year, up from the 3.1 percent estimated last year; from 2018 to 2047, the average growth rate is projected to be about 3.4 percent per year, roughly the same as last year's estimate.)

For each category of spending except CHIP, through 2028, CBO used the rate of excess cost growth implicit in the agency's 10-year baseline projections.[6] For 2029, the rate equals the average rate from 2024 to 2028 (the last 5 years of the 10-year baseline projections). The rates of excess cost growth for Medicare, Medicaid, and private health insurance therefore all differ in 2029. After 2029, 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 2048.[7]

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5. Potential GDP is the maximum sustainable output of the economy. Excess cost growth is the extent to which health care costs per person, after being adjusted for demographic changes, grow faster than potential GDP per person.

6. Spending for CHIP is projected differently. Outlays for CHIP are projected to be a constant percentage of GDP after 2028.

7. For more information, see Congressional Budget Office, *The 2016 Long-Term Budget Outlook* (July 2016), Chapter 3, www.cbo.gov/publication/51580.

For Medicare, the average annual rate of excess cost growth implicit in CBO's baseline projections is about 1.0 percent from 2019 through 2028, slightly lower than last year's average of 1.1 percent from 2018 through 2027. The rate of excess cost growth for 2029 is 1.2 percent, the same as last year's estimate. Excess cost growth is projected to average 1.1 percent over the full projection period, the same as last year's estimate but lower than the historical average of 1.3 percent from 1985 to 2016.

For Medicaid, the average annual rate of excess cost growth implicit in CBO's baseline projections for the federal share of such spending is 1.5 percent from 2019 through 2028, up by 0.3 percentage points from last year's estimate for 2018 through 2027. The rate for 2029 is 1.6 percent, up by 0.9 percentage points from last year's estimate. That change was the cumulative result of many updates that CBO made to its baseline projections for legislative, economic, and technical reasons—with the largest contribution resulting from an update to CBO's methods that made the agency's estimates of growth in costs per beneficiary more consistent throughout the 10-year projection period. The rate of excess cost growth is projected to average 1.4 percent over the full projection period, which is 0.4 percentage points higher than last year's estimate and 0.4 percentage points higher than the 1985–2016 average.

For private health insurance premiums, which CBO uses as an input to its calculation of marketplace subsidies, the average annual rate of excess cost growth implicit in CBO's baseline projections is about 2 percent from 2019 through 2028 (the same as last year's estimate). The rate for 2029 is also about 2 percent, which again is similar to last year's estimate. The rate is projected to decline from 2029 to 2048 and to be lower in 2048 than its historical average.

Other Noninterest Spending. Over the next 10 years, other noninterest spending—total federal spending on everything other than Social Security, the major federal health care programs, and net interest—is projected to be slightly higher as a percentage of GDP than projected last year and roughly the same thereafter. For most of the next 10 years, the part of that spending that is mandatory is slightly lower than previously projected as a share of GDP because CBO has revised its projections of GDP upward. But that decline is more than offset

Figure B-3.

Comparison of CBO's 2017 and 2018 Projections of Net Spending for Interest in the Extended Baseline
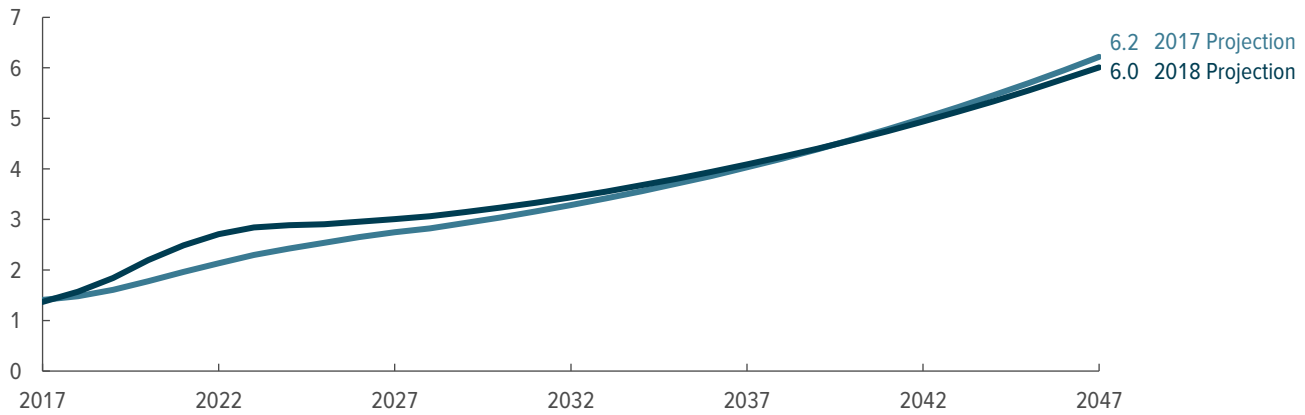
Percentage of Gross Domestic Product

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.

by an increase in projected discretionary spending. That increase stems primarily from legislative changes that increased funding for defense and nondefense spending limited by caps on annual appropriations and that increased funding for emergency requirements.

Beyond 2028, other noninterest spending as a share of GDP is projected to be about the same as projected last year, reflecting lower projections of other mandatory spending offset by higher projections of discretionary spending. The projections of other mandatory spending as a percentage of GDP are lower because such spending is projected to be slightly smaller after 10 years, and CBO projects that it will decline in relation to GDP at the same rate by which it is projected to fall between 2023 and 2028, although at a slightly slower rate than last year. The projections of discretionary spending are higher than they were last year because such spending, at the end of the 10-year period, is now higher than it was in last year's projections. (CBO assumes that discretionary spending will remain roughly constant as a share of GDP after 2028.)

Interest Costs

In CBO's projections, net interest costs are higher through the late 2030s and lower thereafter than they were a year ago (see Figure B-3). Those costs are higher initially because the agency's projections of interest rates and federal debt held by the public are likewise higher.

After the late 2030s, smaller deficits and eventually smaller debt result in lower net interest costs. For the coming decade, net interest costs are projected to average 2.5 percent of GDP; last year, the projected average was 2.2 percent. They are projected to equal 3.1 percent of GDP by 2028 (up 0.2 percentage points from last year's projections) and 6.0 percent of GDP by 2047 (down 0.2 percentage points from last year's projections).

Changes in Projected Revenues

In CBO's current projections, revenues measured as a percentage of GDP are lower through 2026 than they were in last year's projections, similar for most of the following two decades, and then slightly higher by the end of the 30-year projection period. They equal 16.6 percent of GDP this year (which is 1.5 percentage points lower than last year's estimate) and then rise to 18.1 percent of GDP in 2026 (which is 0.2 percentage points lower than last year's estimate). Those downward revisions are the result of recently enacted legislative changes and increased projections of GDP. In particular, provisions of the 2017 tax act temporarily reduced individual income tax rates, nearly doubled the standard deduction, modified or eliminated certain deductions or exemptions, and temporarily allowed firms to deduct the cost of capital investments immediately.

Measured as a share of GDP, revenues in 2027 are projected to be largely the same as in last year's projections,

following the scheduled expiration of most of the individual income tax provisions of the 2017 tax act.[8] From 2027 to 2038, projected revenues average 18.8 percent of GDP (which is equal to last year's estimate). But by 2047, revenues are projected to be 0.2 percentage points higher than projected a year ago. That is because individual income taxes are now projected to grow more quickly through most of the projection period as a result of a change in the price index that is used to adjust tax brackets.[9] As a consequence, income will be pushed into higher tax brackets more quickly than projected a year ago.

Those effects are partially offset by a change in CBO's projection of the distribution of earnings. Specifically, the agency has lowered its projection of the share of earnings that will accrue to the highest earners over the next 30 years (though it still projects that earnings will grow more quickly for higher-income people than for others). The change causes a smaller share of income to be taxed at higher rates under the individual income tax, reducing receipts from that tax source. That decrease is largely offset by an increase in projected payroll taxes, as a smaller increase in the share of income accruing to the highest earners results in more earnings falling below the maximum amount subject to Social Security payroll taxes.

Changes in Social Security's Projected 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.[10] 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 (which is the same as estimated last year) or 4.4 percent of taxable payroll (which is smaller than last year's estimate of 4.5 percent). That reduction resulted from a number of factors. CBO has lowered its projection of nominal outlays for Social Security over the next 10 years and increased its projection of the share of earnings that are subject to Social Security payroll taxes over the next 30 years.[11] In addition, the agency projects slightly higher interest rates over the 75-year period. Partially offsetting those effects is an increase in the actuarial deficit that results each year from incorporating another year of relatively large deficits into the analysis.[12]

Another commonly used measure of Social Security's sustainability is its trust funds' date of exhaustion. CBO projects that if current law did not change, the Disability Insurance Trust Fund would be exhausted in fiscal year 2025, the Old-Age and Survivors Insurance (OASI) Trust Fund would be exhausted in calendar year 2032, and the combined trust funds would be exhausted in calendar year 2031. Last year, those exhaustion dates were two years earlier for the DI trust fund, one year earlier for the OASI trust fund, and one year earlier for the combined funds. The changes in those dates are the result of the lower projections of nominal outlays from the trust funds, the higher projections of interest rates on balances in the trust funds, and higher projections of revenues into the trust funds. The revenues are projected to be higher because of increased projections of earnings relative to last year and because the projected share of earnings that is subject to Social Security payroll taxes has grown.

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8. For more information about the effects of the 2017 tax act, see *The Budget and Economic Outlook: 2018 to 2028* (April 2018), Appendix B, www.cbo.gov/publication/53651, and Box 1 on page 26 of this report.

9. Beginning in 2018, the measure used for adjusting most parameters of the tax system will be changed from the standard consumer price index for urban consumers (CPI-U) to the chained CPI-U. The chained CPI-U tends to grow more slowly than the standard CPI-U because it uses a formula that better accounts for households' tendency to substitute similar goods and services for each other when relative prices change and because, unlike the CPI-U, it is little affected by statistical bias related to the sample sizes that the Bureau of Labor Statistics uses in computing each index. Historically, inflation as measured by the chained CPI-U has been 0.25 percentage points lower, on average, than inflation as measured by the standard CPI-U. CBO's projections reflect that average difference between the two measures.

10. A present value is a single number that expresses a flow of past and future income or payments 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.

11. Beyond the 30-year projection period, the share of earnings subject to Social Security payroll taxes is held constant in CBO's projections.

12. The actuarial deficit includes the trust fund balance at the beginning of the projection period, and that balance represents the present value of all income and costs to the trust funds since their beginning.

List of Tables and Figures

About This Document

Keith Hall
Director
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