

Congressional Budget Office

Nonpartisan Analysis for the U.S. Congress



The 2021 Long-Term Budget Outlook

MARCH | 2021



At a Glance

Each year, the Congressional Budget Office publishes a report presenting its projections of what federal debt, deficits, spending, and revenues would be for the next 30 years if current laws governing taxes and spending generally did not change. This report is the latest in the series.

- **Deficits.** At an estimated 10.3 percent of gross domestic product (GDP), the deficit in 2021 would be the second largest since 1945, exceeded only by the 14.9 percent shortfall recorded last year. In CBO's projections, deficits decline as the effects of the 2020–2021 coronavirus pandemic wane. But they remain large by historical standards and begin to increase again during the latter half of the decade. Deficits increase further in subsequent decades, from 5.7 percent of GDP in 2031 to 13.3 percent by 2051—exceeding their 50-year average of 3.3 percent of GDP in each year during that period.
- **Debt.** By the end of 2021, federal debt held by the public is projected to equal 102 percent of GDP. Debt would reach 107 percent of GDP (surpassing its historical high) in 2031 and would almost double to 202 percent of GDP by 2051. Debt that is high and rising as a percentage of GDP boosts federal and private borrowing costs, slows the growth of economic output, and increases interest payments abroad. A growing debt burden could increase the risk of a fiscal crisis and higher inflation as well as undermine confidence in the U.S. dollar, making it more costly to finance public and private activity in international markets.
- **Spending.** After the spending associated with the pandemic declines in the near term, spending as a percentage of GDP rises in most years in CBO's projections. With growing debt and rising interest rates, net spending for interest more than triples relative to the size of the economy over the last two decades of the projection period, accounting for most of the growth in total deficits. Another significant contributor to growing deficits is the increase in spending for Social Security (mainly owing to the aging of the population) and for Medicare and the other major health care programs (because of rising health care costs per person and, to a lesser degree, the aging of the population).
- **Revenues.** Once the effects of decreased revenues associated with the economic disruption caused by the pandemic dissipate, revenues measured as a percentage of GDP are generally projected to rise. After 2025, they increase in CBO's projections largely because of scheduled changes in tax rules, including the expiration of nearly all the changes made to individual income taxes by the 2017 tax act. After 2031, revenues continue to rise—but not as fast as the growth in spending. Most of the long-term growth in revenues is attributable to the increasing share of income that is pushed into higher tax brackets.

Because future economic conditions are uncertain and budgetary outcomes are sensitive to those conditions, CBO analyzed how those outcomes would differ from its projections if productivity growth or interest rates were higher or lower than the agency expects. Even if economic conditions were more favorable than CBO currently projects, debt in 2051 would probably be much higher than it is today.

CBO's projection of federal debt as a share of GDP is slightly lower in most years over the next three decades than it was in last year's projections. In current estimates, federal debt rises from 102 percent of GDP in 2021 to 195 percent in 2050, compared with last year's projected rise from 104 percent of GDP in 2021 to 195 percent in 2050. Projections of spending and revenues differ from last year's projections for the next decade but are generally similar to them in the longer term.

Contents

Visual Summary	1
The 2021 Long-Term Budget Outlook	5
Overview	5
Consequences of High and Rising Federal Debt	10
Demographic and Economic Projections Underlying CBO’s Long-Term Budget Projections	13
Projected Spending Through 2051	17
Projected Revenues Through 2051	24
Sensitivity of Budget Projections to Changes in Underlying Economic Factors	26
Uncertainty of CBO’s Long-Term Projections	28
Changes From Last Year’s Long-Term Budget Outlook	28
Appendix A: CBO’s Projections of Demographic and Economic Trends	29
Demographic Factors	29
Economic Factors	32
Appendix B: Changes in CBO’s Long-Term Budget Projections Since September 2020	45
Overview	45
Changes in Projected Spending	45
Changes in Projected Revenues	47
Changes in Projected Debt and Deficits	47
Changes in the Social Security Trust Funds	48
Changes in the Sensitivity Analysis of CBO’s Budget Projections	50
Appendix C: Assumptions and Methods Underlying CBO’s Long-Term Budget Projections	51
List of Tables and Figures	53
About This Document	54

Notes

The Congressional Budget Office's extended baseline projections show the budget's long-term path under most of the same assumptions that the agency uses, in accordance with statutory requirements, when constructing its 10-year baseline projections. Both sets of projections incorporate the assumptions that current laws generally remain unchanged, 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.

In most years, CBO examines budgetary outcomes under both the extended baseline and an extended alternative fiscal scenario. Under the alternative fiscal scenario, current law would be changed to maintain certain policies that are now in place. In addition, in most years, the agency examines the size of changes in spending or revenues (or both) that would be needed if lawmakers wanted to achieve some specific targets for federal debt held by the public. In order to release this report when it would be most useful to the Congress, CBO presents budgetary outcomes for the extended baseline only.

Unless this report indicates otherwise, all years referred 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 domestic product or interest rates, are calculated on a calendar year basis.

When October 1 (the first day of the fiscal year) falls on a weekend, certain payments that would have ordinarily been made on that day are instead made at the end of September and thus are shifted into the previous fiscal year. For the graphics in this report, budget projections have been adjusted to exclude the effects of those timing shifts.

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

Unless this 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 (www.cbo.gov/publication/56977). Previous editions of this report are also available on the website (<https://go.usa.gov/xmezZ>).

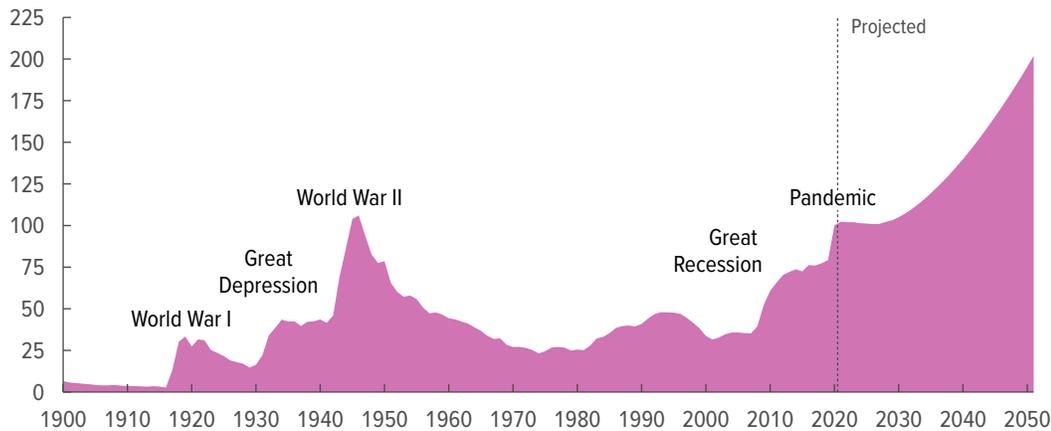
Visual Summary

Each year, the Congressional Budget Office issues a set of long-term budget projections—referred to as the extended baseline projections—that provide estimates of what federal debt, deficits, spending, and revenues would be over the next 30 years if current laws generally remained unchanged. Relative to the size of the economy, federal debt is slightly lower in most years over the next three decades than it was in last year’s projections.

Debt and Deficits

Federal debt held by the public is projected to equal 202 percent of gross domestic product (GDP) in 2051, and the deficit is projected to equal 13 percent of GDP.

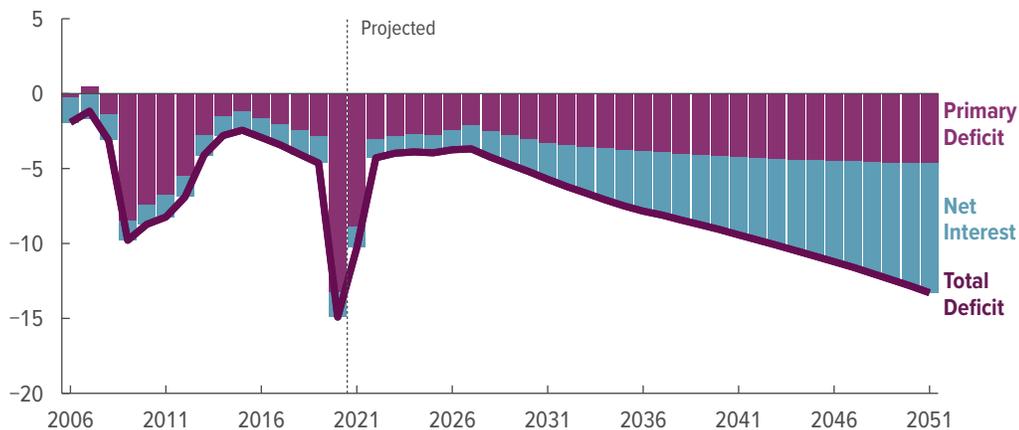
Percentage of Gross Domestic Product



In CBO’s projections, federal debt held by the public reaches 107 percent of GDP (surpassing its historical high) in 2031 and continues to climb.

See Figure 1 on page 6

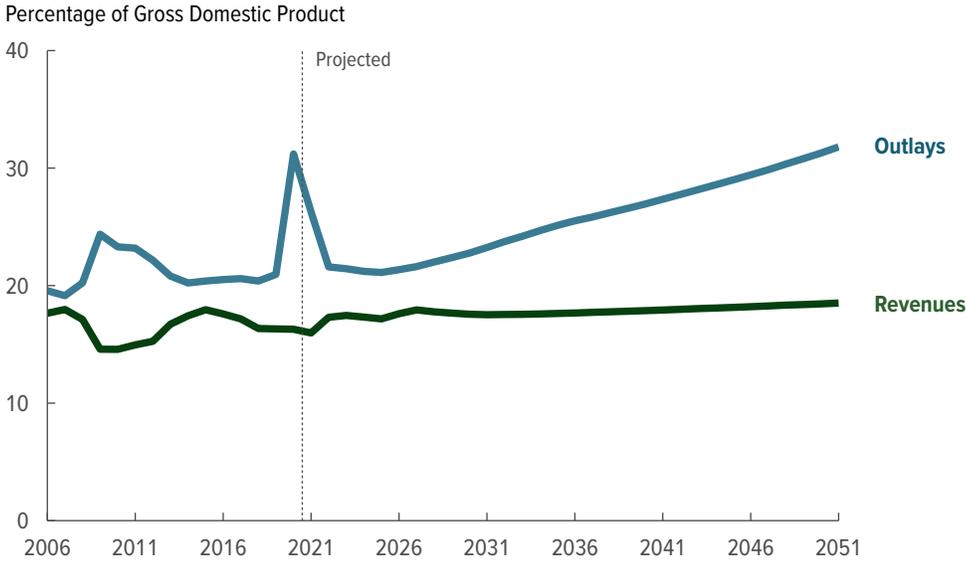
Percentage of Gross Domestic Product



After decreasing as the effects of the 2020–2021 coronavirus pandemic wane, deficits grow, largely because net spending for interest increases rapidly in the last two decades of the projection period. Deficits exceed their 50-year average of 3.3 percent of GDP in each year of that period.

See Figure 2 on page 8

Debt and Deficits (Continued)

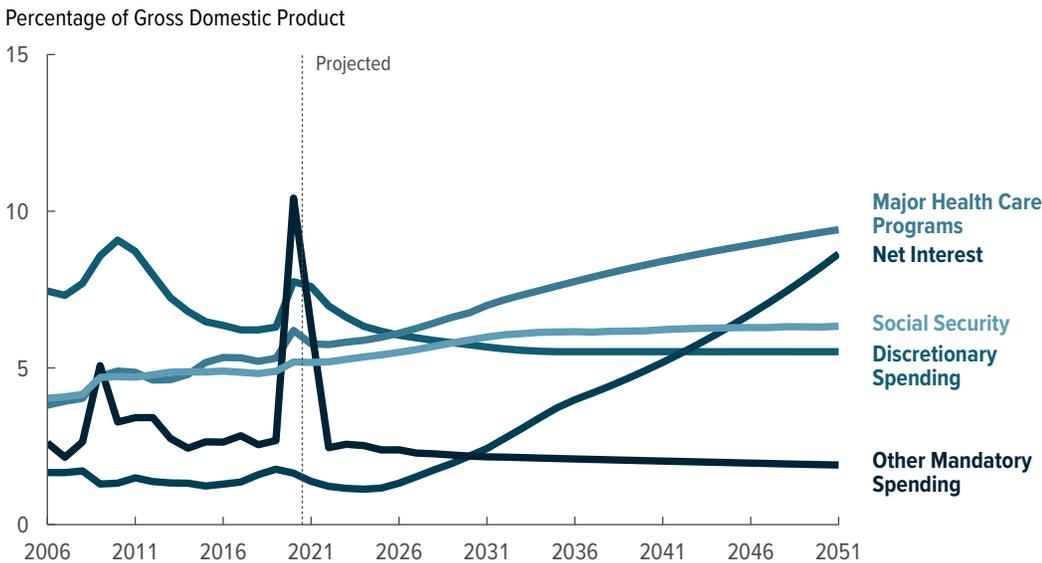


Growth in outlays outpaces growth in revenues, resulting in larger budget deficits over the long term.

See Figure 3 on page 9

Spending

Federal spending grows from an average of 21.3 percent of GDP over the 2010–2019 period to an average of 29.7 percent over the 2042–2051 period in CBO’s projections.



Net spending for interest, measured as a share of GDP, begins to increase in 2025 and more than triples over the last two decades of the projection period. Spending for the major health care programs and Social Security increases in almost every year of the period.

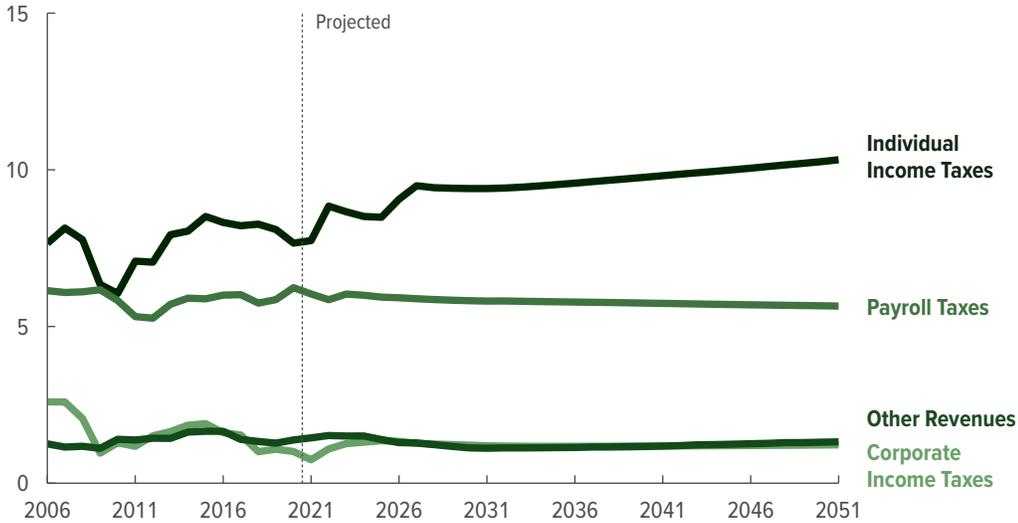
See Figure 3 on page 9



Revenues

In CBO’s projections, federal revenues increase from an average of 16.4 percent of GDP over the 2010–2019 period to an average of 18.2 percent over the 2024–2051 period.

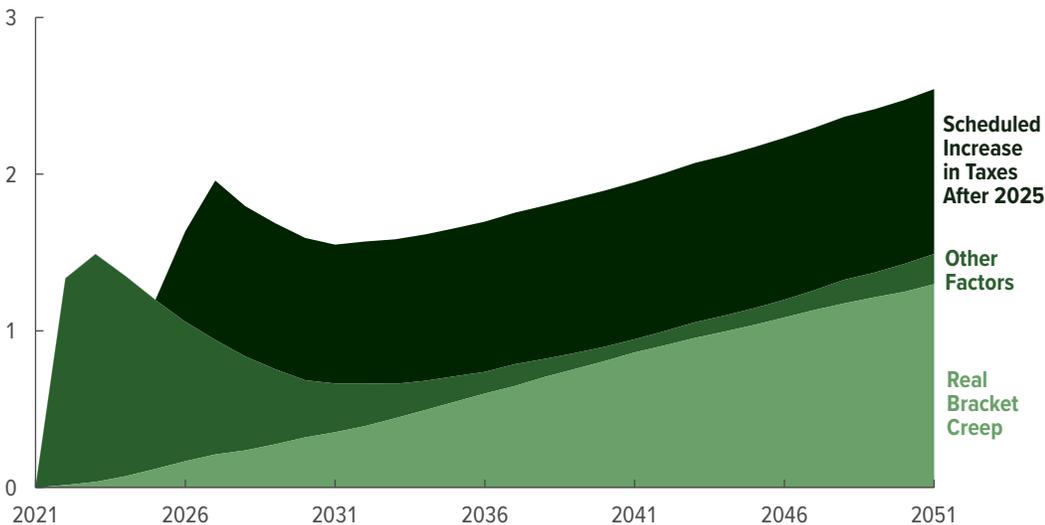
Percentage of Gross Domestic Product



Increases in receipts from individual income taxes account for most of the rise in total revenues. Those receipts increase after 2025, largely because nearly all provisions of the 2017 tax act that affect individual income taxes expire.

See Figure 3 on page 9

Percentage of Gross Domestic Product



Over the long term, the largest source of growth in tax revenues is real bracket creep—the process in which, as income rises faster than inflation, a larger proportion of income becomes subject to higher tax rates.

See Figure 11 on page 25

The 2021 Long-Term Budget Outlook

Overview

By the end of fiscal year 2021, federal debt held by the public is projected to equal 102 percent of gross domestic product (GDP). If current laws governing taxes and spending generally remained unchanged, debt would persist near that level through 2028 before rising further. By 2031, debt would equal 107 percent of GDP, its highest level in the nation's history, the Congressional Budget Office projects.

Debt would continue to increase thereafter, exceeding 200 percent of GDP by 2051 (see Figure 1).¹ That amount of debt would be the highest by far in the nation's history, and it would be on track to increase further.

Debt that is high and rising as a percentage of GDP boosts federal and private borrowing costs, slows the growth of economic output, and increases interest payments abroad. A growing debt burden could increase the risk of a fiscal crisis and higher inflation as well as undermine confidence in the U.S. dollar, making it more costly to finance public and private activity in international markets.

What CBO's Projections Represent

The long-term projections of federal spending, revenues, deficits, and debt in this report are consistent with the baseline budget projections and the economic forecast for the 2021–2031 period that CBO published in February 2021.² Those projections incorporate the assumptions that current laws (enacted as of January 12,

2021) governing federal taxes and spending generally remain in place and that the federal government provides no significant additional emergency funding or aid in response to the 2020–2021 coronavirus pandemic. The projections incorporate the budgetary and economic effects of the pandemic and associated measures taken to limit in-person interactions. They also reflect the economic and budgetary effects of laws enacted as of January 12, 2021, that contain provisions to address the public health emergency and to support households, businesses, and state and local governments.³ In CBO's assessment, the economic effects of those provisions partially offset the deterioration in economic conditions caused by the pandemic.⁴

CBO's long-term projections extend most of the concepts underlying its 10-year projections for an additional 20 years.⁵ Together, those projections constitute the agency's *extended baseline* projections (see Appendix C for more details about the analytic methods underlying CBO's long-term projections).

CBO's 10-year and extended baseline projections are not predictions of budgetary outcomes. Rather, they represent the agency's assessment of future spending, revenues, deficits, and debt under these assumptions:

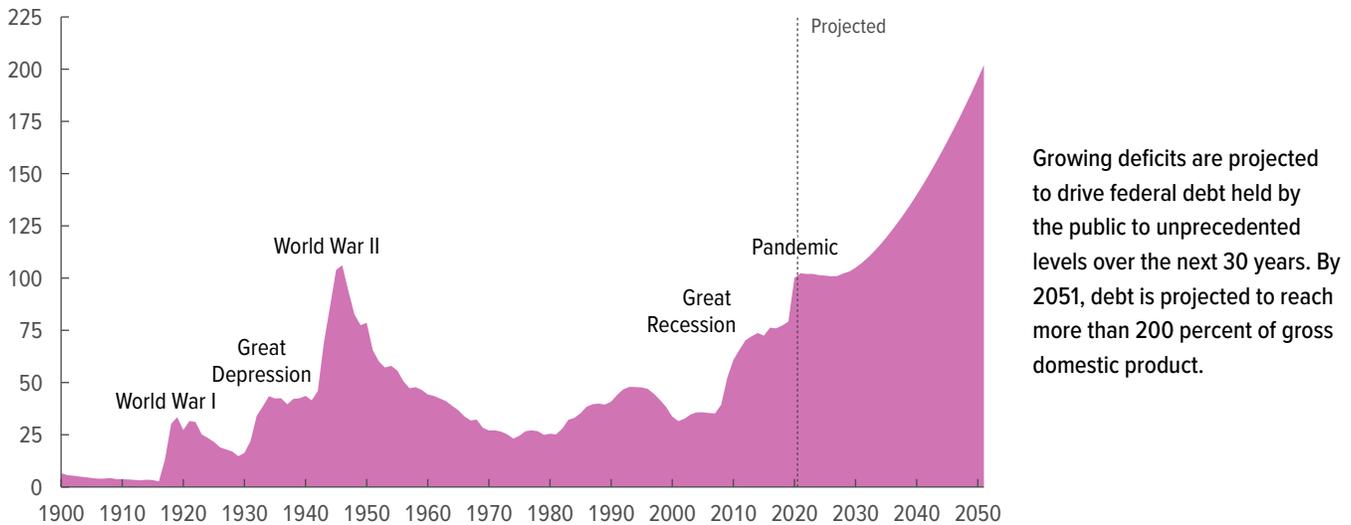
1. Budgetary values, such as the ratio of debt or deficits to gross domestic product, are calculated on a fiscal year basis; economic variables, such as interest rates, are calculated on a calendar year basis.
2. See Congressional Budget Office, *The Budget and Economic Outlook: 2021 to 2031* (February 2021), www.cbo.gov/publication/56970, *An Overview of the Economic Outlook: 2021 to 2031* (February 2021), www.cbo.gov/publication/56965, *Additional Information About the Economic Outlook: 2021 to 2031* (February 2021), www.cbo.gov/publication/56989, and *Additional Information About the Budget Outlook: 2021 to 2031* (forthcoming on March 5, 2021), www.cbo.gov/publication/56996.

3. Provisions enacted in response to the pandemic were included in the Coronavirus Preparedness and Response Supplemental Appropriations Act, 2020 (Public Law 116-123), the Families First Coronavirus Response Act (P.L. 116-127), the Coronavirus Aid, Relief, and Economic Security Act (P.L. 116-136), the Paycheck Protection Program and Health Care Enhancement Act (P.L. 116-139), the Paycheck Protection Program Flexibility Act of 2020 (P.L. 116-142), and divisions M, N, and EE of the Consolidated Appropriations Act, 2021 (P.L. 116-260).
4. See Congressional Budget Office, *The Effects of Pandemic-Related Legislation on Output* (September 2020), www.cbo.gov/publication/56537.
5. CBO's projections are also based on assumptions about the Federal Reserve's implementation of monetary policy. See Board of Governors of the Federal Reserve System, "Federal Open Market Committee Announces Approval of Updates to Its Statement on Longer-Run Goals and Monetary Policy Strategy" (press release, August 27, 2020), <https://go.usa.gov/xGXXn>.

Figure 1.

Federal Debt Held by the Public, 1900 to 2051

Percentage of Gross Domestic Product



Data source: Congressional Budget Office. See www.cbo.gov/publication/56977#data.

- Current laws affecting revenues and spending generally remain unchanged;
- Some programs—for example, the Supplemental Nutrition Assistance Program (SNAP)—are nevertheless extended after their authorizations lapse; and
- Spending for Medicare and Social Security continues as scheduled even after their trust funds are exhausted.

CBO produces its baseline projections under those assumptions, as specified in law. CBO's baseline projections give lawmakers a point of comparison from which to measure the effects of policy options or proposed legislation.

In most years, the agency examines budgetary outcomes under both the extended baseline and an extended alternative fiscal scenario. Under the alternative fiscal scenario, current laws would be changed to maintain certain policies that are now in place (such as current income tax rates). In addition, in most years, CBO examines the size of changes in spending or revenues (or both) that would be needed if lawmakers wanted to achieve some specific targets for federal debt held by the public. In order to release this report when it would be most useful to the Congress, CBO presents budgetary outcomes for the extended baseline only.

Why Federal Debt Has Recently Grown

In the first quarter of 2020, the coronavirus pandemic ended the longest economic expansion in U.S. history and triggered the deepest downturn in output and employment since the demobilization following World War II. Increased spending and decreased revenues associated with the pandemic and ensuing recession boosted federal debt held by the public to 100 percent of GDP in 2020, up from 79 percent at the end of 2019.

Federal debt held by the public is projected to total 102 percent of GDP by the end of this fiscal year (see Table 1). By historical standards, that amount of debt is very large. Over the past 50 years, debt has averaged 44 percent of GDP. It has exceeded 102 percent of GDP in only two years in U.S. history—1945 and 1946, when debt reached 104 percent and 106 percent of GDP, respectively, following the surge in federal spending as a result of World War II.

Why Debt Is Projected to Continue to Grow

Debt as a percentage of GDP is projected to increase in most years as the government incurs budget deficits that are large relative to the size of the economy (see Figure 2). If current laws generally remained unchanged, federal budget deficits would be substantially larger over the next 30 years than they were, on average, over the past 50 years. In CBO's projections, deficits drop below

Table 1.

Key Projections in CBO's Extended Baseline

Percentage of Gross Domestic Product

	2021	Projected Annual Average		
		2022–2031	2032–2041	2042–2051
Revenues				
Individual income taxes	7.7	9.1	9.6	10.1
Payroll taxes	6.0	5.9	5.8	5.7
Corporate income taxes	0.7	1.3	1.2	1.2
Other ^a	1.4	1.3	1.1	1.3
Total Revenues	16.0	17.5	17.7	18.2
Outlays				
Mandatory				
Social Security	5.2	5.6	6.1	6.3
Major health care programs ^b	5.8	6.3	7.8	9.0
Other	6.3	2.3	2.1	2.0
Subtotal	17.3	14.2	16.1	17.2
Discretionary	7.6	6.1	5.5	5.5
Net interest	1.4	1.6	4.0	7.0
Total Outlays	26.3	21.9	25.6	29.7
Deficit	-10.3	-4.4	-7.9	-11.5
Debt Held by the Public at the End of the Period	102	107	145	202
Memorandum:				
Social Security				
Revenues ^c	4.6	4.5	4.5	4.4
Outlays ^d	5.2	5.6	6.1	6.3
Contribution to the Federal Deficit^e	-0.6	-1.1	-1.6	-1.9
Medicare				
Revenues ^c	1.5	1.5	1.6	1.6
Outlays ^d	3.8	4.7	6.2	7.4
Offsetting receipts	-0.6	-0.8	-1.1	-1.4
Contribution to the Federal Deficit^e	-1.7	-2.4	-3.5	-4.4
Gross Domestic Product at the End of the Period (Trillions of dollars)	22.0	32.9	46.8	66.0

Data source: Congressional Budget Office. See www.cbo.gov/publication/56977#data.

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

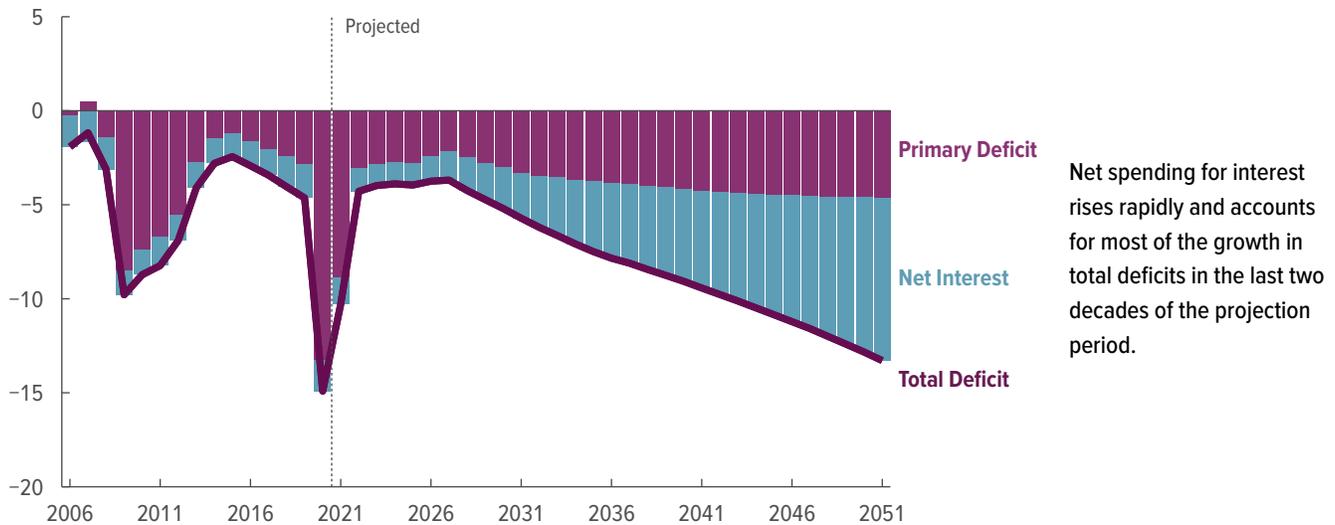
The extended baseline projections, which generally reflect current law, follow CBO's 10-year baseline budget projections and then extend most of the concepts underlying those projections for the rest of the long-term projection period.

- Consists of excise taxes, remittances to the Treasury from the Federal Reserve System, customs duties, estate and gift taxes, and miscellaneous fees and fines.
- 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.
- 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.
- Excludes discretionary outlays related to administration of the program.
- 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 2.

Total Deficits, Primary Deficits, and Net Interest

Percentage of Gross Domestic Product



Data source: Congressional Budget Office. See www.cbo.gov/publication/56977#data.

Primary deficits or surpluses exclude net spending for interest.

4.0 percent of GDP for a few years and then rise again through 2031. After 2031, deficits continue to rise as mandatory spending—in particular, outlays for the major health care programs—and interest payments on federal debt grow faster than revenues (see Figure 3).⁶ That growth in deficits causes projected debt to rise as a percentage of GDP over the 2032–2051 period, reaching 202 percent in 2051.

Deficits From 2021 to 2031. At an estimated 10.3 percent of GDP, the deficit in 2021 would be the second largest since 1945, exceeded only by the 14.9 percent shortfall recorded last year. In CBO’s projections, deficits decline to 4.0 percent of GDP or less from 2023 to 2027 before increasing again, reaching 5.7 percent of GDP in 2031. That level is almost twice the average over the past half-century (3.3 percent of GDP).

The decline in deficits as a percentage of GDP through 2024 is caused primarily by decreases in pandemic-related spending and the recovery from the economic downturn caused by the pandemic. In addition, net spending for interest, relative to the size of the economy, generally declines in the first half of the decade as interest

rates, which have recently fallen, remain low. From 2025 to 2027, deficits average 3.8 percent of GDP as revenues increase, partially driven by the scheduled increases in taxes at the end of calendar year 2025.

Larger deficits in the last few years of the decade result from increases in spending that outpace increases in revenues. In particular:

- Mandatory spending increases as a percentage of GDP. Those increases stem both from the aging of the population, which causes the number of participants in Social Security and Medicare to grow faster than the overall population, and from growth in federal health care costs per beneficiary that exceeds the growth in GDP per capita.
- Net spending for interest as a percentage of GDP is projected to increase over the remainder of the decade as interest rates rise and federal debt remains high.

In contrast, discretionary spending is projected to decrease as a percentage of GDP over the decade.⁷ (Under the rules that govern the construction of CBO’s

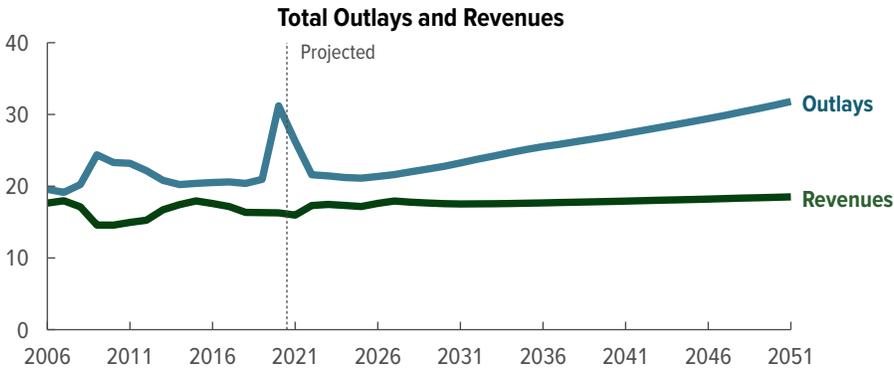
6. Mandatory, or direct, spending includes outlays for some federal benefit programs and for certain other payments to people, businesses, nonprofit institutions, and state and local governments. Such outlays are generally governed by statutory criteria and are not normally constrained by the annual appropriation process.

7. Discretionary spending encompasses an array of federal activities that are funded through or controlled by appropriations. That category includes most defense spending, outlays for highway programs, and spending for many other nondefense activities, such as elementary and secondary education, housing assistance, international affairs, and the administration of justice.

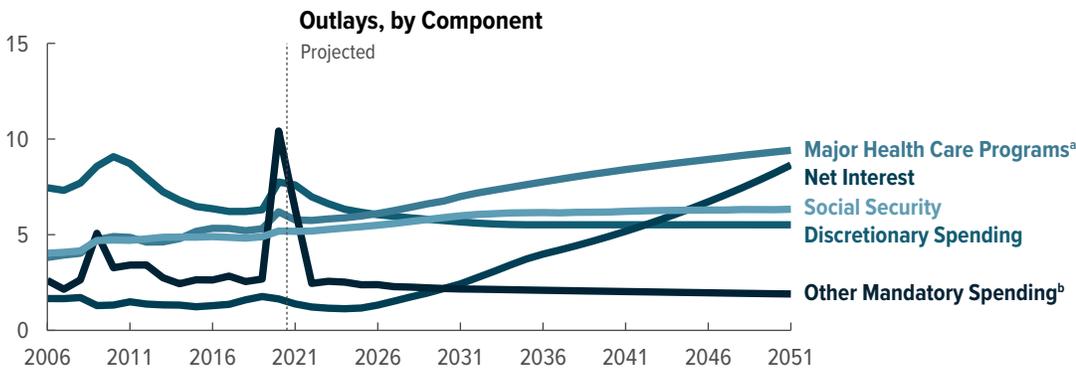
Figure 3.

Outlays and Revenues

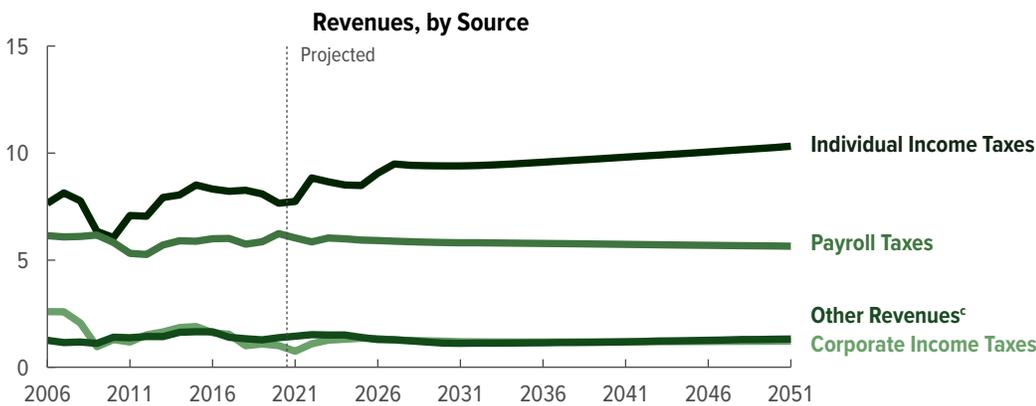
Percentage of Gross Domestic Product



In most years, growth in outlays is projected to outpace growth in revenues, resulting in widening budget deficits.



Over the long term, net spending for interest and outlays for the major health care programs and Social Security are projected to rise in relation to GDP; other spending, in total, is projected to decline.



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 about the same in 2051 as they are today.

Data source: Congressional Budget Office. See www.cbo.gov/publication/56977#data.

GDP = gross domestic product.

- 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 mandatory spending other than that for Social Security and the major health care programs. It includes the refundable portions of the earned income tax credit, the child tax credit, and the American Opportunity Tax Credit.
- 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.

baseline, discretionary spending beginning in 2022 is projected to keep pace with future inflation, but GDP is projected to grow faster.)

Primary deficits—which exclude net spending for interest—fall from 8.9 percent of GDP in 2021 to lower levels in the following years, ending the period at 3.3 percent of GDP in 2031.

Deficits From 2032 to 2051. Deficits are projected to grow from 6.2 percent of GDP in 2032 to 13.3 percent by 2051. That growth is largely driven by increases in interest costs. Although primary deficits grow over that period, from 3.5 percent of GDP in 2032 to 4.6 percent of GDP in 2051, that increase is small relative to the increase in net spending for interest (see Figure 2 on page 8). CBO projects that rising federal debt and higher interest rates would combine to more than triple net spending for interest over that last two decades of the projection period. Over that 20-year period, total deficits average 9.7 percent of GDP, which is much higher than their 50-year average of 3.3 percent of GDP.

After 2031, in CBO's projections, mandatory spending continues to increase faster than economic output. CBO assumes that in 2032, the annual rate of growth in discretionary spending would begin to increase such that, in five years' time, it would equal the growth rate of nominal GDP. That growth is faster than the increase in discretionary spending over the 2026–2031 period, when CBO is mandated by law to assume that discretionary spending will grow at the rate of inflation. Revenues also rise after 2031—although not as quickly as mandatory spending—driven by real bracket creep (the process in which an ever-larger proportion of income becomes subject to higher tax rates as income rises faster than inflation).

Consequences of High and Rising Federal Debt

If federal debt as a percentage of GDP continued to rise at the pace that CBO projects it would under current law, in the long term the economy would be affected in two significant ways:

- That debt path would raise borrowing costs, reduce business investment, and slow the growth of economic output over time,⁸ and

8. When the federal government borrows in financial markets, it competes with other participants for funds. That competition

- Rising interest costs associated with that debt would increase interest payments to foreign holders of U.S. debt.

Persistently rising debt as a percentage of GDP would also pose significant risks to the fiscal and economic outlook, although financial markets currently do not reflect those concerns. In particular, that debt path would have these economic and financial effects:

- It would increase the risk of a fiscal crisis—that is, a situation in which investors lose confidence in the U.S. government's ability to service and repay its debt, causing interest rates to increase abruptly, inflation to spiral upward, or other disruptions—and
- It would increase the likelihood of less abrupt, but still significant, adverse effects, such as expectations of higher rates of inflation, an erosion of confidence in the U.S. dollar as an international reserve currency, and more difficulty in financing public and private activity in international markets.

In addition, high and rising debt makes government financing more vulnerable to increases in interest rates because costs to service that debt rise more for a given increase in interest rates when debt is higher than when it is lower. High and rising debt also might cause policymakers to feel constrained from implementing deficit-financed fiscal policy to respond to unforeseen events or for other purposes, such as to promote economic activity or strengthen national defense.

Not all effects of higher debt and a higher projected path for debt would be unfavorable. Policies that increase deficits can provide support to the economy during challenging times, such as the current pandemic. Also, over time, a higher debt path would boost interest rates above what they otherwise would be, promoting private saving and giving the Federal Reserve more flexibility in implementing monetary policy.

can crowd out private investment, reducing economic output and income in the long term. 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. For more discussion, see Congressional Budget Office, *Federal Debt: A Primer* (March 2020), www.cbo.gov/publication/56165. Several factors not directly included in 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.

Moreover, the effects on economic outcomes would depend on the types of policies that generate the higher deficits and debt. For example, increased high-quality and effective federal investment would boost private-sector productivity and output (though it would only partially mitigate the adverse consequences of greater borrowing).⁹ However, in CBO's projections, the increasing deficits and debt result primarily from increases in noninvestment spending. Notably, net outlays for interest are a significant component of the increase in spending over the next 30 years. In addition, federal spending for Social Security, Medicare, and Medicaid for people age 65 or older would account for about half of all federal noninterest spending by 2051, rising from about one-third in 2021.

Addressing high and rising debt sooner rather than later means that smaller policy changes would be required to achieve long-term objectives. The benefits of reducing deficits sooner include a smaller accumulated debt and therefore less risk to long-term economic growth and stability. The risk of reducing deficits sooner is that changes in spending or in taxes might lead to economic and financial disruptions if people have insufficient time to plan for or adjust to the new measures or if such changes occurred during a time of economic weakness.

How lawmakers respond to high and rising debt determines who would bear the burden of particular changes in spending or taxes and who would realize the economic benefits.¹⁰ In general, if policymakers postponed fiscal tightening and if debt as a share of GDP continued to rise, then future generations would bear more of the burden of the changes necessary to stabilize debt. Earlier generations—most notably, people in those generations who have higher income and more wealth—would bear less of the burden. Within any given generation, who

bears the burden of the changes necessary to stabilize the debt would depend on the policies implemented.

Effects Incorporated in CBO's Extended Baseline Projections

The high and rising path of federal borrowing in CBO's extended baseline projections would have adverse economic consequences over the longer term. Although interest rates remain low for an extended time in those projections, the eventual rise in rates together with the larger amount of debt would lead to an increase in interest costs over the next 30 years. CBO's extended baseline projections and the accompanying economic projections reflect the effects of those rising costs on investment and on national income.

Crowding Out of Private Investment. When the government borrows in financial markets, it does so from people and businesses whose savings would otherwise finance private investment, such as factories and computers. Although an increase in government borrowing strengthens people's incentive to save—in part by boosting interest rates—the resulting rise in private saving is not as large as the increase in government borrowing; therefore, national saving, or the amount of domestic resources available for private investment, declines.¹¹ Private investment falls by less than national saving does in response to larger government deficits, however, because the higher interest rates that are likely to result from increased federal borrowing tend to attract more foreign capital to the United States.

If investment in capital goods declined, workers would, on average, have less capital to use in their jobs. As a result, they would be less productive, they would receive lower compensation, and they would thus be less inclined to work. Those effects would increase over time as federal borrowing grew. If federal borrowing declined, however, those effects would decrease.

9. The macroeconomic effects of increased federal investment spending can be different for different types of investment and also depend on how that spending was financed. For a detailed discussion, see Congressional Budget Office, *The Macroeconomic and Budgetary Effects of Federal Investment* (June 2016), www.cbo.gov/publication/51628.

10. See Congressional Budget Office, *Economic Impacts of Waiting to Resolve the Long-Term Budget Imbalance* (December 2010), www.cbo.gov/publication/21959; and Shinichi Nishiyama and Felix Reichling, *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.

11. In CBO's assessment, another reason that an increase in government borrowing strengthens people's incentive to save is that some of them expect policymakers to raise taxes or cut spending in the future to cover the cost of paying interest on the additional federal debt. As a result, some of those people increase their saving to prepare for paying higher taxes or receiving lower benefits. For further discussion of that effect and the estimated effect of federal borrowing on private investment, see Jonathan Huntley, *The Long-Run Effects of Federal Budget Deficits on National Saving and Private Domestic Investment*, Working Paper 2014-02 (Congressional Budget Office, February 2014), www.cbo.gov/publication/45140.

Rising Interest Payments. The projected increase in interest costs over the next 30 years is partly attributable to a projected rise in interest rates. Because debt is already high, even moderate increases in interest rates would lead to significantly higher interest costs. Moreover, federal borrowing is projected to rise significantly, further driving up interest costs. That increase in interest costs would not happen immediately, however, because the lower interest rates associated with the economic downturn caused by the pandemic and the Federal Reserve's response to it would initially offset the effect of the rising amount of debt.

CBO expects interest rates to rise as the economy recovers and then continues to expand, particularly in the latter half of the coming decade. The agency expects the interest rate on 10-year Treasury notes to average 1.6 percent over the 2021–2025 period and 3.0 percent over the 2026–2031 period. After 2031, the interest rate on 10-year Treasury notes is projected to rise steadily, reaching 4.9 percent by 2051. (Though higher than current rates, the projected interest rates are lower than they have been historically.)

In CBO's extended baseline projections, net outlays for interest grow from 1.4 percent of GDP in 2021 to 2.4 percent in 2031 and then continue to rise over the next two decades, reaching 8.6 percent by 2051. Those higher outlays would include an increase in payments to foreign investors (who currently hold 33 percent of federal debt held by the public), which would reduce the nation's net international income.

A larger amount of debt makes the United States' fiscal position more vulnerable to an increase in interest rates than it would be if the amount was smaller. In CBO's projections, the average interest rate on federal debt initially decreases from 1.4 percent in 2021 to 1.2 percent in 2024 and then increases to 4.6 percent by 2051. The change in interest rates accounts for about one-quarter of the projected growth in debt as a share of GDP over the 2021–2051 period. (The cost of financing the primary deficits projected over that period at current interest rates accounts for the remaining three-quarters of that increase.) Therefore, even though rising interest rates have a sizable effect on the fiscal outlook, rising debt levels would substantially boost interest costs even if rates remained unchanged.

Greater Risk of a Fiscal Crisis

High and rising federal debt increases the likelihood of a fiscal crisis. Such a crisis can occur as investors' confidence

in the U.S. government's fiscal position erodes, undermining the value of Treasury securities and driving up interest rates on federal debt because investors would demand higher yields to purchase those securities. Concerns about the government's fiscal position could lead to a sudden and potentially spiraling increase in people's expectations of inflation, a large drop in the value of the dollar, or a loss of confidence in the government's ability or commitment to repay its debt in full. The risk of a fiscal crisis appears to be low in the short run despite the higher deficits and debt stemming from the pandemic. That risk is also mitigated in the short run by certain characteristics of the U.S. financial system, including independent monetary policy, government debt issued in U.S. dollars, and a central place in the global financial system. Nonetheless, the much higher debt over time would raise the risk of a fiscal crisis in the years ahead.

In a fiscal crisis, dramatic increases in Treasury rates would reduce the market value of outstanding government securities, and the resulting losses incurred by holders of those securities—including mutual funds, pension funds, insurance companies, and banks—could be large enough to cause some financial institutions to fail. A fiscal crisis could thus lead to a financial crisis. Because the United States plays a central role in the international financial system, such a crisis could spread globally.

Policymakers would have several options to respond to a fiscal crisis. Each option would have economic and distributional consequences, though, and choosing among them would involve difficult trade-offs. One policy option would be to dramatically cut noninterest spending or increase taxes, which could have adverse effects on the economy in the short run. A second option would be for the Federal Reserve to fund deficits through the purchase of Treasury securities. That option, if extensively pursued, would ultimately raise inflation (relative to prior inflation expectations), thereby reducing the real (inflation-adjusted) cost of financing outstanding debt. Such an action could lead to depreciation of the dollar and undermine its role in international currency markets, which in turn could lead to even higher inflation and declines in real wealth and purchasing power. A third option would be to restructure the debt (that is, modify the contractual terms of existing obligations) so that repayment was feasible. (Restructuring the debt is generally viewed as less likely because it would undermine investors' confidence in the government's commitment to repay its debt in full.) Coordinating fiscal and monetary policies in times of crisis could also present significant challenges.

The risk of a fiscal crisis depends on factors beyond the amount of federal debt. Ultimately, what matters is the cost of servicing the debt and the ability to refinance it as needed. Among the factors affecting that ability and cost are investors' expectations about the budget and economic outlook, which can change over time, and about domestic and international financial conditions, including interest rates and exchange rates. Furthermore, the relationships between those factors and the risk of a crisis are uncertain and can shift—depending, in part, on the state of the economy. In CBO's assessment, the debt-to-GDP ratio has no set tipping point at which a crisis becomes likely or imminent; nor is there an identifiable set point at which interest costs as a percentage of GDP become unsustainable. Indeed, the agency cannot reliably quantify the probability that a fiscal crisis might occur. Thus, the distribution of possible outcomes that CBO considered in preparing its baseline projections does not include the potential budgetary and economic outcomes of a fiscal crisis.

The risk of a fiscal crisis in the near term is not currently apparent in financial markets, even though the pandemic and the government's response to it have increased the federal deficit; there is still great uncertainty about the speed and scope of a recovery. However, financial markets do not always fully reflect risks on the horizon and, more importantly, the risk of a fiscal crisis could change suddenly in the wake of subsequent unexpected events. For example, a sudden rise in interest rates could lead investors to become concerned about the government's fiscal position over the long term as their uncertainty grew about whether the rise was temporary or signaled a long-term trend.

Risks of Other Disruptions

Even in the absence of an abrupt fiscal crisis, high and rising debt could have persistent adverse effects on the economy beyond those incorporated in CBO's extended baseline projections, including a gradual decline in the value of Treasury securities and other domestic assets. High and rising debt could lead to increases in inflation expectations. Increases in federal borrowing could also lead to an erosion of confidence in the U.S. dollar as an international reserve currency. Among other effects, such developments would make it more difficult to finance public and private activity. Moreover, the increased dependence on foreign investors could pose other challenges, such as making U.S. financial markets more vulnerable to a change in the valuation of U.S. assets by participants in global markets.

The projected amount of debt increases the risk that interest costs would be substantially greater than projected—even without a fiscal crisis—if interest rates were higher than those underlying CBO's extended baseline projections. Alternatively, a lower borrowing rate would result in smaller interest costs than those in CBO's extended baseline projections. (For further discussion of the sensitivity of federal debt to interest rates, see "Sensitivity of Budget Projections to Changes in Underlying Economic Factors" below.)

High and rising debt (and the large deficits that result) might also constrain policymakers' choices about fiscal policy in the future. As the federal government increased its borrowing, ever-larger cuts in primary deficits would be required to achieve particular targets for deficits or debt. As a result, policymakers could feel constrained from using deficit-financed fiscal policy to respond to unforeseen events or for other purposes (to promote economic activity or further other goals, for example), a situation that might not occur if debt and deficits were lower (or the increase was smaller). High debt could also undermine national security if it compromised the international geopolitical role of the United States or if policymakers felt constrained from increasing national security spending to prepare for or respond to an international crisis.

Risks also arise from the interaction of fiscal and monetary policy in response to higher debt. For example, the Federal Reserve's large-scale purchases of Treasury securities and other financial assets in response to the pandemic pose risks to the outlook for interest rates. CBO expects the Federal Reserve's holdings of Treasury securities, measured as a share of GDP, to begin declining in 2024, which would put modest upward pressure on long-term interest rates. There is some risk, however, that participants in financial markets could react adversely to the Federal Reserve's efforts to taper its holdings of such assets by sharply reducing their demand for Treasury securities, which would cause long-term interest rates to rise rapidly. It is also possible that concern about such an adverse reaction by financial market participants could cause the Federal Reserve to delay reducing its holdings of Treasury securities, which would result in lower long-term interest rates for longer than CBO projects in its baseline.

Demographic and Economic Projections Underlying CBO's Long-Term Budget Projections

CBO's projections of demographic and economic trends are key determinants of the long-term budget outlook

(see Appendix A). Through 2031, those projections reflect the agency's assessment of long-term demographic and economic trends as well as the near-term effects of the pandemic and associated social distancing measures. In addition, they include the agency's estimates of the economic effects of legislation enacted in response to the pandemic. In CBO's assessment, that legislation will partially offset the deterioration in economic conditions caused by the pandemic.¹² For years beyond 2031, the agency's demographic and economic projections are based on its assessment of long-term trends.

CBO integrates economic and budgetary projections in various ways. For example, the economic projections reflect how increases in spending and revenues would affect the economy over the long run. In addition, the budgetary projections reflect how changes in the economy would affect the budget over the long run.¹³

Demographic Projections

The size and age profile of the U.S. population affect the nation's economy and the federal budget. For example, both of those factors influence the number of people in the labor force and the number of beneficiaries of Social Security and other federal programs.¹⁴ In CBO's projections, the U.S. population increases from 335 million at the beginning of 2021 to 375 million in 2051, expanding by 0.4 percent per year, on average. That rate is slower than the average annual rate of growth over the past 50 years (0.9 percent). The share of the population that is age 65 or older also expands over the coming decades, continuing a long-standing historical trend (see Figure 4). By 2051, 22 percent of the population will be 65 or older, whereas today that share is 17 percent. To estimate the growth of the U.S. population, CBO projects rates of fertility, net immigration, and mortality.

Economic Projections

The performance of the U.S. economy in coming decades will affect the federal government's spending, revenues, and accumulation of debt. CBO makes its

long-term economic projections by assessing trends in key economic variables, such as the size of the labor force, productivity growth, and interest rates. The agency also considers the ways in which factors like climate change and fiscal policy influence economic activity.

In CBO's extended baseline projections, growth in potential (or maximum sustainable) GDP over the next 30 years is slower than it has been over the past 70 years (see Figure 5). From 2021 to 2051, real potential GDP increases at an average rate of 1.6 percent per year, whereas it grew at an average annual rate of 3.1 percent from 1951 to 2020.

Size of the Labor Force. That slower growth in potential GDP is attributable to several factors—most notably, slower growth of the potential labor force (the labor force adjusted for fluctuations in the business cycle). In CBO's projections, the potential labor force grows by 0.3 percent per year, on average, through 2051; over the past 50 years, its average annual rate of growth was 1.4 percent. Slowing population growth and the aging of the population account for most of that slowdown.

Productivity Growth. Potential labor force productivity (that is, potential output per member of the potential labor force) is expected to grow at an annual average rate of 1.3 percent over the 2021–2051 period, slower than its average rate of 1.5 percent over the past 30 years.

Growth of labor force productivity is largely determined by two factors. One factor is the accumulation of capital, such as structures and equipment, intellectual property products (such as computer software), and residential housing. Capital accumulation is projected to grow slowly over the coming 30 years, in part because increased federal borrowing is projected to crowd out private investment.

The second factor is the growth of total factor productivity (TFP)—real output per unit of combined labor and capital in the various sectors of the economy. Most TFP growth occurs in the nonfarm business sector, which accounts for about three-quarters of economic activity. Several trends and developments underlie CBO's projection of TFP, including trends in labor quality (workers' educational attainment and experience), federal investment, and climate change. Because a large portion of the labor force is already highly educated, CBO does not expect average educational attainment and labor quality to grow as fast as they have over the past 30 years.

12. See Congressional Budget Office, *The Effects of Pandemic-Related Legislation on Output* (September 2020), www.cbo.gov/publication/56537.

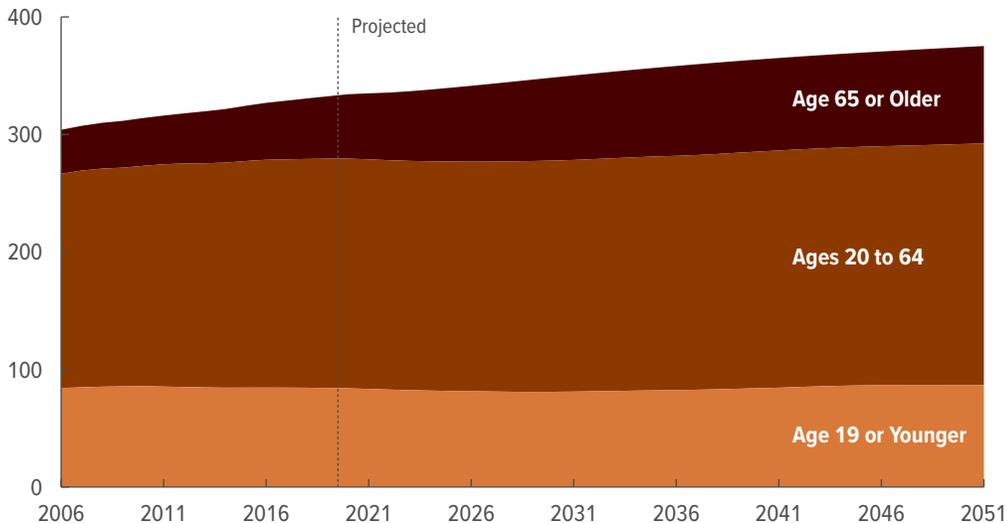
13. See Congressional Budget Office, *An Overview of CBOLT: The Congressional Budget Office Long-Term Model* (April 2018), www.cbo.gov/publication/53667.

14. The labor force refers to the number of people age 16 or older in the civilian noninstitutionalized population who have jobs or who are available for work and are actively seeking jobs.

Figure 4.

Population, by Age Group

Millions of People



CBO projects that the population will become older, on average, throughout the projection period as the share of the population age 65 or older continues to grow.

Data source: Congressional Budget Office. See www.cbo.gov/publication/56977#data.

Actual data are shown through calendar year 2018, the most recent year for which such data are available.

Federal investment is also projected to grow more slowly than it has in the past because spending on social programs and debt service constitute an increasing share of future federal outlays in CBO's baseline projections. The agency also expects the effects of climate change, on net, to reduce TFP growth over the next 30 years. Collectively those developments would lead to slower TFP growth over that period than over the past 30 years, although growth of TFP is projected to accelerate from its historically slow rate in recent years.

Effects of Climate Change on GDP. In the agency's assessment, climate change will, on net, reduce GDP. CBO expects climate change to affect GDP in a variety of ways, some of which will increase output and some of which will reduce it. For example, longer growing seasons in northern states are expected to increase agricultural output, but increased instances of extreme heat in other regions are expected to reduce agricultural output. In addition, stronger hurricanes and bigger storm surges caused by rising sea levels are expected to decrease economic output, on net, by reducing the nation's capital stock, including structures and equipment.

On net, climate change lowers CBO's projected level of real GDP in 2051 by 1.0 percent from what it would have been if climatic conditions from 2021 to 2051 were

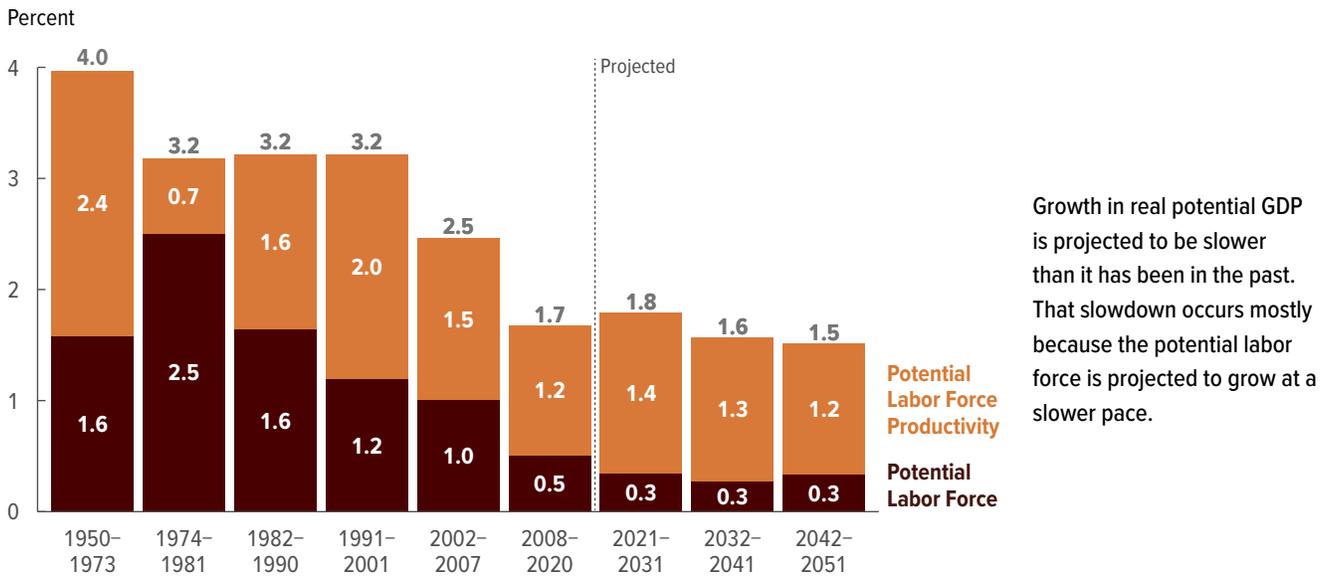
the same as they were at the end of the 20th century.¹⁵ That projection is in the middle of a wide range of possible outcomes, reflecting a variety of economic and scientific uncertainties. The agency also expects climate change to have various effects on the United States that are not directly reflected in economic output.

Interest Rates. CBO expects interest rates to rise throughout the projection period but to remain lower than they have been historically. Notably, the interest rate on 10-year Treasury notes rises from 1.1 percent in 2021 to 3.4 percent in 2031 and 4.9 percent in 2051—about one-half of one percentage point below the 5.4 percent average recorded over the 1995–2004 period. Several factors, including slower growth of the labor force, slower productivity growth, and lower inflation than in the past, are expected to keep interest rates below their historical levels; in CBO's projections, the effects of those three factors and others outweigh the effects of

15. For additional information on the methods CBO used to estimate the effects of climate change on GDP, see Evan Herrstadt and Terry Dinan, *CBO's Projection of the Effect of Climate Change on U.S. Economic Output*, Working Paper 2020-06 (Congressional Budget Office, September 2020), www.cbo.gov/publication/56505.

Figure 5.

Average Annual Growth of Real Potential GDP



Growth in real potential GDP is projected to be slower than it has been in the past. That slowdown occurs mostly because the potential labor force is projected to grow at a slower pace.

Data source: Congressional Budget Office. See www.cbo.gov/publication/56977#data.

Real values are nominal values that have been adjusted to remove the effects of changes in prices. Potential GDP is the maximum sustainable output of the economy. Growth in real potential GDP is the sum of growth in the potential labor force and growth in potential labor force productivity. The potential labor force is the labor force (that is, the number of people in the civilian noninstitutionalized population who are age 16 or older and who are either working or actively seeking work), adjusted to remove the effects of fluctuations in the business cycle. Potential labor force productivity is the ratio of real potential GDP to the potential labor force.

The bars show average annual growth rates over the specified periods.

GDP = gross domestic product.

rising federal debt and other factors that tend to push interest rates above their historical levels.¹⁶

Over the past decade, interest rates on Treasury securities have remained relatively low compared with rates in prior decades, despite the historically large amount of federal borrowing. And interest rates have been low recently, even with the increased borrowing to fund fiscal actions in response to the pandemic. Those low rates over the past decade and more recently partly reflect actions taken by the Federal Reserve.

CBO revised its projections of interest rates downward several times in recent years. For example, the average interest rate on federal debt from 2021 to 2031 is projected to be 1.6 percent, which is 3.3 percentage points lower than what the agency projected for that period

in June 2010. Similarly, the average real interest rate on federal debt is now projected to be -0.7 percent, which is 3.2 percentage points lower than CBO’s 2010 projection. Those downward revisions lower the projected costs of federal borrowing under current law and reduce the estimated scale of changes in fiscal policy that would be necessary to stabilize debt as a share of GDP.

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 are generally lower on shorter-term debt than on longer-term debt because shorter-term debt is less risky, and the average term to maturity for federal debt has been less than 10 years since the 1950s.) On the basis of projections of interest rate spreads, CBO expects the average interest rate on federal debt to be 0.3 percentage points lower than the interest rate on 10-year Treasury notes after 2036. As a result, in the agency’s projections, the average interest rate on federal debt rises from 2.4 percent in 2031 to 4.6 percent by 2051.

16. See Edward N. Gamber, *The Historical Decline in Real Interest Rates and Its Implications for CBO’s Projections*, Working Paper 2020-09 (Congressional Budget Office, December 2020), www.cbo.gov/publication/56891.



Effects of Fiscal Policy. CBO’s economic projections incorporate the effects of projected federal deficits as well as changes in federal tax and spending policies under current law. In particular, the agency projects that borrowing by the federal government would crowd out some private investment in capital over time. Over the next few years, that crowding out of private investment would be much smaller than it would be otherwise because economic conditions brought about by the pandemic will cause short-term interest rates to remain near zero, CBO projects. As the economy expands and interest rates rise, the crowding out of private investment would increase, causing output to be lower in the long term than it would be otherwise, especially in the last two decades of the projection period. Less private investment and less capital would also make workers less productive, leading to lower wages, which would reduce people’s incentive to work and thus lead to a smaller supply of labor.

The agency also incorporates the economic effects of higher marginal tax rates in its extended baseline projections.¹⁷ Under current law, tax rates on individual income are scheduled to rise at the end of 2025. Moreover, as more income is pushed into higher tax brackets over time, labor and capital income face higher tax rates.¹⁸ Higher marginal tax rates on labor income would reduce people’s after-tax wages and thus lessen their incentive to work. Similarly, an increase in the marginal tax rate on capital income would reduce people’s incentives to save and invest, resulting in a smaller stock of capital, which would reduce labor productivity and put downward pressure on wages. All told, less private investment and a smaller labor supply would decrease economic output and income.

Projected Spending Through 2051

Spending by the government is projected to represent a larger percentage of GDP in coming years than it did, on average, during the 50 years before the pandemic. Excluding net spending for interest, federal outlays averaged about 18 percent of GDP from 1970 to 2019. That number reached 29.6 percent of GDP in 2020 because of increased spending in response to the pandemic and a decrease in nominal GDP from the previous year. Under current law, noninterest outlays as a share of GDP are

projected to fall over the next few years as the effects of legislation related to the pandemic wane, and they are projected to be 20.8 percent in 2031. After 2031, under the assumptions that govern the extended baseline, non-interest spending rises relative to the size of the economy, reaching 23.2 percent of GDP by 2051.

Net interest costs are projected to decline in the first few years of the projection period, as the average interest rates on debt held by the public remain low and the effects of those lower rates initially more than offset the effects of the accumulating debt. After several years, though, rising average interest rates on federal debt, along with projected increases in the amount of that debt, cause net interest costs to increase. Those costs more than triple over the last two decades of the projection period, reaching 8.6 percent of GDP in 2051 and boosting total federal spending to 31.8 percent of GDP in that year. Spending has exceeded that level only once, for a three-year period during World War II. In those years, when defense spending increased sharply, total federal spending topped 40 percent of GDP.

Moreover, CBO projects that growth in spending for Social Security, the major health care programs, and interest would reshape the spending patterns of the U.S. government by 2051 (see Figure 6). Net interest costs would account for a much greater portion of total federal spending in 2051 than they did in 2019, and combined spending on Social Security and the major health care programs would account for a much larger share of all federal noninterest spending.

Spending for Social Security and the Major Health Care Programs

Much of the growth in spending for Social Security and the major health care programs over the past few decades has occurred because the number of people age 65 or older—the group that receives most of the benefits provided by Social Security and Medicare—has been growing significantly. In CBO’s extended baseline, the aging of the population continues to drive up outlays for Social Security and Medicare. Outlays for Medicare also climb because, in CBO’s estimation, health care costs per person will continue to rise.

Social Security. Social Security comprises two parts: Old-Age and Survivors Insurance (OASI) and Disability Insurance (DI). OASI pays benefits to retired workers, their eligible dependents, and some survivors of deceased workers. DI pays benefits to disabled workers and their

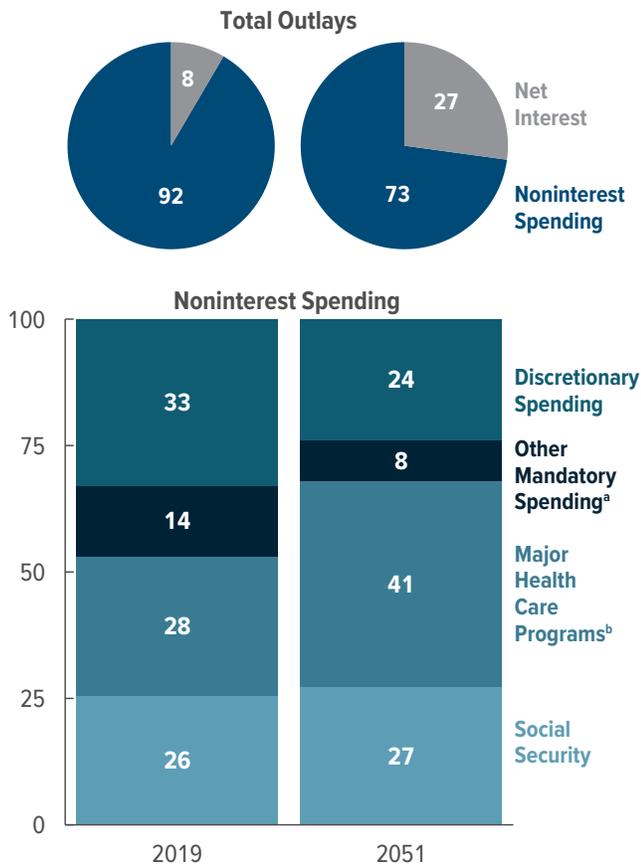
17. The marginal tax rate is the percentage of an additional dollar of income from labor or capital that is paid in taxes.

18. See Congressional Budget Office, “How Income Growth Affects Tax Revenues in CBO’s Long-Term Budget Projections” (presentation, June 2019), www.cbo.gov/publication/55368.

Figure 6.

Composition of Federal Outlays

Percent



Net spending for interest would, under current law, account for a greater portion of total federal spending in 2051 than it did in 2019 (before the coronavirus pandemic), and spending on the major health care programs would account for a much larger share of all federal noninterest spending.

Data source: Congressional Budget Office. See www.cbo.gov/publication/56977#data.

- a. Consists of all mandatory spending other than that for Social Security and the major health care programs. It includes the refundable portions of the earned income tax credit, the child tax credit, and the American Opportunity Tax Credit.
- 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.

dependents until those workers are old enough to claim full retirement benefits under OASI.

In CBO’s projections, spending for Social Security increases as a share of the economy, continuing the trend

of the past five decades. The number of Social Security beneficiaries rises from about 66 million in 2021 to 97 million in 2051, and spending for the program increases from 5.2 percent of GDP to 6.3 percent over that period (see Figure 7). Those projections reflect the assumption that Social Security will continue 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 of the funding 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. In CBO’s extended baseline projections, dedicated tax revenues for the combined trust funds decline from 4.6 percent of GDP in 2021 to 4.4 percent of GDP in 2051.

A commonly used measure of Social Security’s sustainability is the trust funds’ dates of exhaustion. CBO projects that under current law, the OASI trust fund would be exhausted in calendar year 2032 and the DI trust fund would be exhausted in calendar year 2035. If their balances were combined, the Old-Age, Survivors, and Disability Insurance (OASDI) trust funds would be exhausted in calendar year 2032, CBO estimates. The total reduction in annual benefits necessary for the trust funds’ outlays to match their revenues in each year after the two trust funds were exhausted would be about 25 percent in 2033 and would rise to about 30 percent in 2051, in CBO’s estimation.

Major Health Care Programs. Outlays for the major health care programs consist of spending for Medicare,

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 the exhaustion of a trust fund, see Barry F. Huston, *Social Security: What Would Happen If the Trust Funds Ran Out?* Report RL33514, version 31 (Congressional Research Service, July 29, 2020), <https://go.usa.gov/xEtaw>.

20. Sec. 257(b)(1) of the Balanced Budget and Emergency Deficit Control Act of 1985 (Deficit Control Act), P.L. 99-177 (codified at 2 U.S.C. §907(b)(1) (2016)).



Figure 7.

Outlays and Revenues in Selected Years

Percentage of Gross Domestic Product



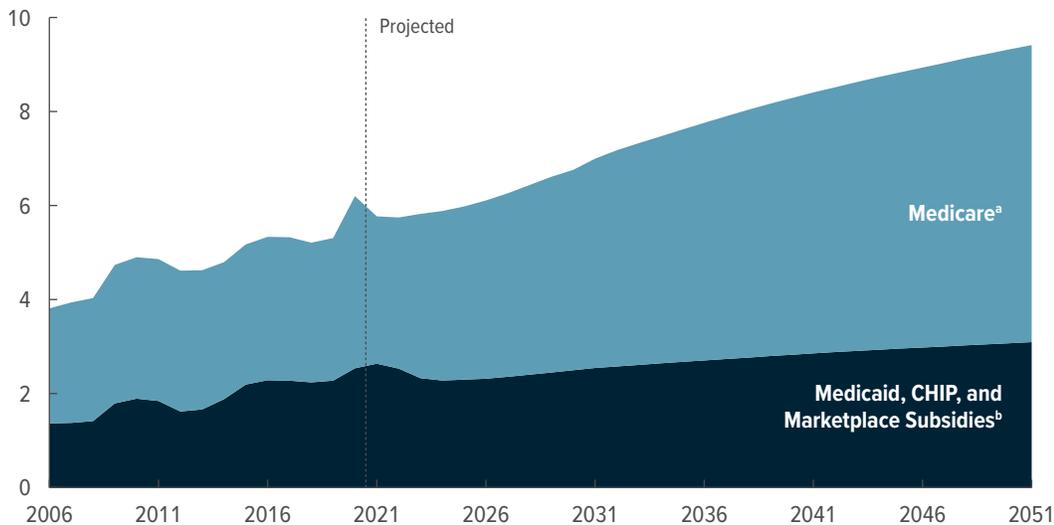
Data source: Congressional Budget Office. See www.cbo.gov/publication/56977#data.

- 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 mandatory spending other than that for Social Security and the major health care programs. It includes the refundable portions of the earned income tax credit, the child tax credit, and the American Opportunity Tax Credit.
- 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.

Figure 8.

Federal Outlays for the Major Health Care Programs, by Category

Percentage of Gross Domestic Product



Medicare spending is projected to account for more than four-fifths of the increase in spending for the major health care programs over the next 30 years.

Data source: Congressional Budget Office. See www.cbo.gov/publication/56977#data.

CHIP = Children's Health Insurance Program.

a. Includes the effects of premiums and other offsetting receipts.

b. "Marketplace Subsidies" refers to spending to subsidize health insurance purchased through the marketplaces established under the Affordable Care Act and related spending.

Medicaid, and the Children's Health Insurance Program (CHIP), as well as outlays for premium tax credits and related spending.²¹ Spending on Medicare, which provides health insurance to 64 million people (most of whom are at least 65 years old), accounts for over half of that spending in 2021.

CBO projects federal spending for the government's major health care programs under the assumption that the laws governing those programs will, in general, remain unchanged. The agency assumes that Medicare will pay benefits as scheduled under current law (the same assumption it makes for Social Security), regardless of the amounts in the program's trust funds.

Over the past five decades, spending for the major health care programs has grown faster than the economy, and that trend persists in CBO's extended baseline. In 2021,

net federal spending for the major health care programs is estimated to equal 5.8 percent of GDP. In the agency's projections, net outlays for those programs increase to 9.4 percent in 2051: Medicare spending, net of offsetting receipts (mostly premiums paid by enrollees), grows by 3.2 percentage points of GDP, and spending on Medicaid and CHIP, combined with outlays for premium tax credits and related spending, grows by 0.5 percentage points of GDP (see Figure 8).²²

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 the primary reasons for the sharp rise in projected spending for Social Security and the major health care programs over the next 30 years. In CBO's extended baseline projections, combined spending for Social Security and the major health care programs grows

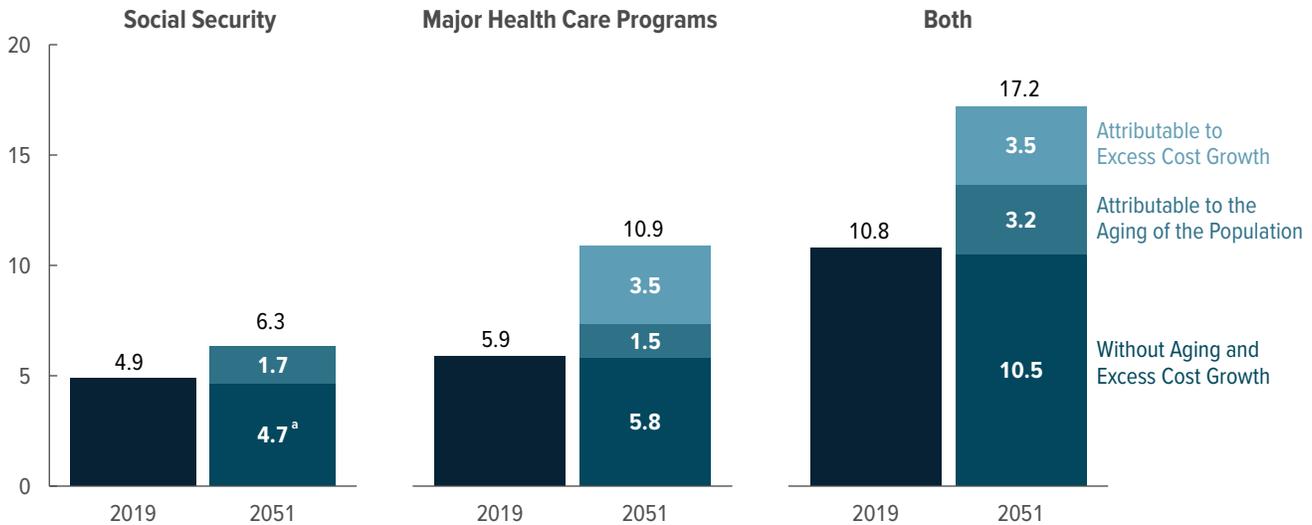
21. Premium tax credits are federal subsidies for health insurance purchased through the marketplaces established by the Affordable Care Act. Related spending consists almost entirely of payments for risk adjustment and the Basic Health Program (an optional state program that covers low-income residents outside of the health insurance marketplaces).

22. In CBO's projections, the outlays for subsidies for insurance purchased through the marketplaces and related spending are combined with outlays for Medicaid and CHIP. Federal subsidies for health insurance for low- and moderate-income households account for most of those outlays.

Figure 9.

Outlays for Social Security and the Major Health Care Programs in 2019 and 2051

Percentage of Gross Domestic Product



Much of the growth in combined spending for Social Security and the major health care programs results from the aging of the population. Growth in spending for the major health care programs is also driven by excess cost growth—the extent to which the growth rate of health care costs per person (adjusted for demographic changes) exceeds the growth rate of potential GDP (the economy’s maximum sustainable output) per person.

Data source: Congressional Budget Office. See www.cbo.gov/publication/56977#data.

Spending for the major health care programs consists of gross spending for Medicare (which does not account for premiums or 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.

Excess cost growth is the extent to which the growth rate of nominal health care spending per person (adjusted for demographic changes) exceeds the growth rate of potential GDP per person. Potential GDP is the maximum sustainable output of the economy.

GDP = gross domestic product.

a. If aging did not occur, spending on Social Security as a share of GDP would be lower in 2051 than it was in 2019, mainly because of the scheduled increases in the full retirement age for Social Security.

from 10.8 percent of GDP in 2019 to 17.2 percent in 2051 (see Figure 9).²³ The aging of the population and rising health care costs per person each account for about half of that increase.

In CBO’s estimation, if the population was not aging and health care costs per person (adjusted for demographic changes) grew with potential GDP per person—that is, more slowly than the agency currently projects—spending on Social Security and the major health care programs as a share of GDP would be slightly lower in 2051 than in 2019.

Aging of the Population. The increase in Social Security spending attributable to the aging of the population is greater than the amount of the projected increase in Social Security spending as a percentage of GDP. In other words, if not for the aging of the population, spending on Social Security as a share of the economy would decline from 4.9 percent of GDP in 2019 to 4.7 percent of GDP in 2051. That is mainly because of the scheduled increases in the full retirement age for Social Security, which reduce the lifetime benefits for affected beneficiaries.²⁴

23. This analysis of the causes of spending growth encompasses gross spending on Medicare and does not reflect receipts credited to the program from premiums and other sources.

24. For more details about the full retirement age for Social Security, see Zhe Li, *The Social Security Retirement Age*, Report R44670, version 12 (Congressional Research Service, January 8, 2021), <https://go.usa.gov/xGnEx>.

Over the 2019–2051 period, spending attributable to the aging of the population accounts for about one-third of the projected increase in total spending for the major health care programs, relative to GDP. That impact of aging stems mostly from the effects of aging on spending for Medicare because it is the largest such program and most beneficiaries qualify for it at age 65. As that group becomes larger and, on average, older, Medicare spending will increase, not only because the number of beneficiaries will rise but also because people tend to require more health care as they age.

Rising Health Care Costs per Person. Even though growth in health care costs per person (adjusted for demographic changes) has slowed recently, over the next 30 years such costs are projected to continue to grow faster than potential GDP per person—1 percent faster for Medicare and 1.3 percent faster for Medicaid, on average. In CBO’s extended baseline projections, that growth in health care costs per person accounts for about two-thirds of the increase in spending, measured as a share of GDP, for the major health care programs between 2019 and 2051.

Other Noninterest Spending

In CBO’s extended baseline projections, total federal spending for all programs and activities other than Social Security, the major health care programs, and interest declines as a share of GDP from a historically high level in 2020 to its lowest level in more than 70 years. Over the past 50 years, such spending has averaged 11 percent of GDP. Before 2020, it had been as high as 15 percent (in the late 1960s) and as low as 8 percent (in the late 1990s and early 2000s).

Other noninterest spending is projected to decrease in 2021 to 13.9 percent of GDP. As the effects on the budget of the laws enacted in response to the pandemic dissipate, CBO projects that such spending would fall to 7.8 percent of GDP in 2031 and to 7.4 percent of GDP in 2051 (see Figure 7 on page 19). Discretionary spending is projected to decline in relation to GDP over the next 10 years and is assumed to stay roughly constant from 2032 to 2051. Other mandatory spending (which excludes outlays for Social Security and the major health care programs) is projected to generally decline relative to GDP over the next 30 years.

Discretionary Spending. About half of all discretionary spending is dedicated to national defense, and the rest is

for an array of federally funded activities and programs, including education, transportation, housing assistance, veterans’ health care, health-related research and public health programs, the administration of justice, and international affairs.

Over the past half-century, discretionary outlays decreased from 11.5 percent of GDP in 1970 to 6.3 percent of GDP in 2019. In 2020, those outlays increased to 7.8 percent of GDP because of policies put in place to counter the pandemic-related economic disruption. In the agency’s baseline projections, those outlays decrease steadily from 7.6 percent of GDP in 2021 to 5.7 percent in 2031.

Through 2021, most discretionary funding is limited by caps on annual discretionary appropriations that were specified in the Bipartisan Budget Act of 2019 (P.L. 116-37). In CBO’s projections, the decline in discretionary outlays relative to GDP over the following 10 years reflects CBO’s assumption (required by law for its 10-year baseline projections) that discretionary funding will grow at the rate of inflation—which is slower than the projected growth of nominal GDP—beginning in 2022.²⁵

After 2031, in CBO’s projections, discretionary spending transitions over a five-year period from growing with the rate of inflation to growing with nominal GDP. Beyond 2036, the agency’s extended baseline projections reflect the assumption that discretionary spending will grow with nominal GDP and remain constant at 5.5 percent of GDP through 2051 (see Figure 10).²⁶

Other Mandatory Spending. Since the mid-1960s, mandatory spending, excluding that for Social Security and the major health care programs, has generally

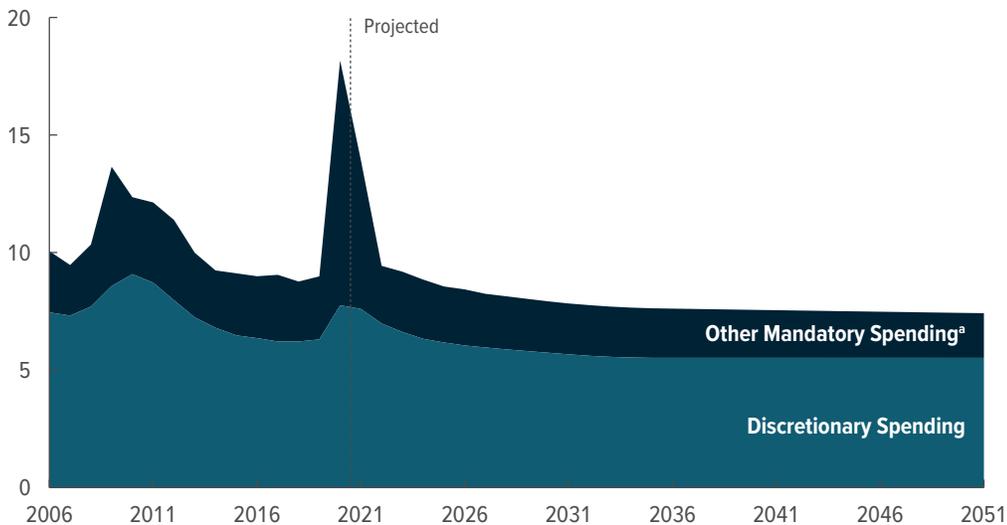
25. In accordance with section 257 of the Deficit Control Act, CBO projects budget authority over the 10-year period by applying the specified inflation rate to the most recent appropriations for discretionary accounts. Because of the unusual size and nature of the emergency funding provided in recently enacted legislation in response to the pandemic, CBO, in consultation with the House and Senate Committees on the Budget, deviated from the standard procedures for constructing its current extended baseline and did not extrapolate the discretionary budget authority provided by the laws enacted in response to the pandemic after March 6, 2020.

26. Although discretionary spending declines in relation to GDP from 2021 to 2031 in CBO’s projections, the agency does not project that it would decline further. That is because discretionary spending has historically been a larger share of economic output than it is projected to be in 2031.

Figure 10.

Other Federal Noninterest Outlays

Percentage of Gross Domestic Product



Over the long term, other federal noninterest spending, measured as a percentage of economic output, declines in CBO's projections.

Data source: Congressional Budget Office. See www.cbo.gov/publication/56977#data.

a. Consists of all mandatory spending other than that for Social Security and the major health care programs. It includes the refundable portions of the earned income tax credit, the child tax credit, and the American Opportunity Tax Credit.

remained between 2 percent and 4 percent of GDP. That category of spending includes spending for SNAP, unemployment compensation, retirement programs for federal civilian and military employees, certain veterans' programs, Supplemental Security Income, and certain refundable tax credits.²⁷

Other mandatory spending is projected to equal 6.3 percent of GDP in 2021. Such spending equaled 10.4 percent of GDP in 2020, an increase from 2.7 percent in 2019 that is mainly attributable to policies enacted in response to the pandemic and associated economic downturn. For the rest of the 10-year period, such spending generally declines as a share of the economy, reaching 2.2 percent of GDP in 2031.²⁸ The projected decline occurs in part because benefit amounts for many

of those programs are adjusted for inflation each year, and inflation in CBO's economic forecast is estimated to be less than the rate of growth in nominal GDP.

In CBO's extended baseline projections, other mandatory spending falls to 1.9 percent of GDP by 2051. That reduction is partly attributable to growth in income, which decreases the number of people who qualify for refundable tax credits. That reduction also reflects the assumption that after 2031 other mandatory spending, excluding outlays for such tax credits, declines at roughly the same rate by which it is projected to fall between 2026 and 2030 in the baseline the agency published in March 2020.²⁹

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. Over the next three years, in CBO's projections, net interest costs decrease from 1.4 percent of GDP in 2021 to 1.1 percent in 2024 because of continued low

27. 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.

28. 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.

29. In CBO's assessment, the pandemic and associated economic downturn will not affect the growth rate of other mandatory spending between 2031 and 2051.

interest rates as well as rising GDP. Those costs increase to 2.4 percent by 2031 as federal debt grows and interest rates rise. Net interest costs reach 8.6 percent of GDP by 2051—higher than they have ever been (see Figure 7 on page 19). If net interest costs followed that projected path, they would exceed other mandatory spending by 2030, exceed all discretionary spending by 2043, and surpass spending for Social Security by 2045.

Over the long term, deficits and debt rise in the agency's projections because of the widening gap between spending and revenues. Higher interest costs are a major contributor to the widening of that gap. Net interest costs are projected to equal about one-third of the total deficit in the 2021–2031 period and about three-fifths of it from 2042 to 2051. Those rising interest costs largely result from increases in interest rates that reflect long-term economic trends, which CBO projects would occur even if debt did not grow beyond its current level. But greater federal borrowing places additional upward pressure on interest rates and thus on interest costs. Moreover, growth in interest costs and growth in debt reinforce one another: Rising interest costs boost deficits and debt, and rising debt pushes up interest costs.

Projected Revenues Through 2051

In CBO's extended baseline projections, revenues measured as a share of GDP are generally higher than they have been, on average, in recent decades. Revenues have averaged 17.3 percent of GDP over the past 50 years, but they have fluctuated between 15 percent and 20 percent of GDP over that period because of changes in tax laws and interactions between those laws and economic conditions.

CBO's revenue projections are based on the assumption that the rules for all tax sources (individual income taxes, corporate income taxes, payroll taxes, and other taxes) will change as scheduled under current law.³⁰ CBO projects a continued decline in revenues as a percentage of GDP in 2021, reflecting the economic disruption caused by the pandemic and the federal government's response to it, including the enactment of legislation. After declining from 16.3 percent in 2020 to 16.0 percent in 2021, total revenues as a share of GDP are projected to

reach 17.2 percent in 2025. Largely because of scheduled increases in taxes resulting from the expiration of certain provisions of the 2017 tax act that affect individual income taxes, revenues are projected to rise after 2025, reaching 17.9 percent of GDP by 2027. From 2028 to 2031, revenues grow more slowly than GDP. In the agency's extended baseline projections, revenues grow faster than GDP after 2031 and total 18.5 percent of GDP in 2051.

Increases in receipts from individual income taxes account for most of the projected 2.5 percentage-point rise in total revenues as a share of GDP from 2021 to 2051. Revenues from corporate income taxes also rise relative to GDP over that period, whereas revenues from payroll taxes and other sources decline (see Figure 7 on page 19).

Reasons for the Growth in Revenues

The underlying causes of the projected increase in total revenues as a share of GDP over the 30-year period are real bracket creep in the individual income tax system, scheduled increases in taxes, and other factors (see Figure 11).

Real Bracket Creep. The largest contributor to the increase in total revenues over the next three decades is real bracket creep, which occurs when income grows faster than inflation, as typically happens during economic expansions. If current laws generally remained unchanged, real bracket creep would continue to gradually push up taxes in relation to income through 2051, CBO projects, thereby increasing tax receipts. Even though most income tax brackets, exemptions, credits, and other tax thresholds are indexed to inflation, more income is pushed into higher tax brackets, and credits are phased out when income growth exceeds the rate of inflation.³¹ Between 2031 and 2051, the share of income taxed at the top rate of 39.6 percent would rise by 1 percentage point—and the share of income excluded from taxation would fall by 3 percentage points—because of real bracket creep (see Figure 12).³²

30. The sole exception is 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 in the past.

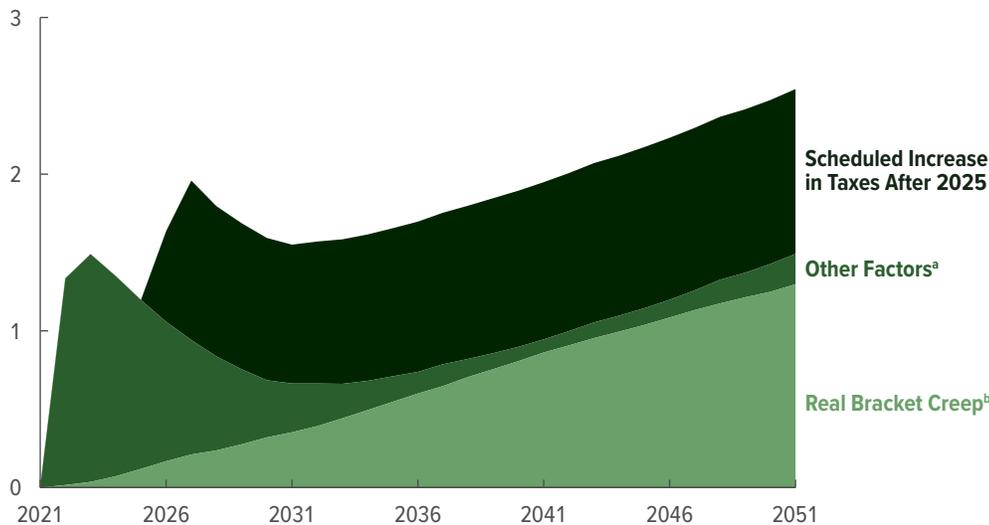
31. Some parameters of the tax system, including the amount of the child tax credit, are fixed in nominal (current-year) dollars and are not adjusted for inflation.

32. For more details, see Congressional Budget Office, "How Income Growth Affects Tax Revenues in CBO's Long-Term Budget Projections" (presentation, June 2019), www.cbo.gov/publication/55368.

Figure 11.

Changes in Revenues

Percentage of Gross Domestic Product



Revenues, measured as a percentage of gross domestic product, are projected to rise in the near term as the economy recovers from the disruption caused by the coronavirus pandemic and as temporary legislation enacted in response to the pandemic expires. Projected revenues rise sharply following the expiration at the end of 2025 of certain temporary provisions of the 2017 tax act.

Data source: Congressional Budget Office. See www.cbo.gov/publication/56977#data.

- a. Other factors include temporary tax provisions enacted in response to the pandemic, which reduce revenues in 2020 and 2021, as well as factors that affect revenues over the longer term, such as changes in the distribution of wages and growth in nontaxable compensation resulting from rising health care costs.
- b. Real bracket creep is the process in which, as income rises faster than inflation, a larger proportion of income becomes subject to higher tax rates.

Scheduled Increases in Taxes After 2025. Another factor pushing up taxes relative to income is the scheduled expiration after calendar year 2025 of nearly all provisions of the 2017 tax act that affect individual income taxes. The provisions that are scheduled to expire include lower statutory tax rates, the higher standard deduction, the repeal of personal exemptions, and the expansion of the child tax credit.³³ Those expirations would cause tax liabilities to rise in calendar year 2026, boosting individual income tax receipts relative to GDP by 0.9 percentage points for the 2021–2031 period.

Other Factors. Many other factors affect revenues—but to a lesser extent—in the extended baseline projections. Initially, temporary tax provisions enacted in response to the pandemic and associated economic disruption are expected to significantly reduce receipts in 2021. The expiration of those temporary provisions is projected to boost receipts in 2022 and beyond.

A different set of factors affects revenues over the longer term. One of those factors is the change in the distribution of earnings. Earnings are projected to grow faster for higher-earning people than for other people in the long term. That trend would cause a larger share of individual earnings to be taxed at higher rates. However, the resulting increase in individual income tax revenues would be largely offset by a decrease of nearly the same amount in payroll tax receipts, CBO projects, because the share of earnings above the maximum amount subject to Social Security payroll taxes would grow. (Workers do not accrue additional Social Security benefits for earnings above the maximum taxable amount. For a given total amount of earnings, therefore, an increase in the share above the limit would reduce overall future benefit payments.)

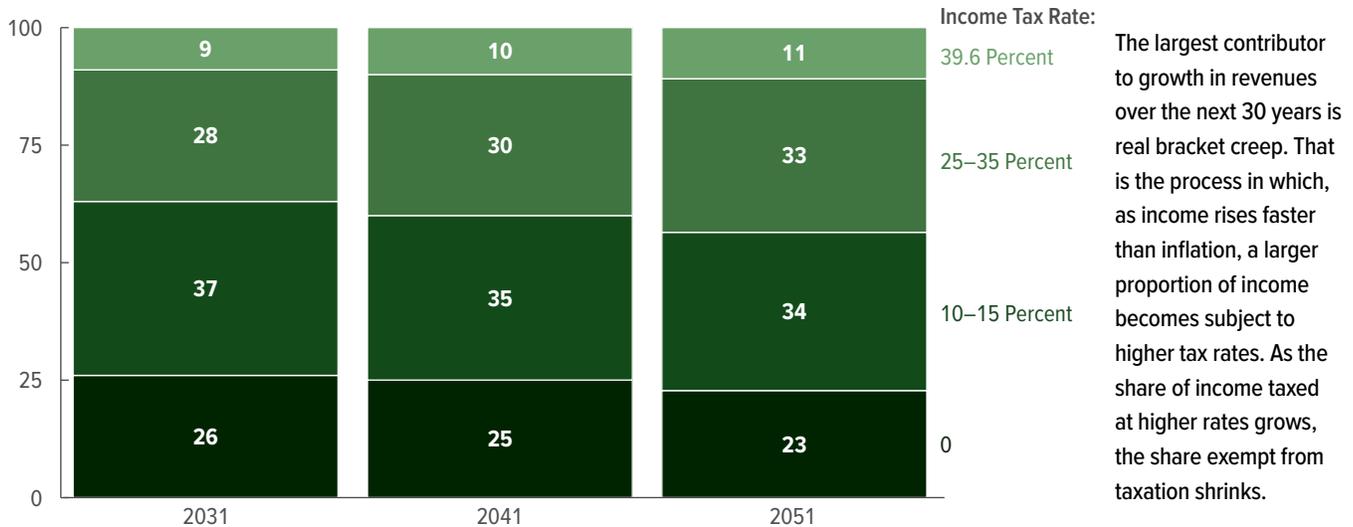
A second factor is growth in health care costs, which is projected to reduce revenues as a share of GDP over the next three decades. The share of employees' compensation that is paid in the form of wages and salaries, which are subject to income and payroll taxes, is projected to decline because of rising spending on fringe benefits (such as employment-based health insurance), which are not taxable. That shift in compensation would decrease

33. Rules allowing accelerated depreciation deductions for certain business investments, which are scheduled to phase out between 2022 and 2027, are not included here.

Figure 12.

Shares of Income Taxed at Different Rates Under the Individual Income Tax System

Percent



Data source: Congressional Budget Office. See www.cbo.gov/publication/56977#data.

In this figure, income refers to adjusted gross income—that is, income from all sources not specifically excluded by the tax code, minus certain deductions. The income tax rate is the statutory rate specified under the individual income tax system. The lowest statutory tax rate is zero (because of deductions and exemptions).

taxable income—and thus revenues from both income and payroll taxes—relative to GDP.

Sensitivity of Budget Projections to Changes in Underlying Economic Factors

CBO's budget projections depend on its forecasts of economic factors, including productivity growth and interest rates. To assess the sensitivity of its budget projections to those forecasts, CBO has analyzed how the projections would differ if those forecasts were higher or lower than it anticipates (see Figure 13).

Growth of Total Factor Productivity

CBO examined the sensitivity of its projection of federal debt to changes in the growth rate of total factor productivity in the nonfarm business sector. The agency projected economic and budgetary outcomes using rates of growth for nonfarm business TFP that were 0.5 percentage points higher and 0.5 percentage points lower than the rate underlying the extended baseline projections.³⁴ That range reflects the variation of about three-quarters

of a percentage point in average TFP growth over 30-year periods between 1950 and the present, plus one-quarter of a percentage point representing additional sources of variation that may not be reflected in the historical data.

- If nonfarm business productivity grew 0.5 percentage points faster than CBO projects, federal debt held by the public would be 156 percent of GDP in 2051 rather than 202 percent, as it is in the extended baseline projection.
- If nonfarm business productivity grew 0.5 percentage points more slowly than projected, federal debt held by the public would be 252 percent of GDP in 2051.

Interest Rates on Federal Debt Held by the Public

CBO also examined the sensitivity of its projection of federal debt to changes in interest rates. The agency projected economic and budgetary outcomes under two scenarios in which federal borrowing rates are higher and lower, respectively, by a differential that increases by 5 basis points per year (before accounting for

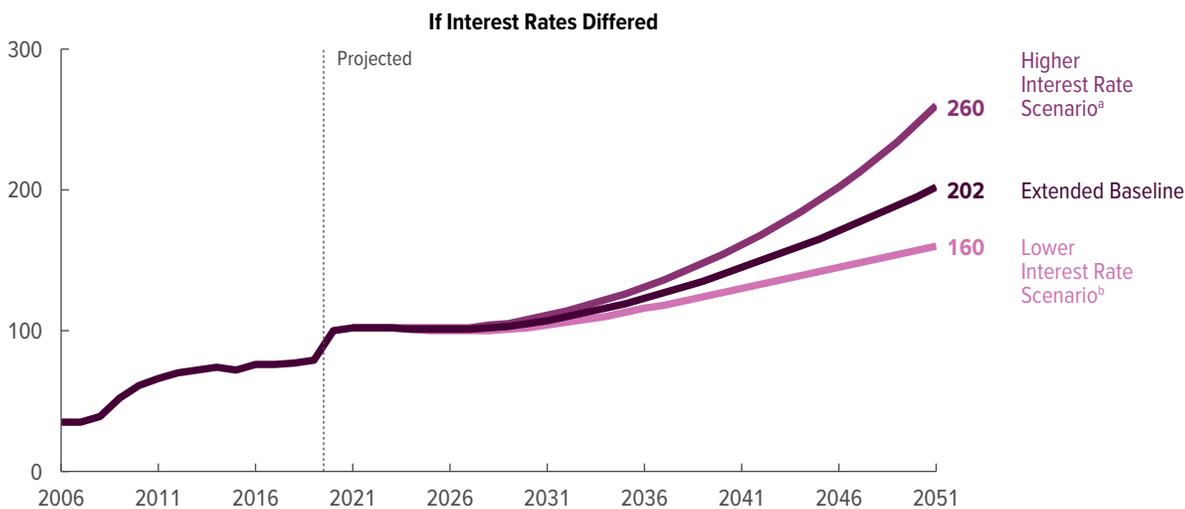
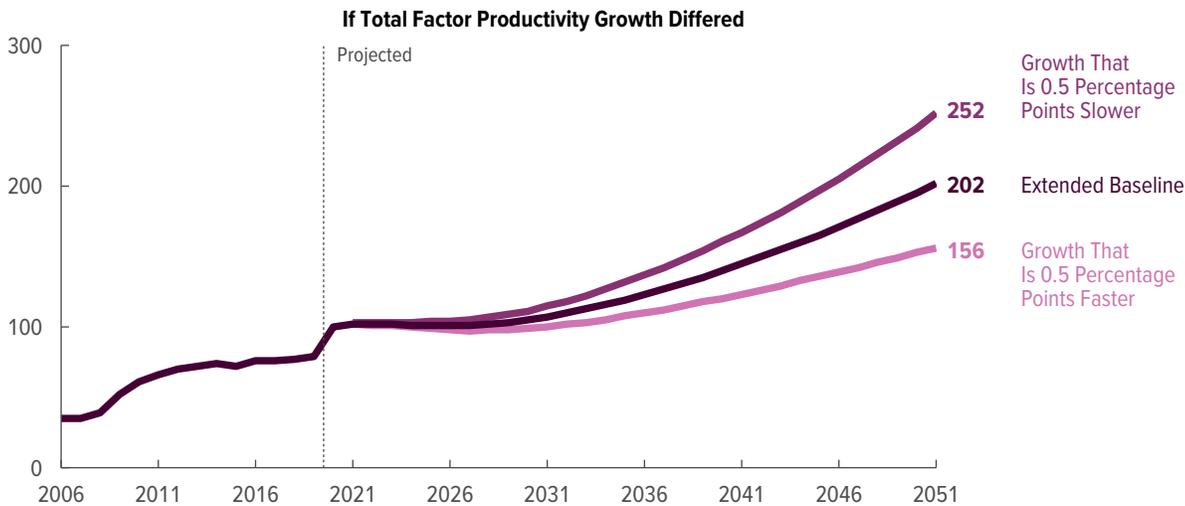
34. CBO's analyses of sensitivity to productivity growth started with a change in the parameter for total factor productivity growth

and then accounted for the effects of that change on capital and other macroeconomic factors in the alternative projections.

Figure 13.

Federal Debt If Total Factor Productivity Growth or Interest Rates Differed From the Values Underlying CBO’s Projections

Percentage of Gross Domestic Product



Data source: Congressional Budget Office. See www.cbo.gov/publication/56977#data.

Total factor productivity growth is the growth of real output (output adjusted to remove the effects of changes in prices) per unit of combined labor and capital services in the nonfarm business sector. The interest rate is the effective rate on federal debt.

The extended baseline projections, which generally reflect current law, follow CBO’s 10-year baseline budget projections and then extend most of the concepts underlying those projections for the rest of the long-term projection period.

- a. In this scenario, the effective interest rate on federal debt is higher than the rate underlying CBO’s extended baseline by a differential that starts at 5 basis points in 2021 and increases by 5 basis points each year (before macroeconomic effects are accounted for)—that is, the interest rate is 5 basis points higher than the baseline rate in 2021, 10 basis points higher than the baseline rate in 2022, 15 basis points higher than the baseline rate in 2023, and so on. (A basis point is one one-hundredth of a percentage point.)
- b. In this scenario, the effective interest rate on federal debt is lower than the rate underlying CBO’s extended baseline by a differential that starts at 5 basis points in 2021 and increases by 5 basis points each year (before macroeconomic effects are accounted for)—that is, the interest rate is 5 basis points lower than the baseline rate in 2021, 10 basis points lower than the baseline rate in 2022, 15 basis points lower than the baseline rate in 2023, and so on.



macroeconomic effects) relative to the rates underlying the agency's extended baseline.³⁵

- If federal borrowing rates were higher by a differential that starts at 5 basis points in 2021 and increases by 5 basis points each year (before macroeconomic effects are accounted for), federal debt held by the public would be 260 percent of GDP in 2051 rather than the 202 percent in the extended baseline projection.³⁶
- If federal borrowing rates were lower by a differential that starts at 5 basis points in 2021 and increases by 5 basis points each year (before macroeconomic effects are accounted for), federal debt held by the public would be 160 percent of GDP in 2051.³⁷

Uncertainty of CBO's Long-Term Projections

Budget projections are inherently uncertain. 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 extended baseline projections because of unexpected changes in demographics, the economy, and other factors. In 2019, CBO analyzed how its budget projections would change if a set of key factors—several demographic and economic factors and the growth of health care costs—together deviated from the paths underlying those projections.³⁸

35. CBO's analyses of sensitivity to interest rates started with a change in the average federal borrowing rate while using the same 10-year Treasury rate. Then the analyses accounted for the effects on capital and other macroeconomic factors in the alternative projections, which affected both rates. For instance, increasing interest rates would lead to higher debt-service payments that would crowd out private investment, causing the average federal borrowing rate to rise further—reaching 6.6 percent in 2051, compared with 4.6 percent in the extended baseline. Similarly, for the scenario in which interest rates on debt are reduced, lower debt-service payments would crowd out less private investment and would cause the federal borrowing rate to decrease further—reaching 2.7 percent in 2051.

36. In this scenario, the interest rate is 5 basis points higher than the baseline rate in 2021, 10 basis points higher than the baseline rate in 2022, 15 basis points higher than the baseline rate in 2023, and so on. (A basis point is one one-hundredth of a percentage point.)

37. In this scenario, the interest rate is 5 basis points lower than the baseline rate in 2021, 10 basis points lower than the baseline rate in 2022, 15 basis points lower than the baseline rate in 2023, and so on.

38. See Congressional Budget Office, *The 2019 Long-Term Budget Outlook* (June 2019), www.cbo.gov/publication/55331.

Demographic and economic projections over 30 years are subject to high degrees of uncertainty because small changes in some factors, compounding over many years, can greatly affect projected budgetary outcomes decades in the future. Furthermore, the pandemic's potential effects on long-term trends are unknown, so the projections in this report are subject to an unusually high degree of uncertainty. That uncertainty stems from many sources, including changes to demographics (how the pandemic will affect rates of fertility, net immigration, and mortality), the economy (how the pandemic will affect economic growth and interest rates), and health care expenditures (how the pandemic will shift the demand for and supply of health care services). Uncertainty also surrounds the effectiveness of monetary and fiscal policy and the response of global financial markets to the substantial projected increases in public deficits and debt. The agency expects to examine the uncertainty surrounding its projections in greater depth in the next report in this series.

Changes From Last Year's Long-Term Budget Outlook

CBO's projection of federal debt as a share of GDP is slightly lower in most years over the next three decades than it was in last year's projections. In the agency's current extended baseline projections, federal debt rises from 102 percent of GDP in 2021 to 195 percent in 2050. The amount for 2021 is 2 percentage points lower than what CBO projected last year, whereas the amount for 2050 is the same. (See Appendix B for more information about the changes in CBO's long-term budget projections since last year.)

Compared with last year's projections, the current projection of total spending as a percentage of GDP is higher in 2021, lower in the near term, and similar during the period thereafter. In addition, the agency's projections of revenues as a percentage of GDP are higher in the next few years and similar thereafter. As a result of those revisions, projected deficits as a percentage of GDP are now higher in 2021 than previously anticipated, generally smaller in the near term, and then similar thereafter. CBO also projects that the OASI trust fund and the DI trust fund would be exhausted later than the agency expected last year—by one year and nine years, respectively. In addition, CBO changed the way it analyzes the sensitivity of its budget projections to changes in the average interest rate on federal debt held by the public.

Appendix A: CBO's Projections of Demographic and Economic Trends

The Congressional Budget Office develops its assessment of the long-term outlook for the federal budget on the basis of its projections of demographic and economic factors over the next three decades. The projections presented in this report are consistent with the baseline budget projections and the economic forecast for the 2021–2031 period that CBO published in February 2021.¹ Those projections incorporate the assumption that current laws governing federal taxes and spending generally remain unchanged and that no significant additional emergency funding or aid is provided. (The agency's annual projections of demographic and economic factors are included in this report's supplemental data; they are available online at www.cbo.gov/publication/56977.)

Demographic Factors

Changes in the size and composition of the U.S. population influence the growth of the economy and affect federal tax revenues and spending. Rates of fertility, net immigration, and mortality determine how the population evolves, and the relative contribution each factor makes to population growth changes over time.

Population

In CBO's projections, changes in fertility, net immigration, and mortality rates over the next 30 years mean that the population increases from 335 million people at the beginning of 2021 to 375 million in 2051.² Although

the population increases, the rate of increase slows over the next three decades, from an average rate of 0.4 percent per year in the first decade to an average rate of 0.3 percent per year in the third decade (see Table A-1). The population is also projected to become older, on average, from 2021 to 2051. The share of the population age 65 or older grows in CBO's projections, whereas the share that is of working age (ages 20 to 64) shrinks. By 2051, CBO expects the population will be 1.1 percent smaller (equaling 4 million fewer people) than the agency projected last year.

Fertility

CBO projects that the total fertility rate—representing the average number of children that a woman would have in her lifetime—will remain at its most recent historical value of 1.71 children per woman in 2020 and decline to 1.61 children per woman in 2021 in response to the economic effects of the 2020–2021 coronavirus pandemic. CBO expects the fertility rate to gradually rise to 1.85 children per woman by 2029 and remain at that value thereafter. That rate is lower than the agency projected last year. As a result, CBO projects fewer births over the entire projection period and a smaller working-age population in the last decade.

Projections of Fertility. CBO projects fertility on the basis of the agency's assessment of historical fertility trends, the effects of the pandemic, and other factors. The fertility rate did not rebound after the 2007–2009 recession (the Great Recession) as it did in previous economic cycles. The rate was 2.02 children per woman, on average, in the 20 years before that recession, peaking at 2.12 in 2007. After 2007, the rate generally fell, equaling 1.71 births per woman in 2019 (the most recent year for which data are available). The decline was largely attributable to lower fertility rates among women age 24 or younger.³

1. See Congressional Budget Office, *The Budget and Economic Outlook: 2021 to 2031* (February 2021), www.cbo.gov/publication/56970, and *An Overview of the Economic Outlook: 2021 to 2031* (February 2021), www.cbo.gov/publication/56965.

2. CBO's projection of the Social Security area population in the year 2020 is roughly consistent with the 2020 Demographic Analysis estimate produced by the Census Bureau. The Social Security area population includes residents of the 50 states and the District of Columbia; civilian residents of Puerto Rico, Guam, American Samoa, and the Northern Mariana Islands; federal civilian employees and military personnel abroad and their dependents; crew members of merchant vessels; and all other U.S. citizens abroad.

3. See Brady E. Hamilton and others, "Births: Provisional Data for 2019," *Vital Statistics Rapid Release*, no. 8 (National Center for Health Statistics, May 2020), www.cdc.gov/nchs/data/vsrr/vsrr-8-508.pdf (372 KB).

Table A-1.

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

	1991–2020	2021–2031	2032–2041	2042–2051	2021–2051
Social Security Area Population (Millions of people) ^a					
Age 19 or younger	82.5	81.8	82.8	86.4	83.6
Ages 20 to 64	178.1	195.7	199.6	203.6	199.5
Age 65 or older	39.8	64.3	76.3	80.9	73.5
Total	300.5	341.8	358.8	370.9	356.7
Growth of the Social Security Area Population (Percent) ^a					
Age 19 or younger	0.4	-0.2	0.4	0.2	0.1
Ages 20 to 64	0.8	0.1	0.2	0.2	0.2
Age 65 or older	1.9	2.4	0.8	0.5	1.3
Overall	0.8	0.4	0.4	0.3	0.4
Contribution to Population Growth (Percentage points) ^b					
Births	1.4	1.1	1.2	1.1	1.1
Deaths	-0.9	-1.0	-1.1	-1.1	-1.0
Net immigration	0.4	0.3	0.3	0.3	0.3
Contribution to Population Growth (Percent)					
Births and deaths	54.3	41.5	25.8	-10.6	24.1
Net immigration	45.7	58.4	74.1	110.5	75.8
Civilian Noninstitutionalized Population ^c					
Size (Millions of people)	226.3	271.0	285.7	295.1	283.5
Growth (Percent)	1.0	0.6	0.3	0.3	0.3
Memorandum:					
Fertility Rate (Children per woman)	1.95	1.76	1.85	1.85	1.82
Life Expectancy at Birth, End of Period (Years) ^d	76.6	79.9	81.1	82.2	82.2
Life Expectancy at Age 65, End of Period (Years) ^d	18.2	20.2	20.9	21.6	21.6
Dependency Ratio ^e	0.7	0.7	0.8	0.8	0.8
Immigration Rate (Per 1,000 people in the U.S. population)	3.8	2.6	3.0	2.9	2.8

Data sources: Congressional Budget Office; Social Security Administration. See www.cbo.gov/publication/56977#data.

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

- The Social Security area population includes residents of the 50 states and the District of Columbia; civilian residents of Puerto Rico, the Virgin Islands, Guam, American Samoa, and the Northern Mariana Islands; federal civilian employees and military personnel abroad and their dependents; crew members of merchant vessels; and all other U.S. citizens abroad.
- Values represent the percentage-point contribution of each factor to the average annual growth rate of the population. The sum of the contributions of the three factors equals the overall growth of the Social Security area population.
- The civilian noninstitutionalized population includes individuals age 16 or older who are not inmates of institutions or on active duty in the armed forces.
- Life expectancy here refers to 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.
- The dependency ratio is the ratio of the non-working-age population (people age 19 or younger and people age 65 or older) to the working-age population (people ages 20 to 64).

CBO expects the fertility rate to fall to 1.61 births per woman in 2021 and then rise to 1.85 births per woman in 2029, remaining at that value thereafter. That rate is below the replacement rate—the fertility rate required for a generation to exactly replace itself in the absence of immigration—of 2.1 births per woman.

Changes in Projections of Fertility Since Last Year.

CBO anticipates the total fertility rate to be lower, on average, after 2028 than the agency's projection last year of 1.90 births per woman. As a result, CBO now expects 130,000 fewer births a year, on average, over the first decade of the projection period than it did last year. The lower number of births has two effects on demographic trends later in the projection period. First, it lowers the number of working-age people by 300,000, on average, in the last decade of the period. Second, it reduces the number of births even more over the latter part of the period because there will be fewer adults of child-bearing age. In the last two decades of the projection period, CBO expects there to be 160,000 fewer births annually, on average, than it projected last year.

Immigration

Under current law, CBO projects that annual net immigration to the United States (a measure that accounts for all people who either enter or leave the United States in any year) will rise from 0.9 million people, on average, in the first decade of the projection period to 1.1 million people, on average, in the third decade of the period. CBO's projection of net immigration is roughly unchanged since last year.

Projections of Immigration. CBO projects net immigration in three categories: lawful permanent residents (LPRs), legal temporary residents (LTRs), and foreign-born people without legal status. Over the first two decades of the projection period, CBO estimates net flows for each category on the basis of the agency's economic projections and its assessment of recent trends. In the last decade of the period, CBO projects, net immigration for most categories will grow each year at a rate equal to overall population growth in the previous year (0.3 percent per year, on average).

Total net immigration flows averaged 1.5 million people per year between 2000 and 2006 before falling considerably in 2007 and 2008 as the Great Recession began. Those flows did not return to their previous levels in subsequent years. From 2009 to 2019, the total net flow of immigration averaged one million people per year.

CBO estimates that immigration fell in 2020 because of travel restrictions and reduced visa-processing capabilities, both of which are related to the pandemic. Immigration is projected to increase as the pandemic's effects subside and economic conditions improve. The annual net flow of LPRs is projected to increase from an average of 800,000 people per year in the first decade of the projection period to 850,000 per year in the second decade. The annual net flow of LTRs is projected to average 60,000 people per year in the first decade of that period and 80,000 people per year in the second decade. The net flow of foreign-born people without legal status is projected to be 40,000 people per year, on average, in the first decade of the projection period, rising to 140,000 people per year, on average, in the second decade of the period.

Changes in Projections of Immigration Since Last Year.

CBO's projections of net immigration are roughly unchanged from its projections in 2020. The agency projects an average net immigration rate of 2.8 immigrants per 1,000 people between 2021 and 2051, identical to the 30-year average in last year's report.

Although the average net immigration rate is essentially unchanged, total net immigration flows in the second and third decades of the projection period are slightly higher than the agency reported last year. That increase stems from slightly higher projected net flows of foreign-born people without legal status, the result of technical changes to CBO's analytic methods. On average, there are 10,000 more immigrants per year in that category than the agency projected over the second and third decades of the projection period last year.

Mortality

CBO anticipates that mortality rates, which represent the annual number of deaths per 1,000 people, will decline over the next 30 years. As a result, life expectancy at birth is projected to increase from its average of 79.1 years from 2021 to 2031 to an average of 81.7 years from 2042 to 2051. Similarly, life expectancy at age 65 is projected to rise from an average of 19.8 years in the first decade of the projection period to an average of 21.3 years in the third decade. In response to the pandemic, CBO now projects more deaths in the near term than it did last year. Over the long term, projected life expectancy at birth and at age 65 are essentially unchanged from last year's projections.

Projections of Mortality. CBO projects mortality rates on the basis of its assessment of historical trends in mortality and the effects of the pandemic. The mortality rate has generally declined in the United States since the early 20th century, but the rate of that decline has slowed over time and even reversed in recent years. For the most part, mortality rates have decreased more quickly for younger people than for older people. However, mortality rates have risen in recent years, particularly among people ages 15 to 44.

The result of those recent higher mortality rates was that life expectancy at birth declined between 2015 and 2017, the first decreases in that metric since 1993. The decreases were primarily driven by increases in mortality from Alzheimer's disease, suicide, and drug overdoses (particularly opioids).⁴

Through 2022, CBO projects mortality rates by first forecasting that they decrease at roughly the same average rate as they did between 2008 and 2017. The agency then adjusts that initial forecast to account for the additional deaths associated with the pandemic. Additional deaths include fatalities from the coronavirus as well as increased fatalities attributable to heart disease, diabetes, pneumonia, and other respiratory illnesses. Deaths from causes other than the pandemic may result from individuals' delaying or not seeking treatment during the pandemic, or they may be directly attributable to the coronavirus but misclassified because of other underlying conditions. (That increased number of additional deaths may be partially offset by a decrease in the number of accidental deaths.) For the remainder of the projection period, the agency expects a return to longer-term trends in mortality improvement, projecting that mortality rates for each age group will generally decline at the average pace experienced between 1950 and 2017.

After projecting average mortality rates for men and women, CBO incorporates differences in those rates for people age 30 or older on the basis of their marital status, education, disability-insurance status, and lifetime household earnings (for people younger than 30, the mortality projections account for age and sex only). CBO projects lower mortality rates and longer life expectancy for people who are married, have more education,

do not receive benefits through the Social Security Disability Insurance program, or are high earners.⁵

Changes in Projections of Mortality Since Last Year. CBO currently projects 180,000 (or 0.5 percent) more deaths in the first decade of the projection period than the agency projected last year. That difference stems from increases in the agency's projections of fatalities in 2021 and 2022 as a result of the pandemic.

Over the long term, the agency's estimates of life expectancy at birth and at age 65 are essentially unchanged from last year's projections. CBO projects life expectancy at birth to be 82.2 years in 2051, whereas the agency last year projected it to be 82.0 years in 2050. Life expectancy at age 65 is projected to be 21.6 years in 2051, the same as last year's estimate for 2050.

Contributions of Demographic Factors to Population Growth

The combination of the three demographic factors described above—fertility, immigration, and mortality—determines CBO's projections of total population growth. Over the course of the next decade, immigration accounts for about 60 percent of the overall increase in the size of the population, and the net contributions of fertility and mortality account for the other 40 percent. With fertility rates expected to remain below the replacement rate, immigration will become an increasingly important part of overall population growth in the United States. In CBO's projections, deaths exceed births by 2044, indicating that without immigration, the population would decline. Thereafter, population growth is driven entirely by immigration (see Figure A-1).

Economic Factors

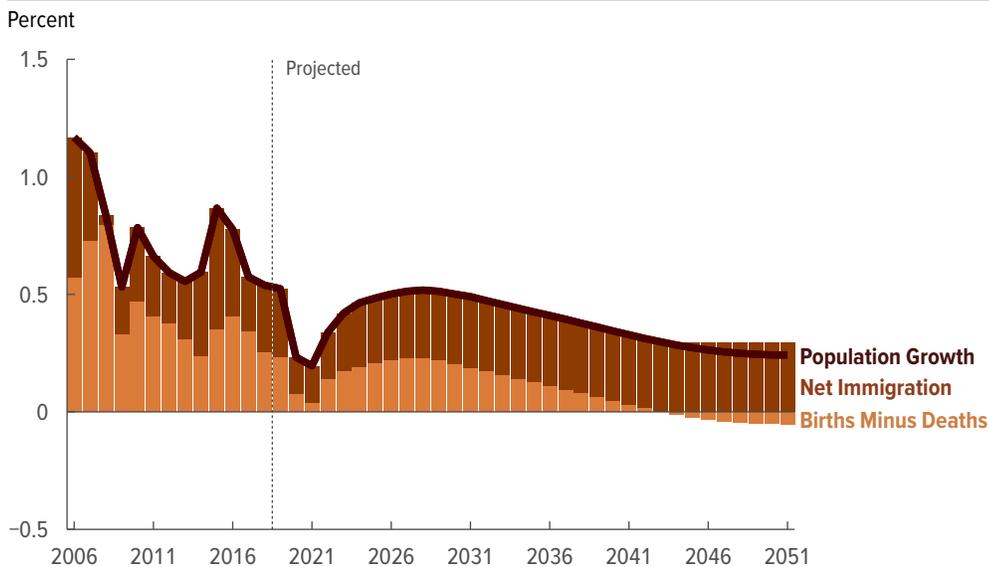
The federal government's revenues, spending, and debt depend on economic factors such as the growth of gross domestic product (GDP); the size and composition of the labor force; the number of hours worked; the distribution of earnings among workers; the accumulation of capital;

4. For an account of the way factors affecting mortality and mortality improvement rates have changed over time, see National Center for Health Statistics, *Health, United States, 2018* (NCHS, 2019), [www.cdc.gov/nchs/data/18.pdf](http://www.cdc.gov/nchs/data/hus/18.pdf) (1.6 MB).

5. 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://go.usa.gov/xGcme> (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.

Figure A-1.

Demographic Factors That Contribute to Population Growth



As fertility rates remain below the replacement rate—the rate required for a generation to exactly replace itself—immigration plays an increasingly important role in population growth. In CBO’s projections, deaths exceed births by 2044, indicating that without immigration, the population would decline. Thereafter, population growth is driven entirely by immigration.

Data sources: Congressional Budget Office; Social Security Administration. See www.cbo.gov/publication/56977#data.

Net immigration is the difference between the number of people who enter the United States and the number who leave.

and productivity, inflation, and interest rates. CBO’s projections of those factors reflect the agency’s assessment of various economic and demographic developments, as well as the effects of policy on economic activity.

Gross Domestic Product

CBO expects real (inflation-adjusted) GDP to grow 1.8 percent per year, on average, over the 2021–2051 period (see Table A-2). That is 0.5 percentage points less than the average growth of 2.3 percent for the past three decades. CBO expects growth in real GDP per person to average 1.4 percent over the next three decades, 0.1 percentage point higher than the average growth of 1.3 percent throughout the past three decades. In the agency’s current projections, both real GDP and real GDP per person grow slightly more quickly over the 2020–2050 period than the agency projected last year.

Projections of GDP. In CBO’s projections, the average annual growth of real GDP slows from 2.2 percent in the first decade of the projection period to slightly less than 1.6 percent in the second decade and just over 1.5 percent in the third decade. In part, the deceleration in growth from the first decade to the second results from the economy’s relatively rapid near-term growth in the wake of the 2020 recession caused by the pandemic.

However, that deceleration also reflects a gradual slowing of growth that results mainly from a slower rate of capital accumulation.

CBO’s long-term projections of GDP reflect the agency’s projections of potential real GDP, a measure of the maximum sustainable level of output. The growth of potential GDP is determined by the growth of the potential labor force (the labor force adjusted for fluctuations in the business cycle) and of potential labor force productivity (potential output per member of the potential labor force). Growth in potential labor force productivity, in turn, is built from projections of trends in several different sectors of the economy. Among those trends are potential hours per worker; the accumulation of capital, such as structures and equipment, intellectual property products, and residential housing; and, in the nonfarm business sector, the growth of potential total factor productivity (TFP), which is the potential output per unit of combined labor and capital.

Typically, the growth rate of actual output in CBO’s forecasts converges with the growth rate of potential output in the second half of the first decade of the projection period, and the level of actual output stays about 0.5 percent below the level of potential output thereafter.

Table A-2.

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

Percent

	1991–2020	2021–2031	2032–2041	2042–2051	2021–2051
Growth of GDP					
Real GDP	2.3	2.2	1.6	1.5	1.8
Real potential GDP ^a	2.4	1.8	1.6	1.5	1.6
Potential labor force	0.9	0.3	0.3	0.3	0.3
Potential labor force productivity	1.5	1.4	1.3	1.2	1.3
Nominal GDP (Fiscal year)	4.3	4.2	3.6	3.5	3.8
Real GDP per person	1.3	1.7	1.1	1.2	1.4
Growth of the Labor Force					
Labor Force Participation Rate	65.2	61.6	60.3	60.1	60.7
Unemployment					
Unemployment rate	5.9	4.4	4.4	4.2	4.3
Natural rate of unemployment ^b	5.0	4.4	4.1	4.0	4.2
Growth of Average Hours Worked					
	*	*	*	*	*
Growth of Total Hours Worked					
	0.6	0.9	0.3	0.3	0.5
Earnings as a Share of Compensation					
	81	81	80	79	80
Growth of Real Earnings per Worker					
	1.3	0.8	0.9	0.8	0.8
Share of Earnings Below the Taxable Maximum					
	84	83	82	81	82
Growth of Productivity					
Total factor productivity in the nonfarm business sector	1.2	1.1	1.1	1.1	1.1
Real GDP per hour worked	1.6	1.3	1.3	1.2	1.3
Inflation					
Growth of the CPI-U	2.3	2.3	2.2	2.2	2.3
Growth of the GDP price index	1.9	2.1	2.0	2.0	2.0
Interest Rates					
Real rates					
On 10-year Treasury notes and the OASDI trust funds	2.0	*	1.6	2.3	1.3
Nominal rates					
On 10-year Treasury notes and the OASDI trust funds	4.3	2.4	3.8	4.6	3.5
On all federal debt held by the public ^c	4.6	1.5	3.2	4.1	2.9

Data source: Congressional Budget Office. See www.cbo.gov/publication/56977#data.

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

Real values are nominal values that have been adjusted to remove the effects of changes in prices.

CPI-U = consumer price index for all urban consumers; GDP = gross domestic product; OASDI = Old-Age, Survivors, and Disability Insurance;

* = between -0.05 percent and 0.05 percent.

- Potential GDP is CBO's estimate of the maximum sustainable output of the economy. Growth in real potential GDP is the sum of growth in the potential labor force and growth in potential labor force productivity. The potential labor force is the labor force (that is, the number of people in the civilian noninstitutionalized population who are age 16 or older and who are either working or actively seeking work), adjusted to remove the effects of fluctuations in the business cycle. Potential labor force productivity is the ratio of real potential GDP to the potential labor force.
- The natural rate of unemployment is the rate that results from all sources except fluctuations in aggregate demand, including normal turnover of jobs and mismatches between the skills of available workers and the skills necessary to fill vacant positions.
- 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.

That persistent gap between actual output and potential output reflects the agency's assessment that actual output falls short of potential output to a greater extent and for longer periods during and after economic downturns than actual output exceeds potential output during economic booms.⁶

CBO's current projection deviates from that typical pattern because real GDP dropped significantly below real potential GDP in 2020 and also because the agency expects monetary policy to allow real GDP to rise above potential for a number of years during the projected expansion. In the current forecast, real GDP recovers to its prerecession peak in mid-2021, continues to expand, and surpasses its potential in early 2025. Real GDP remains above potential GDP for several years, but as monetary policy gradually tightens, the growth rate of real GDP gradually slows. Real GDP falls below potential GDP in 2029 and gradually returns to its long-term relationship with potential output in the mid-2030s.

Real GDP per person is expected to increase at an average annual rate of 1.4 percent over the 2021–2051 period, compared with 1.3 percent for the past 30 years. However, the past 30 years include the 2020 recession. Compared instead with the average growth rate for the 1989–2019 period (1.5 percent), projected growth is slower over the next 30 years.

Changes in Projections of GDP Since Last Year. CBO's current projections of real GDP are higher than last year's throughout the 30-year projection period, primarily because the economic effects of the pandemic proved to be less negative than expected: The downturn in early 2020 was not as pronounced as the agency estimated last year, and the recovery in the second half of the year was much stronger. As a consequence, the level of real GDP is projected to be 1.0 percent higher in 2031, even though real GDP growth over the next decade is now projected to be more than 0.1 percentage point slower than it was

last year. In the second and third decades of the projection period, real GDP is expected to grow slightly more slowly than projected last year, largely because the agency slightly raised its projections of the unemployment rate. By 2050, the level of real GDP is only about 0.6 percentage points greater than expected last year.

Labor Force Participation and Labor Force Growth

The size of the labor force depends on the rates at which people in different demographic groups participate in the labor market. Since the mid-2000s, the overall rate of labor force participation in the United States has declined substantially, driven predominantly by the aging of the population.⁷ CBO expects that decline to continue over the first half of the 30-year projection period before leveling off in the second half of the period. As a result, the labor force is expected to grow even more slowly than the number of people age 16 or older, at an average rate of 0.4 percent per year from 2021 to 2051.

CBO's current projections of labor force participation are higher than last year's throughout the 30-year period, reflecting the stronger-than-expected economic and labor market recovery from the 2020 recession in the near term and the agency's reassessment of the effects of demographic shifts in the long term. As a result, CBO currently projects the labor force to be larger throughout the projection period than the agency anticipated last year, even though it expects the population to be smaller, on average.

Projections of Labor Force Participation. In CBO's projections, the rate of labor force participation rebounds from 61.5 percent in late 2020 to 62.1 percent in 2022 as a substantial fraction of the population acquires immunity from the coronavirus and rejoins the labor force and as the economy recovers from the 2020 recession. After 2022, as downward pressure from the aging population offsets upward momentum from the economic recovery, the labor force participation rate is projected to decline gradually, to 60.8 percent in 2031 and 60.2 percent in 2041. As demographic shifts slow over time, the participation rate is expected to gradually stabilize, hovering around 60.1 percent in the third decade of the projection period.

6. A recent study explains the existence of a persistent output gap by examining asymmetric fluctuations in the natural rate of unemployment (that is, the rate that results from all sources except fluctuations in aggregate demand). See Stéphane Dupraz, Emi Nakamura, and Jón Steinsson, *A Plucking Model of Business Cycles*, Working Paper 748 (Banque De France, January 2020), <https://tinyurl.com/1njkmzxf>. The agency assessed the persistent output gap in an earlier report. See Congressional Budget Office, *Why CBO Projects That Actual Output Will Be Below Potential Output on Average* (February 2015), www.cbo.gov/publication/49890.

7. The labor force participation rate is the share of the civilian noninstitutionalized population age 16 or older that is working or actively seeking work.

The aging of the population accounts for all of the decline in the overall labor force participation rate in the coming decades, in CBO's projections. People age 65 or older tend to participate in the labor force at lower rates than younger people. In 2019, for example, the average participation rate was 82.5 percent among the civilian noninstitutionalized population ages 25 to 54 and 20.2 percent among those age 65 or older. As the baby-boom generation started to turn age 65 in the early 2010s, the share of people age 65 or older in the civilian noninstitutionalized population increased rapidly, from 16.3 percent in 2010 to 20.4 percent in 2019. CBO anticipates that the percentage of people age 65 or older will continue to rise to 27.0 percent by 2041 before becoming more stable in the third decade of the projection period. Were it not for the aging of the population, the overall rate of labor force participation over the coming decades would be substantially higher than currently projected, in CBO's assessment.

In addition to the aging of the population, CBO expects several other demographic trends, economic trends, and current fiscal policies to also influence the labor force participation rate in the coming decades. In particular, two long-term trends are expected to increase participation in the labor force:

- The population is becoming more educated, and people with more education tend to participate in the labor force at higher rates than do people with less education.
- Increasing longevity is expected to lead people to continue working to increasingly older ages.

CBO expects those two trends to be mostly offset by two other trends that will put downward pressure on the participation rate:

- Members of each generation that follows the baby boomers (particularly men) tend to participate in the labor force at lower rates than its predecessors did at the same ages. (One notable exception in later generations is that the share of women age 34 or younger who work is higher than it was for baby-boomer women at the same ages. However, as those later generations of women have aged, their participation rates have also fallen below those of their predecessors.)

- The marriage rate is projected to continue to fall, and unmarried men tend to participate in the labor force at lower rates than married men.

In addition to the effects of those demographic trends, budgetary effects and incentives under current tax law, combined with economic trends, also affect the labor force. For example, rising federal deficits are projected to slow growth in the stock of private capital and to limit the growth of wages, thereby reducing the supply of labor. In addition, as people's income rises faster than inflation, more of their income is pushed into higher tax brackets through a process known as real bracket creep, raising their effective tax rates. Higher tax rates and real bracket creep are projected to decrease participation in the labor force because individuals would earn less return on their labor.

Changes in Projections of Labor Force Participation Since Last Year. CBO's current projections of labor force participation are higher than last year's throughout the 30-year projection period. The agency raised its projection of the labor force participation rate in the near term, primarily because incoming data on employment and unemployment since CBO completed its previous projections indicated that the labor market recovery has been much stronger than CBO previously projected, which supports higher labor force participation in the coming years. CBO also raised its projections of the labor force participation rate over the medium term and long term after reassessing the historical trends in participation among various demographic groups.

Projections of the Labor Force. Largely owing to the pandemic and associated recession, the number of people in the labor force shrank by 3.9 million (or 2.4 percent) by the end of 2020 from its pre-pandemic level; growth is projected to pick up in 2021 as the economy continues to recover. However, the long-term decline in labor force participation means that less of the population's growth translates into labor force growth. For the 2021–2051 period, the number of people age 16 or older is expected to grow by 0.5 percent per year, on average, and the labor force is projected to grow at an average rate of 0.3 percent per year after 2021. That represents a significant slowdown from earlier periods: For example, the average annual growth rate in the labor force was 1.2 percent during the 1990–2006 period and 0.6 percent during the 2010–2019 period.

Changes in Projections of the Labor Force Since Last Year. CBO's current projection of the size of the labor force in the second half of 2021 is 0.8 percent larger than its previous projection, reflecting a stronger recovery from the pandemic and recession. After 2021, labor force growth is projected to be slightly weaker, on average, than CBO anticipated last year, as the negative effect of slower population growth more than offsets the positive effect of a higher labor force participation rate. As a result of the stronger recovery in the near term and the slower growth in later years, by 2050, the size of the labor force is 0.2 percent larger in the current projections than it was in last year's estimates.

Other Labor Market Outcomes

In addition to the rate of labor force participation and the size and growth of the labor force, CBO's long-term labor market outlook includes projections over the next 30 years of the unemployment rate, the average and total number of hours that people work, and various measures of workers' earnings. The agency regularly updates those projections to incorporate revisions in historical data, reassessments of economic and demographic trends, and changes to the agency's analytic methods.

Unemployment. The unemployment rate is projected to decline gradually in the coming years as a result of continued economic growth and legislation the Congress passed in 2020. In CBO's projections, the overall unemployment rate falls from 6.7 percent at the end of 2020 to 5.3 percent by late 2021. It is projected to fall below its natural rate by 2024 and reach 3.9 percent by 2026. However, the unemployment rates for younger workers, workers without a bachelor's degree, and Black or Hispanic workers are expected to improve more slowly than the overall unemployment rate.

After the first decade or so, the unemployment rate is expected to remain roughly one-quarter of one percentage point above its natural rate, a difference that is consistent with both the average historical relationship between the two measures and the projected gap of one-half of one percent between actual and potential GDP.⁸

CBO projects the natural rate of unemployment to decline gradually over the next three decades, from

4.5 percent in 2021 to 4.3 percent in 2031 and to 3.9 percent in 2051. That slow decline reflects the continuing shift in the composition of the workforce toward older workers, who tend to have lower rates of unemployment (when they participate in the labor force), and away from less-educated workers, who tend to have higher ones. As the natural rate of unemployment declines, the actual unemployment rate is also projected to decline. By 2051, the actual rate is projected to reach 4.2 percent.

Average Hours Worked. Workers tend to work a different number of hours depending on their industry: For example, workers in manufacturing put in more than 40 hours per week, on average, whereas those in service industries work about 32 hours per week. As the share of workers employed in manufacturing has decreased and the share employed in service industries has increased over the past several decades, the average number of hours worked per week has declined for the economy as a whole. During the past decade, the shares of workers in the manufacturing and service industries have been largely stable. In CBO's assessment, future changes in the employment shares of different industries are unlikely to have substantial effects on the economywide number of average hours worked.

Incentives under current tax law are projected to influence the average number of hours worked. Higher tax rates on individual income would take effect when, under current law, certain provisions of the 2017 tax act expire at the end of 2025. In CBO's projections, those higher rates slightly reduce the average number of hours worked beginning in 2026. In addition, CBO projects effective tax rates on individual income to rise because of real bracket creep. Given economic trends and current laws, CBO expects the average number of hours worked to decline slightly over the next 30 years. By 2051, CBO expects the average worker to work about 0.6 percent fewer hours per week than he or she does today.

Total Hours Worked. Based on projections of the growth of the labor force, average hours worked, and unemployment, CBO estimates that total hours worked will increase at an average annual rate of 0.5 percent between 2021 and 2051. That is less than the average annual increase of 0.6 percent in total hours worked over the past three decades. The deceleration in the growth of total hours is mainly because the population is expected

8. The natural rate of unemployment is the rate that results from all sources except fluctuations in aggregate demand, including normal turnover of jobs and mismatches between the skills of available workers and the skills necessary to fill vacant positions.

to grow more slowly in the future than it has over the past 30 years.

In CBO's projections, the average growth in total hours worked is 0.9 percent in the first decade, 0.3 percent in the second decade, and 0.3 percent in the third decade. The unusually large growth in hours worked over the first decade of the projection period reflects the economic recovery from the 2020 recession.

Earnings as a Share of Compensation. Workers' total compensation consists of taxable earnings and nontaxable benefits such as employers' contributions to health insurance and pensions. Over the years, the share of total compensation paid in the form of wages and salaries has declined—from 91 percent in 1960 to 82 percent in 2020—mainly because the cost of health insurance has risen more quickly than total compensation.⁹ Because CBO expects that the cost of health insurance will continue to rise, the portion of compensation that workers receive as earnings is projected to decline, on average, to 80 percent of total compensation over the 2021–2051 period, reaching 79 percent in 2051.

Growth of Real Earnings per Worker. Projections of prices, the amount of nonwage compensation (such as employment-based health insurance), the average number of hours worked, and labor productivity imply that real earnings per worker will grow by an average of 0.8 percent annually over the 2021–2051 period. That rate is less than the 1.3 percent average annual growth of real earnings per worker over the past 30 years.

Distribution of Earnings. In CBO's projections, earnings grow faster for higher earners than for lower earners. As a result, the share of earnings accruing to workers in the top 10 percent of the earnings distribution increases at an average rate of 0.2 percent per year. That rate of growth is less than it was between 1978 and 2019, when the share of earnings accruing to workers in the top 10 percent of the earnings distribution increased by 0.6 percent per year.

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 individual income tax; people with lower income pay a smaller share of their earnings in taxes than people with higher income.

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

Social Security payroll taxes are also affected by the earnings distribution. Those taxes are levied only on earnings up to a certain annual amount (\$142,800 in 2021). Because earnings have grown more for higher earners than for others, the portion of covered earnings on which Social Security payroll taxes are paid has fallen from 90 percent in 1983 to 82 percent in 2018.¹⁰ The portion of earnings subject to Social Security taxes is projected to rise to 83 percent, on average, between 2021 and 2031, fall to an average of 82 percent in the second decade of the projection period, and remain at an average of 82 percent in the third decade, equaling 81 percent in 2051. That decline in the share of covered earnings below the taxable maximum reduces the projected balance of the Social Security trust funds.

Changes in Projections of Other Labor Market

Outcomes Since Last Year. Several projections of labor market outcomes differ from last year's projections. CBO's current projection of the unemployment rate is substantially lower than it was last year for the first decade of the projection period, but slightly higher for the second and third decades. Two factors account for the majority of the near-term revision: First, incoming data on employment and unemployment after CBO completed its projections last year indicate a much stronger labor market recovery than the agency anticipated, driven primarily by more-rapid rehiring of workers who were temporarily laid off. Second, projected economic activity, as reflected in GDP and other economic indicators, is stronger throughout the coming decade in CBO's current projections, in part because of various laws enacted in 2020.¹¹ The unemployment rate is projected to be higher in the second and third decades than CBO projected last year, largely because the agency increased its estimate of the natural rate of unemployment.

CBO's current projections of real earnings per worker grow more slowly than they did last year, mainly because its projections for the labor market have changed. Last

10. 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. Earnings above the taxable maximum are also exempt from payroll taxation, and no additional benefits accrue to those excess earnings.

11. See Congressional Budget Office, *The Effects of Pandemic-Related Legislation on Output* (September 2020), www.cbo.gov/publication/56537. Also see divisions M, N, and EE of the Consolidated Appropriations Act, 2021.

year, the agency expected the labor market recovery to be weaker than it was in 2020 and stronger through the 2021–2030 period than it projects this year. As a result, although CBO's current projections of real earnings per worker grow more slowly over the first decade, they are roughly the same in 2030 as it estimated last year. CBO's current projection grows at roughly the same rate as last year's projection over the second and third decades of the projection period.

In CBO's current projections, earnings as a share of compensation are higher than the agency previously estimated for the first decade of the projection period and modestly lower thereafter. The projection is higher in the first decade because the increase in taxable earnings relative to last year's projection is larger than the increase in nontaxable benefits over the first decade. During the second and third decades, slightly slower growth in earnings accompanied by slightly faster growth in nontaxable benefits causes earnings as a share of compensation to fall below the agency's projections last year. The faster growth in nontaxable benefits occurs because CBO expects the cost of health insurance to grow slightly faster than the agency projected last year in the second and third decades. As a result, earnings as a share of compensation are slightly lower in the third decade of the period than the agency published last year.

CBO's projections of the earnings distribution also differ from last year's projections. The top 10 percent of earners in 2050 are projected to make 45 percent of all earnings, slightly less than the projection from last year. Those projections changed because CBO improved its method for calculating the distribution of earnings, leading to a smaller share of earnings accruing to high-wage earners over the long run. (That revision is also the reason that CBO increased its projections of the share of covered earnings on which Social Security payroll taxes are paid.)

Capital Accumulation and Productivity

In addition to the rate of labor force participation, labor force growth, and other labor market outcomes, two other factors directly affect CBO's projections of output. One is the accumulation of capital—residential housing, other structures, equipment, land, and intellectual property such as computer software. That accumulated stock of capital contributes a stream of services to production. The second factor is TFP growth. In CBO's projections, most TFP growth occurs in the nonfarm business sector, which accounts for about three-quarters of economic activity.

Capital Accumulation. Over the long term, in CBO's view, growth of the nation's stock of private capital is driven by private saving, international flows of direct foreign investment and financial capital, and federal borrowing. Private saving and international capital flows tend to move in tandem with the rate of return on investment—a rate that measures the extent to which investment in the stock of capital results in a flow of income. CBO's projection of that rate is consistent with the agency's projection that the average 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) will be 1.1 percent in 2031 and 2.7 percent in 2051. CBO projects an increase in federal borrowing over the next 30 years, which will increase interest rates, thus reducing growth in private investment and tamping down growth in the stock of private capital.

Total Factor Productivity. The annual growth of TFP in the nonfarm business sector is projected to average 1.1 percent over the projection period. That projected growth rate is about 0.3 percentage points slower than the average annual rate since 1950 of 1.4 percent and 0.1 percentage point slower than the average rate since 1990.

CBO projects that nonfarm business TFP will grow more slowly than its long-term historical average for several reasons. Recent analysis of historical trends in TFP growth suggests that projections for the next few decades should place greater weight on slower recent growth than on faster growth in the more distant past. Thus, although CBO projects growth in nonfarm business TFP to accelerate from its unusually slow recent rate, the agency expects the future rate of growth to be slower than its long-term historical average.

A number of developments support CBO's projection of slower growth in nonfarm business TFP. One is the anticipated slower improvement in labor quality—an aggregate measure of workers' skills that accounts for educational attainment and work experience. That measure is implicitly included in CBO's measure of TFP. Labor quality improved rapidly during the 1980s and 1990s and more slowly after 2000. In CBO's assessment, that slowdown was the result of both a less-rapid increase in educational attainment and the continued retirement of members of the baby-boom generation, a large, experienced portion of the workforce. In future decades, however, the slower improvement in labor quality is expected to be partly offset by improvements in health

and increases in life expectancy that lead people (particularly highly educated people) to continue working past the ages at which previous generations retired (thus boosting the total stock of experience in the workforce).

Another development that affects nonfarm business TFP is federal investment in long-lived assets, such as buildings, roads, and intellectual property, which produce a stream of benefits to private businesses. In CBO's projections, federal discretionary spending declines to a much smaller percentage of GDP over the next decade than in past decades. If federal investment spending generally remains unchanged as a share of discretionary spending and discretionary spending declines as a percentage of GDP, federal investment spending will also decline as a share of GDP. In CBO's assessment, a reduction in federal investment spending as a share of GDP would dampen TFP growth.¹²

CBO also estimates the effects of climate change on economic growth in future decades, drawing on studies that relate differences in regional economic activity and growth to differences in regional weather patterns, as well as studies of the economic effects of more-intense storms and rising sea levels. Climate change affects the agency's projections in at least two ways. First, climate change has had a modest effect on recent productivity trends, in the agency's assessment. Because those recent trends are used to project future trends, CBO's projections thus account for a portion of the effects of climate change. Second, the agency explicitly estimates a certain amount of additional impact from future changes in climate, which are projected to affect the growth of nonfarm business TFP. By CBO's estimate, TFP growth over the 2021–2051 period will be lower by about 0.02 percentage points per year, on average; as a result, TFP will be about 0.7 percent less and GDP about 0.5 percent less in 2051 than the metrics would have been without those additional effects.

Real GDP per Hour Worked. Given the projected growth of the capital stock and TFP described above, real GDP per hour worked (a measure of economy-wide productivity) is expected to grow by an annual average of 1.3 percent over the 2021–2051 period. Potential labor force productivity (potential output per member of the potential labor force) is also expected

to grow by an annual average of 1.3 percent over the 2021–2051 period.

Changes in Projections of Capital Accumulation and Productivity Since Last Year. CBO's projections of capital accumulation are stronger over the first decade of the projection period but slightly weaker over the second and third decades than the agency expected last year. Its projections of TFP growth in the nonfarm business sector and real GDP per hour worked in the entire economy are both somewhat weaker over the entire period, mainly because the downturn in early 2020 was not as pronounced as the agency initially estimated and the recovery later in the year was stronger.

Inflation

CBO projects rates of inflation for two categories: prices of consumer goods and services and GDP prices (the price of all goods and services included in GDP). Those rates affect nominal (current-dollar) interest rates, income, and indexation of income tax brackets, thereby influencing tax revenues, 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 2021–2051 period, that measure of inflation averages 2.3 percent in CBO's projections. That long-term rate is roughly the same as the average rate of inflation since 1991. CBO projects that, under a chained measure of CPI-U inflation, prices will grow at a rate that is about 0.25 percentage points less than the annual increase in the traditional CPI-U.¹³

GDP Prices. Over the 2021–2051 period, inflation in GDP prices, as measured by the annual rate of increase in the GDP price index, is projected to average 2.0 percent. That rate is slightly higher than the average growth in the GDP price index over the past 30 years

12. For more details about how CBO estimates the macroeconomic effects of federal investment, see Congressional Budget Office, *The Macroeconomic and Budgetary Effects of Federal Investment* (June 2016), www.cbo.gov/publication/51628.

13. The chained consumer price index for all urban consumers (CPI-U) tends to grow more slowly than the traditional CPI-U for two reasons. First, it uses a formula that better accounts for households' tendency to substitute goods and services with similar but cheaper alternatives when prices go up. Second, unlike the CPI-U, the chained CPI-U 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 about 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.

of 1.9 percent per year. The GDP price index grows at a different rate than the CPI-U because it is based on the prices of a different set of goods and services and is calculated using a different method.

Changes in Projections of Inflation Since Last Year.

Inflation, as measured by growth in either the CPI-U or the GDP price index, is projected to be considerably higher from 2021 to 2031 than CBO projected last year. There are two reasons for that higher projection. First, inflation is projected to be higher in the short term because consumers and businesses have proven better able to adapt to social distancing—allowing spending on goods and services to continue—than the agency previously expected and because of laws enacted in 2020, both of which limit the disinflationary impact of the pandemic. Over the 2021–2025 period, CBO projects the CPI-U to grow at an average annual rate of 2.2 percent, more than the average of 1.9 percent the agency projected last year for the same period. Second, inflation is projected to be higher after the economy fully recovers from the 2020 recession because of the Federal Reserve's recent revision to its statement of goals and policies, which states that when there is a period in which inflation falls short of the Federal Reserve's objective, inflation will be allowed to moderately exceed that objective in a future period.¹⁴ Over the 2026–2031 period, CBO projects the CPI-U to grow at an average annual rate of 2.4 percent, more than the average of 2.2 percent the agency projected last year for the same period.

CBO did not significantly revise its projection for later decades in the projection period. After 2031, inflation returns to its projected long-term average. CBO projects the CPI-U to grow at an average annual rate of 2.2 percent and the GDP price index to grow at an average annual rate of 2.0 percent, the same rates the agency projected last year.

Interest Rates

CBO projects the interest rates that apply to federal borrowing, including the rates on 10-year Treasury notes and special-issue Social Security bonds. It also projects the average 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 balances of the trust funds.

CBO expects real interest rates on federal borrowing to be lower in the future than they were, on average, over the 1995–2004 period, the period CBO uses for historical comparison. The agency expects several factors, including slower growth in the labor force and slower growth in TFP relative to that historical period, to continue to put downward pressure on interest rates through 2051. That downward pressure is expected to be partly mitigated by upward pressure from other factors such as rising debt relative to GDP. The real interest rate on 10-year Treasury notes averaged roughly 3 percent between 1995 and 2004. That rate has averaged 0.7 percent since 2009 and is projected to be 1.1 percent in 2031. CBO projects the rate to rise thereafter, reaching 2.7 percent in 2051. That projection is 0.3 percentage points below the average real interest rate on 10-year Treasury notes over the 1995–2004 period.

CBO's current projections of real interest rates over the 2021–2050 period are roughly unchanged, on average, from last year's projections. Over the 2031–2050 period, the agency expects real interest rates to be slightly higher than last year's projection for reasons including an upward revision to CBO's forecast of the share of income paid to capital in coming decades. By 2050, the agency projects the real interest rate on 10-year Treasury notes to reach 2.6 percent, 0.1 percentage point higher than last year's projection.

Factors Affecting Interest Rates. Interest rates are determined by a number of factors. CBO projects those rates by comparing how the values of factors that affect them are expected to differ in the long term from their average values over the 1995–2004 period. That period was chosen for comparison because expectations of inflation were stable, there were no severe economic downturns or significant financial crises, and according to CBO's estimates, monetary policy was, on average, neutral—that is, the real federal funds rate—the interest rate that financial institutions charge each other for overnight loans of their monetary reserves—was, on average, consistent with the economy's operating at full employment during that period.¹⁵

14. See Board of Governors of the Federal Reserve System, "Federal Open Market Committee Announces Approval of Updates to Its Statement on Longer-Run Goals and Monetary Policy Strategy" (press release, August 27, 2020), <https://go.usa.gov/xGXXn>.

15. For further details on the factors affecting CBO's interest rate projections, see Edward N. Gamber, *The Historical Decline in Real Interest Rates and Its Implications for CBO's Projections*, Working Paper 2020-09 (Congressional Budget Office, December 2020), www.cbo.gov/publication/56891.

In CBO's estimates for the 2021–2051 period, several factors tend to reduce interest rates on government securities below their average from 1995 to 2004:

- The labor force is projected to grow much more slowly than it did from 1995 to 2004. Slower growth in the number of workers tends 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.¹⁶
- The share of total earnings received by higher-earning households is expected to be larger in the future than it was during the 1995–2004 period. Higher-income households tend to save a greater proportion of their income, so the difference in the distribution of earnings 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 1995 to 2004. For a given rate of investment, a lower rate of productivity growth reduces the return on capital and results in lower interest rates, all else being equal.
- CBO expects investors' preference for Treasury securities over riskier assets to remain greater than it was during the 1995–2004 period. Investors began to have less appetite for risk in the early 2000s, and the demand for low-risk assets was strengthened by the economic fallout from the 2007–2009 recession, the slow expansion that followed, and the response of financial institutions to increased regulatory oversight. The 2020 recession further increased investors' demand for Treasury securities instead of riskier assets. That greater demand contributed to lower interest rates for Treasury securities. CBO expects the preference for Treasury securities to gradually decline over the next three decades but to remain stronger than it was from 1995 to 2004.

At the same time, in CBO's estimates, several factors tend to boost interest rates on government securities above their average over the 1995–2004 period:

- In CBO's extended baseline projections, federal debt is much larger as a percentage of GDP than it was before 2004, reaching 107 percent by 2031 and 202 percent by 2051. The latter figure is more than five times the average over the 1995–2004 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.
- The capital share of income—the percentage of total income that is paid to owners of capital—has been rising for the past few decades. That share is projected to decline from its current percentage over the next decade but to remain greater than its average in previous decades. The factors that appear to have contributed to capital's rising share of income (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 would increase interest rates.
- The retirement of members of the baby-boom generation and slower growth in the size of the labor force means that there will be fewer workers in their prime saving years relative to the number of older people who are drawing down their savings. As a result, CBO estimates that the total amount of saving available for investment will be less than it otherwise would be (all else being equal) and expects that decrease to reduce the amount of capital per worker and thereby push up interest rates. (CBO estimates that the effect of that decrease will only partially offset the positive effect of the larger share of earnings received by high-income households, leaving a net increase in saving available for investment.)
- CBO anticipates that emerging-market economies will attract a greater share of foreign investment in coming decades than they did in the 1995–2004 period. The agency expects that as those economies recover from the global economic downturn caused by the pandemic, they will become increasingly attractive destinations for foreign investment. CBO projects the increased appeal of investing in emerging markets to put upward pressure on interest rates in the United States.

16. 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.

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 by using theoretical models and the findings of existing research. The extent to which other factors affect interest rates is more difficult to estimate. A shift in preferences for low-risk rather than high-risk assets is not directly observable, for example. That shift is especially uncertain in light of the unprecedented increase in federal debt in response to the pandemic and recession. It is difficult to anticipate how financial markets will respond to that rising debt once the economy begins to recover. The effect on interest rates of changes in the distribution of earnings is also difficult to quantify.

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 from now. The low rate on 30-year Treasury bonds since the onset of the 2020 recession points to expectations that interest rates will be considerably lower well into the future than they were from 1995 to 2004.

Projections of Interest Rates. The nominal interest rate on 10-year Treasury notes is projected to average 3.5 percent over the 2021–2051 period and to reach 4.9 percent in 2051. The real interest rate on 10-year Treasury notes is projected to average 1.3 percent over that period and to be 2.7 percent in 2051.

The average interest rate on all federal debt held by the public (Treasury securities) tends to be lower than the rates on 10-year Treasury notes because other Treasury securities generally mature over a shorter period and their interest rates are therefore lower.¹⁷ CBO projects a 0.5 percentage-point difference between the rate on 10-year Treasury notes and the average interest rate on federal debt over the 2021–2051 period. That difference is projected to average 0.8 percentage points over the next decade. The difference is larger before 2031 because the federal debt up to that time includes Treasury securities that were issued during the 2020 recession. That difference decreases to 0.3 percentage points by 2036 and remains at the same level in later years as earlier securities with relatively low interest rates mature, in

17. Over the next decade, CBO expects the difference between the rate on 3-month Treasury bills and the rate on 10-year Treasury notes to average 0.8 percentage points.

CBO's projections. The same factors that increase interest rates also increase the average interest rate on federal debt held by the public between 2041 and 2051. In CBO's projections, the average nominal interest rate on federal debt held by the public is about 2.9 percent for the 2021–2051 period, reaching 4.6 percent in 2051.

The Social Security trust funds hold special-issue bonds that generally earn interest at higher rates than the average rate of interest on federal debt. In CBO's projections, the nominal interest rate on bonds newly issued to the trust funds is equal to the rate on 10-year Treasury notes; it averages 3.5 percent over the 2021–2051 period and reaches 4.9 percent in 2051. The corresponding real rates are 1.3 percent, on average, over the full period, and 2.7 percent in 2051.

For two reasons—because interest rates have been low for much of the past decade and because the pandemic has driven rates even lower—CBO projects that the average interest rate earned by all bonds held by the Social Security trust funds (including those issued in the future) is slightly lower than the interest rate on bonds issued 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 3.3 percent for the 2021–2051 period.¹⁸

Changes in Projections of Interest Rates Since Last Year. CBO's projections of interest rates in this year's long-term budget outlook are slightly higher than they were last year.

CBO raised its projection of average nominal interest rates. The nominal rates on 10-year Treasury notes and Social Security bonds are projected to average 3.5 percent over the 30-year projection period. Last year, CBO projected both rates to average 3.3 percent over the 30-year period. The agency also raised its projection of average real interest rates. The real rates on 10-year Treasury notes and Social Security bonds are projected to average 1.3 percent over the 30-year projection period. Last year, CBO projected both rates to average 1.1 percent over the 30-year period.

18. 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.

CBO's projections of higher average interest rates over the coming decade are primarily the result of the faster-than-expected recovery from the 2020 recession. CBO now expects the Federal Reserve to begin raising short-term rates in the second half of 2024, almost two years earlier than previously projected. In addition, the agency now expects the Federal Reserve to begin reducing its holdings of Treasury and other securities earlier than it forecast last year. That reduction is expected to put upward pressure on the term premium—the extra return paid to bondholders for the greater risk associated with holding long-term Treasury securities.

After 2031, CBO projects higher interest rates because of its revisions to other factors that affect those rates. CBO expects the share of income paid to capital to be higher than the agency forecast last year. That increased share of income is expected to put upward pressure on interest rates. Toward the end of the projection period, 2046 to 2050, the agency expects the growth rate of the labor force to be slightly slower than in last year's projections. The slower growth rate is expected to put downward pressure on real interest rates. The net effect of the revisions to those factors is a small upward revision to real interest rates over the 2031–2051 period.

Appendix B: Changes in CBO’s Long-Term Budget Projections Since September 2020

Overview

This appendix compares the Congressional Budget Office’s current extended baseline projections over the 2021–2050 period with the projections the agency published in September 2020.¹ The differences, which are generally small, are attributable to changes in law, changes to the agency’s projections of demographic and economic factors, and the availability of more recent data.

In CBO’s current projections:

- Measured as a percentage of gross domestic product (GDP), *federal debt held by the public* is projected to be slightly lower in most years than the agency projected last year. That debt is now projected to rise from 102 percent of GDP in 2021 to 195 percent in 2050. The 2021 amount is 2 percentage points lower than CBO projected in September 2020, and the 2050 amount is the same.
- *Spending* is higher as a percentage of GDP in 2021 than it was in last year’s projections, lower in the near term, and then similar thereafter.
- *Revenues* as a percentage of GDP are higher by 0.5 percentage points in 2021 than projected last year, higher over the next few years, and then similar thereafter.
- As a result of those revisions, *total deficits* and *primary deficits* (that is, total deficits excluding net spending for interest) as a percentage of GDP are now larger in 2021, generally smaller in the near term, and then similar thereafter (see Figure B-1).

This appendix also describes changes in CBO’s projections for the two Social Security trust funds—the Old-Age and Survivors Insurance (OASI) Trust Fund and the Disability Insurance (DI) Trust Fund. Those trust funds will be exhausted later than the agency projected last year. In addition, the appendix discusses changes in the agency’s analysis of the sensitivity of its budget projections to changes in the average interest rate on federal debt held by the public.

The extended baseline projections presented in this report follow the agency’s baseline budget projections for the first 10 years and then extend most of the baseline concepts for an additional 20 years. Those projections incorporate the budgetary and economic effects of the 2020–2021 coronavirus pandemic and associated measures taken to limit in-person interaction. They also reflect the economic and budgetary effects of laws enacted as of January 12, 2021, which contain provisions to address the public health emergency and to support households, businesses, and state and local governments.²

Changes in Projected Spending

In CBO’s extended baseline projections, total spending is higher as a percentage of GDP in 2021 than it was in last year’s projections, lower in the near term, and then similar thereafter. Like total spending, noninterest spending as a percentage of GDP is higher in 2021, lower in the near term than it was in last year’s projections, and generally the same thereafter. In the second and third decades of the projection period, all the major components of non-interest spending—that is, spending for Social Security, the major federal health care programs, other mandatory

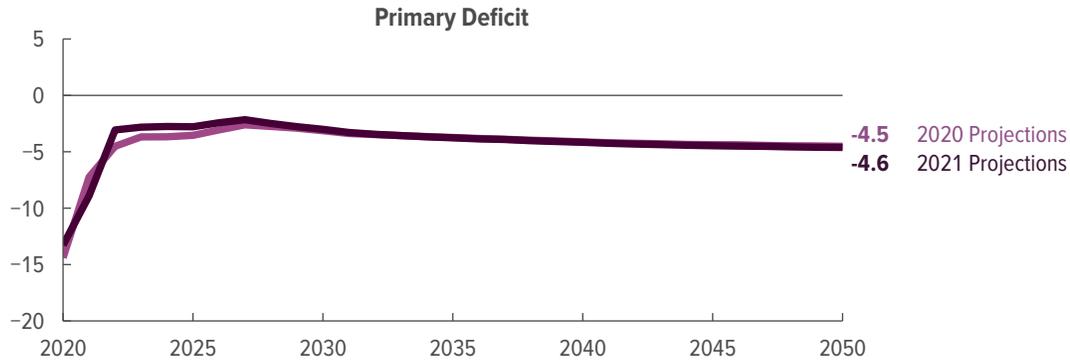
1. See Congressional Budget Office, *The 2020 Long-Term Budget Outlook* (September 2020), www.cbo.gov/publication/56516. Because most of last year’s projections ended in 2050, this appendix generally makes comparisons only through that year. For changes in projections of demographic and economic factors since 2020, see Appendix A of this report. For further information on budgetary projections for the first 10 years, see Congressional Budget Office, *Additional Information About the Budget Outlook: 2021 to 2031* (forthcoming on March 5, 2021), www.cbo.gov/publication/56996.

2. Provisions enacted in response to the pandemic were included in the Coronavirus Preparedness and Response Supplemental Appropriations Act, 2020 (Public Law 116-123), the Families First Coronavirus Response Act (P.L. 116-127), the Coronavirus Aid, Relief, and Economic Security Act (P.L. 116-136), the Paycheck Protection Program and Health Care Enhancement Act (P.L. 116-139), the Paycheck Protection Program Flexibility Act of 2020 (P.L. 116-142), and divisions M, N, and EE of the Consolidated Appropriations Act, 2021 (P.L. 116-260).

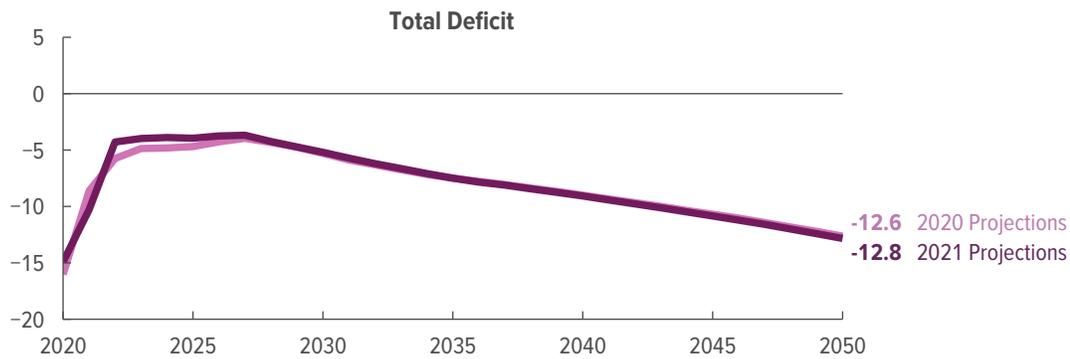
Figure B-1.

CBO's 2020 and 2021 Extended Baseline Projections of Deficits and Federal Debt Held by the Public

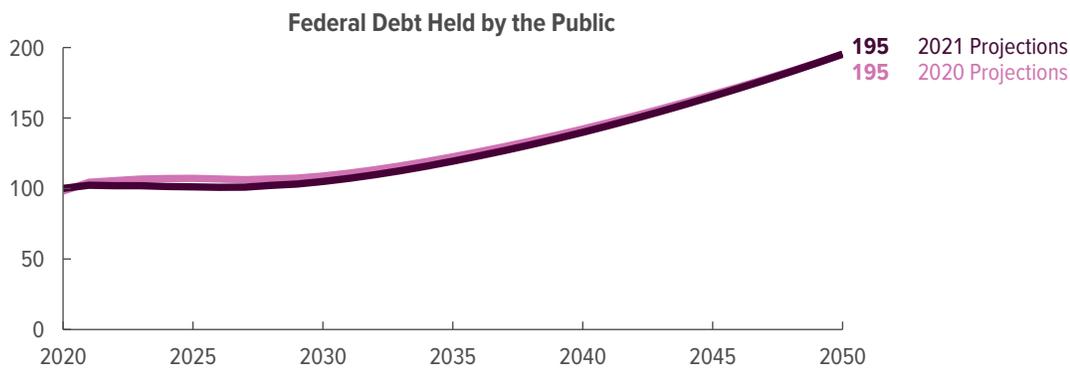
Percentage of Gross Domestic Product



In CBO's current projections, primary deficits as a percentage of GDP are generally smaller over the near term than they were in last year's projections; thereafter, primary deficits are projected to be roughly the same as they were projected to be last year.



CBO has generally decreased its projections of total deficits in the near term but has changed its projections for subsequent years only slightly.



Measured as a percentage of GDP, federal debt is now projected to be slightly lower in most years than CBO projected last year.

Data source: Congressional Budget Office. See www.cbo.gov/publication/56977#data.

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

Primary deficits exclude net spending for interest.

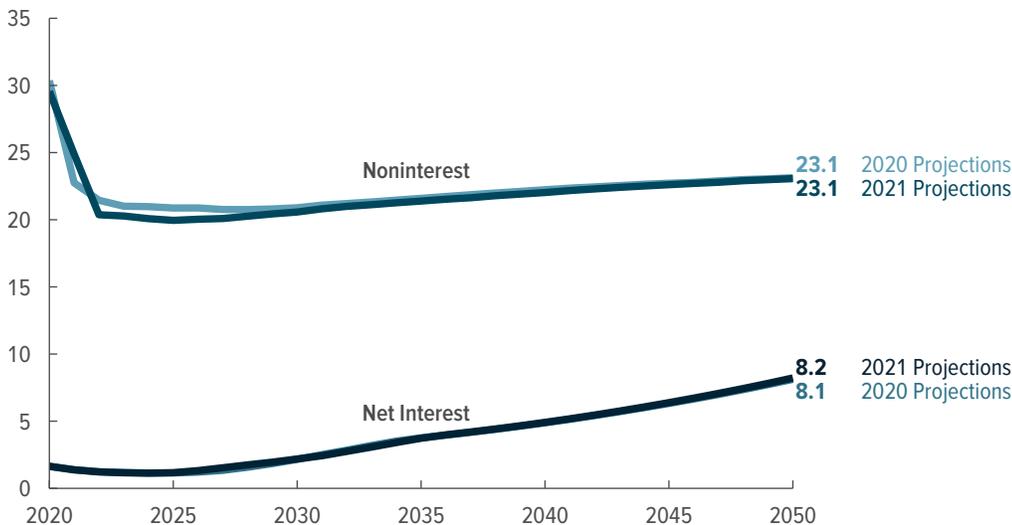
GDP = gross domestic product.



Figure B-2.

CBO's 2020 and 2021 Extended Baseline Projections of Outlays

Percentage of Gross Domestic Product



Compared with last year's projections, noninterest spending as a percentage of GDP in CBO's current extended baseline projections is generally lower in the near term and roughly the same thereafter.

Net spending for interest measured as a percentage of GDP is roughly the same as it was in last year's projections.

Data source: Congressional Budget Office. See www.cbo.gov/publication/56977#data.

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

GDP = gross domestic product.

spending, and discretionary spending—changed slightly as a share of GDP (see Table B-1).³

Net spending for interest measured as a percentage of GDP is 1.4 percent of GDP in 2021, the same as it was in last year's projections; it is roughly the same in the long term as projected last year (see Figure B-2).

Changes in Projected Revenues

Compared with last year's projections, federal revenues as a percentage of GDP in this year's projections are higher

3. Spending on the government's major health care programs consists of spending for Medicare, Medicaid, and the Children's Health Insurance Program, as well as outlays to subsidize health insurance purchased through the marketplaces established under the Affordable Care Act and related spending. Other mandatory spending includes outlays for retirement programs for federal civilian and military employees, certain programs for veterans, certain refundable tax credits, the Supplemental Nutrition Assistance Program, and all other mandatory programs aside from Social Security and the health care programs described above. Discretionary spending encompasses an array of federal activities that are funded through or controlled by appropriations. That category includes most defense spending, outlays for highway programs, and spending for many other nondefense activities, such as elementary and secondary education, housing assistance, international affairs, and the administration of justice.

in 2021 (by 0.5 percentage points), higher in the next few years, and then similar thereafter (see Figure B-3 on page 50). In the second and third decades of the projection period, the major components of total revenues—that is, individual income tax revenues, payroll tax revenues, and corporate income tax revenues—changed slightly as a share of GDP relative to CBO's projections from September 2020.

Changes in Projected Debt and Deficits

Measured as a percentage of GDP, federal debt held by the public is projected to be slightly lower in most years than the agency projected last year. In CBO's current projections, that debt rises from 102 percent of GDP in 2021 to 195 percent in 2050; last year, CBO projected that it would rise from 104 percent of GDP in 2021 to 195 percent in 2050.

Since last year, CBO's projections of primary deficits are larger in 2021, and then smaller over the near term, reducing the agency's projections of federal debt. Primary deficits are now projected to be 8.9 percent of GDP in 2021 and to average 2.8 percent of GDP from 2022 to 2031—1.7 percentage points larger in 2021 and 0.5 percentage points smaller from 2022 to 2031 than they

Table B-1.

CBO's 2020 and 2021 Projections of Revenues, Outlays, Deficits, and Federal Debt Held by the Public in Selected Years

Percentage of Gross Domestic Product

	2021	2032	2042	2050
Revenues				
Individual income taxes				
2020 projections	7.5	9.5	10.0	10.3
2021 projections	7.7	9.4	9.9	10.3
Payroll taxes				
2020 projections	5.9	5.8	5.8	5.7
2021 projections	6.0	5.8	5.7	5.7
Corporate income taxes				
2020 projections	0.6	1.2	1.2	1.3
2021 projections	0.7	1.2	1.2	1.2
Other ^a				
2020 projections	1.5	1.1	1.2	1.3
2021 projections	1.4	1.1	1.2	1.3
Total Revenues				
2020 projections	15.5	17.7	18.2	18.6
2021 projections	16.0	17.5	18.0	18.4
Outlays				
Mandatory				
Social Security				
2020 projections	5.4	6.1	6.3	6.3
2021 projections	5.2	6.1	6.2	6.3
Major health care programs ^b				
2020 projections	6.1	7.2	8.5	9.2
2021 projections	5.8	7.2	8.5	9.3
Other ^c				
2020 projections	3.7	2.2	2.1	2.0
2021 projections	6.3	2.2	2.0	1.9
Subtotal, Mandatory				
2020 projections	15.2	15.6	16.9	17.5
2021 projections	17.3	15.4	16.8	17.5

Continued

averaged over that period in last year's projections. After the first decade, primary deficits are now projected to be similar to what they were projected to be last year.

As a result of those revisions, projected total deficits as a percentage of GDP are now larger in 2021, generally smaller in the near term, and then generally similar thereafter (see Figure B-1 on page 46). In the current projections, deficits are 10.3 percent of GDP in 2021 and average 4.4 percent of GDP from 2022 to 2031—1.7 percentage points larger in 2021 and 0.5 percentage points smaller than their average over that period in last year's projections. By 2050, total deficits are now projected to be 12.8 percent of GDP, 0.2 percentage points larger than they were in last year's projections.

Changes in the Social Security Trust Funds

CBO projects that if current laws governing the Social Security program's taxes and benefits did not change, the OASI trust fund would be exhausted in calendar year 2032, and the DI trust fund would be exhausted in calendar year 2035. Those dates are later than the agency projected last September, by one year and by nine years, respectively. If the OASI and DI trust funds were combined, the projected exhaustion date would be in calendar year 2032, which is one year later than CBO projected in 2020.

Since last year, the agency has boosted its projections of income credited to the OASI trust fund by 4.4 percent

Table B-1.

Continued

CBO's 2020 and 2021 Projections of Revenues, Outlays, Deficits, and Federal Debt Held by the Public in Selected Years

Percentage of Gross Domestic Product	2021	2032	2042	2050
Discretionary				
2020 projections	7.6	5.6	5.6	5.6
2021 projections	7.6	5.6	5.5	5.5
Net interest				
2020 projections	1.4	2.8	5.4	8.1
2021 projections	1.4	2.8	5.5	8.2
Total Outlays				
2020 projections	24.1	24.0	27.9	31.2
2021 projections	26.3	23.7	27.8	31.3
Deficit				
2020 projections	-8.6	-6.3	-9.7	-12.6
2021 projections	-10.3	-6.2	-9.8	-12.8
Federal Debt Held by the Public				
2020 projections	104	113	152	195
2021 projections	102	110	150	195
Memorandum:				
Noninterest Spending				
2020 projections	22.7	21.2	22.4	23.1
2021 projections	24.9	21.0	22.3	23.1
Primary Deficit^d				
2020 projections	-7.2	-3.5	-4.2	-4.5
2021 projections	-8.9	-3.5	-4.3	-4.6

Data source: Congressional Budget Office. See www.cbo.gov/publication/56977#data.

- 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 the refundable portions of the earned income tax credit, the child tax credit, and the American Opportunity Tax Credit.
- d. Excludes net spending for interest.

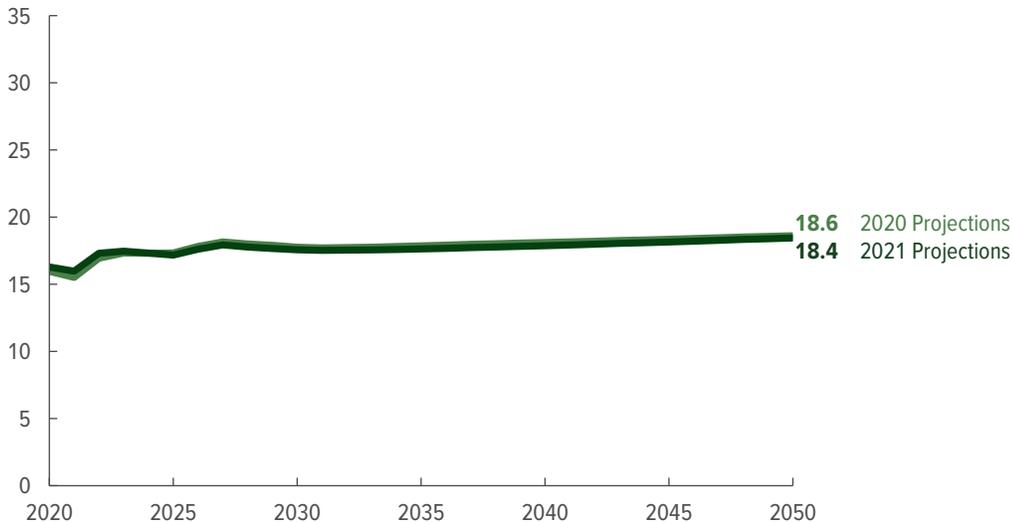
over the 2021–2032 period, mainly because of higher payroll tax revenues associated with the stronger economy reflected in the current projections. However, the agency has also increased its projected expenditures from the fund; those are now 1.3 percent higher over that period than projected last year. Those increases stem primarily from higher estimates of cost-of-living adjustments and higher projections of average wages, which offset the effect of fewer OASI beneficiaries during that period. The increases in projected income more than offset the increases in projected expenditures from the fund, leading to the later projected exhaustion date for the OASI trust fund.

In this year's projections, income credited to the DI trust fund from 2021 to 2035 is higher by 4.1 percent than the agency projected last year, primarily because of the stronger economy and higher payroll tax revenues that CBO now projects. The projected expenditures from the DI trust fund are lower from 2021 through 2035—in total, by 0.6 percent—than the agency projected last year. CBO revised those projections downward mainly because DI caseloads have been smaller than anticipated in recent months, which led the agency to reduce its projection of the number of DI beneficiaries. Those downward revisions to the number of DI beneficiaries are partially offset by higher estimates of cost-of-living adjustments and higher projections of average wages. The

Figure B-3.

CBO's 2020 and 2021 Extended Baseline Projections of Revenues

Percentage of Gross Domestic Product



In CBO's current extended baseline projections, federal revenues measured as a percentage of GDP are higher in the next few years than they were in last year's projections and similar to last year's projections thereafter.

Data source: Congressional Budget Office. See www.cbo.gov/publication/56977#data.

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

GDP = gross domestic product.

projections of increased income and decreased expenditures lead to the later projected exhaustion date for the DI trust fund.

All told, CBO's projections of income credited to the combined OASDI trust funds are 4.4 percent higher over the 2021–2032 period than they were last year, and its projections of expenditures are 1.1 percent higher. Because the increases in projected income more than offset the increases in projected expenditures, CBO now anticipates that the exhaustion date for the combined trust funds will be one year later than the agency expected last year.

Changes in the Sensitivity Analysis of CBO's Budget Projections

CBO has modified the way it varies the average interest rate on federal debt held by the public to show the

sensitivity of its budget projections to such changes. Last year, the agency projected federal debt as a share of GDP under two scenarios: In one, the average interest rate on federal debt was 1.0 percentage point higher (before accounting for macroeconomic effects) than CBO's central estimates for all years in its extended baseline projection period; in the other, the interest rate was 1.0 percentage point lower. However, deviations in the average interest rate on federal debt from the central estimate are likely to be small in the near term and to grow gradually over time. This year, the agency projects federal debt as a share of GDP under two different scenarios: In each, the federal borrowing rate is increased or lowered, respectively, by an additional 5 basis points per year (before accounting for macroeconomic effects) relative to the agency's central estimate.⁴

4. A basis point is one one-hundredth of a percentage point.

Appendix C: Assumptions and Methods Underlying CBO’s Long-Term Budget Projections

The long-term budget projections presented in this report are consistent with the 2021–2031 baseline budget projections and economic forecast that the Congressional Budget Office published in February 2021.¹ (For a summary of the assumptions about spending and revenues that underlie CBO’s extended baseline, see Table C-1.) For years beyond 2031, CBO used a model with the following four components to integrate demographic and economic changes into its long-term budget projections.²

- A *demographic model* was used to project the size of the population by age and sex.
- A *microsimulation model* was used to project annual changes in demographic characteristics and economic outcomes for a representative sample of the population.

- A *long-term budget model* was used to project federal outlays, revenues, deficits, and debt beyond CBO’s standard 10-year budget period.
- A *model of economic growth* was used to simulate how demographic changes, economic factors, and fiscal policy would affect the U.S. economy and, in turn, the federal budget.

Those four components interact in various ways. For example, the economic projections reflect how increases in spending and revenues in the extended baseline projections would affect the economy.³ In turn, the budgetary outcomes in the extended baseline projections reflect those economic effects.

1. See Congressional Budget Office, *The Budget and Economic Outlook: 2021 to 2031* (February 2021), www.cbo.gov/publication/56970.

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

3. The extended baseline projections, which generally reflect current law, follow CBO’s 10-year baseline budget projections and then extend most of the concepts underlying those projections for the rest of the long-term projection period.

Table C-1.

Assumptions About Outlays and Revenues Underlying CBO's Extended Baseline Projections

Assumptions About Outlays	
Social Security	As scheduled under current law ^a
Medicare	As scheduled under current law through 2031; thereafter, projected spending depends on the estimated growth rates of the number of beneficiaries, health care costs per beneficiary, potential GDP per person, and excess cost growth for Medicare (which is projected to move smoothly to a rate of 1 percent by 2051) ^a
Medicaid	As scheduled under current law through 2031; thereafter, projected spending depends on the estimated growth rates of the number of beneficiaries, health care costs per beneficiary, potential GDP per person, and excess cost growth for Medicaid (which is projected to move smoothly to a rate of 1 percent by 2051)
Children's Health Insurance Program	As projected in CBO's baseline through 2031; projected spending remains constant as a percentage of GDP thereafter
Subsidies for Health Insurance Purchased Through the Marketplaces	As scheduled under current law through 2031; thereafter, projected spending depends on the estimated number of beneficiaries, an additional indexing factor for subsidies, the growth of potential GDP per person, and excess cost growth for private health insurance premiums (which is projected to move smoothly to a rate of 1 percent by 2051)
Other Mandatory Spending	As scheduled under current law through 2031; 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 2026 and 2030 in the agency's baseline published in March 2020
Discretionary Spending	As projected in CBO's baseline through 2031; beyond that year, CBO assumes that, after a five-year transition period, discretionary spending would grow at the rate of nominal GDP
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 ^b
Estate and Gift Taxes	As scheduled under current law
Other Sources of Revenues	As scheduled under current law through 2031; remain constant as a percentage of GDP thereafter

Data source: Congressional Budget Office.

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

For CBO's most recent 10-year baseline projections, see Congressional Budget Office, *The Budget and Economic Outlook: 2021 to 2031* (February 2021), www.cbo.gov/publication/56970.

Excess cost growth is the extent to which the growth rate of nominal health care spending per person (adjusted to remove the effects of demographic changes) 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 scheduled under current law, regardless of the amounts in the program's trust funds.
- b. 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.

List of Tables and Figures

Tables

1. Key Projections in CBO's Extended Baseline	7
A-1. Average Annual Values for Demographic Variables That Underlie CBO's Extended Baseline Projections	30
A-2. Average Annual Values for Economic Variables That Underlie CBO's Extended Baseline Projections	34
B-1. CBO's 2020 and 2021 Projections of Revenues, Outlays, Deficits, and Federal Debt Held by the Public in Selected Years	48
C-1. Assumptions About Outlays and Revenues Underlying CBO's Extended Baseline Projections	52

Figures

1. Federal Debt Held by the Public, 1900 to 2051	6
2. Total Deficits, Primary Deficits, and Net Interest	8
3. Outlays and Revenues	9
4. Population, by Age Group	15
5. Average Annual Growth of Real Potential GDP	16
6. Composition of Federal Outlays	18
7. Outlays and Revenues in Selected Years	19
8. Federal Outlays for the Major Health Care Programs, by Category	20
9. Outlays for Social Security and the Major Health Care Programs in 2019 and 2051	21
10. Other Federal Noninterest Outlays	23
11. Changes in Revenues	25
12. Shares of Income Taxed at Different Rates Under the Individual Income Tax System	26
13. Federal Debt If Total Factor Productivity Growth or Interest Rates Differed From the Values Underlying CBO's Projections	27
A-1. Demographic Factors That Contribute to Population Growth	33
B-1. CBO's 2020 and 2021 Extended Baseline Projections of Deficits and Federal Debt Held by the Public	46
B-2. CBO's 2020 and 2021 Extended Baseline Projections of Outlays	47
B-3. CBO's 2020 and 2021 Extended Baseline Projections of Revenues	50

About This Document

This volume is one of a series of reports on the state of the budget and the economy that the Congressional Budget Office issues each year. In keeping with CBO's mandate to provide objective, impartial analysis, the report makes no recommendations.

Overseen by Molly Dahl and prepared with guidance from Devrim Demirel, Edward Harris, Joseph Kile, John Kitchen, John McClelland, Julie Topoleski, and Jeffrey Werling, the report represents the work of many analysts at CBO. Jordan Trinh prepared the visual summary. Daniel Crown prepared the main text, in collaboration with Aaron Betz and with contributions from Kathleen Burke, Xinzhe Cheng, Edward Gamber, John Kitchen, Kyoung Mook Lim, Robert Shackleton, and Jordan Trinh. Daniel Crown coordinated work on Appendix A, in collaboration with Aaron Betz and with contributions from Yiqun Gloria Chen, Terry M. Dinan, Edward Gamber, Evan Herrnstadt, Kyoung Mook Lim, Jeffrey Schafer, and Robert Shackleton. Xinzhe Cheng prepared Appendix B and Appendix C, with contributions from Kathleen Burke. Barry Blom, Stuart Hammond, Lori Housman, Noah Meyerson, Eamon Molloy, Lisa Ramirez-Branum, Dan Ready, Sarah Sajewski, Emily Stern, and Robert Stewart contributed to the analysis in this report, with guidance from Christina Hawley Anthony, Chad Chirico, Sheila Dacey, Paul Masi, and Sam Papenfuss.

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Mark Doms, Jeffrey Kling, and Robert Sunshine reviewed the report. Scott Craver, Loretta Lettner, Bo Peery, and Elizabeth Schwinn were the editors, and Robert Rebach was the graphics editor. Xinzhe Cheng, Daniel Crown, and Jordan Trinh prepared the supplemental data. The report is available on CBO's website (www.cbo.gov/publication/56977).

CBO continually seeks feedback to make its work as useful as possible. Please send any comments to communications@cbo.gov.



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Director
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