The Uncertainty of Long-Term Budget Projections

Budget projections are inherently uncertain. The projections in this report generally reflect current law and estimates of future economic conditions and demographic trends. If future spending and tax policies differ from what is prescribed in current law, budgetary outcomes will differ from those in the Congressional Budget Office's extended baseline, as the preceding chapter shows. But even if policies do not change, the economy, demographics, and other factors will undoubtedly differ from what CBO projects, and those differences will in turn cause budgetary outcomes to deviate from the projections in this report. Those variations could be within the ranges of experience observed in the relevant historical data—which, for the factors that CBO analyzes, cover roughly the past 50 to 70 years—or they might deviate from historical experience. Moreover, there could be significant budgetary effects from channels that CBO does not currently take into account in its estimates.

To illustrate some of the uncertainty about long-term budgetary outcomes, CBO constructed alternative projections showing what would happen to the budget if various underlying factors differed from the values that are used in most of this report. The agency focused on four factors that are among the most fundamental and yet most uncertain inputs into the agency's long-term economic and budget projections. Specifically, CBO quantified the consequences of alternative paths for the following variables:

■ The decline in mortality rates;

■ The growth rate of total factor productivity (that is, the efficiency with which labor and capital are used to produce goods and services; it is often referred to in this chapter simply as productivity);

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

■ The growth rate of federal spending per beneficiary for Medicare and Medicaid.

Different paths for those four factors would affect the budget in various ways. For example, lower-than-projected mortality rates would mean longer average life spans, which would increase the number of people who received benefits from such programs as Social Security, Medicare, and Medicaid; lower mortality rates would also boost the size of the labor force and thereby add to tax revenues (but by less than the increase in benefit costs). Faster growth in spending per beneficiary for Medicare and Medicaid would boost outlays for those two programs. Either of those changes would increase deficits and debt—which would lead to lower output and higher interest rates, macroeconomic feedback that would further worsen the budget outlook.[1] By contrast, faster growth in productivity or lower interest rates on federal debt held by the public would reduce deficits and debt—the former, by raising output and increasing revenues, and the latter, by lowering the government's interest payments.

The projected budgetary outcomes under the alternative paths differ widely. The simulated variations in productivity, interest rates, and Medicare and Medicaid spending have large effects on the budget within 25 years, whereas the simulated variation in mortality rates does not. When only one of the factors is changed, CBO's projections of federal debt held by the public in 2040 range from

---

1. In cases in which projected budget deficits are larger than those in the extended baseline, output would be lower, leading to lower revenues (under current tax law), less spending on Social Security (because lower earnings result in smaller benefits), and less federal spending on Medicare and Medicaid (according to CBO's standard approach to projecting long-term cost growth, which is described in Chapter 2). However, CBO assumes that other federal noninterest spending would remain at the amounts in the extended baseline even if output deviated from the amounts underlying that baseline.

89 percent of gross domestic product (GDP) to 130 percent, whereas it is projected to be 107 percent under the extended baseline with macroeconomic feedback.[2] When all four factors are changed at once, projections of federal debt in 2040 range from 76 percent to 144 percent of GDP. Those projected levels of debt are all high by historical standards, and a number of them exceed the peak of 106 percent of GDP that the United States reached in 1946.

The four factors listed above are not the only ones that could differ from CBO's expectations and, in turn, affect the agency's budget projections. For example, an increase in the birth rate or in labor force participation could boost the growth of the labor force and thus raise tax revenues. Similarly, decisions by states about how much they spend on Medicaid could increase or decrease federal spending relative to CBO's projections.

Large disruptions in the economy could have significant effects on the budget that are not quantified in this analysis. The analytic approach that CBO used for this long-term analysis focuses on projecting average outcomes. An economic depression, unexpectedly large losses on federal financial obligations, a large-scale military conflict, the development of a previously underused natural resource, or a major catastrophe—to give just a few examples—could create conditions in the next 25 years that are substantially better or worse than those that produced the historical data on which the analysis is based.

Policymakers could address the uncertainty associated with long-term budget projections in various ways. For instance, they might design policies that partly insulated the federal budget from some unanticipated events; however, such policies could have unwanted consequences, such as shifting risk to individuals. Another possibility is that policymakers might aim for a smaller amount of federal debt to provide a buffer against the budgetary impact of adverse surprises and allow for more flexibility in responding to unexpected crises in the future.

Long-Term Budgetary Effects of Changes in Mortality, Productivity, Interest Rates on Federal Debt, and Federal Spending on Medicare and Medicaid

Budgetary outcomes could differ from CBO's projections if mortality rates, the growth rate of productivity, interest rates on government debt, or the growth of federal spending on Medicare and Medicaid diverged from the paths that underlie the extended baseline projections in this report. Unexpected changes in mortality rates would gradually lead to changes in spending for Social Security, Medicare, and Medicaid. Changes in productivity would lead to changes in economic output, which would affect both revenues and spending. Changes in the interest rates on federal debt would affect the amount of interest paid by the government. And changes in the growth rate of federal health care spending, one of the largest components of the budget, would have significant implications for overall federal spending.

For CBO's alternative projections, the ranges of variation for those four factors were based on the historical variation in their 25-year averages as well as on consideration of possible future developments, which together offer a guide (though admittedly an imperfect one) to the amount of uncertainty that surrounds projections of those factors over the next 25 years. To better capture overall uncertainty, CBO also constructed two projections in which all four factors simultaneously varied from their values under the extended baseline. In one of those cases, all of the factors varied in ways that increased the amount of federal debt; in the other, they varied in ways that reduced the amount of the debt.[3]

Under the projections of those four factors that are used in CBO's extended baseline, federal debt held by the

---

2. As Chapter 6 explains, that version of the extended baseline incorporates the macroeconomic effects of the fiscal policies in the extended baseline and, in turn, the feedback of those effects to the federal budget. As a result, the economic and budget projections in the extended baseline with macroeconomic feedback differ somewhat from those presented in the first five chapters of this report.

3. Another approach to quantifying the uncertainty of budget projections would be to create a distribution of outcomes from a large number of simulations in which such factors as productivity growth, interest rates, and the rate of increase of health care costs varied. CBO generally uses that approach in its reports on the financial outlook for the Social Security trust funds. See Congressional Budget Office, *CBO's 2014 Long-Term Projections for Social Security: Additional Information* (December 2014), www.cbo.gov/publication/49795, and *Quantifying Uncertainty in the Analysis of Long-Term Social Security Projections* (November 2005), www.cbo.gov/publication/17472. However, determining the appropriate variation in those factors and estimating the distribution of outcomes for the federal budget as a whole requires additional modeling tools that CBO has not yet developed.

public would equal 107 percent of GDP in 2040 (including macroeconomic feedback). Alternative projections of the factors would lead to the following outcomes:

■ If mortality rates declined 0.5 percentage points per year more slowly or more quickly than they do in CBO's extended baseline, federal debt held by the public in 2040 would be 106 percent of GDP or 109 percent of GDP, respectively.

■ If productivity grew 0.5 percentage points per year more quickly or more slowly than it does in CBO's extended baseline, federal debt held by the public in 2040 would be 91 percent of GDP or 125 percent of GDP, respectively.

■ If the average interest rate on government debt was 0.75 percentage points lower or higher than that in CBO's extended baseline, federal debt held by the public in 2040 would be 89 percent of GDP or 130 percent of GDP, respectively.

■ If spending per beneficiary for Medicare and Medicaid grew 0.75 percentage points per year more slowly or more quickly than it does in CBO's extended baseline, federal debt held by the public in 2040 would be 89 percent of GDP or 129 percent of GDP, respectively.

■ If all four factors deviated from their baseline values in ways that reduced deficits but did so by only 60 percent as much as in the cases specified above, federal debt held by the public in 2040 would be 76 percent of GDP; if all four factors deviated in ways that increased deficits but did so by only 60 percent as much as in the cases specified above, federal debt held by the public would be 144 percent of GDP.[4]

Mortality

Mortality rates measure the number of deaths in a given year per thousand people in a population. Faster improvement in age-specific mortality rates would mean people of all ages would be expected to live longer, which would

increase the number of people who received benefits from—and thus outlays for—Social Security, Medicare, Medicaid, and certain other mandatory spending programs.[5] Changes in mortality rates would also affect the budget by changing the size of the labor force and thereby changing tax revenues; specifically, CBO projects that the average person would work three more months for each additional year of life expectancy, slightly increasing overall labor force participation (see Appendix A).

Mortality rates have declined steadily over the past half century, and CBO expects that decline to continue. Just how steep that future decline will be, however, is quite uncertain. CBO therefore constructed projections covering a 1 percentage-point range (see Figure 7-1). The agency arrived at that range by comparing the average annual change in mortality rates for the 45 25-year periods that began each year from 1942 (the 1942–1966 period) to 1986 (the 1986–2010 period). The average annual change varied by about the same amount— roughly 1 percentage point—for men and for women.[6] Applying that 1 percentage-point range around the 1.2 percent rate used in CBO's extended baseline resulted in rates of decline ranging from 0.7 percent per year to 1.7 percent per year. If the rate of decline was within that range, life expectancy for 65-year-olds would be between 85.8 years and 87.9 years in 2040, whereas under the extended baseline, it would be 86.8 years in 2040; it is 84.5 years today.

Those alternative projections for the decline in mortality rates would lead to the following alternative budget projections:
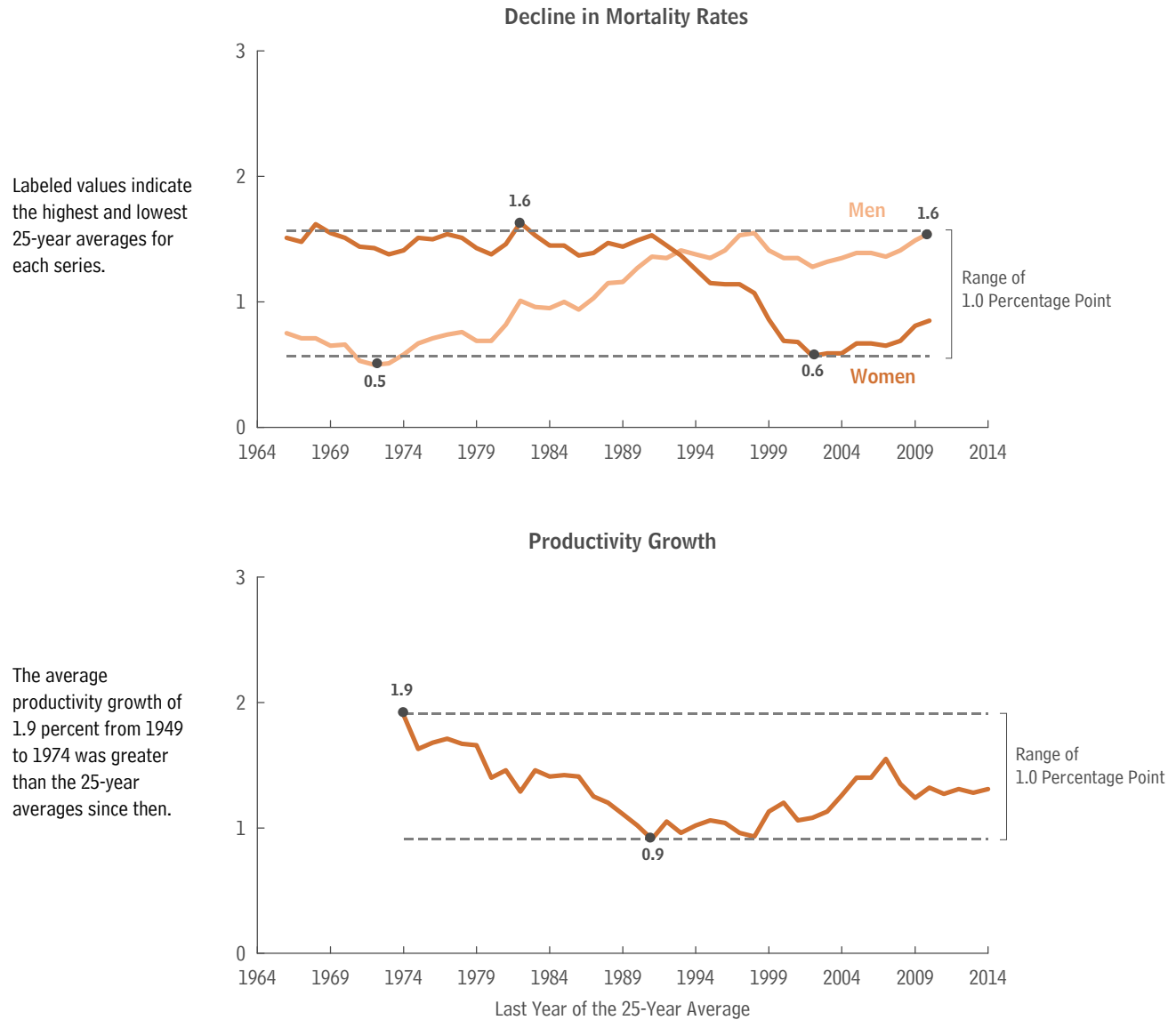
---

4. According to CBO's analysis of the historical data, joint variation to that extent yields outcomes for federal debt that are about as likely as the outcomes when an individual factor changes to the full extent of its range.

5. If an increase in life expectancy was accompanied by a gain in the average number of years that elderly people spend in good health, Medicare and Medicaid spending for elderly beneficiaries would not necessarily increase with the growth in the elderly population.

6. The rate of decline in *aggregate* mortality—that is, the rate for men and women combined—exhibited substantially less variation than the decline in mortality rates for men and women separately. From 1950 through 1980, the mortality rate for women declined faster than the mortality rate for men; after 1980, the mortality rate for men declined faster than the mortality rate for women. (That difference resulted in part from changes in smoking rates over time for men and for women.) In CBO's assessment, the variations in the declines of the mortality rates of men and women considered separately are more representative of the uncertainty in mortality rates over the next 25 years.

Figure 7-1.

The 25-Year Averages and Ranges CBO Used for Four Factors Affecting Budgetary Outcomes

Percentage Points

Decline in Mortality Rates

Labeled values indicate the highest and lowest 25-year averages for each series.

Productivity Growth

The average productivity growth of 1.9 percent from 1949 to 1974 was greater than the 25-year averages since then.

Last Year of the 25-Year Average

Sources: Congressional Budget Office; Social Security Administration; Federal Reserve.

Notes: The 25-year average for a given year is the average of the data value for that year and the values for the preceding 24 years. For example, the 25-year average for productivity growth in 1974 is the average of the growth of productivity from 1949 through 1974.

The decline in the mortality rate is the decline in the number of deaths per thousand people in a population in a given year.

Productivity growth is the growth in total factor productivity, which is the efficiency with which labor and capital are used to produce goods and services.

The spread between private and government borrowing rates is the difference between the interest rate on Baa-rated corporate bonds and on 10-year Treasury notes.
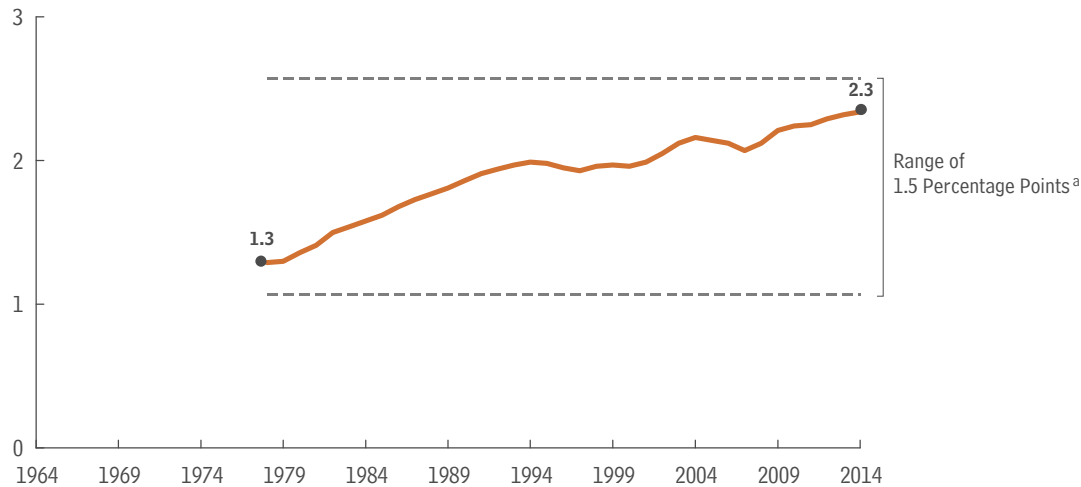
Continued

Figure 7-1.   **Continued**
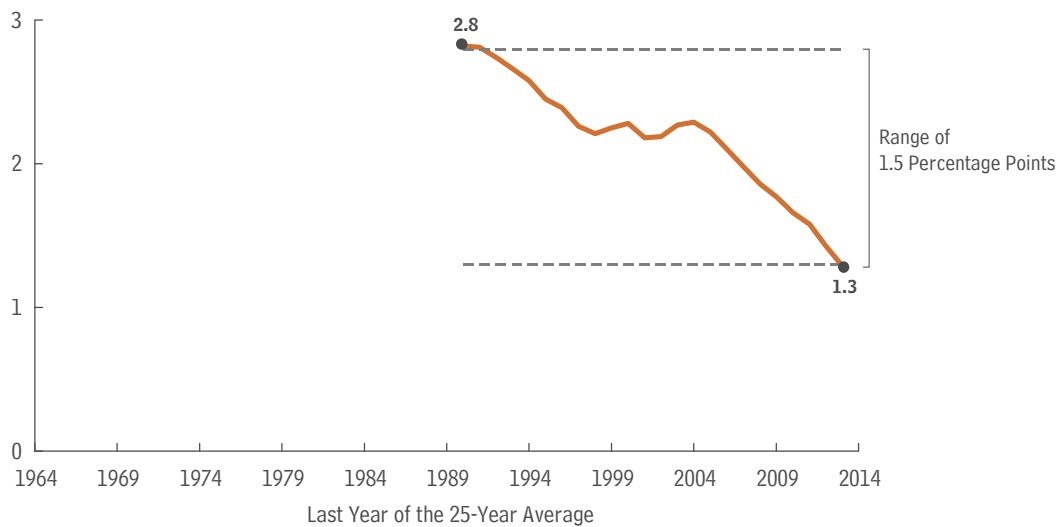
The 25-Year Averages and Ranges CBO Used for Four Factors Affecting Budgetary Outcomes

Percentage Points

Spread Between Private and Government Borrowing Rates

Excess Cost Growth for Total Spending on Health Care*

Last Year of the 25-Year Average

Excess cost growth refers to the extent to which the annual growth rate of nominal health care spending per capita—adjusted for demographic characteristics of the relevant populations—outpaces the annual growth rate of potential (maximum sustainable) output per capita. The historical rates of excess cost growth are a weighted average of annual rates: Twice as much weight is placed on the latest year as on the earliest year.

Time periods reflect data availability.

a. To account for various sources of uncertainty as well as for other factors that may not be fully represented by the particular measure of the spread used and the historical time period analyzed, CBO expanded the range of uncertainty used for this analysis from the 1.0 percentage point suggested by the historical data to 1.5 percentage points.

[* Panel heading corrected on July 1, 2015]

Figure 7-2.

Federal Debt Given Different Rates of Mortality Decline

Percentage of Gross Domestic Product
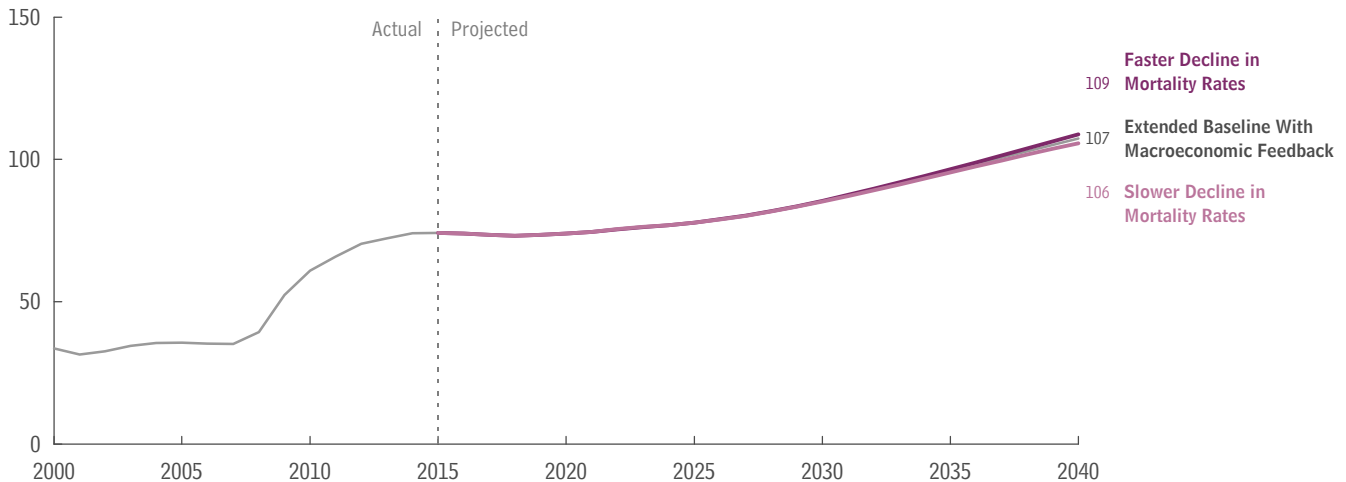
Source: Congressional Budget Office.

Notes: The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2025 and then
extending the baseline concept for the rest of the long-term projection period.

The faster decline in the mortality rates is 0.5 percentage points higher—and the slower decline in the mortality rates is
0.5 percentage points lower—than the annual decline of 1.2 percent used in the extended baseline with macroeconomic feedback.

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

■ If mortality rates declined by 0.7 percent a year—that is, 0.5 percentage points more slowly than the rate used in the extended baseline—outlays for Social Security, Medicare, and Medicaid would be lower. That would lead to less federal debt held by the public—specifically, debt would equal 106 percent of GDP in 2040 rather than the 107 percent that CBO projects under the extended baseline with macroeconomic feedback (see Figure 7-2). In addition, the estimated changes in spending or revenues needed to keep federal debt held by the public at its current level of 74 percent of GDP over the 25-year period—the fiscal gap—would be slightly smaller than CBO projects under the extended baseline, but they would round to the same 1.1 percent of GDP.[7] Although those differences are relatively small in 2040, they would grow substantially over time as the effect on mortality rates compounded and average life spans fell increasingly below those incorporated in the baseline.

■ In contrast, if mortality rates declined by 1.7 percent a year, or 0.5 percentage points more quickly than in the extended baseline, outlays for the same three programs would be higher, resulting in federal debt held by the public that reached 109 percent of GDP in 2040. The 25-year fiscal gap would rise to 1.2 percent of GDP.

Productivity

Total factor productivity is an important determinant of economic output. Its growth stems from the introduction and spread of new technological approaches, from increases in workers' education and skill levels, and from

7. For a discussion of how CBO measures the fiscal gap, see Chapter 1. The estimates of the fiscal gap presented in this chapter, like those in Chapter 1, are calculated without macro-economic feedback. It would not be informative to include the negative economic effects of rising debt (and their feedback to the budget) in the fiscal gap calculation because the fiscal gap shows the budgetary changes required to keep debt from rising in the first place; if those budgetary changes were made, the negative economic effects (and their feedback to the budget) would not occur.

the use of new processes that improve the efficiency of organizations.[8] CBO estimates that the growth of total factor productivity, which has averaged 1.4 percent per year since 1950, has accounted for over 40 percent of the increase in real (inflation-adjusted) nonfarm business output over that time. CBO's extended baseline incorporates the projection that such productivity will increase, on average, by 1.3 percent per year in the coming decades.

However, the growth rate of total factor productivity has often varied for extended periods. Periods of rapid growth have generally resulted from major technological innovations. For example, innovations in four critical areas—electricity generation, internal combustion engines, chemicals, and telecommunications—triggered a surge in productivity in the 1920s and 1930s. Another surge occurred in the 1950s and 1960s, spurred by the electrification of homes and workplaces, suburbanization, completion of the nation's highway system, and production of consumer appliances. The latest surge in productivity—a more modest one—began in the 1990s and is attributed to innovations involving computers and other types of information technology.[9] Productivity growth has been relatively weak since the 2007–2009 recession, largely because of the cyclical weakness in the economy that is expected to continue to dissipate over the next few years.

The future growth rate of productivity is quite uncertain. The nation could experience faster growth in productivity than is reflected in CBO's extended baseline, either steadily (from ongoing gains from, for example, integrating information technology into the economy) or in a burst (from a technological breakthrough, such as the development of a new source of energy). Conversely, the growth of productivity could be slower than in CBO's extended baseline if the rate of increase in workers' education levels declined or if technological innovation or the dispersion of previous technological innovations throughout the economy diminished. For example, although CBO projects that productivity

growth will improve once the economy fully recovers, the 2007–2009 recession and slow recovery have weakened productivity for an extended period. If the continued weakness indicates that the effects of the recession will last longer than CBO projected, productivity growth over the longer term could be weaker than is reflected in the extended baseline.

A different growth rate for productivity would affect the federal budget by changing output and income and also, in CBO's assessment, by changing the interest rates paid by the federal government. Higher total factor productivity means that capital is more productive, which implies a higher rate of return from private capital investment, all else being equal. According to widely used economic models, if productivity grows faster, that rate of return remains higher over time. Because the federal government competes with private borrowers for investors' money, higher returns from private investment should push up interest rates paid by the federal government. Although empirical estimates of the relationship between productivity growth and interest rates vary, the theoretical relationship is clear enough for CBO to incorporate an effect on interest rates into this analysis.[10]

Average productivity growth during the 41 25-year periods beginning with the 1950–1974 period and ending with the 1990–2014 period varied by about 1 percentage point (see Figure 7-1 on page 94). CBO therefore projected economic and budgetary outcomes if total factor productivity grew by either 0.8 percent or 1.8 percent per year over the next 25 years—that is, 0.5 percentage points more slowly or more quickly than the 1.3 percent per year incorporated in the extended baseline.[11]

---

8. Total factor productivity is different from labor productivity, which measures the amount of goods and services that can be produced per hour of labor.

9. For further discussion, see Robert Shackleton, *Total Factor Productivity Growth in Historical Perspective*, Working Paper 2013-01 (Congressional Budget Office, March 2013), www.cbo.gov/publication/44002.

10. For example, in the Solow-type growth model that CBO used for this analysis, if productivity grew 0.5 percentage points more quickly than in the extended baseline with macroeconomic feedback, the average interest rate on federal debt held by the public in 2040 would be about 1 percentage point higher than the baseline value. For details of that model, see Congressional Budget Office, *CBO's Method for Estimating Potential Output: An Update* (August 2001), www.cbo.gov/publication/13250.

11. For another approach to measuring uncertainty in long-run projections of productivity growth, see Ulrich K. Müller and Mark W. Watson, *Measuring Uncertainty About Long-Run Predictions* (draft, Princeton University, September 2014), http://tinyurl.com/nl9bzws (PDF, 3 MB). Müller and Watson's approach yields a range of uncertainty around productivity growth that is similar in size to the range that CBO calculated.

Figure 7-3.

Federal Debt Given Different Rates of Productivity Growth

Percentage of Gross Domestic Product
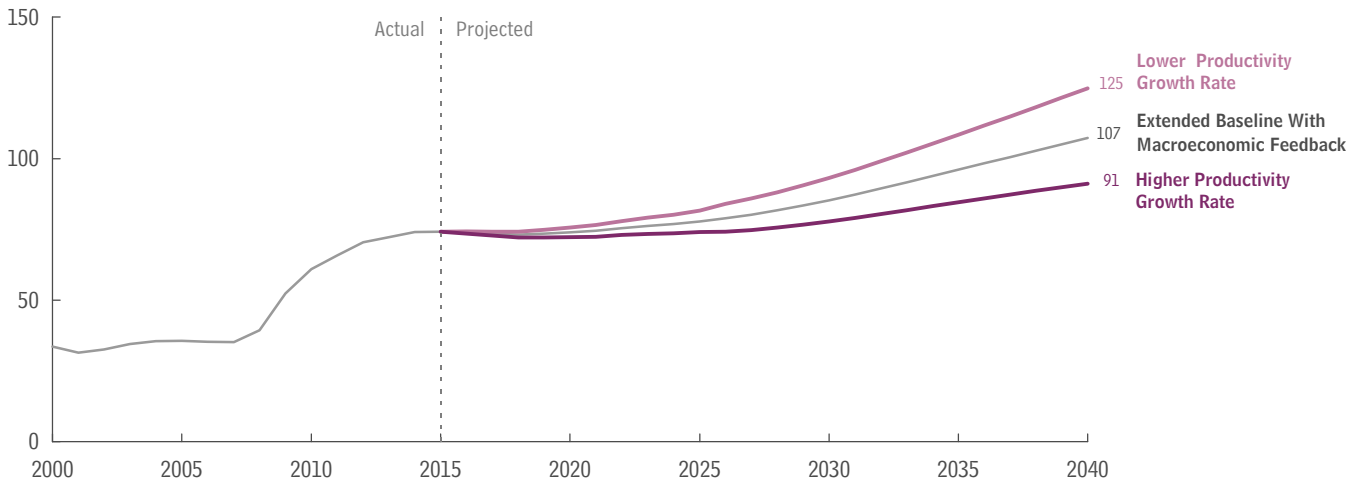
Source: Congressional Budget Office.

Notes: The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2025 and then
          extending the baseline concept for the rest of the long-term projection period.

          The lower productivity growth rate is 0.5 percentage points lower—and the higher productivity growth rate is 0.5 percentage points
          higher—than the annual rate of 1.3 percent used in the extended baseline with macroeconomic feedback.

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

Those alternative projections for total factor productivity growth would lead to the following alternative budget projections:

■ If total factor productivity grew by 1.8 percent annually, 0.5 percentage points more quickly than in the baseline, then the greater GDP would result in more revenue, smaller budget deficits, and less federal debt. Federal debt held by the public would be 91 percent of GDP in 2040 rather than the 107 percent that CBO projects under the extended baseline with macroeconomic feedback (see Figure 7-3). The 25-year fiscal gap would be 0.8 percent of GDP rather than the 1.1 percent that CBO projects under the extended baseline.

■ If productivity grew by 0.8 percent annually, 0.5 percentage points more slowly than in the baseline, the slower economic growth would result in less revenue, bigger budget deficits, and more debt. That debt would be 125 percent of GDP in 2040.

The 25-year fiscal gap would rise to 1.5 percent of GDP.

Faster or slower productivity growth could also affect the budget in ways that are not accounted for in this analysis—for example, by changing the shares of the nation's income received by workers (as wages and salaries, for instance) and by the owners of capital (as corporate profits, for instance). In recent years, technological change appears to have affected productivity in ways that put downward pressure on labor's share (for example, by expanding options for using capital in place of labor), a trend that some economists believe will be long-lasting.[12] In addition, some types of ongoing technological change appear to be intensifying wage inequality.[13] Such shifts in

12. For further discussion, see Congressional Budget Office, *How CBO Projects Income* (July 2013), www.cbo.gov/publication/ 44433.

13. For further discussion, see Congressional Budget Office, *The Distribution of Household Income and Federal Taxes, 2011* (November 2014), www.cbo.gov/publication/49440.

the distribution of income could significantly affect tax revenues and spending for some programs (such as Social Security); whether they would have a large net effect on the federal budget overall is unclear.

Interest Rates on Federal Debt

Interest rates affect the budget by changing the interest payments that the federal government makes on debt held by the public. Interest rates are currently at historic lows, but CBO projects that they will rise over the next few years and return to levels closer to their long-run averages. As a result, interest payments on federal debt held by the public, which are currently a little over 1 percent of GDP, are projected to grow to about 3 percent of GDP by 2025, even though federal debt as a percentage of GDP is projected to be only slightly larger in that year than it is currently.

However, given how much interest rates on government debt have varied in the past, projections of those rates involve a great deal of uncertainty. CBO estimates that the real interest rate on 10-year Treasury notes (that is, the rate adjusted to exclude the effects of inflation) averaged about 3 percent during the 1960s, about 1 percent during the 1970s, about 5 percent during the 1980s, about 4 percent during the 1990s, about 2 percent between 2000 and 2007, and about 1 percent during the past seven years.[14]

CBO's long-term projection of interest rates takes into account economic and financial factors such as the amount of federal debt, the rate of growth of the labor force, the rate of growth of productivity, private saving, and the amount of inflows of capital from foreign investors (see Appendix A). Different projections of those factors would imply different projections of interest rates. For example, as explained above, faster productivity growth implies higher interest rates, all else being equal. But many of the economic and financial factors that affect interest rates also affect the budget in other ways— for instance, faster productivity growth leads to faster income growth and higher revenues—and those additional effects complicate the relationship between interest rates and the budget.[15]

To isolate the budgetary effect of changes to the interest rate that the federal government pays on debt held by the public, CBO analyzed uncertainty in its projection of the difference (called the spread) between the federal government's borrowing rates and private borrowing rates. For any given level of private borrowing rates, changes to that spread affect the rate at which the federal government borrows but do not usually have significant direct effects on economic conditions or on the federal budget apart from interest payments.

The conditions that have historically determined the spread between the government's borrowing rates and private borrowing rates include portfolio preferences among U.S. and foreign investors, the perception of the underlying risk of private securities relative to federal debt, the response of financial institutions to regulations that require the holding of low-risk assets, and the liquidity of federal debt relative to that of private securities. For example, the difference between the rates of interest on 10-year Treasury notes and on highly rated corporate bonds rose from the 1990s to the 2000s as investors became more averse to risk in the wake of the sharp stock market drop of the early 2000s; even after the economy recovered, the difference remained larger than it had been before the drop.

To find a guide to the uncertainty surrounding the spread between government borrowing rates and private borrowing rates, CBO examined the average spread between the interest rate on 10-year Treasury notes and the interest rate on a large class of corporate debt (specifically, an index of corporate debt with a credit rating of Baa) during the 25-year periods beginning with the 1954–1978 period and ending with the 1990–2014 period. That spread varied over those periods by about 1 percentage point (see Figure 7-1 on page 94). However, the historical averages do not reflect certain sources of uncertainty about spreads in the future. For one thing, estimates of the risk premium—the additional return that investors require to hold assets that are riskier than Treasury securities—have been quite volatile in recent years, so more distant history may be a poor guide to the future premium. For another, although private and foreign investors alike have been eager to invest in risk-free U.S. assets in recent

---

14. To calculate historical real interest rates, the actual rates were adjusted using changes in the consumer price index. Past values of the consumer price index were adjusted to account for changes over time in how that index measures inflation.

15. In addition, many economic and financial factors that affect the government's borrowing rate also affect interest rates in the private sector, which in turn affect private capital investment and thus income and output.

Figure 7-4.

Federal Debt Given Different Interest Rates

Percentage of Gross Domestic Product
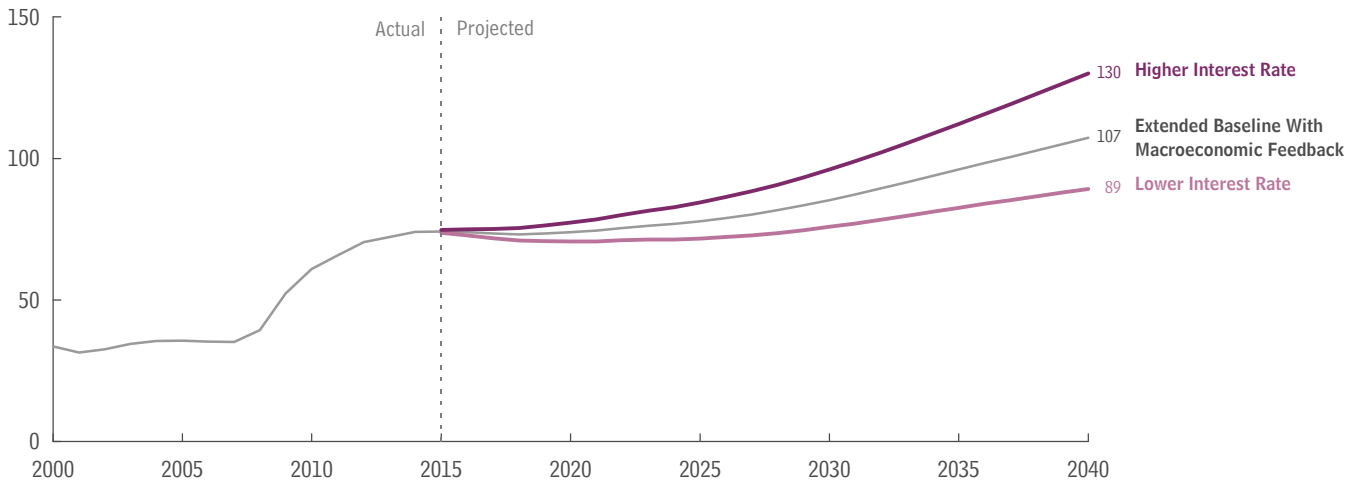
Source: Congressional Budget Office.

Notes: The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2025 and then extending the baseline concept for the rest of the long-term projection period.

The higher interest rate is 0.75 percentage points higher—and the lower interest rate is 0.75 percentage points lower—than the rate used for each year in the extended baseline with macroeconomic feedback.

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

years, those investors may change their preferences as financial markets in emerging economies continue to develop and become more attractive. Furthermore, the effect that the regulatory changes that were enacted in response to the 2007–2009 financial crisis will have on investors' demand for corporate and federal debt remains very uncertain. To account for those sources of uncertainty as well as for other factors that may not be fully represented by the particular measure of the spread used and the historical period analyzed, CBO expanded the range of uncertainty used for this analysis from the 1.0 percentage point suggested by the historical data to 1.5 percentage points.[16]

Those alternative projections for the interest rate on federal debt held by the public would lead to the following alternative budget projections:

■ If the spread between the government and private borrowing rates was 0.75 percentage points larger than the average incorporated in the baseline—resulting in a lower government borrowing rate—but the economy was otherwise the same, then net interest would equal 3.2 percent of GDP by 2040 instead of the 4.7 percent projected in the extended baseline with macroeconomic feedback.[17] Federal debt held by the public would be 89 percent of GDP in 2040 rather than the 107 percent that CBO projected in that baseline (see Figure 7-4). The 25-year fiscal gap

16. For the extended baseline with macroeconomic feedback, CBO projects that the federal government's nominal borrowing rate wil average 3.9 percent between 2015 and 2040. If the spread between government and private borrowing rates was within the 1.5 percentage-point range of uncertainty, then after accounting for macroeconomic feedback, the government's nominal borrowing rate would be expected to be between 3.1 percent and 4.8 percent, on average, over that period.

17. The estimated effects on budget projections of changes in the government's borrowing rates do not incorporate any changes in remittances by the Federal Reserve or in the relative amounts of different types of taxable income (for example, profits and interest income). Such changes would have additional budgetary implications.

would be 0.6 percent of GDP rather than the 1.1 percent that CBO projects under the extended baseline.[18]

■ If the spread between the government and private borrowing rates was 0.75 percentage points smaller than the average incorporated in the baseline but the economy was otherwise the same, then net interest would equal 6.9 percent of GDP in 2040, and federal debt held by the public would be projected to reach 130 percent of GDP. The 25-year fiscal gap would rise to 1.6 percent of GDP.

Federal Spending on Medicare and Medicaid

The federal government pays for health care through Medicare, Medicaid, subsidies for insurance purchased through the exchanges established under the Affordable Care Act, and other programs as well as through tax preferences, especially the exclusion for employment-based health insurance.[19] In CBO's extended baseline, federal spending on health care per beneficiary increases more slowly in the future than it has, on average, in recent decades, though it still substantially outpaces the growth of potential (that is, maximum sustainable) output per capita. But the future growth of health care costs is quite uncertain, and it is consequently a significant source of budgetary uncertainty. CBO assesses the effects of uncertainty in the future growth of health care costs on the federal budget by varying the growth rate of costs in the two largest components of federal spending on health care, Medicare and Medicaid.

Many factors will affect Medicare and Medicaid spending per beneficiary in the long term (for further discussion, see Chapter 2). One of them is the extent to which advances in health care technology raise or lower costs. New medical procedures or treatments may prove more effective in helping patients, which could lower costs.

However, such procedures and treatments are often very expensive; even services that are relatively inexpensive could make spending rise quickly if ever-growing numbers of patients used them.[20] Other factors that could affect health care costs are changes in the structure of payment systems and innovations in the delivery of health care.

In addition, Medicare and Medicaid spending will be affected by the health of the population. Outlays for Medicare and Medicaid depend in part on the prevalence of certain medical conditions—cardiovascular and pulmonary diseases, diabetes, arthritis, and depression, for example—among beneficiaries. The prevalence of such conditions could evolve in unexpected ways for various reasons, including changes in behavior (for example, in smoking rates, levels of physical activity, or dietary patterns), new treatments for various illnesses, new medical interventions that reduced the occurrence or severity of certain conditions or diseases, and the emergence of epidemics.

The measure that CBO examined for this analysis of uncertainty was excess cost growth—that is, the difference between the growth rate of health care spending per capita and the growth rate of potential output per capita.[21] In the 25-year periods starting with the 1966–1990 period and ending with the 1989–2013 period, excess cost growth for the health care system as a whole varied by about 1.5 percentage points (see Figure 7-1 on page 94). CBO used a 1.5 percentage-point range of variation and analyzed the effects of rates of excess cost growth for Medicare and Medicaid that were 0.75 percentage points above and below the rate of growth for each year in the extended baseline.[22] (CBO focused on Medicare and Medicaid because the projected

18. In estimating the fiscal gap under the alternative projections for interest rates, CBO altered the rate used to discount future taxes, noninterest spending, and debt by the same amount as other interest rates. For example, in calculating the fiscal gap under the projection with lower interest rates, future primary deficits (that is, deficits excluding interest payments) and the end-of-period debt are given a greater weight than they are under projections with higher interest rates.

19. Under that provision of the tax code, most payments that employers and employees make for health insurance coverage are exempt from income and payroll taxes.
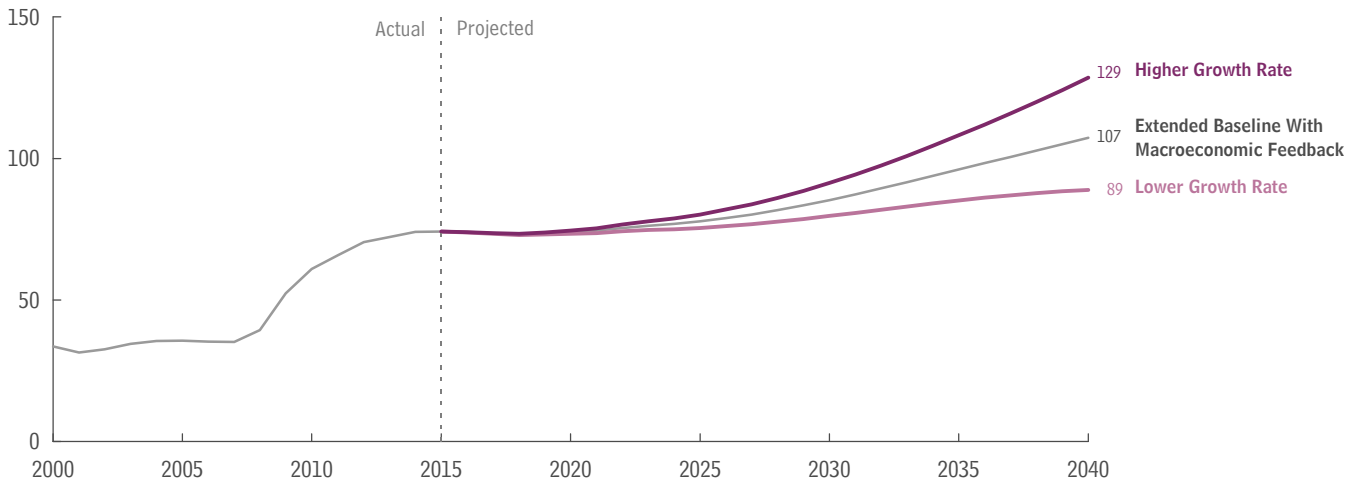
20. See Congressional Budget Office, *Technological Change and the Growth of Health Care Spending* (January 2008), www.cbo.gov/publication/41665.

21. The definition and calculation of excess cost growth are discussed in more detail in Chapter 2.

22. In the extended baseline, CBO projects that the rate of excess cost growth in Medicare and Medicaid for each year will match the rate in the agency's baseline projections for the next 10 years and then move in the succeeding 15 years toward the projected underlying path. The estimated underlying rate starts at the rate of excess cost growth experienced in the health care system in recent decades and declines gradually as people respond to the pressures of rising costs.

Figure 7-5.

Federal Debt Given Different Rates of Growth of Federal Health Care Spending

Percentage of Gross Domestic Product

Source: Congressional Budget Office.

Notes: The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2025 and then extending the baseline concept for the rest of the long-term projection period.

The higher growth rate of per-beneficiary federal spending on Medicare and Medicaid is 0.75 percentage points higher—and the lower growth rate is 0.75 percentage points lower—than the growth rate used for each year in the extended baseline with macroeconomic feedback.

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

size of those programs means that variations in their rates of growth would have particularly large effects on the federal budget.)

Those alternative projections for the growth of health care spending would lead to the following alternative budget projections:

■ If Medicare and Medicaid spending per beneficiary rose 0.75 percentage points per year more slowly than in the extended baseline, federal debt held by the public would be 89 percent of GDP in 2040 rather than the 107 percent that CBO projects under the extended baseline with macroeconomic feedback (see Figure 7-5). The 25-year fiscal gap would be 0.5 percent of GDP rather than the 1.1 percent that CBO projects under the extended baseline.

■ If Medicare and Medicaid spending per beneficiary rose 0.75 percentage points per year more quickly than in the extended baseline, federal debt held by the

public would be 129 percent of GDP in 2040. The 25-year fiscal gap would rise to 1.8 percent of GDP.

Multiple Factors

The previous cases illustrated what would happen to the federal budget if a single factor differed from the projections that CBO used in the extended baseline. Undoubtedly, however, multiple factors will differ from CBO's projections. In addition, estimating the budgetary consequences of such a circumstance is more complicated than simply adding together the outcomes of the individual cases. For example, higher-than-projected health care costs would have a larger effect on the budget if interest rates on federal debt were also higher than CBO projects—because the government would have to pay more interest on debt that resulted from the additional health care spending.

To account for the interactions among the key variables and the fact that having just one individual factor reach the end of its range is much more likely than having all

Figure 7-6.

Federal Debt Given Different Rates of Mortality Decline, Productivity Growth, Interest, and Growth of Federal Health Care Spending
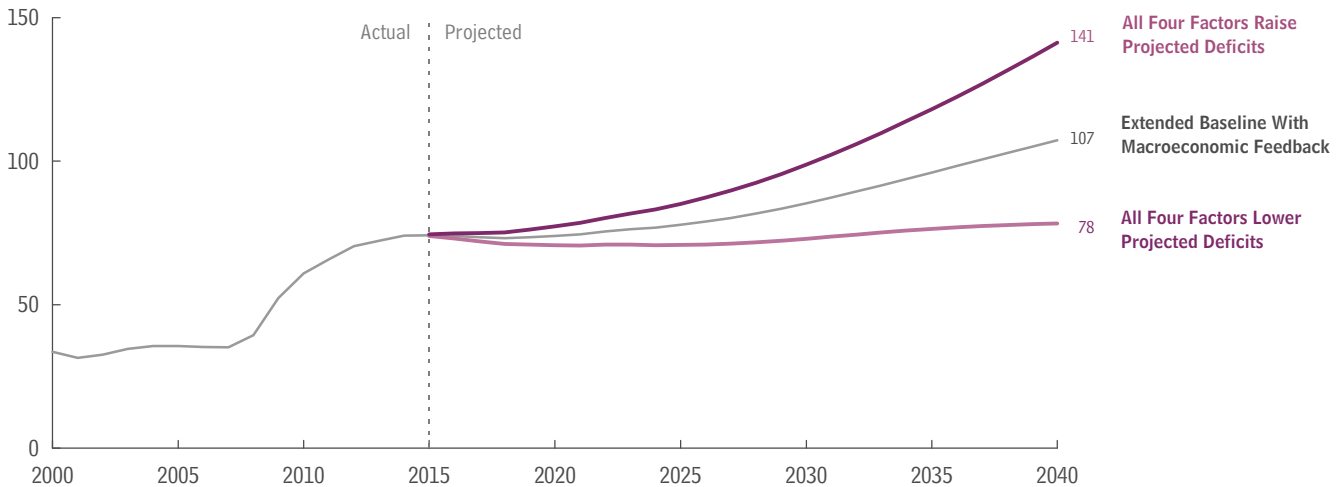
Percentage of Gross Domestic Product

Source: Congressional Budget Office.

Notes: The extended baseline generally reflects current law, following CBO's 10-year baseline budget projections through 2025 and then extending the baseline concept for the rest of the long-term projection period.

For this figure, CBO used ranges for the four factors that are 60 percent as large as the ranges used for the individual cases (shown in Figures 7-2 to 7-5).

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

[Figure corrected on September 25, 2015]

four do so simultaneously, CBO used smaller ranges for each of the four factors when they are assumed to change together than it used for them individually. It analyzed illustrative cases in which all four factors varied from the baseline by 60 percent of their individual ranges. According to CBO's analysis of the historical data, joint variation to that extent yields outcomes for federal debt that are about as likely as the outcomes when an individual factor changes to the full extent of its range. For example, in the cases discussed above, the range for the rate of productivity growth was 1 percentage point, yielding growth rates that were 0.5 percentage points higher and lower than the values in the extended baseline; but for the combined projections, the range for the rate of productivity growth is 0.6 percentage points, yielding growth rates that span the baseline values by 0.3 percentage points.

Varying the four factors together in that way would lead to the following budget projections:

■ If mortality rates declined 0.3 percentage points per year more slowly, productivity grew 0.3 percentage points per year more quickly, the difference between the average interest rate on government debt and private interest rates was about 0.45 percentage points greater, and federal costs per beneficiary for Medicare and Medicaid grew by about 0.45 percentage points per year more slowly than under the extended baseline, federal debt held by the public would be 78* percent of GDP in 2040—about what it is now—rather than the 107 percent that CBO projects under the extended baseline with macroeconomic feedback (see Figure 7-6). The 25-year fiscal gap would be 0.2* percent of GDP rather than the 1.1 percent that CBO projects under the extended baseline.

■ If mortality rates declined 0.3 percentage points per year more quickly, productivity grew 0.3 percentage points per year more slowly, the difference between the average interest rate on government debt and private interest rates was about 0.45 percentage points

[*Value corrected on September 25, 2015]

smaller, and federal costs per beneficiary for Medicare and Medicaid grew by about 0.45 percentage points per year more quickly than under the extended baseline, federal debt held by the public would be 141* percent of GDP in 2040. The 25-year fiscal gap would be 2.1* percent of GDP.

Other Sources of Uncertainty Related to Demographic, Economic, and Other Trends

CBO's long-term budget estimates depend on projections of numerous variables in addition to those analyzed above. (Many of those variables are discussed in detail in Appendix A.) Although the factors discussed in the previous section are four of the more important ones, they are intended to provide illustrative examples, not to be exhaustive. Every variable has some uncertainty associated with it. For instance, demographics, labor force growth, and decisions by states about Medicaid are also important, but CBO has not yet quantified the potential effects on the budget of uncertainty involving those factors.

Changes in Demographics and Labor Force Growth

Demographic factors have significant effects on economic and budgetary outcomes. For instance, GDP depends to a large degree on the size of the labor force, which is related to the number of adults between the ages of 20 and 64, and federal outlays for Medicare, Medicaid, and Social Security are closely linked to the number of people who are at least 65 years old. Higher rates of fertility or greater immigration flows would generally cause federal spending to decrease relative to GDP because they would increase the ratio of adults ages 20 to 64 to elderly adults. (Mortality, another demographic factor that affects the economy and the budget, was addressed separately above.)

The growth of the labor force could also change for reasons other than demographic ones. Projections of the labor force are based on estimates of the size of the population and estimates of the rates of participation in the labor force by people in different demographic groups. Those participation rates in turn depend on a number of factors, including economic conditions, cultural shifts, and public policies (especially those that involve taxes on labor or that directly affect people's incentive to work in some other way).[23] The overall rate of participation in the labor force has varied considerably over time. For

example, it averaged 59 percent in the 1950s and 1960s, increased to more than 67 percent by 2000, and has declined since then, averaging a little more than 62.8 percent in the first four months of 2015. The large increase from the 1960s to 2000 was mostly the result of an increasing number of women in the labor force. If the next 25 years saw some kind of cultural shift that had a similarly large effect on the overall rate of participation in the labor force, labor force growth could be significantly different from what CBO expects.

Faster or slower labor force growth would produce better or worse budgetary outcomes, all else being equal. If the labor force grew more quickly than projected for the extended baseline, the faster economic growth would result in higher revenues, smaller budget deficits, and a smaller ratio of federal debt to GDP. In contrast, if the labor force grew more slowly than projected in the extended baseline, the slower economic growth would result in lower revenues, larger budget deficits, and a greater ratio of debt to GDP.

Decisions by States About Medicaid

State governments have flexibility in administering their Medicaid programs, and the decisions that they make about eligibility, benefits, and payments to providers affect the federal budget because the federal government pays a large share of Medicaid's costs. One source of uncertainty is whether states will maintain or increase Medicaid spending—by obtaining program waivers to expand eligibility to new population groups, enhancing outreach efforts to increase enrollment of eligible people, or expanding covered benefits—as rising earnings reduce the number of children and nondisabled adults who are eligible for the program over time. Decisions by states could significantly decrease or increase federal expenditures for Medicaid relative to the amounts in CBO's projections.

Potential Developments in the Economy and Their Effects on the Budget

The range of outcomes presented above conveys only part of the uncertainty associated with long-term budget projections. They do not account for other plausible

---

23. The rate of participation in the labor force has changed over time within demographic groups; see Congressional Budget Office, *CBO's Labor Force Projections Through 2021* (March 2011), www.cbo.gov/publication/22011.

[*Value corrected on September 25, 2015]

but unpredictable developments that could increase or decrease federal debt relative to CBO's projections. Such possible developments could include an economic depression like the one that occurred in the United States in the 1930s; unexpectedly large losses on federal financial obligations, such as mortgage guarantees; and unpredictable catastrophes, such as a major natural disaster or world war, the effects of changes in climate, or the discovery of valuable natural resources.

A Severe Economic Downturn

In general, when economic output rises or falls, the federal budget is automatically affected. For example, economic downturns can reduce revenues significantly and raise outlays for safety-net programs, such as unemployment insurance and nutrition assistance.[24] In addition, such downturns have historically prompted policymakers to enact legislation that further reduces revenues and increases federal spending—to help people suffering from the weak economy, to bolster the financial condition of state and local governments, and to stimulate additional economic activity and employment. The budgetary effects of the recent recession were particularly large: Federal debt increased from 35 percent of GDP at the end of 2007 to 70 percent at the end of 2012, in large part because of the recession and weak recovery and the policy responses enacted to counter those developments.

The long-term projections of output and unemployment in this report reflect economic trends from the end of World War II to the present, a period that included several economic downturns that were not fully offset by upturns of similar magnitude.[25] But the projections do not account for the possibility of a severe economic

downturn like the Great Depression of the 1930s. Such events are rare; for that reason and others, their magnitude and timing cannot readily be predicted. If such an event occurred in the next 25 years, federal debt would probably be substantially greater than projected in CBO's extended baseline.

Changes in Losses on Federal Insurance or Credit Programs

The federal government supports a variety of private activities through federal insurance and credit programs that provide loans and loan guarantees.[26] CBO includes the expected losses from those credit and insurance programs in its baseline projections. Significantly greater losses could result from certain unexpected events, such as a major disruption in the financial system or a deep slump in the economy. Alternatively, long periods of financial and economic stability could lead to smaller losses.

Federal insurance and credit programs generate losses when the support provided by the federal government exceeds the money taken in by the programs through fees, loan repayments, interest payments, asset sales, wage garnishment, and other means. For example, in the wake of the recent housing crisis, widespread defaults on guaranteed mortgages led to substantial outlays by the federal government. Widespread defaults on student loans or the bankruptcy of numerous companies with underfunded pension plans could lead to analogous costs for the federal government in the future.[27] Conversely, long periods of particularly strong economic growth could allow federal insurance and credit programs to collect higher-than-projected repayments and cover lower-than-projected expenses.

---

24. See Congressional Budget Office, *The Budget and Economic Outlook: 2015 to 2025* (January 2015), Appendix D, www.cbo.gov/publication/49892.

25. Since the end of World War II, the unemployment rate has been about one-quarter of one percentage point higher, on average, than CBO's estimate of the natural rate of unemployment (the rate arising from all sources except fluctuations in aggregate demand). That difference implies that periods of significant economic weakness (such as the 2007–2009 recession and its aftermath) have pushed the unemployment rate above CBO's estimate of the natural rate more than periods of significant economic strength have pushed it below that estimate. Consistent with that finding is CBO's projection that the unemployment rate in the long term will be 5.3 percent, which is about one-quarter of one percentage point higher than CBO's estimate of the natural rate of unemployment in the long term. For further discussion, see Appendix A.

26. Federal insurance programs provide coverage for deposits at financial institutions (through the Federal Deposit Insurance Corporation), for workers' pensions (through the Pension Benefit Guaranty Corporation), and for property against damage by floods (through the National Flood Insurance Program), among other things. The largest federal credit programs provide mortgage loan guarantees (through the Federal Housing Administration, Fannie Mae, and Freddie Mac); student loans; and federally backed loans to businesses (through the Small Business Administration, for example). There are a number of smaller programs, including the loan guarantees provided by the Department of Energy and the terrorism risk insurance program administered by the Treasury Department.

27. For more discussion, see James D. Hamilton, *Off-Balance-Sheet Federal Liabilities*, Working Paper 19253 (National Bureau of Economic Research, July 2013), www.nber.org/papers/w19253.

Moreover, the federal government may have significant implicit liabilities apart from the liabilities created by formal government programs. In the event of a financial crisis, for example, federal policymakers might decide to provide monetary support to the financial system, as they did during the recent financial crisis. Such support could increase federal outlays above the amounts in the extended baseline.

Catastrophes

The federal government also faces implicit obligations in the case of catastrophes. Small-scale natural and man-made disasters occur fairly often in the United States; they may seriously damage local communities and economies, but they have rarely had significant, lasting impacts on the national economy. By contrast, a catastrophe could affect budgetary outcomes by reducing economic growth over a number of years, leading to substantial increases in federal spending. For example, the nation could experience a massive earthquake, a pandemic, an asteroid strike, a geomagnetic storm from a large solar flare, or a nuclear meltdown or attack that rendered a significant part of the country uninhabitable. Participation in a major war could also have significant economic and budgetary impacts: The ratio of federal debt held by the public to GDP rose by 60 percentage points during World War II, for instance. Because catastrophic events are extremely rare, it is very difficult to estimate the probability of their future occurrence and their possible effects on the budget.

Climate Change

CBO's extended baseline does not explicitly incorporate the effects of climate change. It implicitly includes some small effects by reflecting historical spending on such programs as federal crop insurance, federal flood insurance, and the Federal Emergency Management Agency's disaster relief program.[28] Aside from those implicit changes in federal outlays, the extended baseline does not incorporate any budgetary effect that climate change might have; it does not, for example, account for the effect on federal tax revenues that climate change could have if it affected the nation's economic output.

Substantial uncertainty surrounds any projection that attempts to account for the impact that climate change might have on the economy or on the budget. That uncertainty arises from several sources, including the unpredictability of global economic activity and

technology development—both of which affect the amount of emissions in the future—as well as limitations in current data and the imperfect understanding of physical processes and of many aspects of the interacting components (land, air, water and ice, and life) that make up the Earth's climate system. In addition to the unpredictability of climate change itself, the impact that any such change would have on the economy and the budget is also quite uncertain.

CBO has not undertaken a full analysis of the budgetary costs stemming from climate change, but it is currently analyzing the potential costs of future hurricanes.[29] That analysis suggests that the costs of future hurricane damage will rise at a faster rate than GDP; however, the amount of additional hurricane damage is likely to remain small enough, on average, that the resulting federal expenditures would not significantly affect the general budget categories in which hurricane-related spending falls.

Three factors that influence the rate of growth of future hurricane damage are sea levels, the frequency of severe hurricanes, and the amount of development in coastal areas (because the damage caused by hurricanes will depend, in part, on the amount of people and property in harm's way):

■ Hurricane damage is expected to increase over time because climate change is projected to lead to rising sea levels, which will tend to increase damage from storm surges when hurricanes occur.

---

28. Some of the programs most affected by weather-related disasters—such as federal crop insurance and flood insurance—fall into the "other mandatory spending" category in CBO's long-term projections; in CBO's extended baseline, other mandatory spending (apart from outlays for refundable tax credits) is projected to continue to decline as a share of GDP after the 10-year period that CBO's baseline projections span at the same rate as it is projected to decline during the last five years of that initial period. Other programs affected by weather-related disasters—such as the Federal Emergency Management Agency's disaster relief program—are discretionary; spending for those programs is projected to remain constant as a share of GDP after the 10-year baseline projection period.

29. Terry Dinan, Senior Adviser, Congressional Budget Office, "Hurricane Damage: Effects of Climate Change and Coastal Development" (presentation to the Summer Conference of the Association of Environmental and Resource Economists, San Diego, Calif., June 5, 2015), www.cbo.gov/publication/50230.

■ Climate change may increase the occurrence of the most intense (Category 4 and 5) storms in the North Atlantic Basin, leading to more damage in the United States.

■ The growth in hurricane damage attributable solely to increases in coastal development is projected to be slower than the growth of the economy overall. That slower rate stems from the expectation that new development will tend to be denser (reducing wind damage per structure if buildings are closer together and storm surge damage per structure if buildings are taller), more expensive construction and therefore less vulnerable to storm damage.

All told, CBO projects that the amount of damage attributable to climate change and coastal development will probably be around 0.05 percent of GDP in the 2030s and less than 0.1 percent of GDP in the 2070s.

Many estimates suggest that the effect of climate change on the nation's economic output, and hence federal tax revenues, will probably be small over the period that is covered by CBO's long-term projections and larger, but still modest, in later years.[30] Even under scenarios in which significant warming is assumed, the projected long-term effects of climate change on GDP in the United States tend to be modest relative to underlying economic growth for two primary reasons. First, only a small share of the U.S. economy is directly affected by changes in climate; the largest effects will probably occur in the agricultural sector, which currently represents about 1 percent of total U.S. output. (The direct economic effects of climate change may be larger in other countries, particularly those for which agricultural output is a larger share of the total.) Second, some activities within the agricultural sector—crop production in the north, for example—could experience gains because of climate change. In any event, some of the effects of climate change (such as the loss of biodiversity), neither directly relate to measured economic output nor affect tax revenues. CBO continues to monitor research on the effects of climate change on the U.S economy, to consider how those effects might alter the federal budget outlook,

and to evaluate federal policies that may lead to lower emissions or mitigate damage from changes in the climate.

In addition to uncertainty about the magnitude of disasters caused by climate change, there is uncertainty about how lawmakers would respond to them. In the future, lawmakers could increase funding above the amounts in CBO's projections if the effect of climate change on the frequency and magnitude of weather-related disasters became significantly larger. For example, increased damage from storm surges might lead the Congress to pass additional emergency supplemental appropriations for disaster relief or to approve legislation providing funding to protect infrastructure that is vulnerable to rising sea levels. Or lawmakers could amend existing laws to reduce federal spending on weather-related disasters. For instance, the Congress might decide to alter flood insurance or crop insurance programs in a way that provides insured parties with greater incentive to avoid potential damage. But CBO's baseline projections, which are built on current law, cannot capture such possible changes.

Natural Resources

The future discovery and development of productive natural resources may cause federal receipts to increase. For example, recent advances in combining two drilling techniques, hydraulic fracturing and horizontal drilling, have allowed access to large deposits of shale resources—that is, crude oil and natural gas trapped in shale and certain other dense rock formations. Virtually nonexistent a decade ago, the development of shale resources has boomed in the United States in recent years, affecting two kinds of federal receipts—federal tax revenues and payments to the government by private developers of federally owned resources. By boosting GDP, shale development increases tax receipts. Because some of the shale resources being developed are federally owned, developers must make payments to the federal government; however, most of the nation's shale resources are not federally owned, so those payments do not increase federal receipts by a significant amount.[31] Advances in the development of other resources may also contribute to federal receipts and make federally owned resources more valuable.

---

30. Congressional Budget Office, *Potential Impacts of Climate Change in the United States* (May 2009), www.cbo.gov/publication/ 41180.

31. Congressional Budget Office, *The Economic and Budgetary Effects of Producing Oil and Natural Gas From Shale* (December 2014), www.cbo.gov/publication/49815.

Implications of Uncertainty for the Design of Fiscal Policy

Policymakers could take uncertainty into account in various ways when making fiscal policy choices.[32] For example, they might decide to design policies that reduced the budgetary implications of certain unexpected events. Policymakers might also decide to provide a buffer against events with negative budgetary implications by aiming for lower debt than they would otherwise.

Reducing the Budgetary Implications of Unexpected Events

Fiscal policy cannot eliminate the risk factors that create uncertainty about budgetary outcomes, but it can reduce the budgetary implications of those factors. However, reducing budgetary uncertainty for the federal government could have unwanted consequences, such as shifting risk to individuals. Under current law, for example, growth in Medicare and Medicaid outlays per beneficiary depends on the growth of per capita health care costs. Some policymakers have proposed that growth in federal outlays per beneficiary of those programs be linked instead to measures of overall economic growth.[33] Such a change could affect national spending for health care, the federal budget, individuals' costs, and the budgets of state and local governments. It might greatly reduce uncertainty about future federal outlays for Medicare and Medicaid, but it might also greatly increase uncertainty about the future costs borne by the programs' beneficiaries and by state and local governments.[34]

Similarly, policymakers could reduce the budgetary implications of uncertainty about future life expectancy by indexing the eligibility age for programs such as Social Security or Medicare to average life spans. Under current law, if longevity increased more than expected, outlays for federal health care and retirement programs would

exceed projections. If policies were changed so that the age of eligibility for those programs rose automatically with increases in longevity, the budgetary effects of such increases would be dampened. However, people would face greater uncertainty about the timing and size of the benefits that they would receive, and the effects would vary among subgroups of the population.

In addition, policymakers could reduce the budgetary implications of unexpected rises in interest rates by increasing the share of government borrowing that is done through longer-term securities. Using that approach, the Treasury could lock in interest rates for a considerable period. However, interest rates on longer-term debt are typically higher than rates on shorter-term debt, so that approach would probably raise the interest that the federal government paid. Moreover, if interest rates were locked in for a long period, the federal government would benefit less from unexpected *declines* in interest rates.

Whether or not the federal budget directly bears the risk of uncertain outcomes, all risk is ultimately distributed among individuals—as taxpayers, as beneficiaries of federal programs, or as both. If federal spending for certain programs turned out to be higher than projected, the additional imbalance could be offset only through higher revenues or lower outlays for other programs or activities at some point in the future. If the additional imbalance was not offset, then deficits would be larger, resulting in lower future income. Conversely, if budgetary imbalances were smaller than expected, then an opportunity would exist to lower taxes or boost spending; it would also be possible to reduce future deficits, resulting in higher income. Which income groups or generations benefited the most—or bore the largest burden—from unexpected budgetary imbalances would depend on the policies that lawmakers enacted to deal with such imbalances.

Reducing Federal Debt

As an alternative or complementary approach, policymakers could improve the federal government's ability to withstand the effects of events that would significantly worsen the budgetary outlook. In particular, reducing the amount of federal debt held by the public would give future policymakers more flexibility in responding to extraordinary events. For example, a financial crisis in the future might have significant negative economic and budgetary implications—just as the 2007–2009 financial

---

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

33. For examples of these proposals, see Congressional Budget Office, *Preliminary Analysis of the Rivlin-Ryan Health Care Proposal* (attachment to a letter to the Honorable Paul D. Ryan, November 17, 2010), www.cbo.gov/publication/21928.

34. Most proposed policy changes of that sort would affect both the expected amounts of federal outlays and the uncertainty about those outlays, but those two effects are conceptually distinct.

crisis did: The ratio of federal debt held by the public to GDP increased by 35 percentage points between 2007 and 2012. If another financial crisis prompted a similar increase when the ratio of federal debt to GDP was already at a high level (such as its current level of 74 percent), policymakers might be reluctant to accept the initial cost of a desired intervention in the financial system or the economy, even if they expected to recoup at least part of that cost over time.

In addition, a high ratio of debt to GDP increases the risk of a fiscal crisis in which investors lose confidence in the government's ability to manage its budget and the government in turn loses its ability to borrow at affordable rates.[35] There is no way to predict the amount of debt that might precipitate such a crisis, but starting from a position of relatively low debt would reduce the risk.

---

35. That sort of crisis might be triggered by an adverse event that quickly drove up the ratio of debt to GDP, such as a depression or a war. For further discussion, see Congressional Budget Office, *Federal Debt and the Risk of a Fiscal Crisis* (July 2010), www.cbo.gov/publication/21625.