

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 trends over the next three decades. Through 2029, the economic and demographic projections presented in this report are the same as those that CBO published in January.¹ For 2030 through 2049—the remaining years of CBO's extended baseline—the agency's projections generally reflect historical trends and anticipated demographic changes.² (A set of annual projections is included in this report's supplemental data, available online at www.cbo.gov/publication/55331.)

Demographic Factors

Both the size and composition of the U.S. population influence the overall growth of the economy and affect federal tax revenues and spending. Rates of fertility, net immigration, and mortality determine the population and thus the size of the labor force and the number of people receiving benefits from federal programs such as Social Security and Medicare. Because of changes to those rates, CBO projects the population to be smaller and to grow at a slower pace in the future than it projected last year.

Population

In CBO's projections, the total population increases from 333 million at the beginning of 2019 to 388 million in 2049, and population growth slows from a rate of 0.6 percent per year to 0.4 percent per year by the end of the projection period (see Table A-1). The slowdown in growth is particularly pronounced for the population age 16 or older, which grows on average by 0.8 percent per

year in the first decade of the projection, 0.5 percent in the second decade, and 0.4 percent in the third. Over the entire 30-year period, the U.S. population is projected to grow at an average annualized rate of 0.5 percent (compared with a rate of 0.9 percent over the past 30 years): Births account for an average annual increase of 1.2 percentage points, immigration adds 0.3 percentage points, and mortality subtracts 1.0 percentage point.

The population is projected not only to grow more slowly but also to become older, on average, than in the past. In the agency's projections, over the 30-year period, the share of the population that is 65 or older grows, whereas the share that is of working age (defined as people ages 20 to 64) shrinks. As a result, CBO projects, a growing portion of the population will receive benefits from the Social Security and Medicare programs while a shrinking portion will be working and paying into the trust funds that support those programs.

Fertility

CBO projects a gradual rise in the total fertility rate over the next few years, increasing from a rate of 1.8 children per woman in 2018 to a rate of 1.9 children per woman from 2022 through 2049.³ Fertility rates tend to be procyclical, meaning they often decline during recessions and rebound during recoveries. However, the U.S. fertility rate did not recover after the 2007–2009 recession; the rate (which averaged 2.0 children per woman in the 20 years prior to the recession) peaked at 2.1 in 2007.

1. See Congressional Budget Office, *The Budget and Economic Outlook: 2019 to 2029* (January 2019), www.cbo.gov/publication/54918.

2. The extended baseline generally reflects current law, following CBO's 10-year baseline projections through 2029 and then extending most of the concepts underlying those projections through the rest of the long-term projection period.

3. The total fertility rate represents the average number of children that a woman would have in her lifetime and is calculated as the sum of fertility rates for all ages between 15 and 49 in a given year. The total fertility rate can also be defined as the average number of children that a woman would have if, in each year of her life, she experienced the birth rates observed or assumed for that year and if she survived her entire childbearing period. In CBO's long-term model, the likelihood that a particular woman will have a child depends on such factors as that woman's education, marital status, immigration status, and childbearing history.

Table A-1.

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

	1989–2018	2019–2029	2030–2039	2040–2049	Overall, 2019–2049
Growth of Population (Percent)	0.9	0.6	0.5	0.4	0.5
Contribution to Population Growth (Percentage points):					
Births	1.4	1.2	1.2	1.2	1.2
Net immigration	0.4	0.3	0.3	0.3	0.3
Deaths	-0.9	-0.9	-1.0	-1.1	-1.0
Growth of Civilian Noninstitutionalized Population (Percent) ^a	1.1	0.8	0.5	0.4	0.6
Memorandum:					
Fertility Rate (Children per woman)	2.0	1.9	1.9	1.9	1.9
Life Expectancy at Birth, End of Period (Years) ^b	78.9	80.3	81.4	82.5	82.5
Life Expectancy at Age 65, End of Period (Years) ^b	19.4	20.1	20.8	21.5	21.5
Immigration Rate (Per 1,000 people in the U.S. population)	3.7	3.1	3.1	3.1	3.1

Source: Congressional Budget Office.

The extended baseline projections generally reflect current law, following CBO's 10-year baseline budget projections through 2029 and then extending most of the concepts underlying those projections for the rest of the long-term projection period.

- a. The civilian noninstitutionalized population includes individuals age 16 or older who are not inmates of institutions or on active duty in the armed forces.
- b. Life expectancy as used here is period life expectancy, which is the amount of time that a person in a given year would expect to survive beyond his or her current age on the basis of that year's mortality rates for various ages.

Since then, the fertility rate has steadily declined, reaching 1.9 children per woman in 2010 and 1.8 children per woman in 2017 (the most recent year for which data are available).

CBO projects that total fertility rates will remain below the replacement rate—the fertility rate required for a generation to exactly replace itself—of 2.1 children per woman for the next three decades.⁴ Over the next 30 years, that relatively low rate of fertility will contribute to slower population growth. CBO's projection is consistent with the recommendation made to the Social Security Advisory Board by its 2015 Technical Panel on Assumptions and Methods.⁵

Immigration

Under current law, CBO projects, 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) would rise from 0.9 million people in 2019 to 1.2 million people in 2049. In an environment of relatively low birth rates, net immigration flows become a more important part of overall U.S. population growth. Between 2019 and 2029, projected net inflows account for approximately half of overall population growth, but by the last decade of the projection period that share is about four-fifths of all growth.

The new immigrants would largely consist of legal permanent residents (LPRs). Over the next two decades, average annual net flows of LPRs are projected to increase from approximately 860,000 LPRs per year in the first decade to approximately 890,000 over the second decade. In addition, the number of legal temporary residents is projected to increase steadily by approximately 80,000 per year over the next 20 years.

CBO's projections of annual net flows of foreign-born people without legal status, which are informed by the agency's economic projections and by recent demographic

4. See Joyce A. Martin and others, *Births: Final Data for 2017*, National Vital Statistics Reports, vol. 67, no. 8 (National Center for Health Statistics, November 2018), www.cdc.gov/nchs/data/nvsr/nvsr67/nvsr67_08-508.pdf (988 KB).

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

trends, increase over that period.⁶ Growth in the U.S. economy is an important factor because, in CBO's estimation, periods of faster growth over the past two decades have been associated with higher net flows of foreign-born people without legal status. CBO expects that relationship to boost such immigration. However, estimates indicate that the number of foreign-born people without legal status in 2016 was the lowest since 2004 despite relatively strong economic conditions in the United States, which implies that other factors have constrained such immigration in recent years. CBO expects those other factors to continue to hold down such immigration in the near term.⁷ Nevertheless, over time, the agency expects economic growth to again become an important factor for immigration.

On the basis of recent data, CBO anticipates that net flows of foreign-born people without legal status will be smaller in the near term than the long-term relationship between immigration and economic growth would suggest; the agency projects zero net flows in 2019 (meaning that immigration is offset by emigration in this category). The agency expects annual net flows of foreign-born people without legal status to increase significantly between 2020 and 2024, reaching approximately 170,000 by 2024, and then remain roughly unchanged through 2039, reflecting both economic growth and those other constraining factors.

For projections beyond the next 20 years, CBO employs a simplified approach: After 2039, under current law, the

agency projects that net immigration for all categories would grow at a rate equal to overall population growth in the prior year; that rate averages 0.4 percent annually through 2049.

Mortality

The mortality rate, which is the number of deaths per thousand people, has generally declined in the United States since the early 20th century, although the rate of those improvements has slowed over time. For the most part, the mortality rate has decreased more quickly for younger people than for older people during that period. However, mortality rates rose in 2015 and 2016, the most recent years for which data were available at the time this analysis was completed. The result was that life expectancy at birth declined in both years, marking the first decreases in this metric since 1993. Those declines are primarily driven by increases in mortality from Alzheimer's disease, suicide, chronic liver disease, septicemia, and unintentional drug overdoses (in particular, opioids).⁸

CBO projects mortality rates for every five-year age group to decline at the same average pace each group experienced from 1950 through 2015. After projecting average mortality rates for men and women in each age group, CBO incorporates differences in those rates for people 30 years of age and older on the basis of marital status, education, disability insurance status, and lifetime household earnings (for people under 30, the mortality projections account for age and sex only). CBO projects lower mortality rates and thus longer life expectancies for people who are married, have more education, do not receive benefits through the Social Security Disability Insurance (DI) program, or are in higher-income groups.⁹

6. CBO uses this term to refer to foreign-born people other than LPRs, refugees, asylees, temporary residents, and visitors. Most foreign-born people without legal status either unlawfully entered the United States without inspection or lawfully entered the United States in a temporary status and then unlawfully remained in the country after that temporary status expired. Some foreign-born people without legal status are beneficiaries under Temporary Protected Status or under policies whereby the executive branch does not seek their immediate removal from the United States (for example, Deferred Action for Childhood Arrivals); others are allowed into the United States while they await their removal proceedings in immigration courts. Many of those foreign-born people without legal status are authorized to work in the United States, in which case they may apply for a Social Security number and must pay applicable federal taxes.

7. For the most recent estimates, see Jeffrey S. Passel and D'Vera Cohn, *U.S. Unauthorized Immigrant Total Dips to Lowest Level in a Decade* (Pew Research Center, November 2018), <https://tinyurl.com/y9tmol2g>. Official data on foreign-born people without legal status are limited, so historical estimates are very uncertain.

8. For an account of how factors affecting mortality and mortality improvement rates have changed over time, see National Center for Health Statistics, *Health, United States, 2017: With Special Feature on Mortality*, www.cdc.gov/nchs/data/hus/17.pdf (10.5 MB).

9. For more information about mortality differences among groups with different earnings, see Tiffany Bosley, Michael Morris, and Karen Glenn, *Mortality by Career-Average Earnings Level*, Actuarial Study 124 (Social Security Administration, April 2018), <https://tinyurl.com/yct5qdew> (PDF, 301KB); Congressional Budget Office, *Growing Disparities in Life Expectancy* (April 2008), www.cbo.gov/publication/41681; and Julian P. Cristia, *The Empirical Relationship Between Lifetime Earnings and Mortality*, Working Paper 2007–11 (Congressional Budget Office, August 2007), www.cbo.gov/publication/19096.

CBO's projections result in an average life expectancy at birth of 82.5 years in 2049, compared with 79.1 years in 2019.¹⁰ Similarly, life expectancy at age 65 is projected to be 21.5 years in 2049, or 2.1 years longer than life expectancy at age 65 in 2019.¹¹

Changes in Demographic Projections Since Last Year

CBO's estimates of the U.S. population change as the result of changes in rates of fertility, immigration, and mortality.

Population. In CBO's projections, the population increases from approximately 333 million in 2019 to 355 million in 2029—an average annualized growth rate of about 0.6 percent. Last year, CBO projected the population would grow slightly faster, increasing from 335 million to 358 million over that same period, an average annualized rate of 0.7 percent. Those revisions reflect changes to underlying data—specifically, unexpectedly high mortality rates for 2015 and 2016 and unexpectedly low fertility rates for 2016 and 2017—as well as changes to the way the agency projects fertility rates and net immigration.

In the two decades following 2029, the population is projected to grow at an average annual rate of 0.4 percent (revised down from 0.5 percent in last year's report) to 388 million by 2049 (5 million, or 1.4 percent, fewer people than projected last year).

Fertility. The total fertility rate is projected to be lower through 2021 than CBO projected last year. Total fertility rates have been persistently low since the 2007–2009 recession. In recognition of that trend, CBO expects total fertility rates to remain low for the next few years, gradually rising from a rate of 1.8 children per woman in 2019 to 1.9 children per woman by 2022, and then remaining at that rate. By contrast, CBO last year

projected a total fertility rate of 1.9 children per woman in each year for 2018 through 2048.

The lower fertility rate in the first three years of the projection period eventually results in fewer births and a smaller working-age population throughout the entire period than CBO projected last year. There are approximately 547,000 fewer births over the first half of the projection period, but the effects of fewer births become most evident in the second half of the projection period, as the 2019–2021 birth cohort ages into its working and childbearing years. Between 2035 and 2049, the population age 16 and older contains about 3.7 million fewer people per year, on average, than CBO projected last year. Moreover, the combination of lower fertility rates and a smaller population of childbearing adults results in roughly 60,000 fewer births per year, on average, than the agency projected last year.

Net Immigration. CBO's projection of net immigration is also lower than its projection last year. Between 2019 and 2049, the agency projects the average net immigration rate to be 3.1 immigrants per thousand people, compared with an average rate of 3.2 over the same period in last year's report. Those revisions are attributable to more recent data and adjustments to the way CBO projects net immigration in the extended baseline.

In total, over the next decade, CBO projects approximately 352,000 (or 2.9 percent) fewer immigrants, on net, than the agency projected last year. That change is driven primarily by smaller projected net flows of LPRs and foreign-born people without legal status. In particular, CBO has revised its near-term projection of net flows of foreign-born people without legal status to be lower on the basis of recent data that suggest net flows for this category are likely to be smaller over the next few years than previously projected. Indeed, the agency's projection of zero net flows for 2019 reflects a downward revision of 171,000. Nevertheless, in CBO's assessment, domestic economic conditions will return as an important driver of immigration flows by the middle of the coming decade and, under current law, net flows of foreign-born people without legal status will again be positive.

Last year, for the final 20 years of the extended baseline projection, CBO based its projections of net immigration flows for all categories on the average growth in net immigration published by the Census Bureau—a

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

11. CBO projects life expectancy in 2090 to be 86.4 years at birth and 24.1 years at age 65. CBO's projections of life expectancies are longer than those of the Social Security trustees (85.7 and 23.5 years, respectively) but shorter than the projections (88.3 and 25.3 years, respectively) recommended in 2015 Technical Panel on Assumptions and Methods, *Report to the Social Security Advisory Board* (September 2015), pp. 13–20, <https://go.usa.gov/cJYR5> (PDF, 3.4 MB).

constant rate of 0.6 percent. After reassessing that approach, the agency now projects that the same economic forces driving immigration trends in the first decade of its projection will persist through the second decade. Because of that change, net immigration is projected to grow at an average annual rate of 0.3 percent—half the rate of growth projected last year—resulting in a total of 400,000 (or 3.4 percent) fewer immigrants, on net, between 2030 and 2039.

Beyond 2039, because of the significant uncertainty surrounding the mix of immigrants in the long run, CBO projects net immigration flows based on overall population growth in the prior year. As a result of that change, net immigration is projected to grow at an average annual rate of 0.4 percent between 2040 and 2049, compared with the annual rate of 0.6 percent CBO projected last year. In total, CBO projects approximately 740,000 (or 6.0 percent) fewer net immigrants over that period than the agency projected last year.

Mortality. Recent data show higher mortality rates than CBO expected last year for all age groups, but particularly for people under 45 years of age. Those data led CBO to increase its projection of mortality rates for all age groups in the near term and to reduce their rates of mortality improvement over the next three decades. As a result, CBO now projects approximately 970,000 (or 0.9 percent) more deaths over the next three decades than the agency projected last year.

CBO's new projections of mortality rates and mortality improvement also affect the agency's projections of life expectancies, which it now expects to be lower than it reported last year. Life expectancy at birth is projected to be 82.4 years in 2048, 0.4 years shorter than CBO projected last year, and life expectancy at age 65 is projected to be 21.5 years, 0.2 years shorter than in last year's projection.

Economic Factors

The federal government's revenues, spending, and debt depend on key 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, capital accumulation, 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 fiscal policy on economic activity.

Gross Domestic Product

CBO expects total output, or GDP, in the economy to grow by an average of 3.9 percent per year over the 2019–2049 period (see Table A-2). In the agency's projections, real (inflation-adjusted) GDP growth over that period averages 1.9 percent per year, about what CBO projected last year for the 2018–2048 period. That rate is less than the average growth of 2.5 percent for the past three decades. CBO expects that growth in real GDP per person will average 1.3 percent over the next three decades, less than the 1.6 percent growth of the past three decades.

Projections of GDP. CBO projects that over the next five years, GDP and employment will initially exceed and then return to their long-run relationships with their maximum sustainable levels. After five years, real GDP is then projected to grow at a pace that reflects the increases in the supply of labor, capital services, and productivity described below. That projected pace also takes into consideration the influences of the marginal tax rates and increases in federal debt that CBO projects in its extended baseline.¹²

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

Projected real GDP growth over the next three decades is slower than the average annual rate of 2.5 percent recorded over the past three decades because the labor force is projected to grow more slowly. On average, CBO projects that real GDP will grow at an annual rate of 1.8 percent from 2019 to 2029. In the decade after 2029, average growth is projected to remain at 1.8 percent before rising to 1.9 percent over the 2040–2049 period. The pattern of projected GDP growth

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

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

Table A-2.

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

Percent

	1989–2018	2019–2029	2030–2039	2040–2049	Overall, 2019–2049
Growth of GDP					
Real GDP ^a	2.5	1.8	1.8	1.9	1.9
Nominal GDP (Fiscal year)	4.7	4.0	3.8	3.9	3.9
Real GDP per Person	1.6	1.2	1.3	1.5	1.3
Growth of the Labor Force					
Labor Force Participation Rate	65.5	62.0	60.3	59.7	60.7
Unemployment					
Unemployment rate	5.9	4.5	4.6	4.5	4.5
Natural rate of unemployment	5.1	4.5	4.4	4.2	4.4
Growth of Average Hours Worked					
	-0.1	*	*	*	*
Growth of Total Hours Worked					
	0.9	0.4	0.3	0.4	0.4
Earnings as a Share of Compensation					
	81	81	81	81	81
Growth of Real Earnings per Worker					
	0.9	1.2	1.1	1.0	1.1
Share of Earnings Below the Taxable Maximum					
	85	82	81	80	81
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 ^a	1.6	1.4	1.5	1.5	1.5
Labor force productivity ^b	1.5	1.3	1.5	1.5	1.4
Inflation					
Growth of the CPI-U	2.5	2.4	2.4	2.4	2.4
Growth of the GDP price index	2.1	2.1	2.0	2.0	2.0
Interest Rates					
Real rates					
On 10-year Treasury notes and the OASDI trust funds	2.2	1.3	1.6	2.0	1.6
Nominal rates					
On 10-year Treasury notes and the OASDI trust funds	4.7	3.7	4.0	4.4	4.0
On all federal debt held by the public ^c	4.8	3.1	3.6	4.0	3.6

Source: Congressional Budget Office.

The extended baseline projections generally reflect current law, following CBO's 10-year baseline budget projections through 2029 and then extending most of the concepts underlying those projections for the rest of the long-term projection period.

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

* = between -0.05 and 0.05.

a. Real values have been adjusted to remove the effects of changes in prices.

b. The ratio of real GDP to the labor force. Elsewhere, CBO reports other measures of labor productivity, such as the ratio of real potential GDP to the potential labor force.

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

follows the pattern of labor force growth over the next three decades.

Real GDP per person is expected to increase at a slower pace than it has in the past—at an average annual rate of 1.3 percent over the 2019–2049 period, compared with 1.6 percent over the past 30 years. That occurs mainly because the labor force is projected to grow more slowly than the overall population.

Changes in Projections of GDP Since Last Year. In CBO's current projections, the level of real GDP is slightly higher in 2028 than the agency projected last year. Over the subsequent two decades, the agency's current projection of real GDP grows slightly more slowly than it did last year; by 2048, real GDP is 1.6 percent less than it was last year. GDP growth is projected to grow more slowly in the second decade (2030 to 2039), mainly because growth in the labor force is slower in this year's projection than it was in last year's projection. In the third decade, GDP growth is similar to last year's projection.

The Rate of Labor Force Participation and Labor Force Growth

The size of the labor force depends on the rates at which people of different demographic groups participate in the labor market. Since the mid-2000s, the overall labor force participation rate in the United States has declined substantially, driven predominantly by the aging of the population.¹⁴ CBO expects that downward trend to continue over the coming decades before slowing down and eventually leveling off toward the end of the 30-year projection period. As a result, the labor force is projected to grow more slowly than the population. CBO's projections of the overall participation rate and labor force growth are broadly similar to its previous projections. However, the agency has made larger revisions to the participation rates of specific demographic groups.

Projections of the Labor Force Participation Rate. In CBO's projections, the rate of labor force participation declines from 62.8 percent in 2019 to 61.0 percent in 2029 and to 59.8 percent in 2040, where it remains roughly constant for the rest of the projection period. In CBO's assessment, the aging of the population accounts

for nearly the entire decline, while the effects of other factors largely offset one another.

People over age 65 tend to participate in the labor force at lower rates than younger people—as of 2018, the average participation rate for prime-age people (those ages 25 to 54) was 82 percent, whereas that for people over age 65 was about 20 percent. Therefore, the ongoing aging of the population is expected to dampen the overall rate of participation in the labor force over the next 30 years. Among the civilian noninstitutionalized population age 16 or older, the share of people over age 65 has increased from 16 percent to 20 percent over the past decade and is projected to rise to 27 percent by 2049. In the meantime, the share of the prime-age population is expected to decline from 49 percent in 2018 to 45 percent by 2049. Without the effects of further aging of the population—that is, if the age composition of the population remained the same as it was in 2018—the overall labor force participation rate over the next 30 years would be roughly constant (and slightly higher than its 2018 level), in CBO's assessment.

Aside from the aging of the population, CBO expects the effects on labor force participation of other demographic trends, economic trends, and fiscal policies under current law to largely offset one another over the coming decades. In particular, two long-term trends are expected to put downward pressure on the participation rate:

- Members (particularly men) of each generation that followed the baby boomers tend to participate in the labor force at lower rates than their predecessors did at the same age.¹⁵ (One notable exception in later generations is that women younger than 35 generally participate at higher rates than female baby boomers did 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, especially among men, and unmarried men tend to participate in the labor force at lower rates than married men do.

CBO expects those forces to be mostly offset by two trends that are expected to increase participation:

14. The labor force participation rate is the share of the civilian noninstitutionalized population age 16 or older that participates in the labor force.

15. Baby boomers are people born between 1946 and 1964.

- 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.

In addition to the effects of those demographic trends, budgetary effects and incentives under current tax law, combined with economic trends, would 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 after-tax wages, thereby reducing the supply of labor. Meanwhile, under current law, tax rates on individual income are set to rise in 2026 when some provisions of the 2017 tax act expire. 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. After 2025, those higher tax rates and real bracket creep are projected to decrease participation in the labor force because people would see a lower return on their labor.

Changes in Projections of the Labor Force Participation Rate Since Last Year. CBO's current projection of the overall labor force participation rate is slightly lower than previously projected for 2019 to 2024 and slightly higher than previously projected for 2025 to 2048. The new projection incorporates the agency's reassessment of recent trends in the participation rates of different demographic groups.

Compared with its previous projections, CBO has lowered its projection of the participation rate of the youngest group of workers (ages 16 to 24) throughout the 30-year projection period. The agency now expects that group's rate of participation in the labor force to fall, from about 55 percent in 2018 to 54 percent in 2048, instead of rising to 57 percent as previously projected. CBO's revision mainly reflects the observation that the participation rate of the youngest workers has declined substantially since the 2007–2009 recession and has failed to recover meaningfully in recent years despite the growth of the economy.¹⁶ That development suggests that the factors that have pushed down younger

Americans' participation rates since the last recession are more structural and less cyclical than previously estimated.

Conversely, the agency has raised its projection of the participation rate of prime-age people throughout the 30-year projection period. CBO now expects the participation rate of that group to be higher, on average, over the next three decades than its current rate. That contrasts with CBO's previous projection that the rate would decline slightly over the next three decades. The agency revised its projection primarily because the participation rate of prime-age people has rebounded more strongly in the past year than expected, which suggests that the rate's decline after the last recession was driven more by cyclical factors and less by structural factors than previously estimated.

Projections of Labor Force Growth. Because a falling participation rate means that less of the growth in population translates into labor force growth, the labor force is expected to increase even more slowly than the population from 2019 to 2049. Although the population age 16 or older is expected to grow by 0.6 percent per year, on average, the labor force is projected to grow at an average rate of 0.4 percent per year. That represents a significant slowdown in labor force growth from earlier periods: For example, the average annual growth rate was 1.2 percent during the 1990–2006 period.

In CBO's projections, growth in the labor force declines from an average of 0.5 percent during the 2019–2029 period to 0.3 percent during the 2030–2039 period, driven by a decline in population growth over the next two decades as well as a decline in the participation rate. Labor force growth rebounds slightly, to an average of 0.4 percent per year, in the third decade of the 30-year projection period; the labor force participation rate is expected to have stabilized by then and therefore would no longer subtract from labor force growth.

Changes in Projections of Labor Force Growth Since Last Year. CBO's current projection of labor force growth is similar to last year's projection through 2029 but lower in the second decade because of the downward revision in population growth discussed in previous sections. In the third decade, projected labor force growth

16. For a discussion of CBO's methods for projecting labor force participation, see Joshua Montes, *CBO's Projection of Labor Force*

Participation Rates, Working Paper 2018-04 (Congressional Budget Office, March 2018), www.cbo.gov/publication/53616.

is similar to last year's projection because higher participation rates offset the downward revisions to population growth.

Other Labor Market Outcomes

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

Unemployment. In CBO's projections, the unemployment rate falls from 3.9 percent at the end of 2018 to 3.5 percent in 2019, about 1.1 percentage points below the agency's estimate of the natural rate of unemployment (the rate that results from all sources other than fluctuations in overall demand related to the business cycle). As economic growth slows after 2019, the unemployment rate rises, surpassing the natural rate by 2022. (The natural rate of unemployment is projected to fall from 4.6 percent in 2019 to 4.5 percent in 2029.) From 2023 onward, the unemployment rate is expected to remain roughly one-quarter of one percentage point above the natural rate, a difference that is consistent both with the historical average relationship between the two measures and with the projected gap of one-half of one percent between actual and potential GDP.

After 2029, both the actual and the natural rates of unemployment are projected to decline gradually as the labor force ages and becomes increasingly educated. (Older and more educated workers tend to have lower actual and natural rates of unemployment.) By 2049, the natural rate of unemployment is projected to be about 4.2 percent, and the actual rate is projected to be about 4.4 percent.

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

the labor force as a whole is expected to decline slightly. By 2049, the average number of hours that people work is expected to be about 0.9 percent less than it is today.

Total Hours Worked. Based on projections of the size of the labor force, average hours worked, and unemployment, total hours worked are estimated to increase at an average annual rate of 0.4 percent between 2019 and 2049. This is slower than the average annual rate of 0.9 percent over the past three decades. The drop in the growth of total hours is mainly because the population is expected to grow more slowly in the future than it has over the past 30 years.

Average growth in total hours worked falls from 0.4 percent in the first decade of CBO's projections (2019 to 2029) to 0.3 percent in the second decade, rising to 0.4 percent in the third decade. A drop in population growth between the first and second decades is the main cause of the projected decline in growth of total hours worked. Growth in total hours worked increases in the third decade because the decline in the rate of labor force participation ends.

Earnings as a Share of Compensation. Workers' total compensation consists of taxable earnings and non-taxable benefits such as employers' contributions to health insurance and pensions. Over the years, the share of total compensation paid in the form of earnings has declined—from about 90 percent in 1960 to about 81 percent in 2018—mainly because the cost of health insurance has risen more quickly than total compensation.¹⁷

CBO expects that trend in health care costs to continue, which would further decrease the proportion of compensation that workers receive as earnings. However, under current law, an excise tax on certain employment-based health insurance plans that have premiums above specified amounts is scheduled to take effect in 2022. Some employers and workers are expected to respond by shifting to less expensive plans, thereby reducing the share of compensation consisting of health insurance premiums and increasing the share that consists of earnings. In CBO's projections, the effects of the tax on the mix of compensation roughly offset the effects of rising costs for health care until the effects of rising costs outweigh those of the excise tax late in the projection period. As a result,

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

the share of compensation that workers receive as earnings is projected to remain close to 81 percent through most of the 2019–2049 period.

Growth of Real Earnings per Worker. Projections of wages and salaries, nonwage compensation (such as employment-based health insurance), average hours worked, labor productivity (discussed below), and prices imply that real earnings per worker would grow by an average of 1.1 percent annually over the 2019–2049 period. That rate is higher than the average annual growth of 0.9 percent over the past 30 years.

Distribution of Earnings. Over the past several decades, earnings have grown faster for higher earners than for lower earners. In CBO’s projections, the unequal growth in earnings continues for the next three decades, although that disparity falls over time. 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 than people with higher income do.

Social Security payroll taxes are also affected by the earnings distribution. Those taxes are levied only on earnings up to a certain annual amount (\$132,900 in 2019). Below that amount, earnings are taxed at a combined rate of 12.4 percent, split between the employer and employee (self-employed workers pay the full amount); no tax is paid on earnings above the cap. The taxable maximum has remained a nearly constant proportion of the average wage since the mid-1980s, but because earnings have grown more for higher earners than for others, the portion of covered earnings on which Social Security payroll taxes are paid has fallen from 90 percent in 1983 to 84 percent in 2017.¹⁸ The portion of earnings subject to Social Security taxes is projected to fall to an average of 82 percent between 2019 and 2029, 81 percent in the following decade, and 80 percent between 2040 and 2049.

Changes in Projections of Other Labor Market Outcomes Since Last Year. Projections of most other labor market outcomes are generally similar to what

CBO projected last year. CBO’s current projections of wages and salaries are slightly lower than last year’s, mainly because updates to historical wage and salary data indicate that their share of GDP was, on average, lower over the past decade than previously reported. As a result, CBO revised down its projection of wages and salaries over the next three decades.

Also, CBO’s current projection of the unemployment rate is higher during the 2019–2023 period but slightly lower from 2024 onward. The upward revision in the near term largely reflects the agency’s assessment that recent trends in hiring, layoffs, and retirement that had put downward pressure on the unemployment rate will not last as long as CBO estimated earlier. For the 2024–2048 period, in contrast, the downward revision occurred because the agency lowered its estimate of the natural rate of unemployment after reassessing the effects of the composition of the potential labor force. In particular, because younger workers tend to have higher natural rates of unemployment (on average, more than 10 percent, compared with prime-age workers’ 4 percent from 1990 to 2018), revising down their share in the potential labor force, as CBO did, leads to a reduction in the estimate of the economywide natural rate of unemployment.

Capital Accumulation and Productivity

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

Capital Services. Over the longer term, growth in the nation’s stock of capital will be driven by private saving, federal borrowing, total factor productivity, the after-tax rate of return, and international flows of financial capital. Private saving and international capital flows tend to move with the after-tax rate of return on investment, which measures the extent to which investment in the stock of capital results in a flow of income. CBO’s

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

projection of that rate is consistent with the agency's projection that the real interest rate on 10-year Treasury notes will be 1.4 percent in 2029 and 2.2 percent in 2049 (see "Interest Rates" on page 60).

Total Factor Productivity. The annual growth of TFP in the nonfarm business sector is projected to increase from about 0.7 percent in 2019 to about 1.1 percent in 2022 and then to remain at that rate through 2049, yielding an average annual growth rate of roughly 1.1 percent from 2019 to 2049. That projected growth rate is about 0.3 percentage points slower than the average annual rate of 1.4 percent since 1950 and slightly slower than the average rate recorded since 1989.

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

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

Nevertheless, CBO anticipates slower growth in labor quality than in the past.

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

Labor Productivity. Taken together, the projections of the labor force, capital services, and TFP result in labor force productivity that is expected to grow on average by 1.4 percent annually over the 2019–2049 period. When projections of total hours worked are used instead, real GDP per hour worked is expected to grow by an annual average of 1.5 percent over the 2019–2049 period.

Changes in Projections of Capital Accumulation and Productivity Since Last Year. CBO has revised its analytic methods to account more fully for economic growth outside the nonfarm business sector—that is, in the farm, household, nonprofit, and government sectors. That revision, which affects only the projection beyond the 10-year budget window, yields a more comprehensive accounting of the growth of private-sector capital services. For example, capital services from more sectors outside the nonfarm business sector are now explicitly included in CBO's measure of capital services, in order to assess their contributions to GDP, whereas last year, those services only implicitly contributed to GDP. As a result, CBO's measure of capital services accounts for a greater share of overall production than was the case last year, and TFP accounts for less.

In addition, changes in historical data regarding the national income and product accounts that the Bureau of Economic Analysis reported in July 2018 led CBO to increase its projection of the growth in capital services and to lower its projection of the growth in TFP in the nonfarm business sector. (As a result, TFP growth in that sector is expected to be slightly slower than it was in last

year's projections.) Those revisions offset each other and have little net effect on projected labor productivity.

The updated data and CBO's revised analytic methods are reflected in its projection of labor force productivity over the 30-year projection period, which is lower than last year's projection. This year, CBO projects that the average annual rate of growth in labor force productivity would be roughly 1.4 percent from 2019 to 2048; last year, CBO projected that rate would be roughly 1.5 percent from 2019 to 2048.

Inflation

CBO projects rates of inflation for two categories: prices of consumer goods and services and prices of final goods and services.¹⁹ Those rates influence nominal levels of interest rates and income (that is, the levels without adjustments to remove the effects of inflation) and thereby influence tax revenues, various types of federal expenditures that are indexed for inflation, and interest payments on federal debt.

Prices of Consumer Goods and Services. One measure of consumer price inflation is the annual rate of change in the consumer price index for all urban consumers (CPI-U). Over the 2019–2049 period, inflation in that measure averages 2.4 percent in CBO's projections. That long-term rate is slightly less than the average rate of inflation of 2.5 percent per year since 1990. CBO projects that, under a chained measure of CPI-U inflation, prices will grow at a rate 0.25 percentage points less than the annual increase in the consumer price index.²⁰

Prices of Final Goods and Services. After 2019, the annual inflation rate for all final goods and services produced in the economy, as measured by the rate of increase in the GDP price index, is projected to average

0.4 percentage points less than the annual increase in the consumer price index. The GDP price index grows more slowly than the consumer price index because it is based on the prices of a different set of goods and services and a different method of calculation.

Changes in Projections of Inflation Since Last Year.

Inflation in both measures of consumer prices is projected to be the same as the rates CBO projected last year for the 2018–2048 period.

Interest Rates

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

After considering a number of factors, including slower growth in the labor force, slower growth in TFP, and higher government debt, CBO expects real interest rates on federal borrowing to be lower in the future than they have been, on average, over the past few decades. The real interest rate on 10-year Treasury notes (calculated by subtracting the rate of increase in the consumer price index from the nominal yield on those notes) averaged roughly 2.9 percent between 1990 and 2007.²¹ That rate has averaged 0.8 percent since 2009 and is projected to be 1.4 percent in 2029. In CBO's projections, the rate continues to rise thereafter, reaching 2.2 percent in 2049. That rate is 0.7 percentage points below the average real interest rate on 10-year Treasuries over the 1990–2007 period. CBO's current projections of interest rates are lower than last year's.

Factors Affecting Interest Rates. Interest rates are determined by a number of factors. CBO projects the rates by comparing how the values of those factors are expected to differ in the long term relative to their average values in the past. However, conclusions from such analyses

19. Final goods and services include not only those purchased directly by consumers, but also by businesses (for investment) and governments, as well as net exports.

20. The chained CPI-U tends to grow more slowly than the standard CPI-U for two reasons. First, it uses a formula that better accounts for households' tendency to substitute similar goods and services for each other when relative prices change. 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 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.

21. Between 1970 and 2007, the real interest rate on 10-year Treasury notes averaged 2.8 percent; the average from 1954 to 2007 was 2.6 percent. Historical inflation rates are taken from the consumer price index, adjusted to account for changes over time in the way that the index measures inflation. See Bureau of Labor Statistics, "CPI Research Series Using Current Methods (CPI-U-RS)" (accessed on March 28, 2018), www.bls.gov/cpi/research-series/home.htm.

depend greatly on the period being considered, as some recent decades show: Real interest rates were low in the 1970s because of an unexpected surge in inflation. In the 1980s, when inflation declined at an unexpectedly rapid pace, real rates were high.²² Interest rates fell sharply during the financial crisis and recession that began in 2007.

To avoid using any of those possibly less representative periods, CBO considered average interest rates and their determinants over the 1990–2007 period and then judged how different those determinants might be over the long term.²³ That period was chosen for comparison because it featured fairly stable expectations of inflation and no severe economic downturns or significant financial crises.

Some factors reduce interest rates; others increase them. In CBO's estimates for the 2019–2049 period, several factors tend to reduce interest rates on government securities relative to their 1990–2007 average:

- The labor force is projected to grow much more slowly than it did from 1990 to 2007. That slower growth in the number of workers would tend to increase the amount of capital per worker in the long term, reducing the return on capital and therefore

also reducing the return on government bonds and other investments.²⁴

- The share of total income received by higher-income households is expected to be larger in the future than during the 1990–2007 period. Higher-income households tend to save a greater proportion of their income, so the difference in the distribution of income is projected to increase the total amount of saving available for investment, other things being equal. As a consequence, the amount of capital per worker is projected to rise and interest rates are expected to be lower.
- TFP is projected to grow more slowly in the future than it did from 1990 to 2007. For a given rate of investment, lower productivity growth reduces the return on capital and results in lower interest rates, all else being equal.
- CBO expects investors' preferences for Treasury securities relative to riskier assets to remain elevated compared with inclinations over the 1990–2007 period. Investors began to have less appetite for risk in the early 2000s, and the demand for low-risk assets was strengthened by the economic fallout from the financial crisis, the slow subsequent recovery, and financial institutions' response to increased regulatory oversight. The rise in demand for Treasury securities from those factors contributed to lower returns (that is, to lower interest rates). CBO expects preferences for Treasury securities relative to riskier assets to gradually decline over the next three decades but to remain above their average levels from 1990 to 2007.

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

- Under CBO's extended baseline, federal debt is projected to be much larger as a percentage of GDP than it was before 2007—reaching 93 percent by 2029 and 144 percent by 2049. The latter figure is more than three and a half times the average over the 1990–2007 period. Greater federal borrowing

22. CBO calculates real interest rates by subtracting expected rates of inflation from nominal interest rates. In general, borrowers and lenders agree to nominal interest rates after accounting for their expectations of what inflation will be. However, if inflation ends up being higher than was expected when the rates were agreed to, real interest rates will turn out to be lower than anticipated. If inflation ends up lower than expected, the opposite will occur. CBO uses the actual consumer price index, adjusted to account for changes over time in the way that the index measures inflation, as a proxy for both what expectations of inflation have been in the past and what they will be in the future. One drawback is that if inflation fluctuates rapidly over time, changes in expectations may lag behind changes in actual inflation. Although CBO's approach could mismeasure expectations of inflation and real interest rates in some years, the way inflation has varied over time suggests that CBO's approach is a useful proxy over long periods, on average.

23. A Bank of England study identified a similar set of determinants that account for the decline in real interest rates over the past 30 years. See Rachel Lukasz and Thomas D. Smith, *Secular Drivers of the Global Real Interest Rate*, Staff Working Paper 571 (Bank of England, December 2015), <https://tinyurl.com/y3mrtoyv> (PDF, 1.8 MB).

24. 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.

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 on an upward trend for the past few decades. That share is projected to decline over the next decade from its current, elevated level but remain higher than its average has been over recent decades. The factors that appear to have contributed to the rise in income for owners of capital (such as technological change and globalization) are likely to persist, keeping it above the historical average. In CBO’s estimation, a larger share of income accruing to owners of capital would directly boost the return on capital and, thus, interest rates.
- The retirement of members of the baby-boom generation and slower growth of the labor force will reduce the number of workers in their prime saving years relative to the number of older people who are drawing down their savings, CBO projects. As a result, in CBO’s estimates, the total amount of saving available for investment is less than it otherwise would be (all else being equal), which tends to reduce the amount of capital per worker and thereby push up interest rates. (CBO estimates that this effect will only partially offset the positive effect of increased income inequality on saving, leaving a net increase in savings 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 1990–2007 period. As economic and financial conditions in those economies continue to improve, they will become increasingly attractive destinations for foreign investment. CBO projects that development would put upward pressure on interest rates in the United States.

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

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

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

Projections of Interest Rates. The nominal interest rate on 10-year Treasury notes is projected to average 4.0 percent over the 2019–2049 period and to reach 4.6 percent in 2049. The real interest rate on 10-year Treasury notes is projected to average about 1.6 percent and, at the end of the period, to be 2.2 percent.

The average interest rate on all federal debt held by the public tends to be lower than the rates on 10-year Treasury notes because interest rates are generally lower on shorter-term debt than on longer-term debt and because Treasury securities are expected to mature, on average, over periods of less than 10 years.²⁵ CBO projects a 0.4 percentage-point difference between the rate on 10-year Treasury notes and the effective rate on federal debt over the 2030–2049 period. That difference is projected to average 0.6 percentage points over the next decade. The difference is larger over the coming decade than for later years because a significant portion of federal debt that will be outstanding during the next 10 years was issued at the very low interest rates prevailing in the aftermath of the 2007–2009 recession. (The average interest rate on all federal debt changes more slowly than the 10-year rate because only a portion of federal debt matures each year.) Thus, in CBO’s

25. In particular, 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.

projections, the average nominal interest rate on all federal debt held by the public is about 3.6 percent for the 2019–2049 period and reaches 4.2 percent in 2049.

The Social Security trust funds hold special-issue bonds that generally earn interest at rates that are higher than the average rate on federal debt. In CBO's projections, the nominal interest rate on bonds newly issued to the trust funds is equal to the rate on 10-year Treasury notes and averages 4.0 percent over the 2019–2049 period and reaches 4.6 percent in 2049. The corresponding real rates are 1.6 percent, on average, over the full period and 2.2 percent in 2049.

Because interest rates have been low for much of the past decade, CBO projects that the average interest rate earned by all bonds held by the Social Security trust funds (both new and previously issued) would be slightly lower than the interest rate on newly issued bonds over the next decade. The average interest rate on all bonds, which CBO uses to calculate the present value of future streams of revenues and outlays for those funds, is projected to average 3.8 percent over the 2019–2049 period.²⁶

Changes in Projections of Interest Rates Since Last Year. CBO's current projections of interest rates are lower than last year's. The real rates on 10-year Treasury notes and the Social Security bonds are projected to average 1.6 percent over the 2019–2049 period and to be 2.2 percent in 2048. Last year, CBO projected that both rates would average 1.7 percent over the 2018–2048 period and would be 2.4 percent in 2048.

26. 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 interest rates are different from last year's mainly because they are now based on a more comprehensive assessment of how changes in private investment affect the capital stock and thus the return on capital. Changes in the return on capital are estimated to drive changes in interest rates across the economy. Previously, changes in CBO's measure of capital services owing to changes in investment in essence incorporated effects only on nonfarm business capital. Now, changes in capital services from changes in investment incorporate effects on a broader range of capital, including owner-occupied residential housing.

That modeling improvement results in a smaller estimated effect on capital services from a change in investment (because of larger deficits and more crowding out, for example). Because CBO now incorporates the effect of changes in a capital stock measure that is more comprehensive this year than it was last year, any given change in private investment results in a smaller percentage change in the agency's capital stock measure than it did last year. In addition, residential housing depreciates more slowly than most other forms of capital, so the immediate effect of residential investment on residential capital is relatively small. The smaller percentage effect on capital results in a smaller change in the return on capital and ultimately a smaller change in interest rates resulting from a change in investment.

Because of that modeling improvement, changes in deficits have a smaller effect on interest rates in this year's extended baseline projection. That occurs even though CBO has not changed its assessment of how changes in deficits affect private investment. In addition, slower growth in both the labor force and TFP imply slightly lower returns on capital and, in turn, lower interest rates. All told, the average projected interest rate on 10-year Treasury notes over the 2019–2048 period is 0.1 percentage point lower than CBO projected a year ago.