

## Assumptions Used to Evaluate Social Security's Financial Condition

NOVEMBER 2020

### The Importance of Assumption-Setting for Social Security Valuations

- Since the 1980s, the *Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds* has consistently indicated that, in the absence of corrective legislation, assets currently in the trust funds plus future payroll tax income will not be sufficient to finance all scheduled benefits over the 75-year valuation period.
- The trustees are not the only ones making projections about Social Security's future. Within the federal government, the Congressional Budget Office makes its own projections. Actuaries and other experts from think tanks, academia, and the private sector also make such projections.
- All of these projections rely on assumptions about future demographic and economic trends because the future cannot be known with any certainty. The selection of assumptions affects the results of any projection and, hence, the policy prescriptions of anyone relying on such a projection.
- The Trustees Report describes in detail the assumptions used by the trustees and the rationale behind these assumptions. It is important that any report about Social Security's future include a description of the assumptions used in the calculations.
- Likewise, it is important that anyone reading these reports understand how differences in assumptions affect the results.

### Background

Since Social Security's earliest days, its Board of Trustees has reported annually to Congress on the projected long-range financial status of the system. The trustees base their projections on actuarial assumptions. The actuaries at the Social Security Administration make initial recommendations for these assumptions, but the trustees have the ultimate responsibility for setting the assumptions. The final assumptions selected by the trustees are subject to review by the chief actuary of the Social Security



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Administration, whose Statement of Actuarial Opinion in the report includes an opinion as to whether the assumptions are reasonable. To date, the chief actuary has always found the trustees' assumptions reasonable. Based on these assumptions, the actuarial staff of the Social Security Administration prepares the projections that are presented by the trustees.

The projections cover a 75-year period in order to assess the adequacy of financing over the lifetime of virtually all current program participants. The actuaries typically use year-by-year assumptions about a number of critical economic and demographic parameters for the first 10 to 25 years of the projection period and then apply "ultimate" rates over the remainder of the 75-year period. The Trustees Report describes in detail the assumptions used.

Each year, the Social Security program gains another year of actual experience that can affect the projections in two ways. First, if experience is more favorable than projected in the aggregate, the system's projected financial status improves; if experience is less favorable, the projected financial status worsens. Second, emerging experience constitutes additional evidence that can be used for setting assumptions. For example, if mortality improves more rapidly than expected, then the assumed future rate of mortality improvement might be adjusted to reflect that trend. The normal process provides for monitoring experience to detect any differences between actual experience and past projections and for fine-tuning assumptions based on the results of this analysis. When a change occurs in some demographic or economic factor, no one can determine immediately whether the change represents a short-term fluctuation or a long-term trend, just as no one can know if a week without rain is the beginning of a drought. For this reason, changes in assumptions generally lag behind changes in the underlying demographic and economic experience. The actuaries and trustees use judgment about the reliability of past experience when deciding if and when to revise an assumption.

Members of the Social Security Committee include Ron Gebhardtsbauer, MAAA, FSA—*Chairperson*; Amy Kemp, MAAA, ASA, EA—*Vice Chairperson*; Janet Barr, MAAA, ASA; Gordon Enderle, MAAA, FSA; Margot Kaplan, MAAA, ASA, FCA; Eric Klieber, MAAA, FSA; Alexander Landsman, MAAA, FSA, EA; Leslie Lohmann, MAAA, FSA, FCA, FCIA, EA; Gerard Mingione, MAAA, FSA, FCA, EA, CERA; and Brian Murphy, MAAA, FSA, FCA, EA.

Every four years since 1999, the Social Security Advisory Board has appointed a technical panel composed of leading economists, demographers, and actuaries from outside the Social Security Administration to review the trustees' assumptions. The technical panel provides independent analysis of the trends affecting Social Security's finances. In the past, these panels have concluded that the trustees' assumptions are reasonable. However, reasonableness is a range, and there can be disagreement regarding the best possible assumptions within that range. The technical panels frequently recommend specific changes to the assumptions. The trustees weigh these recommendations carefully and sometimes make changes to their assumptions based on these recommendations, although they may also choose not to follow the recommendations. In the end, the trustees have the final say regarding the assumptions.

The Trustees Report presents three projections: intermediate, low-cost, and high-cost. The intermediate, or "best estimate," projection is the one usually cited by policymakers and the news media. The low-cost and high-cost projections show how the results of the projection would change under alternative sets of assumptions that are, respectively, very favorable and very unfavorable for the system's finances. The alternative assumption sets include the following key variables: levels of fertility, rates of change in mortality, immigration levels, changes in the consumer price index, changes in average real wages, unemployment rates, trust fund returns, and disability incidence and recovery rates. Although these alternative assumption sets differ substantially from the best estimate assumptions, the trustees believe they represent possible, if unlikely, scenarios for the future that contrast with the best estimate assumptions.

The Trustees Report also includes sensitivity analyses that show how the results of the projection would change if each key variable cited above is changed one by one to its value under the low-cost or high-cost assumption set while the other assumptions remain at their intermediate-cost values. Finally, the Trustees Report includes an analysis of the results from a stochastic model of the system. In 5,000 independent runs of the projection system, referred to as simulations, the value of each key variable is allowed to vary according to a pattern under which the average value across the simulations equals the value under the intermediate assumption set, and the variation of the values among the simulations follows historical patterns. The results of these runs are analyzed statistically to draw conclusions about the probabilities that actual long-term system performance will lie in different ranges. This methodology is described in more detail in the Academy's issue brief [\*A Guide to the Use of Stochastic Models in Analyzing Social Security\*](#).

Every recent Trustees Report has projected that, under the best estimate assumptions, assets currently in the trust funds plus future income from the payroll tax and other sources will not be sufficient to finance all scheduled benefits over the 75-year projection period. As part of its regular duties, the Office of the Chief Actuary of the Social Security Administration (OCACT) provides analyses of legislative proposals submitted by members of Congress and, sometimes, by experts outside of the government intended to eliminate this actuarial deficit and thereby bring the system back into actuarial balance. To the extent possible, these analyses use the same assumptions as the most recent Trustees Report. When a proposal requires introduction of an assumption not required for the Trustees Report, that assumption is chosen by OCACT consistent with the demographic and economic trends reflected in the best estimate assumptions. For example, proposals that involve investing some or all of the trust fund assets in private-sector securities require adding an assumption regarding future investment returns from such securities.

The Congressional Budget Office (CBO) makes its own projections of Social Security's financial condition. In a December 2019 report, CBO projects a 75-year deficit significantly larger than that projected in the 2019 Trustees Report.

Experts outside the government have also performed independent analyses of various reform proposals. These experts also use assumptions in their projections of Social Security's financial future that may differ from those used by the trustees. Because small changes in assumptions can have large effects on cost estimates over long periods, even when the assumptions used in these analyses appear to closely match those used by government actuaries, it is possible to skew the results, intentionally or unintentionally, to favor one proposal over another.

This issue brief describes the assumptions that must be made in any actuarial projection of the Social Security program's finances and explains how different assumptions affect the projections. The issue brief cites the specific assumptions used in the [2019 Trustees Report](#), and in [CBO's 2019 Long-Term Social Security Projections](#). This is the latest year for which both reports are available when this issue brief was prepared. These assumptions are subject to change in subsequent reports. These specific assumptions are used for purposes of illustration, but are not the primary subject of the issue brief, which is how the choice of assumptions affects the results of the projections. After publication of the Trustees Report each year, the Social Security Committee of the American Academy of Actuaries updates its issue brief, [An Actuarial Perspective on the Social Security Trustees Report](#), which describes the specific assumptions the trustees used in their most recent report and any major changes since the previous report. As of this writing, the effects of the COVID-19 pandemic have not been factored into the trustees'

assumptions. The 2021 update of this issue brief will report any changes the trustees made to their assumptions due to the pandemic and how these changes affect the system's long-term actuarial balance.

## Assumptions

The assumptions used for Social Security's financial projections fall into two broad categories—demographic and economic. Demographic assumptions are used to project the future population of Social Security participants and provide a basis for estimating the number of workers paying into the system and the number of beneficiaries receiving benefits. Economic assumptions are used to project wages and the resulting taxes paid into the program, benefit payments, and the investment income on the system's accumulated assets. Together, these factors are used to calculate the system's projected annual income and expenses.

Although the assumptions are described one by one, they are not independent of one another. Factors underlying the various economic assumptions tend to move together as the economy experiences short-term cyclical ups and downs and longer-term trends. For example, real wage growth, interest rates, and labor force participation rates all tend to be higher and unemployment rates lower during periods of rapid economic growth. Factors underlying many of the demographic assumptions also respond to changes in the economy. For example, birth rates and immigration rates tend to be higher and disability rates lower during favorable economic periods. In all these examples, the effect is the opposite when the economy falls into recession. For the intermediate assumption set, the trustees take these relationships into account when setting year-by-year assumptions early in the projection period, but later in the projection period, when the amplitude and timing of the economic cycle are no longer predictable, the trustees use constant ultimate assumptions. When setting the low-cost and high-cost assumptions, however, the assumptions that yield the lowest and highest costs are grouped together even though the resulting combinations may not yield a likely scenario.<sup>1</sup>

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<sup>1</sup> There is one exception to this rule: The inflation assumption is higher in the high-cost estimate and lower in the low-cost estimate, although higher inflation improves the actuarial balance.

## Major Demographic Assumptions

*Fertility:* As workers retire, they are replaced by new entrants into the labor force, most of whom are born in this country. The trustees use an assumed rate of birth for women at each age from 14 to 49. These are summarized by the fertility rate, or average number of children born to a woman during her lifetime (if she survives to age 49), which is the primary determinant of whether the number of new workers will be sufficient to pay for the benefits promised older workers, assuming current-law tax rates. A higher fertility rate increases the number of workers coming into the system, improving overall finances. The total fertility rate fell from 3.7 in 1957 to 1.74 during the mid-1970s, recovered to slightly over 2.0 from 1990 to 2009, then fell below 1.9 in the wake of the recession of December 2007–June 2009. The trustees cite several factors that have contributed to the decline in fertility since the baby boom, including higher educational attainment and labor force participation among women, delayed marriage and higher divorce rates, and widespread adoption of medical birth control methods. Although fertility rates have yet to rebound from their recent post-recession low, based on consideration of these factors the trustees predict a gradual increase to an ultimate rate of 2.0.

When the fertility rate is adjusted to exclude children who do not survive to age 10, and who therefore never participate in Social Security, the rate stayed generally constant at approximately 3.0 from the early 20th century up to the 1960s, except for a period of low fertility during the Depression and World War II and a period of high fertility during the baby boom from 1946 to 1964. With improvements in health care, sanitation, and nutrition, the adjusted fertility rate today is only slightly lower than the unadjusted rate. The rapid decline in the adjusted fertility rate from 3.0 to 2.0 during the 1960s and 1970s is one of the principal factors underlying the expected decrease in the number of covered workers per beneficiary, historically over 3.0 and currently 2.8, to 2.1 by the end of the projection period. This, in turn, is a primary reason that future income, supplemented by current trust fund assets, is projected to fall short of the level necessary to pay all scheduled benefits starting in 2035.

*Immigration:* Immigration also accounts for some new entrants into the labor force. Indeed, if the fertility rate remains at or below the replacement level (approximately 2.1 births per woman), then any long-term population growth must come from net immigration (i.e., immigration less emigration). Most immigrants are young and have all or most of their working lifetimes ahead of them when they enter the country, while emigrants are more likely to be in the older part of the age spectrum. As a result, a higher net immigration rate, like a higher fertility rate, tends to improve overall system finances.

Social Security projections take into account both lawful permanent residents (LPRs) and other-than-LPRs. The former include permanent residents authorized to live and work in the United States and refugees. The latter include workers, students and tourists with temporary visas and undocumented immigrants. The trustees make five independent assumptions regarding the annual rate of immigration: LPRs entering and leaving the country, other-than-LPRs entering and leaving the country, and other-than-LPRs adjusting their status to become LPRs. From these, the trustees derive the net annual level of LPR and other-than-LPR immigration.

Net LPR immigration has increased substantially since World War II, driven primarily by legislative increases in immigration quotas. In the years following the 2007–2009 recession, net annual LPR immigration held steady at just under 800,000 for five years, increased to a peak of 877,000 in 2016, and then fell back to 803,000 in 2018. Immigration has become a highly contentious political issue, and changes in immigration policy through either executive action or legislation could result in unpredictable changes to immigration patterns. Under the intermediate assumptions, net annual LPR immigration is projected to remain level at 788,000, slightly below the 2018 level.

The other-than-LPR population is subject to much uncertainty because reliable data about undocumented immigrants is difficult to obtain. Based on the best available evidence, net annual other-than-LPR immigration declined from over 1 million in the years immediately preceding the 2007–2009 recession to negligible levels in the years immediately following the recession, then recovered to an average of just over 500,000 from 2014 to 2018. In their 2019 report, the trustees project a short-term increase in net annual other-than-LPR immigration to 625,000, followed by a gradual decline due to an increase in the number of other-than-legal immigrants leaving the country.

*Mortality:* The mortality assumption is perhaps the most publicly debated of the demographic assumptions. The mortality assumption is used to estimate, among other things, how long retired and disabled workers and their survivors are projected to receive benefits. The mortality assumption also determines how many workers are expected to die before retirement, often resulting in payments to survivors. Except for short periods, such as during epidemics, mortality has declined throughout the history of the Social Security program, and the trustees project that this trend will continue.

When developing their mortality assumption, the trustees take into account trends in deaths due to specific causes, but the assumption itself varies explicitly only by sex and age. Many studies, including [one by OCACT](#), show that mortality also varies by earnings, with low-earning individuals having higher mortality than high-earning individuals. Other factors, such as marital status, place of residence, and education, are also correlated with mortality, although because these factors are all correlated with one another, it can be difficult to tease out the independent contribution of each. The trustees take into account differential mortality among subgroups of beneficiaries implicitly in the average benefits assumption described below.

Although pre-retirement mortality improvement reduces the cost of survivor benefits, it also increases the number of workers who reach retirement age. Post-retirement mortality improvement results in longer lifetimes for those receiving benefits and generally has a much greater impact on the total cost of benefits. Increases in life expectancy accelerated greatly in the 1970s, leading the trustees to lower the mortality rates used for Social Security projections. Since then, life expectancy has increased more slowly, and the mortality rates used in the projections have been updated less frequently than in the past. In each year since the 2007–2009 recession, mortality experience has been slightly higher than predicted by the trustees' assumption, but not enough to lead the trustees to change their projections for future improvement.

The future rate of decline in mortality is the subject of much debate. There is certainly potential for a more rapid decline in mortality based on medical advances that slow disease development or allow better management of chronic conditions, such as heart disease, cancer, and stroke. But it is also difficult, if not impossible, to anticipate new diseases that may surface in the coming decades, the effect of lifestyle changes (e.g., less smoking but more obesity), how rapidly medical breakthroughs will be accessible to the general population, and whether new treatments will be affordable. There is general agreement that mortality will continue to decline in the future—the issue is the pace at which these declines will occur.

*Disability:* The disability-incidence assumption is the most important determinant of the projected cost of the disability insurance (DI) portion of Social Security. Social Security law provides objective criteria for determining when covered workers become eligible for disability benefits, although some degree of subjectivity is inevitable in applying the law. Partly for this reason, disability incidence rates tend to be cyclical, depending on the health of the economy and, to some extent, political and social attitudes toward disability. A surge in disability incidence rates following the 2007–2009 recession was followed by



an unexpected decline to levels significantly lower than pre-recession rates. When these lower disability incidence rates persisted for several years, the trustees lowered their ultimate disability incidence assumption in the 2019 report, thus cutting the long-term actuarial deficit for the DI program by nearly half compared to 2018.

## Major Economic Assumptions

*Rate of Increase in Nominal Covered Earnings:* The increase in nominal wages earned by workers from year to year affects both the revenue received and benefits paid by Social Security. As wages increase, taxes on those wages increase, raising revenue immediately. In contrast, these wage increases are reflected in higher benefits gradually as current workers retire or die. Thus, wage increases reduce the actuarial deficit, and this effect is greater the more rapidly wages increase. The trustees' estimate of the annual rate of increase in nominal covered wages is derived from the following five factors. The net result is an ultimate annual rate of increase of 3.81%.

- *Productivity Increases:* Wage increases are made possible by increases in worker productivity. Productivity is defined as the ratio of real gross domestic product (GDP)<sup>2</sup> to hours worked by all workers. Because production is the ultimate source of workers' compensation, it should not be surprising that increases in productivity give rise to higher compensation. Since the 1960s, annual increases in productivity have generally ranged from 1% to 3%, averaging about 1.8%. However, since 2010 the rate of increase has not exceeded 1%. In their 2019 report, the trustees assume a rapid transition to an ultimate rate of 1.63% beginning in 2023.
- *Change in Average Hours Worked:* Because productivity is the ratio of real GDP to hours worked, multiplying the ratio of productivity in successive years by the ratio of average hours worked in successive years yields the growth rate of real GDP per worker. Over the past 40 years, the average annual hours worked has declined at an average rate of 0.3% per year, partly because the labor force has included an increasing proportion of women, older workers, and part-time workers, all of whom work fewer hours on average. This trend has offset some of the effect of improvements in productivity on workers' compensation. The trustees assume the average hours worked will decline at an annual rate of 0.05% per year for the indefinite future, much more slowly than the historical rate. This projection reflects their assessment that most factors underlying the past trend will not continue into the future.

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<sup>2</sup> Real GDP is a measure of the total value of goods and services produced in the United States that has been adjusted for price increases so that any changes in the dollar value from year to year reflect only "real" growth and not growth due to price increases.

- *GDP Price Index:* Increases in the nominal value of worker production—that is, the value measured in current dollars—are due partly to inflation, which is measured by the price index for gross domestic purchases (also known as the GDP deflator). This is different from price inflation measured by the consumer price index (CPI), because it applies to goods produced in the United States, while the CPI applies to goods consumed in the United States, including imports but excluding exports. There are other technical reasons why the two indices differ. Multiplying the growth rate of real GDP by the GDP price index yields the growth rate of nominal GDP. Like the CPI, the GDP price index has varied widely over the past several decades, averaging a few tenths of a percentage point lower than the CPI. The trustees assume the GDP price index will settle at 2.25% in 2021.
- *Ratio of Total Labor Compensation to GDP:* Total labor compensation is the value of all remuneration, both in cash and in kind, received by workers in exchange for their labor. Generally, total labor compensation grows in tandem with nominal GDP. However, the ratio of total labor compensation to GDP can change over time. This ratio has declined from an average of about 65% in the 1950s and '60s to about 61% over the most recent decade. When the ratio is declining, total labor compensation grows more slowly than GDP. Conversely, when the ratio is increasing, total labor compensation grows more rapidly than GDP. The trustees assume the ratio will trend back upward to an ultimate constant ratio of 63.2% in 2028.
- *Ratio of Covered Earnings to Total Labor Compensation:* Social Security benefits are based only on covered earnings, including wages and self-employment income, but excluding fringe benefits such as health insurance premiums and employer contributions to retirement plans. From 1969 to 2009, the portion of total compensation paid to employees as wages declined on average 0.2% per year, due largely to increases in the cost of employer-provided health insurance. With the passage of the Patient Protection and Affordable Care Act of 2010 (PPACA), the trustees expected growth in the cost of employer-provided health insurance to moderate somewhat, and this has proved to be the case. Based on recent experience under PPACA and projections of national health expenditures, the trustees have adopted a long-term assumption regarding the annual decline in covered wages relative to total employee compensation of 0.05% per year.

While all these factors play an important role in projecting the rate of increase in nominal covered earnings, productivity and the GDP price index have historically fluctuated more than the other three and thus contributed more to changes in the rate of increase, and this is expected to continue in the future.

*Taxable Earnings:* The formulas for computing Social Security taxes and benefits include covered wages only up to a limit, called the contribution and benefit base. The amount of this limit was \$132,900 in 2019; this amount is adjusted each year according to the average wage index, which tracks year-to-year changes in the National Average Wage. Projecting payroll tax income to the system requires projecting the portion of covered earnings up to the contribution and benefit base—that is, taxable earnings. After a series of ad hoc increases to the contribution and benefit base in 1979, 1980, and 1981, the ratio of taxable to covered earnings was about 90%. This ratio fell to 82.6% in 2000, and has since varied up and down with the business cycle. The trustees assume this ratio will settle at 82.5% after 2028.

*Consumer Price Index:* Since 1975, Social Security benefits in pay status have been adjusted based on increases in the cost of living, so that the buying power of benefits keeps pace with inflation. These adjustments are determined once a year in October (applicable to the following January benefit payment) based on increases in the consumer price index for urban wage earners and clerical workers (CPI-W), calculated by the Bureau of Labor Statistics. The assumed annual increase in the CPI affects projected future benefit payments. The CPI has been trending downward from an average of 4.5% in the 1980s, 2.7% in the 1990s, 2.4% in the 2000s, to 1.7% since 2010. The trustees assume a rapid increase to 2.6% in 2022.

*Increases in Real Wages:* The increase in nominal wages minus the increase in the CPI is called the real-wage differential—the increase in the buying power of wages after adjustment for price increases. The projected rates of increase in wages and prices are both assumptions discussed above. Beginning in 2028, the projected rate of increase in wages is 3.81%, and of prices 2.6%, yielding a real wage differential of 1.21%. If all the factors that determine benefit amounts were adjusted according to the average wage index, wage increases would have a relatively small positive effect on system finances. However, because benefits after commencement are indexed to the CPI-W, any excess of wage over cost-of-living increases has a much larger positive effect on system finances. Indeed, the average future rate of increase in real wages is one of the most important factors affecting the financial health of Social Security.

*Labor Force Participation Rates:* Labor force participation rates measure the proportion of the working-age population that is employed, self-employed, or looking for paid work. The labor force includes workers with earnings covered by Social Security, those in non-covered employment, and the unemployed. Everything else being equal, a higher labor force participation rate improves the program's financial condition for two reasons. First, it increases tax revenue *earlier* than it increases the resulting benefits, which improves

the actuarial balance due to the time value of money as long as the interest rate exceeds the rate of inflation. Second, it increases tax revenue *more* than it increases benefits, primarily because the proportion of two-earner married couples increases, and the additional payroll tax paid by the lower-earning spouse provides additional benefits only to the extent that worker benefits based on that spouse's own wage record exceed spouse benefits based on the higher-earning spouse's wage record.

An important consideration for Social Security is labor force participation rates at ages when old age benefits are payable, i.e., beginning at age 62. Participation in the labor force among potential workers at these ages correlate with patterns of retirement—lower participation rates mean workers are retiring earlier and vice versa. Labor force participation rates at ages 60 through 64 have changed considerably for both men and women. Before 1985, the labor force participation rate for men at ages 60 through 64 had been decreasing dramatically, from more than 80% in 1962 to 56% in 1985. The rate then leveled off for a period before beginning a slow increase, due in large part to improved health and the need to work longer to save for a longer period of retirement. The pattern for women has been steadily increasing labor force participation rates at all ages since the early 20th century, with particularly dramatic increases from the late 1960s until about 1980. Since then, the rates for women have leveled off at rates somewhat lower than for men. Increased labor force participation among older women reflects this long-term trend. The trustees have concluded that the incentives for remaining longer in the labor force are permanent and, as a result, have increased the assumed labor force participation rates at older ages in recent reports.

Possible changes in the labor force participation rate in response to demographic changes predicted for the next several decades are among the greatest uncertainties in projecting the future financial condition of Social Security. With expected slower growth in the population at traditional working ages, workers will need to work to older ages to maintain the current level of labor force participation across the entire population. For this to occur, workers must both choose to work longer and be able to work longer, and employers must choose to continue employing them or to hire them when they are looking for employment. The trustees assume the labor force will grow at 0.8% per year for the next 10 years and 0.4% per year thereafter.

*Unemployment:* The unemployment rate measures the proportion of workers participating in the labor force but unable to find work. Higher unemployment reduces program income. Unemployment also reduces benefits, but the effect is much smaller and is largely deferred. High unemployment therefore adversely affects the program's financial health. But temporary shifts in the level of unemployment do not have as significant

an impact on system finances as do some of the other factors discussed here. The spike in the unemployment rate due to the 2007–2009 recession caused benefit payments to overtake payroll tax income about five years earlier than predicted before the recession but did not have a large effect on the system’s long-range finances. The trustees assume that unemployment will increase from recent low rates to 5.5% by 2023 and remain at that level thereafter.

*Real GDP Growth:* As with the real wage differential, the trustees do not directly make an assumption regarding the annual growth of real GDP. The trustees estimate real GDP growth from the assumed growth in productivity, average weekly total employment, and average hours worked. Average weekly total employment depends, in turn, on population projections, labor force participation rates, and unemployment rates. From an average of over 4% per year in the 1960s, real GDP growth leveled off at around 3% per year until the 2007–2009 recession, but has since managed only 1.6% per year during the current economic recovery. This pattern reflects the influx of baby boomers and women into the labor force starting in the 1960s, followed by a leveling off of labor force participation, and then by the beginning of the retirement of the baby boomers in the years following the 2007–2009 recession. Without an increase in labor force participation at older ages or unexpected increases in fertility or net immigration, the labor force component of real GDP growth will continue to slow, causing real GDP growth to decline absent a compensating rise in productivity. Under the trustees’ intermediate assumptions, real GDP is projected to grow at about 2.3% per year for the next 10 years, and at about 2.0% per year thereafter.

*Interest Rates:* Social Security trust fund assets are invested in special-issue Treasury securities. These securities pay interest at the average rate for Treasury securities issued to the public that are at least four years from maturity. Thus, the interest-rate assumption approximates the yields on intermediate-term Treasury securities. Interest rates affect Social Security in two ways. First, a higher interest rate raises the return on the system’s accumulated assets and thus improves the financial condition of the program; a lower rate has the opposite effect. Second, a higher interest rate reduces the present value of the program’s long-term actuarial deficit.

Real interest rates (i.e., nominal interest rates less inflation) have varied widely over the past several decades. During the 1980s, the real interest rate averaged 6%, and then declined steadily to about 2% immediately before the 2007–2009 recession. Following the recession, the real interest rate declined dramatically, and since 2010 has averaged less than 0.5%. The trustees assume this rate will recover from the current low level to 2.5% by 2030.

*Average Benefits:* The Social Security trustees do not project future program benefit payments by adding up the expected payments to individual beneficiaries, but by projecting average benefits for categories of beneficiaries defined by sex, age, and status—i.e., non-disabled and disabled workers, spouses and other dependents—and multiplying those average benefits by the projected number of beneficiaries in each category based on the demographic assumptions. The projected average benefits are based on recent historical averages projected forward using the assumed rate of wage increase and other economic assumptions. In this way some of the factors that affect benefit amounts are incorporated into the projection only implicitly. For example, because low-earning individuals have higher mortality than high-earning individuals, average benefits increase more rapidly as beneficiaries age than they would otherwise because low earners, who have lower benefits, drop out of the payment pool on average at earlier ages. Thus, the differential mortality between low and high earners is reflected in the projected rate of increase in average benefits with age rather than as an explicit assumption. Other factors correlated with mortality, such as marital status and education, are reflected similarly.

## Congressional Budget Office Assumptions vs. Social Security Trustees Intermediate Assumptions

CBO projects Social Security's long-term financial status as part of its annual Long-Term Budget Outlook. Later, CBO issues a separate report focused exclusively on Social Security, which includes a comparison with the most recent projection by the Social Security trustees. This report, issued most recently in December 2019, projects an OASDI 75-year actuarial deficit of 1.53% of GDP, versus 0.99% based on the intermediate assumptions in the 2019 Trustees Report, or 4.56% of the taxable wages versus 2.78%. The disparity in these results is attributable mostly to the following:

- CBO uses an ultimate fertility rate of 1.9 children per woman versus 2.0 children per woman by the trustees, resulting in a smaller population of workers paying taxes into the system.
- CBO raised its projected near-term mortality rates and lowered its projected rate of future mortality improvement in 2019, but still predicts a slightly more rapid improvement in mortality than the trustees. Also, in contrast to the trustees, CBO projects future benefits for a large sample of individual participants rather than projecting average benefits for a small number of participant groups, as in the trustees' projection. This enables CBO to vary its mortality assumption explicitly not only by sex and age, but also by marital status, education, disability insurance status, and lifetime household earnings. The net result is that CBO predicts beneficiaries will receive benefits for a longer period on average than the trustees.

- CBO predicts a different pattern for net immigration, with slightly lower rates in the near future and a slightly higher ultimate rate than the trustees.
- CBO projects that compensation as a percent of GDP will level off at 62.0%, versus 63.2% according to the trustees, resulting in lower taxable wages and, hence, lower contribution income.
- CBO projects that the disparity in wages between high and low income workers will increase, with the result that taxable wages as a percent of all wages will fall from the current 83.0% to 79.3%, versus 82.5% according to the trustees.
- CBO predicts the real interest rate on 10-year Treasury notes will settle at 2.2% in 2049, versus 2.5% in 2034 according to the trustees, so that future benefit payments are discounted at a lower rate by CBO.
- CBO projects ultimate rates of annual productivity increases, inflation, and unemployment at 1.5%, 2.4%, and 4.5%, respectively, versus 1.6%, 2.6% and 5.5% according to the trustees. The net effect of these factors plus the demographic factors described above is that the working-age population under the CBO projection will produce less and thus be less able to support both itself and the retired population.

The following table summarizes the reasons for the differences in the projected long-term actuarial deficit between the 2019 CBO projection and 2019 Social Security Trustees Report:

Reason for Difference	Expressed as a Percent of GDP	Expressed as a Percent of Taxable Wages
Trustees Report Deficit	0.99	2.78
Change Due to Demographic Assumptions	0.13	0.40
Change Due to GDP Projections	0.12	0.36
Change Due to Wage Projections	0.11	0.57
Change Due to Interest Rate	0.06	0.18
Change Due to Other Assumptions	0.01	0.00
Change Due to Differences in Methods	0.10	0.27
CBO Deficit	1.53	4.56

Source: [CBO's Long-Term Social Security Projections: Changes Since 2018 and Comparisons With the Social Security Trustees' Projections](#)

The table shows how small assumption differences can produce significant changes in results when accumulated over a 75-year projection period.

## Social Security Reform and the Equity Return Assumption

Some Social Security reform proposals call for investing a portion of trust fund assets in private-sector securities, particularly equity securities such as stocks. Some of these proposals would allow workers to set up individual accounts; others would continue the current arrangement in which the government directly invests all of the system's accumulated assets. Advocates assert that investing payroll taxes in equity securities would provide a better return than the special U.S. government securities used by the current program. This claim is based on historical data showing that equity investments have consistently outperformed U.S. government interest-bearing securities over long periods—20 years, for example. Although the annual real rate of return on equities is not an assumption used in the annual report, such an assumption must be made to evaluate any reform proposals involving equity investments. The higher the assumed real rate of return on stocks, the more proposals for investing Social Security assets in equities appear to improve the program's financial position.

Many economists question whether actuarial projections for any purpose should include an assumption that the past superior long-term performance of stocks over other investment alternatives will continue. In addition, recent volatility in the securities markets has focused investors' attention on the greater risks inherent in equity investments. These issues are explored in depth in the Academy issue brief [\*Investing Social Security Assets in the Securities Markets\*](#). Given the high degree of uncertainty regarding the future performance of the securities markets, it is important when evaluating any reform proposal that changes the way Social Security assets are invested to use a range of possible investment return scenarios to illustrate this uncertainty. In its formal analyses of legislative proposals that include investment of trust fund assets in private-sector securities, OCACT shows results using two different assumptions that take into account historical higher rates of return on equities as well as an assumption that returns will equal those expected for risk-free securities.



## Assumptions Over an Infinite Time Horizon

Since the 2003 report, the trustees have included the program's unfunded obligations and actuarial balance over an infinite time horizon. Given the uncertainty of projections 75 years into the future, extending these projections into the infinite future can only increase the uncertainty, so these results might have little or no value for policymakers. This is due to anomalies and incongruities that inevitably arise from extending any set of long-range actuarial assumptions to infinity. For example, extending the assumptions used for labor force participation rates and mortality improvement leads ultimately to a situation in which the typical worker is expected to receive benefits for a period longer than he or she has paid into the system. It is not surprising that the OASDI program cannot sustain itself indefinitely under these assumptions without a significant increase in the payroll tax rate. It seems unreasonable to argue that workers will not extend their working years longer than currently projected, based on extended years of ability to work and the need to save more (beyond Social Security benefits) to fund a lengthened period of retirement.

Mortality improvement by itself has a major impact on Social Security's projected financial status and presents great difficulties when making long-range projections. The controversy surrounding the assumed rate of mortality improvement in the 75-year projection has already been described. Given these sharp disagreements among experts over projecting mortality for 75 years, the futility of reliably projecting mortality over an infinite time horizon becomes apparent.

## Conclusion and Recommendations

As baseball legend Yogi Berra once observed, "It's tough to make predictions, especially about the future." Reasonable people can and do disagree about economic and demographic conditions 25, 50, or 75 years into the future. Yet making such assumptions is critical for evaluating the current status of the Social Security program and the various proposals for reforming it.

There are always those who question whether the Social Security trustees' assumptions are the best basis for evaluating the financial condition of Social Security and the impact of various reform proposals. There are certainly other assumptions that can be characterized as reasonable. And even small changes in assumptions over a 75-year projection period can lead to large changes in the results. Any projection over a 75-year period is subject to a high degree of uncertainty. The trustees' intermediate assumptions are what they are described to be—a best estimate of future demographic and economic trends based on careful study and analysis of all available data.

A number of different proposals for Social Security reform are before the public. When evaluating these potential changes, it is recommended that policymakers be aware of the demographic and economic assumptions that underlie the analyses. In some cases, the potential advantages of a particular reform proposal may depend as much on the assumptions used as on the proposal's actual provisions. In addition, policymakers should take care to assess whether assumptions are used consistently across all proposals that are being compared.

The following might be considered to provide a higher level of confidence to people trying to understand the financial status of the Social Security program and to compare the various proposals for reforming it:

1. All analyses of Social Security reform proposals that include financial projections disclose the key assumptions used.
2. Any such analysis use assumptions that are internally consistent.
3. In situations where substantial uncertainty exists as to the appropriate value of a critical assumption, sensitivity analysis or a range of assumptions be provided.
4. In view of the wide attention given to the annual publication of the trustees' report, reform proposals include an analysis using the assumptions from the most recent Trustees Report to facilitate comparison by the public.

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