American Academy of Actuaries

Issue Brief

Assumptions Used to Evaluate Social Security's Financial Condition

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The Importance of Assumption-Setting for Social Security Valuations

Amendments to Social Security adopted in 1983 briefly brought the program into actuarial balance, but since the late 1980s, the annual report to Congress by the Social Security Board of Trustees (the Trustees Report) has consistently indicated that, in the absence of corrective legislation, 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 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 assessment of policy proposals by anyone relying on such a projection.

The Trustees Report describes in detail the assumptions used by the trustees and the rationale behind these assumptions, providing excellent material for illustrating the practical effects of the many assumptions covered in this issue brief. 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.

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Background

Since 1965, the annual Trustees Report has included a projection of the long-range financial status of the Social Security system (the "system"). The trustees base their projections on actuarial assumptions. The Office of the Chief Actuary (OCACT) at the Social Security Administration makes 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 personal review by the chief actuary, 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, OCACT 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 assumptions about a number of critical economic and demographic parameters that change year by year 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, it is difficult to determine immediately whether the change represents a short-term fluctuation or a long-term trend. For this reason, changes in assumptions generally lag behind changes in the underlying

The 2023 Social Security Committee, which authored this issue brief, includes Amy Kemp, MAAA, ASA, EA—*Chairperson*; Sam Gutterman, MAAA, FSA, FCA, FCAS, HonFIA, CERA—*Vice Chairperson*; Janet Barr, MAAA, ASA; Gordon Enderle, MAAA, FSA; Margot Kaplan, MAAA, ASA, FCA; Iris Kazin, MAAA, FSA, FCA, EA; Eric Klieber, MAAA, FSA; Alexander Landsman, MAAA, FSA, EA; Mahrukh Mavalvala, MAAA, FSA, EA; Gerard Mingione, MAAA, FSA, EA; Brian Murphy, MAAA, FSA, FCA, EA; John Nylander, MAAA, FSA; Larry Rubin, MAAA, FCA, FSA; Jeffery M. Rykhus, MAAA, FSA; Keith Sartain, MAAA, FSA, EA; and Joan Weiss, MAAA, FSA.

demographic and economic experience. The actuaries and trustees use judgment about the reliability and relevance of past experience when deciding if and when to revise an assumption.

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 consider 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: fertility rate, mortality, immigration, real wage growth, consumer price index, real interest rate, taxable ratio, 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*.

The 1983 Trustees Report, based on recently enacted major changes to the system, projected that, under the best estimate assumptions, assets currently in the trust funds plus future income from the payroll tax and other sources would be sufficient to finance all scheduled benefits over the 75-year projection period—that is, through 2057. No subsequent report has projected 75-year solvency. The 2023 Trustees Report projects that the system will be unable to continue paying full scheduled benefits in 2034. As part of its regular duties, OCACT provides analyses of legislative proposals submitted by members of Congress and, sometimes, by experts outside of the government, many of which are intended to eliminate all or part of this actuarial deficit. 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.

This issue brief describes the assumptions that must be made in any actuarial projection of the Social Security program's finances and explains how variations in the assumption values affect the projections. The issue brief cites the specific assumptions used in the 2023 Trustees Report. These are subject to change in subsequent reports. These specific assumptions are cited for purposes of illustration, but are not the primary subject of the issue brief, which is *how the choice of assumption values affects the results of the projection*. 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 provides more details about the specific assumptions the trustees used in their most recent report and any major changes since the previous report.

The COVID-19 pandemic and social and economic policies adopted in response to the pandemic caused experience under many assumptions to deviate significantly from trends in the immediate preceding years. These effects had not yet worn off when the 2023 Trustees Report was prepared. The report notes that there is no consensus regarding the long-term effects of the pandemic. In all cases, the trustees assumed that these effects would be temporary and that future experience would reflect pre-pandemic trends after a short transition period.

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 in a consistent manner 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 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.[1]

Major Demographic Assumptions

Fertility Rate: 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, that is, the average number of children born alive in a year, 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. A higher fertility rate increases the number of workers coming into the system, improving the system's long-term 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

1 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.

fell again in the wake of the recession of December 2007–June 2009, reaching a low point of 1.64 in 2020. The trustees cite several factors that have contributed to the long-term decline in fertility since the baby boom, including higher educational attainment and labor force participation among women, delayed marriage, and higher divorce rates. However, they predict these factors have now had their full effect, and that fertility will gradually return to the 2.0 rate based on experience before the 2007–2009 recession by 2050.

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 stays 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 2.7, to 2.1 by the end of the projection period. The long-term decline in the fertility rate 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 2034.

Immigration: Immigration also accounts for 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). Under the trustees' assumptions, most immigrants are young and have much 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.[2] As a result, a higher net immigration rate, like a higher fertility rate, tends to improve overall system finances. These factors are described in greater detail in the Academy's issue brief *Immigration and Social Security*.

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.

2 All immigration data in this section of this issue brief are found in this Social Security Administration table.

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 declined steadily to 713,000 in 2019, before the pandemic disrupted international travel. 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 level out at 788,000 beginning in 2022.

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, and has fluctuated markedly since then. In their 2023 report, the trustees project a short-term increase in net annual other-than-LPR immigration, followed by a gradual decline due to an increase in the number of other-than-legal immigrants leaving the country, ultimately reaching a net annual rate just over 400,000.

Combining LPR and non-LPR immigration, the trustees project total net immigration to exceed 1.3 million annually through the 2030s, and then to fall to just over 1.2 million by the end of the projection period.

Mortality: The mortality assumption is perhaps the most publicly debated of the demographic assumptions. The mortality assumption is used to estimate 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 age and sex. Many studies, including one by OCACT, show that mortality also varies by earnings, with low-earning individuals experiencing higher mortality on average 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, and particularly after 2010, 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 through 2019, mortality experience was slightly higher—that is, the rate of improvement slightly lower—than predicted by the trustees' assumption, but not enough to lead the trustees to change their projections for future improvement. The COVID-19 pandemic caused significant increases in mortality in 2021 and 2022. The trustees anticipate the mortality effects of the pandemic will wear off by 2025, followed by a gradual transition to ultimate rates of mortality improvement first applicable in 2047.

The future rate of decline in mortality is the subject of much discussion. 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 to anticipate new diseases/pandemics 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 have tended to be cyclical, depending on the health of the economy and, to some extent, 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, cutting the long-term actuarial deficit for the DI program by nearly half compared to 2018. When the decline in the disability incidence rate continued into 2021, the trustees again lowered their ultimate disability incidence assumption in the 2022 report, thereby entirely eliminating the long-term actuarial deficit in the DI program.

The precise reasons for the recent decline in disability incidence are unclear, but likely comprise some combination of low unemployment, improvements in care and mitigation for disabling conditions, the shift in the labor market toward less physically demanding work, and greater willingness by employers to accommodate workers with disabilities. The trustees attribute some of the continued decline in disability incidence during 2020, 2021, and 2022 to delays in processing applications due to the pandemic and anticipate a temporary uptick in incidence rates through 2027 as the backlog in applications is cleared, followed by a gradual decline to the ultimate rate after 2032 at the same value as in the 2022 report. This ultimate rate is still 23% higher than actual experience from 2013 through 2022, reflecting the trustees' assessment that not all of the recent decline in disability incidence is permanent.

Major Economic Assumptions

Rate of Increase in Average Earnings: The increase in average earnings per worker from year to year affects both the revenue received and benefits paid by Social Security. Increased earnings cause taxes on those earnings to increase, raising revenue immediately. Increased earnings also yield higher benefits to future beneficiaries, but more gradually over time. Thus, more-rapid-than-expected earnings increases reduce the actuarial deficit. The trustees' estimate of the annual rate of increase in average covered earnings is derived from the following five factors. The net result is an ultimate annual rate of increase of 3.56%.

- *Productivity Increases:* Productivity is defined as the ratio of real gross domestic product (GDP)[3] 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. During the six five-year periods from 1980 to 2010, average annual increases in productivity ranged from 1.30% in 1990–1995 to 2.63% in 2000–2005, averaging 1.87% for the entire 30-year period. From 2011 to 2016, in the wake of the 2007–2009 recession, the rate of increase did not exceed 0.61%, but began to increase in 2017, reaching 1.32% in 2019, the last pre-pandemic year. In their 2023 report, the trustees expect some short-term fluctuations before settling at an ultimate rate of 1.63% beginning in 2029.

- *Change in Average Hours Worked:* Because productivity is the ratio of real GDP to hours worked, multiplying the growth rate of productivity by the rate of change in average hours worked in a given year yields the growth rate of real GDP per worker in that year. From 1969 to 2019, the average annual hours worked has declined

3 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.

at an average rate of 0.2% 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 than the post-World War II labor force comprising mostly men in their traditional working years. This trend has offset some of the effect of improvements in productivity on workers' compensation. After a short transition, 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.

- *GDP Price Index:* Increases in the nominal value of economic production—that is, the value measured in current dollars—are due partly to increases in prices, commonly referred to as 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. Following an uptick in 2021 and 2022, the trustees assume the GDP price index will quickly fall to 2.05% in 2025.

- *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, including self-employment. Generally, total labor compensation grows in tandem with nominal GDP. However, the ratio of total labor compensation to GDP can change over time. 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. This ratio has declined from an average of about 65% in the 1950s and '60s to about 61% over the most recent pre-pandemic decade. Following a short period of pandemic-related volatility, the trustees assume the ratio will trend back upward to an ultimate constant ratio of 62.8% in 2032.

- *Ratio of Earnings to Total Labor Compensation:* Social Security benefits are based on covered earnings, including the wages, but not fringe benefits, of employed workers and the total compensation of self-employed workers. 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* (ACA), the trustees

expected growth in the cost of employer-provided health insurance to moderate somewhat, and that proved to be the case. Based on recent experience under the ACA and projections of national health expenditures, the trustees have adopted a long-term assumption regarding the annual decline in covered earnings relative to total employee compensation of 0.08% per year.

The following equation summarizes the calculation of the rate of increase in average earnings as the product of increases in these five factors:

$$\text{Average Earnings per Worker} = \frac{\text{Real GDP}}{\text{Hour Worked}} \times \frac{\text{Average Hours Worked}}{\text{Worker}} \times \frac{\text{Nominal GDP}}{\text{Real GDP}} \times \frac{\text{Compensation}}{\text{Nominal GDP}} \times \frac{\text{Earnings}}{\text{Compensation}}$$

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

Taxable Ratio: The formulas for computing Social Security taxes and benefits include covered earnings only up to a limit, called the contribution and benefit base. The amount of this limit is $160,200 in 2023; 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 in a narrow range with the economic cycle. The trustees assume this ratio will settle at 82.5% in 2032.

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. Until 2021, the CPI had 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% in the 2010s. Following an upward spike to 5.9% in 2021 and 8.7% in 2022, the trustees assume a long-term rate of 2.4% starting in 2025.

Real Wage Growth: While benefits in pay status are adjusted based on increases in the

cost of living, the formula for calculating workers' initial benefits is adjusted by the same average wage index described above for adjusting the contribution and benefit base, so that initial benefits keep pace with improvements in living standards, not just price increases. Covered earnings, also described above, includes both the wages of employed workers and the total compensation of self-employed workers, but the average wage index is based only on the former. The growth rate of nominal wages is adjusted for increases in the CPI to determine real wage growth—the increase in the buying power of those wages. Historically, growth in real wages has been highly volatile from year to year, greatly affected by ups and downs in the economic cycle. Since the 2007–2009 recession, growth has varied from a low of -0.41% in 2011 to a high of 3.83% in 2015, with a pre-pandemic average of 1.24%. While the trustees expect price inflation to stabilize rapidly following the pandemic, they anticipate higher-than-usual but gradually declining earnings increases until, after 2032, the projected rate of increase in earnings and prices have both reached their ultimate levels, 3.56% and 2.40%, respectively. At that time, real wage growth will settle at 1.14%.

Real wage growth is a useful gauge of how the economy will affect the system's financial health over the long term. If all the factors that determine benefit amounts were adjusted according to the average wage index, wage increases would have a small positive effect on system finances, because higher tax revenues would come immediately but benefit increases only gradually over time. However, because benefits after commencement are indexed to the CPI-W, a much greater positive effect on system finances results when wages increase more rapidly than the cost of living.

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 the payment of the resulting higher benefits. 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 correlates 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, the need to work longer to save for a longer period of retirement, and scheduled increases in the age at which unreduced Social Security benefits become payable. The pattern for women has been steadily increasing labor force participation 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.

Further changes in labor force participation 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 would need to work to older ages to maintain the labor force at its current level as a proportion of 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 on average at 0.7% per year for the next 10 years as the country emerges from the pandemic and settle at around 0.4% per year thereafter, mirroring projected increases in the working age population with some allowance for increased participation at older ages.

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. While prolonged periods of high unemployment adversely affect the program's financial health, temporary shifts in the level of unemployment in tandem with the economic cycle do not have a significant long-term impact. 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 same is true of a similar spike

early in the COVID-19 pandemic. In the 2020 and 2021 reports, the trustees lowered their long-term unemployment rate assumption in half-percentage-point increments from 5.5% to 4.5%, reflecting what the trustees believe to be a permanent structural shift in the labor market. The lower projected unemployment rate partially offsets the effect of anticipated slower growth in the labor force.

Real GDP Growth: The trustees do not directly make an assumption regarding the annual growth of real GDP. The trustees derive 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 averaged only 2.3% per year during the subsequent 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 a decline as the baby boomers began retiring in the years following the 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 1.9% per year for the next 10 years, and at about 2.0% per year thereafter.

Real Interest Rate: 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 calculated 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 in the last pre-pandemic decade averaged only 0.5%. Real interest rates turned negative at times due to the 2021 to 2023 spike in inflation. The trustees anticipate a gradual increase over successive years before settling at 2.3% after 2032.

Average Benefits: The 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, to the extent 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, 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.

Projections From Other Sources

As part of its regular responsibilities, the Congressional Budget Office (CBO) makes annual short-term (i.e., 10-year) and long-term (i.e., 30-year) projections of the federal budget. In addition, CBO makes its own 75-year projection of Social Security's financial condition, but since 2019, CBO has published only the results of its projection beyond the first 30 years without further elaboration. In its most recent report, CBO projects a 75-year deficit significantly larger than that in the corresponding Trustees Report.

Organizations outside the government have developed demographic and economic models that can be used for projecting Social Security's financial condition. These projections also use assumptions that may differ from those used by the trustees. This report is based on the budget model developed at the Wharton School.

Although not a projection model, the Urban Institute's Dynamic Simulation of Income Model (DYNASIM) has been used to show the effect of proposed changes to Social Security on different classes of beneficiaries.

Small changes in assumptions can have large effects on cost estimates over long periods. When comparing a reform proposal to the current system or to another proposal, using different sets of assumptions—even when they appear to match closely—may produce results that, intentionally or unintentionally, advance a favored proposal.

Social Security Reform and the Equity Return Assumption

Some Social Security reform proposals have called for investing a portion of trust fund assets in private-sector securities, particularly equity securities such as stocks. Some of these proposals would continue the current arrangement in which the government directly invests all of the system's accumulated assets; others would allow workers to direct investments in their own individual accounts, greatly expanding the potential range of investments. 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 periods of several decades or more. 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.

Some 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, volatility in the securities markets means there are greater short-term 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 values for the rate of return on equity investments: the first based on historical higher rates of return on equities, and the second equal to the expected rate of return on 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 this uncertainty, so these results likely have very limited 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 currently used for labor force participation 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. The controversy surrounding the assumed rate of mortality improvement in the 75-year projection has already been described. Given these disagreements among experts over projecting mortality for 75 years, the difficulty 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. Any projection over a 75-year period is subject to a high degree of uncertainty. Even small changes in assumptions over a 75-year projection period can lead to large changes in the results. 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 results based on a range of alternative assumption values be provided.

4. In any analysis comparing a reform proposal to the current system or to another proposal, projections use the same set of assumptions to ensure any differences in results are attributable solely to the differences in provisions.