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# ISSUE BRIEF

AMERICAN ACADEMY of ACTUARIES

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

All recent reports of the Board of Trustees of the Old-Age, Survivors and Disability Insurance ("Social Security") Trust Funds project that, under the Board's intermediate (best-estimate) assumptions, Social Security's combined trust funds will be exhausted before the middle of this century in the absence of corrective legislation. The Trustees Report uses long-term financial projections based — at least in part — on assumptions adopted by the Board of Trustees to determine if Social Security will be financially viable over the long term. In addition, Social Security reform proposals introduced in Congress or developed by outside experts are sometimes evaluated for their potential effect on the program's financial condition using the same or similar projection methods and assumptions.

The nature and extent of any changes designed to resolve the program's financing problem depend, of course, on the magnitude of the problem. Although the projection based on the trustees' intermediate assumptions is generally quoted when discussing Social Security reform proposals, the range of alternative assumptions used by the trustees illustrates the considerable uncertainty about the future. Opponents of major structural reform generally believe that any perceived problem is manageable with modest changes within the current framework. Conversely, proponents of more extensive reforms often argue that the problems are serious enough to demand consideration of approaches outside the current framework.

Experts outside the Social Security Administration — from such organizations as the Employee Benefit Research Institute, the Brookings Institution, and the Cato Institute — have performed independent analyses of various reform proposals, sometimes including their own. These experts also use assumptions in their projections of Social Security's financial future, and those assumptions may differ from those used by the trustees.

This issue brief describes the major assumptions used in projections of Social Security's financial condition and how variations in the assumptions affect the results. The issue brief also encourages policy advocates to disclose the assumptions underlying their reform proposals and to apply assumptions consistently.

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Members of the Social Insurance Committee who participated in revising this issue brief include: Eric J. Klieber, EA, FSA, MAAA, MSPA, Chairperson; Kenneth G. Buffin, EA, FSA, FCA, MAAA; Edward E. Burrows, EA, MAAA, MSPA; Ron Gebhardtshauer, EA, FSA, FCA, MAAA, MSPA; Robert J. Randall, Sr., FSA, MAAA; Richard G. Schreitmüller, FSA, FCA, MAAA; P.J. Eric Stallard, ASA, FCA, MAAA; Joan M. Weiss, EA, FSA, MAAA; James A. Wiseman, FSA, MAAA.



AMERICAN ACADEMY of ACTUARIES

1100 Seventeenth Street NW Seventh Floor Washington, DC 20036  
Tel 202 223 8196 Fax 202 872 1948  
[www.actuary.org](http://www.actuary.org)

Richard C. Lawson, Executive Director  
Noel Card, Director of Communications  
Craig Hanna, Director of Public Policy  
Heather Jerbi, Policy Analyst, Pension

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## Background

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Since Social Security's earliest days, its Board of Trustees has reported annually to Congress on the projected financial status of the Social Security Trust Funds. The trustees base their projections on actuarial assumptions. The actuaries at the Social Security Administration make initial recommendations for these assumptions, which are then modified as deemed necessary by the trustees and their staffs. The final assumptions selected by the trustees are subject to review by the Chief Actuary of the Social Security Administration, who must state in the report his opinion as to whether they are reasonable. Based on these assumptions, the actuarial staff of the Social Security Administration prepares the projections that are presented by the trustees.

The trustees evaluate the program over a 75-year long-range projection period in order to view the adequacy of financing over the lifetime of virtually all current program participants. Typically, the actuaries use year-by-year assumptions about a number of critical economic and demographic parameters for the next 10 to 20 years and then apply "ultimate" rates over the remainder of the 75-year period. The Trustees Report describes the assumptions and methods used in detail.

Each year, the Social Security program gains another year of actual experience that can affect the projections in two ways. (1) Everything else being equal, if the experience is more favorable than projected, the system's financial forecast improves, and vice versa. (2) Emerging experience also constitutes additional evidence that can be used for setting assumptions. For example, if mortality improves more rapidly than expected, then future mortality expectations 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. The actuaries and trustees must use their own judgment about how the future will differ from the past.

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. For example, the economy has recently experienced an extended period during which productivity has increased at a rate above the historical average. The trustees and actuaries are uncertain whether this is the start of a long-term trend, so this high productivity growth is substantially reflected in the trustees' short-term assumptions, but less so in their long-range assumptions. If high productivity growth persists so that the trustees conclude that it stems from permanent changes in the economy, any resulting change to the long-range assumptions will lag by several years the onset of high productivity growth rates.

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 reasonable alternative scenarios.

Over the years, various technical panels composed of leading economists, demographers, and actuaries have reviewed the trustees' assumptions. In 1989, for example, the Technical Panel appointed by the Advisory Council on Social Security recommended that three of the most critical economic assumptions be altered to reflect a greater likelihood of more pessimistic scenarios — in particular, that the assumed ultimate real-wage differential be decreased. Consistent with the panel's recommendations, the trustees' assumption in this area became more conservative in the early 1990s. Three Technical Panels have made recommendations since 1989. Most recently, the 2003 Technical Panel on Assumptions and Methods, appointed by the Advisory Council on Social Security, recommended changes to five assumptions: (1) an increase in the projected rate of immigration; (2) an increase in the rate of mortality decline; (3) elimination of the projected rise in the labor force participation rate of older persons related to projected increase in life expectancy; (4) an increase in projected real wage

growth; and (5) a decrease in the projected level of inflation. Interestingly, although some of the changes the Technical Panel recommended would have a large impact on Social Security's projected financial status, the effect of adopting all five recommended changes would be slight, because the changes have offsetting effects.

The assumptions that the trustees use for each year's report are based on their analysis of historical data and expected future trends. The issue brief *An Actuarial Perspective on the Social Security Trustees Report* describes the assumptions the trustees used in their most recent report and the changes since the previous report.

## **Assumptions**

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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, which provides a basis for estimating the number of workers paying into the system, the number of retired- and disabled-worker beneficiaries, and the number of family members and survivors receiving benefits. Economic assumptions are used to project wages and the resulting tax income of the program, benefit amounts, and the investment income on assets in the trust funds. Together, these factors are used to calculate the projected annual income and expenses of the trust funds.

### ***Major Demographic Assumptions***

*Fertility:* As workers retire, they are replaced by new entrants into the labor force, most of whom were born in this country. The fertility rate, or average number of children born to a woman during her lifetime (if she survives the child-bearing years), is the primary determinant of whether the number of new workers will be sufficient to pay for the benefits promised, assuming current-law tax rates. A higher fertility rate increases the number of workers coming into the system, improving overall finances. The fertility rate fell from 3.70 in 1957 to an all-time low of 1.74 during the mid-1970s but has increased somewhat since then to slightly above 2.0.

*Immigration:* Immigration also accounts for some new entrants into the labor force. Indeed, if the fertility rate remains at or below the replacement level (about 2.1 births per woman), then any positive population growth comes from immigration. Most immigrants are young and have all or most of their working lifetimes ahead of them when they enter the country. Therefore, a higher immigration rate, like a higher fertility rate, tends to improve overall system finances. Social Security projections take into account both legal and illegal immigration. The factors underlying legal immigration are mostly political. A change in immigration laws, for example, can produce a sudden change in the level of immigration at any time. Projecting the rate of illegal immigration is highly uncertain; indeed, the current rate of illegal immigration is not known with precision.

*Mortality:* The mortality assumptions are perhaps the most publicly debated of the demographic assumptions. The mortality assumptions are used to estimate, among other things, how long retired and disabled workers and their survivors are projected to receive benefits. Mortality assumptions also determine how many workers are expected to die before retirement, often resulting in payments to survivors. Although reductions in pre-retirement mortality reduce the cost of survivor benefits, they also increase the number of workers who will reach retirement age. Reductions in post-retirement mortality result in longer lifetimes for those receiving benefits and generally have a much greater impact on the total cost of benefits. Increases in longevity accelerated greatly in the 1970s, leading the trustees to update the mortality assumptions used for Social Security projections. Since 1982, however, longevity has increased more slowly, and the projected reduction in mortality rates has been relatively stable.

The rate at which longevity will continue to increase is the subject of much debate. Certainly, there is potential for more rapid decrease in mortality based on medical advances that slow disease development or allow better management of chronic conditions such as heart disease, cancer and stroke. Conversely, it is difficult, if not impossible, to anticipate new diseases that may surface in the coming decades, how rapidly medical breakthroughs will be accessible to the general population, and whether new treatments will be affordable. There is widespread agreement that death rates 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 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. The trustees set the disability incidence assumption initially by looking at past trends and making projections about the future without regard to the increases in the normal retirement age (NRA, or the age at which workers can receive unreduced benefits) scheduled under present law. These rates are then adjusted upward to reflect the additional workers who are expected to file for disability benefits because of the scheduled increases in the NRA.

### ***Major Economic Assumptions***

*Wage increases:* The nominal (i.e., without adjustment for inflation) increase in 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 go up proportionately, raising revenue immediately. However, the formula for determining initial benefits is indexed to wage increases, so higher wages gradually result in higher benefits.

*Consumer Price Index:* Benefits for existing beneficiaries are adjusted automatically each year for inflation. This cost-of-living adjustment (COLA) is based on changes in the Consumer Price Index (CPI), which is measured by the Bureau of Labor Statistics. Thus, the assumed annual increase in the CPI affects the projected benefit payments from the trust funds. Since automatic adjustment of benefits began in 1975, the annual rate of increase in the CPI has varied widely, from double digits in the early 1980s to only 1 percent to 3 percent per year recently.

*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. Real wage increases are made possible by increases in the productivity of workers. If wages were used for indexing benefits after commencement, as well as for calculating initial benefits, then the increases in revenue and benefits resulting from real wage increases would offset each other. However, because benefits after eligibility are indexed to the CPI, any excess of wage increases over CPI increases causes the program's cost to be lower than would be the case if benefits after eligibility rose at the same rate as wages (and vice versa). The average future rate of increase in real wages is one of the most important factors affecting the financial health of Social Security.

*Interest rates:* Interest rates affect Social Security in two ways. First, higher interest rates raise the return on trust fund assets and thus improve the financial condition of the program; lower rates have opposite effects. Second, higher interest rates reduce 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. Before 1980, real interest rates averaged about 1 percent. In the mid-1980s, the real interest rate rose to 9 percent; since then, it has declined to around 3 percent.

*Labor Force Participation Rates:* Labor force participation rates measure the proportion of the working-age population (including non-covered workers and the unemployed) with earnings covered by Social Security. Generally, those without covered earnings are outside the labor force, in non-covered employment, unemployed or receiving benefits. Everything else being equal, a higher labor force participation rate increases tax revenue earlier and to a greater extent than it increases benefits, thereby improving the program's financial condition. A lower rate has the opposite effect.

Labor force participation rates at ages 60 through 64 have changed considerably since 1985, for both men and women. Before 1985, the labor force participation rate for men at ages 60 through 64 had been decreasing dramatically, from over 80 percent in 1962 to 56 percent in 1985; this rate has since leveled off and actually increased from 53 percent in 1995 to 55 percent in 2000. For women, the labor force participation rate has increased significantly from 33 percent in 1985 to 40 percent in 2000. Possible changes in labor force participation rates in response to demographic changes predicted for the early decades of the next century 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, will older workers want to work longer, and will their employers want to maintain an older workforce?

*Unemployment:* The unemployment rate measures the proportion of workers in the labor force unable to find work. Higher rates of unemployment reduce income to the trust funds. Unemployment also generally reduces benefits, but the effect is much smaller and is largely deferred. Therefore, high unemployment adversely affects the program's financial health. However, unemployment does not have as significant an impact on system finances as do some of the other factors discussed here.

*GDP Growth:* The trustees do not directly make an assumption regarding the growth of gross domestic product (GDP), which is the total dollar value of all goods and services produced in the United States. The trustees arrive at their estimate of GDP growth indirectly by estimating growth in the labor force and growth in productivity (which is closely related to growth in real wages), both discussed above. GDP growth was high in the 1960s and 1970s, due primarily to the large increases in the labor force. However, with the retirement of the baby boomers, the labor force component of GDP growth could dramatically decrease. If the labor force growth rate were to slow and productivity not rise to compensate, GDP growth would decline significantly.

Long-range GDP growth will depend on a variety of factors, such as whether workers will retire at a different rate than projected, whether future workers will be more or less productive than assumed, and whether a shortage of workers will lead to a change in immigration law. At present, a wide divergence of views exists on these questions.

Taken together, these assumptions underlie the projections of the program's short-term and long-term financial condition. These projections provide policymakers with an indication of whether reform is needed.

## **Social Security Reform and the Stock Yield Assumption**

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Many Social Security reform proposals would invest all or a portion of the assets accumulated to fund future benefits in private-sector securities, particularly 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 assets in the trust funds. Advocates for these reform plans assert that investing payroll taxes in common stocks 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 stocks have consistently outperformed U.S. government interest-bearing securities over long periods — say,

20 years. Although the annual real yield on stocks is not an assumption used in the Annual Report, such an assumption must be made to evaluate any reform proposals involving stock investments.

Future returns on stocks could be lower than realized in the long-term past, for one or both of the following reasons: (1) although stock prices have declined substantially from their peaks in early 2000, many analysts claim stocks are still overvalued when measured against historic price-to-earnings ratios; or (2) maintaining higher price-to-earnings ratios will result in lower dividend yields, thus lowering the total yield rate. Thus, the advantage of investing in stocks might, at least temporarily, be less than has been assumed in the evaluations of most of these proposals. In particular, if price-to-earnings ratios do not return to the historical average, then lower stock yields than in the past would be expected.

The use of the long-range historical average annual real yield on stocks of 7 percent as an assumption for the future must be based on a presumption that the future price-to-earnings ratio for stocks will be about the same, on average, as it has been in the past. While recent experience suggests that this may be the case, it is not a certainty. Thus, the average future yield on stocks is likely more uncertain than other assumptions. For this reason, it is important to consider the financial effects of reform proposals that involve stock investments using a range of possible yields to illustrate this uncertainty.

### **Assumptions Over an Infinite Time Horizon**

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For the first time, in their 2003 report the Trustees 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 that the results can have only limited value for policymakers. This is due largely to anomalies and incongruities that inevitably arise from extending any set of long-range actuarial assumptions to infinity. For example, extending to infinity the assumptions used for labor force participation rates and mortality improvement leads ultimately to a situation where the typical worker is expected to receive benefits for a period longer than he or she pays into the system. It is not surprising that, at the current payroll-tax rate, the OASDI program cannot sustain itself in this situation. However, it seems unreasonable to argue that workers would 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 for the 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. Demographers have reached no consensus, despite years of debate, on whether the rate of mortality improvement observed in the last century is sustainable for the very long-term future. Under the trustees' assumption, mortality improvement will taper off but not disappear entirely over the 75-year valuation period. Some demographers, citing steady robust mortality improvement over the past century, claim the trustees are understating future mortality improvement. The 2003 Technical Panel, on the other hand, recommends that assumed mortality rates stop declining at some point in the future. 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**

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As 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 have always been some observers who have questioned using the Social Security Trustees' assumptions as a basis for evaluating the financial condition of Social Security and the impact of vari-

ous reform proposals. Panels of independent technical experts periodically review the Trustees' assumptions. The latest such panel, in 2003, concluded that the Trustees' intermediate assumptions are reasonable in the aggregate. However, this conclusion does little to settle the debate, because other assumptions, such as the trustees' optimistic and pessimistic sets, are also reasonable, and even small changes in assumptions can, over a 75-year period, lead to large changes in the projections.

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

To remove some of the uncertainty about the effects of Social Security reforms, the American Academy of Actuaries makes the following recommendations:

- All analyses of Social Security reform proposals that include financial projections should include an explanation of the assumptions used.
- All analyses of proposals should use assumptions that are internally consistent.
- Where substantial uncertainty exists as to the appropriate level of a critical assumption, sensitivity analysis or a range of assumptions should be provided.
- When calculations for competing reform proposals use different sets of assumptions, comparisons of these proposals should recognize the effects of the differing assumptions.



AMERICAN ACADEMY *of* ACTUARIES

1100 Seventeenth Street NW

Seventh Floor

Washington, DC 20036

[www.actuary.org](http://www.actuary.org)