Issue Brief

JUNE 2016

An Actuarial Perspective on the 2016 Social Security Trustees Report

The Social Security Trustees Report is a detailed annual assessment that serves as a basis for discussions of Social Security's financial problems and their solutions. Social Security's chief actuary prepares and certifies the financial projections for the Old-Age, Survivors, and Disability Insurance program, under the direction of the Social Security Board of Trustees.

New Report Shows Modest Improvement
Social Security's Financial Soundness Should Be Addressed Now

The 2016 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance (OASI) and Federal Disability Insurance (DI) Trust Funds highlights that:

- The combined Social Security trust fund reserves are projected to become depleted during 2034, the same year as projected in last year's report. If changes are not implemented by that date, only about 79 percent of scheduled benefits would be payable after 2034, declining to 74 percent in 2090.
- The Bipartisan Budget Act of 2015 increased the portion of the 12.4% payroll tax allocated to the Disability Insurance fund from 1.80% to 2.37% for three years. This and other changes in the Act extended the projected depletion date for the DI trust fund by about 6 years and had no effect on the projected combined depletion date.
- To bring Social Security into actuarial balance for the next 75 years (using best-estimate assumptions), changes equivalent to either an immediate increase of 2.75 percentage points in the payroll tax rate, or an immediate decrease of about 17 percent of benefits for all current and future beneficiaries, or some combination thereof, is required. The analogous numbers from last year's report were a 2.78 percentage point increase in the payroll tax rate and a 17.2 percent decrease in all benefits. (These percentages differ slightly from the actuarial deficit shown above because they reflect a behavioral response to tax rate changes.)
- All actuarial projections are sensitive to the assumptions used. For example the 75-year actuarial balance changes from (2.66%) under the intermediate assumptions (as shown above) to a surplus of 0.22% under the low-cost assumptions and (6.30%) under the high-cost assumptions.

ANNUAL REPORT	2015	2016
Depletion Dates		
OASI	2035	2035
DI	2016	2023
Percent of Benefits Payable Upon Depletion		
OASI	77%	77%
DI	81%	89%
75-Year Actuarial Deficit		
	2.68%	2.66%

CONGRESS SHOULD ACT SOON TO IMPROVE THE LONG-TERM FINANCIAL OUTLOOK OF SOCIAL SECURITY.

Because future events are inherently uncertain, the report contains three 75-year financial projections to illustrate a broad range of possible outcomes. Three projections, each based on a different set of assumptions are referred to as intermediate, low-cost, and high-cost. The report also provides a sensitivity analysis for key assumptions. The trustees consider the intermediate projection to be their best estimate. **All information in this issue brief is based on the intermediate projection, unless otherwise noted.**

Under current law, when trust fund reserves are depleted, tax income will be sufficient to provide about only three-quarters of the scheduled benefits. The Trustees Report quantifies benefit and tax changes that could restore actuarial balance. Such changes would require congressional action. Failure to act would cause a delay in some benefit payouts which, if not corrected by subsequent congressional action, would result in benefit reductions.

Overview of Financial Status

Short-Range Estimates, 2016–2025

Short-range solvency and financial adequacy are measured separately for Old-Age and Survivors Insurance and Disability Insurance programs, as well as for the combined Old-Age and Survivors Insurance and Disability Insurance (OASDI) trust funds. These measures are based on the projected trust fund ratios. A trust fund ratio is the ratio of the trust fund assets at the beginning of the year

to the benefits payable during the year. A program is considered solvent during any period if the trust fund ratios are positive for each year in the period. For a program to pass the test of short-range financial adequacy, a further requirement is that the trust fund ratios remain at or above 100 percent throughout the 10-year short-range period.[1] The DI trust fund ratio is 21 percent at the beginning of 2016, and is expected to rise somewhat over the next few years and then decline to zero during 2023. The OASI trust fund ratio is expected to drop from 357 percent at the beginning of the projection period to 194 percent in the 10th year of the projection period.

Social Security's OASI finances (excluding disability) are somewhat worse than the projection made a year ago. The total change in the projected 10th-year trust fund ratio was a decline of 22 percentage points. Moving the Short-Range Estimate period one year forward accounted for much of the change. Other changes, with the impact on the 10th-year trust fund ratio in parentheses, include:
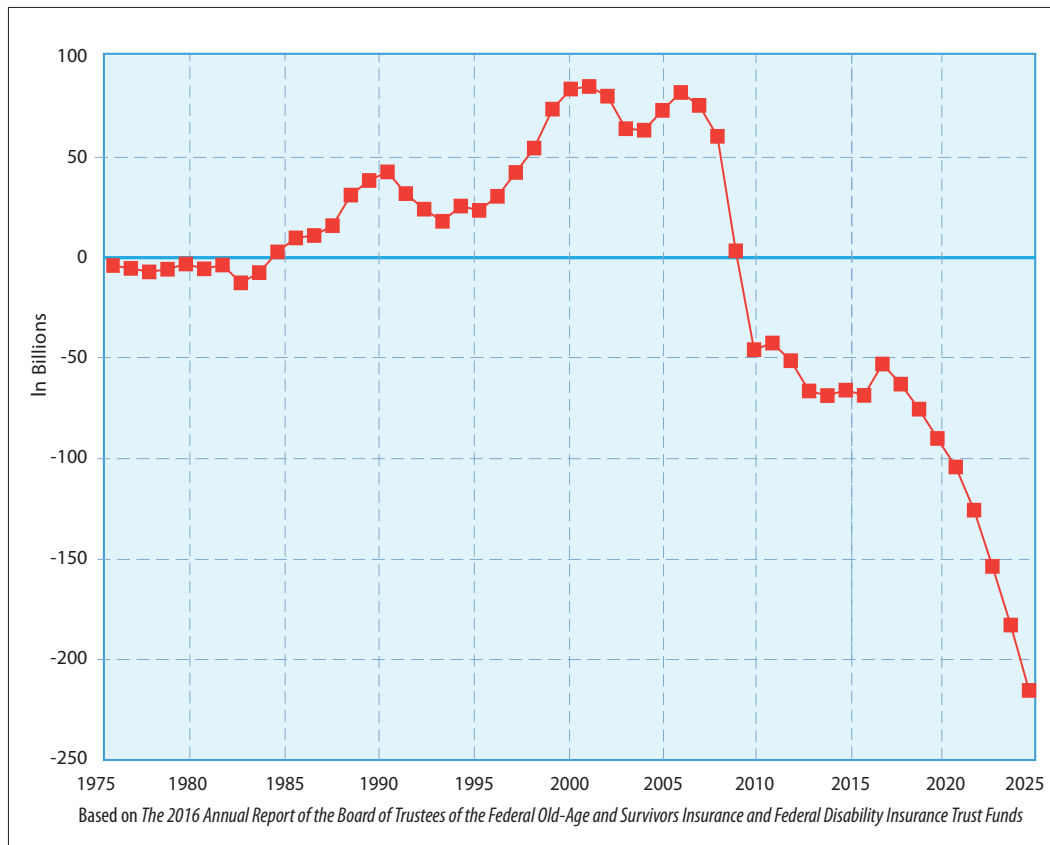
- Moving the Short-Range Estimate period forward one year (reduced ratio by 17 percentage points)

- Changes in economic data and assumptions (reduced ratio by 3 percentage points)

- Changes in demographic data and assumptions (increased ratio by 4 percentage points)

- Changes in legislation and regulations—see note below (reduced ratio by 12 percentage points)

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[1] This condition applies when the trust fund ratio is at least 100 percent at the beginning of the period. If the trust fund ratio is below 100 percent at the beginning of the period, the test of short-term financial adequacy requires that the trust fund ratio increase to 100 percent within five years (while remaining positive at all times) and then remain at or above 100 percent for the rest of the short-range period.

FIGURE 1: OASDI CASH FLOW EXCLUDING INTEREST ON ASSETS

Based on *The 2016 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds*

- Changes in programmatic data and assumptions (increased ratio by 10 percentage points)

- Changes in projection methods and data (reduced ratio by 4 percentage points)

The changes in legislation and regulations were primarily those made by the 2015 Bipartisan Budget Act including reallocation of the payroll tax and closure of unintended loopholes.

Unless otherwise noted, all subsequent information in this issue brief is based on the combined OASDI trust funds.

Trust Fund Asset Reserves

Any excess of tax income over outgo is recorded as an asset reserve of the Social Security trust funds. These trust fund asset reserves are held in special U.S. Treasury securities that totaled $2.8 trillion at the end of 2015. Trust fund asset reserves are expected to increase to almost $2.9 trillion by the end of 2019 and then decline slightly by the end of the short-range estimate
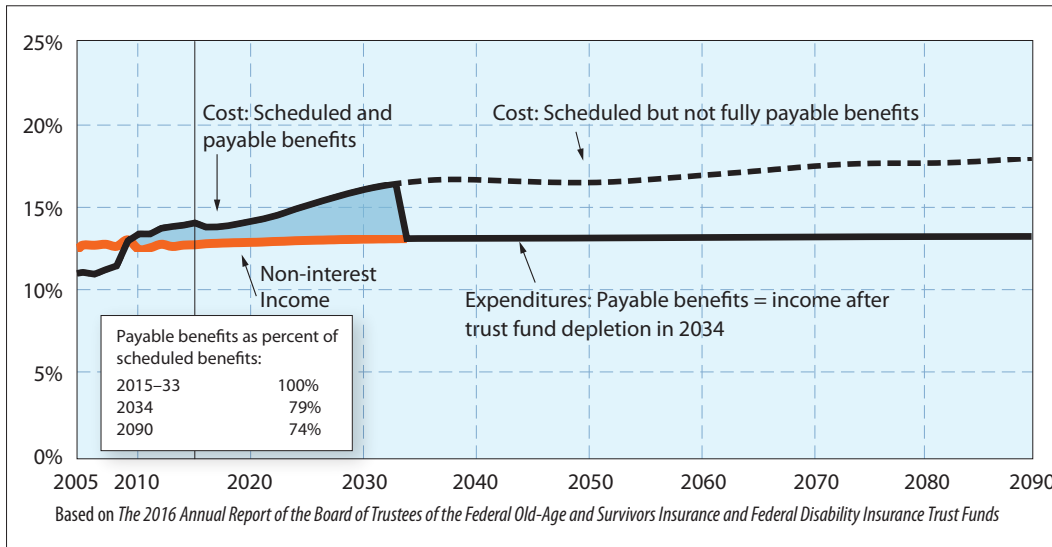
period. The bonds in the trust funds represent the government's commitment to repay the borrowed funds whenever Social Security needs the money.

Income and Cost

Figure 1 above shows the excess of income (excluding interest) over cost (referred to as a positive cash flow) in the period from 1976 through 2009, and the anticipated excess of cost over income through 2025. The excess of income over cost prior to 2009 has led to the current $2.8 trillion in trust fund asset reserves.

The net annual amounts of income (excluding interest) to, and outgo from, Social Security are expressed in the Trustees Report as percentages of taxable payroll. These percentages are known respectively as the **income rate** and **cost rate**. During the short-range estimate period of 2016–2025, the income rate will increase (due to taxation of Social Security benefits) from 12.94 percent to 13.11 percent of annual taxable

FIGURE 2: PROJECTED ANNUAL COST AND TAX INCOME AS A PERCENTAGE OF TAXABLE PAYROLL

Based on *The 2016 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds*

payroll. The cost rate, meanwhile, will rise from 14.05 percent to 15.29 percent of taxable payroll. The difference between these two rates, called the **annual balance**, ranges from a deficit of 1.10 percent to a deficit of 2.17 percent[2] of taxable payroll during the period from 2016 to 2025.

Long-Range Estimates, 2016–2090
Long-range estimates are based on a 75-year projection that covers the future lifetimes of nearly all current participants, which includes those paying payroll taxes and those already retired. The estimates show that, beginning in 2034, trust fund asset reserves are projected to be depleted and the system is expected to revert to a pay-as-you-go (PAYGO) system. This date is the same as shown in last year's report. After reserves are depleted in 2034, Social Security income will be sufficient to pay 79 percent of scheduled benefits. This ratio decreases to 74 percent in 2090, as shown in Figure 2.

The projections show expenditures exceeding non-interest income in every year (as has been the case since 2010) and rising rapidly through 2035 as the baby boomers retire. While costs are expected to

increase quickly, tax revenue is also expected to grow, but more slowly. After 2035, projected costs are fairly level as a share of both GDP and taxable payroll increasing somewhat later in the 75-year projection.

Actuarial balance conveys the long-range solvency of Social Security in one number. Actuarial balance is the present value of all income less all costs, divided by the present value of the taxable payroll over the 75-year period. It represents the annual amount (expressed as a percent of taxable payroll) by which income would need to increase to have trust fund assets equal to one year of scheduled benefits at the end of the 75-year projection period. The actuarial balance improved, from a negative 2.68 percent to a negative 2.66 percent from the 2015 to the 2016 Trustees Report. Refer to the appendix for a more expanded definition of actuarial balance.

The Statement of Actuarial Opinion addresses the inconsistency between trust fund accounting versus unified budget accounting that may be of interest to those who desire a deeper understanding of those important budget scoring conventions.

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[2] Table IV.B1, *The 2016 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds.* Please note that due to rounding, numbers may not add up.

Now is the Time to Restore Social Security's Long-Term Financial Soundness

The sooner a solution is implemented to ensure the sustainable solvency of Social Security, the less disruptive the required solution will need to be.

The long-range expected increase in Social Security program costs relative to program income is principally caused by demographic trends. These demographic trends are very well-known and are generally referred to as "aging" or, sometimes, as "the aging of America." It is useful to further separate the aging trend into two components:

(i) macro-aging, which is observed at the population level and refers to a shift in the age distribution of the population caused by the large one-time decrease in birth rates beginning in the mid-1960s (the fertility drop after the large Baby Boom generation), and

(ii) micro-aging, which can be observed at an individual level and refers to the expected continuous long-term increase in life expectancies, caused by individuals living longer, on average, in each succeeding generation.
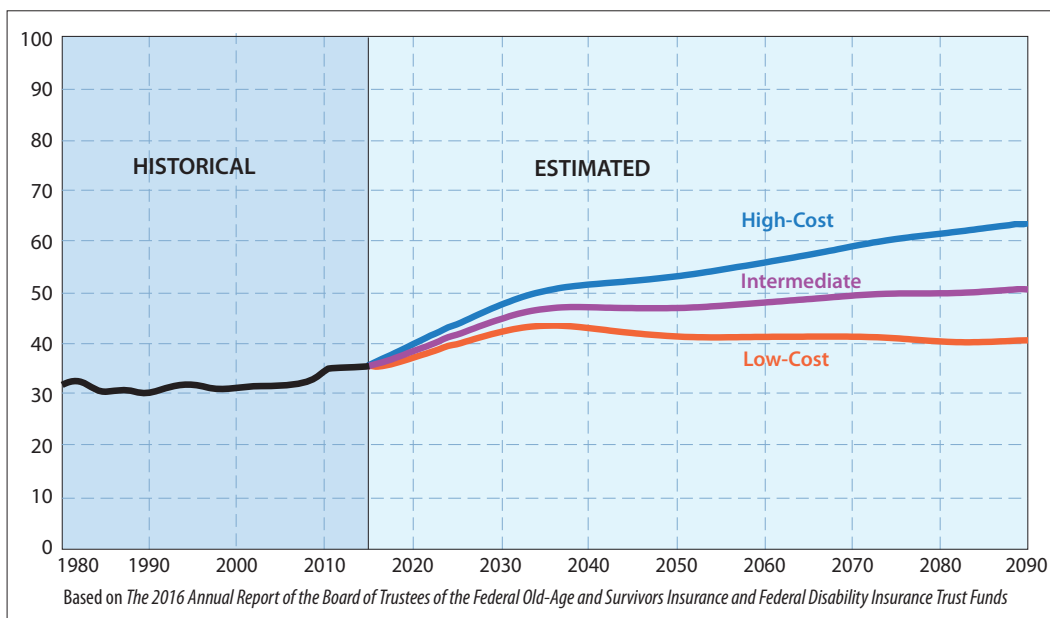
A third demographic component, which acts to partially offset macro-aging, is net immigration. Because immigrants tend to be younger, higher immigration can offset some of the change in the age distribution of the population caused by lower birth rates.

An additional significant component of differences between low-cost, intermediate, and high-cost projections is the real-wage growth (specifically the difference between inflation and real-wages, or the real-wage differential). Actuarial balances at all durations as well as the projected depletion dates change materially based on changes to this component.

The ratio of covered workers to Social Security beneficiaries is expected to decrease significantly from 2.8 in 2015 to 2.2 in 2035, primarily due to macro-aging, and then to decrease more slowly, primarily due to micro-aging, to 2.0, by the end of the 75-year projection period. This decrease over the projection period of approximately 30 percent is important in a system in which the dollars paid in must equal the dollars paid out—a PAYGO system.

Figure 3 shows the projected growth in the number of Social Security beneficiaries relative to the covered working population, under the three sets of

FIGURE 3: NUMBER OF SOCIAL SECURITY BENEFICIARIES PER 100 WORKERS

Based on *The 2016 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds*

assumptions. Because the program financing is nearly PAYGO, the three alternative projections of long-range cost show similar patterns.

The Social Security Committee of the American Academy of Actuaries believes that any modifications to the Social Security system should include **sustainable solvency** as a primary goal. Sustainable solvency means that not only will the program be solvent for the next 75 years under the reform methods adopted, but also that the trust fund reserves at the end of the 75-year period will be stable or increasing as a percentage of annual program cost. Refer to the appendix for a more complete explanation of sustainable solvency.

Providing for solvency beyond the next 75 years will require changes to address micro-aging, as beneficiaries will likely be receiving benefits for ever-longer periods of retirement.

Regardless of the types of changes ultimately enacted into law, measures to address Social Security's financial condition will best serve the public if implemented sooner rather than later. Some advantages of acting promptly are:

- Future beneficiaries gain time to plan for all aspects of retirement and modify their own financial planning, while adjusting to legislated changes in Social Security.

- Implementation of program changes can be more gradual and span multiple generations of retirees.

- Public trust in the financial soundness of the Social Security program will improve.

Providing for solvency of Social Security both during and after the period where the macro-aging trend impacts Social Security requires a timely and thoughtful solution. Not only should changes address the Baby Boom bulge, they should continue to address micro-aging trends and provide for solutions beyond the 2030s.

Appendix

Other Measures of Financial Status
The metrics used by the trustees to present the program's financial status are discussed in more detail below.

Actuarial Balance
Actuarial balance is calculated as the difference between the summarized income rate and the summarized cost rate over a period of years. The summarized income rate is the ratio of any existing trust fund plus the sum of the present value of scheduled tax income for each year of the period to the sum of the present value of taxable payroll for each year of the period. The summarized cost rate is the ratio of the sum of the present value of cost for each year of the period, including one year's outgo at the end of the period, to the sum of the present value of taxable payroll for each year of the period. Table 1 shows the components of actuarial balance.

In the 75-year period, 2016–2090, the actuarial deficit is 2.66 percentage points. The actuarial deficit decreased from the comparable figure of 2.68 percentage points a year ago due to a combination of factors, including changes in

TABLE 1: LONG-RANGE ACTUARIAL BALANCE
(percentage of taxable payroll)

Period	Summarized Income Rate	Summarized Cost Rate	Actuarial Balance (percentage points)*
25-year (2016-40)	14.67%	16.15%	-1.48
50-year (2016-65)	14.03%	16.26%	-2.23
75-year (2016-90)	13.84%	16.50%	-2.66

Based on *The 2016 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds*
* The results shown in the Actuarial Balance column may not be equal to the difference between Summarized Income Rate and Summarized Cost Rate because of rounding.

FIGURE 4: LONG-RANGE PROJECTIONS OF TRUST FUND RATIOS UNDER ALTERNATIVE SCENARIOS
(assets as a percentage of annual cost)

Based on *The 2016 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds*
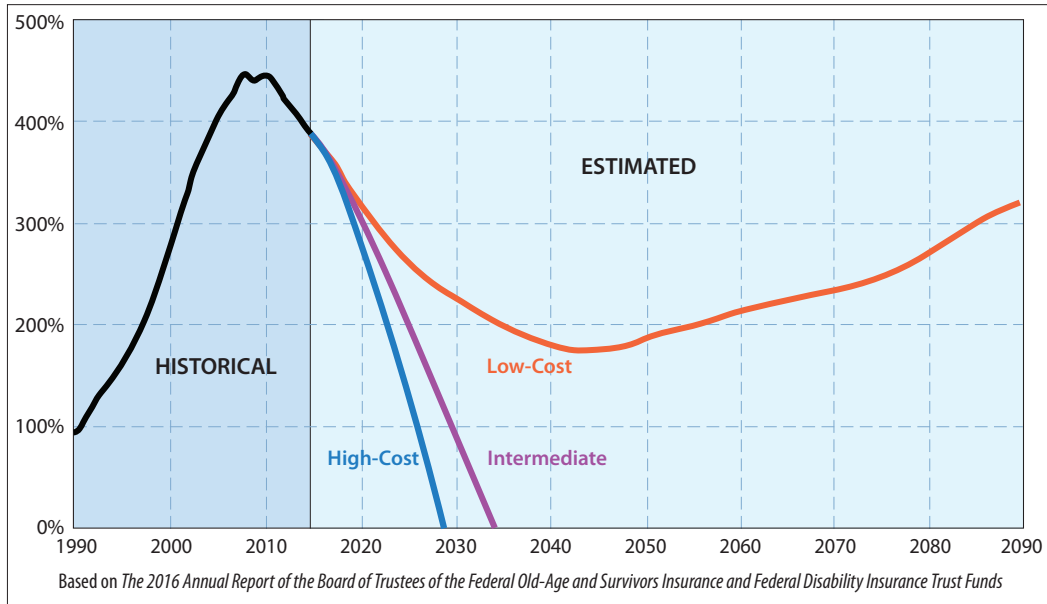
demographic data and assumptions, changes in economic data and assumptions and legislative and policy changes.

An immediate increase of 2.58 percentage points in the payroll tax (from 12.4 percent of payroll to 14.98 percent of payroll), a benefit reduction of about 16 percent, or some combination of the two, would pay all benefits during the period, but would <u>not</u> end the period with any trust fund reserve.

The high-cost 75-year projection in the Trustees Report shows a far greater actuarial deficit— 6.30 percent of taxable payroll. The low-cost projection is much more favorable, with a small positive actuarial balance for the 75-year period.

Trust Fund Ratios

The **trust fund ratio**, equal to trust fund assets as a percentage of the following year's cost, is an important measure of short-term solvency. A trust fund ratio of at least 100 percent indicates the ability to cover the expected scheduled benefits and expenses for the next year without any additional income. Figure 4 shows projected trust fund ratios under all three sets of assumptions.

As a measure of long-range solvency, the trust fund ratio shows when the program is expected to deplete reserves and become unable to pay full benefits scheduled under current law. Figure 4 illustrates that trust fund reserve depletion occurs in 2034 under the intermediate projection. The high-cost projection moves the trust fund reserve depletion date up by approximately five years to 2029, while the low-cost projection shows no trust fund reserve depletion during the 75-year period.

Sustainable Solvency

Sustainable solvency means the program is not expected to deplete reserves any time in the 75-year projection period, and trust fund ratios are expected to finish the 75-year projection period on a stable or upward trend.

The results shown in the Actuarial Balance column may not be equal to the difference between Summarized Income Rate and Summarized Cost Rate because of rounding.

Sustainable solvency is a stronger standard than actuarial balance in two ways. First, actuarial balance is based on averages over time, without regard to year-by-year figures that could indicate inability to pay full benefits from trust fund assets at some point along the way. Second, actuarial balance can exist even when trust fund ratios toward the end of the period are trending sharply downward.

Sustainable solvency, in contrast, requires strict year-by-year solvency *and* trust fund ratios that are level or trending upward toward the end of the period. For example, following the last major Social Security reform, the 1983 Trustees Report projected a positive actuarial balance under the intermediate assumptions, but the annual balances were negative and declining at the end of the 75-year period. That report was in actuarial balance but did not show sustainable solvency. As a result, the actuarial balance generally has been declining since then, primarily as a consequence of the passage of time. It is important to note that this result was exactly what the Trustees Report projected in 1983. More than 30 years later, it should be no surprise that large and growing actuarial deficits are now projected at the end of the long-range projection period. Adequate financing beyond 2090, or sustainable solvency, would require larger program changes than needed to achieve actuarial balance.

Unfunded Obligation

The **unfunded obligation** is another way of measuring Social Security's long-term financial commitment. To compute it, discount with interest the year-by-year streams of future cost and income and then sum them to obtain their present values. Based on these present values, the general formula for computing the unfunded obligation is:

> Present value of future cost (benefits and expenses) *minus* the present value of future income from taxes *minus* current trust fund assets.

The unfunded obligation may be computed and presented in several ways. Perhaps the most useful way is based on taxes and benefits for an open group of participants over the next 75 years, including many people not yet born, the same as was calculated in the basic projections. That methodology is consistent with the primarily pay-as-you-go way the program is designed and currently run. Although the trustees provide alternative calculations based on the closed group of current participants, we

believe the open-group basis makes more sense for Social Security and avoids certain misleading outcomes. For example, if the program were in exact actuarial balance, the open group measure of the unfunded obligation would be zero, while the closed group measure would show a substantial unfunded obligation.

The dollar amount of unfunded obligation is easier to interpret if put in perspective, for example, by comparing it with the size of the economy over the same period. The unfunded obligation is often presented as a percentage of the present value of either taxable payroll or of gross domestic product (GDP). At the beginning of 2016, the open-group unfunded obligation over the next 75 years was $11.4 trillion (up from $10.7 trillion last year). This now represents 2.49 (2.53 last year) percent of taxable payroll, or 0.9 percent (same as last year) of GDP.

In recent years, the Trustees' Reports have also presented the unfunded obligation based on stretching the 75-year projection period into infinity. The infinite horizon projections project all annual balances beyond 75 years assuming that the current law, demographic assumptions, and economic trends from the 75-year projection continue indefinitely; in practice, this is highly problematic. Projections over an infinite time period have an extremely high degree of uncertainty. Troublesome inconsistencies can arise among demographic and program-specific assumptions. By assuming that longevity keeps increasing forever while retirement ages remain static, for example, the infinite time period forecast will eventually result in an extremely long period of retirement.

Measures of Uncertainty

Because the future is unknown, the trustees use alternative projections and other methods to assess how the financial results may vary with changing economic and demographic experience.

TABLE 2: CURRENT AND LONG-RANGE VALUES OF KEY ECONOMIC AND DEMOGRAPHIC ASSUMPTIONS

	Average of Estimated and Historical Values*	Estimated 2015 Value	Long-Range Value		
			Low-Cost Assumptions	Intermediate Assumptions	High-Cost Assumptions
Fertility (children per woman)	2.0	1.9	2.2	2.0	1.8
Mortality reduction (assumed average annual decrease in adjusted death rates)	1.41%	1.14%	0.42%	0.78%	1.16%
Annual net immigration (thousands)	1,014	1,557	1,629	1,291	961
Productivity growth (total U.S. economy)	0.98%	0.44%	1.98%	1.68%	1.38%
Real-wage growth	0.45%	3.17%	1.83%	1.20%	0.59%

Based on *The 2016 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds*
* 10-year average, except productivity growth and real-wage growth, which are measured from 2008.

Alternative Sets of Assumptions

Table 2 shows a comparison between recent values and ultimate long-range values of five key assumptions used in each of the three projections. With the exception of productivity growth, where the ultimate values have not changed from last year's report, the ultimate values of the other assumptions exhibit some minor changes when compared to last year's Trustees Report.

Sensitivity Analysis

The low-cost and high-cost projections change all the major intermediate assumptions at once in the same direction, either favorably or unfavorably. In contrast, there might be some interest in how the projections change when only one key assumption is changed at a time, either favorably or unfavorably. A sensitivity analysis shows exactly this. Just one assumption is changed at a time to determine the financial impact. Table 3 gives results of three sensitivity tests focusing on total fertility rate, mortality reduction, and real-wage growth.

If the real-wage growth assumption were changed from 1.21 percent to 1.83 percent, for example, the actuarial deficit would be reduced from 2.66 percent of taxable payroll to 1.64 percent, and the year of trust fund asset reserve depletion would be extended from 2034 to 2038.

TABLE 3: SENSITIVITY TO VARYING ANY OF THREE KEY ASSUMPTIONS

Sensitivity Assumption	Favorable Change	Results based on Intermediate Assumptions, with one assumption changed at a time	Unfavorable Change
		Intermediate Assumption	
Total Fertility Rate			
Ultimate total fertility rate	2.2	2.0	1.8
75-year actuarial deficit	2.28%	2.66%	3.02%
Year of combined trust fund reserve depletion	2034	2034	2034
Mortality Reduction			
Average annual reduction (in adjusted death rates over 75-year period)	0.42%	0.78	1.16%
75-year actuarial deficit	2.18%	2.66%	3.16%
Year of combined trust fund depletion	2034	2034	2033
Real-Wage Growth			
Ultimate percentage increase in wages in excess of CPI	1.83%	1.21%	0.59%
75-year actuarial deficit	1.64%	2.66%	3.69%
Year of combined trust fund reserve depletion	2038	2034	2032

Based on *The 2016 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds*

References

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