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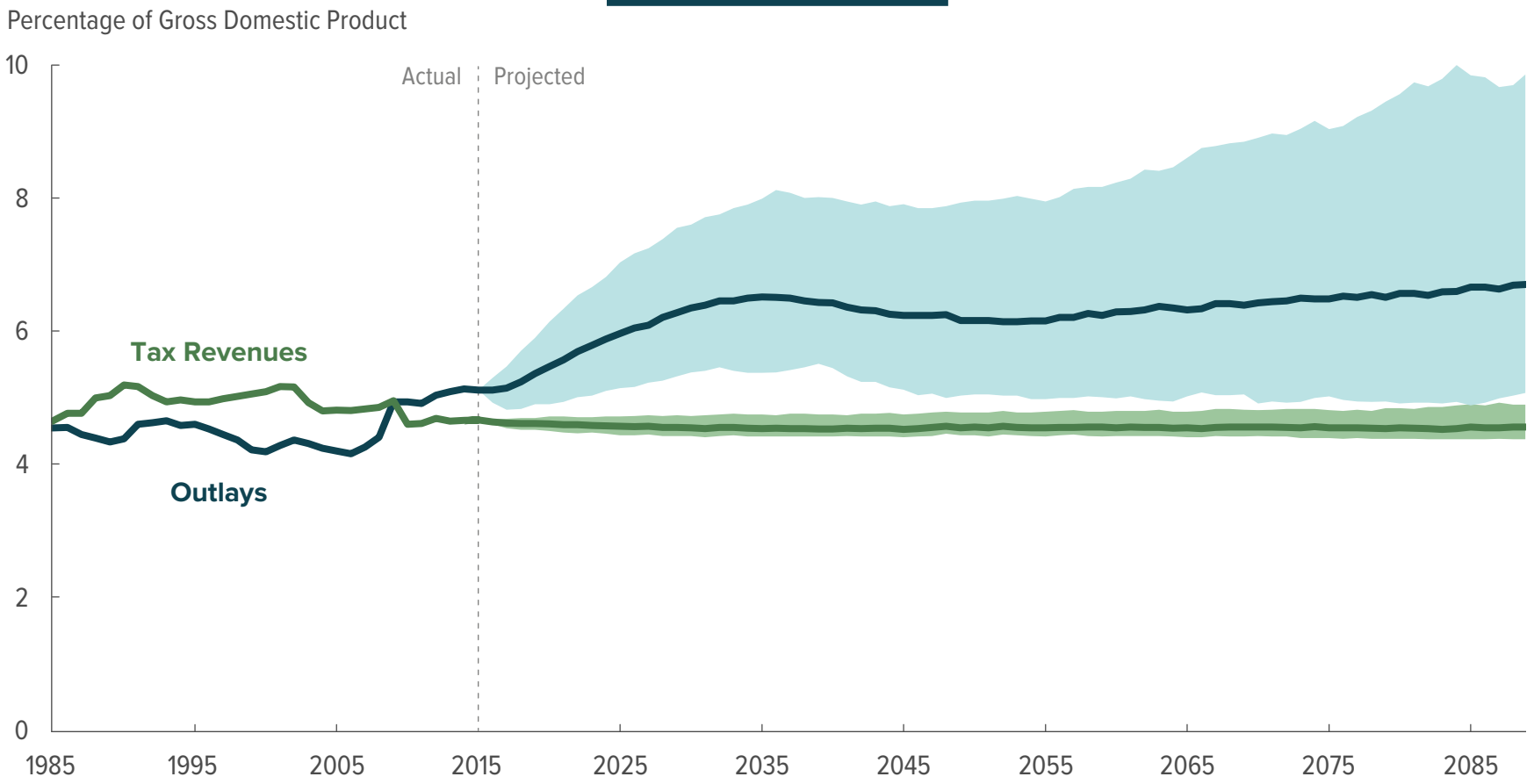
CBO

CBO's 2015 Long-Term Projections for Social Security: Additional Information



DECEMBER 2015

Notes

Unless otherwise indicated, the years referred to in this report are calendar years. Fiscal years run from October 1 to September 30 and are designated by the calendar year in which they end.

Numbers in the text and tables may not add up to totals because of rounding.

Additional data are posted with this report on CBO's website.

The analysis presented in this report relies on and updates projections published in *The 2015 Long-Term Budget Outlook* (Congressional Budget Office, June 2015, www.cbo.gov/publication/50250). For that report, CBO had projected that the Disability Insurance (DI) Trust Fund would be exhausted in fiscal year 2017 and that the Old-Age and Survivors Insurance (OASI) Trust Fund would be exhausted in calendar year 2031. The Bipartisan Budget Act of 2015 (Public Law 114-74; www.congress.gov/bill/114th-congress/house-bill/1314), enacted on November 2, 2015, revised the allocation of the payroll tax between the two trust funds. Where appropriate, CBO has modified its projections to account for the resulting shift of a 0.57 percentage-point share of the payroll tax from the OASI trust fund to the DI trust fund for calendar years 2016 through 2018. This report does not account for the effects of several other small changes to Social Security under the new law. For pertinent estimates, see Congressional Budget Office, cost estimate for H.R. 1314, the Bipartisan Budget Act of 2015 (October 28, 2015), www.cbo.gov/publication/50938.

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CBO's 2015 Long-Term Projections for Social Security: Additional Information

Summary and Introduction

Social Security, which marked its 80th anniversary in 2015, is the largest single program in the federal government's budget.[1] About 72 percent of the roughly 60 million people who currently receive Social Security benefits are retired workers or their spouses and children, and another 10 percent are survivors of deceased workers; all of those beneficiaries receive payments through Old-Age and Survivors Insurance (OASI). The remaining 18 percent of beneficiaries are disabled workers or their spouses and children; they receive Disability Insurance (DI) benefits.

In fiscal year 2015, spending for Social Security benefits totaled $877 billion, or almost one-quarter of federal spending. OASI payments accounted for about 84 percent of those outlays, and DI payments made up about 16 percent.

Each year (most recently in June 2015), the Congressional Budget Office publishes its long-term projections of revenues and outlays for the federal government, including those for the Social Security program.[2] CBO's projections generally reflect current law, following its 10-year baseline budget projections and then extending the baseline concept for the rest of the long-term projection period. This report presents additional information about CBO's long-term projections for Social Security in the form of 15 exhibits that illustrate the program's finances and the distribution of benefits paid to and payroll taxes collected from various groups of people. Any harm that rising debt would cause to the economy was not factored into the long-term projections published in this report. The appendix presents more information on CBO's demographic projections. A list of definitions of common terms appears at the end of the publication.

Social Security is funded by dedicated tax revenues from two sources: payroll taxes and income taxes on benefits. Today, 96 percent of that tax revenue comes from the payroll tax—generally, 12.4 percent of people's earnings that are subject to the Social Security tax. Workers and their employers each pay half; self-employed people pay the entire amount.[3] Earnings up to a maximum annual amount—now $118,500—are subject to the payroll tax. The remaining share of tax revenues for the program—about 4 percent—is collected from income taxes on Social Security benefits.[4] The tax revenues that funded the program totaled $786 billion in fiscal year 2015.[5]

1. For an overview of Social Security and a discussion of the program's financing and trust funds, see Congressional Budget Office, *Social Security Policy Options, 2015* (December 2015), www.cbo.gov/publication/51011.

2. See Congressional Budget Office, *The 2015 Long-Term Budget Outlook* (June 2015), Chapter 3, www.cbo.gov/publication/50250. In the current report, the 75-year projection period consists of calendar years 2015 through 2089, matching the period used in Social Security Administration, *The 2015 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds* (July 2015), www.ssa.gov/oact/TR/2015.

3. The worker's portion of the payroll tax was reduced by 2 percentage points for 2011 and 2012 (as was the tax paid by self-employed workers), and the reduction in tax revenues was made up by reimbursements from the Treasury's general fund. In this report, Social Security tax revenues include those reimbursements.

4. See Joshua Shakin and Kurt Seibert, "The Taxation of Social Security Benefits" (*CBO Blog*, February 12, 2015), www.cbo.gov/publication/49948. A portion of income taxes on Social Security benefits is credited to the Medicare Hospital Insurance Trust Fund; in fiscal year 2015, that amount was $20 billion.

5. That amount included $16 billion that the government contributed as the employer's share of the payroll tax for federal workers. Such funds are recorded as offsetting receipts, rather than as revenues, because they result from intragovernmental transfers.

Social Security retirement and disability benefits and the program's administrative costs are paid from two trust funds—one for the OASI program and one for the DI program. In addition to the tax revenues, the funds also receive intragovernmental interest payments on the Treasury securities they hold. In a given year, the receipts credited to a fund, including the interest credited on its balances, minus spending for benefits and administrative costs, constitute the trust fund's surplus or deficit. Although the two trust funds are legally separate, in this report, CBO generally follows the common analytical convention of considering them as combined.

In 2010, for the first time since the enactment of the Social Security Amendments of 1983, annual outlays for the program exceeded annual revenues (excluding interest) credited to the combined OASDI trust funds. A gap between those amounts has persisted since then, and in fiscal year 2015, outlays exceeded noninterest income by almost 9 percent. As more people in the baby-boom generation retire over the next 10 years, CBO projects, that gap will widen. If current laws governing taxes and spending stayed generally the same—an assumption that underlies CBO's extended baseline projections—outlays from the Social Security program would exceed revenues by almost 30 percent in 2025 and by more than 40 percent in 2040.

According to CBO's extended baseline projections, the DI trust fund will be exhausted in fiscal year 2021, the OASI trust fund will be exhausted in calendar year 2030, and the combined OASDI trust funds will be exhausted in calendar year 2029.[6] If a trust fund's balance declined to zero and current revenues were insufficient to cover benefits specified in law, the Social Security Administration would no longer be permitted to pay full benefits when they were due. In the years after a trust fund was exhausted, annual outlays would be limited to annual revenues: All receipts to the trust fund would be used, and the trust fund's balance would remain essentially at zero.[7]

The amount of Social Security taxes paid by various groups of people differs, as do the benefits that different groups receive. For example, people with higher earnings pay more in Social Security payroll taxes than do lower-earning participants, and they also receive benefits that are larger. Because Social Security's benefit formula is progressive, replacement rates—annual benefits as a percentage of past earnings—are lower, on average, for workers who have had higher earnings.[8] As another example, CBO projects that people who were born in more recent decades will pay more in taxes and receive more in benefits because they typically will earn more over a lifetime, even after an adjustment for inflation.

Scheduled and Payable Benefits

CBO prepares projections of Social Security benefits as they would be paid under two scenarios. *Scheduled benefits* are full benefits as calculated under the Social Security Act, without regard to the trust funds' balances. If, however, a fund's balance was insufficient to pay the full amounts, beneficiaries would receive *payable benefits*, the amounts of which would be reduced from the scheduled amounts such that annual outlays would be limited to annual revenues.

Quantifying Uncertainty

CBO's long-term projections for Social Security depend critically on its projections of key demographic and economic factors; all such long-term projections are inherently uncertain. (See the appendix for information on CBO's demographic projections.) To quantify the uncertainty, CBO estimated a distribution of outcomes from 500 simulations using its long-term model. The values for most of the important demographic and economic variables in that model—for example, fertility rates, mortality rates, interest rates, and the rate of growth in productivity—were based on historical

6. CBO previously had projected that the DI trust fund would be exhausted in fiscal year 2017 and that the OASI trust fund would be exhausted in calendar year 2031. It revised those projections as a result of a provision in the Bipartisan Budget Act of 2015 that changed the allocation of the payroll tax between the two programs, granting a larger share to the DI trust fund for calendar years 2016 through 2018 and reducing by an equal amount the share allocated to the OASI trust fund for those years. Because total tax revenues would remain the same, CBO does not project a change from calendar year 2029 for the exhaustion of the combined OASDI trust funds.

7. Noah P. Meyerson, *Social Security: What Would Happen If the Trust Funds Ran Out?* Report for Congress RL33514 (Congressional Research Service, August 28, 2014), available from U.S. House of Representatives, Committee on Ways and Means, *2014 Green Book,* Chapter 1: Social Security, "Social Security Congressional Research Service Reports" (accessed December 9, 2015), http://go.usa.gov/cCXcG. That report explains that it is unclear how payments would be reduced. In its analysis, CBO assumes that each year after the trust funds became exhausted, each recipient's annual benefit would be reduced by the percentage necessary for outlays to match revenues.

8. See Congressional Budget Office, *Is Social Security Progressive?* (December 2006), www.cbo.gov/publication/18266.

year-to-year variation.[9] Several of the exhibits in this report illustrate the 80 percent range of uncertainty implied by the model's simulations: Eighty percent of the time, the value in question lies within a given range; for 10 percent, the value is above the range; and for 10 percent, it is below.

The simulations show that uncertainty in projections for key demographic and economic factors in turn leads to uncertainty of budget projections. In 2089, the 80 percent range of uncertainty for outlays for scheduled benefits extends from about 5 percent to almost 10 percent of gross domestic product (GDP). Nevertheless, under a variety of values for key economic and demographic factors, the balances in the Social Security trust funds would be insufficient to pay scheduled benefits.

Changes in CBO's Long-Term Social Security Projections Since 2014

CBO currently projects shortfalls for Social Security that are larger than the projections it published in last year's edition of this report.[10]

Spending and Revenues Measured Relative to Taxable Payroll

At 4.37 percent of taxable payroll, CBO's projection for the 75-year actuarial deficit (the difference between the income and cost rates for the period) is higher than the agency's 2014 projection of 3.97 percent.[11] Because payroll taxes are a fixed share of taxable payroll, the projection for the 75-year income rate is about the same as the 2014 estimate. However, the projection for the 75-year cost rate is about 2 percent higher than last year's projection.

About half of the increase in CBO's projection of the 75-year actuarial deficit results from revised projections for various economic factors, primarily for lower interest rates. Lower interest rates raise the 75-year cost rate because spending on Social Security is increasing, and lower interest rates increase the importance of the later years in the present-value calculation.

Revised projections of taxable payroll account for the other half of the increase in the actuarial deficit. CBO now anticipates that wages will grow more quickly for high earners than it anticipated last year. Because of this change, CBO projects that a diminishing share of earnings will be subject to the Social Security payroll tax and that taxable payroll will be smaller, resulting in an increase in the cost rate projected for any given amount of benefits (when the cost rate is calculated as a percentage of taxable payroll). The change also led CBO to reduce the benefit amounts that it projects will be paid to future beneficiaries, although that reduction is not large enough to fully offset the effect of the reduction in taxable payroll. Smaller changes—attributable to newer data, the effects of the one-year change in the projection period, and changes in estimating methods—are largely offsetting.

Spending and Revenues Measured Relative to Gross Domestic Product

CBO's projection of the 75-year actuarial deficit as a share of GDP has increased from 1.38 percent of GDP in last year's report to 1.45 percent in the current analysis. CBO's current projection of the 75-year cost rate is about 3 percent lower and the 75-year income rate is 5 percent lower than last year's, largely because of the assumption that, over the next 75 years, a diminishing portion of earnings will be subject to the Social Security payroll tax.

Revised Measure of the Replacement Rate for Social Security Benefits

CBO formerly presented replacement rates as workers' initial benefits as a percentage of average lifetime earnings, with those earnings adjusted either for growth in wages or for growth in prices. However, older workers approaching retirement may find it more useful to know the extent to

9. For more information, see Congressional Budget Office, *Quantifying Uncertainty in the Analysis of Long-Term Social Security Projections* (November 2005), www.cbo.gov/publication/17472. This report's methodology differs slightly from the techniques described in that publication. This report's analysis of uncertainty also differs from that described in Congressional Budget Office, *The 2015 Long-Term Budget Outlook* (June 2015), www.cbo.gov/publication/50250. Instead of presenting an analysis of the effects of year-to-year variations in key demographic and economic factors around the underlying projections, as in this report, *The 2015 Long-Term Budget Outlook* examines the budgetary effects of alternative average values for similar key demographic and economic factors over a 25-year projection period. The ranges of variation for those projections were based on the historical variation in 25-year averages and on consideration of possible future developments.

10. See Congressional Budget Office, *CBO's 2014 Long-Term Projections for Social Security: Additional Information* (December 2014), www.cbo.gov/publication/49795.

11. The income rate is the present value of tax revenues for a period, plus the trust funds' initial balance, divided by the present value of taxable payroll or GDP over the same period. The cost rate is the present value of outlays for a period, plus the present value of a year's worth of benefits at the end of the period, divided by the present value of taxable payroll or GDP over the same period.

which Social Security can replace their preretirement earnings rather than their lifetime earnings. This report presents workers' initial benefits as a percentage of average late-career earnings, consisting of the last five years of substantial earnings (earnings that are at least half of the worker's average indexed earnings) before a worker reaches age 62.[12] Those earnings are adjusted for growth in prices. Late-career replacement rates are slightly lower, on average, than lifetime replacement rates (when adjusted either for growth in wages or for growth in prices) because late-career earnings tend to be higher than average earnings over a lifetime.

12. The 2015 Technical Panel on Assumptions and Methods recommended that such a measure be added to the annual Social Security trustees report. See 2015 Technical Panel on Assumptions and Methods, *Report to the Social Security Advisory Board* (September 2015), p. 83, http://go.usa.gov/cTjxW (PDF, 3.4 MB). Lifetime replacement rates adjusted for growth in wages or in prices are available in the supplemental information accompanying this report, see www.cbo.gov/publication/51047.

Related CBO Analyses

This report updates projections in *CBO's 2014 Long-Term Projections for Social Security: Additional Information* (December 2014), www.cbo.gov/publication/49795; it includes analysis arising from newly available economic and programmatic data and updated projections of economic trends as well as from some changes in methodology and improvements in models.

For this analysis, CBO used projections that it published in *The 2015 Long-Term Budget Outlook* (June 2015), www.cbo.gov/publication/50250, which are generally consistent with the 10-year baseline CBO published in *Updated Budget Projections: 2015 to 2025* (March 2015), www.cbo.gov/publication/49973. Where appropriate, CBO has modified those projections to account for the recently enacted shift of a 0.57 percentage-point share of the payroll tax from the OASI trust fund to the DI trust fund for calendar years 2016 through 2018.

The methodology used to develop the projections presented in this report is described in *CBO's Long-Term Model: An Overview* (June 2009), www.cbo.gov/publication/20807. The values used for the demographic and economic variables underlying the projections are explained in *The 2015 Long-Term Budget Outlook* (June 2015), www.cbo.gov/publication/50250.

Various approaches to changing Social Security also are presented in *Social Security Policy Options*, 2015 (December 2015), www.cbo.gov/publication/51011, *Policy Options for the Social Security Disability Insurance Program* (July 2012), www.cbo.gov/publication/43421, and *Options for Reducing the Deficit: 2014 to 2023* (November 2013), www.cbo.gov/publication/44715.

A collection of CBO's Social Security analyses can be found on the Social Security page of CBO's website (www.cbo.gov/topics/social-security).

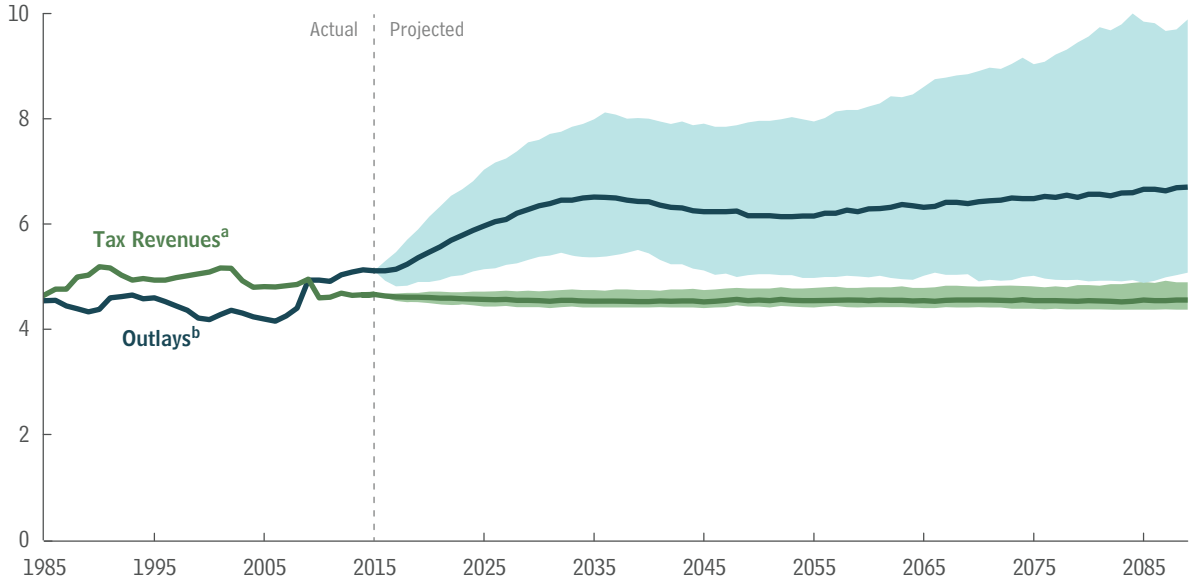
The System's Finances

The first part of this report (Exhibits 1 through 8) examines Social Security's financial status from several vantage points. The fullest perspective is provided through projections of the streams of the program's annual tax revenues and outlays. A more succinct analysis is given in measures that summarize those annual streams as single numbers. The system's finances also are described in projections of the trust fund ratio—the amount in a trust fund at the beginning of a year divided by outlays in that year.

Exhibit 1.

Social Security Tax Revenues and Outlays, With Scheduled Benefits

Percentage of Gross Domestic Product



Source: Congressional Budget Office.

Note: The dark lines indicate CBO's projections of expected outcomes; the shaded areas indicate the 80 percent range of uncertainty around those projections from 500 simulations from CBO's long-term model. Scheduled benefits are benefits as calculated under the Social Security Act, regardless of the balances in the trust funds.

a. Tax revenues consist of payroll taxes, income taxes on benefits, and, in 2011 and 2012, reimbursements from the Treasury's general fund to make up for reductions in payroll taxes in those years.

b. Outlays consist of scheduled benefits and administrative costs.

In calendar year 2014, Social Security's total outlays equaled 4.9 percent of the country's gross domestic product: 4.1 percent in payments from the OASI trust fund and 0.8 percent from the DI trust fund. Tax revenues dedicated to the program equaled 4.5 percent of GDP: 3.9 percent credited to the OASI trust fund and 0.6 percent credited to the DI trust fund. Most of the tax revenue was from payroll taxes, although about 4 percent came from income taxes on benefits.

During the next few decades, the number of OASI beneficiaries will increase as members of the baby-boom generation retire. As a result, in 2039, under current law, spending for OASI will be 5.4 percent of GDP if scheduled benefits are paid, CBO estimates. In the decade after that, OASI spending with scheduled benefits is projected to decline slightly, relative to the size of the economy, as people in the baby-boom generation die. Demographers generally predict increasing life expectancy but stable birth rates, so scheduled benefits are projected to resume their upward trajectory in the mid-2050s, boosting OASI outlays to 5.6 percent of GDP in 2089. Under current law and with scheduled benefits, outlays for DI will reach 0.8 percent of GDP in 2039, rise to 0.9 percent by 2064, and remain at about that level thereafter, CBO projects.

CBO projects that Social Security revenues relative to GDP will be stable over the next few decades. With the continuing widening of the earnings distribution that has been observed in past decades, taxable earnings are projected to decline as a share of GDP. Because Social Security's payroll taxes are a fixed share of

(continued)

Exhibit 2.

Social Security Tax Revenues and Outlays, With Scheduled Benefits, in Selected Years

Percentage of Gross Domestic Product

	Actual, 2014	Projected 2039	2064	2089
			CBO's Projections	
Old-Age and Survivors Insurance				
Tax Revenues	3.86	3.77	3.78	3.81
Outlays	4.11	5.41	5.23	5.60
Difference	-0.25	-1.64	-1.45	-1.79
Disability Insurance				
Tax Revenues	0.64	0.60	0.60	0.59
Outlays	0.84	0.79	0.88	0.86
Difference	-0.20	-0.19	-0.28	-0.27
Combined Old-Age and Survivors Insurance and Disability Insurance				
Tax Revenues	4.50	4.37	4.38	4.40
Outlays	4.95	6.20	6.12	6.46
Difference	-0.46	-1.83	-1.73	-2.06
			80 Percent Range of Uncertainty[a]	
Combined Old-Age and Survivors Insurance and Disability Insurance				
Tax Revenues		4.3 to 4.6	4.3 to 4.6	4.2 to 4.7
Outlays		5.3 to 7.7	4.8 to 8.2	4.9 to 9.5
Difference		-3.2 to -1.0	-3.6 to -0.5	-4.9 to -0.7

Source: Congressional Budget Office.

Note: Tax revenues consist of payroll taxes and income taxes on benefits in the specified year. Outlays consist of scheduled benefits and administrative costs. Scheduled benefits are benefits as calculated under the Social Security Act, regardless of the balances in the trust funds.

a. Each range spans the outcomes of 80 percent of 500 simulations from CBO's long-term model. The range for the difference may not equal the difference between outlays and revenues because each value is drawn from a separate simulation.

(continued)

taxable earnings, CBO anticipates that, under current law, payroll tax receipts will decline as a percentage of GDP—from 4.3 percent in 2014 to 4.1 percent in 2039. However, because CBO expects that both the number of recipients whose benefits are subject to taxation and their average tax rates will increase, the agency projects a rise in income taxes on Social Security benefits from about 0.2 percent of GDP today to about 0.3 percent in 2039. The decrease in payroll tax receipts and the increase in income taxes will offset each other, CBO projects, so the amount of tax revenues credited to the trust funds is expected to stay roughly constant as a percentage of GDP.

Under current law, Social Security tax revenues will equal 4.4 percent of GDP and outlays will equal 6.2 percent of GDP in 2039, by CBO's estimate. In 80 percent of CBO's simulations, projected tax revenues are between 4.3 percent and 4.6 percent of GDP. The range of uncertainty is much wider for outlays: In 80 percent of CBO's simulations, projected outlays range between 5.3 percent and 7.7 percent of GDP. With outlays likely to increase sharply and tax revenues expected to remain roughly stable (both relative to GDP), the difference between them is projected to increase from 0.5 percent of GDP in 2014 to 1.8 percent in 2039. That gap is projected to narrow slightly until the early 2050s (because of a drop in outlays as the baby-boom population shrinks) but then to widen again, reaching 2.1 percent of GDP in 2089. ◆

Exhibit 3.

Percentage of Simulations in Which Social Security Outlays Exceed Tax Revenues by Specified Percentages, With Scheduled Benefits

Percent

	By 0 Percent of GDP or More	By 1 Percent of GDP or More	By 2 Percent of GDP or More	By 3 Percent of GDP or More	By 4 Percent of GDP or More	By 5 Percent of GDP or More
2020	98	35	1	0	0	0
2030	100	87	37	7	1	0
2040	100	89	44	13	2	0
2050	98	76	35	11	1	0
2060	97	76	42	16	4	1
2070	96	80	51	23	10	4
2080	97	78	51	29	14	7

Source: Congressional Budget Office.

Notes: Outlays consist of scheduled benefits and administrative costs. Tax revenues consist of payroll taxes and income taxes on benefits in the specified year. Scheduled benefits are benefits as calculated under the Social Security Act, regardless of the balances in the trust funds. This analysis is based on 500 simulations from CBO's long-term model.

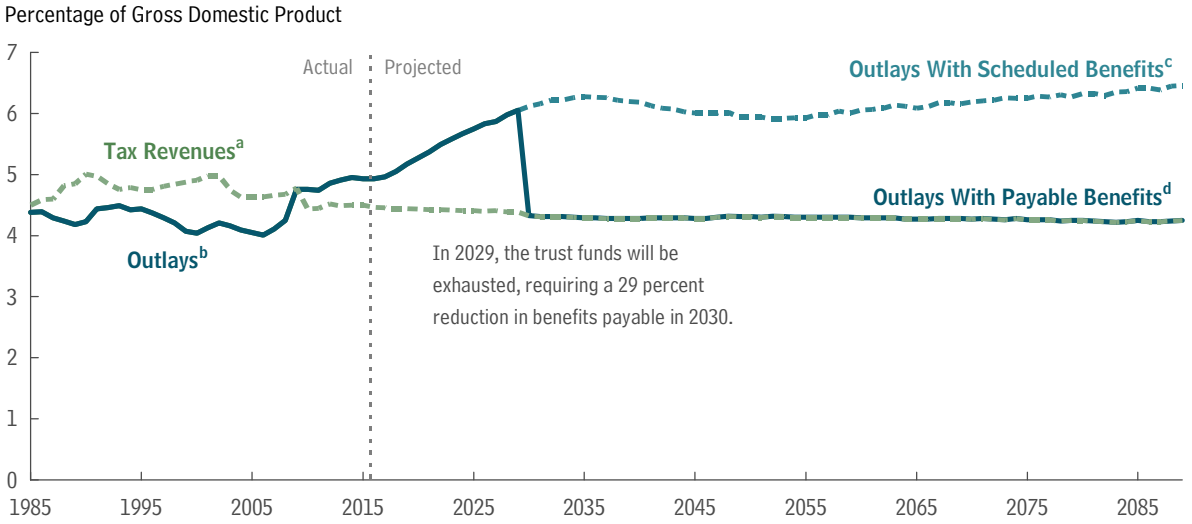
GDP = gross domestic product.

Another way to assess uncertainty in projections of Social Security's finances is to consider the percentage of simulations from CBO's long-term model in which total outlays exceed tax revenues by a given amount in a particular year. (Most values for the model's demographic and economic variables are based on historical year-to-year variation.) In all 500 simulations for 2030, for example, outlays equaled or exceeded tax revenues; in 87 percent, that difference amounted to at least 1 percent of GDP. In 37 percent of the simulations, the difference was at least 2 percent of GDP. Uncertainty increased somewhat for projections for later decades: In 97 percent of the simulations for 2080, outlays equaled or exceeded tax revenues, and more than half the time, the difference was at least 2 percent of GDP.

Uncertainty in projections of outlays and tax revenues stems largely from uncertainty in projections of mortality rates and productivity growth. Mortality rates affect outlays because people who live longer receive benefits for a longer time, on average. Productivity growth affects total earnings and, hence, tax revenues, benefits, and GDP. Nevertheless, in CBO's projections, the ratio of tax revenues to GDP does not change much even with productivity changes because earnings are estimated to be a relatively constant share of GDP and payroll taxes are estimated to be a constant share of earnings. Earnings growth at any time affects benefits in the future, so uncertainty about that growth has a greater effect on projections of future ratios of outlays to GDP than of tax revenues to GDP. ◆

Exhibit 4.

Social Security Tax Revenues and Outlays, With Scheduled and Payable Benefits



Source: Congressional Budget Office.

a. Tax revenues consist of payroll taxes, income taxes on benefits, and, for 2011 and 2012, reimbursements from the general fund of the Treasury to make up for reductions in payroll tax rates in those years. Tax revenues do not include interest credited to the Social Security trust funds. Tax revenues shown are consistent with payable benefits; they would be slightly higher if scheduled benefits were paid because revenues from income taxes paid on those benefits would be higher.

b. Outlays consist of benefits and administrative costs.

c. Scheduled benefits are benefits as calculated under the provisions of the Social Security Act, regardless of balances in the Social Security trust funds.

d. Payable benefits are benefits as calculated under the provisions of the Social Security Act, reduced as necessary to ensure that outlays do not exceed the Social Security system's revenues once the balances in the Social Security trust funds are exhausted. If a trust fund's balance declined to zero and current revenues were insufficient to cover benefits specified in law, the Social Security Administration would no longer be permitted to pay full benefits when they were due. In the years after a trust fund was exhausted, annual outlays would be limited to annual revenues.

If the gap between outlays and revenues occurs as CBO projects, the balance in the trust funds will decline to zero and the Social Security Administration will no longer be permitted to pay full benefits when they are due. In the years after the trust funds' exhaustion, annual outlays would thus be limited to annual revenues (although the method of payment reduction is not prescribed under current law).

In its projections of outlays with payable benefits, CBO assumed that in each year after the combined OASDI trust funds' exhaustion, recipients' annual benefit amounts would be reduced by the percentage needed to make total outlays match total revenues. Payable benefits would equal scheduled benefits until the combined trust funds were exhausted; after that, they would be the same as the program's annual revenues.

According to CBO's projections, under current law the DI trust fund will be exhausted in fiscal year 2021, the OASI trust fund will be exhausted in calendar year 2030, and the combined OASDI trust funds will be exhausted in calendar year 2029. In 2030, when revenues are projected to equal 71 percent of scheduled outlays, payable benefits thus would be 29 percent below scheduled benefits. The projected gap between scheduled and payable benefits then would close slightly, reaching 27 percent in 2050 before widening again, to 34 percent, by 2089. ◆

Exhibit 5.

Reductions in Old-Age and Survivors Insurance Benefits and Disability Insurance Benefits Following Exhaustion of the Trust Funds, in Selected Years

Percentage Reduction in Benefits

	2022[a]	2031[b]	2040	2060	2080
Old-Age and Survivors Insurance	n.a.	31	32	29	32
Disability Insurance	21	26	24	31	33

Source: Congressional Budget Office.

Note: n.a. = not applicable.

a. Fiscal year 2022 is the first year after the projected exhaustion in 2021 of the Disability Insurance Trust Fund.

b. Calendar year 2031 is the first year after the projected exhaustion in 2030 of the Old-Age and Survivors Insurance Trust Fund.

CBO projects that, under current law, the OASI trust fund will be exhausted in 2030. In 2031, therefore, benefits would need to be reduced by 31 percent from scheduled amounts if outlays were limited to revenues credited to the trust fund. After increasing for several years, however, the required reduction would abate as people in the baby-boom generation died: In 2060, CBO projects, payable benefits would need to be 29 percent lower than scheduled benefits. And because life expectancy is anticipated to continue to rise, by 2080, they would need to be 32 percent lower.

CBO projects that, under current law, the DI trust fund will be exhausted in fiscal year 2021. If the program's outlays were limited thereafter to revenues credited to the trust fund and if the Social Security Administration reduced DI benefits, payments to beneficiaries in fiscal year 2022 would be 21 percent below the amounts scheduled under current law, CBO projects. Moreover, because of the requirement to keep the trust fund in balance, the government would need to continue to reduce benefits: In 2040, payable DI benefits would be 24 percent lower than scheduled benefits, and by 2080, they would be 33 percent lower. ◆

Exhibit 6.

Summarized Financial Measures for Social Security, With Scheduled Benefits

	As a Percentage of Gross Domestic Product			As a Percentage of Taxable Payroll		
	Income Rate	Cost Rate	Actuarial Balance (Difference)	Income Rate	Cost Rate	Actuarial Balance (Difference)
	CBO's Projections					
Old-Age and Survivors Insurance						
25 years (2015–2039)	4.39	5.15	-0.76	13.00	15.27	-2.27
50 years (2015–2064)	4.10	5.15	-1.06	12.27	15.43	-3.16
75 years (2015–2089)	4.01	5.23	-1.23	12.10	15.79	-3.70
Disability Insurance						
25 years (2015–2039)	0.65	0.83	-0.18	1.94	2.46	-0.53
50 years (2015–2064)	0.63	0.84	-0.20	1.89	2.50	-0.61
75 years (2015–2089)	0.62	0.84	-0.22	1.87	2.54	-0.67
Combined Old-Age and Survivors Insurance and Disability Insurance						
25 years (2015–2039)	5.04	5.98	-0.94	14.94	17.73	-2.80
50 years (2015–2064)	4.73	5.99	-1.26	14.16	17.93	-3.77
75 years (2015–2089)	4.63	6.07	-1.45	13.97	18.33	-4.37
	80 Percent Range of Uncertainty[a]					
Combined Old-Age and Survivors Insurance and Disability Insurance						
25 years (2015–2039)	4.9 to 5.2	5.4 to 6.7	-1.5 to -0.5	14.6 to 15.4	16.2 to 19.8	-4.5 to -1.5
50 years (2015–2064)	4.6 to 4.9	5.3 to 6.8	-1.9 to -0.7	13.8 to 14.7	16.1 to 20.3	-5.8 to -2.2
75 years (2015–2089)	4.5 to 4.9	5.3 to 7.1	-2.2 to -0.8	13.7 to 14.5	16.3 to 21.1	-6.7 to -2.5

Source: Congressional Budget Office.

Note: Scheduled benefits are benefits as calculated under the Social Security Act, regardless of the balances in the trust funds. Over the relevant periods, the *income rate* is the present value of annual tax revenues plus the initial trust fund balance, and the *cost rate* is the present value of annual outlays plus the present value of a year's worth of benefits as a reserve at the end of the period, each divided by the present value of gross domestic product or taxable payroll. Present value is a single number that expresses a flow of current and future income or payments in terms of an equivalent lump sum received or paid at a specific time. The actuarial balance is the difference between the income and cost rates.

a. Each range spans the outcomes of 80 percent of 500 simulations from CBO's long-term model. The range for the differences may not equal the difference between the individual income and cost rates because each value is drawn from a separate simulation.

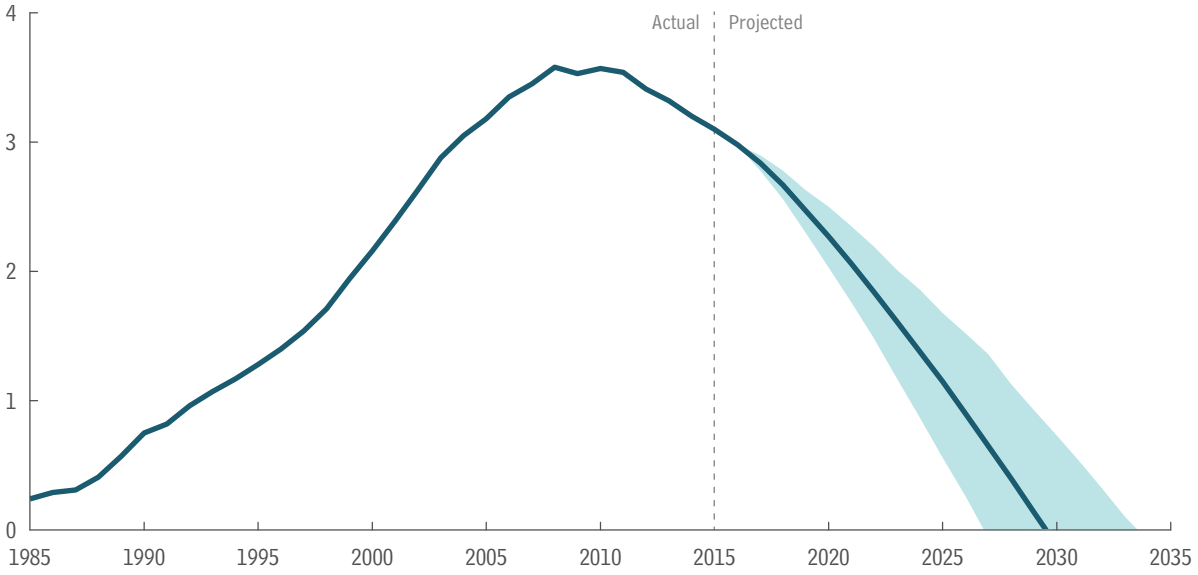
The actuarial balance—a summary measure of the financial status of the trust funds—is the difference between two other financial measures: the income rate (a measure of tax revenues over time) and the cost rate (a measure of outlays over time).

CBO estimates that, under current law, the 75-year actuarial balance for the combined trust funds will be –4.37 percent of taxable payroll. Thus, if the payroll tax rate was increased immediately and permanently by 4.37 percentage points (from the current 12.40 percent to 16.77 percent, an increase of more than one-third) or if scheduled benefits were reduced equivalently, at the end of 2089, the trust funds' balance would equal the outlays projected for 2090. This analysis does not account for any feedback to the economy resulting from such a change. The actuarial balance could be noticeably larger or smaller than CBO currently projects, however. Because the projected gap between outlays and revenues widens over time, the actuarial balance is projected to be more negative over 75 years than it is over the 25- or 50-year periods.

Separately, CBO projects that under current law, the 75-year actuarial balance for the OASI trust fund will be –3.70 percent of taxable payroll. Thus, if the OASI payroll tax rate was increased by 3.70 percentage points, or if a matching cut was made to benefits, at the end of 2089 the balance in the OASI trust fund would equal projected outlays for 2090. Similarly, if the DI tax rate was increased by 0.67 percentage points the DI trust fund balance would, at the end of 2089, equal projected outlays for 2090. ◆

Exhibit 7.

Combined Social Security Trust Funds' Ratio



Source: Congressional Budget Office.

Notes: The trust funds' ratio is the balance in the Social Security trust funds at the beginning of the year, divided by outlays (benefits and administrative costs) for that year. The trust funds are exhausted when the ratio reaches zero. Under current law, the trust funds cannot incur negative balances.

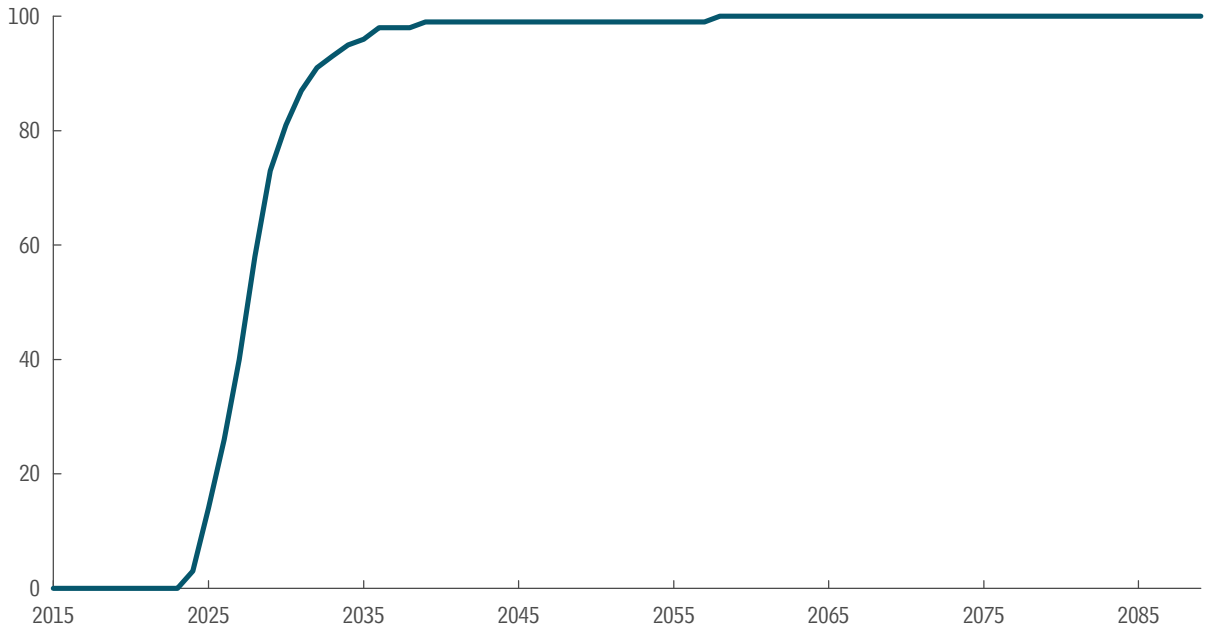
The dark line indicates CBO's projections of expected outcomes; the shaded area indicates the 80 percent range of uncertainty around those projections from 500 simulations from CBO's long-term model.

The trust funds' ratio indicates how much of a year's Social Security benefits could be paid from the balances in the trust funds at the beginning of a year. CBO estimates that the ratio was 3.1 at the beginning of 2015; that is, the trust funds' balances were about three times the projected benefit payments for the year. Under current law, the last year that the ratio is expected to be positive is 2029. That is, the balance in the combined OASDI trust funds will be exhausted by the end of 2029, and payments to beneficiaries would need to be reduced to make outlays equal revenues.

That timing could differ from CBO's estimate, however. To examine the possibilities, the agency simulated alternative outcomes by varying most of its long-term model's key demographic and economic factors on the basis of historical experience. The shaded area illustrates the model's 80 percent range of uncertainty around the expected outcomes. In 80 percent of simulations, the trust funds' ratio is last positive between 2026 and 2033. It is most likely, therefore, that the combined trust funds would be exhausted between those two years. ◆

Exhibit 8.

Percentage of Simulations That Show the Combined Social Security Trust Funds' Exhaustion by a Particular Year



Source: Congressional Budget Office.

Note: Analysis is based on 500 simulations from CBO's long-term model.

Another way to assess the uncertainty of the trust funds' exhaustion dates is to examine the percentage of simulations, using CBO's long-term model, that show the funds' exhaustion by a specific year. For this analysis, CBO estimated a distribution of outcomes from 500 simulations. The values for most of the key demographic and economic variables in that model were based on historical year-to-year variation. In 10 percent of the simulations, the combined OASDI funds were exhausted by 2026; in almost 60 percent, they were exhausted by 2029. In 95 percent, exhaustion occurred by 2035, and in 99 percent it occurred by 2040. CBO's best estimate is that, under current law, the combined OASDI trust funds will be exhausted in 2029. ◆

The Distribution of Benefits and Payroll Taxes

The second part of this report (Exhibits 9 through 15) examines Social Security benefits and taxes distributed to and paid by participants grouped by birth year and lifetime household income (a household can consist of a single person or a married couple). CBO divided people into 10-year birth cohorts (by the decade of birth) and, for each person who lives at least to age 45, into quintiles of lifetime household earnings (the lowest, middle, and highest fifths are shown in the exhibits). In this analysis, for someone who is single in all years, lifetime earnings equal the present value at age 65 of that person's real (inflation-adjusted) earnings over a lifetime. In any year in which someone is married, the earnings measure equals the couple's total earnings, adjusted for economies of scale in household consumption.

The discount rate that CBO used to compute present values in its Social Security distributional analyses is equal to the effective interest rate on federal debt. CBO's modeling approach produces estimates for individuals; household earnings are used only to place individuals into groups. CBO calculated benefits net of income taxes paid by some recipients on their benefits. Mean values are estimated for each earnings group and birth cohort.

Most retired and disabled workers receive benefits on the basis of their own work history. Exhibits 9 through 12 present measures of those benefits that do not include benefits received by dependents or survivors who are entitled to receive payments on the basis of another person's work history. Exhibits 13 and 14 present a more comprehensive perspective on the distribution of Social Security benefits. They show measures of the total that each participant pays in payroll taxes over his or her lifetime and each participant's total lifetime benefits—including dependents' and survivors' benefits. Exhibit 15 shows the percentage of the 500 simulations in which payable benefits exceeded specified percentages of scheduled benefits for people grouped by birth cohort.

Exhibit 9.

Mean Initial Benefits for Retired Workers, With Scheduled and Payable Benefits

Thousands of 2015 Dollars

10-Year Birth Cohort	All Retired Workers		Lowest Quintile of Lifetime Household Earnings		Middle Quintile of Lifetime Household Earnings		Highest Quintile of Lifetime Household Earnings	
	Scheduled	Payable	Scheduled	Payable	Scheduled	Payable	Scheduled	Payable
				All				
1940s	17	17	9	9	18	18	24	24
1960s	19	16	10	9	19	17	27	23
1980s	24	18	12	9	24	17	36	26
2000s	35	25	19	13	35	24	52	36
				Men				
1940s	20	20	11	11	22	22	26	26
1960s	21	18	11	9	22	19	30	26
1980s	27	20	13	9	26	19	40	30
2000s	39	27	20	13	39	27	57	40
				Women				
1940s	14	14	8	8	14	14	19	19
1960s	17	14	10	8	17	15	23	20
1980s	21	16	12	9	21	15	31	23
2000s	32	22	18	12	32	22	46	32

Source: Congressional Budget Office.

Note: Initial annual benefits are computed for all people who are eligible to claim retirement benefits at age 62 and who have not yet claimed any other Social Security benefits. All workers are assumed to claim benefits at age 65. All amounts are net of income taxes paid on benefits. Scheduled benefits are benefits as calculated under the Social Security Act, regardless of the balances in the trust funds. Payable benefits are benefits as calculated under that act, reduced as necessary to ensure that outlays do not exceed the Social Security system's revenues once the balances in the Social Security trust funds are exhausted.

Given the anticipated growth in average earnings, Social Security recipients are expected to receive higher real initial scheduled benefits in the future than beneficiaries do today. CBO considered a hypothetical benefit: the mean initial amount workers would receive based on earnings through age 61 if everyone claimed benefits at age 65. That benefit would grow over time, although the growth would be partly offset for some birth cohorts because of the scheduled rise in the full retirement age from 65 (for people born before 1938) to 67 (for people born after 1959). The effect is equivalent to a reduction in benefits at any age at which benefits are claimed.

Measured in 2015 dollars, average initial scheduled benefits for people born in the 2000s are projected to be roughly twice the initial benefits received by those born in the 1940s. The proportionate increase is greater for women than for men.

In CBO's projections, payable benefits decline sharply when the trust funds are first exhausted but then gradually rise because of growth in earnings and in tax revenues. For people who were born in or after the late 1960s, initial payable benefits are lower than initial scheduled benefits.

Benefits are projected to be generally 20 percent to 30 percent lower for women than for men in all birth cohorts because women have lower average earnings, although the gap narrows (as a share of men's benefits) for later cohorts as men's and women's earnings become more equal. ◆

Exhibit 10.

Mean Initial Replacement Rates for Retired Workers, With Past Earnings Limited to the Last Five Years of Substantial Earnings, Adjusted for Growth in Prices

Percent

10-Year Birth Cohort	All Retired Workers		Lifetime Household Earnings: Lowest Quintile		Middle Quintile		Highest Quintile	
	Scheduled	Payable	Scheduled	Payable	Scheduled	Payable	Scheduled	Payable
				All				
1940s	43	43	62	62	45	45	27	27
1960s	40	35	63	55	41	36	22	20
1980s	46	34	79	58	45	33	23	17
2000s	46	32	82	57	44	31	22	16
				Men				
1940s	40	40	61	61	42	42	21	21
1960s	39	34	64	56	40	35	18	16
1980s	46	34	82	60	46	33	19	14
2000s	46	32	85	59	44	31	18	13
				Women				
1940s	46	46	61	61	47	47	35	35
1960s	42	36	62	54	42	37	27	24
1980s	47	34	76	56	45	32	28	21
2000s	46	33	79	55	44	31	27	19

Source: Congressional Budget Office.

Notes: Initial replacement rates are computed as a percentage of preretirement earnings—specifically, the average of the last five years of substantial earnings before age 62. Earnings are "substantial" if they amount to at least half of a worker's average indexed earnings. Replacement rates are computed for all people who are eligible to claim retirement benefits at age 62 and who have not yet claimed any other Social Security benefits. Workers with fewer than 20 years of earnings above 10 percent of the average wage index in each year were excluded from the analysis. All workers are assumed to claim benefits at age 65. All values are net of income taxes paid on benefits.

Median initial replacement rates are included in the supplemental data for this report, which are available on CBO's website (www.cbo.gov/publication/51047).

In this exhibit, initial replacement rates are initial benefits as a percentage of workers' preretirement earnings—specifically, the average of the last five years of substantial earnings before age 62.

Several patterns are worth noting. First, because of the progressive nature of Social Security's benefit formula, replacement rates are much higher for workers with lower earnings. Second, with payable benefits, replacement rates would drop noticeably for people in the cohorts that first received benefits after the trust funds were exhausted.

Third, scheduled replacement rates are higher for later cohorts than for earlier cohorts in the lowest quintile of lifetime household earnings, whereas they are lower for later cohorts in the highest earnings quintile. Because of increasing earnings inequality, earnings for workers in the lower quintiles are growing more slowly than average wages, while earnings for workers in the higher quintiles are growing more quickly than average.

Finally, replacement rates are noticeably higher for women than for men in the highest quintile. Although for that quintile, men's earnings are greater than women's earnings, on average, their benefits are not proportionately larger because of Social Security's progressive benefit formula. By contrast, replacement rates are higher for men in the lowest household earnings quintile who were born in the 1960s or later because men tend to earn more over a lifetime, so their benefits are larger, on average, than women's benefits. However, late-career earnings are similar for men and women in that group, so the replacement rate is higher, on average, for men. ◆

[Text and table corrected on February 10, 2016]

Exhibit 11.

Mean Present Value of Lifetime Benefits Relative to Lifetime Earnings for Retired Workers, With Scheduled and Payable Benefits

Percent

10-Year Birth Cohort	All Retired Workers		Lifetime Household Earnings: Lowest Quintile		Middle Quintile		Highest Quintile	
	Scheduled	Payable	Scheduled	Payable	Scheduled	Payable	Scheduled	Payable
				All				
1940s	9	9	16	16	11	10	7	7
1960s	10	7	22	17	15	11	6	5
1980s	11	8	28	20	18	13	7	5
2000s	11	8	28	19	18	12	7	5
				Men				
1940s	7	7	14	13	9	9	6	5
1960s	8	6	20	15	13	10	5	4
1980s	9	7	26	19	16	12	6	4
2000s	9	6	27	18	16	11	6	4
				Women				
1940s	13	12	18	18	14	14	12	11
1960s	13	10	24	18	17	12	9	7
1980s	15	10	29	21	20	14	10	7
2000s	14	10	30	20	20	13	10	7

Source: Congressional Budget Office.

Note: Benefits are measured as the present value of all retired-worker benefits received. Benefits are computed for all people who claim retired-worker benefits on the basis of their own earnings and have not yet claimed any other Social Security benefits. To calculate present value, benefits are adjusted for inflation (to produce constant dollars) and discounted to age 65. All values are net of income taxes paid on benefits. Scheduled benefits are benefits as calculated under the Social Security Act, regardless of the balances in the trust funds. Payable benefits are benefits as calculated under that act, reduced as necessary to ensure that outlays do not exceed the Social Security system's revenues once the balances in the Social Security trust funds are exhausted.

CBO calculates lifetime retirement benefits as the present value of all such benefits that a worker receives from the program, and it measures those benefits relative to the present value of lifetime earnings, with all values adjusted for inflation. Scaling by lifetime earnings accounts for economic growth over time and provides context for benefit amounts. CBO estimates that—with the exception of the highest earnings quintile—each birth cohort's real, average lifetime scheduled benefits relative to lifetime earnings will be greater than those for the preceding cohort.

The projected trends in lifetime retirement benefits relative to lifetime earnings differ from the trends in initial replacement rates, for two reasons. First, as life expectancy increases, people will collect benefits for longer periods, so the amount of lifetime scheduled benefits will grow faster than initial scheduled benefits. Second, although people in cohorts that begin to receive benefits before the trust funds' projected exhaustion dates will collect their initial scheduled benefits, some people in those cohorts will still be receiving benefits when the trust funds are exhausted. At that point, payable benefits will be less than scheduled benefits, and lifetime payable benefits for those recipients will be less than lifetime scheduled benefits.

Within a birth cohort, the ratio of lifetime benefits to lifetime earnings is higher for workers with lower earnings than for workers with higher earnings because of the progressive nature of the Social Security benefit formula and the difference in mean lifetime earnings. Those effects are partially offset by the longer average life expectancy of higher earners. Within each birth cohort, the ratio is higher for women than for men. ◆

Exhibit 12.

Mean Initial Benefits, Replacement Rates, and Lifetime Benefit-to-Earnings Ratios for Disabled Workers, With Scheduled and Payable Benefits

10-Year Birth Cohort	Initial Benefits (Thousands of 2015 Dollars)		Initial Replacement Rate[a]* (Percent)		Present Value of Lifetime Benefits Relative to Lifetime Earnings[b] (Percent)	
	Scheduled	Payable	Scheduled	Payable	Scheduled	Payable
All Disabled Workers						
1940s	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1960s	17	16	58	57	20	17
1980s	22	16	59	45	23	17
2000s	32	23	60	43	24	16
Workers Whose Disability Begins Before Age 40						
1940s	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1960s	10	10	66	66	76	72
1980s	12	12	63	63	70	58
2000s	18	14	65	47	82	57
Workers Whose Disability Begins Between Ages 40 and 54						
1940s	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1960s	15	15	66	66	27	24
1980s	19	14	61	48	32	23
2000s	28	20	64	46	33	23
Workers Whose Disability Begins Between Age 55 and the Full Retirement Age						
1940s	16	16	55	55	11	10
1960s	20	19	52	50	15	12
1980s	26	19	55	40	17	12
2000s	38	27	55	39	17	12

Source: Congressional Budget Office.

Notes: Initial annual benefits and replacement rates are computed for all people who are projected to receive Disability Insurance benefits. All values are net of income taxes paid on benefits.

n.a. = not available. No data are available for people who died before 1984.

a. Initial annual benefits as a percentage of the average of the last five years of substantial earnings before being awarded benefits, adjusted for growth in prices. Earnings are "substantial" if they amount to at least half of a worker's average indexed earnings.

b. All disability benefits received plus retired-worker benefits received after the full retirement age. To calculate present value, benefits are adjusted for inflation (to produce constant dollars) and discounted to age 65. To compute lifetime earnings, past earnings are adjusted for average growth in prices.

CBO

The trends projected for initial benefits for disabled workers are similar to those for retired workers (see Exhibit 9): DI beneficiaries are expected to receive higher real initial benefits in the future than beneficiaries receive today.

For this analysis, replacement rates for disabled workers were computed using the last five years of substantial earnings, adjusted for growth in prices. Replacement rates are higher for younger workers than for older ones and for disabled workers than for retired ones (see Exhibit 10) because the earnings of disabled workers tend to be lower overall.**

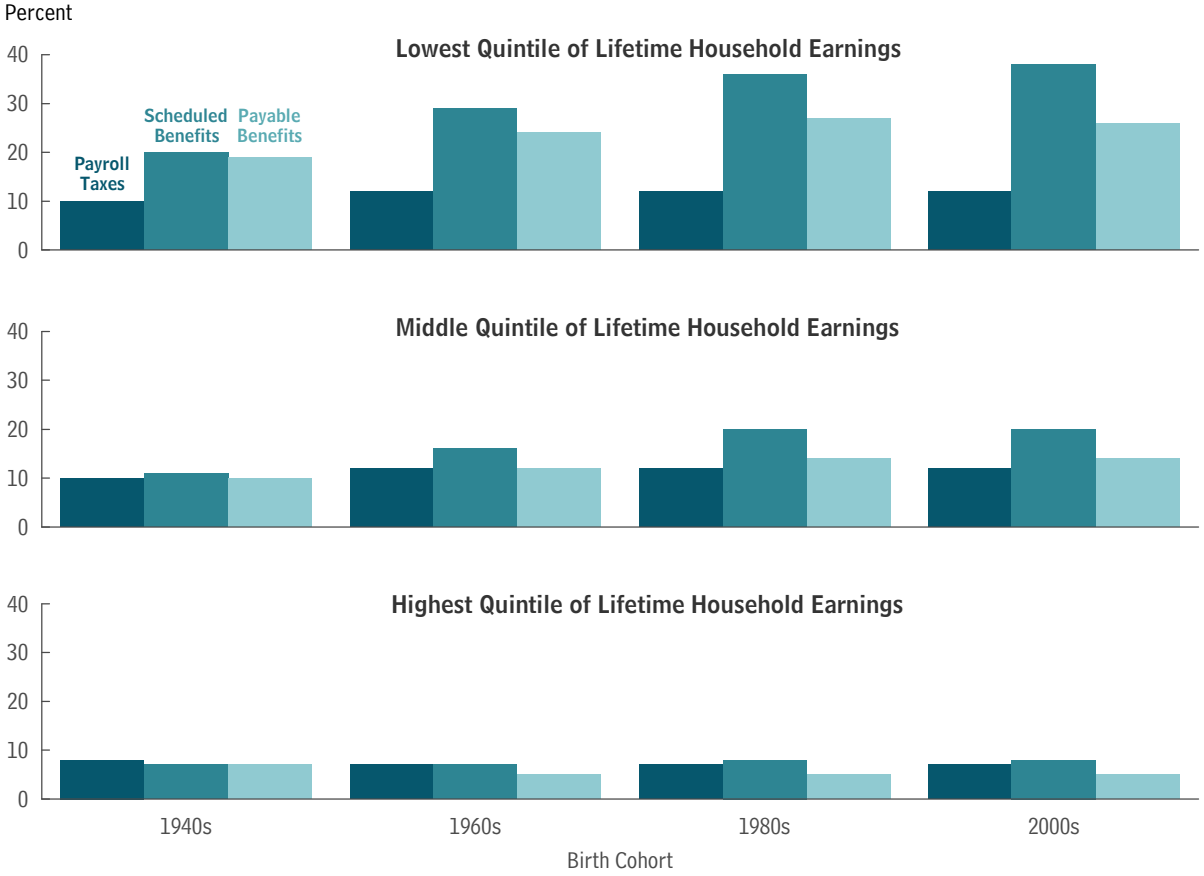
The mean present value of lifetime payments to disabled beneficiaries relative to their lifetime earnings—including the retirement benefits they receive after reaching the full retirement age—is greater than the equivalent ratio for retired workers (see Exhibit 11). That occurs because disabled beneficiaries are younger when they begin to collect benefits, so they receive benefits for a longer period, on average, than retired workers do and because their lifetime earnings are lower than those of retired workers. CBO projects that real lifetime disability benefits relative to lifetime earnings will, in general, be greater for each birth cohort than for the preceding cohort if scheduled benefits are paid. ◆

[*Data on initial replacement rates corrected on February 10, 2016]

[**Sentence corrected on February 10, 2016]

Exhibit 13.

Mean Lifetime Social Security Taxes and Benefits Relative to Lifetime Earnings, With Scheduled and Payable Benefits, by Birth Cohort



Source: Congressional Budget Office.

Notes: Lifetime Social Security taxes consist of the present value of the employer's and employee's payroll taxes combined. Lifetime benefits include the present value of all Social Security benefits except those received by young widows and children, which are excluded from this measure because of insufficient data for years before 1984.

Scheduled benefits are benefits as calculated under the Social Security Act, regardless of the balances in the trust funds. Payable benefits are benefits as calculated under that act, reduced as necessary to ensure that outlays do not exceed the Social Security system's revenues once the balances in the Social Security trust funds are exhausted.

To calculate present value, amounts are adjusted for inflation (to produce constant dollars) and discounted to age 65.

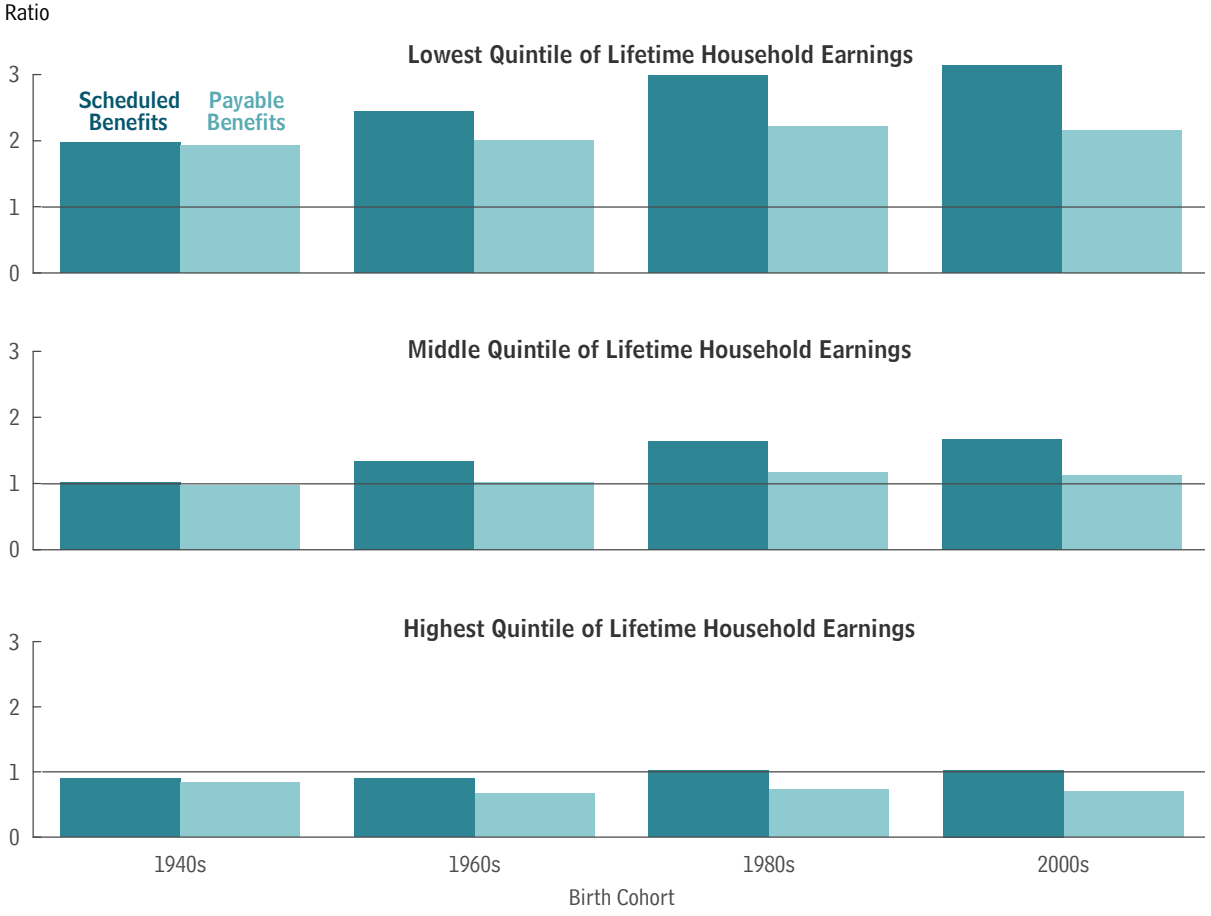
People in lower earnings quintiles receive more in Social Security benefits, relative to their lifetime earnings, than do people with higher earnings. In contrast, benefits paid are substantially higher, in dollar terms, for people in groups with higher lifetime earnings.

In contrast to Exhibit 11, the scheduled and payable benefits shown here include benefits paid not only to retired workers but also to disabled workers as well as to the dependents and survivors of both groups of workers. Benefits shown are net of the income taxes that some recipients pay on their benefits.

Changes in the proportion of wages going to earners in different quintiles and in projected increases in life expectancy lead to larger increases in real lifetime Social Security benefits than in lifetime earnings. For example, people who were born in the 1940s and who are in the lowest quintile of household earnings are projected to receive lifetime benefits that are about 20 percent of lifetime earnings, whereas people in that same quintile but born in the 1980s are projected to receive scheduled benefits that are equal to 36 percent of their lifetime earnings. For people in the highest quintile, for whom earnings growth is faster than for others, that ratio is 7 percent for people born in the 1940s and 8 percent for people born in the 1980s. Lifetime payable benefits are lower than scheduled benefits but follow a similar pattern across quintiles. ◆

Exhibit 14.

Mean Lifetime Social Security Benefit-to-Tax Ratios, With Scheduled and Payable Benefits, by Birth Cohort



Source: Congressional Budget Office.

Notes: The benefit-to-tax ratio is a comparison of the present values of benefits received over a lifetime—net of income taxes that some recipients pay on their benefits—and of payroll taxes paid. To calculate present values, amounts are adjusted for inflation (to produce constant dollars) and discounted to age 65. Payroll taxes consist of the employer's and employee's shares combined.

Scheduled benefits are benefits as calculated under the Social Security Act, regardless of the balances in the trust funds. Payable benefits are benefits as calculated under that act, reduced as necessary to ensure that outlays do not exceed the Social Security system's revenues once the balances in the Social Security trust funds are exhausted.

If benefits are paid as scheduled, Social Security participants will receive more in benefits than they pay in taxes, on average. (In this exhibit, that occurs when a bar is above the horizontal line, which denotes a 1:1 ratio.) For people with lower lifetime earnings, the present value of scheduled benefits will exceed the present value of taxes paid. However, for people with household earnings in the top quintile, the present value of scheduled benefits received will be less than or equal to the present value of taxes paid.

Benefit-to-tax ratios are higher for people with lower household earnings, in part because the benefit formula is progressive and in part because people with lower earnings are more likely to receive disability benefits, dependent benefits, or both. Increases in life expectancy boost benefit-to-tax ratios for later cohorts.

CBO projects that if the combined trust funds are exhausted, the taxes collected will be insufficient to pay scheduled benefits, and benefit-to-tax ratios for payable benefits will be lower than those for scheduled benefits for all categories of people. For the program to be self-supporting, current and future participants would need to pay more in taxes all together than they receive in benefits to offset the larger benefit-to-tax ratios of the program's oldest participants. ◆

Exhibit 15.

Percentage of Simulations in Which Payable Benefits Exceed Specified Percentages of Scheduled Benefits

Percent

10-Year Birth Cohort	Payable Benefits as a Percentage of Scheduled Benefits[a]									
	99 or More	95 or More	90 or More	85 or More	80 or More	75 or More	70 or More	65 or More	60 or More	55 or More
					Initial Benefits					
1940s	100	100	100	100	100	100	100	100	100	100
1960s	9	19	34	55	71	83	92	98	99	100
1980s	2	3	7	14	25	42	56	73	86	96
2000s	3	5	8	13	21	33	45	57	71	83
					Lifetime Benefits					
1940s	4	50	94	100	100	100	100	100	100	100
1960s	1	2	5	14	32	57	79	95	99	100
1980s	0	2	5	11	23	41	57	74	90	98
2000s	0	1	4	9	16	28	40	57	72	85

Source: Congressional Budget Office.

Note: Analysis is based on a distribution of 500 simulations from CBO's long-term model.

a. The sum of all payable benefits for everyone in a 10-year birth cohort divided by the sum of scheduled benefits for everyone in that cohort. Payable benefits are benefits as calculated under the Social Security Act, reduced as necessary to ensure that outlays do not exceed the Social Security system's revenues once the balances in the Social Security trust funds are exhausted. Scheduled benefits are benefits as calculated under that act, regardless of the balances in the trust funds.

Under current law, initial payable benefits will be more likely to fall short of initial scheduled benefits for people in later than in earlier birth cohorts. For example, in each of 500 simulations, the 1940s birth cohort received initial payable benefits that were at least 99 percent of the amount of initial scheduled benefits; the 1960s cohort, by contrast, did so in only 9 percent of the simulations. In 83 percent of the simulations, the 1960s cohort received initial payable benefits that were at least 75 percent of the amount of initial scheduled benefits; that percentage was only 33 percent for the 2000s cohort. For this exercise, CBO varied most of the underlying key demographic and economic factors on the basis of historical experience.

In CBO's simulations, it was possible for the exhaustion of the trust funds to occur after a group had begun to collect benefits, so the odds that a beneficiary's lifetime payable benefits would be as large as—or nearly as large as—his or her lifetime scheduled benefits were generally lower than the corresponding odds for initial benefits. Thus, although initial payable benefits equaled at least 99 percent of initial scheduled benefits in every simulation for the 1940s cohort, in only 4 percent of the simulations did the same occur for lifetime benefits. Yet in 94 percent of the simulations, the 1940s cohort received lifetime payable benefits that equaled at least 90 percent of lifetime scheduled benefits; that was true for the 1960s, 1980s, and 2000s cohorts in only 4 percent or 5 percent of the simulations. ◆

Appendix: CBO's Projections of Demographic Variables

Social Security's revenues and outlays depend on the size and composition of the U.S. population, and the Congressional Budget Office's revenue and outlay projections for the program in turn rely on projections of the nation's rates of fertility, mortality, and immigration. For the current analysis, CBO used projections published by the Social Security Administration for fertility rates but produced its own projections for mortality and immigration.[1] All told, CBO projects, the population will grow from 325 million today to 394 million in 2040. The agency also has projected the rate at which people will qualify for Social Security's Disability Insurance program in coming decades.

Fertility

CBO has adopted the intermediate (midrange) estimates of fertility rates that the Social Security Administration published in 2014. Those values imply an average fertility rate of 2.0 children per woman between 2015 and 2040. (The Social Security trustees define *fertility rate* as the average number of children that a woman would have in her lifetime if at each age of her life she experienced the birth rate observed or assumed for that year and if she survived her entire childbearing period.)

Mortality

CBO projects that U.S. mortality rates will continue to decline as they did between 1950 and 2010: that is, at an average rate of 1.2 percent per year.[2] That extrapolation of past trends suggests that the average life expectancy at birth in 2040 will be 82.6 years; CBO estimates an average life expectancy of 79.2 years for someone born in 2015. Similarly, CBO projects that life expectancy at age 65 in 2040 will be 21.8 years, on average, or 2.4 years longer than life expectancy at age 65 in 2015. Those figures represent averages for all people of a given age in those years.

CBO's projections also incorporate differences in mortality on the basis of age, sex, marital status, education, and lifetime household earnings. (For people under 30, the mortality projections reflect only age and sex.) CBO anticipates that future increases in life expectancy will be larger for people with higher lifetime earnings than for those with lower earnings—an assessment that is consistent with patterns of past increases.[3] Today, on average,

1. See Social Security Administration, *The 2014 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds* (July 2014), www.ssa.gov/oact/tr/2014. Annual projected values for selected economic variables for the next 75 years are included in the supplemental data for this report, which are available on CBO's website (www.cbo.gov/publication/51047).

2. Because of uncertainty about the possible effects of changes in other factors as disparate as the population increase in obesity and improvements in medical technology, CBO has based its mortality projections on a simple extrapolation of past trends. For further discussion on the topic, see Hilary Waldron, "Literature Review of Long-Term Mortality Projections," *Social Security Bulletin,* vol. 66, no. 1 (September 2005), pp. 16–50, http://go.usa.gov/XKGk; and John R. Wilmoth, *Overview and Discussion of the Social Security Mortality Projections,* Working Paper for the 2003 Technical Panel on Assumptions and Methods (Social Security Advisory Board, May 2005), http://go.usa.gov/3efkh (PDF, 490 KB).

3. For more information on mortality differentials among groups with different earnings, see National Academy of Sciences, Engineering, and Medicine, *The Growing Gap in Life Expectancy by Income: Implications for Federal Programs and Policy Responses* (National Academies Press, 2015), http://tinyurl.com/pp74v49; Hillary Waldron, "Mortality Differentials by Lifetime Earnings Decile," *Social Security Bulletin*, vol. 73, no. 1 (February 2013), pp. 1–37, www.ssa.gov/policy/docs/ssb/v73n1/v73n1p1.html; and Julian P. Cristia, *The Empirical Relationship Between Lifetime Earnings and Mortality*, Working Paper 2007-11 (Congressional Budget Office, August 2007), www.cbo.gov/publication/19096.

a 65-year-old man whose household is in the highest quintile of the distribution of lifetime earnings will live more than three years longer, CBO projects, than a man of the same age whose household is in the lowest quintile of lifetime earnings; for women, that difference in life span is more than a year. CBO projects that by 2040, men in households in the highest quintile of lifetime earnings will live more than five years longer than men in households in the lowest quintile of lifetime earnings; the corresponding difference for women will be almost three years.

Immigration

CBO projects that after 2025, net annual immigration (the net result of people leaving and entering the United States) will equal 3.2 immigrants for every 1,000 members of the U.S. population, a ratio that is consistent with data for most of the past two centuries.[4] On that basis, CBO projects that net annual immigration to the United States will amount to 1.2 million people in 2026 and 1.3 million in 2040. Estimates of authorized and unauthorized immigration over the long term are subject to a great deal of uncertainty, however, and the number of immigrants could be higher or lower than CBO projects. Over the past 50 years, net annual immigration (averaged over five-year periods) has varied from almost 7 per 1,000 to fewer than 2 per 1,000 members of the U.S. population.[5]

Disability

Another demographic variable that affects the federal budget is the rate of disability incidence—the rate at which people will claim Social Security's Disability Insurance benefits. CBO projects that, on average, in every year after 2025, 5.6 people out of every 1,000 insured people (those who have met the work requirements for disabled workers' benefits but are not yet receiving benefits) will qualify for that program (adjusted for changes in the age and sex makeup of the population, relative to its composition in 2000).

4. The ratio equals the estimated average net flow of immigrants between 1821 and 2002; see 2003 Technical Panel on Assumptions and Methods, *Report to the Social Security Advisory Board* (October 2003), p. 28, http://go.usa.gov/cBRxk (PDF, 596 KB). That ratio also was published in 2011 Technical Panel on Assumptions and Methods, *Report to the Social Security Advisory Board* (September 2011), http://go.usa.gov/3efBm (PDF, 6.3 MB). For more on U.S. immigration, see Congressional Budget Office, *A Description of the Immigrant Population—2013 Update* (May 2013), www.cbo.gov/publication/44134.

5. 2011 Technical Panel on Assumptions and Methods, *Report to the Social Security Advisory Board* (September 2011), p. 70, http://go.usa.gov/3efBm (PDF, 6.3 MB).

Definitions

actuarial balance: The difference between a trust fund's income rate and its cost rate.

average indexed earnings. A measure of average annual earnings over a lifetime, equal to average indexed monthly earnings multiplied by 12.

average indexed monthly earnings (AIME): A measure of taxable earnings over a person's lifetime that is used to set Social Security benefits. The AIME for a retired-worker beneficiary is calculated from the recipient's 35 years with the highest earnings subject to Social Security payroll taxes. Taxable earnings before age 60 are indexed to growth in average wages; earnings at age 60 and later enter the computations at their nominal amounts. Dividing the total earnings (after indexing) by 420 (35 years multiplied by 12 months) yields the AIME for a retired worker. For a disabled worker, the number of years of earnings included in the calculation depends on the age at which that person becomes eligible for disability benefits. Taxable earnings that were credited more than two years before the initial benefit computation are indexed to growth in average wages; earnings for the two years that precede the initial benefit computation enter the computations at their nominal amounts. A period of less than 35 years is used in the AIME calculation for a worker who claims retired-worker benefits after having previously claimed disability benefits but then recovered and left the disability rolls.

average wage index: An index that measures the average amount of total wages in the United States in a calendar year, including earnings in employment not covered by Social Security. Several automatic adjustments under Social Security law are based on this index.

cost rate: The present value of outlays for a period, plus the present value of a year's worth of benefits at the end of the period, divided by the present value of gross domestic product or taxable payroll over the same period.

Disability Insurance Trust Fund: One of two Social Security trust funds, it finances the activities of the Disability Insurance program.

eighty percent range of uncertainty: A range of uncertainty based on 500 simulations using CBO's long-term model. Outcomes were above the range in 10 percent of the simulations, below the range in 10 percent, and within the range in 80 percent.

full retirement age: The age at which a person becomes entitled to claim full retirement benefits; also called the normal retirement age. That age is set according to the year in which a person was born. Under current law, for workers born before 1938, that age is 65. For workers born between 1938 and 1943, the full retirement age increases by by two months for each successive birth year, until it reaches age 66 for people born in 1943. The full retirement remains at age 66 for workers born between 1943 and 1954, and then, starting with people born in 1955, it increases by two months for each successive birth year, until it reaches age 67 for people born in or after 1960. For people turning 62 in 2015 the full retirement age is 66. It will begin to increase again for people turning 62 in 2017, and it will reach age 67 for those turning 62 in 2022.

income rate: The present value of tax revenues for a period, plus the trust funds' initial balance, divided by the present value of taxable payroll or gross domestic product over the same period.

initial benefits: For retired workers, benefits that would be received by workers eligible to claim Old-Age Insurance benefits who have not yet claimed any other Social Security benefits (such as disability benefits or survivors' benefits). For this study, CBO calculated benefits under the simplifying assumption that all workers would claim benefits at age 65. The initial benefit amount is based on a worker's own earnings only through age 61 and is net of income taxes paid on those benefits. For disabled beneficiaries, initial benefits are benefits at the time of initial benefit receipt, net of any income taxes paid on those benefits.

lifetime benefits: The present value at age 65 of benefits received over a lifetime for a person who lives at least to age 45, net of income taxes paid on those benefits. Lifetime benefits include retired-worker

benefits, disabled-worker benefits, and benefits paid to dependents and survivors of workers. Because there are insufficient data on benefits received by young widows and children for years before 1984, benefits paid to young widows, spouses of disabled workers, and child beneficiaries are excluded from this measure.

lifetime earnings: The present value at age 65 of inflation-adjusted earnings over a lifetime, including earnings above the taxable maximum, for a person who lives at least to age 45.

lifetime household earnings: For someone who is single in all years, the present value of his or her inflation-adjusted earnings over a lifetime, including earnings above the taxable maximum. In any year in which a person is married, lifetime household earnings consists of the couple's total inflation-adjusted earnings (adjusted for economies of scale in household consumption).

Old-Age and Survivors Insurance Trust Fund: One of two Social Security trust funds, it finances the activities of the Old-Age and Survivors Insurance program.

payable benefits: Benefits as calculated under current law, reduced as necessary to conform to the limits imposed by a trust fund's balance. If a trust fund's balance declined to zero and current revenues were insufficient to cover benefits specified in law, the Social Security Administration would no longer be permitted to pay full benefits when they were due. The manner in which outlays would be reduced is not specified in law. For this report, CBO assumed that Old-Age and Survivors Insurance and Disability Insurance benefits paid to existing beneficiaries and to new beneficiaries would be reduced by the percentage necessary to make the program's total annual outlays equal its total available revenues once the combined trust funds were exhausted.

payroll tax: A tax on people's earnings that is credited to the Old-Age and Survivors Insurance Trust Fund and the Disability Insurance Trust Fund. Under current law, 12.4 percent of people's earnings up to a maximum amount each year—now $118,500—are subject to the payroll tax. Workers and their employers each pay half; self-employed people pay the entire amount.

present value: A single number that expresses a flow of current and future income (in taxes) or payments (in benefits) in terms of an equivalent lump sum received or paid at a specific time. The value depends on the rate of interest, known as the discount rate, used to translate past and future cash flows into dollars at that time.

quintile: One of five equal groups into which a population can be divided according to the distribution of a particular variable; in this report, the distribution is in lifetime household earnings.

replacement rate: The ratio of a Social Security recipient's benefit payments to his or her past earnings.

scheduled benefits: Full benefits as calculated under current law, regardless of the amounts available in the Social Security trust funds.

taxable maximum: The maximum amount of annual earnings to which the payroll tax is applied (now $118,500). The taxable maximum increases annually with average earnings; in years without a cost-of-living adjustment (as in 2010, 2011, and 2016), the taxable maximum does not increase. The taxable maximum does not decrease when average wages decline.

taxable payroll: The total earnings (wages and self-employment income) for employment covered by Social Security that is below the applicable annual taxable maximum.

trust funds: The accounts to which Social Security taxes are credited and from which benefits are paid. Interest on the funds' balances also is credited to the trust funds, and administrative expenses are withdrawn from them. The two trust funds discussed in this report are the Old-Age and Survivors Insurance (OASI) Trust Fund and the Disability Insurance (DI) Trust Fund. Although they are legally separate, in this report, CBO generally follows the common analytical convention of considering them as combined and refers to them as the combined, or OASDI, trust funds.

trust fund balance: At any given time, the balance in a program's trust fund is an indicator of the historical relationship between receipts and expenditures. Trust funds have an important legal meaning in that their balances are a measure of the amounts that the government is permitted to spend for certain purposes under current law. In a given year, the receipts credited to a trust fund, along with any interest credited on previous balances, minus spending for benefits and administrative costs constitute its surplus or deficit.

trust fund exhaustion date: The year in which a trust fund's balance will reach zero.

trust fund ratio: The balance in the Social Security trust funds at the beginning of the year divided by projected outlays for that year.

About This Document

This Congressional Budget Office publication provides additional information about long-term projections of the Social Security program's finances that were included in *The 2015 Long-Term Budget Outlook* (June 2015). Those projections and the additional information presented in this document update projections CBO prepared last year and reported in *CBO's 2014 Long-Term Projections for Social Security: Additional Information*. In keeping with CBO's mandate to provide objective, impartial analysis, this report makes no recommendations.

The analysis was prepared by Stephanie Hugie Barello, Geena Kim, Marina Kutyavina, Xiaotong Niu, Charles Pineles-Mark, and Michael Simpson of CBO's Long-Term Analysis Unit, with guidance from Julie Topoleski and Linda Bilheimer. Noah Meyerson and David Weiner provided comments on the report, and Kyle Redfield provided the fact-checking.

Jeffrey Kling and Robert Sunshine reviewed the report. Kate Kelly edited the document, and Maureen Costantino and Jeanine Rees prepared it for publication. Stephanie Hugie Barello and Michael Simpson prepared the supplemental data with assistance from Jeanine Rees.

The report is available on the agency's website (www.cbo.gov/publication/51047).

Keith Hall
Director

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