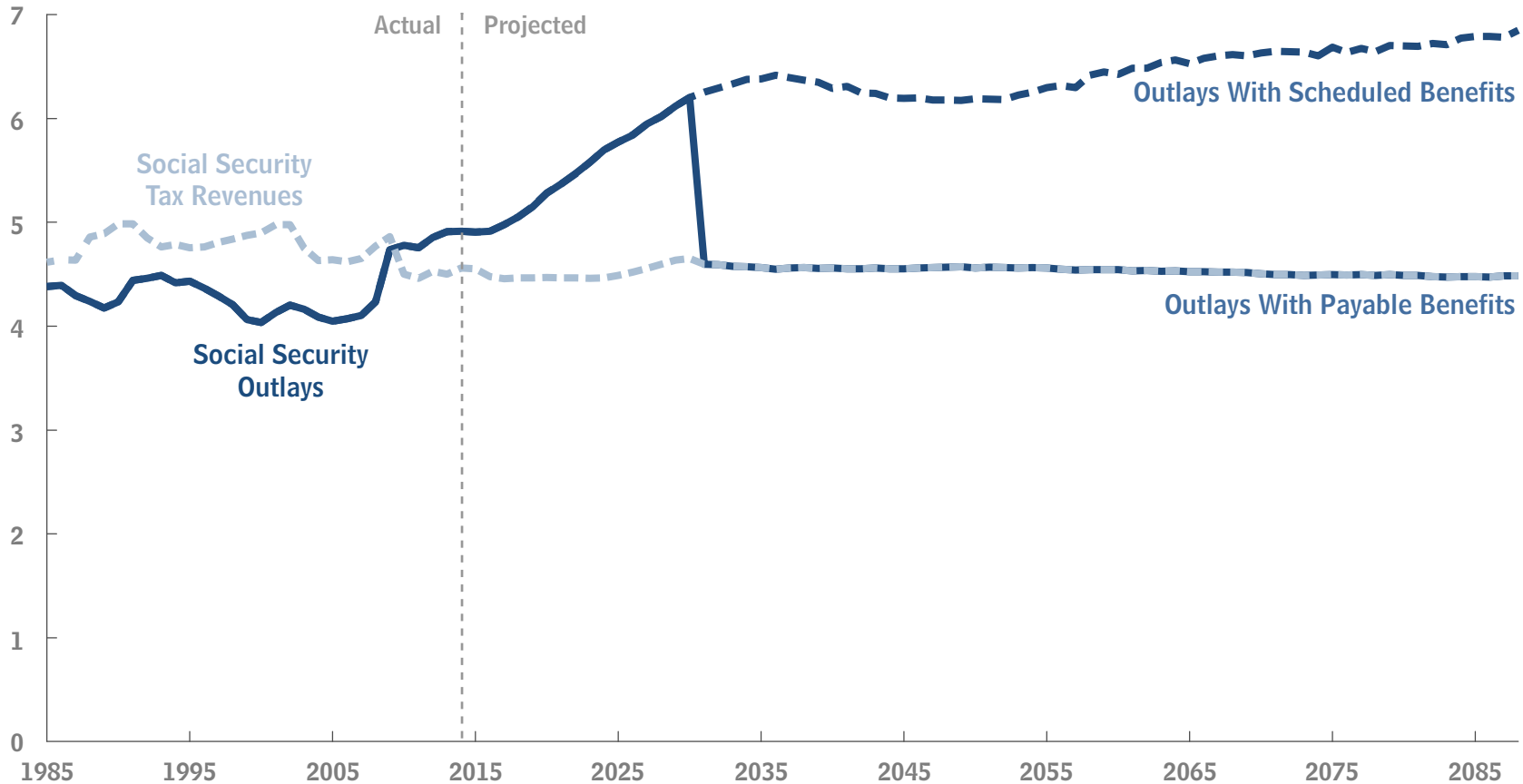# CBO

CBO's 2014 Long-Term Projections for Social Security: Additional Information

Percentage of Gross Domestic Product

Actual | Projected

Social Security Tax Revenues

Outlays With Scheduled Benefits

Outlays With Payable Benefits

Social Security Outlays

7
6
5
4
3
2
1
0

1985 1995 2005 2015 2025 2035 2045 2055 2065 2075 2085

DECEMBER 2014

Notes and Definitions

Unless otherwise noted, all years referred to in this report are calendar years. Numbers in the text and tables may not add up to totals because of rounding. Supplemental data are posted along with this report on the Congressional Budget Office's (CBO's) website, www.cbo.gov/publication/49795.

Actuarial balance: The difference between the summarized income rate and the summarized cost rate (see those definitions below).

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 can receive unreduced Social Security benefits.

Lifetime earnings: The present value of an individual's real (inflation-adjusted) earnings over a lifetime.

Lifetime household earnings: Lifetime earnings for someone who is single in all years equal the present value of his or her real earnings over a lifetime. In any year in which a person is married, the earnings measure is a function of his or her earnings plus those of his or her spouse (adjusted for economies of scale in household consumption).

Mean: The average. When the mean outcome for a group of people (defined in this report by birth cohort and lifetime household earnings category) is shown, the value is the average for all people in that group.

Median: The middle of the distribution.

Payable benefits: Benefits as calculated under current law, 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 that occurred, the Social Security Administration would reduce all scheduled benefits such that outlays from the funds equaled revenues flowing into the funds each year.

Present value: 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 point in time. The present 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: Any of five equal groups into which a population can be divided according to the distribution of a particular variable.

Replacement rate: Annual benefits at age 65 as a percentage of average annual lifetime earnings. For this purpose, average annual lifetime earnings are the average of the highest 35 years of earnings adjusted either for growth in wages or for growth in prices.

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

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

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

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CBO's 2014 Long-Term Projections for Social Security: Additional Information

Summary and Introduction

Social Security is the federal government's largest single program.[1] Of the 59 million people who currently receive Social Security benefits, about 71 percent 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 other 19 percent of beneficiaries are disabled workers or their spouses and children; they receive Disability Insurance (DI) benefits.

In fiscal year 2014, spending for Social Security benefits totaled $840 billion, or almost one-quarter of federal spending; OASI payments accounted for about 83 percent of those outlays, and DI payments made up about 17 percent.[2] Each year, the Congressional Budget Office (CBO) prepares long-term projections of revenues and outlays for the program. The most recent set of 75-year projections was published in July 2014.[3] Those projections generally reflect current law, following CBO's 10-year baseline budget projections through 2024 and then extending the baseline concept for the rest of the long-term projection period. This publication presents additional information about those projections.

Social Security has two primary sources of tax revenues: payroll taxes and income taxes on benefits. About 97 percent of those revenues derive from a payroll tax—generally, 12.4 percent of earnings—that is split evenly between workers and their employers; self-employed people pay the entire tax.[4] The payroll tax applies only to taxable earnings—earnings up to a maximum annual amount ($117,000 in 2014). The remaining share of tax revenues—3 percent—is collected from income taxes that higher-income beneficiaries pay on their benefits. Tax revenues credited to the program totaled $777 billion in fiscal year 2014.

Those tax revenues are credited to Social Security's two trust funds—one for OASI and one for DI—along with intragovernmental interest payments on the Treasury securities held by those funds. In turn, the program's benefits and administrative costs are paid from those funds. Although legally separate, the funds often are described collectively as the OASDI trust funds. In a given year, the sum of receipts to each of the funds, along with the interest that is credited on balances, minus spending for benefits and administrative costs, constitutes that fund's surplus or deficit.

In calendar year 2010, for the first time since the enactment of the Social Security Amendments of 1983, annual outlays for the program exceeded annual tax revenues (that is, outlays exceeded total

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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* (July 2010), pp. 1–5, www.cbo.gov/publication/21547.

2. Numbers for 2014 were derived from information reported in Department of the Treasury, *Monthly Treasury Statement of Receipts and Outlays of the United States Government for Fiscal Year 2014 Through September 30, 2014, and Other Periods* (October 2014), http://go.usa.gov/H2GV.

3. See Congressional Budget Office, *The 2014 Long-Term Budget Outlook* (July 2014), www.cbo.gov/publication/45471. Some of the 75-year projections in that volume extend through fiscal year 2089 because the Congressional Budget Office generally considers the projection period to begin in the next fiscal year (in this case, fiscal year 2015). In this report and in Chapter 3 ("Social Security") of *The 2014 Long-Term Budget Outlook*, the 75-year projection period consists of calendar years 2014 through 2088, matching the period used in *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.

4. The worker's portion of the payroll tax was reduced by 2 percentage points for 2011 and 2012 (as was the tax on the self-employed), 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.

revenues excluding interest credited to the trust funds). In 2013, outlays exceeded noninterest income by about 9 percent, and CBO projects that the gap will average about 17 percent of tax revenues over the next decade. As more members of the baby-boom generation retire, outlays will increase relative to the size of the economy, whereas tax revenues will remain at an almost constant share of the economy. As a result, the gap will grow larger in the 2020s and will exceed 30 percent of revenues by the late 2020s.

CBO projects that under current law, the DI trust fund will be exhausted in fiscal year 2017, and the OASI trust fund will be exhausted in 2032. If a trust fund's balance fell to zero and current revenues were insufficient to cover the benefits specified in law, the Social Security Administration would no longer have legal authority to pay full benefits when they were due. In 1994, legislation redirected revenues from the OASI trust fund to prevent the imminent exhaustion of the DI trust fund. In part because of that experience, it is a common analytical convention to consider the DI and OASI trust funds as combined. Thus, CBO projects, if some future legislation shifted resources from the OASI trust fund to the DI trust fund, the combined OASDI trust funds would be exhausted in 2030.

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 (although not proportionately so). Because Social Security's benefit formula is progressive, replacement rates—

annual benefits as a percentage of average annual lifetime earnings—are lower, on average, for workers who have had higher earnings. As another example, the amount of taxes paid and benefits received will be greater for people who were born more recently because they typically will have higher earnings over a lifetime, even after an adjustment for inflation, CBO projects.

Scheduled and Payable Benefits

CBO prepares two types of benefit projections for Social Security. Benefits as calculated under the Social Security Act, regardless of the balances in the trust funds, are called scheduled benefits. However, if the trust funds were depleted, the Social Security Administration would no longer have legal authority to pay full benefits when they were due. If that occurred, it appears that annual outlays would be limited to annual revenues in the years after the exhaustion of the trust funds.[5] Benefits thus reduced are called payable benefits. In such a case, all receipts to the trust funds would be used, and the trust fund balances would remain essentially at zero. When presenting projections of Social Security's finances, CBO generally focuses on scheduled benefits because, by definition, the system would be fully financed if only payable benefits were disbursed.

Quantifying Uncertainty

Long-term projections are necessarily uncertain, and CBO's long-term projections for Social Security depend critically on its projections of key demographic and economic factors. (For more information on CBO's projections of demographic trends, see Appendix A.)

To quantify the uncertainty in its Social Security projections, CBO, using its long-term model, created a distribution of outcomes from 500 simulations. In those simulations, the values for most of the key demographic and economic factors that underlie the analysis—for example, fertility and improvements to mortality rates, interest rates, and the rate of growth of productivity—were based on historical patterns of year-to-year variation.[6] That variation was added to or subtracted from CBO's projections in each period.[7]

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5. See Noah P. Meyerson, *Social Security: What Would Happen If the Trust Funds Ran Out?* Report for Congress RL33514 (Congressional Research Service, August 2014). As explained in that report, it is unclear how payments would be reduced. In its analysis, CBO assumes that each year after the trust funds became exhausted, each individual's annual benefit would be reduced by the percentage necessary for outlays to match revenues.

6. 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. The methodology used in this report differs slightly from the techniques described in that earlier publication.

7. The analysis of uncertainty in this report differs from the analysis of uncertainty described in *The 2014 Long-Term Budget Outlook*. 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 2014 Long-Term Budget Outlook* presents the budgetary effects of alternate average values for similar key demographic and economic factors over the 25-year projection period. For those alternate projections, the ranges of variation were based on the historical variation in 25-year averages, as well as on consideration of possible future developments.

Several exhibits in this publication show the 80 percent range of uncertainty for those simulations: That is, in 80 percent of the 500 simulations, the value in question fell within the range shown; in 10 percent of the simulations, the value was above that range; and in 10 percent, it was below. Those simulations show that uncertainty about key demographic and economic factors is a significant source of budgetary uncertainty. For example, they indicate that, in 2088, the 80 percent range of uncertainty encompasses Social Security outlays ranging from about 5 percent of gross domestic product (GDP) to almost 10 percent. Nevertheless, under a variety of values for those key factors, the Social Security trust funds would not have sufficient balances to pay scheduled benefits.[8]

Changes in CBO's Long-Term Social Security Projections Since 2013

The shortfalls for Social Security that CBO is currently projecting are larger than those the agency projected a year ago.[9] (For a description of the major methodological and presentational changes in CBO's estimates since 2013, see Appendix B.)

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8. In *The 2013 Long-Term Projections for Social Security: Additional Information*, the uncertainty analysis focused on projections for 25 years. Beyond that period, projections of economic outcomes were unreliable because the projected ratio of debt held by the public to gross domestic product was well outside historical experience in a significant share of simulations.

9. See Congressional Budget Office, *The 2013 Long-Term Projections for Social Security: Additional Information* (December 2013), www.cbo.gov/publication/44972.

Spending and Revenues Measured Relative to Taxable Payroll

The 75-year imbalance has increased from 3.36 percent to 3.97 percent of taxable payroll (see Exhibit 5). When measured as a share of taxable payroll, CBO's current estimates of long-term tax revenues are about the same as those that the agency produced in 2013, but the current projections of long-term outlays are slightly higher. Specifically, the 75-year income rate—a measure of Social Security's tax revenues—is about the same as CBO projected last year.[10] The 75-year cost rate—a measure of outlays—is 0.6 percentage points higher, an increase of about 3½ percent.

Outlays are a larger share of taxable payroll, primarily because of lower projected interest rates; the resulting lower discount rate increases the present value of larger values late in the projected stream of spending. That change accounts for about half of the increase of 0.6 percentage points in the 75-year cost rate. Changes to CBO's 10-year baseline projections account for another 0.2 percentage points, and updated data and other estimating changes account for the remaining 0.1 percentage point.

Spending and Revenues Measured Relative to Gross Domestic Product

The 75-year imbalance has increased from 1.17 percent of GDP to 1.38 percent. The estimated imbalance has grown as a share of GDP in the same proportion and for the same reasons that it has risen as a share of taxable payroll.

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10. For definitions of income rate and cost rate, see the "Notes and Definitions" at the beginning of this report.

The current projection of annual Social Security spending as a percentage of GDP is slightly higher than last year's projection, owing to lower projected levels of GDP in this year's analysis.[11] The projection of the annual revenues as a percentage of GDP is about the same as it was in last year's report because projected revenues and GDP are both lower by about the same proportion.

Distributional Measures

In previous reports, CBO has presented, for different population groups, median outcomes for initial benefits and replacement rates, lifetime benefits and taxes, and the ratio of lifetime benefits to lifetime taxes. The median reflects the benefit or tax amounts for a person in the middle of a given group. This year, CBO is presenting means for those outcomes: The mean is the average amount for the group. This report also introduces a new distributional measure. Instead of showing the present value of lifetime benefits or taxes in dollars (as in previous reports), they are shown relative to the present value of lifetime earnings (see Exhibits 11 and 13).[12] Scaling by lifetime earnings accounts for economic growth over time and provides useful context for the amount of benefits. Finally, in previous reports, CBO has shown Social Security benefits net of income taxes paid on benefits and credited to the Social Security trust funds. This year, Social Security benefits are shown net of all

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11. See Congressional Budget Office, *The 2014 Long-Term Budget Outlook* (July 2014), p. 113, www.cbo.gov/publication/45471.

12. The supplemental data for this report show the present value of lifetime benefits and payroll taxes in thousands of 2014 dollars; see www.cbo.gov/publication/49795.

income taxes paid on those benefits, which better reflects the net benefits received by beneficiaries.

Related CBO Analyses

Further information about Social Security and CBO's projections is available in other CBO publications:

Various approaches to changing the program are presented in *Social Security Policy Option*s (July 2010), www.cbo.gov/publication/21547, and in *Policy Options for the Social Security Disability Insurance Program* (July 2012), www.cbo.gov/publication/43421.

The current long-term projections are consistent with the 10-year baseline CBO published in *Updated Budget Projections: Fiscal Years 2014 to 2024* (April 2014), www.cbo.gov/publication/

45229. Data in that report and in *The 2014 Long-Term Budget Outlook* (July 2014), www.cbo.gov/publication/45471, generally are presented for fiscal years; this analysis, *Social Security Policy Options*, and *Policy Options for the Social Security Disability Insurance Program* use calendar year data.

The current projections update those published in *The 2013 Long-Term Projections for Social Security: Additional Information* (December 2013), www.cbo.gov/publication/44972. Differences in the two sets of projections result from newly available economic and programmatic data and updated projections of economic trends, as well as from some methodological changes and improvements in models.

The methodology used to develop the projections in this report is described in *CBO's Long-Term*

Model: An Overview (June 2009), www.cbo.gov/publication/20807.

The data underlying the figures in this report and expanded versions of some of the tables are available as supplemental material on CBO's website (www.cbo.gov/publication/49795).

The values used for the demographic and economic variables underlying the projections are explained in Appendix A of *The 2014 Long-Term Budget Outlook* (pp. 103–111), www.cbo.gov/publication/45471.

Numerous other aspects of the Social Security program are addressed in various publications available on the "Retirement" page of CBO's website (www.cbo.gov/topics/retirement).

The System's Finances

The first part of this report (Exhibits 1 through 7) examines Social Security's financial status from several vantage points. The fullest perspective is provided by projected streams of annual revenues and outlays. A more succinct analysis is given by measures that summarize the annual streams in a single number. The system's finances also are described by projecting the trust fund ratio, which is the amount in the trust funds at the beginning of a year in proportion to the outlays in that year.

Exhibit 1.

Social Security Tax Revenues and Outlays, With Scheduled Benefits

Percentage of Gross Domestic Product
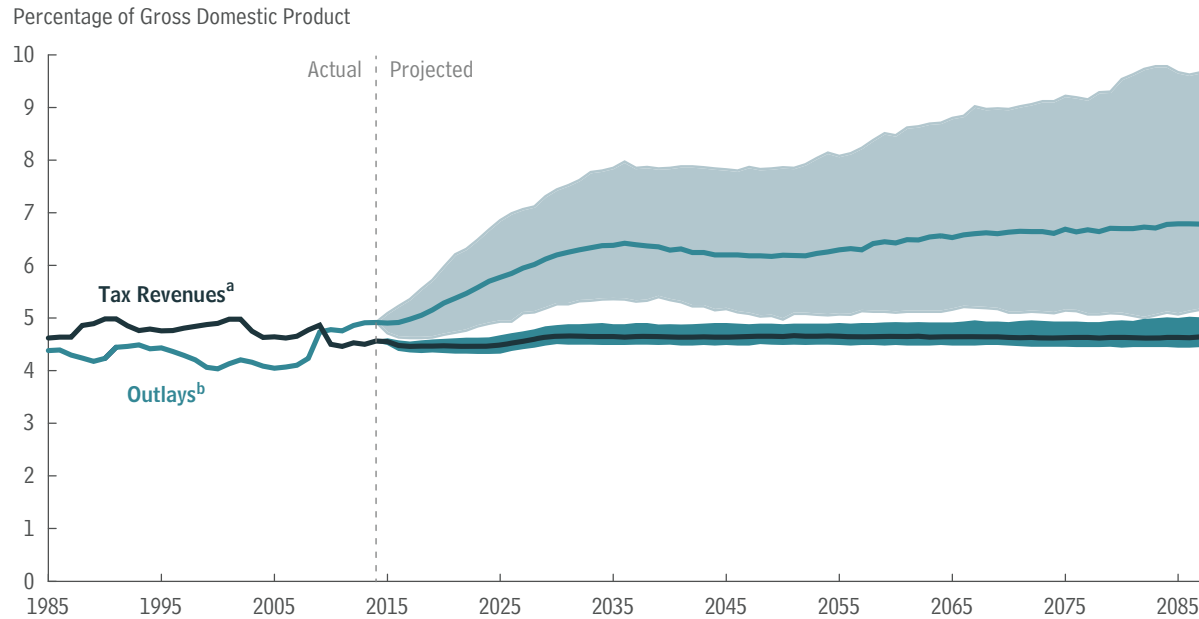
Source: Congressional Budget Office.

Note: The lines indicate CBO's projections of expected outcomes. The shaded areas indicate the 80 percent range of uncertainty.

a.   Includes 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.   Includes scheduled benefits and administrative costs.

In 2013, Social Security's total outlays (benefits plus administrative costs) equaled 4.9 percent of the country's gross domestic product; tax revenues dedicated to the program equaled 4.5 percent of GDP. Most of Social Security's tax revenues come from payroll taxes, although a small portion comes from income taxes on benefits paid to higher-income beneficiaries. In addition, the trust funds are credited with interest on the Treasury securities they hold.

During the next few decades, the number of beneficiaries will increase as the baby-boom generation ages. In 2038, under current law, scheduled spending will be 6.4 percent of GDP, CBO estimates. Over the ensuing decade, spending will decline slightly, relative to the size of the economy, as people in the baby-boom generation die. Demographers generally predict that life expectancy will continue to rise and that birth rates will remain as they are now, so scheduled outlays are projected to resume their upward trajectory around 2050, reaching 6.8 percent of GDP in 2088.

The amount of tax revenues credited to the trust funds is projected to be roughly constant as a share of GDP, at about 4.6 percent, largely because the share of compensation that workers receive as taxable earnings is expected to change little in the coming decades—remaining near 80 percent. Three factors account for that projection. CBO expects that health care costs will continue to rise more rapidly than taxable earnings, a trend that by itself would further decrease the proportion of compensation that workers receive as taxable earnings. However, the Affordable Care Act will impose an excise tax on some employment-based health insurance plans that have premiums above a specific threshold. Some employers and workers are

(Continued)

Exhibit 2.

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

Percentage of Gross Domestic Product

	Actual,	Projected		
	2013	**2038**	**2063**	**2088**
Tax Revenues	4.50	4.66	4.64	4.65
Outlays	4.91	6.37	6.54	6.85
Difference	-0.41	-1.71	-1.90	-2.20
		80 Percent Range of Uncertainty for CBO's Projections[a]		
Tax Revenues		4.5 to 4.9	4.5 to 4.9	4.5 to 5.0
Outlays		5.3 to 7.9	5.1 to 8.7	5.2 to 9.6
Difference		-3.0 to -0.8	-3.8 to -0.6	-4.8 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.   The range spans the outcomes of 80 percent of CBO's simulations. The range of differences displayed does not equal the difference between the outlays and revenues shown because each value is drawn from a different simulation.

responding to that tax—which is scheduled to take effect in 2018—by shifting to less expensive plans, thereby reducing the share of compensation composed of health insurance premiums and increasing the share composed of taxable earnings. CBO projects that the effects of the excise tax on the mix of compensation will roughly offset the effects of rising costs for health care for a few decades; after that, the effects of rising health care costs will outweigh the effects of the excise tax. In addition, when the distribution of earnings widens as it has in recent decades, the taxable share of earnings declines because more earnings are above the maximum amount that is taxed for Social Security. CBO projects some continued widening during the next few decades.

Under current law, Social Security tax revenues will equal 4.7 percent of GDP in 2038, CBO projects; in 80 percent of simulations, tax revenues are between 4.5 percent and 4.9 percent of GDP. For Social Security outlays, the range of uncertainty is much wider: If benefits are paid as scheduled, Social Security outlays will equal 6.4 percent of GDP in 2038, CBO projects; but, in 80 percent of CBO's simulations, outlays range between 5.3 percent and 7.9 percent of GDP. With outlays likely to increase sharply and tax revenues expected to rise only slightly (both relative to GDP), the difference between them is projected to increase from 0.4 percent of GDP in 2013 to 1.7 percent in 2038. The gap widens further beyond 2038, in part because life expectancy is expected to continue to rise. ◆

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	33	1	0	0	0
2030	99	81	29	5	1	0
2040	99	82	39	11	2	1
2050	98	74	36	10	2	0
2060	97	77	47	20	7	1
2070	98	82	54	27	11	5
2080	97	81	55	30	16	8

Source: Congressional Budget Office.

Notes: 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. This analysis is based on 500 simulations from CBO's long-term model.

GDP = gross domestic product.

Another perspective on the uncertainty of projections of Social Security's finances involves the percentage of simulations in which total outlays exceed tax revenues by a given amount in a particular year. In the 500 simulations that CBO ran, most of the key demographic and economic factors that underlie the analysis vary on the basis of historical patterns. In almost every case, outlays equal or exceed tax revenues in 2030. Outlays are at least 1 percentage point greater than tax revenues (when both are measured as shares of GDP) in 81 percent of simulations for that year and at least 2 percentage points greater in 29 percent of the simulations. In later decades, projections of outlays are less certain. Nevertheless, the percentage of simulations in which outlays equal or exceed tax revenues remains at or above 97 percent through 2080. But the increase in uncertainty about outlays causes a significant rise in the portion of simulations in which outlays exceed tax revenues (as shares of GDP) by at least 2 percentage points—that portion reaches 55 percent by 2080—and by at least 3 percentage points—30 percent by 2080.

Uncertainty surrounding projections for Social Security revenues and outlays largely derives from uncertainty in mortality rates and productivity growth. The former has the largest effect on benefits, as life spans determine the number of years people receive benefits. The latter affects total earnings and, hence, tax revenues, benefits, and GDP, but the ratio of tax revenues to GDP does not change much even as the growth of productivity changes. Because earnings growth at any point in time affects benefits in the future, uncertainty about that growth has a greater effect on the future ratio of outlays to GDP. ◆

Exhibit 4.

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

Percentage of Gross Domestic Product
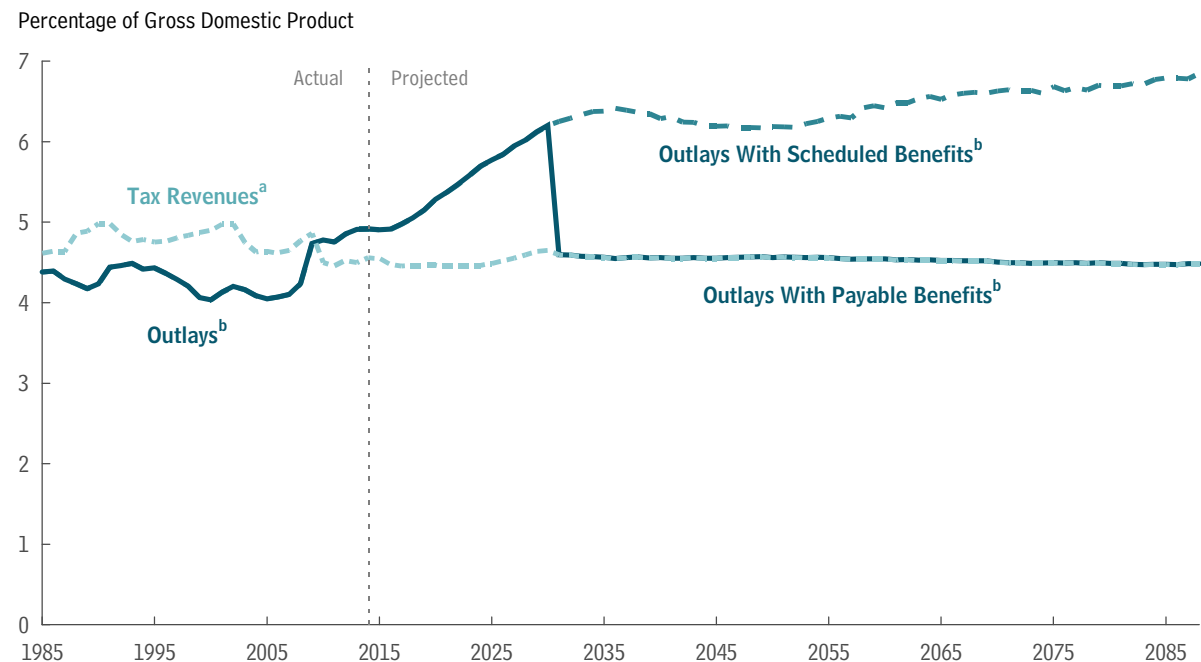
Source: Congressional Budget Office.

a. Includes 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. 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. Includes benefits and administrative costs.

If the projected gap between outlays and revenues occurred, it would ultimately eliminate the balance in the trust funds. Once the balance was depleted, the Social Security Administration would no longer have legal authority to pay full benefits when they were due. Annual outlays would be limited to annual revenues in the years after the exhaustion of the trust funds. (As explained in a report by the Congressional Research Service, how payments would be reduced is unclear. See Noah Meyerson, *Social Security: What Would Happen If the Trust Funds Ran Out?* Report for Congress RL33514, August 2014.)

In this analysis, CBO assumes that in each year following the exhaustion of the trust funds, each individual's annual benefit would be reduced by the percentage necessary for outlays to match revenues. Payable benefits would equal scheduled benefits until the trust funds were exhausted; after that, they would equal the Social Security program's annual revenues.

CBO projects that, under current law, the trust funds, considered in combination for analytical purposes, will be exhausted in 2030. (For the DI trust fund, that date is fiscal year 2017; and for the OASI trust fund, 2032.) In 2031, revenues are projected to equal 74 percent of scheduled outlays. Under those circumstances, payable benefits will be 26 percent less than scheduled benefits. For more than 20 years thereafter, the projected gap between scheduled and payable benefits fluctuates narrowly around 27 percent. It then widens, and by 2088, payable benefits are estimated to be 34 percent smaller than scheduled benefits. ◆

Exhibit 5.

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						
25 years (2014–2038)	5.22	5.96	-0.74	14.95	17.07	-2.12
50 years (2014–2063)	4.96	6.10	-1.14	14.17	17.42	-3.25
75 years (2014–2088)	4.87	6.25	-1.38	13.98	17.95	-3.97
80 Percent Range of Uncertainty for CBO's Projections[a]						
25 years (2014–2038)	5.1 to 5.4	5.4 to 6.7	-1.3 to -0.3	14.6 to 15.4	15.6 to 18.9	-3.8 to -0.8
50 years (2014–2063)	4.8 to 5.2	5.5 to 6.9	-1.8 to -0.7	13.8 to 14.7	15.8 to 19.6	-5.1 to -1.9
75 years (2014–2088)	4.7 to 5.1	5.6 to 7.1	-2.1 to -0.9	13.7 to 14.5	16.2 to 20.4	-6.0 to -2.5

Source: Congressional Budget Office.

Note: Benefits as calculated under the Social Security Act, regardless of the balances in the trust funds, are known as scheduled benefits. 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 GDP or taxable payroll. The actuarial balance is the difference between the income and cost rates.

a.   The balances displayed generally do not equal the difference between the income and cost rates shown because the low and high values of the ranges (for the income rate, the cost rate, and the actuarial balance) are drawn from different simulations.

To present the results of long-term projections succinctly, analysts often summarize scheduled outlays and revenues as a single number that covers a given period. The data are summarized by computing the present value of outlays or tax revenues for a period and dividing that figure by the present value of GDP or taxable payroll over the same period.

The income rate is the present value of annual non-interest revenues plus the initial trust fund balance, and the cost rate is the present value of annual outlays plus a target trust fund balance at the end of the period (which is traditionally the following year's projected outlays), each divided by the present value of GDP or taxable payroll. The actuarial balance is the difference between the income and cost rates.

The estimated 75-year actuarial balance is -1.38 percent of GDP, or -3.97 percent of taxable payroll. That is, if the Social Security payroll tax rate was increased immediately and permanently by 3.97 percentage points—from the current rate of 12.40 percent to 16.37 percent—or if scheduled benefits were reduced by an equivalent amount, then the trust funds' projected balance at the end of 2088 would equal projected outlays for 2089. The gap in 2088 could be noticeably larger or smaller, however. Because the gap between projected costs and projected revenues is widening over time, the actuarial balance is more negative over 75 years than over shorter periods. ◆

Exhibit 6.

Trust Fund Ratio, With Scheduled Benefits
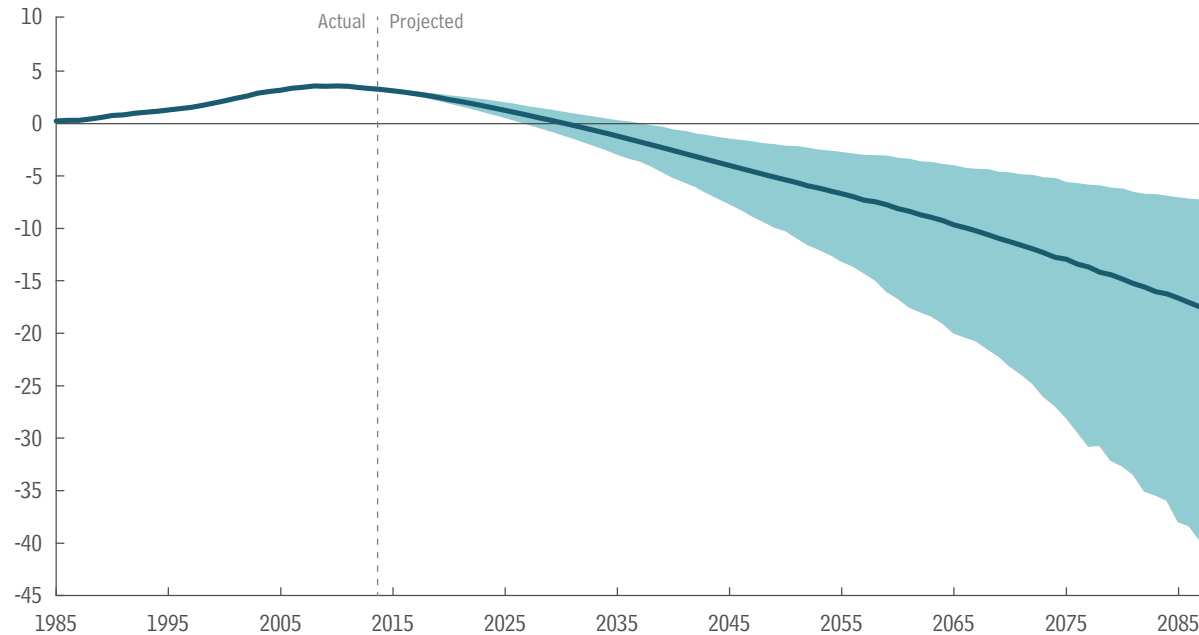
Source: Congressional Budget Office.

Notes: The trust fund ratio is the ratio of the trust fund balance (the amount in the trust funds) at the beginning of a year
to outlays in that year. Outlays consist of benefits and administrative costs. The trust funds are exhausted when the
trust fund ratio reaches zero. Under current law, the trust funds cannot incur negative balances. The negative balances
shown in this exhibit indicate a projected shortfall, reflecting the trust funds' inability to pay scheduled benefits out
of current-law revenues.

The dark line indicates CBO's projection of expected outcomes; the shaded area indicates the 80 percent range of
uncertainty around the projection.

The trust fund ratio—the balance in the Social Security trust funds at the beginning of the year divided by the system's outlays for that year—indicates the proportion of a year's cost that could be paid with the funds available. CBO projects that the ratio will fall to 3.2 this year (from 3.3 in 2013). Under current law, the ratio is expected to reach zero in 2031; that is, the trust funds (combined) will be exhausted by the end of 2030 and payments to beneficiaries would need to be reduced to make outlays equal revenues.

The year in which the trust funds are exhausted could differ from CBO's projection, however. CBO simulated alternative outcomes by varying most key demographic and economic factors on the basis of historical experience. The shaded area in the figure shows the 80 percent range of uncertainty. The intersection between the shaded area and the horizontal line at zero, spanning the years 2028 through 2037, corresponds to the 80 percent range of uncertainty about the year in which the trust fund ratio falls to zero. But 10 percent of the time, the trust fund ratio falls to zero in 2028 or earlier (that is, the trust funds are exhausted by 2027 or earlier). And another 10 percent of the time, the ratio drops to zero in 2037 or later (that is, the trust funds are exhausted by 2036 or later).

The negative amounts in the figure represent CBO's estimates of the cumulative amount of scheduled benefits plus interest on debt incurred to pay those benefits that cannot be paid from the program's revenues under current law, expressed as a ratio to outlays in each year. By 2038, that shortfall amounts to more than two years' worth of benefits and is growing rapidly. ◆

Exhibit 7.

Percentage of Simulations That Show the Social Security Trust Funds Exhausted by a Particular Year
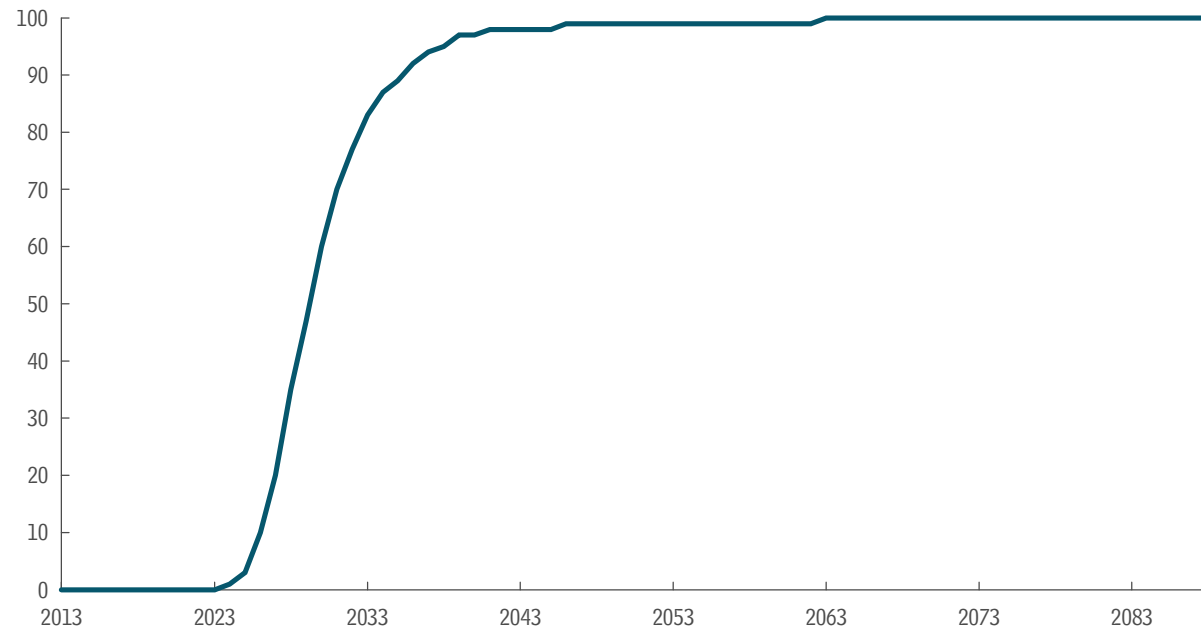
Source: Congressional Budget Office.

Note: The data are based on 500 simulations from CBO's long-term model.

An alternative way to consider the uncertainty about when the trust funds might be exhausted is to examine the percentage of simulations in which the trust funds are exhausted by a specific year. In those simulations, CBO varied most of the key demographic and economic factors that underlie the analysis on the basis of historical experience. In 10 percent of CBO's simulations, the combined funds are exhausted by 2026, and in 60 percent, they are exhausted by 2030. The trust funds are exhausted by 2038 in 95 percent of the simulations and by 2046 in 99 percent of them. CBO's best estimate is that the trust funds will be exhausted in 2030. ◆

The Distribution of Benefits and Payroll Taxes

In the second part of this report (Exhibits 8 through 15), CBO examines the Social Security program's effects on people by grouping participants according to various characteristics and presenting the average taxes and benefits for those groups. In its analysis, CBO divided people into groups by the decade in which they were born and by the quintile of their lifetime household earnings.[13] For example, one 10-year cohort consists of people born in the 1940s, and the highest earnings quintile consists of the top fifth of earners. CBO's modeling approach produces estimates for individuals; household earnings are used only to place people into groups.

In this part of the analysis, benefits are calculated net of income taxes paid on benefits by higher-income recipients. The payroll taxes paid do not reflect the 2 percentage-point reduction in 2011 and 2012. Mean values are estimated for each group.

Most retired and disabled workers receive Social Security benefits on the basis of their own work

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13. Each person who lives to at least age 45 is ranked by lifetime household earnings. Lifetime earnings for someone who is single in all years equal the present value of his or her real earnings over a lifetime. In any year in which a person is married, the earnings measure is a function of his or her earnings plus those of his or her spouse (adjusted for economies of scale in household consumption). To compute present values in Social Security analyses, CBO uses a real discount rate equal to the effective rate on federal debt.

history. In Exhibits 8 through 12, this report presents measures of those benefits that do not include benefits received by dependents or survivors who are entitled to them on the basis of another person's work history. For a more comprehensive perspective on the distribution of Social Security benefits, Exhibits 13 and 14 present measures of the total amount of Social Security payroll taxes that each participant pays over his or her lifetime as well as the total Social Security benefits—including payments received as a worker's dependent or as a survivor—that each participant receives over a lifetime. Exhibit 15 shows the percentage of simulations in which payable benefits exceed specified percentages of scheduled benefits for people born in different periods.

Exhibit 8.

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

Thousands of 2014 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	17	10	9	20	18	27	24
1980s	25	19	13	10	25	19	36	28
2000s	36	25	20	13	36	25	53	37
Men								
1940s	20	20	11	11	22	22	27	27
1960s	21	19	11	10	22	20	30	27
1980s	28	21	14	11	28	21	40	31
2000s	40	28	21	15	40	28	58	40
Women								
1940s	14	14	8	8	14	14	19	19
1960s	17	15	10	9	17	15	24	21
1980s	22	17	13	9	22	17	32	24
2000s	33	22	19	13	33	22	47	32

Source: Congressional Budget Office.

Note: Initial annual benefits are computed for all individuals who are eligible to claim retirement benefits at age 62 and who have not yet claimed any other benefit. All workers are assumed to claim benefits at age 65. All values are net of income taxes paid on benefits.

Future retired workers are projected to receive higher initial scheduled Social Security benefits than today's beneficiaries receive (net of income taxes paid on the benefits and adjusted for the effects of inflation).

CBO considered a hypothetical benefit amount: the mean initial benefit among workers if everyone claimed benefits at age 65, based on earnings through age 61. The mean initial scheduled benefit rises over time because of growth in average earnings. However, the effect of growing earnings will be partly offset for several cohorts by the scheduled rise in the full retirement age, from 65 for people born before 1938 to 67 for those born after 1959. The effect is equivalent to a reduction in benefits at any age at which benefits are claimed. Once the older retirement age is in place, the mean initial benefit will grow at about the same rate as average earnings.

In CBO's projections, when the trust funds are exhausted, payable benefits fall, but then they rise again as earnings (and therefore tax revenues) grow. Initial payable benefits, measured in 2014 dollars, are lower than initial scheduled benefits for people born in the latter part of the 1960s and later.

Projected benefits are generally 20 percent to 30 percent lower for women than for men in all 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 9.

Mean Initial Replacement Rates for Retired Workers, With Past Earnings Adjusted for Growth in Wages

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	50	50	73	73	48	48	32	32
1960s	46	41	69	62	44	40	27	25
1980s	48	36	72	54	46	35	29	22
2000s	47	32	71	49	45	31	27	19
Men								
1940s	43	43	67	67	40	40	25	25
1960s	41	37	66	60	39	36	22	20
1980s	44	33	71	53	43	32	23	17
2000s	43	30	69	47	41	28	22	15
Women								
1940s	58	58	77	77	57	57	42	42
1960s	50	45	71	65	48	44	34	31
1980s	52	39	74	55	50	37	35	27
2000s	51	35	72	50	48	33	33	23

Source: Congressional Budget Office.

Note: The initial replacement rate is a worker's initial benefit as a percentage of his or her average annual lifetime earnings. (To compute lifetime earnings, past earnings are adjusted for average growth in economywide earnings.) Replacement rates are computed for all individuals who are eligible to claim retirement benefits at age 62 and who have not yet claimed any other benefit. All workers are assumed to claim benefits at age 65. All values are net of income taxes paid on benefits.

Initial replacement rates—workers' initial benefits net of income taxes paid on those benefits as a percentage of workers' average annual lifetime earnings—provide a perspective on retired workers' benefits that differs from that provided by looking simply at dollar amounts. In this exhibit, to cumulate earnings at different points in time, the amounts are adjusted for overall growth in wages, consistent with how earnings are adjusted to calculate people's benefits; in the next exhibit, they are adjusted for growth in prices.

Several factors affect the patterns. First, the progressive nature of Social Security's benefit formula results in replacement rates that are higher for workers who have had lower earnings. Second, with payable benefits, the replacement rate will drop noticeably at all earnings amounts for people in the cohorts that first receive benefits after the trust funds are exhausted.

Third, the scheduled increase in the full retirement age will, in the absence of other changes, lower the replacement rate for future beneficiaries (at any chosen age for claiming benefits) compared with the rate for people who are claiming benefits now. However, because of other factors, such as changes in the relative earnings of different groups, overall mean replacement rates with scheduled benefits for the cohorts shown in the exhibit do not vary much.

Fourth, because women tend to have lower lifetime earnings, their average replacement rates are higher than men's are, especially for earlier birth cohorts. The difference between the rates for women and men is largest in the highest quintile, in part because that group includes many women who spend time out of the labor force or who work part time. In contrast, most men in households with high earnings are employed full time. ◆

Exhibit 10.

Mean Initial Replacement Rates for Retired Workers, With Past 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	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1960s	58	53	88	79	56	50	34	30
1980s	64	48	99	74	61	46	37	28
2000s	63	43	98	67	60	41	34	24
Men								
1940s	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1960s	52	47	84	76	50	45	27	24
1980s	59	44	97	72	56	42	29	22
2000s	57	39	95	65	54	37	27	19
Women								
1940s	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1960s	64	58	91	83	61	55	42	38
1980s	70	52	101	75	66	49	46	35
2000s	68	47	101	69	64	44	43	30

Source: Congressional Budget Office.

Notes: The initial replacement rate is a worker's initial benefit as a percentage of his or her average annual lifetime earnings. (To compute lifetime earnings, past earnings are adjusted for average growth in inflation as measured by the personal consumption expenditures index.) Replacement rates are computed for all individuals who are eligible to claim retirement benefits at age 62 and who have not yet claimed any other benefit. All workers are assumed to claim benefits at age 65. All values are net of income taxes paid on benefits.

n.a. = not available. CBO was not able to fully complete the work needed to incorporate indexing of earnings by prices into the analysis of historical data on earnings—specifically, for individuals who died before 2011—by the date of this publication, so results for the 1940s cohort are not shown here.

In this exhibit, replacement rates are calculated using a different measure of average earnings: Earnings at different points in time are adjusted for growth in prices rather than for growth in wages. Indexing earnings to prices (using the personal consumption expenditures index) better captures the real amount of resources available to a worker over his or her lifetime, whereas indexing earnings to wages (as in Exhibit 9) may overstate those amounts.

Replacement rates calculated using price-indexed earnings are higher than those calculated using wage-indexed earnings. The difference is larger for people born more recently. For people born in the 1960s, the replacement rate calculated using earnings adjusted for growth in prices is about 27 percent larger than the rate calculated using earnings adjusted for growth in wages. For people born in the 1980s, that difference is about 33 percent.

The replacement rates calculated using price-indexed earnings are generally higher for people born in the 1980s and 2000s than for those born earlier when benefits are assumed to be paid as scheduled. That increase occurs because benefits are calculated using earnings that are adjusted for growth in wages, and wages typically grow more quickly than prices. With payable benefits, however, the initial replacement rate decreases for each successive cohort (as it does in Exhibit 9). ◆

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	17	16	11	10	7	7
1960s	10	7	21	17	14	11	6	5
1980s	11	8	25	18	16	11	7	5
2000s	11	7	25	17	16	11	7	5
Men								
1940s	7	7	14	14	9	9	6	5
1960s	8	6	19	15	12	9	5	4
1980s	9	7	23	17	14	10	6	4
2000s	9	6	23	16	15	10	6	4
Women								
1940s	13	13	19	18	14	14	11	11
1960s	12	10	23	18	16	12	9	7
1980s	13	10	26	19	17	12	9	7
2000s	13	9	26	18	18	12	9	6

Source: Congressional Budget Office.

Note: Benefits are measured as the present value of all retired-worker benefits received. 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.

CBO calculates lifetime retirement benefits as the present value—discounted to the year in which the beneficiary turns 65—of all such benefits that a worker receives from the program and 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 the amounts of benefits. CBO estimates that real average lifetime scheduled benefits for each birth cohort relative to lifetime earnings will generally 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 lifetime scheduled benefits will grow faster than initial scheduled benefits. Second, although cohorts that begin to receive benefits before the trust funds are projected to be exhausted will collect their initial scheduled benefits, some members of those cohorts would still be receiving benefits when the trust funds were exhausted. At that point, payable benefits would be less than scheduled benefits, and the lifetime payable benefits for those recipients would be less than their lifetime scheduled benefits.

Within a cohort, the ratio of lifetime benefits to lifetime earnings is lower for workers with higher earnings than for workers with lower earnings because of the progressive nature of the Social Security benefit formula and the difference in mean lifetime earnings. That ratio is higher for women than for men, but it is rising more quickly for men than for women. ◆

Exhibit 12.

Mean Benefits and Initial Replacement Rates for Disabled Workers, With Scheduled and Payable Benefits

10-Year Birth Cohort	Initial Benefits (Thousands of 2014 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	15	15	51	51	14	14
1960s	17	16	57	56	20	18
1980s	21	17	56	45	22	16
2000s	31	22	56	40	23	16
Workers Whose Disability Begins Before Age 40						
1940s	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1960s	10	10	65	65	76	73
1980s	12	12	65	65	72	60
2000s	18	14	63	49	74	55
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	58	58	26	23
1980s	19	15	58	46	30	22
2000s	28	20	58	42	31	22
Workers Whose Disability Begins Between Age 55 and the Full Retirement Age						
1940s	16	16	52	52	12	11
1960s	20	19	53	52	15	12
1980s	25	19	53	39	15	11
2000s	37	26	53	36	17	11

Source: Congressional Budget Office.

Notes: Initial annual benefits and replacement rates are computed for all individuals who are projected to receive Disability Insurance worker 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 average annual lifetime earnings.

b. The present value of 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 economywide earnings.

The projected trends for initial benefits for disabled workers are similar to those for retired workers (shown in Exhibit 8): Future beneficiaries are likely to receive higher real initial benefits than today's beneficiaries receive. The scheduled increase in the full retirement age—which will effectively reduce annual benefits for retired workers—will have no direct effect on people who receive disability benefits because they can receive those benefits in any year before they reach the full retirement age.

Initial replacement rates (with earnings adjusted for growth in wages) tend to be higher for disabled workers than for retired workers (shown in Exhibit 9) because disabled workers' earnings tend to be lower. Also because their earnings tend to be lower, workers who become disabled at earlier ages tend to have lower benefits, but higher replacement rates, than do workers who become disabled when they are older.

The mean present value of lifetime benefits paid to disabled beneficiaries relative to their lifetime earnings—including the retirement benefits they receive after reaching the full retirement age—is greater than the present value of lifetime benefits paid to retired workers relative to their lifetime earnings (shown in Exhibit 11), for two reasons. First, disabled beneficiaries are younger when they begin to collect benefits, so they receive benefits for a longer period, on average, than retired workers do. Second, because benefits are received at younger ages, their present value is greater and lifetime earnings are lower. As with retirement benefits, projected lifetime disability benefits relative to lifetime earnings are generally greater for each birth cohort than for the preceding one if they receive scheduled benefits. ◆

Exhibit 13.

Mean Lifetime Social Security Taxes and Benefits Relative to Lifetime Earnings, With Scheduled and Payable Benefits
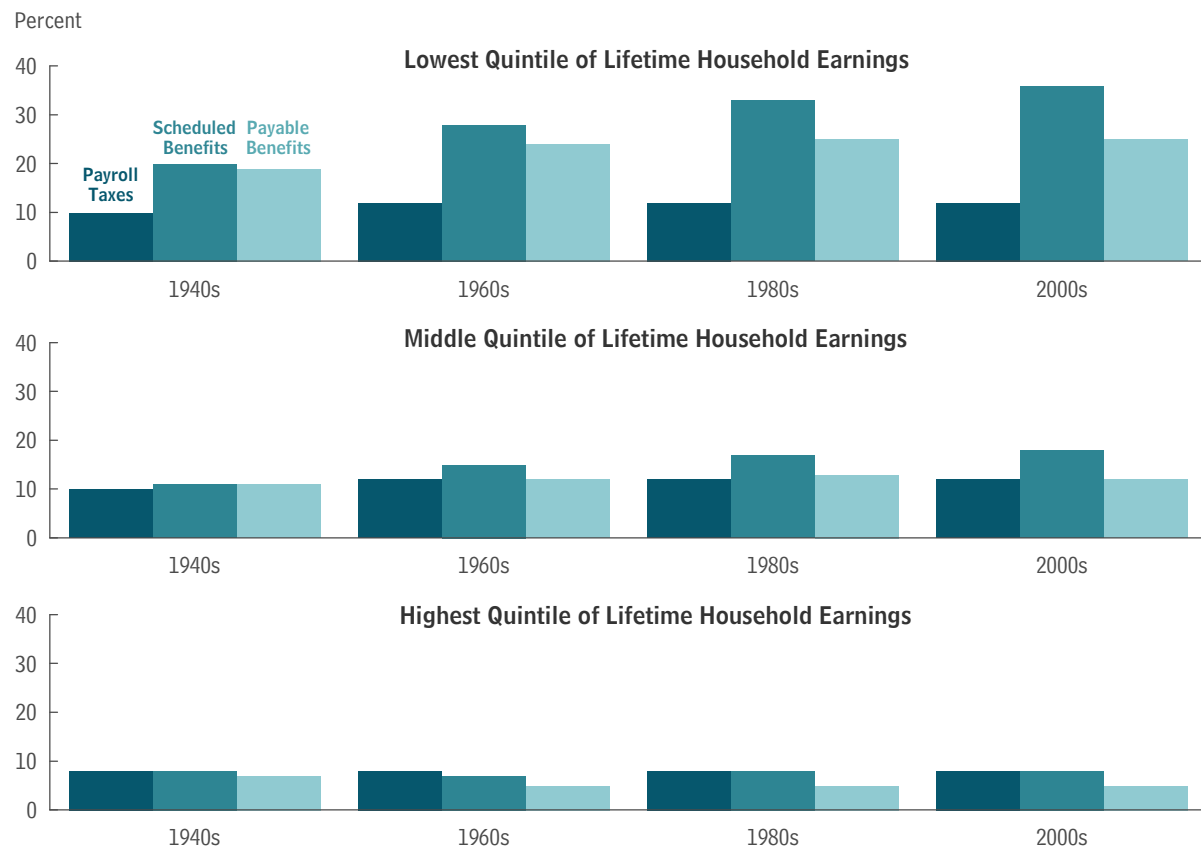
Percent

Lowest Quintile of Lifetime Household Earnings

Middle Quintile of Lifetime Household Earnings

Highest Quintile of Lifetime Household Earnings

Source: Congressional Budget Office.

Notes: The distribution of lifetime household earnings includes only people who live to at least age 45. Payroll taxes consist of the employer's and employee's shares combined. To calculate present value, amounts are adjusted for inflation (to produce constant dollars) and discounted to age 65.

Lifetime Social Security benefits include all benefits paid to an individual except those received by young widows and children. Those benefits are excluded from this measure because there are insufficient data for years before 1984.
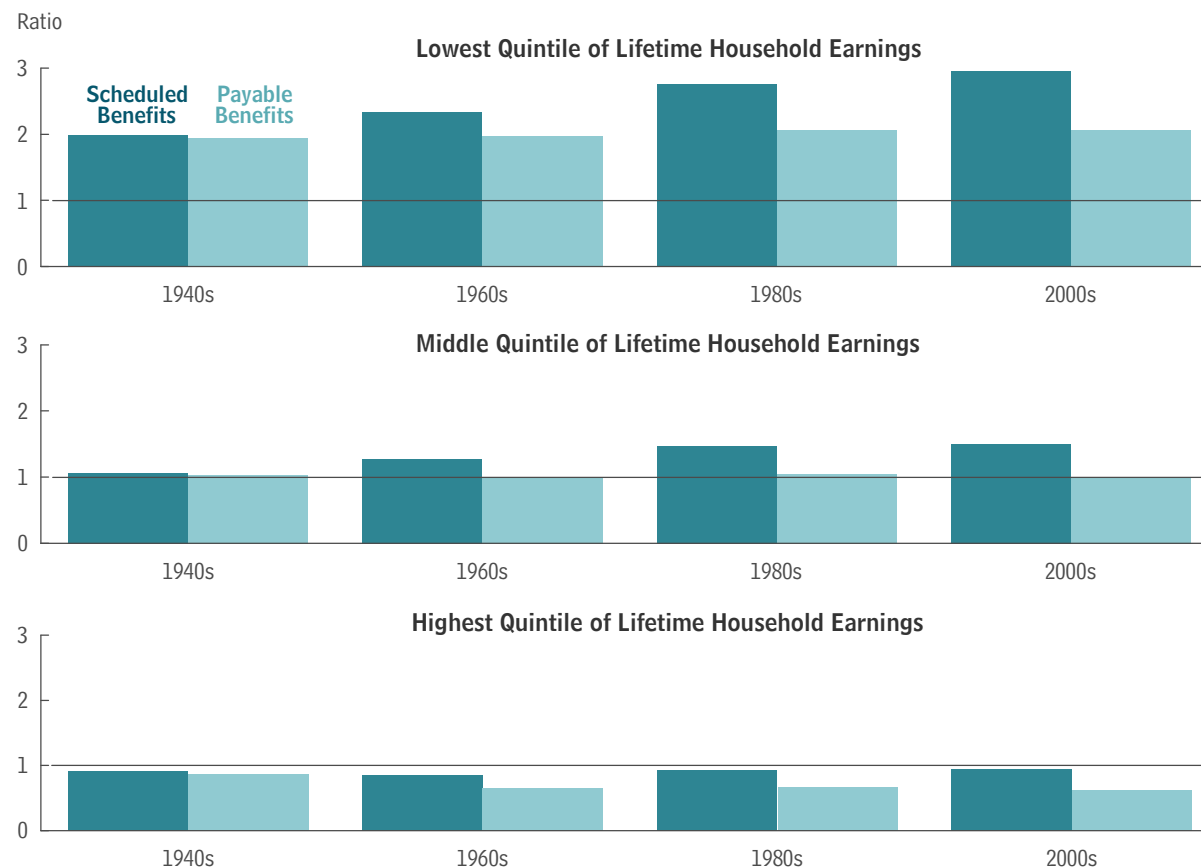
Social Security payroll taxes are a fixed share of earnings that are subject to the tax, so people with higher earnings generally pay more in payroll taxes. (In this analysis, payroll taxes comprise all Social Security payroll taxes levied on individual earnings, including the shares paid by employers and by employees. Taxable earnings exclude individuals' earnings above a threshold that increases over time with average earnings—termed the taxable maximum, which this year is $117,000.)

Benefits shown in this exhibit include almost all payments—those based on the recipient's own work history as well as most benefits the individual receives as another worker's dependent or survivor—net of income taxes paid on benefits by higher-income recipients.

Projected increases in real earnings and in life expectancy lead to increases in real lifetime Social Security benefits over time. For example, the mean amount of benefits received over a lifetime is projected to be about 20 percent of lifetime earnings for people born in the 1940s who are in the lowest quintile of household earnings. For those born in the 1980s, that percentage will be 33 percent if they receive scheduled benefits. Lifetime payable benefits are lower but follow a similar pattern over time. In dollar terms, benefits are substantially higher for people in groups with higher lifetime household earnings, but they are lower as a percentage of lifetime earnings. ◆

CBO

Exhibit 14.

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

Ratio

Lowest Quintile of Lifetime Household Earnings

Scheduled Benefits   Payable Benefits

1940s   1960s   1980s   2000s

Middle Quintile of Lifetime Household Earnings

1940s   1960s   1980s   2000s

Highest Quintile of Lifetime Household Earnings

1940s   1960s   1980s   2000s

Source: Congressional Budget Office.

Notes: The distribution of lifetime household earnings includes only people who live to at least age 45. Payroll taxes consist of the employer's and employee's shares combined. To calculate present value, amounts are adjusted for inflation (to produce constant dollars) and discounted to age 65.

Mean lifetime Social Security benefits and taxes are reported in thousands of 2014 dollars in the supplemental data that accompany this report (www.cbo.gov/publication/49795).

The present value of total net benefits received over a lifetime can be compared with the present value of total payroll taxes paid over a lifetime by computing a ratio. A benefit-to-tax ratio of 1.5, for example, indicates that benefits are 50 percent greater than taxes paid on a present-value basis.

Social Security participants, on average, receive more in benefits than they pay in taxes when benefits are paid as scheduled. But for people who have household earnings in the top quintile, the present value of taxes paid will exceed the present value of scheduled benefits.

Benefit-to-tax ratios are lower for people with higher household earnings, in part because the benefit formula is progressive and in part because those with lower earnings are more likely to receive disability benefits, dependent benefits, or both. Those effects are partially offset by the longer average life expectancy of higher earners; see Congressional Budget Office, *Is Social Security Progressive?* (December 2006), www.cbo.gov/publication/18266.

However, taxes are projected to be insufficient to pay for scheduled benefits, so benefit-to-tax ratios for payable benefits will be lower than those for scheduled benefits for all categories of people. (If the program is to be self-supporting, then current and future participants must pay more in taxes than they receive in benefits to offset the larger benefit-to-tax ratios of participants born before the 1940s.)◆

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	19	30	46	65	80	90	95	98	100	100
1980s	1	4	9	16	30	45	63	78	91	97
2000s	1	4	7	11	19	32	42	56	71	83
Lifetime Benefits										
1940s	9	63	97	100	100	100	100	100	100	100
1960s	1	3	9	24	48	71	89	98	100	100
1980s	0	2	5	13	27	45	66	83	97	99
2000s	0	1	3	9	16	29	43	61	77	89

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.

Initial payable benefits are more likely to fall short of specified percentages of initial scheduled benefits for later birth cohorts. For this analysis, CBO created a distribution of outcomes from 500 simulations in which most of the key demographic and economic factors that underlie the analysis were varied on the basis of historical experience. In all of the simulations, the 1940s cohort receives initial payable benefits that are at least 99 percent of the amount of initial scheduled benefits. However, the 1960s cohort does so in only 19 percent of the simulations. In 90 percent of the simulations, the 1960s cohort receives initial payable benefits that are at least 75 percent of the amount of initial scheduled benefits.

The exhaustion of the trust funds could occur after a group has begun collecting benefits, so the odds that a beneficiary's lifetime payable benefits will be as large as—or nearly as large as—his or her lifetime scheduled benefits are generally lower than the corresponding odds for initial benefits. For instance, although initial payable benefits equal at least 99 percent of initial scheduled benefits in every simulation for the 1940s cohort, in only 9 percent of the simulations does the same occur for lifetime benefits. Yet the 1940s cohort receives lifetime payable benefits equal to at least 90 percent of lifetime scheduled benefits in 97 percent of the simulations. ◆

Appendix A:
CBO's Projections of Demographic Variables

Future revenues and outlays for the Social Security program will depend on the size and composition of the U.S. population. Population projections, in turn, depend on projections of fertility, immigration, and mortality. The Congressional Budget Office (CBO) used projected values from the Social Security trustees for fertility rates but produced its own projections for immigration and mortality rates. Together, those projections imply a total U.S. population of 395 million in 2039, compared with 324 million today. CBO also produced its own projection of the rate at which people will qualify for Social Security's Disability Insurance program in coming decades.[1]

Fertility

For fertility rates, CBO adopted the intermediate (midrange) values published in the 2013 report of the Social Security trustees.[2] Those values imply an average fertility rate of 2.0 children per woman over the next 25 years. (The trustees define that rate as the average number of children that a woman would have in her lifetime if she survived her entire childbearing period and, at each age of her life, experienced the birth rate estimated for that year.)

Immigration

CBO projects that in the long run, 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—the average ratio seen for most of the past two centuries. On that basis, CBO projects that net annual immigration to the United States will amount to 1.2 million people in 2025 and 1.3 million in 2039. The amount of authorized and unauthorized immigration over the long term is subject to a great deal of uncertainty, however.

Mortality

Demographers have concluded that mortality rates have declined steadily in the United States for roughly the past half century. In the absence of compelling reasons to expect that future trends will differ, CBO projects that mortality rates will fall at the same pace that they did, on average, between 1950 and 2008: by 1.17 percent a year.[3] (Mortality rates measure the number of deaths per thousand people in a population. Historically, declines in mortality rates have varied among age groups, but

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1. Annual projected values for selected demographic and 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/49795).

2. See Social Security Administration, *The 2013 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds* (May 2013), www.ssa.gov/oact/tr/2013.

3. That figure is greater than the 0.79 percent average annual decline projected in the Social Security trustees' 2014 report, but it is less than the 1.26 percent average annual decline recommended by the Social Security Advisory Board's 2011 Technical Panel on Assumptions and Methods. The panel's recommendation reflects a belief that the decrease in mortality will be larger in the future than in the past because of declines in smoking rates. However, because of uncertainty about the possible effects of many other factors, such as obesity and future medical technology, CBO has based its mortality projections on a simple extrapolation of past trends. For further discussion of mortality patterns in the past and methods for projecting mortality, see 2011 Technical Panel on Assumptions and Methods, *Report to the Social Security Advisory Board* (September 2011), pp. 55–64, http://go.usa.gov/XKvm (PDF, 6.3 MB). For additional background, 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 5, 2005), http://go.usa.gov/XKGG (PDF, 480 KB).

for simplicity, CBO projects the same rate of decline for all ages.) That extrapolation of past trends suggests that the average life expectancy for someone born in 2060 will be 85.2 years, substantially higher than CBO's estimate of 79.0 years for someone born today. Similarly, CBO projects that people who turn 65 in 2060 can be expected to live another 23.9 years, on average, which is 4.5 years longer than current 65-year-olds are expected to live.

CBO's projections also incorporate differences in mortality rates based on sex, marital status, education, and lifetime household earnings. (For people under 30, the mortality projections reflect only age and sex.) CBO expects that future increases in life expectancy will be larger for people with higher lifetime earnings than for those with lower earnings, which would be consistent with the pattern of

past increases.[4] Today, on average, a 65-year-old man whose household is in the highest one-fifth (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 spans is one year. CBO projects that by 2039, men in households in the highest quintile of lifetime earnings will live about six years longer than men in households in

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4. For more information about mortality differences among groups with different earnings, see 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; and Congressional Budget Office, *Growing Disparities in Life Expectancy* (April 2008), www.cbo.gov/publication/41681.

the lowest quintile of lifetime earnings, and the corresponding difference for women will be about three years.

Disability

Another demographic variable that affects the federal budget is the rate of disability incidence, defined here as the rate at which people will become eligible for Social Security's Disability Insurance program. CBO projects that of the people who have worked long enough to qualify for disability benefits but who are not yet receiving them, an average of 5.6 per 1,000 will qualify each year after 2024 (adjusted for changes in the age and sex makeup of the population, relative to its composition in 2000).

Appendix B:
Major Methodological and Presentational Changes Since 2013

The Congressional Budget Office (CBO) has made a number of changes in presentation and methodology since it produced last year's report on its long-term projections for Social Security.

Mean Values Rather Than Medians

In last year's report, CBO reported median values for various measures, including the present values of lifetime benefits and taxes for different groups in the population. Those median values reflected the amount for a person in the middle of a 10-year birth cohort or in the middle of a lifetime household earnings quintile (or fifth of the population). This year, CBO is reporting means rather than medians for those measures; the mean reflects the average value for a person in that birth cohort or earnings quintile, which better represents the values for a cohort or quintile because it includes amounts for everyone in a group rather than just reflecting amounts for the middle of that group.

Modified Discount Rates

In addition, CBO has changed the discount rate used to calculate present values for lifetime benefits and taxes. The present value of lifetime benefits minus taxes for each birth cohort is a measure of the cost to the government of those net transfers. In 2013, those present values were calculated using a fixed interest rate based on the average nominal interest rate projected for the long term by CBO for securities held in the Social Security trust funds, minus the average rate of inflation projected for the long term, as measured by the consumer price index (CPI).

This year, as part of a comprehensive reevaluation of its interest rate projections, CBO changed the interest rate used for those calculations to be the real (inflation-adjusted) effective rate on federal debt observed at different points in the past and projected for different points in the future. For any given year, the effective rate on federal debt measures the average cost of the outstanding debt, reflecting its distribution among securities of different maturities issued at different times. CBO projects that the effective rate on federal debt will be 30 basis points lower than the interest rate earned by the trust funds. In addition, CBO's current long-run projection of the effective rate on federal debt is about 50 basis points lower, on average, than the agency projected last year.[1] Therefore, the discount rate used for future years in the calculation of lifetime benefits and taxes is now about 80 basis points lower, on average, than the rate used last year—roughly 2.2 percent rather than 3.0 percent.[2]

Different Measure of Inflation

CBO has also changed the measure of inflation it uses for converting nominal amounts to constant dollars, from increases in the CPI to increases in the gross domestic product (GDP) price index.[3] The GDP price index better accounts for changes in spending patterns over time, does not have a statistical bias related to the limited amount of price data the government collects, and includes a broader set of goods and services. Accounting for that broader set is useful in this analysis because it facilitates comparing the cost to the government of the net transfers in Social Security with the costs of a wide set of other programs that involve different goods and services.

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1. For more information about how CBO's projections of interest rates changed, see Congressional Budget Office, *The 2014 Long-Term Budget Outlook* (July 2014), pp. 113–114, www.cbo.gov/publication/45471.

2. These interest rates are adjusted to exclude the effects of inflation as measured by the rate of increase in the CPI.

3. In CBO's projections, the annual growth of the GDP price index averages 0.4 percentage points less than the growth in the CPI. If the effective rate on federal debt was adjusted to a real rate using the GDP price index rather than the CPI, the discount rate would be 0.4 percentage points higher, on average.

Effects of Changing From the Median to the Mean

Last year, CBO projected that, on a present-value basis, the median lifetime scheduled benefits paid to people born in the 1940s would be $189,000, and median lifetime payroll taxes would be $205,000, resulting in a benefit-to-tax ratio of 0.92. For people born in the 1980s, the median lifetime scheduled benefits were projected to be $312,000 and median lifetime payroll taxes $256,000, resulting in a benefit-to-tax ratio of 1.22.

Applying rates of interest and inflation consistent with last year's analysis, changing from medians to means increased the amounts reported for each group, but decreased the ratio of benefits to taxes. For example, when reporting means, the present value of lifetime scheduled benefits received by people born in the 1940s would be $228,000, and lifetime payroll taxes paid by that group would be $278,000 (see the top panel of Table B-1). The ratio of benefits to taxes would be 0.82; that is, people born in the 1940s, over their lifetime, would receive 18 percent less in scheduled benefits, on average, than they paid in taxes.[4] For the 1980s cohort, the average lifetime scheduled benefits would be $364,000, and average lifetime payroll taxes would be $372,000; the resulting benefit-to-tax ratio would be 0.98.

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4. The means that CBO reports also reflect demographic and modeling updates unrelated to changing the rates of interest and inflation. Total benefits received and taxes paid by those groups did not change significantly as a result of those updates.

Table B-1.

Present Value of Mean Lifetime Benefits and Social Security Taxes, With Scheduled Benefits, Using Various Estimating Approaches

10-Year Birth Cohort	Thousands of 2014 Dollars		Ratio of Benefits to Taxes	Percentage of Lifetime Earnings	
	Benefits	Taxes		Benefits	Taxes
3.0 Percent Fixed Discount Rate, Inflation Measured by CPI					
1940s	228	278	0.82	7.7	9.4
1960s	278	339	0.82	8.4	10.2
1980s	364	372	0.98	9.9	10.1
2000s	517	504	1.03	10.4	10.1
2.2 Percent Fixed Discount Rate, Inflation Measured by CPI					
1940s	239	227	1.05	9.9	9.4
1960s	297	284	1.04	10.5	10.1
1980s	391	314	1.25	12.4	10.0
2000s	558	425	1.31	13.1	10.0
Discount Rate Equal to Effective Rate on Federal Debt, Inflation Measured by CPI					
1940s	263	241	1.09	10.2	9.4
1960s	295	258	1.14	11.4	10.0
1980s	391	304	1.29	12.8	9.9
2000s	559	425	1.31	13.1	10.0
Discount Rate Equal to Effective Rate on Federal Debt, Inflation Measured by GDP Price Index					
1940s	260	246	1.06	10.0	9.4
1960s	313	275	1.14	11.4	10.0
1980s	450	349	1.29	12.8	9.9
2000s	695	528	1.32	13.1	9.9

Source: Congressional Budget Office.

Note: CPI = consumer price index; GDP = gross domestic product.

The mean amounts of lifetime taxes and benefits are greater than the medians because the benefits and taxes for high-income people have a greater effect on the calculation of the mean amounts than on the calculation of medians. The ratio of benefits to taxes declines because the switch increases the measure of projected lifetime taxes more than that of lifetime benefits.

Effects of Changing Discount Rates

Using a lower discount rate increases the present value of lifetime benefits at age 65 because benefits received in the future are larger on a present-value basis (compare the second panel of Table B-1 with the first panel). Conversely, using a lower discount rate makes the present value of lifetime payroll taxes at age 65 *smaller* for all birth cohorts because taxes paid earlier have a lower rate applied to them. Thus, the resulting ratios of lifetime benefits to lifetime taxes are significantly larger for all birth cohorts. Notably, with a lower discount rate, the

overall benefit-to-tax ratio for people born in the 1940s and later exceeds 1.0, meaning that, on average, those people receive more in scheduled benefits than they pay in taxes on a present-value basis.

Reducing the discount rate from 3.0 percent to 2.2 percent significantly increases lifetime benefits as a percentage of lifetime earnings for all birth cohorts because the benefits occur later than the earnings (see the fourth column of numbers in the first two panels of Table B-1). Lifetime taxes as a percentage of lifetime earnings change only slightly, however, because taxes are roughly the same proportion of earnings in each time period (see the fifth column in those panels).

Moving from a fixed discount rate to one that varies with the observed and projected effective rate on federal debt has only modest effects on benefit-to-tax ratios, boosting most of them a bit. That change increases the present value of both benefits and taxes for people born in the 1940s because

government interest rates were high in the 1980s through the late 1990s. For people born in the 1960s and 1980s, the present value of lifetime taxes decreases because of the low interest rates from the early 2000s through the present (see the third panel of Table B-1).

Effects of Changing the Measure of Inflation

Finally, changing the measure of inflation from increases in the CPI to increases in the GDP price index also has little effect on benefit-to-tax ratios. Because inflation measured by the GDP price index is projected to be lower than inflation measured by the CPI, that change raises the present values of both benefits and taxes for people born in the 1960s and later by similar proportions. Similarly, adjusting the inflation rate used has only small effects on the ratios of either lifetime benefits or taxes to earnings (see the fourth panel of Table B-1).

About This Document

This Congressional Budget Office (CBO) publication provides additional information about long-term projections of the Social Security program's finances that were included in *The 2014 Long-Term Budget Outlook* (July 2014). Those projections, which cover the 75-year period spanning 2014 to 2088, and the additional information presented in this document update projections CBO prepared last year and reported in *The 2013 Long-Term Projections for Social Security: Additional Information*.

The analysis was prepared by Geena Kim, Xiaotong Niu, Charles Pineles-Mark, Michael Simpson, and Julie Topoleski of CBO's Long-Term Analysis Unit, with guidance from Linda Bilheimer. Edward Harris, Jonathan Huntley, and Damien Moore made helpful contributions. Kyle Redfield fact-checked the report.

Jeffrey Kling and Robert Sunshine reviewed the report. Christine Bogusz edited the document, and Maureen Costantino and Jeanine Rees prepared it for publication. Michael Simpson prepared the supplemental data, with assistance from Jeanine Rees.

The report is available on the agency's website (www.cbo.gov/publication/49795).

Douglas W. Elmendorf
Director

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