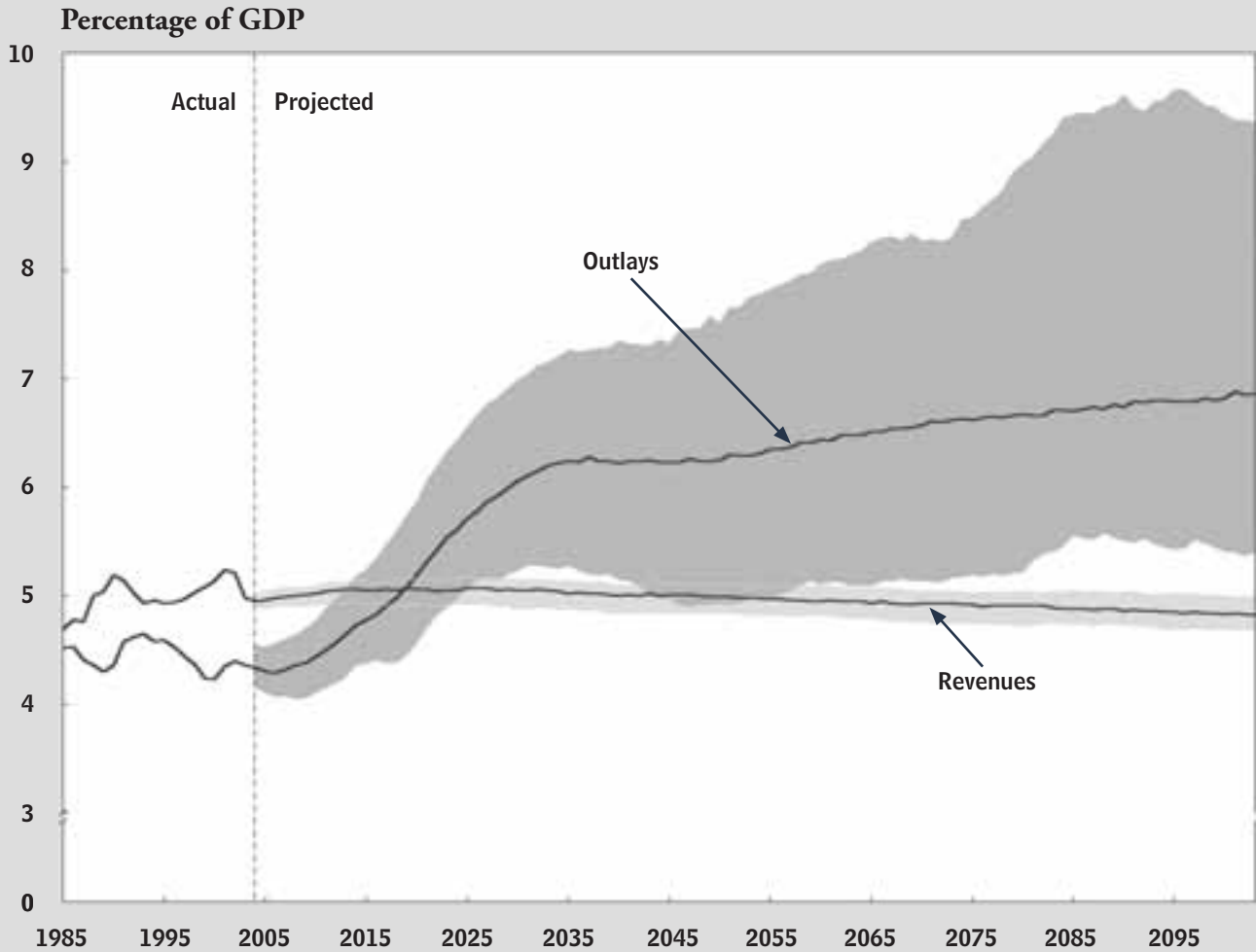


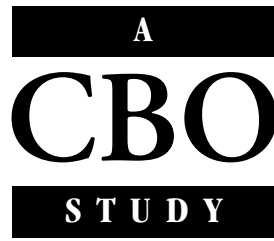
# The Outlook for Social Security

## Potential Range of Social Security Outlays and Revenues Under Current Law



JUNE 2004





# **The Outlook for Social Security**

June 2004

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## **Notes**

All of the years referred to in this study are calendar years.

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

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## Preface

**O**ver the past several years, as lawmakers have become more aware of long-term pressures facing the federal government, the Congressional Budget Office (CBO) has been asked to evaluate the long-term economic and budgetary implications of current laws governing major entitlement programs and of legislative changes to those programs. In accordance with its mission to provide the Congress with budget projections and estimates of the costs of legislation, CBO has sought to enhance its capacity to produce long-term analyses. As a starting point, the agency presented comprehensive 50-year scenarios for the federal budget in December 2003 in *The Long-Term Budget Outlook*.

This updated study presents more-detailed 100-year projections for Social Security under current law, as a prelude to evaluating any legislation affecting that program. The report focuses on the resource demands of the Social Security system, the program's finances, and projections of the benefits received by individuals in different age and income groups. In keeping with CBO's mandate to provide objective analysis, the study makes no recommendations. (Background on Social Security, including information about the program's structure and financing, underlying demographic trends, and strategies that have been proposed to prepare for the aging of the U.S. population, can be found in an earlier CBO publication, *Social Security: A Primer*, published in September 2001).

Noah Meyerson, Amy Rehder Harris, and Josh O'Harra of CBO's Health and Human Resources Division wrote this study. They and Kevin Perese, John Sabelhaus, Michael Simpson, and Julie Topoleski contributed to the underlying research and techniques. Paul Cullinan, Robert Dennis, Douglas Hamilton, Arlene Holen, Ben Page, Elizabeth Robinson, John Sabelhaus, Robert Shackleton, Ralph Smith, Robert Sunshine, and Thomas Woodward reviewed the study and provided helpful comments.

Members of CBO's Long-Term Modeling Advisory Panel—Barry P. Bosworth, Dan L. Crippen, Roland (Guy) King, Thomas E. MaCurdy, Olivia S. Mitchell, John Rust, Sylvester J. Schieber, and C. Eugene Steuerle—provided considerable assistance in reviewing this analysis. In addition, many analysts from the Social Security Administration's Office of the Chief Actuary were generous in contributing their time and sharing data. (The assistance of such external participants implies no responsibility for the final product, which rests solely with CBO.)

Christian Spoor edited the study, and John Skeen proofread it. Maureen Costantino produced the cover and prepared the report for publication. Lenny Skutnik printed the initial copies, and Annette Kalicki prepared the electronic versions for CBO's Web site ([www.cbo.gov](http://www.cbo.gov)).

Douglas Holtz-Eakin  
Director



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## Summary

**T**oday, 47 million Americans receive some form of Social Security benefit. As the baby-boom generation begins to retire, that number will rise considerably. Under the laws that currently govern Social Security, spending for the program will increase from about 4.4 percent of the nation's gross domestic product (GDP) now to more than 6 percent of GDP in 2030, the Congressional Budget Office (CBO) projects. In later years, outlays will continue to grow steadily as a share of GDP, though more slowly. Over the long term, paying the Social Security benefits scheduled under current law will require economic resources totaling between 5 percent and 8 percent of GDP, CBO projects.

At the same time, the federal revenues dedicated to Social Security will remain close to their current level—about 5 percent of GDP—in the absence of changes to the program. Thus, annual outlays for Social Security are projected to exceed revenues beginning in 2019. Even if spending ends up being lower than expected and revenues higher than expected, a gap between the two is likely to remain for the indefinite future.

Only four approaches to narrowing that gap exist, and each of those approaches has drawbacks:

- The benefits scheduled to be paid under current law could be reduced, lowering Social Security's contribution to the income of future beneficiaries.
- The taxes that fund Social Security could be increased, drawing additional resources from the economy to the program.
- The resources consumed by other federal activities could be cut to make up for the shortfall in Social Security. However, the aging of the U.S. population and increases in medical costs will also lead to higher costs for other entitlement programs, most notably Medicare and Medicaid.

- Federal borrowing could be increased, which would also draw additional resources from the economy to Social Security. But that borrowing would need to be repaid by future generations, either through higher taxes or lower spending.

Any changes to Social Security will have to be made in the context of the pressures on the total federal budget. CBO projects that spending for government health programs will grow even faster than spending for Social Security because of rising health care costs. In particular, increasing outlays for Medicare and Medicaid are projected to cause long-term shortfalls in the rest of the budget that will be even greater than Social Security's. Unless taxation reaches levels that are unprecedented in the United States, current spending policies are likely to result in an ever-growing burden of federal debt held by the public, which will have a corrosive and potentially contractionary effect on the economy.<sup>1</sup>

Ultimately, the nation's ability to support Social Security beneficiaries will depend on the size of the economy. Different changes to that program will have different economic effects. The taxes paid and benefits received by program participants embody important incentives that will affect their choices about work and saving. Decisions to raise revenues, borrow, or reduce spending will therefore influence economic growth.

The long-term nature of Social Security's structural imbalance—along with the desirability of phasing in any policy changes over many years so participants have time to adjust their plans accordingly—requires that analyses of proposed changes extend beyond the traditional 10-year horizon of federal budget projections. Moreover, if the Congress considers changes to Social Security law, it will benefit from receiving timely analyses of the impact

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1. See Congressional Budget Office, *The Long-Term Budget Outlook* (December 2003).

of legislative proposals. To provide such analyses, CBO has developed the capacity to produce comprehensive long-term projections of Social Security's finances under current law and under a variety of possible legislative changes.

This report presents CBO's outlook for Social Security over the next 100 years under current law. Projections of various measures of Social Security's finances all show that outlays will continually grow faster than revenues, resulting in significant annual deficits in the system. Projections of benefit levels indicate that future generations will receive higher retirement benefits—and pay higher Social Security taxes—than current beneficiaries do, even after adjustment for inflation. However, those benefits will represent a smaller percentage of their pre-retirement earnings than is the case now. Such long-term projections are necessarily uncertain, but the general conclusions presented in this report hold true under a wide range of assumptions about future demographic and economic trends.

## The Financial Outlook for Social Security

Social Security is currently running an annual surplus. In 2003, total outlays (benefits plus administrative costs) equaled 4.4 percent of GDP, whereas dedicated revenues (Social Security payroll taxes and the income taxes that some recipients pay on their benefits) equaled 5.0 percent of GDP. CBO projects that at the end of the century, revenues will equal nearly 5 percent of GDP, about the same as today (see Summary Figure 1). Outlays, by contrast, will increase substantially in the near future with the retirement of the baby-boom generation. Annual spending will outstrip annual revenues starting in 2019 and will reach 6.1 percent of GDP in 2030—nearly 40 percent higher than in 2003. With life expectancy continuing to increase, outlays are projected to keep growing thereafter: to 6.3 percent of GDP in 2050 and nearly 7 percent of GDP in 2100. CBO's projection of a widening gap between outlays and revenues is consistent with other analyses of the outlook for Social Security. That gap is the key economic indication of the shortfall between the program's spending commitments and dedicated revenues.

By running an annual surplus, the Social Security system as a whole currently contributes to reducing the total

budget deficit. However, CBO's projection indicates that within the next several years, that contribution will start to decline, and beginning in 2019, the Social Security system will either increase the size of the total deficit or reduce the size of the total surplus. That impact will grow over time as the system's gap widens.

Social Security's finances are often discussed in terms of the trust funds that are used in the federal budget to track outlays and revenues over the life of the program. Those trust funds are mainly accounting mechanisms and contain no economic resources. But they are important from a policy perspective, because Social Security's legal spending authority each year is limited to the total balance of the trust funds. CBO projects that the trust funds will become exhausted in 2052, after which spending authority will be limited to annual revenues—which are projected at that point to equal only about 80 percent of scheduled benefits.

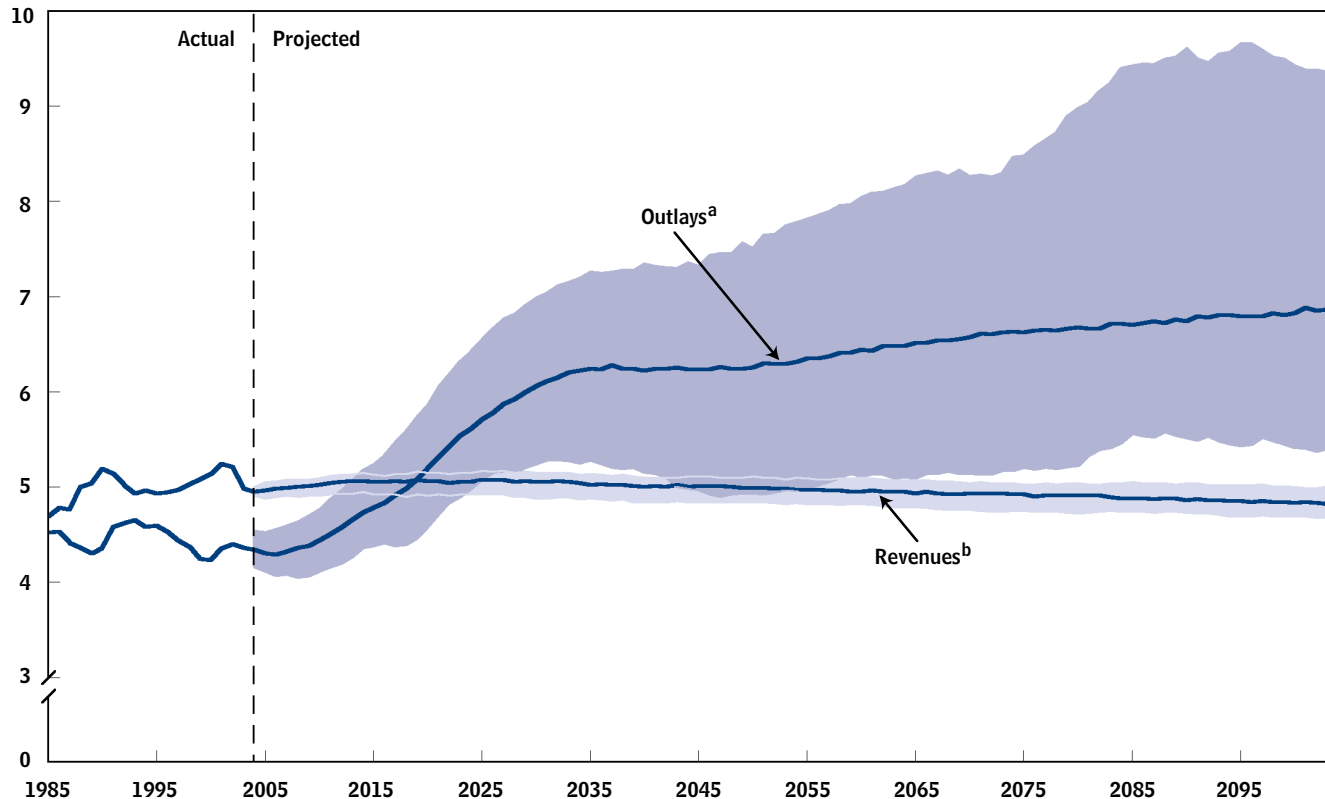
## The Distribution of Taxes and Benefits

An important part of understanding the economic impact of Social Security is examining the distribution of taxes and benefits among groups of participants. This study provides several measures of projected benefits received and Social Security taxes paid by people in various age and income groups. The different measures lead to different insights.

- People with high earnings receive higher benefits than people with low earnings do, and under current law, future generations will receive higher benefits than current beneficiaries do, even after adjustment for inflation.
- Future beneficiaries will live longer than today's beneficiaries and would therefore receive greater benefits over their lifetime even if their annual benefits stayed the same.
- Under the assumption that the Social Security payroll tax remains a constant portion of taxable earnings, future generations will pay higher taxes than current generations do, because taxable earnings are projected to increase over time even after adjustment for inflation.

**Summary Figure 1.****Projected Social Security Outlays and Revenues Under Current Law, 1985 to 2103**

(Percentage of GDP)



Source: Congressional Budget Office.

Note: The dark lines indicate CBO's projections of expected outcomes. In those projections, annual Social Security outlays exceed revenues starting in 2019, and scheduled benefits cannot be paid beginning in 2053. Shaded areas indicate the 80 percent range of uncertainty around each projection. (In other words, there is a 10 percent chance that actual values will be above that range, a 10 percent chance that they will be below it, and an 80 percent chance that they will fall within the range. Those uncertainty ranges are based on a distribution of 500 simulations from CBO's long-term model.)

- a. Scheduled benefits and administrative costs.  
 b. Payroll taxes and revenues from the taxation of benefits.

- Low-earning workers have a larger percentage of their earnings replaced by Social Security than high earners do, and current beneficiaries have a larger percentage of their earnings replaced than future generations will.
- In Social Security, earlier generations of participants received very high benefits relative to the taxes they paid. As a result of that windfall, later participants receive less in total benefits, on average, than the total dedicated taxes they pay. That situation reflects the pay-as-you-go nature of the Social Security program,

which results in a transfer from later generations to earlier generations.

- For workers with low lifetime household earnings, total Social Security benefits received over a lifetime exceed dedicated taxes paid over a lifetime, on average. The opposite is true for workers with average and above-average earnings. If the projected shortfall in revenues led to a reduction in benefits for all workers, those general patterns would remain similar for each income group.

## Analyzing the Uncertainty of Social Security Projections

The uncertainty about Social Security that individuals and policymakers face is an important economic and policy consideration. To display the uncertainty inherent in long-term projections, CBO calculates not only basic projections for Social Security but also ranges of possible outcomes. To do that, CBO uses standard statistical techniques to analyze patterns of past variation in most of the demographic and economic factors that underlie the analysis, such as fertility and mortality rates, interest rates, and the rate of earnings growth. It then uses its model to run hundreds of projections, each time with random variations in the assumed values for those factors that are equivalent to the variation observed historically.

Although any one of those simulations has little meaning, together they enable CBO to display the probability distribution of possible outcomes.

That probability distribution is shown in this study (as it is in Summary Figure 1) by the 80 percent range of uncertainty—the range within which there is an 80 percent chance that the actual value will fall. For example, although Social Security outlays are projected to equal about 6 percent of GDP in 2030, CBO’s uncertainty analysis indicates that there is a 10 percent chance that outlays will be less than 5.2 percent of GDP in that year and a 10 percent chance that they will exceed 7.0 percent of GDP. In any case, they are certain to be notably higher than current outlays.

## Projections of Social Security's Finances

**U**nder current law, outlays for Social Security will rise from about 4.4 percent of gross domestic product (GDP) today to more than 6 percent of GDP 30 years from now, the Congressional Budget Office (CBO) projects. In later years, spending will continue to grow steadily, though more slowly. That projection is necessarily uncertain. But past variation in the economic and demographic factors underlying the projection suggests that over the next 50 to 100 years, Social Security's demand for economic resources will range between 5 percent and 8 percent of GDP.

By contrast, federal revenues dedicated to Social Security are expected to remain close to their current level—about 5 percent of GDP—over that period. As a result, outlays are projected to begin exceeding revenues in 2019, with the gap growing ever wider thereafter. Even if outlays for Social Security turn out to be lower than expected and revenues higher, a gap is likely to remain.

Only four approaches to closing that gap are possible, each of which has its own drawbacks:

- The benefits that are scheduled to be paid to future recipients under current law could be reduced, lowering Social Security's contribution to their income.
- The taxes that fund Social Security could be raised to draw additional resources from the economy to the program.
- The resources consumed by other federal programs could be reduced to cover the gap between Social Security's outlays and revenues.
- The federal government's borrowing could be increased, which would be another way to draw

more resources from the economy to Social Security. That borrowing would need to be repaid by future generations, however, either through increased taxes or reduced federal spending.

Social Security is not the only source of pressure on the overall federal budget. The aging of the U.S. population—which is the main source of the projected increase in Social Security spending—will also raise costs for other entitlement programs. In particular, CBO projects that expenditures for Medicare and Medicaid will grow even faster than Social Security outlays because of rising health care costs. Unless taxation reaches levels that are unprecedented in the United States, current spending policies are likely to prove financially unsustainable over the long term because they will lead to an ever-growing burden of federal debt held by the public, which will have a corrosive and potentially contractionary effect on the economy.<sup>1</sup>

### The Social Security Program at Present

In 2003, the federal government spent a total of \$479 billion on the Social Security program. That year, about 47 million people received Social Security benefits—29.5 million retired workers; 5.9 million disabled workers; and 11.6 million family members of retired, disabled, or deceased workers. Social Security has two parts.<sup>2</sup> The Old-Age and Survivors Insurance (OASI) program provides benefits to retired workers, members of their fami-

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1. See Congressional Budget Office, *The Long-Term Budget Outlook* (December 2003).
  2. For more information about Social Security's structure and benefits, see Congressional Budget Office, *Social Security: A Primer* (September 2001), Chapter 2. The numbers in this paragraph are as of December 31, 2003.

lies, and their survivors. The Disability Insurance (DI) program pays benefits to disabled workers younger than the normal retirement age and their dependents.<sup>3</sup> OASI is by far the larger program: last year it accounted for about 85 percent of spending for the two parts combined (referred to as OASDI). On average, retired workers received about \$11,060 in OASI benefits in 2003, and disabled workers received \$10,340 in DI benefits.

Benefits are financed primarily through payroll taxes, with half collected from employers and half from workers.<sup>4</sup> The combined tax rate, currently 12.4 percent, is levied on wages and self-employment income covered by the OASDI program, up to the taxable maximum of \$87,900. (That threshold rises annually with average earnings in the economy.) Last year, about 154 million workers were covered by Social Security and paid some payroll taxes. Their average taxable earnings were \$28,100—for a total taxable payroll of \$4.3 trillion and total payroll tax revenues of \$534 billion. (The Medicare program is partially funded by a separate payroll tax, which raised \$149 billion in 2003. References in this report to payroll taxes refer to Social Security taxes.)

The Social Security system also receives revenues from income taxes that the approximately one-third of beneficiaries with the highest income pay on their Social Security benefits.<sup>5</sup> Those revenues are far smaller than payroll tax receipts: \$13 billion in 2003.<sup>6</sup>

Social Security is currently running an annual surplus. In 2003, dedicated revenues exceeded outlays by \$68 billion. Viewed as a component of the overall budget, that surplus helped reduce the government's total deficit in 2003. However, Social Security also has a distinct, specific accounting structure. Revenues from payroll taxes

- 
3. In Social Security, the “normal retirement age” is the age at which a worker becomes eligible for full retirement benefits. It is 65 for people born in or before 1937 and higher for those born later, rising to 67 for people born after 1959.
  4. Economists generally agree that workers effectively pay the full tax because employers pass on their share to workers in the form of lower compensation.
  5. For more information about the taxation of Social Security benefits, see Box 3-1 on page 24.
  6. Some additional federal revenues from the taxation of Social Security benefits are allocated to Medicare's Hospital Insurance Trust Fund, but that stream of revenues is not considered in this report.

and the taxation of benefits are credited to the budget's OASI and DI trust funds. Any revenues not needed to pay for benefits or administrative expenses are invested in government bonds. The interest that the bonds earn (a total of \$85 billion in 2003) is credited to the trust funds. But because that interest represents the government paying itself, it provides no net revenues to the government and has no effect on the total budget.<sup>7</sup>

The trust funds serve mainly as an accounting mechanism to track revenues and outlays for Social Security. The funds' balance represents the total amount that the government is legally authorized to spend on Social Security. That balance provides only a limited perspective on the program's finances, however, because it does not consider the interaction with other federal tax and spending programs. Although the Social Security system is authorized to spend certain amounts, the resources to finance those outlays derive from the budget as a whole—and ultimately from the economy.

## Current-Law Projections of Social Security

The Social Security system bridges many generations, which makes long-term forecasts valuable. Having long-term projections allows policymakers to determine what changes are needed well in advance of their implementation—which in turn gives workers more time to respond to any changes by adjusting their plans for saving and retirement.

CBO has developed the capability to project various measures of Social Security's finances far into the future, both under current law and under a variety of possible legislative changes to the program. CBO's current-law projections of those measures for the next 100 years are described below. Projections of benefit levels and tax payments for different income and age groups are detailed in Chapter 2. An important feature for policymakers and program participants is the uncertainty inherent in those projections. By examining the history of the demographic and economic factors on which the analysis is based, CBO is able to quantify that uncertainty, as explained in Chapter 3.

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7. See Congressional Budget Office, *The Impact of Trust Fund Programs on Federal Budget Surpluses and Deficits*, Long-Range Fiscal Policy Brief No. 5 (November 4, 2002).

Even under a wide range of assumptions, CBO's projections point to a financial imbalance in the Social Security system over the long run. Changes in economic growth can affect the system's finances. But because the initial benefits paid to new recipients are indexed to the overall growth of earnings, the effect of such changes is muted. For the most part, the future financial status of Social Security will be driven not by economic conditions but by long-term demographic shifts—most notably, the aging of the population. That trend is generally predictable, because anyone who will receive retirement benefits during the next 62 years has already been born.<sup>8</sup>

### Annual Outlays and Revenues Relative to GDP

The measures that provide the fullest understanding of Social Security's finances are projections of the program's annual outlays (scheduled benefits plus administrative costs) and revenues (payroll taxes and the income taxes paid on benefits and credited to the OASDI trust funds). Because many Social Security projections are made over a long horizon and because the system's finances are large compared with the size of the economy, it is useful to consider projected outlays and revenues not in dollars but relative to either economywide earnings or gross domestic product.

A common way to compare outlays and revenues with earnings is to present them relative to taxable payroll. Those measures are frequently referred to as the cost and income rates, respectively. An advantage of those measures is that they relate directly to a common policy lever, the OASDI payroll tax rate. A disadvantage is that the denominator, taxable payroll, can itself vary with policy changes, which makes it harder to clearly see the effects of legislative proposals on outlays and revenues. For example, a proposal to raise the taxable maximum or to cover those state and local employees who are not now covered by Social Security would increase the size of the taxable payroll. That increase could make changes in outlays or revenues as a share of taxable payroll appear smaller than they would appear using other measures.<sup>9</sup> In addition, focusing on taxable payroll and payroll taxes could limit the attention paid to other types of taxes.

8. Of course, to make projections of Social Security's finances, CBO must make assumptions about the rates at which people will die or become disabled, the level of immigration, and the rate at which earnings will grow (among other factors). Those assumptions are described in Chapter 3.

An alternative approach is to compare Social Security outlays and revenues with GDP, a more comprehensive measure of the nation's economic resources. CBO typically presents various types of outlays and revenues relative to GDP in other projections, and the use of a common metric allows policymakers to more easily compare the costs of different programs. Therefore, this report mainly presents Social Security outlays and revenues relative to GDP, although it also includes measures relative to taxable payroll.

In 2003, Social Security outlays equaled 4.4 percent of GDP, and revenues equaled 5.0 percent (see Table 1-1). Under current law, revenues are projected to be fairly stable for the next 20 years and then to decline slightly each year relative to GDP as workers are assumed to take an increasing share of their compensation in the form of nontaxable benefits, such as health insurance and pensions. In 2100, revenues are projected to equal 4.8 percent of GDP.<sup>10</sup>

Although revenues will remain relatively stable as the baby-boom generation retires, outlays will rise dramatically. The growth relative to GDP will begin around 2007 and then slowly accelerate, with annual outlays projected to exceed annual revenues by 2019 (see the dark lines in Figure 1-1). Although today the Social Security system as a whole contributes to reducing the total budget deficit, within the next several years that contribution will begin to decline. And starting in 2019, the Social Security system will either increase the size of the total deficit or reduce the size of the total surplus.<sup>11</sup>

The fastest growth in outlays as a share of GDP will occur from 2018 to 2023, CBO projects, when that share will increase at an average rate of 2.2 percent a year. By 2030, projected outlays will reach 6.1 percent of GDP—nearly 40 percent higher than in 2003. In later years, as baby-boom beneficiaries die, outlays relative to GDP will sta-

9. If revenues increased by more than outlays under such a proposal, outlays relative to taxable payroll would decline even as total outlays rose.

10. Interest credited to the trust funds is not included in that measure of annual revenues because such interest is an intragovernmental transaction.

11. For scenarios of total budget spending and revenues over the long term, see Congressional Budget Office, *The Long-Term Budget Outlook* (December 2003).

**Table 1-1.****Social Security Outlays and Revenues in Selected Years, 2003 to 2100**

(Percentage of GDP)

	Actual 2003	2025	2050	2075	2100
<b>Expected Outcome Under Current Law</b>					
Revenues	4.98	5.07	4.99	4.92	4.83
Outlays	4.36	5.71	6.25	6.62	6.82
Balance	0.62	-0.64	-1.27	-1.70	-1.99
<b>80 Percent Range of Uncertainty<sup>a</sup></b>					
Revenues	4.98	4.92 to 5.17	4.84 to 5.11	4.75 to 5.03	4.69 to 5.00
Outlays	4.36	5.08 to 6.55	4.93 to 7.51	5.20 to 8.48	5.41 to 9.43
Balance	0.62	-1.47 to -0.12	-2.75 to -0.07	-3.78 to -0.44	-4.65 to -0.77

Source: Congressional Budget Office.

Note: Revenues consist of receipts from Social Security payroll taxes and from income taxes paid on Social Security benefits. Outlays comprise scheduled benefits and administrative costs. Annual outlays exceed annual revenues beginning in 2019; scheduled benefits cannot be paid starting in 2053. (Annual data through 2103 are available at CBO's Web site, [www.cbo.gov](http://www.cbo.gov).)

- a. The range within which there is an 80 percent probability that the actual value will fall (that is, the range between the 10th and 90th percentiles for each measure based on a distribution of 500 simulations from CBO's long-term model). The balances shown do not equal the difference between the outlays and revenues shown because each value is obtained from a different simulation. For example, the scenario with the 90th percentile of outlays has higher outlays than 90 percent of all simulations, the scenario with the 90th percentile of revenues has higher revenues than 90 percent of the simulations, and the scenario with the 90th percentile of balances (revenues minus outlays) has higher balances than 90 percent of the simulations. Those will generally be three different simulations.

bilize for about 15 years. But they will then resume their increase, albeit at a slower pace, as lifespans continue to lengthen. By 2100, CBO projects, scheduled outlays will equal 6.8 percent of GDP—56 percent higher than in 2003, and 41 percent higher than projected revenues in 2100.

Those projections depend on assumptions about a number of factors. Based on patterns of historical variation in those factors, there is a 10 percent chance that outlays will be less than 5.2 percent of GDP in 2030 and a 10 percent chance that they will be greater than 7.0 percent of GDP that year. The range between those numbers is known as the 80 percent range of uncertainty, because there is an 80 percent chance that actual outlays will fall somewhere within that range. The uncertainty of the projections grows over time (see Figure 1-1). The 80 percent uncertainty range for outlays more than doubles between 2030 and 2100, when it spans from 5.4 percent to 9.4 percent of GDP. (Because of asymmetries in the structure of the Social Security system, the expected outcomes do not fall exactly in the middle of the uncertainty range.)

In current-law projections, Social Security payroll taxes remain at 12.4 percent of taxable income, and taxable income is assumed to grow at about the same rate as GDP. Thus, there is comparatively little uncertainty about revenues relative to GDP—on average, the uncertainty range for projected outlays is about nine times as large as that for revenues.<sup>12</sup>

Another common way to look at Social Security's annual finances is to consider the annual balance: the difference between outlays and revenues in a given year. As noted above, revenues exceeded outlays last year, resulting in a positive balance of 0.6 percent of GDP. In 2030, outlays will be much higher than revenues, resulting in a projected deficit of 1.0 percent of GDP. That gap is projected to grow to 2.0 percent of GDP in 2100. Because annual balances are small compared with outlays and revenues, they are more volatile: a small change in either outlays or revenues can lead to a large percentage change in the balance.

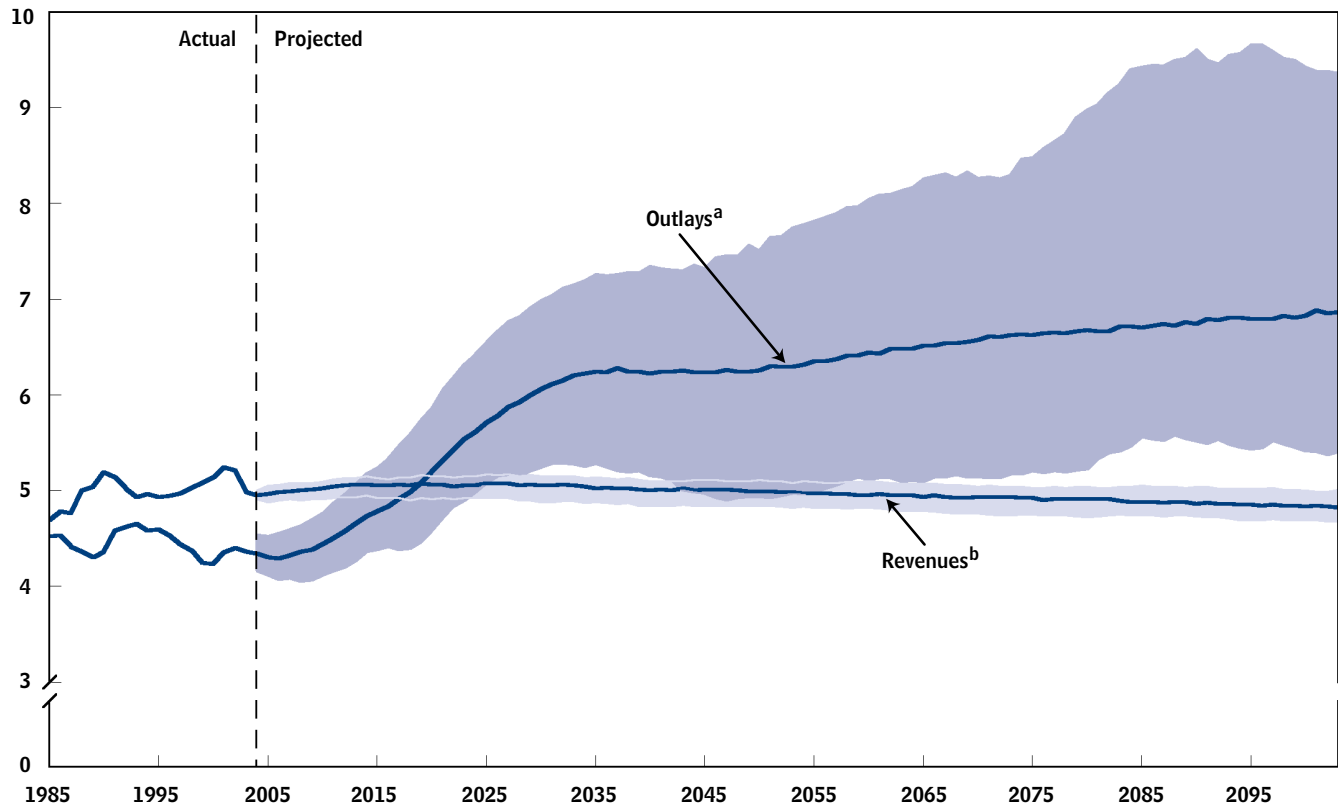
12. CBO's uncertainty analysis does not account for uncertainty about the relationship between taxable income and GDP.



**Figure 1-1.**

## Projected Social Security Outlays and Revenues Under Current Law, 1985 to 2103

(Percentage of GDP)



Source: Congressional Budget Office.

Note: The dark lines indicate CBO's projections of expected outcomes. In those projections, annual Social Security outlays exceed revenues starting in 2019, and scheduled benefits cannot be paid beginning in 2053. Shaded areas indicate the 80 percent range of uncertainty around each projection. (In other words, there is a 10 percent chance that actual values will be above that range, a 10 percent chance that they will be below it, and an 80 percent chance that they will fall within the range. Those uncertainty ranges are based on a distribution of 500 simulations from CBO's long-term model.)

- a. Scheduled benefits and administrative costs.
- b. Payroll taxes and revenues from the taxation of benefits.

The OASI and DI programs are legally distinct, with separate dedicated payroll taxes and trust funds, but from an economic and policy perspective, they are generally treated as a single program. Older workers are more likely to become disabled than younger workers, so an older population results in both higher disability outlays and higher retirement outlays. But after DI beneficiaries reach the normal retirement age, their benefits are paid from the OASI trust fund. Therefore, the aging of the population will not affect outlays for disability benefits as much as outlays for retirement benefits. OASI outlays are pro-

jected to grow by 61 percent (from 3.7 percent of GDP to 5.9 percent) between 2003 and 2100, whereas DI outlays are projected to grow by 31 percent (from 0.7 percent of GDP to 0.9 percent).

### Summarized Outlays and Revenues Relative to GDP

Long-term projections of annual outlays and revenues provide a comprehensive summary of the overall scope and timing of the economic and budgetary implications of the Social Security program under current law. For narrower purposes, analysts frequently summarize the

program's outlay and revenue data in a single number for a given time period (for example, total outlays over 75 years). Summarized values can be expressed as a percentage of either GDP or taxable payroll over the same period.

Summarizing outlays or revenues by taking a simple average of projected values would be misleading, because it would not take into account the fact that, even after adjustment for inflation, a dollar today is more valuable than a dollar in the future. Thus, the data are summarized by computing the present value of outlays or revenues for a given period and dividing that figure by the present value of the stream of GDP or taxable payroll. Calculating the summarized measures typically involves making two other adjustments as well. First, the current trust fund balance is added to summarized revenues to reflect Social Security's financial history (incorporating the net effect of past annual Social Security surpluses and deficits). Second, an additional year's worth of projected outlays is added to summarized outlays to reflect the goal of having a "cushion" in the trust funds at the end of the time period being considered.

CBO projects Social Security's summarized outlays over 100 years at 5.8 percent of GDP and summarized revenues at 5.2 percent, resulting in a summarized deficit of 0.5 percent of GDP (see Table 1-2). CBO's analysis can also calculate the range of uncertainty around those projections. The probability is more than 95 percent that, under current law, total outlays over 100 years will exceed total revenues (that is, the summarized balance will be less than zero), CBO projects. In addition, the 100-year summarized deficit could be much greater than 0.5 percent of GDP; there is a 10 percent chance that it will exceed 1.1 percent of GDP.

The 100-year summarized deficit can be interpreted as indicating that if annual Social Security revenues were permanently increased, or annual outlays decreased, by 0.5 percent of GDP beginning immediately, trust fund balances would be sufficient to provide spending authority for all of the benefits scheduled to be paid over the next 100 years. If either of those changes—or their equivalent—was made, projected trust fund balances would remain positive over that period. And at the end of the

100 years, the balance would be large enough to authorize paying one year's worth of benefits.

As noted earlier, however, positive trust fund balances indicate the legal authority to pay benefits but not the budgetary resources to do so. Thus, they do not give as full a picture of the financial situation as annual outlays and revenues do. A limitation of simply targeting the summarized balance is that such an approach would not necessarily provide solvency to the Social Security system over the long term. Because outlays are projected to rise over time, a policy that increased revenues by 0.5 percent of GDP every year would still result in annual Social Security deficits beginning in 2024 and would only modestly reduce them in the long run. For example, the annual deficit under current law is projected to equal 1.3 percent of GDP in 2050 and 2.0 percent of GDP in 2100, so boosting revenues by 0.5 percent of GDP would still leave large deficits in those years.

As a share of taxable payroll, the summarized 100-year deficit equals 1.4 percent, CBO projects (see Table 1-2). The Social Security trustees commonly summarize the system's deficit relative to taxable payroll over 75 years. CBO projects a 75-year summarized deficit of 1.00 percent of taxable payroll.<sup>13</sup>

### Trust Fund Ratios

Another common measure of Social Security's finances is the ratio of the trust fund balance to annual outlays, which indicates how many years' worth of benefits could be funded with a given balance. The trust fund balance summarizes the entire accounting history of the Social Security program in a single number, because it equals the present value of all past revenues minus the present value of all past outlays. As noted above, it is also important from a policy perspective, because legal spending au-

13. The trustees project a 75-year summarized deficit of 1.89 percent of taxable payroll; see Social Security Administration, *The 2004 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds* (March 23, 2004), p. 13. The difference between that number and CBO's projection results from different economic assumptions and methods of analysis. For example, a small difference in the assumed long-term real interest rate (which is used as the discount rate in calculations of present value) accounts for one-fifth of the difference between the two estimates. For more details, see Appendix A of this study.

**Table 1-2.**  
**Summarized Social Security Outlays, Revenues, and Balances**

	Revenues	Outlays	Balance
<b>As a Percentage of GDP</b>			
Expected Outcome Under Current Law			
50 Years (2004-2053)	5.39	5.50	-0.10
100 Years (2004-2103)	5.24	5.79	-0.54
80 Percent Range of Uncertainty <sup>a</sup>			
50 Years (2004-2053)	5.27 to 5.45	5.02 to 5.96	-0.61 to 0.28
100 Years (2004-2103)	5.14 to 5.32	5.31 to 6.28	-1.07 to -0.17
<b>As a Percentage of Social Security Taxable Payroll</b>			
Expected Outcome Under Current Law			
50 Years (2004-2053)	14.02	14.29	-0.27
100 Years (2004-2103)	13.85	15.29	-1.44
80 Percent Range of Uncertainty <sup>a</sup>			
50 Years (2004-2053)	13.78 to 14.21	13.09 to 15.56	-1.58 to 0.72
100 Years (2004-2103)	13.70 to 14.13	14.41 to 17.36	-2.46 to -0.08

Source: Congressional Budget Office.

Note: Summarized outlays and revenues are the present value of annual outlays and revenues over the relevant time period divided by the present value of GDP or taxable payroll over that period. The balance is the present value of revenues minus the present value of outlays, divided by the present value of GDP or taxable payroll over that period.

- a. The range within which there is an 80 percent probability that the actual value will fall (that is, the range between the 10th and 90th percentiles for each measure based on a distribution of 500 simulations from CBO's long-term model). The balances shown do not equal the difference between the outlays and revenues shown because each value is obtained from a different simulation.

thority is limited to the balance of the trust funds. However, trust fund holdings, which are invested in Treasury bonds, are liabilities to the rest of the government (which will need to pay for the bonds when they are redeemed). Thus, such holdings are not assets of the government as a whole.

The 2004 trust fund ratio—the balance at the beginning of the year divided by projected outlays for the year—equals 3.04, CBO estimates. That ratio is projected to rise to 4.46 in 2019 and then decline quickly (see Figure 1-2).

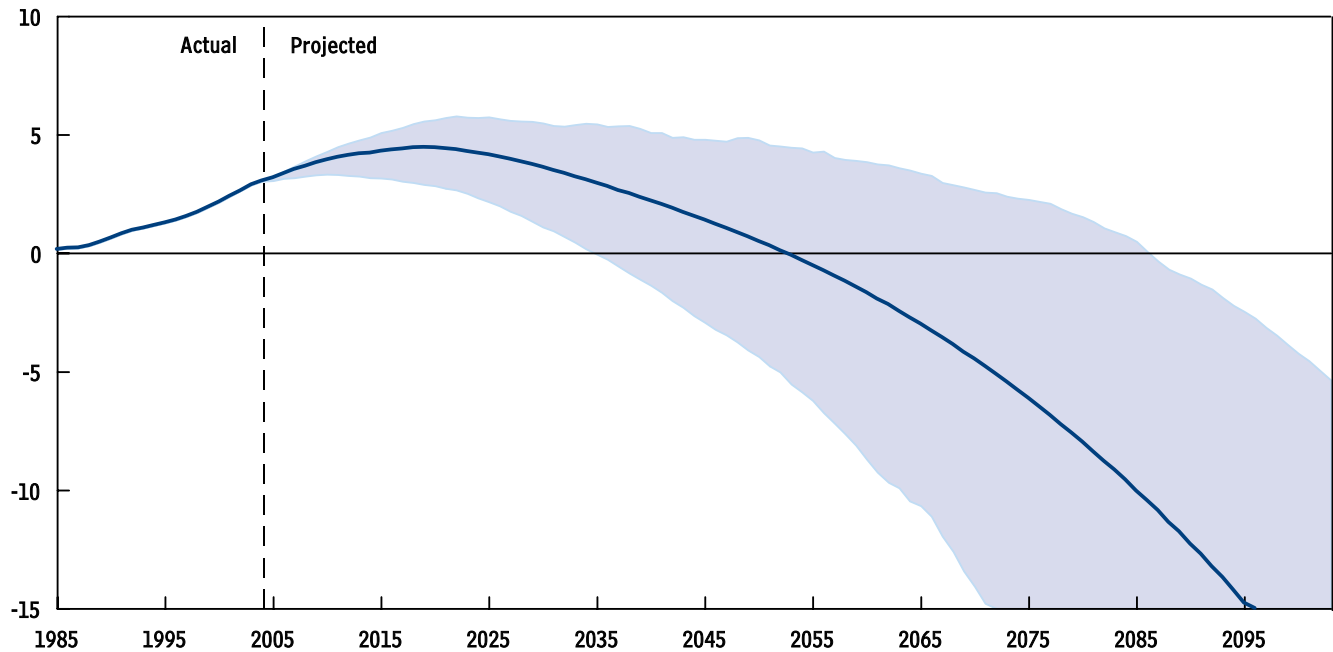
The expected trust fund exhaustion date—the year in which the trust fund balance (and thus the trust fund ratio) falls to zero—is 2052 in CBO's projection. But as the uncertainty range in Figure 1-2 shows, there is a 10 percent chance that the exhaustion date will be 2034 or earlier and a 10 percent chance that it will be after 2085. Although the figure shows negative trust fund ratios after the exhaustion date, under current law the trust funds cannot be negative because the Social Security program does not have the legal authority to borrow money. Thus, those negative balances represent the cumulative amount that the federal government's general fund would have to provide to pay all scheduled Social Security benefits.

### Alternative Measures of Outlays

It is unclear how to describe future benefit levels in the unlikely case that no changes are made to current law and the trust funds are exhausted. On the one hand, the exhaustion of the trust funds would not affect a beneficiary's legal right to full benefits. On the other hand, the Social Security Administration would not have the legal authority to pay full benefits.<sup>14</sup>

Consequently, this analysis presents future benefit spending under two scenarios. In the "scheduled benefits" scenario, outlays after the trust funds are exhausted are assumed to include the full benefits owed, despite any shortfall in the system's annual revenues. Alternatively, in the "trust-fund-financed benefits" scenario, outlays are

14. See the memorandum from Thomas J. Nicola, Legislative Law Attorney, Congressional Research Service, to the House Committee on the Budget, "Whether Entitlement to Full Social Security Benefits Depends on Solvency of the Social Security Trust Funds If Congress Does Not Change the Law," November 20, 1998.

**Figure 1-2.****The OASDI Trust Fund Ratio, 1985 to 2103**

Source: Congressional Budget Office.

Notes: The trust fund ratio is the ratio of the total trust fund balance at the beginning of a calendar year to total Social Security outlays in that year. The dark line indicates CBO's projection of expected outcomes; the shaded area indicates the 80 percent range of uncertainty (based on a distribution of 500 simulations from CBO's long-term model).

OASDI = Old-Age, Survivors, and Disability Insurance.

assumed to include only those benefits that could be financed by annual revenues. Thus, that scenario assumes that all benefits are reduced annually once the trust funds are exhausted so that total outlays equal available revenues.

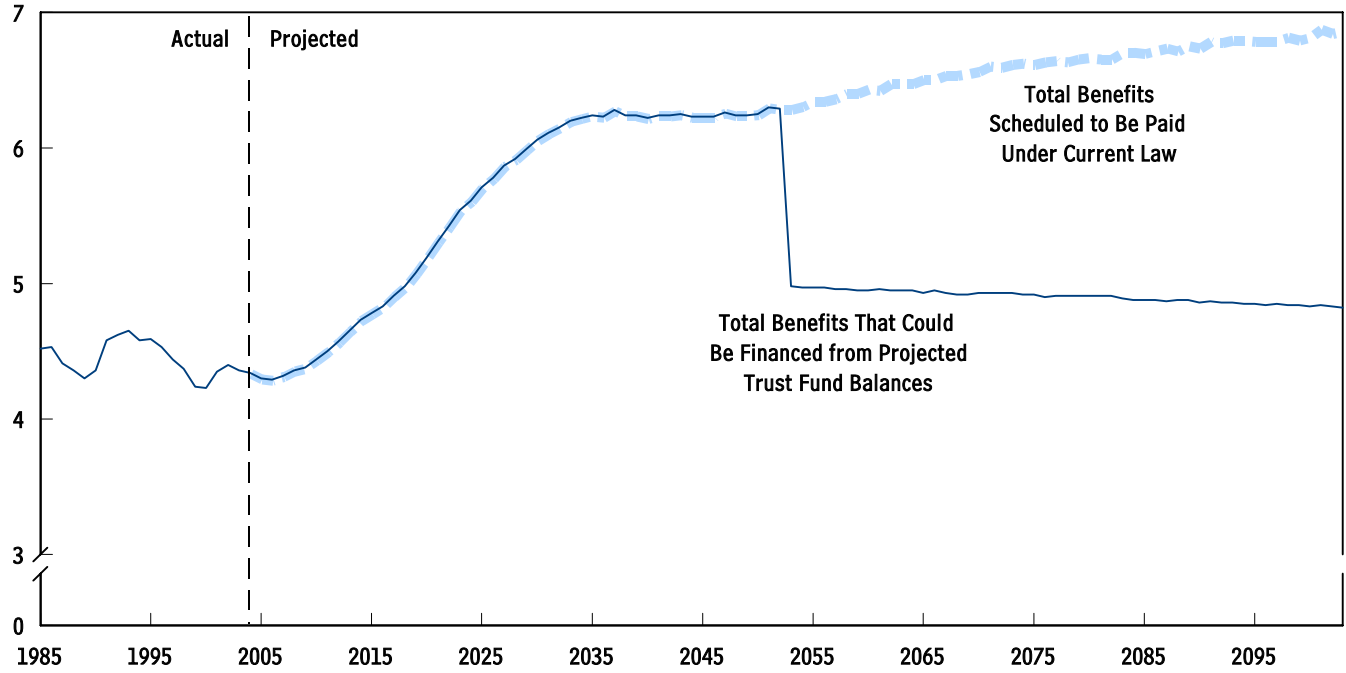
Trust-fund-financed benefits equal scheduled benefits until the trust funds are exhausted (projected to occur in 2052) and Social Security revenues thereafter. In 2053, dedicated revenues are projected to equal only 81 percent of scheduled outlays, so trust-fund-financed benefits are 19 percent lower than scheduled benefits (see Figure 1-3). The difference grows: by 2100, projected revenues are only 71 percent of projected outlays.

That computation of trust-fund-financed benefits implies a lower level of total annual outlays beginning in 2053. However, even before that, dedicated Social Security revenues will not fully pay for scheduled benefits. Although today those revenues exceed annual outlays, beginning in 2019 they will fall short of outlays. At that point, from a trust fund perspective, some revenues will come from interest earnings on Treasury bonds held by the trust funds (and, beginning in 2033, from redemption of those bonds). In effect, cash will be transferred from the government's general fund to Social Security—just as it would be after the trust funds are exhausted in the scheduled-benefits scenario. To generate the real financial resources to support those transfers, the government will have to either run a surplus in the rest of the budget or borrow from the public.

**Figure 1-3.**

**Outlays for Benefits Under Current Law and Under Projections of Trust Fund Balances, 1985 to 2103**

(Percentage of GDP)



Source: Congressional Budget Office.

Note: Trust-fund-financed benefits (those financed by legal spending authority) are projected to fall below scheduled benefits in 2053, when the trust funds have been exhausted. After that, trust-fund-financed benefits equal annual Social Security revenues.



## Projections of Benefit Levels for Different Age and Income Groups

**A**n important aspect of the economic impact and policy design of the Social Security program is its effects on individuals, both as taxpayers and as beneficiaries. This chapter presents various measures of the benefits received and taxes paid by program participants, categorized by the decade of their birth and their earnings level.

Social Security is designed both to ensure a minimum level of benefits to even the poorest recipients (the “adequacy” goal) and to distribute benefits so that workers who have paid more Social Security taxes receive more benefits (the “equity” goal). The program’s progressive benefit structure reflects those two objectives. Retired workers with a history of low earnings (wages and self-employment income) receive annual benefits that replace a higher *percentage* of their preretirement earnings than other retired workers do. Nonetheless, workers with higher earnings receive a higher *level* of annual benefits.

As discussed in the previous chapter, there are two concepts for projecting benefits. “Scheduled” benefits are those specified in current law. However, once the trust funds are exhausted, Social Security will not have sufficient spending authority to pay scheduled benefits. Thus, for illustrative purposes, the Congressional Budget Office also computes “trust-fund-financed” benefits, under the assumption that after the trust funds are exhausted, all types of benefits are cut annually, by an equal percentage, so that total outlays equal available revenues. (If federal officials decided to implement the benefit cuts differently, the effects on individual benefit levels could differ from those shown here.) Under current law, those reductions would begin in 2053, CBO projects, so anyone who was collecting benefits in that year or later would experience a cut from the level of scheduled benefits.

Many different ways to measure benefit levels exist, each of which offers a different perspective on Social Security’s impact on participants. This report considers six measures. The first three present only benefits received by retired workers: first-year retirement benefits in real (inflation-adjusted) dollars, the first-year replacement rate (the percentage of preretirement earnings replaced by retirement benefits), and lifetime retirement benefits in real dollars.<sup>1</sup> The other three measures apply to all participants in the Social Security program and thus are more comprehensive: total payroll taxes paid over an individual’s lifetime, total Social Security benefits received over a lifetime, and the ratio of lifetime benefits to lifetime payroll taxes. To gauge the effect that benefits have on the resources available to recipients, all six measures compute benefits net of the income taxes paid on those benefits and credited to the Social Security trust funds.<sup>2</sup>

### First-Year Retirement Benefits

The initial level of benefits that a retired worker receives (in real dollars) measures his or her purchasing power.<sup>3</sup> A

1. For a discussion of those measures, see Congressional Budget Office, *Measuring Changes to Social Security Benefits*, Long-Range Fiscal Policy Brief No. 11 (December 2003).
2. As noted in Chapter 1, some revenues from the taxation of Social Security benefits are allocated to Medicare’s Hospital Insurance Trust Fund.
3. That level depends in part on when the retiree decides to claim benefits—the later the claiming age, the higher the benefits. Thus, changes in claiming age over time would result in apparent changes in benefit levels. To ensure that the data are comparable over time, this study considers a hypothetical benefit amount: the median benefit that workers would receive if everyone claimed benefits at age 65.

worker's scheduled benefit level depends both on the program's benefit structure, which is specified by Social Security law, and on the worker's earnings history. On the one hand, growth in average earnings will generally cause scheduled benefits to increase over time. On the other hand, the normal retirement age is rising under current law—from 65 for people born in 1937 and earlier to 67 for those born after 1959. That rise is effectively equivalent to a benefit reduction for those later cohorts, because benefits will be lower at any given age, regardless of when beneficiaries choose to begin claiming them. However, the effects of increased earnings are projected to more than offset that reduction, so on net, scheduled benefits are likely to continue growing. For example, in the scheduled-benefits scenario, CBO projects that people born in the 1990s—who will probably retire in the 2050s and 2060s—will receive median benefits of \$21,500 (in 2004 dollars), compared with \$13,300 for those born in the 1940s, who are retiring today (see Figure 2-1 and the first column of Table 2-1).

Trust-fund-financed benefits are projected to fall by nearly 20 percent in the year the trust funds are exhausted but then resume their increase as earnings grow. Even with that drop, future retirees would earn higher real median benefits than today's retirees. Those born in the 1990s would receive median first-year benefits of \$16,700 (in 2004 dollars), still higher than the \$13,300 received by people born in the 1940s (see Figure 2-1 and the second column of Table 2-1).<sup>4</sup>

### First-Year Replacement Rates

A different perspective on benefit levels is given by the replacement rate—the ratio of first-year benefits to average career earnings.<sup>5</sup> People generally want to avoid dramatic changes in their standard of living when they retire, so many retirement and pension programs are designed

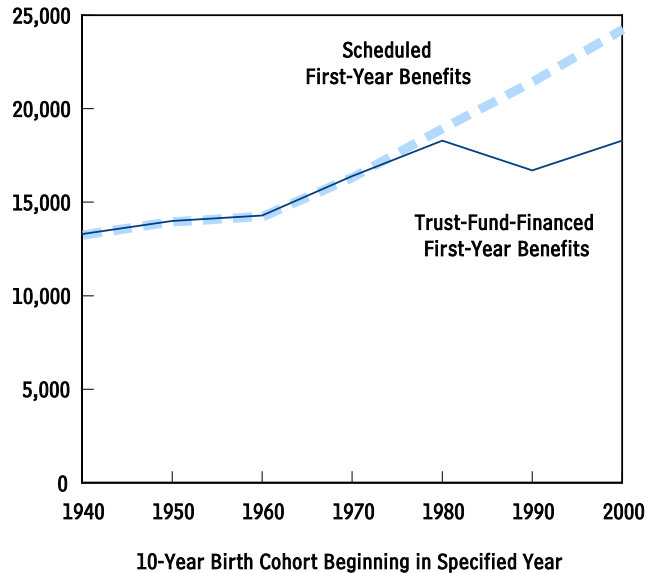
4. Benefit levels under both scenarios, broken down by sex as well as by cohort and lifetime household earnings level, are shown in Table B-1 in Appendix B.

5. In that calculation, average career earnings refers to the average of a worker's highest 35 years of covered earnings, indexed to compensate both for past inflation and for real growth in average earnings nationwide. (Covered earnings may be higher than taxable earnings because they include all earnings, including amounts above the taxable maximum.)

**Figure 2-1.**

### Median First-Year Retirement Benefits, by Birth Cohort

(2004 dollars)



Source: Congressional Budget Office.

Notes: First-year benefits are projected assuming that all workers claim benefits at age 65. Values are net of income taxes paid on benefits and credited to the Social Security trust funds.

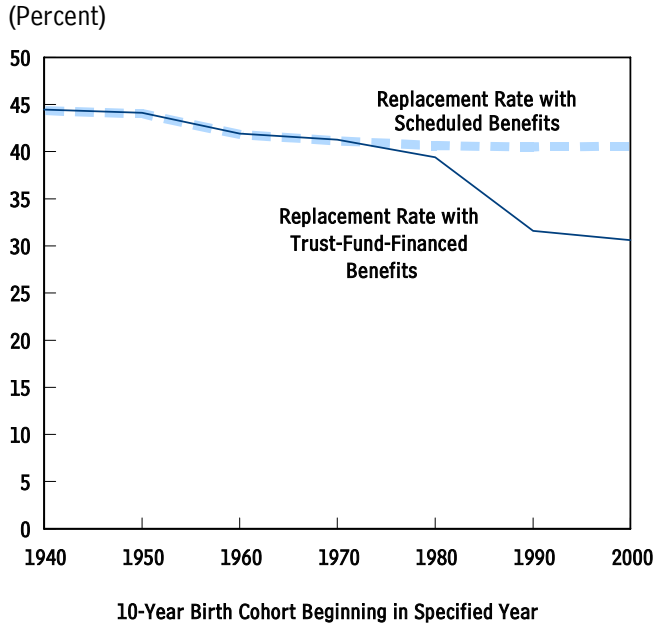
In CBO's projection, trust-fund-financed benefits fall below scheduled benefits beginning in 2053, when the trust funds are exhausted. Trust-fund-financed benefits are projected by assuming an across-the-board cut in benefits each year such that total annual benefits are limited to total annual revenues.

to link retirement benefits to the level of preretirement income.<sup>6</sup> Social Security links benefit levels to preretirement income by basing first-year benefits on a worker's average level of earnings over a lifetime. However, just as the scheduled increase in the normal retirement age reduces benefits at any given age, it also lowers the replacement rate for future retirees compared with the rate for people retiring now. If benefits are paid as scheduled, the median replacement rate for retirees born in the 1990s will be 4 percentage points lower than the rate for retirees born in the 1940s (see the third column in Table 2-1). In the case of trust-fund-financed benefits, the replacement rate will drop dramatically after the trust

6. See Congressional Budget Office, *Baby Boomers' Retirement Prospects: An Overview* (November 2003).



**Figure 2-2.**  
**Median Replacement Rates, by Birth Cohort**



Source: Congressional Budget Office.

Notes: Replacement rates are first-year retirement benefits (net of income taxes paid on benefits and credited to the Social Security trust funds) as a percentage of average career earnings.

In CBO's projection, trust-fund-financed benefits fall below scheduled benefits beginning in 2053, when the trust funds are exhausted. Trust-fund-financed benefits are projected by assuming an across-the-board cut in benefits each year such that total annual benefits are limited to total annual revenues.

funds are exhausted (see Figure 2-2). In that scenario, the median replacement rate for retirees born in the 1990s will be 13 percentage points lower than the rate for those born in the 1940s.

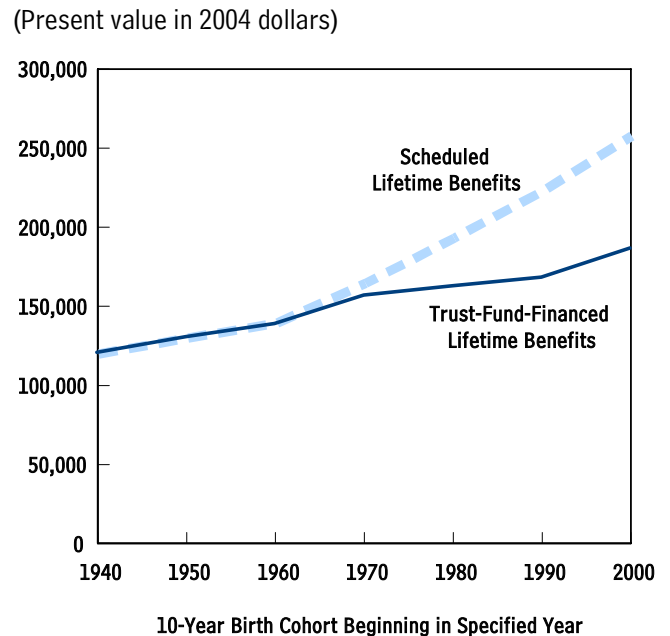
The progressivity of Social Security's benefit formula means that replacement rates are higher for workers with lower earnings. For example, among workers born in the 1940s, the median worker in the lowest one-fifth (quintile) of the earnings distribution will have more than 70 percent of his or her preretirement earnings replaced by Social Security. The median worker in the highest earnings quintile for that age group, by contrast, will have less than 30 percent of his or her earnings replaced.

**Lifetime Retirement Benefits**

Another way to measure the income that retirees receive from Social Security is to look at lifetime retirement benefits—the present value of all of the benefits that a worker gets from the program during retirement. That measure represents the amount of money that, if invested in Treasury securities, would pay retirement benefits over a person's lifetime.

The trend in lifetime retirement benefits (shown in Figure 2-3) differs from the trend in first-year benefits (shown in Figure 2-1). Two factors explain that difference. First, as life expectancy increases, retirees will collect benefits for a longer period, and scheduled lifetime bene-

**Figure 2-3.**  
**Median Lifetime Retirement Benefits, by Birth Cohort**



Source: Congressional Budget Office.

Notes: Lifetime retirement benefits have been adjusted for inflation (to put them in constant dollars) and discounted to age 60. Values are net of income taxes paid on benefits and credited to the Social Security trust funds.

In CBO's projection, trust-fund-financed benefits fall below scheduled benefits beginning in 2053, when the trust funds are exhausted. Trust-fund-financed benefits are projected by assuming an across-the-board cut in benefits each year such that total annual benefits are limited to total annual revenues.

**Table 2-1.**

### Measures of the Benefits Received by the Median Retired Worker, by Birth Cohort and Earnings Level

10-Year Birth Cohort Beginning in Specified Year	First-Year Benefits (2004 dollars)		First-Year Replacement Rate (Percent) <sup>a</sup>		Present Value of Lifetime Benefits (2004 dollars) <sup>b</sup>	
	Scheduled	Trust-Fund-Financed	Scheduled	Trust-Fund-Financed	Scheduled	Trust-Fund-Financed
<b>Median</b>						
1940	13,300	13,300	44.5	44.5	120,400	120,400
1950	14,000	14,000	44.1	44.1	130,400	130,300
1960	14,300	14,300	41.9	41.9	139,800	138,600
1970	16,400	16,400	41.3	41.3	165,100	156,500
1980	19,000	18,300	40.8	39.4	193,700	162,500
1990	21,500	16,700	40.6	31.6	223,500	167,900
2000	24,300	18,300	40.7	30.6	258,300	186,300
<b>Median in Lowest Household Earnings Quintile</b>						
1940	7,400	7,400	72.7	72.7	60,200	60,200
1950	8,200	8,200	69.4	69.4	66,200	66,100
1960	8,500	8,500	65.2	65.2	71,100	70,800
1970	9,500	9,500	65.8	65.8	78,600	76,900
1980	10,200	9,800	69.9	66.3	85,100	73,700
1990	11,500	9,000	70.8	54.7	100,000	75,000
2000	13,000	9,800	69.7	52.2	119,100	87,200
<b>Median in Middle Household Earnings Quintile</b>						
1940	14,900	14,900	42.9	42.9	138,800	138,800
1950	15,300	15,300	43.0	43.0	148,200	148,100
1960	15,500	15,500	41.0	41.0	160,800	159,500
1970	17,700	17,700	40.5	40.5	187,100	178,400
1980	20,500	19,700	39.8	38.7	223,500	187,200
1990	23,300	18,100	39.5	30.8	264,200	199,800
2000	26,400	19,900	39.6	29.8	302,500	217,300

Continued

fits will rise faster than scheduled first-year benefits. For example, median scheduled lifetime benefits are projected to be 86 percent higher for retirees born in the 1990s than for those born in the 1940s (\$223,500 versus \$120,400, in 2004 dollars), whereas scheduled first-year benefits are projected to be 62 percent higher (\$21,500 compared with \$13,300).

Second, cohorts who retire before the trust funds are exhausted will collect the full amount of their scheduled

first-year benefits, but some will still be receiving benefits when the trust funds become exhausted. As a result, their trust-fund-financed lifetime benefits will be lower than scheduled lifetime benefits (see the last two columns of Table 2-1). However, even trust-fund-financed lifetime benefits will increase for every cohort. For example, retirees born in the 1990s are projected to receive median trust-fund-financed lifetime benefits of \$167,900, compared with \$120,400 for those born in the 1940s.

**Table 2-1.****Continued**

10-Year Birth Cohort Beginning in Specified Year	First-Year Benefits (2004 dollars)		First-Year Replacement Rate (Percent) <sup>a</sup>		Present Value of Lifetime Benefits (2004 dollars) <sup>b</sup>	
	Scheduled	Trust-Fund-Financed	Scheduled	Trust-Fund-Financed	Scheduled	Trust-Fund-Financed
<b>Median in Highest Household Earnings Quintile</b>						
1940	19,900	19,900	28.5	28.5	209,200	209,200
1950	21,600	21,600	27.8	27.8	235,200	235,200
1960	22,400	22,400	26.3	26.3	250,000	248,300
1970	25,200	25,200	25.4	25.3	295,900	279,100
1980	29,500	28,400	22.9	22.0	352,200	293,800
1990	33,200	25,900	22.6	17.6	407,400	306,200
2000	37,600	28,400	22.8	17.2	465,800	339,800

Source: Congressional Budget Office.

Notes: All values are net of income taxes paid on benefits and credited to the Social Security trust funds. First-year benefits and replacement rates are simulated as if all workers claimed benefits at age 65. In the trust-fund-financed measures, all beneficiaries are subject to an across-the-board cut in benefits each year so that total annual benefits equal total annual revenues once the trust funds have been exhausted.

The overall median values differ from the median values in the middle quintile because individuals are sorted into quintiles on the basis of household earnings, not benefit levels.

- a. First-year benefits as a percentage of average career earnings.  
 b. The present value of all retired-worker benefits received.

## Total Lifetime Payroll Taxes and OASDI Benefits

For simplicity, the three measures discussed above include only retirement benefits. A more comprehensive perspective comes from considering the present value of total Social Security payroll taxes paid over a lifetime and the present value of total Social Security benefits—Disability Insurance payments as well as Old-Age and Survivors Insurance payments—received by individuals over a lifetime.

Beneficiaries prefer higher benefits, of course, but they also prefer more certainty. When projections of benefits are being considered, both the level of and the uncertainty about those benefits are important. Uncertainty carries a real economic cost because it increases the chance that workers will prepare for the future inappropriately. As a basis for understanding how legislative proposals affect uncertainty, this report presents ranges of uncertainty for lifetime measures of taxes and benefits.

Figure 2-4 shows the 80 percent range of uncertainty for the projected lifetime payroll taxes that individuals will pay under current law, broken down by 10-year birth cohort and quintile of lifetime household earnings. Those taxes comprise all Social Security payroll taxes levied on individual earnings (both the employer and employee shares). Individual lifetime earnings depend on the annual level and number of years of earnings.<sup>7</sup> Not surprisingly, total taxes are higher for people with greater earnings. The uncertainty range of CBO's projections for those people is larger as well. In addition, as earnings increase for later cohorts, real lifetime payroll taxes also increase.

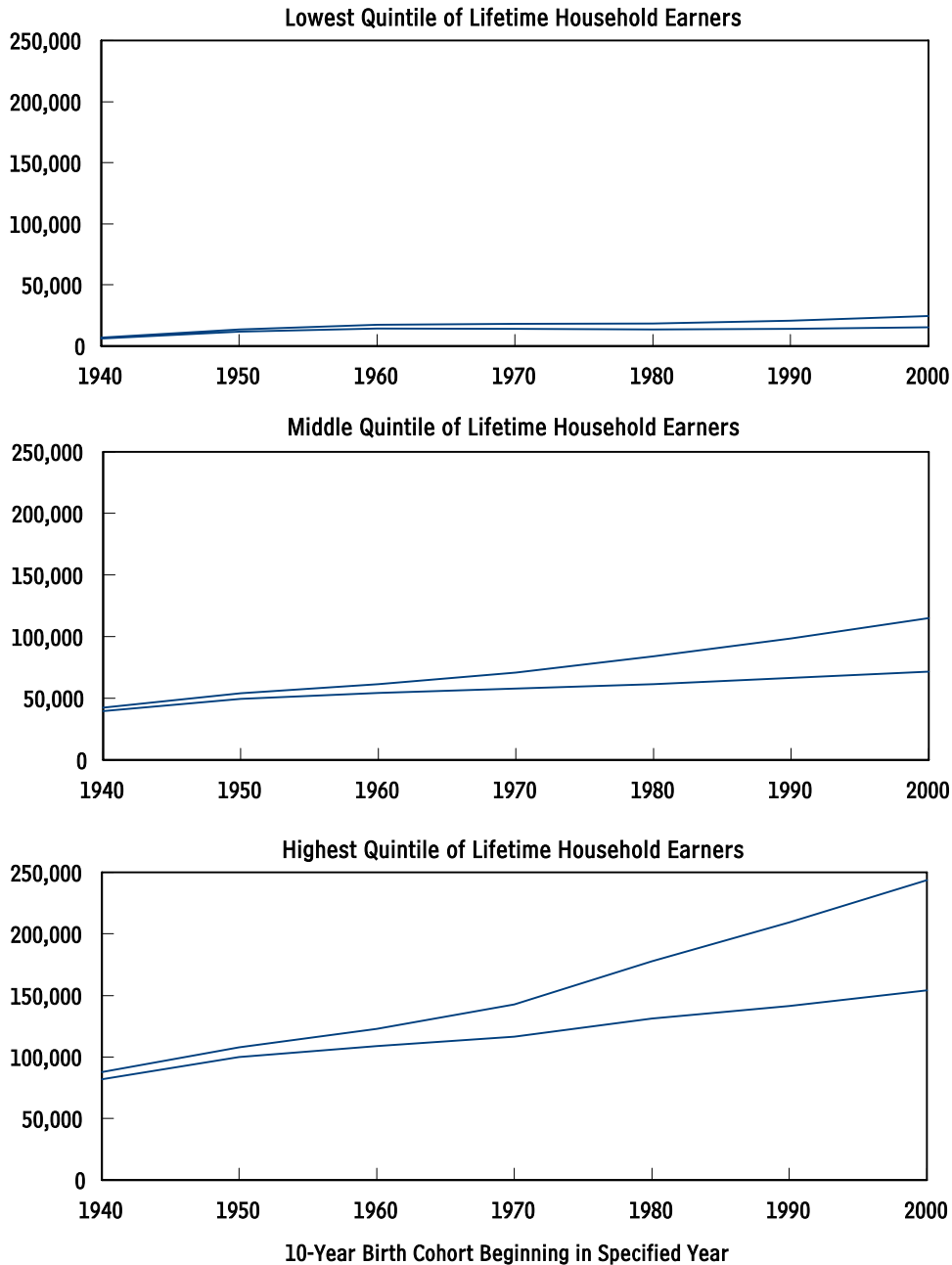
Figure 2-5 presents equivalent projections for average lifetime benefits, which comprise all benefits received by individuals within a birth cohort (including retired-

7. Low lifetime earnings may reflect low annual earnings or a low number of years of paid work. For example, about 20 percent of people with low lifetime household earnings worked 10 or fewer years during their careers.

**Figure 2-4.**

**Potential Range of Lifetime Payroll Taxes, by Birth Cohort and Earnings Level**

(2004 dollars)



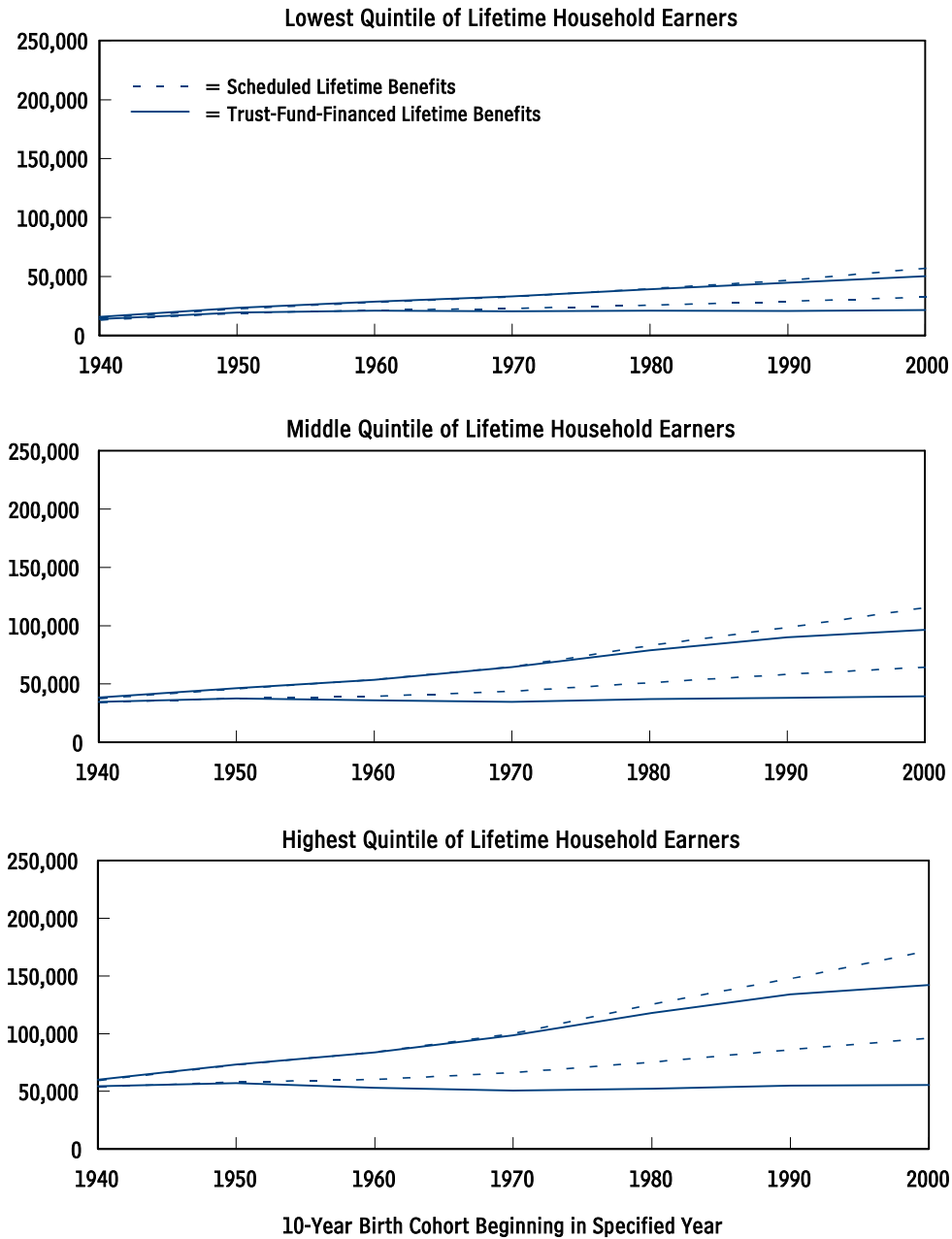
Source: Congressional Budget Office.

Note: Each pair of lines indicates the boundaries of the 80 percent range of uncertainty for projected lifetime payroll taxes (adjusted for inflation and discounted to age 60). Those results are based on 500 simulations from CBO's long-term model, including only simulated individuals who live to at least age 45. Taxes include both the employer and employee shares of Social Security payroll taxes.

**Figure 2-5.**

**Potential Range of Lifetime OASDI Benefits, by Birth Cohort and Earnings Level**

(2004 dollars)



Source: Congressional Budget Office.

Notes: Each pair of lines indicates the boundaries of the 80 percent range of uncertainty for projected lifetime OASDI benefits (including retired-worker, disabled-worker, spousal, and survivor benefits) net of income taxes paid on benefits and credited to the Social Security trust funds. The results are based on 500 simulations from CBO's long-term model, including only simulated individuals who live to at least age 45. Values are adjusted for inflation and discounted to age 60.

In CBO's projections, trust-fund-financed benefits fall below scheduled benefits beginning in 2053, when the trust funds are exhausted. Trust-fund-financed benefits are projected by assuming an across-the-board cut in benefits each year such that total annual benefits are limited to total annual revenues.

OASDI = Old-Age, Survivors, and Disability Insurance.

worker, disabled-worker, spousal, and survivor benefits) minus income taxes paid on those benefits and credited to the Social Security trust funds. Individual lifetime benefits depend on the age at which people first claim benefits, their marital history, and how long they live. Those benefits also depend on earnings—people with low lifetime household earnings have lower lifetime benefits than people with higher earnings. Figure 2-5 shows lifetime benefits under the scenarios for both scheduled and trust-fund-financed benefits. Although trust-fund-financed benefits are lower than scheduled benefits, they still increase over time.

Finally, Figure 2-6 presents the ratio of those two measures: the present value of total net benefits received over a lifetime divided by the present value of total payroll taxes paid over a lifetime. For example, a benefit-to-tax ratio of 150 percent means that benefits are 50 percent greater than taxes. The dotted lines in Figure 2-6 show the ratio of scheduled benefits to payroll taxes. That ratio is fairly stable for average and high earners but grows for the lowest quintile in later years. (For the early cohorts, the lifetime benefit-to-tax ratio falls as the normal retirement age rises.) However, scheduled taxes are not sufficient to pay for scheduled benefits, so those ratios may be unrealistically high.

An alternative that accounts for the imbalance between projected Social Security revenues and outlays is the ratio of trust-fund-financed benefits to payroll taxes, shown with solid lines in Figure 2-6. Because trust-fund-financed benefits decline after the trust funds are exhausted, that ratio also declines in later years.

In Social Security, as in any pay-as-you-go social insurance system, earlier generations of participants received very high benefits relative to the taxes they paid. As a result of that windfall, later generations will receive total benefits that are lower, on average, than the total taxes they paid. That low benefit-to-tax ratio is not an indication of inefficiency in the system; it merely reflects a transfer from current and future beneficiaries to earlier generations.

The benefit-to-tax ratio is higher for workers with lower lifetime earnings than for those with higher earnings. That outcome results in part from Social Security's progressive benefit formula. Low lifetime earners are also more likely to include recipients of disabled-worker,

spousal, or survivor benefits—who receive benefits in excess of the payroll taxes they pay, reflecting the insurance nature of the Social Security system. (The effect of disabled-worker benefits on the benefit-to-tax ratio can be seen by examining ratios for DI and OASI workers separately. Figures showing that information are available at CBO's Web site, [www.cbo.gov](http://www.cbo.gov).)

## Conclusions

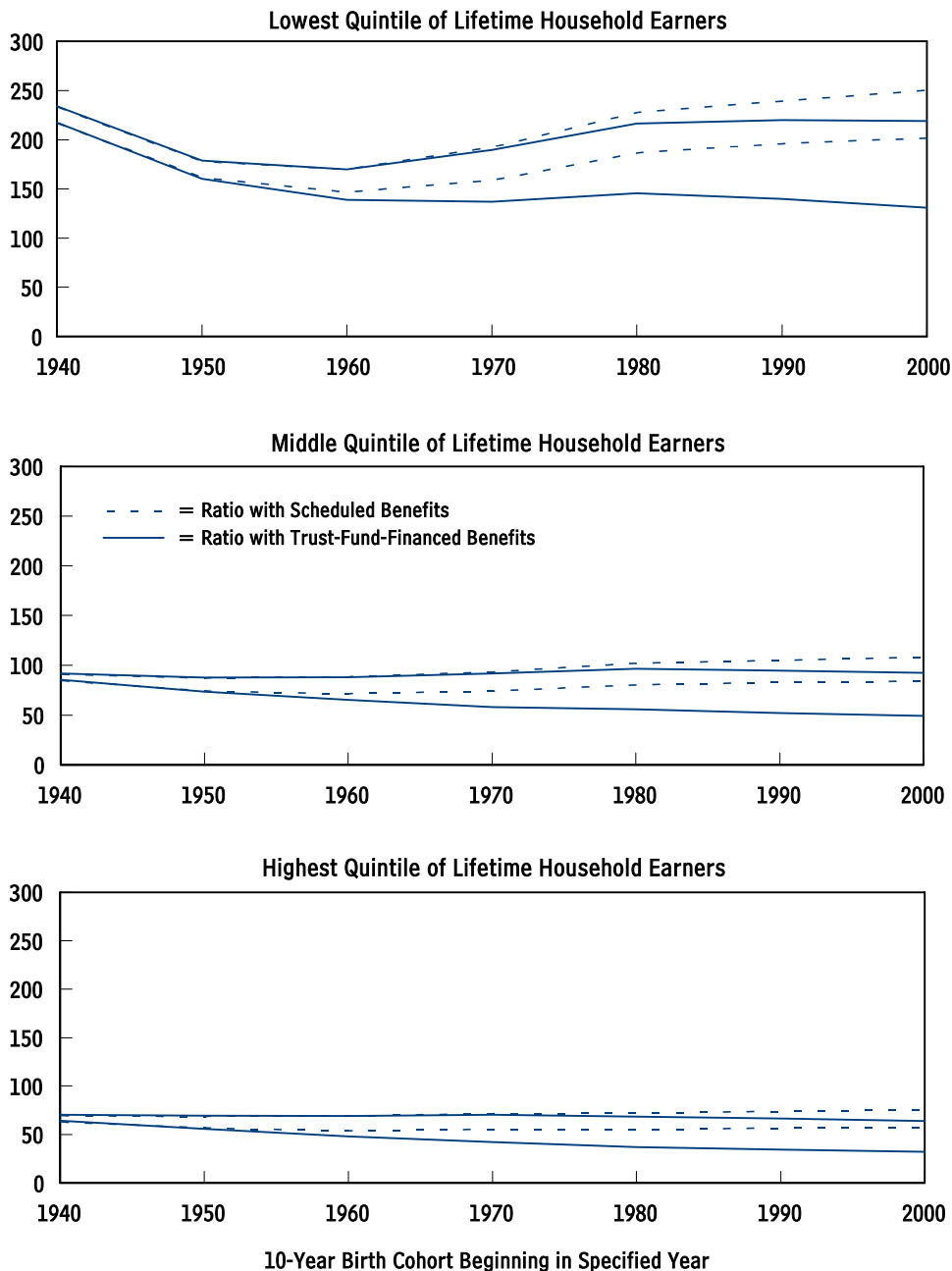
Those different measures of the benefits received and taxes paid, broken down by age and income group, lead to different insights about the impact of Social Security under current law.

- High earners receive higher benefits than low earners do, and future generations will receive larger benefits than current beneficiaries do, even after adjustment for inflation and even if benefits cannot be paid as scheduled once the trust funds are exhausted.
- Conversely, low earners have a larger percentage of their earnings replaced by Social Security than high earners do, and current beneficiaries have a larger percentage of their earnings replaced than future generations will.
- Future beneficiaries will not only receive higher annual benefits than today's beneficiaries but will live longer, on average; thus, they will receive greater total benefits over their lifetime.
- The payroll tax is a constant percentage of taxable earnings, which means that because taxable earnings are projected to rise over time (even after adjustment for inflation), future generations will pay higher taxes.
- For workers with low lifetime household earnings, total Social Security benefits received over a lifetime are higher, on average, than dedicated taxes paid over a lifetime. For workers with average and above-average earnings, the reverse is true. If benefits were reduced across the board because of the projected shortfall in revenues, the general pattern of taxes paid relative to benefits received would remain similar for each income group.

**Figure 2-6.**

**Potential Range of the Ratio of Lifetime OASDI Benefits to Lifetime Payroll Taxes, by Birth Cohort and Earnings Level**

(Percent)



Source: Congressional Budget Office.

Notes: Each pair of lines indicates the boundaries of the 80 percent range of uncertainty for projected ratios of lifetime payroll taxes (as shown in Figure 2-4) to lifetime OASDI benefits (as shown in Figure 2-5). Those results are based on 500 simulations from CBO's long-term model, including only simulated individuals who live to at least age 45.

In CBO's projections, trust-fund-financed benefits fall below scheduled benefits beginning in 2053, when the trust funds are exhausted. Trust-fund-financed benefits are projected by assuming an across-the-board cut in benefits each year such that total annual benefits are limited to total annual revenues.

OASDI = Old-Age, Survivors, and Disability Insurance.





## Assumptions and Methods Used in This Analysis

**U**ncertainty about future Social Security taxes and benefits is an important economic consideration for beneficiaries and policymakers. This chapter describes the methods that the Congressional Budget Office uses to produce long-term projections for Social Security and the demographic, economic, and disability assumptions underlying those projections. It also discusses how CBO creates probability distributions that illustrate the uncertainty of the projections.

### CBO's Approach to Making Social Security Projections

CBO's projections rely on simulations of a representative sample of Social Security participants.<sup>1</sup> All of the components of the simulations are based on the actual experience of workers and beneficiaries, as measured in survey data and data from the Social Security program. In CBO's modeling, a simulated individual is born in the United States (as either a boy or a girl) or immigrates to the United States at a certain age; obtains a particular level of education; may marry a specific person in the sample, divorce, or be widowed; may work in some years, with earnings that vary from year to year; may become disabled and claim Disability Insurance benefits; and may claim Old-Age and Survivors Insurance benefits. The process ends with the death of the simulated individual, which may occur in any year (although the risk of mortality increases with age). In each projection, hundreds of thousands of simulated individuals go through those processes, with each individual having a unique "lifetime." For example, a simulated man may in 2010 be 27, single, working full time, and earning \$33,210. If he does not

die, he will be 28 in 2011, but he may get married, switch to working part time, and experience a decline in earnings to \$27,013. For the purposes of the projections, each individual in the sample represents 1,000 people.

As in real life, many outcomes are determined partly by an individual's characteristics and partly by chance. The probability that a person will marry, for instance, has been observed to be correlated with age, sex, birth year, current marital status, and education. (For example, the probability of getting married is much higher for a single 25-year-old woman than for a 59-year-old widow.) Once the probability of marriage is estimated for an individual, a random number between zero and one is drawn. If that number is lower than the computed probability, the person is projected to get married. The same process is used to project work activity, disability status, and many other life events.

The detail of the modeling requires assumptions about individual decisions, but the techniques are calibrated so that the characteristics of the sample each year match the characteristics projected for the U.S. economy and population as a whole. The modeling is also designed so that lifetime patterns of work, earnings, and other individual characteristics in the sample match those observed in actual data.

The projection methods recognize that during the simulated individuals' working lives, they earn money and pay taxes on their earnings, and if they survive long enough, they claim benefits based on those earnings. Thus, there is a direct link between Social Security revenues—which are closely tied to economywide earnings—and benefits. To obtain estimates of aggregate values, such as total Social Security outlays and revenues, the data from the hundreds of thousands of simulated individuals in the sample are aggregated and then multiplied by 1,000. The

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1. For more information, see Josh O'Harra, John Sabelhaus, and Michael Simpson, *Overview of the Congressional Budget Office Long-Term (CBOLT) Policy Simulation Model*, Technical Paper 2004-01 (January 2004), available at [www.cbo.gov/Tech.cfm](http://www.cbo.gov/Tech.cfm).

projection methods also link spouses, resulting in projections of earnings on a household basis, which allows spousal benefits to be computed directly.

Such microsimulation makes it possible to analyze in detail proposed changes to Social Security's current tax rates or benefit formula when those changes would vary depending on the age, earnings level, and marital status of workers and beneficiaries. Using a sample that represents the full diversity of participants in the Social Security system allows CBO to compute separately the effects of those changes on each individual in the sample, as well as any responses he or she might have, such as altered work patterns.

### Demographic Assumptions

CBO adopts the assumptions of the Social Security trustees to project overall demographic trends. Assumptions are required for three main demographic variables: the fertility rate, the rate of decline in mortality, and the level of immigration.

As the trustees do in their 2004 report, CBO assumes that in the long run, the total fertility rate will equal 1.95 children per woman, mortality rates will decline by 0.71 percent per year, and annual net immigration will total 900,000 people.<sup>2</sup> CBO's projections of marriage and divorce rates are also consistent with those used by the trustees. In addition, CBO's projection method requires that mortality and marital status be distributed among the simulated individuals in the sample.

Individual mortality rates are set to reflect the correlation with earnings that is observed in the population (known as "differential mortality"). On average, people with higher household earnings live longer. Taking that correlation into account is especially important because of the progressivity of Social Security. The total amount of money that beneficiaries receive over their lifetime depends on both their earnings and the number of years they live, so ignoring differential mortality would bias measures of individual outcomes.

2. See Social Security Administration, *The 2004 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds* (March 23, 2004), Section V.A, pp. 71-82.

CBO simulates the annual marital history of each individual. In the case of a first marriage or remarriage, spouses are also matched.<sup>3</sup> Properly assigning those matches is important because spousal and survivor benefits depend on the earnings histories of both spouses (or former spouses, in the case of divorced or widowed people).

### Economic Assumptions

The four key economic variables required for modeling Social Security's finances are the rate of real earnings growth, the real interest rate, the inflation rate, and the unemployment rate. To a certain extent, the economic environment (and thus those variables) will depend on government policy, including that for Social Security. In principle, CBO's Social Security projections could include the potential for macroeconomic-feedback effects. For example, large Social Security deficits could lead to higher net government debt, which in turn could lead to lower national savings and higher interest rates. However, under current law, those linkages are conjectural, for several reasons. First, policymakers might react to large Social Security deficits by running smaller deficits (or larger surpluses) in the rest of the budget, offsetting the effect of Social Security deficits on net government debt. Second, forward-looking households might react to changes in government debt by altering the level of their private savings. Estimates of that effect would determine the link between higher government debt and lower national savings. Such long-term effects are important, but they are particularly difficult to estimate.<sup>4</sup> For simplicity, CBO did not integrate any macroeconomic feedback in the projections in this report. Instead, it set its assumptions for the four economic variables equal to or consistent with the values assumed at the end of CBO's 10-year projection horizon.<sup>5</sup>

3. See Josh O'Harra and John Sabelhaus, *Projecting Longitudinal Marriage Patterns for Long-Run Policy Analysis*, Technical Paper 2002-2 (October 2002), and Kevin Perese, *Mate Matching for Microsimulation Models*, Technical Paper 2002-3 (November 2002), both available at [www.cbo.gov/Tech.cfm](http://www.cbo.gov/Tech.cfm).

4. For a discussion of the economic effects of growing federal debt, see Congressional Budget Office, *The Long-Term Budget Outlook* (December 2003), pp. 12-18.

5. See Congressional Budget Office, *The Budget and Economic Outlook: Fiscal Years 2005 to 2014* (January 2004), Chapter 2.

For Social Security projections, the two most important economic variables are the rate of earnings growth and the interest rate on Treasury bonds held in the trust funds. CBO assumes that real earnings will grow by an average of 1.27 percent annually. (That assumption is determined primarily by an assumption about the rate of productivity growth.)<sup>6</sup> CBO also assumes a real interest rate of 3.3 percent a year, the projected real rate on 10-year Treasury bonds. That assumed interest rate does not affect projections of annual Social Security outlays or dedicated revenues, but it is used to compute the interest earned on trust fund holdings. It also serves as the discount rate used in present-value calculations. In estimates of present value, the higher the discount rate, the less weight that large future Social Security deficits receive in the calculations, and therefore the smaller the long-term summarized deficit.

In addition, CBO assumes that annual inflation—as measured by the growth in the consumer price index for urban wage earners and clerical workers, or CPI-W—will be 2.2 percent and that the unemployment rate will be 5.2 percent.

### Disability Assumptions

The last two assumptions required for projections involve rates of disability incidence (the percentage of workers eligible for DI benefits who become entitled to them in a given year) and disability termination (the percentage of DI beneficiaries who leave the rolls because of death or recovery). The cost of the DI program depends on the number of people who qualify for benefits. (Disability rates also affect the level of total OASI benefits, because once disabled beneficiaries reach the normal retirement age, they receive retirement benefits equivalent to the disability benefits they received previously.) Disability rates are difficult to project with any certainty since they are determined not only by the incidence of specific medical impairments but also by program standards, social trends, and economic conditions.

CBO uses the same assumptions about future trends in disability incidence and termination as the Social Security

trustees. Specifically, 5.8 out of every 1,000 eligible workers are assumed to become disabled each year over the long run. The vast majority of DI terminations result either from the automatic transition to retirement benefits at the normal retirement age or from death. Mortality rates for DI beneficiaries are projected to remain about 10 times higher than for the population as a whole but to decline at the same rate as overall mortality.

### Revenue Projections

CBO projects payroll tax revenues by directly summing the taxes paid by each simulated worker. For every individual between the ages of 16 and 90, the projections indicate whether the person works and, if so, whether part time or full time and at what level of earnings.<sup>7</sup>

The probability that a person will be in the labor force is estimated on the basis of his or her age, sex, marital status, beneficiary status, and past work history. However, not everyone who is in the labor force finds a job; on the basis of the assumption about the overall unemployment rate, some of those people are projected to be unemployed.

Next, each worker is assigned a level of earnings. Earnings are based in part on age and education, but they vary even within groups of people with similar demographic characteristics. For example, two 47-year-old high-school-educated women are unlikely to earn the same amount of money. The best predictor of someone's earnings is his or her earnings in the previous year. Therefore, each simulated individual is assigned a lifetime earnings level that—along with age, education, hours worked, and some random annual variation—determines earnings in each year. In addition, all individual earnings are adjusted annually on the basis of projected growth in average earnings nationwide.

That process results in a representative annual earnings distribution for the economy. Using payroll tax rates and the projected taxable maximum, CBO can then calculate the payroll taxes paid by each individual. Total payroll tax revenues are simply the sum of those individual taxes.

6. For a discussion of the components of earnings growth, see Social Security Administration, *The 2004 Annual Report*, pp. 85-89. CBO does not make a specific assumption about the growth of labor productivity but instead makes an assumption about total factor productivity. Its economic model then computes the effective growth rate of labor productivity.

7. For details, see Amy Rehder Harris and John Sabelhaus, *Projecting Longitudinal Earnings Patterns for Long-Run Policy Analysis*, Technical Paper 2003-02 (April 2003); and O'Harra, Sabelhaus, and Simpson, *Overview of the Congressional Budget Office Long-Term (CBOLT) Policy Simulation Model*, Section 5.4, both available at [www.cbo.gov/Tech.cfm](http://www.cbo.gov/Tech.cfm).

**Box 3-1.****Projecting the Taxation of Benefits Under Different Assumptions About Future Income Tax Rates**

All of the projections presented in this study are made under the assumption that the laws governing Social Security will not change. Such a baseline approach means that future analyses of proposed changes to the program can be compared with these projections to clearly identify the effects of the proposals. However, future revenues from income taxes paid on Social Security benefits depend on future income tax law, which is logically distinct from Social Security law and could be amended many times in coming years.

Most parameters of the income tax system—such as the level of personal exemptions, standard deductions, and tax brackets—are indexed to inflation. Earnings generally grow faster than inflation, so if no changes are made to tax law, average tax rates will automatically increase because of the interaction between economic growth and the progressive structure of the income tax.<sup>1</sup> Over the past half century, total federal revenues have ranged from 16.1 percent to 20.8 percent of gross domestic product (GDP). In the absence of any changes to federal tax law, revenues will rise to 24.7 percent of GDP in 2050 and continue growing thereafter, the Congressional Budget Office projects.

1. See Congressional Budget Office, *The Long-Term Budget Outlook* (December 2003), Chapter 5.

Such high rates of taxation are without historical precedent. Thus, the projections in this study are based on a scenario in which the average rate at which income is taxed remains constant over the projection period—which is equivalent to assuming that the income tax system is indexed to the growth of earnings beginning in 2015. The Social Security trustees use a similar assumption in their projections.

The income tax system treats income from Social Security benefits differently than it treats other income. Single filers must pay taxes on Social Security benefits if the sum of their non-Social Security income and half of their benefits exceeds \$25,000. The threshold for joint filers is \$32,000. Under current law, those thresholds remain fixed, with no adjustment for earnings growth or inflation. Therefore, even under the assumption of constant average income tax rates, the taxation of benefits will increase. Specifically, revenues from the taxation of Social Security benefits are projected to grow under the current-law scenario from 3.4 percent of benefits last year to 9.4 percent in 2050 and 11 percent in 2090. Under the assumption of constant income tax rates, by comparison, those revenues rise to 5.7 percent in 2020 and then stabilize at 6.6 percent by 2070 (see the figure at right).

Assuming growth in the taxation of benefits consistent with current income tax law would not signifi-

Estimating the income taxes that higher-income recipients pay on their Social Security benefits is more complicated than estimating payroll taxes because the former depends in part on nonwage income and itemized deductions. CBO imputes that information for each simulated individual on the basis of the relationships between nonwage income, benefits, and wages observed in recent tax data. Those relationships are assumed to hold true in the future, and individual income taxes are assigned under the assumption that average income tax rates will remain

relatively constant. (That assumption differs from current income tax law; for details, see Box 3-1.)

**Benefit Projections**

CBO's simulations of individual work histories serve as the basis for projecting Social Security benefits. The last piece of information needed to compute individual benefits is the age at which a worker claims benefits. In the simulations, workers begin receiving benefits either when they successfully apply for DI benefits or when they choose to claim retirement benefits.

**Box 3-1.****Continued**

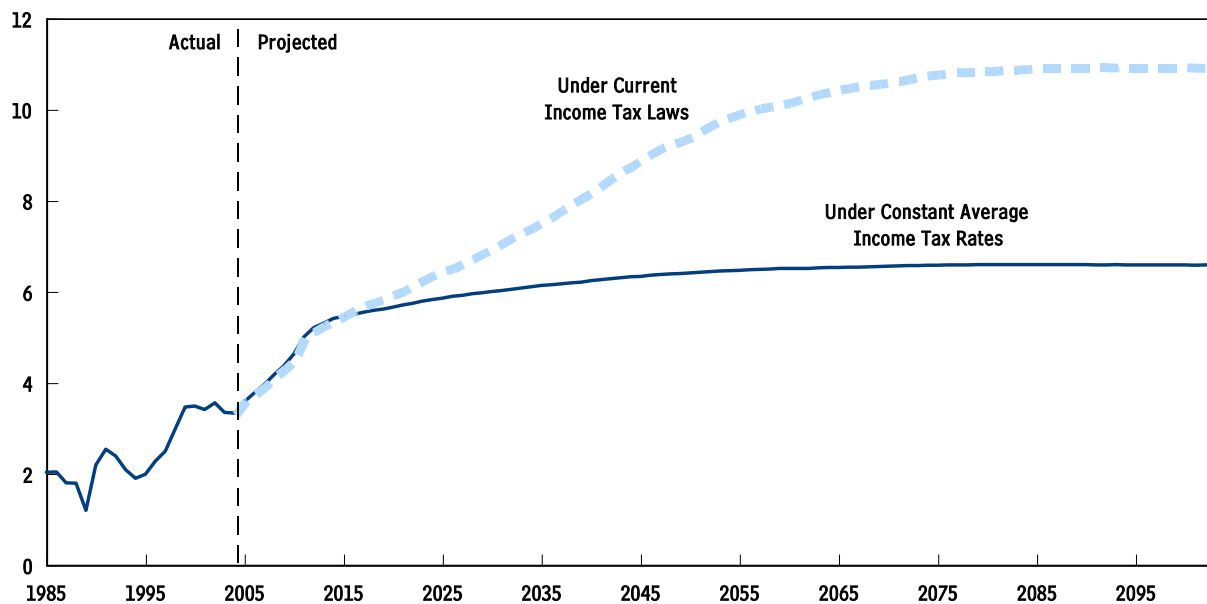
cantly alter the projected fiscal condition of the Social Security system. Revenues in 2100 would equal 5.1 percent of GDP under that assumption, compared with 4.8 percent of GDP assuming constant tax rates. The balance in 2100 would amount to -1.7 percent of GDP instead of -2.0 percent.

Although assuming that the income tax system is effectively indexed to the growth of earnings has little impact on the projected fiscal outlook for Social

Security, it does affect the interpretation of any legislation that might alter the income tax system. When projections are based on current law, it is straightforward for estimators to simulate the changes that legislation would make, run new projections, and interpret any difference between the two projections as the fiscal implications of the legislation. But such changes may have a very different impact—or even no impact—on projections in which income taxes are indexed to earnings growth.

### Revenues from Taxation of Social Security Benefits, 1985 to 2103

(Percentage of total benefits)



Source: Congressional Budget Office.

CBO assigns individuals different probabilities of becoming disabled, depending on their earnings. Historical data show that workers with lower earnings are more likely to become disabled. For example, 55-year-old men in the lowest earnings decile have eight times the probability of becoming disabled as those in the highest earnings decile. If the correlation between earnings and disability rates were ignored, total projected outlays for DI benefits would be too high because there would be too many high-earning beneficiaries, who would receive relatively large benefit amounts. To avoid such bias, CBO adjusts

an individual's rate of disability incidence according to the earnings decile that the person was in during the previous year.

The transition of DI beneficiaries to retirement status at the normal retirement age occurs automatically in CBO's modeling. Other departures from the DI rolls, whether due to death or to recovery, are simulated in the same way as disability incidence (although death and recovery rates for the disabled are set only by age and sex, not by earnings level).

Because the entire earnings history of each individual (as well as that of any current spouse or past spouses) is known, calculating disability benefit levels is straightforward.<sup>8</sup> Benefits for people remaining on the rolls are then increased at the assumed rate of inflation in future years, and those benefits are summed to obtain projections of total disabled-worker benefits.

Eligible workers may choose to claim Social Security retirement benefits beginning at age 62. Although many people apply for benefits when they stop working, others cease to work years before claiming benefits, and others continue working even after they start claiming benefits.<sup>9</sup> The actual pattern of claiming is difficult to model. One approach is to compute the most advantageous time to claim benefits given a worker's earnings and life expectancy. The observed pattern, however, does not agree with such theoretical projections; in particular, more workers apply for benefits at 62 and 65 than is predicted. CBO's projections are calibrated to the observed data. They are also adjusted to take into account the scheduled increase in the normal retirement age that is under way, which will induce workers to claim benefits somewhat later, on average.

The benefits that a retired worker initially receives are based on his or her birth year, earnings history, and age when claiming benefits. In future years, those benefits increase with inflation. In cases in which recipients continue to work, the additional earnings may also result in higher benefits.

The benefits that married, widowed, and many divorced beneficiaries receive depend on the combination of the worker's and the spouse's earnings histories. Spousal benefits (including those paid to "dual" beneficiaries, who receive benefits based on both their and their spouse's earnings histories) can be computed directly. Benefits paid to other dependents, such as children, are estimated on an aggregate basis, using methodology developed by the Social Security Administration. They represent a small portion of total benefits: about 5 percent in 2003.

In addition to benefits, CBO projects administrative expenses for the Social Security program. Those costs are computed as a percentage of total benefit outlays, on the basis of data from the Social Security Administration.

## The Uncertainty of Long-Term Social Security Projections

In general, the farther ahead a projection looks, the less certain it is. In the case of outlays for Social Security, however, most of the increase relative to gross domestic product over time will be driven by foreseeable demographic trends. Nearly everyone who will be paying taxes or receiving benefits in the next 25 years has already been born, so it is quite certain that outlays will rise substantially relative to GDP over the next few decades. Nevertheless, uncertainty exists about the future economic, demographic, and programmatic assumptions discussed above. Fully understanding the projections requires looking at both the most likely outcome and the probable range of outcomes.<sup>10</sup>

The values of the economic and demographic factors underlying the projections will vary from year to year in the future, as they have in the past, with some ending up higher than expected and others lower. Thus, the pattern of those values—and their net effect on Social Security's finances—will differ from year to year. Standard statistical techniques allow economists to quantify future uncertainty on the basis of historical data. CBO first computes probability distributions for its projections of fertility rates, earnings growth, and other major assumptions by looking at how those factors have varied historically. It then randomly picks annual values for each factor from the estimated distributions to create a set of input values that are random but consistent with historical patterns. Just as it does with its basic assumptions, it can use that set of values to compute the effects on Social Security. Repeating that process hundreds of times with different sets of random (but historically plausible) input values

8. For a discussion of how those benefits are computed, see Congressional Budget Office, *Social Security: A Primer* (September 2001), pp. 19-25.

9. Virtually all eligible workers apply for retirement benefits by age 70, because they would forgo some benefits if they waited longer.

10. For more discussion of the uncertainty of Social Security projections, see Congressional Budget Office, *Uncertainty in Social Security's Long-Term Finances: A Stochastic Analysis* (December 2001), pp. 2-4; and 1999 Technical Panel on Assumptions and Methods, *Report to the Social Security Advisory Board* (November 1999), pp. 70-78, available at [www.ssab.gov/Rpt99.pdf](http://www.ssab.gov/Rpt99.pdf).

allows CBO to produce probability distributions for various measures of Social Security's finances.<sup>11</sup>

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11. That process is explained in more detail in Congressional Budget Office, *Uncertainty in Social Security's Long-Term Finances*, Chapters 4 and 5. In addition, pp. 9-10 of that report discuss the types of uncertainty not captured by CBO's methodology. Some equations and data have been updated since that report (current data are available on request). The same methodology was used in the Social Security trustees' 2004 report to produce Appendix E.

Displaying an entire probability distribution is impractical, which is why figures and tables in this study show the 10th and 90th percentiles surrounding the expected estimate.<sup>12</sup> By definition, there is a 10 percent chance that the outcome will be below the 10th percentile, a 10 percent chance that it will be above the 90th percentile, and an 80 percent chance that it will fall between those levels.

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12. Further detail about uncertainty distributions is available on request.





## A

## Differences from the Trustees' 2004 Report

**B**oth the Congressional Budget Office (CBO) and the Social Security trustees conclude that under current law, the program's scheduled outlays will exceed scheduled revenues over the next 50 years and that annual Social Security deficits will be large and growing over the long term.<sup>1</sup> CBO projects that by 2080 (the last year for which the trustees have published projections), Social Security outlays will equal 6.7 percent of gross domestic product (GDP) and revenues will equal 4.9 percent. The Social Security trustees project that in that year, outlays will equal 6.6 percent of GDP and revenues 4.6 percent. Those numbers differ slightly, but they point to the same conclusion: that under current law, the program will generate a sustained and significant demand for budgetary resources.

### Annual Revenues and Outlays Relative to GDP

The trustees project that the Social Security deficit will equal 2.1 percent of GDP in 2080, whereas CBO projects a deficit of 1.8 percent. That disparity results from different economic assumptions (shown in Table A-1) and different modeling techniques. As explained in Chapter 3, although CBO employs the same demographic assumptions as the trustees, its long-term economic assumptions are consistent with the ones used in its 10-year projections.<sup>2</sup> Some of those differences in assumptions improve the financial outlook for Social

**Table A-1.**

### CBO's and the Social Security Trustees' Long-Term Economic Assumptions

(Percent)

	CBO	Social Security Trustees
Real Earnings Growth	1.3	1.1
Real Interest Rate	3.3	3.0
Inflation	2.2	2.8
Unemployment Rate	5.2	5.5

Source: Congressional Budget Office.

Security and others worsen it. CBO assumes slightly higher average productivity growth, resulting in lower annual projected deficits. The assumption about productivity growth also leads CBO to project a higher level of outlays in real dollars. In addition, CBO assumes a lower rate of inflation than the trustees do, which results in higher outlays for the Social Security system relative to taxable payroll.<sup>3</sup>

A final difference in economic assumptions involves the share of compensation that workers will receive in the form of fringe benefits. Historically, nontaxable fringe benefits have made up a growing share of compensation and wages a declining share. Consequently, taxable payroll has shrunk as a percentage of GDP. Both CBO and the Social Security trustees assume that the trend will continue, but the trustees estimate that it will occur at a faster pace. Thus, they project that taxable payroll will be

1. See Social Security Administration, *The 2004 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds* (March 23, 2004), for the trustees' projections.

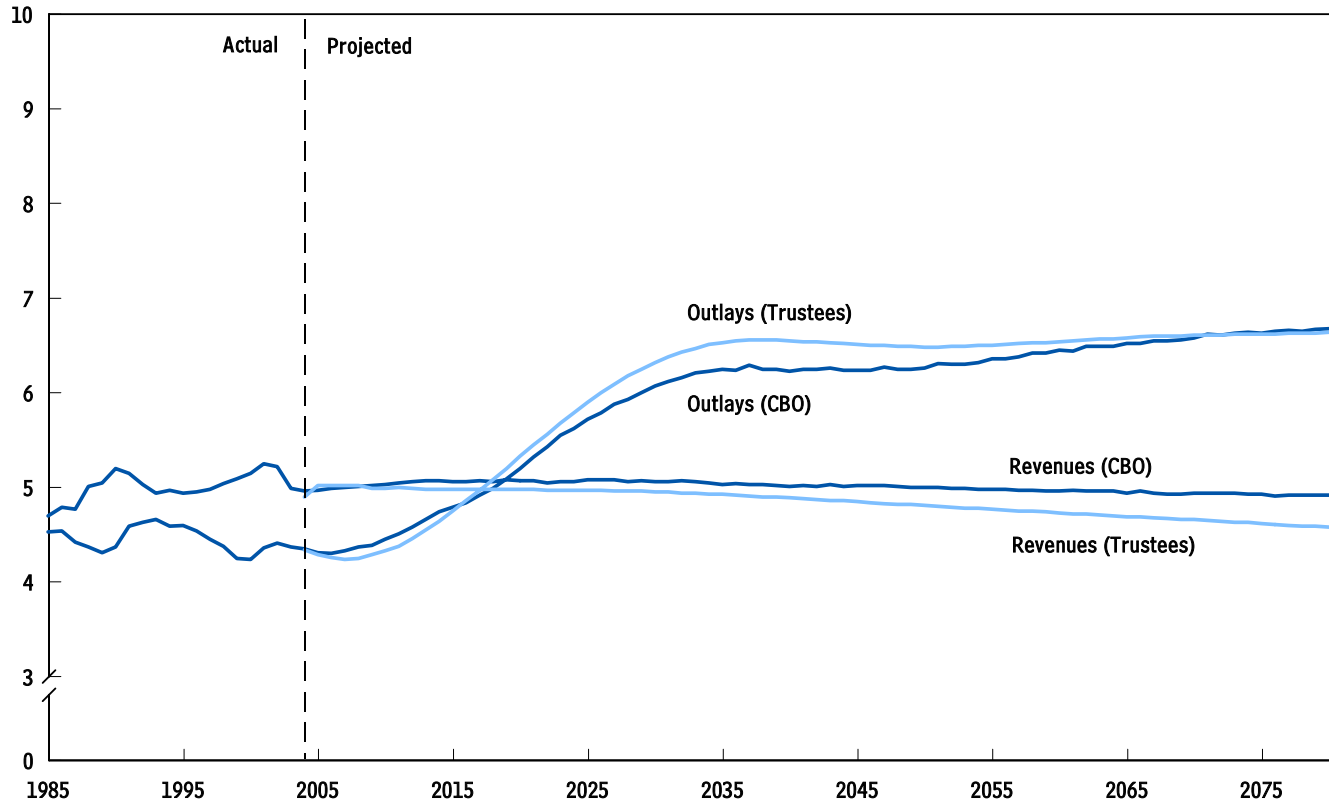
2. See Congressional Budget Office, *The Budget and Economic Outlook: Fiscal Years 2005 to 2014* (January 2004), Chapter 2.

3. Inflation increases earnings, and thus tax revenues, immediately. Benefit payments, however, are based on past inflation, so they are increased by inflation only after a delay. That lag makes higher inflation slightly advantageous for the system's finances and vice versa.

**Figure A-1.**

## CBO's and the Social Security Trustees' Projections of Annual Social Security Outlays and Revenues, 1985 to 2080

(Percentage of GDP)



Sources: Congressional Budget Office; Social Security Administration, *The 2004 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds* (March 23, 2004).

Note: Outlays comprise scheduled benefits and administrative costs; revenues come from Social Security payroll taxes and from income taxes paid on benefits.

a smaller share of GDP than CBO projects. And since Social Security revenues are a fairly constant portion of taxable payroll, as taxable payroll falls relative to GDP, revenues do as well (see Figure A-1). The trustees' projection of revenues relative to GDP actually falls below the range of uncertainty for CBO's revenue projection. That occurs because in CBO's analyses of uncertainty, the assumption about the share of compensation received as fringe benefits does not vary.

Overall, CBO's economic assumptions result in higher projected outlays relative to GDP than the trustees' assumptions do. CBO's modeling techniques, by contrast, result in lower projected outlays than the trustees' do when using the same economic assumptions. CBO and the trustees take different approaches to projecting

the distribution of future beneficiaries' earnings; that and other modeling differences cause CBO to project lower average retirement benefits than the trustees do, especially for men retiring around 2020 and later. The economic and modeling differences completely offset each other by 2080. In earlier years, however, the effects of the differences in modeling techniques are larger, so CBO's projection of outlays relative to GDP is lower than the trustees' projection.

### Annual Revenues and Outlays Relative to Taxable Payroll

The trustees project that the Social Security deficit will equal 6.0 percent of taxable payroll in 2080, compared with CBO's projection of 4.9 percent. That difference

stems almost entirely from disparate projections of outlays. For 2080, the trustees project outlays equaling 19.4 percent of taxable payroll, about 6 percent higher than CBO's projection (18.3 percent of taxable payroll).

Roughly one-third of the difference in projected outlays relative to taxable payroll reflects different long-term economic assumptions. If CBO used the trustees' 2004 intermediate economic assumptions in its model, projected outlays in 2080 would equal 18.6 percent of taxable payroll—about 4 percent lower than the trustees' projection rather than 6 percent lower. The remaining difference in projected outlays is attributable to different modeling techniques.

### Summarized Revenues and Outlays Relative to Taxable Payroll

The 75-year summarized balance is -1.89 percent of taxable payroll in the trustees' 2004 report, compared with -1.00 percent in CBO's projections. Like the difference in annual balances relative to taxable payroll, the disparity is essentially all on the outlay side: the trustees project summarized outlays of 15.7 percent of taxable payroll, whereas CBO projects 14.9 percent.

Different long-term economic assumptions account for about 40 percent of the difference in projected summarized balances. If CBO used the trustees' 2004 intermediate economic assumptions in its model, its projected 75-year summarized balance would be -1.36 percent of taxable payroll. In addition to the different assumptions

about earnings growth and inflation discussed above, CBO assumes a higher interest rate than the trustees do. The interest rate does not affect projections of annual outlays or revenues, but it is used as the discount rate in calculations of present value. Thus, CBO's assumption of a higher interest rate places a lower weight on the large deficits in the distant future and results in lower projected summarized balances.

### Estimates of Uncertainty

Finally, CBO focuses on a different measure of projection uncertainty than the Social Security trustees do. Both CBO and the trustees present projections that are based on the demographic and economic conditions they believe to be most likely in the future. The trustees call that projection their intermediate scenario. Their report highlights the issue of uncertainty by also providing low-cost and high-cost scenarios in which each assumption is changed to either a low- or high-cost level. The ranges of uncertainty that CBO provides are different in nature.<sup>4</sup> As explained in Chapter 3, CBO uses historical data and standard statistical techniques to run hundreds of simulations, which generate an entire probability distribution for every outcome. Although the body of the trustees' report uses the scenario approach, that report also presents a probability distribution in Appendix E.

4. For more details about the differences between CBO's and the Social Security trustees' methods of projecting uncertainty, see Congressional Budget Office, *Uncertainty in Social Security's Long-Term Finances: A Stochastic Analysis* (December 2001).



**B**

## **Individual Benefit Measures for Male and Female Beneficiaries**

**T**able 2-1 in Chapter 2 shows the Congressional Budget Office's projections of the median Social Security benefits that retired workers would receive under current law, by birth cohort and household earnings quintile. Benefit levels vary not only by those factors but also by sex, since men and women have different earnings patterns and different life expectancies, on average. To pro-

vide more detail, this appendix shows the same measures as Table 2-1—median first-year retirement benefits, the first-year replacement rate, and the present value of lifetime retirement benefits—separately for male and female beneficiaries. The projections include both the benefits scheduled to be paid under current law and the benefits that could be financed by trust fund balances.

**Table B-1.****Measures of the Benefits Received by the Median Retired Worker, by Sex, Birth Cohort, and Earnings Level**

10-Year Birth Cohort Beginning in Specified Year	First-Year Benefits (2004 dollars)		First-Year Replacement Rate (Percent) <sup>a</sup>		Present Value of Lifetime Benefits (2004 dollars) <sup>b</sup>	
	Scheduled	Trust-Fund-Financed	Scheduled	Trust-Fund-Financed	Scheduled	Trust-Fund-Financed
<b>Males</b>						
<i>Median</i>						
1940	17,200	17,200	38.5	38.5	149,000	149,000
1950	17,200	17,200	39.7	39.7	151,500	151,400
1960	17,000	17,000	38.4	38.4	156,800	156,100
1970	20,000	20,000	37.6	37.6	185,700	177,700
1980	22,900	21,900	37.1	35.4	218,400	183,200
1990	26,200	20,400	36.6	28.5	255,100	190,500
2000	29,500	22,300	36.8	27.8	290,900	208,900
<i>Median in Lowest Household Earnings Quintile</i>						
1940	9,000	9,000	58.0	58.0	74,000	74,000
1950	9,200	9,200	59.6	59.6	76,400	76,300
1960	9,400	9,400	58.7	58.7	78,200	78,100
1970	10,400	10,400	59.8	59.8	85,700	82,700
1980	11,000	10,500	64.3	61.6	93,600	80,200
1990	12,500	9,700	63.9	49.9	105,600	78,600
2000	14,000	10,500	64.2	48.2	135,000	94,800
<i>Median in Middle Household Earnings Quintile</i>						
1940	17,700	17,700	37.7	37.7	172,300	172,300
1950	17,800	17,800	39.3	39.3	172,100	172,100
1960	17,600	17,600	38.2	38.2	179,600	179,000
1970	20,600	20,600	37.2	37.2	212,100	203,100
1980	23,600	22,500	36.9	35.6	256,000	213,700
1990	26,900	21,100	36.3	28.2	299,000	224,600
2000	30,200	22,800	36.6	27.7	344,700	246,500
<i>Median in Highest Household Earnings Quintile</i>						
1940	20,900	20,900	22.1	22.1	232,800	232,800
1950	22,900	22,900	22.4	22.4	265,900	265,900
1960	23,800	23,800	21.0	21.0	275,900	275,500
1970	26,900	26,900	20.3	20.3	329,400	309,000
1980	31,100	30,100	18.2	17.6	388,800	321,400
1990	35,300	27,500	17.7	13.8	446,900	336,600
2000	39,800	30,000	18.1	13.7	513,800	372,800

Continued

Source: Congressional Budget Office.

Note: All values are net of income taxes paid on benefits and credited to the Social Security trust funds. First-year benefits and replacement rates are simulated as if all workers claimed benefits at age 65. In the trust-fund-financed measures, all beneficiaries are subject to an across-the-board cut in benefits each year so total annual benefits equal total annual revenues once the trust funds are exhausted.

**Table B-1.****Continued**

10-Year Birth Cohort Beginning in Specified Year	First-Year Benefits (2004 dollars)		First-Year Replacement Rate (Percent) <sup>a</sup>		Present Value of Lifetime Benefits (2004 dollars) <sup>b</sup>	
	Scheduled	Trust-Fund-Financed	Scheduled	Trust-Fund-Financed	Scheduled	Trust-Fund-Financed
<b>Females</b>						
<i>Median</i>						
1940	10,200	10,200	52.6	52.6	99,600	99,600
1950	11,600	11,600	49.5	49.5	114,500	114,500
1960	12,200	12,200	46.4	46.4	127,200	126,000
1970	14,000	14,000	45.3	45.3	150,300	141,500
1980	16,300	15,600	44.5	43.0	174,900	146,100
1990	18,200	14,200	44.5	34.6	199,900	150,800
2000	20,800	15,600	44.3	33.3	234,500	169,500
<i>Median in Lowest Household Earnings Quintile</i>						
1940	6,500	6,500	79.9	79.9	50,500	50,500
1950	7,700	7,700	75.0	75.0	58,700	58,700
1960	8,000	8,000	70.3	70.3	64,800	64,700
1970	9,000	9,000	70.2	70.2	73,500	71,300
1980	9,600	9,100	72.8	69.8	79,400	68,300
1990	10,800	8,400	72.7	56.2	94,200	71,100
2000	12,100	9,200	72.6	54.1	107,000	80,500
<i>Median in Middle Household Earnings Quintile</i>						
1940	11,600	11,600	49.6	49.6	112,300	112,300
1950	12,700	12,700	47.6	47.6	130,000	130,000
1960	13,200	13,200	44.6	44.6	145,300	144,800
1970	15,400	15,400	43.6	43.6	171,500	162,000
1980	18,100	17,400	42.7	41.4	205,600	171,600
1990	20,300	15,800	42.5	32.9	235,700	178,100
2000	23,000	17,400	42.5	32.0	273,100	196,600
<i>Median in Highest Household Earnings Quintile</i>						
1940	14,700	14,700	41.6	41.6	164,300	164,300
1950	17,500	17,500	37.8	37.8	196,000	195,300
1960	18,100	18,100	35.6	35.6	213,600	210,300
1970	20,500	20,500	35.2	35.2	246,200	228,200
1980	25,000	23,900	32.4	31.1	307,000	255,600
1990	28,100	21,800	33.0	25.7	350,300	263,100
2000	32,000	24,100	32.5	24.4	400,000	291,300

Note: The overall median values differ from the median values in the middle quintile because individuals are sorted into quintiles on the basis of household earnings, not benefit levels.

a. First-year benefits as a percentage of average career earnings.

b. The present value of all retired-worker benefits received.





