THE 2019 ANNUAL REPORT OF THE BOARD OF TRUSTEES OF THE FEDERAL OLD-AGE AND SURVIVORS INSURANCE AND FEDERAL DISABILITY INSURANCE TRUST FUNDS

COMMUNICATION

FROM

THE BOARD OF TRUSTEES, FEDERAL OLD-AGE AND SURVIVORS INSURANCE AND FEDERAL DISABILITY INSURANCE TRUST FUNDS

TRANSMITTING

THE 2019 ANNUAL REPORT OF THE BOARD OF TRUSTEES OF THE FEDERAL OLD-AGE AND SURVIVORS INSURANCE AND FEDERAL DISABILITY INSURANCE TRUST FUNDS

LETTER OF TRANSMITTAL

BOARD OF TRUSTEES OF THE
FEDERAL OLD-AGE AND SURVIVORS INSURANCE AND
FEDERAL DISABILITY INSURANCE TRUST FUNDS,
Washington, D.C., April 22, 2019

HON. NANCY PELOSI,
Speaker of the House of Representatives.

HON. MICHAEL R. PENCE,
President of the Senate.

DEAR MADAM SPEAKER AND MR. PRESIDENT:

We have the honor of transmitting to you the 2019 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds, the 79th such report.

Respectfully,

STEVEN T. MNUCHIN,
Secretary of the Treasury,
and Managing Trustee of the Trust Funds.

R. ALEXANDER ACOSTA,
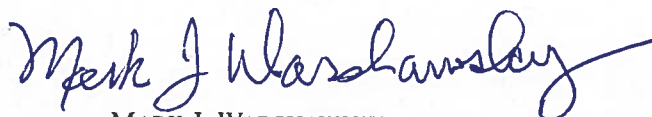*Secretary of Labor,*
and Trustee.

ALEX M. AZAR II,
Secretary of Health and Human Services,
and Trustee.

NANCY A. BERRYHILL,
Acting Commissioner
of Social Security, and Trustee.

VACANT,
Public Trustee.

VACANT,
Public Trustee.

MARK J. WARSHAWSKY,
Deputy Commissioner
for Retirement and Disability Policy,
Social Security Administration,
and Acting Secretary, Board of Trustees.

CONTENTS

THE 2019 ANNUAL REPORT OF THE BOARD OF TRUSTEES OF THE FEDERAL OLD-AGE AND SURVIVORS INSURANCE AND FEDERAL DISABILITY INSURANCE TRUST FUNDS

I. INTRODUCTION

The Old-Age, Survivors, and Disability Insurance (OASDI) program makes monthly income available to insured workers and their families at retirement, death, or disability. The OASDI program consists of two parts. Retired workers, their families, and survivors of deceased workers receive monthly benefits under the Old-Age and Survivors Insurance (OASI) program. Disabled workers and their families receive monthly benefits under the Disability Insurance (DI) program.

The Social Security Act established the Board of Trustees to oversee the financial operations of the OASI and DI Trust Funds. The Board is composed of six members. Four members serve by virtue of their positions in the Federal Government: the Secretary of the Treasury, who is the Managing Trustee; the Secretary of Labor; the Secretary of Health and Human Services; and the Commissioner of Social Security. The President appoints and the Senate confirms the other two members to serve as public representatives. These two positions are currently vacant. The Deputy Commissioner of the Social Security Administration serves as Secretary of the Board.

The Social Security Act requires that the Board, among other duties, report annually to the Congress on the actuarial status and financial operations of the OASI and DI Trust Funds. The 2019 report is the 79th such report.

II. OVERVIEW

A. HIGHLIGHTS

This section summarizes the report's major findings.

In 2018

At the end of 2018, the OASDI program was providing benefit payments[1] to about 63 million people: 47 million retired workers and dependents of retired workers, 6 million survivors of deceased workers, and 10 million disabled workers and dependents of disabled workers. During the year, an estimated 176 million people had earnings covered by Social Security and paid payroll taxes on those earnings. The total cost of the program in 2018 was $1,000 billion. Total income was $1,003 billion, which consisted of $920 billion in non-interest income and $83 billion in interest earnings. Asset reserves held in special issue U.S. Treasury securities grew from $2,892 billion at the beginning of the year to $2,895 billion at the end of the year.

Short-Range Results

Under the Trustees' intermediate assumptions, Social Security's total cost is projected to be less than its total income in 2019 and higher than its total income in 2020 and all later years. Social Security's cost has exceeded its non-interest income since 2010. For 2019, program cost is projected to be less than total income by about $1 billion and exceed non-interest income by about $81 billion.

To illustrate the actuarial status of the Social Security program as a whole, the operations of the OASI and DI funds are often shown on a combined basis as OASDI. However, by law, the two funds are separate entities and therefore the combined fund operations and reserves are hypothetical. The combined reserves are projected to decrease from $2,895 billion at the beginning of 2019 to $2,148 billion at the end of 2028.

The reserves of the combined OASI and DI Trust Funds along with projected program income are adequate to cover projected program cost over the next 10 years under the intermediate assumptions. The ratio of reserves to annual cost is projected to decline from 273 percent at the beginning of 2019 to 130 percent at the beginning of 2028. By remaining at or above 100 percent,

---

[1] The definitions of "benefit payments" and other terms appear in the Glossary.

the combined OASI and DI Trust Funds satisfy the Trustees' test of short-range financial adequacy.[1] Considered separately, the OASI Trust Fund also satisfies the test, but the DI Trust Fund does not. For last year's report, the Trustees projected that combined reserves would be 272 percent of annual cost at the beginning of 2019 and 120 percent at the beginning of 2028.

Long-Range Results

Under the Trustees' intermediate assumptions, OASDI cost is projected to exceed total income starting in 2020, and the dollar level of the hypothetical combined trust fund reserves declines until reserves become depleted in 2035. Figure II.D2 shows the implications of reserve depletion for the combined OASI and DI Trust Funds. Considered separately, the OASI Trust Fund reserves become depleted in 2034 and the DI Trust Fund reserves become depleted in 2052.[2] In last year's report, the projected reserve depletion years were 2034 for OASDI, 2034 for OASI, and 2032 for DI.

The large change in the reserve depletion date for DI is mainly due to continuing favorable experience for DI applications and benefit awards, both of which fell well below levels projected in last year's report for 2018. Disability applications have been declining steadily since 2010, and the total number of disabled-worker beneficiaries in current payment status has been falling since 2014. For this report, disability applications and incidence rates are assumed to rise more gradually from the current low levels to an ultimate age-sex-adjusted disability incidence rate assumption of 5.2 per thousand exposed by the end of the short-range projection period, compared to 5.4 per thousand assumed in last year's report. See page 37 for more details on these changes in the DI projections.

Projected OASDI cost increases more rapidly than projected non-interest income through 2040 primarily because the retirement of the baby-boom generation will increase the number of beneficiaries much faster than the number of covered workers increases, as subsequent lower-birth-rate generations replace the baby-boom generation at working ages. From 2040 through 2051, the cost rate (the ratio of program cost to taxable payroll) generally declines because the aging baby-boom generation is gradually replaced at

---

[1] The test of short-range financial adequacy for a trust fund is met if (1) the estimated trust fund ratio is at least 100 percent at the beginning of the period and remains at or above 100 percent throughout the 10-year short-range period or (2) the ratio is initially less than 100 percent, reaches at least 100 percent within 5 years (without reserve depletion at any time during this period) and remains at or above 100 percent throughout the remainder of the 10-year short-range period.

[2] If the OASI Trust Fund reserves were to become depleted in 2034 as is currently projected, the operations of the hypothetical combined OASI and DI Trust Funds would not reflect the aggregated operation of the OASI Trust Fund and the DI Trust Fund because part of the OASI benefits could not be paid without a change in the law. Implicitly, the values shown for the hypothetical combined trust funds assume the law will have been changed to permit the transfer of resources between funds as needed.

retirement ages by subsequent lower-birth-rate generations. Thereafter, increases in life expectancy cause OASDI cost to increase generally relative to non-interest income, but more slowly than between 2010 and 2040.

The projected OASDI annual cost rate increases from 13.91 percent of taxable payroll for 2019 to 16.62 percent for 2040 and to 17.47 percent for 2093, a level that is 4.11 percent of taxable payroll more than the projected income rate (the ratio of non-interest income to taxable payroll) for 2093. For last year's report, the Trustees estimated the OASDI cost for 2093 at 17.72 percent, or 4.36 percent of payroll more than the annual income rate for that year. Expressed in relation to the projected gross domestic product (GDP), OASDI cost generally rises from 4.9 percent of GDP for 2019 to about 5.9 percent by 2039, then declines to 5.8 percent by 2052, and then generally increases to 6.0 percent by 2093.

For the 75-year projection period, the actuarial deficit is 2.78 percent of taxable payroll, decreased from 2.84 percent of taxable payroll in last year's report. The closely-related open-group unfunded obligation for OASDI over the 75-year period is 2.61 percent of taxable payroll, decreased from 2.68 percent of payroll in last year's report. The open-group unfunded obligation for OASDI over the 75-year period is $13.9 trillion in present value and is $0.7 trillion more than the measured level of $13.2 trillion a year ago. If the assumptions, methods, starting values, and the law had all remained unchanged, the actuarial deficit would have increased to 2.90 percent of taxable payroll, and the unfunded obligation would have risen to about 2.74 percent of taxable payroll and $13.7 trillion in present value due to the change in the valuation date.

To illustrate the magnitude of the 75-year actuarial deficit, consider that for the combined OASI and DI Trust Funds to remain fully solvent throughout the 75-year projection period: (1) revenue would have to increase by an amount equivalent to an immediate and permanent payroll tax rate increase of 2.70 percentage points[1] to 15.10 percent, (2) scheduled benefits would have to be reduced by an amount equivalent to an immediate and permanent reduction of about 17 percent applied to all current and future beneficiaries, or about 20 percent if the reductions were applied only to those who become

---

[1] The necessary tax rate increase of 2.70 percent differs from the 2.78 percent actuarial deficit for two reasons. First, the necessary tax rate increase is the increase required to maintain solvency throughout the period with a zero trust fund reserve at the end of the period, whereas the actuarial deficit also incorporates an ending trust fund reserve equal to one year's cost at the end of the projection period. Second, the necessary tax rate increase reflects a behavioral response to tax rate changes, whereas the actuarial deficit does not. In particular, the calculation of the necessary tax rate increase assumes that an increase in payroll taxes results in a small shift of wages and salaries to forms of employee compensation that are not subject to the payroll tax.

initially eligible for benefits in 2019 or later; or (3) some combination of these approaches would have to be adopted.

If substantial actions are deferred for several years, the changes necessary to maintain Social Security solvency would be concentrated on fewer years and fewer generations. Much larger changes would be necessary if action is deferred until the combined trust fund reserves become depleted in 2035. For example, maintaining 75-year solvency with changes that begin in 2035 would require: (1) an increase in revenue by an amount equivalent to a permanent 3.65 percentage point payroll tax rate increase to 16.05 percent starting in 2035, (2) a reduction in scheduled benefits by an amount equivalent to a permanent 23 percent reduction in all benefits starting in 2035, or (3) some combination of these approaches.

Conclusion

Under the intermediate assumptions, the projected hypothetical combined OASI and DI Trust Fund asset reserves become depleted and unable to pay scheduled benefits in full on a timely basis in 2035. At the time of depletion of these combined reserves, continuing income to the combined trust funds would be sufficient to pay 80 percent of scheduled benefits. The OASI Trust Fund reserves are projected to become depleted in 2034, at which time OASI income would be sufficient to pay 77 percent of OASI scheduled benefits. DI Trust Fund asset reserves are projected to become depleted in 2052, at which time continuing income to the DI Trust Fund would be sufficient to pay 91 percent of DI scheduled benefits.

Lawmakers have a broad continuum of policy options that would close or reduce Social Security's long-term financing shortfall. Cost estimates for many such policy options are available at www.ssa.gov/OACT/solvency/provisions/.

The Trustees recommend that lawmakers address the projected trust fund shortfalls in a timely way in order to phase in necessary changes gradually and give workers and beneficiaries time to adjust to them. Implementing changes sooner rather than later would allow more generations to share in the needed revenue increases or reductions in scheduled benefits. Social Security will play a critical role in the lives of 64 million beneficiaries and 178 million covered workers and their families during 2019. With informed discussion, creative thinking, and timely legislative action, Social Security can continue to protect future generations.

B. TRUST FUND FINANCIAL OPERATIONS IN 2018

Table II.B1 shows the income, cost, and asset reserves for the OASI, the DI, and the combined OASI and DI Trust Funds in calendar year 2018.

Table II.B1.—Summary of 2018 Trust Fund Financial Operations
[In billions]

	OASI	DI	OASDI
Asset reserves at the end of 2017.	$2,820.3	$71.5	$2,891.8
Total income in 2018	831.0	172.3	1,003.4
Net payroll tax contributions	715.9	169.2	885.1
Interest	80.7	2.6	83.3
Taxation of benefits	34.5	.5	35.0
Reimbursement from General Fund of the Treasury . . .	a	a	a
Total cost in 2018.	853.5	146.8	1,000.2
Benefit payments	844.9	143.7	988.6
Administrative expenses	3.8	2.9	6.7
Railroad Retirement financial interchange	4.8	.2	4.9
Net increase in asset reserves in 2018	-22.4	25.6	3.1
Asset reserves at the end of 2018.	2,797.9	97.1	2,894.9

[a] Less than $50 million.

Note: Totals do not necessarily equal the sums of rounded components.

In 2018, net payroll tax contributions accounted for 88.2 percent of total trust fund income. Net payroll tax contributions consist of taxes paid by employees, employers, and the self-employed on earnings covered by Social Security. These taxes are paid on covered earnings up to a specified maximum annual amount, which was $128,400 in 2018. Table II.B2 shows the payroll tax rates for 2018.

Interest earned on invested trust fund asset reserves accounted for 8.3 percent of OASI and DI combined trust fund income in 2018. Revenue from subjecting up to 50 percent of Social Security benefits to Federal personal income taxation for beneficiaries with income (including half of benefits and all non-taxable interest received) exceeding specified levels accounted for 3.5 percent of OASDI income. The remaining income to the combined OASI and DI Trust Funds, less than 0.01 percent, came from reimbursements from the General Fund of the Treasury.[1]

---

[1] Public Laws 111-312, 112-78, and 112-96 account for most of the reimbursement for the year. These acts specified General Fund reimbursement for temporary reductions in revenue due to reduced payroll tax rates for employees and for self-employed workers for 2011 and 2012.

The Department of the Treasury invests trust fund reserves in interest-bearing securities issued by the U.S. Government. In 2018, the combined trust fund reserves earned interest at an effective annual rate of 2.9 percent.

Retirement, survivor, and disability benefits accounted for 98.8 percent of OASI and DI combined trust fund cost in 2018. The expenses for administering the Social Security program were 0.7 percent of total cost. The net payment to the Railroad Retirement Social Security Equivalent Benefit Account from the combined OASI and DI Trust Funds accounted for 0.5 percent of total OASDI cost.

The trust fund investments provide the basis for paying benefits. Combined trust fund reserves increased by $3.1 billion during 2018 because income to the combined funds, including interest earned on trust fund reserves, exceeded total cost. In last year's report, combined reserves were projected to start declining in 2018. At the end of 2018, the combined reserves of the OASI and the DI Trust Funds were $2,895 billion, or 273 percent of estimated cost[1] for 2019. In comparison, the combined reserves at the end of 2017 were 289 percent of actual cost for 2018.

Table II.B2.—Payroll Tax Contribution Rates for 2018
[In percent]

	OASI	DI	OASDI
Payroll tax contribution rate for employees......................	5.015	1.185	6.20
Payroll tax contribution rate for employers.......................	5.015	1.185	6.20
Payroll tax contribution rate for self-employed persons	10.030	2.370	12.40

Note: Section 833 of Public Law 114-74, the Bipartisan Budget Act of 2015, requires a temporary reallocation of the payroll tax rates between the OASI and DI Trust Funds. For earnings in calendar years 2016 through 2018, this section increases from 1.80 percent to 2.37 percent the portion of the total 12.40 percent OASDI payroll tax that is directed to the DI Trust Fund. There is a corresponding decrease in the portion of the tax rates directed to the OASI Trust Fund for these years.

---

[1] Estimated cost is based on the intermediate set of assumptions.

C. ASSUMPTIONS ABOUT THE FUTURE

The future income and cost of the OASI and DI Trust Funds will depend on many factors, including the size and characteristics of the population receiving benefits, the level of monthly benefit amounts, the size of the workforce, and the level of covered workers' earnings. These factors will depend in turn on future birth rates, death rates, immigration, marriage and divorce rates, retirement-age patterns, disability incidence and termination rates, employment rates, productivity gains, wage increases, inflation, interest rates, and many other demographic, economic, and program-specific factors.

Table II.C1 presents key demographic, economic, and programmatic assumptions for three alternative scenarios. The intermediate assumptions reflect the Trustees' best estimates of future experience. Therefore, most of the figures in this overview present outcomes under the intermediate assumptions only. Any projection of the future is, of course, uncertain. For this reason, the Trustees also present results under low-cost and high-cost alternatives to provide a range of possible future experience. The actual future costs are unlikely to be as extreme as those portrayed by the low-cost or high-cost projections. A separate section on the uncertainty of the projections, beginning on page 17, highlights the implications of these alternative scenarios.

The Trustees reexamine the assumptions each year in light of recent experience and new information. This annual review helps to ensure that the Trustees' assumptions provide the best estimate of future possibilities.

Table II.C1.—Key Assumptions[a] and Summary Measures
for the Long-Range (75-year) Projection Period

Long-range assumptions	Intermediate	Low-cost	High-cost
Demographic:			
Total fertility rate (children per woman), for 2027 and later	2.0	2.2	1.8
Average annual percentage reduction in total age-sex-adjusted death rates from 2018 to 2093	.77	.41	1.16
Average annual net immigration (in thousands) for 2019 to 2093	1,265	1,601	949
Economic:			
Average annual percentage change in:			
Productivity (total U.S. economy), for 2029 and later	1.63	1.93	1.33
Average wage in covered employment from 2028 to 2093 . . .	3.81	5.04	2.60
Consumer Price Index (CPI-W), for 2021 and later	2.60	3.20	2.00
Average annual real-wage differential (percent) for 2029 to 2093	1.21	1.84	.60
Unemployment rate (percent, age-sex-adjusted), for 2025 and later	5.5	4.5	6.5
Annual trust fund real interest rate (percent), for 2029 and later.	2.5	3.0	2.0
Programmatic:			
Disability incidence rate (per 1,000 exposed, age-sex-adjusted) in 2093	5.2	4.2	6.2
Disability recovery rate (per 1,000 beneficiaries, age-sex-adjusted) in 2093	10.3	12.5	8.2

[a] See chapter V for details, including historical and projected values.

8

D. PROJECTIONS OF FUTURE FINANCIAL STATUS

Short-Range Actuarial Estimates

For the short-range period (2019 through 2028), the Trustees measure financial adequacy by comparing projected asset reserves at the beginning of each year to projected program cost for that year under the intermediate set of assumptions. Maintaining a trust fund ratio of 100 percent or more—that is, reserves at the beginning of each year at least equal to projected cost for the year—is a good indication that the trust fund can cover most short-term contingencies. The projected trust fund ratios under the intermediate assumptions for the OASI Trust Fund exceed 100 percent throughout the short-range period. Therefore, OASI satisfies the Trustees' test of short-range financial adequacy. The DI Trust Fund fails the Trustees' test of short-range financial adequacy. The Trustees estimate that the DI trust fund ratio was at 65 percent at the beginning of 2019. The projected DI trust fund ratio declines to 56 percent at the beginning of 2022, and then increases to 68 percent by the beginning of 2028. On a combined basis, OASDI also satisfies the Trustees' test of short-range financial adequacy. Figure II.D1 shows that the trust fund ratio for the combined OASI and DI Trust Funds declines consistently after 2010, but remains above 100 percent throughout the short-range period.

Projected OASDI cost is less than total income in 2019, so that combined trust fund reserves increase during the year. In last year's report, combined trust fund reserves were projected to decline starting in 2018. For this report, combined reserves are projected to start declining in 2020 and to continue to decline throughout the remainder of the short-range period. The trust fund ratio declines throughout the short-range period, as shown in figure II.D1.

Figure II.D1.—Short-Range OASI and DI Combined Trust Fund Ratio
[Asset reserves as a percentage of annual cost, under Intermediate Assumptions]
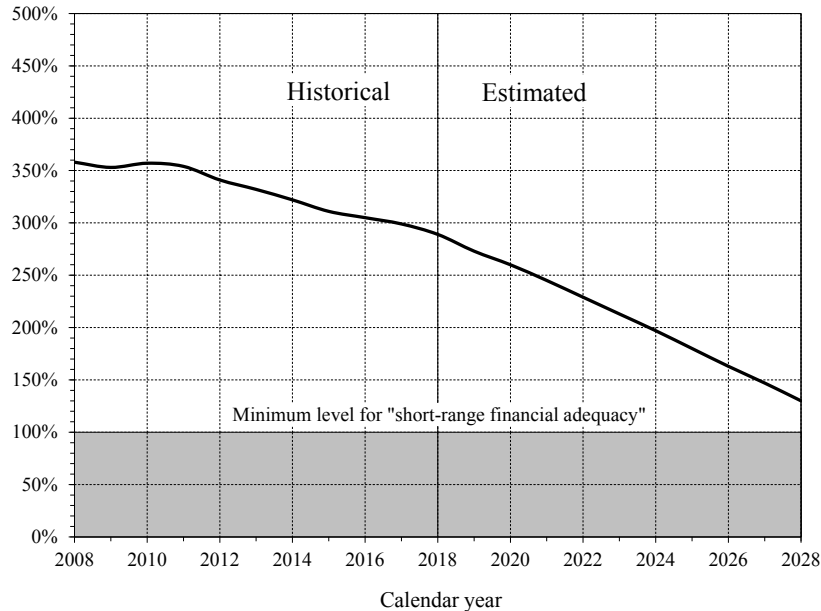
Long-Range Actuarial Estimates

The Trustees use three types of measures to assess the actuarial status of the program over the next 75 years: (1) annual cash-flow measures, including income rates, cost rates, and balances; (2) trust fund ratios; and (3) summary measures such as actuarial balances and open-group unfunded obligations. The Trustees express these measures as percentages of taxable payroll, as percentages of gross domestic product (GDP), or in dollars. The Trustees also present summary measures over the infinite horizon in appendix F. The infinite horizon values provide an additional indication of Social Security's very-long-run financial condition.

The Trustees also apply a test of long-range close actuarial balance each year. To satisfy the test, a trust fund must meet two conditions: (1) the trust fund satisfies the test of short-range financial adequacy, and (2) the trust fund ratio stays above zero throughout the 75-year projection period, such that benefits would be payable in a timely manner throughout the period. The OASI, DI, and combined OASI and DI Trust Funds all fail the test of long-range close actuarial balance under the intermediate assumptions.

Annual Income Rates, Cost Rates, and Balances

Figure II.D2 illustrates the year-by-year relationship among OASDI income (excluding interest), cost (including scheduled benefits), and expenditures (including payable benefits) for the full 75-year period (2019 through 2093). The figure shows all values as percentages of taxable payroll. Under the intermediate assumptions, demographic factors would by themselves cause the projected cost rate to rise rapidly for the next two decades before leveling off in about 2040. However, the most recent recession temporarily depressed taxable earnings and increased the number of beneficiaries, which in turn sharply, but temporarily, increased the cost rate starting in 2009. From a peak in 2013, the cost rate declined through 2017 under the economic recovery and thereafter returns to a gradually rising trend. The projected income rate is stable at about 13 percent throughout the 75-year period.

Annual OASDI cost has exceeded non-interest income every year beginning with 2010. The Trustees project that cost will continue to exceed non-interest income throughout the 75-year valuation period. Beginning in 2020, cost is projected to exceed total income, and combined OASI and DI Trust Fund reserves diminish until they become depleted in 2035. After trust fund reserve depletion, continuing income is sufficient to support expenditures at a level of 80 percent of program cost for the rest of 2035, declining to 75 percent for 2093. Figure II.D2 depicts OASDI operations as a combined whole. However, under current law, the differences between scheduled and payable benefits would begin at different times for the program's two trust funds: in 2034 for OASI and in 2052 for DI.

Overview

Figure II.D2.—OASDI Income, Cost, and Expenditures as Percentages of Taxable Payroll
[Under Intermediate Assumptions]

Calendar year
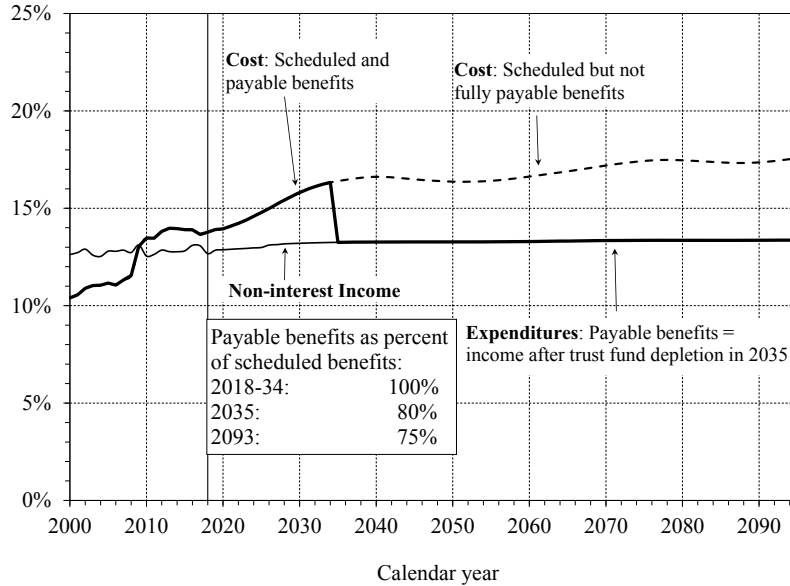
 Figure II.D3 shows the estimated number of covered workers per OASDI beneficiary. Figures II.D2 and II.D3 illustrate the inverse relationship between cost rates and the number of workers per beneficiary. In particular, the projected future increase in the cost rate reflects a projected decline in the number of covered workers per beneficiary. There were about 2.8 workers for every OASDI beneficiary in 2018. This ratio had been stable, remaining between 3.2 and 3.4 from 1974 through 2008, and has declined since then due to the most recent economic recession and the beginning of the demographic shift that will continue to drive this ratio down over the next 20 years. The ratio of workers to beneficiaries will continue to decline due to this demographic shift, as workers of lower-birth-rate generations replace workers of the baby-boom generation. The ratio of workers to beneficiaries reaches 2.2 by 2035 when the baby-boom generation will have largely retired, and will generally decline very gradually thereafter due to increasing longevity.

Figure II.D3.—Number of Covered Workers Per OASDI Beneficiary
[Under Intermediate Assumptions]
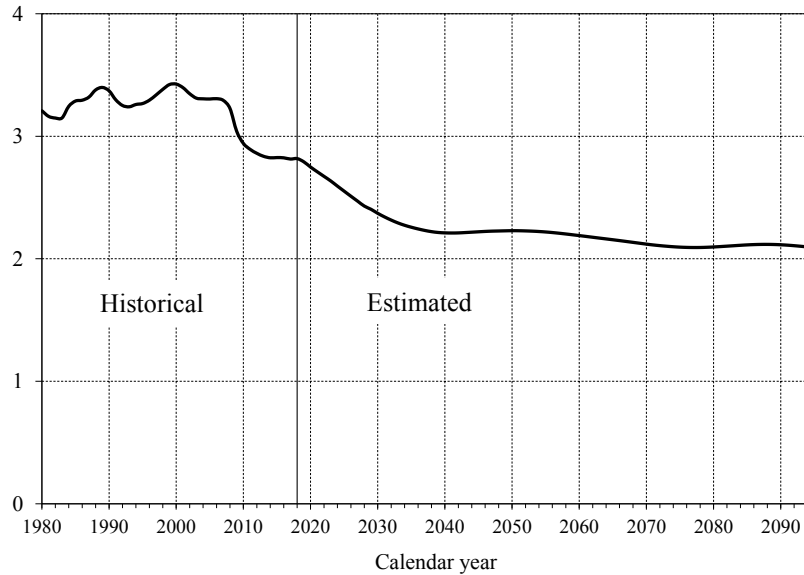
Another important way to look at Social Security's future is to view its annual cost and non-interest income as a share of U.S. economic output (GDP). As shown in figure II.D4, Social Security's cost as a percent of GDP is projected to grow from 4.9 percent in 2019 to about 5.9 percent by 2039, then decline to 5.8 percent by 2052, and generally increase thereafter to 6.0 percent by 2093. Social Security's non-interest income is projected to rise from 4.6 percent of GDP in 2019 to 4.8 percent by 2029. Thereafter, non-interest income as a percent of GDP declines gradually, to about 4.6 percent by 2093, because the Trustees expect the share of employee compensation provided as noncovered fringe benefits to increase gradually.

13

Figure II.D4.—OASDI Cost and Non-interest Income as a Percentage of GDP
[Under Intermediate Assumptions]
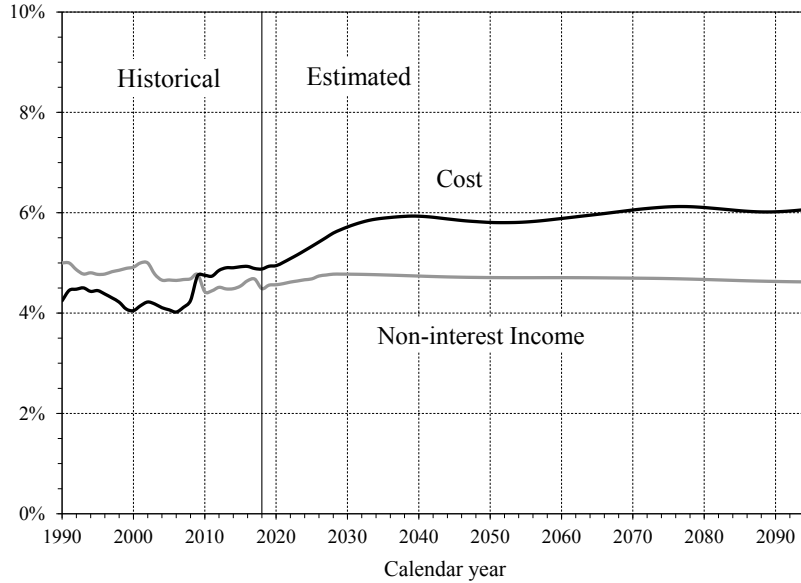
Trust Fund Ratios

The trust fund ratio is defined as the asset reserves at the beginning of a year expressed as a percentage of the cost during the year. The trust fund ratio thus represents the proportion of a year's cost which could be paid solely with the reserves at the beginning of the year. Table II.D1 displays the projected maximum trust fund ratios during the long-range period for the OASI, DI, and combined OASI and DI funds. The table also shows the year of maximum projected trust fund ratio during the long-range projection period (2019 through 2093) and the year of trust fund asset reserve depletion. Trust fund ratios for OASI and OASDI are projected to decline from their current levels until reserve depletion. For DI, the trust fund ratio is projected to rise to 91 in 2037, then decline until reserve depletion.

**Table II.D1.—Projected Maximum Trust Fund Ratios During the Long-Range Period
and Trust Fund Reserve Depletion Dates**
[Under Intermediate Assumptions]

	OASI	DI	OASDI
Maximum projected trust fund ratio (percent).	307	91	273
Year attained.	2019	2037	2019
Projected year of trust fund reserve depletion	2034	2052	2035

Summary Measures

The actuarial balance is a summary measure of the program's financial status through the end of the 75-year valuation period. The actuarial balance measure includes the trust fund asset reserves at the beginning of the period, all cost and income during the valuation period, and the cost of reaching a target trust fund reserve of one year's cost by the end of the period. Therefore, the actuarial balance is essentially the difference between the present values of income and cost from 1937 through the end of the valuation period. Actuarial balance is expressed as a percentage of the taxable payroll for the 75-year valuation period. A negative actuarial balance is called an actuarial deficit. The actuarial deficit represents the average amount of change in income or cost that is needed throughout the valuation period in order to achieve actuarial balance.

In this report, the actuarial deficit for the combined OASI and DI Trust Funds under the intermediate assumptions is 2.78 percent of taxable payroll. The actuarial deficit was 2.84 percent in the 2018 report. If the assumptions, methods, starting values, and the law had all remained unchanged from last year, the actuarial deficit would have increased to 2.90 percent of payroll solely due to advancing the valuation period by 1 year.

Another way to illustrate the projected financial shortfall of the OASDI program is to examine the cumulative present value of scheduled income less cost. Figure II.D5 shows the present value of cumulative OASDI income less cost from the inception of the program through each of the years from 2018 to 2093. A positive value represents the present value of trust fund reserves at the end of the selected year. A negative value is the unfunded obligation through the selected year. The asset reserves of the combined trust funds were $2.9 trillion at the end of 2018. The combined trust fund reserves decline on a present value basis after 2018, but remain positive through 2034. However, after 2034 this cumulative amount becomes negative, which means that the combined OASI and DI Trust Funds have a net unfunded obligation through each year after 2034. Through the end of 2093, the combined funds have a present-value unfunded obligation of $13.9 trillion. If the assumptions, methods, starting values, and the law had all remained unchanged from last year, the unfunded obligation would have risen to about $13.7 trillion due to the change in the valuation date.

This unfunded obligation represents 2.61 percent of taxable payroll (decreased from 2.68 percent in last year's report) and 0.9 percent of GDP (decreased from 1.0 percent in last year's report) for the 75-year valuation period. The unfunded obligation as a share of taxable payroll (2.61 percent)

and the actuarial deficit (2.78 percent) are similar measures, but differ because the actuarial deficit includes the cost of having an ending trust fund reserve equal to one year's cost.

Figures II.D2, II.D4, and II.D5 show that the program's financial condition is worsening at the end of the projection period. Trends in annual balances and cumulative values toward the end of the 75-year period provide an indication of the program's ability to maintain solvency beyond 75 years. Consideration of summary measures alone for a 75-year period can lead to incorrect perceptions and to policy prescriptions that do not achieve sustainable solvency.[1]

**Figure II.D5.—Cumulative Scheduled OASDI Income Less Cost,
From Program Inception Through Years 2018-2093**
[Present value as of January 1, 2019, in trillions, under Intermediate Assumptions]

Ending year of accumulation
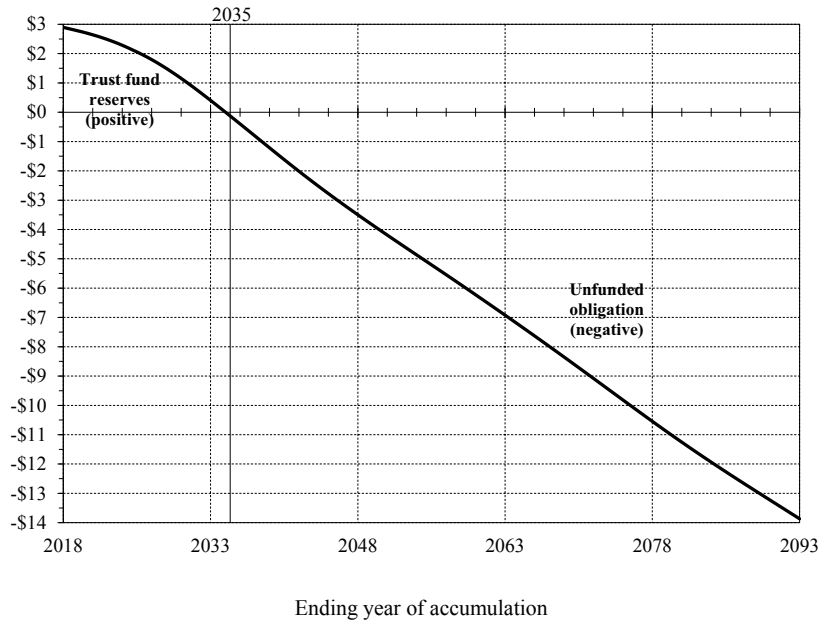
Appendix F presents summary measures over the infinite horizon. The infinite horizon values provide an additional indication of Social Security's financial condition for the period beginning with the inception of the program and extending indefinitely into the future, but results are subject to

---

[1] Sustainable solvency for the financing of the program under a specified set of assumptions has been achieved when the projected trust fund ratio is positive throughout the 75-year projection period and is either stable or rising at the end of the period.

much greater uncertainty. Extending the horizon beyond 75 years increases the measured unfunded obligation. Through the infinite horizon, the unfunded obligation, or shortfall, is equivalent to 4.1 percent of future taxable payroll or 1.4 percent of future GDP.

Uncertainty of the Projections

Significant uncertainty surrounds the intermediate assumptions. The Trustees use several methods to help illustrate that uncertainty.

A first approach uses alternative scenarios reflecting low-cost (alternative I) and high-cost (alternative III) sets of assumptions. Figure II.D6 shows the projected trust fund ratios for the combined OASI and DI Trust Funds under the intermediate, low-cost, and high-cost assumptions. The figure indicates that the combined trust funds are projected to become depleted in 2035 under the intermediate alternative, remain above 100 percent of annual cost throughout the projection period under the low-cost alternative, and become depleted in 2030 under the high-cost alternative. The low-cost alternative includes a higher ultimate total fertility rate, slower improvement in mortality, a higher real-wage differential, a higher ultimate real interest rate, a higher ultimate annual change in the CPI, and a lower unemployment rate. The high-cost alternative, in contrast, includes a lower ultimate total fertility rate, more rapid improvement in mortality, a lower real-wage differential, a lower ultimate real interest rate, a lower ultimate annual change in the CPI, and a higher unemployment rate. These alternatives are not intended to suggest that all parameters would be likely to differ from the intermediate values in the specified directions, but are intended to illustrate the effect of clearly defined scenarios that are, on balance, very favorable or unfavorable for the program's financial status. Actual future costs are unlikely to be as extreme as those portrayed by the low-cost or high-cost projections. The method for constructing the low-cost and high-cost projections does not lend itself to estimating the probability that actual experience will lie within or outside the range they define.

Figure II.D6.—Long-Range OASI and DI Combined Trust Fund Ratios Under Alternative Scenarios
[Asset reserves as a percentage of annual cost]
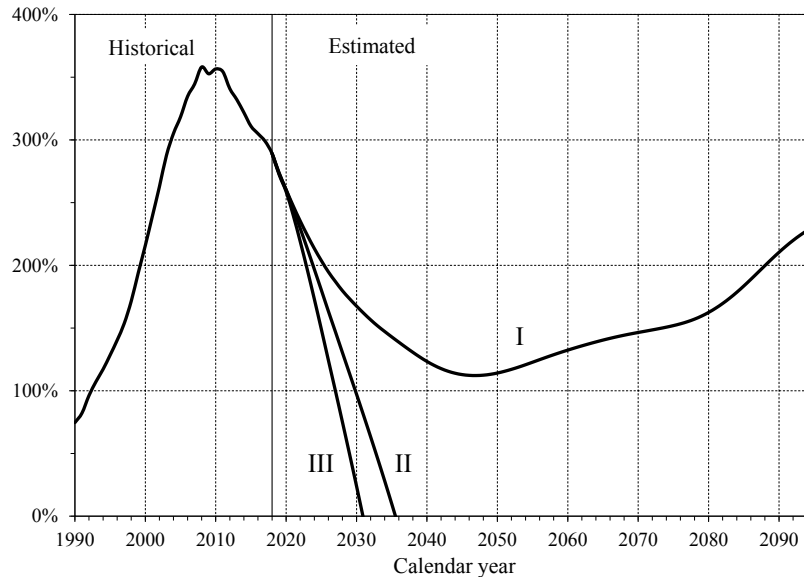
Appendix D of this report presents long-range sensitivity analysis for the OASDI program. By varying one parameter at a time, sensitivity analysis provides a second approach for illustrating the uncertainty surrounding projections into the future.

A third approach uses 5,000 independently generated stochastic simulations that reflect randomly assigned annual values for most of the key parameters. These simulations produce a distribution of projected outcomes and corresponding probabilities that future outcomes will fall within or outside a given range. The results of the stochastic simulations, discussed in more detail in appendix E, suggest that trust fund reserve depletion (i.e., the point at which the trust fund ratio reaches zero) is very likely by mid-century. In particular, figure II.D7 suggests that based on these stochastic simulations, trust fund asset reserves will become depleted between 2031 and 2044 with a 95-percent confidence.

The stochastic results suggest that trust fund ratios as high as the low-cost alternative are very unlikely. However, the relationship between the stochastic results and the low-cost and high-cost alternatives may change as the methodology for the stochastic simulations is further developed. As noted in

appendix E, future improvements and refinements are expected to be more likely to expand than to reduce the indicated range of uncertainty.

Figure II.D7.—Long-Range OASI and DI Combined Trust Fund Ratios From Stochastic Modeling
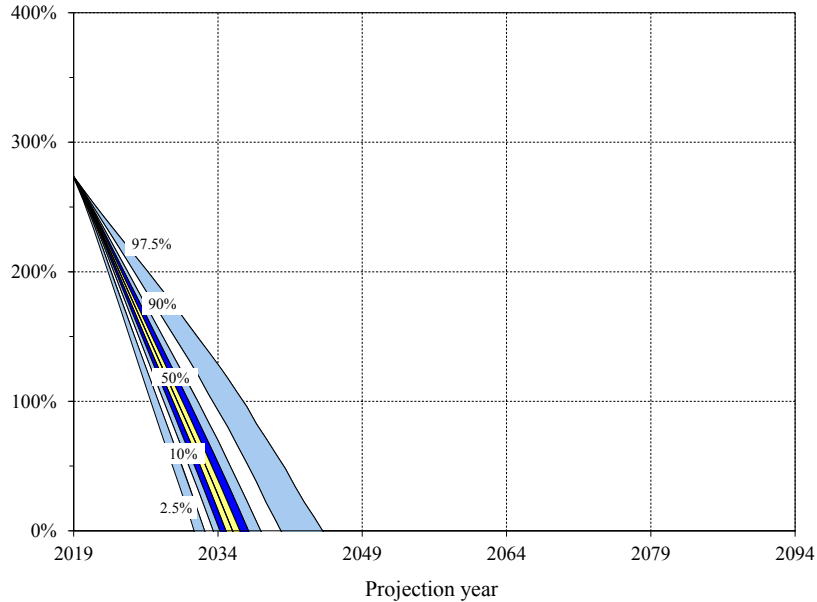
Changes From Last Year's Report

The projected long-range OASDI actuarial deficit decreased from 2.84 percent of taxable payroll for last year's report to 2.78 percent of taxable payroll for this year's report. The change in the 75-year projection period alone would have increased the actuarial deficit to 2.90 percent. Changes in law, methods, starting values, and assumptions combined to decrease the actuarial deficit by 0.11 percent of taxable payroll. For a detailed description of the specific changes identified in table II.D2, see section IV.B.6.

**Table II.D2.—Reasons for Change in the 75-Year Actuarial Balance,
Based on Intermediate Assumptions**
[As a percentage of taxable payroll]

Item	OASI	DI	OASDI
Shown in last year's report:			
Income rate.	11.99	1.86	13.84
Cost rate	14.62	2.07	16.69
Actuarial balance	**-2.63**	**-.21**	**-2.84**
Changes in actuarial balance due to changes in:			
Legislation / Regulation	.00	.00	.00
Valuation period [a]	-.05	-.01	-.05
Demographic data and assumptions	.06	.00	.06
Economic data and assumptions.	-.03	.00	-.04
Disability data and assumptions	-.02	.09	.07
Methods and programmatic data	.00	.02	.01
Total change in actuarial balance	-.04	.09	.06
Shown in this report:			
Actuarial balance	**-2.67**	**-.12**	**-2.78**
Income rate.	11.96	1.85	13.81
Cost rate	14.63	1.97	16.60

[a] The change in the 75-year valuation period from last year's report to this report means that the 75-year actuarial balance now includes the relatively large negative annual balance for 2093. This change in the valuation period results in a larger long-range actuarial deficit. The actuarial deficit includes the trust fund reserve at the beginning of the projection period.

Note: Totals do not necessarily equal the sums of rounded components.

Figure II.D8 compares this year's projections of annual balances (non-interest income minus cost) to those in last year's report. The annual balances in this year's report are higher (less negative) throughout the 75-year projection period. For the full 75-year projection period, the annual balances average 0.18 percentage point higher. See page 78 for details.

Figure II.D8.—OASDI Annual Balances: 2018 and 2019 Trustees Reports
[As a percentage of taxable payroll, under the intermediate assumptions]

Calendar year
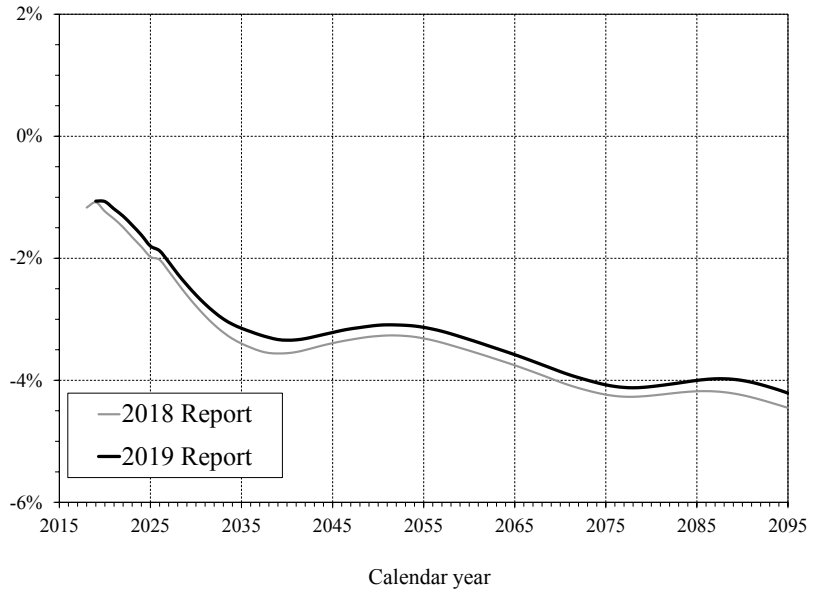
E. CONCLUSION

Under current law, the projected cost of Social Security increases faster than projected income through 2040 primarily because the ratio of workers paying taxes to beneficiaries receiving benefits will decline as the baby-boom generation ages and is replaced at working ages with subsequent lower birthrate generations. While the effects of the aging baby boom and subsequent lower birth rates will have stabilized after 2040, annual cost will continue to grow faster than income, but to a lesser degree, reflecting continuing increases in life expectancy. Based on the Trustees' intermediate assumptions, Social Security's cost exceeds total income beginning in 2020, and throughout the remainder of the 75-year projection period.

The OASI Trust Fund and the DI Trust Fund are projected to have sufficient reserves to pay full benefits on time until 2034 and 2052, respectively. Legislative action will be needed to prevent reserve depletion in those years. In the absence of such legislation, continuing income to the trust funds at the time of reserve depletion would be sufficient to pay 77 percent of OASI benefits and 91 percent of DI benefits.

Social Security's combined trust funds are projected to cover full payment of scheduled benefits on a timely basis until the trust fund reserves become depleted in 2035. (Full payment of benefits until combined reserve depletion in 2035 implicitly assumes that the law will have been changed to permit the transfer of funds between OASI and DI as needed.) At that time, projected continuing income to the combined trust funds equals about 80 percent of the program cost. By 2093, continuing income equals about 75 percent of the program cost.

The 75-year actuarial deficit for the combined trust funds under the intermediate assumptions is 2.78 percent of taxable payroll, decreased from the 2.84 percent deficit in last year's report. To illustrate the magnitude of the deficit, consider that for the combined OASI and DI Trust Funds to remain fully solvent throughout the 75-year projection period: (1) revenue would have to be increased by an amount equivalent to an immediate and permanent payroll tax rate increase of 2.70 percentage points to 15.10 percent; (2) scheduled benefits would have to be reduced by an amount equivalent to an immediate and permanent reduction of about 17 percent applied to all current and future beneficiaries, or about 20 percent if the reductions were applied only to those who become initially eligible for benefits in 2019 or later; or (3) some combination of these approaches would have to be adopted. If actions are deferred for several years, the changes necessary to

maintain Social Security solvency become concentrated on fewer years and fewer generations.

If lawmakers design legislative solutions only to eliminate the overall actuarial deficit without consideration of year-by-year financing, then a substantial financial imbalance could remain at the end of the period, and the long-range sustainability of program financing could still be in doubt. Sustainable solvency for the financing of the program under a specified set of assumptions is achieved when the projected trust fund ratio is positive throughout the long-range period and is either stable or rising at the end of the period. Making changes now that achieve sustainable solvency could avoid the need for later legislative changes.

Lawmakers have a broad continuum of policy options that would close or reduce Social Security's long-term financing shortfall. Cost estimates for many such policy options are available at www.ssa.gov/OACT/solvency/provisions/. Broadly speaking, the approaches that lawmakers can take include increasing revenue from workers and employers by raising the tax rate or the maximum level of taxable earnings, or by dedicating revenue from other sources; lowering benefits for some or all beneficiaries by changing certain program parameters; or a combination of these approaches. There are countless variations on these options, including those that vary the timing, magnitude, and other specifics of the changes under consideration.

The Trustees recommend that lawmakers address the projected trust fund shortfalls in a timely way in order to phase in necessary changes gradually and give workers and beneficiaries time to adjust to them. Implementing changes sooner rather than later would allow more generations to share in the needed revenue increases or reductions in scheduled benefits. Social Security will play a critical role in the lives of 64 million beneficiaries and 178 million covered workers and their families during 2019. With informed discussion, creative thinking, and timely legislative action, Social Security can continue to protect future generations.

For further information related to the contents of this report, see the following websites:

- www.ssa.gov/OACT/tr/2019/
- www.ssa.gov/OACT/solvency/provisions/
- www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/ReportsTrustFunds/
- www.treasury.gov/resource-center/economic-policy/ss-medicare/Pages/Soc-Sec-and-Medicare.aspx

III. FINANCIAL OPERATIONS OF THE TRUST FUNDS AND LEGISLATIVE CHANGES IN THE LAST YEAR

A. OPERATIONS OF THE OLD-AGE AND SURVIVORS INSURANCE (OASI) AND DISABILITY INSURANCE (DI) TRUST FUNDS, IN CALENDAR YEAR 2018

This section presents detailed information on the operations of the OASI and DI Trust Funds[1] during calendar year 2018. Chapter IV provides projections for calendar years 2019 through 2095.

1. OASI Trust Fund

Table III.A1 presents a statement of the income and cost of the Federal Old-Age and Survivors Insurance Trust Fund in calendar year 2018, and of the asset reserves in the fund at the beginning and end of the calendar year. As shown in this table, total trust fund income in 2018 amounted to $831.0 billion, while cost totaled $853.5 billion, a decrease in trust fund reserves during 2018 of $22.4 billion.

Total income during calendar year 2018 included $718.3 billion in payroll tax contributions. These contributions include initial appropriations of payroll taxes, made on an estimated basis, and adjustments to appropriations for prior years to reflect actual tax income. The OASI fund paid the General Fund $2.4 billion for the estimated amount of employee payroll-tax refunds, partially offsetting these gross contributions. Employees who work for more than one employer during a year and pay contributions on total earnings in excess of the contribution and benefit base are eligible for such refunds. Net payroll tax contributions were therefore $715.9 billion in 2018.

Net reimbursements from the General Fund of the Treasury amounted to $18 million in 2018. As shown in the table, almost all of that amount came from adjustments to prior year reimbursements based on Public Law 111-312, the Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act of 2010, Public Law 112-78, the Temporary Payroll Tax Cut Continuation Act of 2011, and Public Law 112-96, the Middle Class Tax Relief and Job Creation Act of 2012. These acts specified General Fund reimbursement for temporary reductions in employee and self-employment payroll taxes for earnings in 2011 and 2012.

Income to the OASI Trust Fund based on the taxation of OASI benefits amounted to $34.5 billion in 2018. As first required by the 1983 Social Secu-

---

[1] See www.ssa.gov/oact/ProgData/fundsQuery.html.

rity Amendments, this income comes from two separate sources: (1) Federal income taxation on up to 50 percent of an individual's or couple's OASI benefits under certain circumstances, and (2) a tax withheld from the benefits paid to certain nonresident alien beneficiaries. For the direct Federal income tax portion, Treasury transfers estimated amounts to the OASI Trust Fund in advance at the beginning of each calendar quarter. Treasury makes subsequent adjustments based on the actual amounts shown on annual income tax records. There were two such adjustments made in 2018 totaling $2.2 billion. The amount of income from direct Federal income taxation on OASI benefits constituted approximately 99 percent of income from benefit taxation. The remaining one percent of the income from benefit taxation is the amounts withheld from the benefits paid to nonresident aliens.

In 2018, the OASI Trust Fund earned $80.7 billion in net interest, which consisted of: (1) interest earned on the investments held by the trust fund, (2) interest on adjustments in the allocation of administrative expenses between the trust fund and the General Fund account for the Supplemental Security Income program, (3) interest arising from the revised allocation of administrative expenses among the trust funds, and (4) interest on certain reimbursements to the trust fund.

The remaining income, about $188 thousand, consisted of gifts received under the provisions authorizing the deposit of monetary gifts or bequests in the trust funds.

Table III.A1.—Operations of the OASI Trust Fund, Calendar Year 2018
[In millions]

Total asset reserves, December 31, 2017		$2,820,309
Income:		
Net payroll tax contributions:		
Payroll tax contributions[a]	$718,285	
Payments from the General Fund of the Treasury for payroll tax contributions subject to refund[a]	-2,420	
Net payroll tax contributions[a]		715,865
Reimbursements from the General Fund:		
Reduction in payroll tax contributions due to P.L. 111-312, P.L. 112-78, and P.L. 112-96[a]	18	
Payroll tax credits due to P.L. 98-21[a]	b	
Net General Fund reimbursements[a]		18
Income based on taxation of benefit payments:		
Withheld from benefit payments to nonresident aliens	217	
All other, not subject to withholding[a]	34,271	
Total income from taxation of benefits[a]		34,488
Investment income and interest adjustments:		
Interest on investments	80,655	
Interest adjustments[c]	b	
Total investment income and interest adjustments		80,655
Gifts		b
Total income		831,026
Cost:		
Benefit payments:		
Monthly benefits and lump-sum death payments[d]	844,924	
Reimbursement from the General Fund for unnegotiated checks	-36	
Payment for costs of vocational rehabilitation services for disabled beneficiaries .	7	
Net benefit payments[d]		844,895
Financial interchange with the Railroad Retirement "Social Security Equivalent Benefit Account"		4,769
Administrative expenses:		
Costs incurred by:		
Social Security Administration	3,277	
Department of the Treasury	530	
Offsetting miscellaneous receipts	-1	
Miscellaneous reimbursements from the General Fund [e]	-6	
Net administrative expenses		3,800
Total cost		853,464
Net increase in asset reserves		-22,437
Total invested assets	2,797,974	
Undisbursed balances [f]	-102	
Total asset reserves, December 31, 2018		2,797,872

[a] Includes adjustments for prior calendar years.

[b] Between -$0.5 and $0.5 million.

[c] Includes: (1) interest on adjustments in the allocation of administrative expenses between the trust fund and the General Fund account for the Supplemental Security Income program, (2) interest arising from the revised allocation of administrative expenses among the trust funds, and (3) interest on certain reimbursements to the trust fund.

[d] Includes net reductions for the recovery of overpayments.

[e] Reimbursements for costs incurred in performing certain legislatively mandated activities not directly related to administering the OASI program.

[f] A negative balance represents a situation where the actual cash payments exceeded the amount of invested securities of the OASI Trust Fund that were redeemed to make such payments. In this situation, future redemption of additional invested securities will be required to pay for this shortfall.

Note: Totals do not necessarily equal the sums of rounded components.

Of the $853.5 billion in total OASI cost in 2018, $844.9 billion were for net benefit payments, including recovered overpayments, reimbursements from the General Fund for unnegotiated checks, and the reimbursable costs of vocational rehabilitation services.[1] Net benefit payments increased by 5.8 percent from calendar year 2017 to calendar year 2018. This increase is due primarily to: (1) an increase in the average number of beneficiaries during the year and (2) an increase in the average monthly benefit amount. The increase in the average benefit amount in 2018 was due in part to the automatic cost-of-living benefit increase of 2.0 percent which became effective for December 2017 under the automatic-adjustment provisions in section 215(i) of the Social Security Act. In addition, new beneficiaries tend to have higher monthly benefit amounts than previous beneficiary cohorts, because their initial benefits are based on average wages, which tend to rise faster than the cost of living.

The Railroad Retirement Act requires an annual financial interchange between the Railroad Retirement program and the OASDI program. The purpose of the interchange is to put the OASI and DI Trust Funds in the same financial position in which they would have been had railroad employment always been covered directly by Social Security. The Railroad Retirement Board and the Social Security Administration calculated an interchange of $4.8 billion from the OASI Trust Fund to the Social Security Equivalent Benefit Account for June 2018.

The remaining $3.8 billion of cost for the OASI Trust Fund were for net administrative expenses. The Social Security Administration charges administrative expenses incurred to administer the OASI program directly to the trust fund on an estimated basis. Periodically, as actual expenses are recorded, adjustments are made to the allocations of administrative expenses for prior periods. These adjustments affect the OASI Trust Fund, the DI Trust Fund, the Hospital Insurance (HI) Trust Fund, the Supplementary Medical Insurance (SMI) Trust Fund, and the General Fund account for the Supplemental Security Income program, and include appropriate interest adjustments. As described earlier, the trust fund accounting records such interest adjustments under investment income.

For 2018, the cost incurred by the Social Security Administration to administer the OASI program was 86 percent of OASI net administrative expenses. The Social Security Administration charged such costs to the trust fund in

---

[1] Vocational rehabilitation services under the OASI program are furnished to disabled widow(er) beneficiaries and to those children of retired or deceased workers who receive benefits based on disabilities that began before age 22. The trust funds reimburse the providers of such services only in those cases where the services contributed to the successful rehabilitation of the beneficiary.

the amount of $3.3 billion in 2018. In addition, the Department of the Treasury charged the trust fund $0.5 billion in 2018 for services provided in administering the OASI program. A relatively small offset to administrative expenses of $1 million in 2018 represents income from miscellaneous receipts due to the trust fund, which may include refunds, penalties, fees, and other receipts.

Finally, the General Fund of the Treasury makes net reimbursements for administrative costs incurred by the Social Security Administration in performing certain legislatively mandated activities that are not directly related to paying OASI benefits. These reimbursements include $5 million in costs associated with union activities related to administering the OASI program and $1 million in costs of providing information to participants in certain pension plans in 2018. These miscellaneous reimbursements totaled $6 million in 2018.

The asset reserves shown for the OASI Trust Fund at the end of calendar year 2018 totaled $2,797.9 billion, consisting of $2,798.0 billion in U.S. Government obligations and, as an offset, an extension of credit of $102 million against securities to be redeemed within the first few days of the following year. The effective annual rate of interest earned by the reserves in the OASI Trust Fund during calendar year 2018 was 2.9 percent, slightly lower than the 3.0 percent earned during calendar year 2017. Table VI.A4, presented in appendix A, shows a detailed listing of OASI Trust Fund holdings by type of security, interest rate, and year of maturity at the end of calendar years 2017 and 2018.

By law, the Department of the Treasury must invest trust fund reserves in interest-bearing securities backed by the full faith and credit of the United States Government. The securities currently held by the OASI Trust Fund are entirely special issue securities sold by the Treasury only to the trust funds. These special issues are of two types: short-term certificates of indebtedness and longer-term bonds. Daily trust fund tax income is invested in the short-term certificates of indebtedness which mature on the next June 30 following the date of issue. The trust fund normally acquires long-term special-issue bonds when special issue securities of either type mature on June 30 and must be reinvested. The amount of long-term bonds acquired on June 30 is equal to the amount of special issue securities maturing (including accrued interest earnings), plus tax income for that day, less amounts required to meet cost on that day.

Section 201(d) of the Social Security Act provides that the obligations issued for purchase by the OASI and DI Trust Funds shall have maturities fixed

with due regard for the needs of the funds. The usual practice has been to reinvest the maturing special issue securities, as of each June 30, so that the value of the total portfolio of special issue securities maturing in each of the next 15 years are approximately equal. Accordingly, the Department of the Treasury, in consultation with the Chief Actuary of the Social Security Administration, selected the amounts and maturity dates of the special-issue bonds purchased on June 30, 2018, so that the maturity dates of the total portfolio of special issue securities were spread evenly to the extent possible over the 15-year period 2019 through 2033. The bonds purchased on that date have an interest rate of 2.875 percent, reflecting the average market yield, as of the last business day of the prior month, on all of the outstanding marketable U.S. obligations that are due or callable more than 4 years in the future. Table III.A7 shows additional details on the investment transactions during 2018, including the amounts of bonds purchased on June 30, 2018.

2. DI Trust Fund

Table III.A2 presents a statement of the income and cost of the Federal Disability Insurance Trust Fund in calendar year 2018, and of the asset reserves in the fund at the beginning and end of the calendar year.

Line entries in the DI statement are similar to those in the OASI statement. The explanations of the OASI entries generally apply to DI as well.

Of the $172.3 billion in total income, $169.2 billion was net payroll tax contributions.

Of the $146.8 billion of total cost, $143.7 billion was net benefit payments. The total level of net benefit payments in 2018 increased by 0.7 percent from total net benefit payments paid in 2017, largely due to an increase in average benefit amounts and an offsetting decrease in the average number of beneficiaries. Non-interest income, and total income, exceeded total cost in 2018 due primarily to the temporary reallocation of the payroll tax rate from OASI to DI for years 2016 through 2018. DI total cost exceeded non-interest income from 2005 to 2015, and exceeded total income to the trust fund from 2009 to 2015.

29

Table III.A2.—Operations of the DI Trust Fund, Calendar Year 2018
[In millions]

Total asset reserves, December 31, 2017		$71,480
Income:		
Net payroll tax contributions:		
Payroll tax contributions[a]	$169,769	
Payments from the General Fund of the Treasury for payroll tax contributions subject to refund[a]	-583	
Net payroll tax contributions[a]		169,186
Reimbursements from the General Fund:		
Reduction in payroll tax contributions due to P.L. 111-312, P.L. 112-78, and P.L. 112-96[a]	3	
Payroll tax credits due to P.L. 98-21[a]	[b]	
Net General Fund reimbursements[a]		3
Income based on taxation of benefit payments:		
Withheld from benefit payments to nonresident aliens	4	
All other, not subject to withholding[a]	526	
Total income from taxation of benefits[a]		530
Investment income and interest adjustments:		
Interest on investments	2,626	
Interest adjustments[c]	3	
Total investment income and interest adjustments		2,628
Gifts		—
Total income		172,347
Cost:		
Benefit payments:		
Monthly benefits[d]	143,656	
Reimbursement from the General Fund for unnegotiated checks	-19	
Payment for costs of vocational rehabilitation services for disabled beneficiaries .	103	
Net benefit payments[d]		143,741
Financial interchange with the Railroad Retirement "Social Security Equivalent Benefit Account"		174
Administrative expenses:		
Costs incurred by:		
Social Security Administration	2,745	
Department of the Treasury	96	
Demonstration projects	19	
Miscellaneous reimbursements from the General Fund[e]	-4	
Net administrative expenses		2,856
Total cost		146,770
Net increase in asset reserves		25,577
Total invested assets	97,201	
Undisbursed balances[f]	-144	
Total asset reserves, December 31, 2018		97,057

[a] Includes adjustments for prior calendar years.

[b] Between -$0.5 and $0.5 million.

[c] Includes: (1) interest on adjustments in the allocation of administrative expenses between the trust fund and the General Fund account for the Supplemental Security Income program, (2) interest arising from the revised allocation of administrative expenses among the trust funds, and (3) interest on certain reimbursements to the trust fund.

[d] Includes net reductions for the recovery of overpayments.

[e] Reimbursements for costs incurred in performing legislatively mandated activities not directly related to administering the DI program.

[f] A negative balance represents a situation where the actual cash payments exceeded the amount of invested securities of the DI Trust Fund that were redeemed to make such payments. In this situation, future redemption of additional invested securities will be required to pay for this shortfall.

Note: Totals do not necessarily equal the sums of rounded components.

During 2018, the reserves in the DI Trust Fund increased by $25.6 billion, from $71.5 billion at the end of 2017 to $97.1 billion at the end of 2018. This $97.1 billion consisted of $97.2 billion in U.S. Government obligations and, as an offset, an extension of credit of $144 million against securities to be redeemed within the first few days of the following year. The effective annual rate of interest earned by the asset reserves in the DI Trust Fund during calendar year 2018 was 3.1 percent, slightly lower than the 3.2 percent earned during calendar year 2017. Table VI.A5 shows a detailed listing of DI Trust Fund holdings by type of security, interest rate, and year of maturity at the end of calendar years 2017 and 2018.

Section 201(d) of the Social Security Act provides that the Treasury securities issued for purchase by the OASI and DI Trust Funds shall have maturities fixed with due regard for the needs of the funds. Each year, bond purchases for each trust fund are made on June 30, taking into account the projected reserve depletion date in the most recently issued Trustees Report. The usual practice has been to reinvest the maturing special issue securities, as of each June 30, so that the values of the securities maturing in each of the next 15 years are approximately equal. However, as of June 2018, the Trustees projected that the reserves in the DI Trust Fund would be depleted within 15 years. Therefore, the Department of the Treasury, in consultation with the Chief Actuary of the Social Security Administration, selected the amounts and maturity dates of the DI special-issue bonds purchased on June 30, 2018, so that the bonds would mature over the 14-year period 2019-32. The bonds purchased have an interest rate of 2.875 percent, reflecting the average market yield, as of the last business day of the prior month, on the outstanding marketable U.S. obligations that are due or callable more than 4 years in the future. As of June 30, 2018, most of the invested asset reserves of the DI Trust Fund had maturity dates of June 30 in 2019 through 2023, so this investment approach required that all bond purchases on June 30, 2018 be split over the maturity dates of June 30, 2024 through June 30, 2032. Table III.A7 shows details on investment transactions during 2018.

3.   OASI and DI Trust Funds, Combined

Table III.A3 presents a statement of the operations of the OASI and DI Trust Funds on a hypothetical combined basis.[1] The entries in this table represent the sums of the corresponding values from tables III.A1 and III.A2. The two preceding subsections that cover OASI and DI provide a description of the nature of these income and cost transactions.

---

[1] The OASI and DI Trust Funds are distinct legal entities which operate independently. To illustrate the actuarial status of the program as a whole, the fund operations are often combined on a hypothetical basis.

Financial Operations and Legislative Changes

**Table III.A3.—Operations of the Combined OASI and DI Trust Funds,
Calendar Year 2018**
[In millions]

Total asset reserves, December 31, 2017		$2,891,789
Income:		
Net payroll tax contributions:		
Payroll tax contributions[a]	$888,054	
Payments from the General Fund of the Treasury for payroll tax contributions sub-ject to refund[a]	-3,003	
Net payroll tax contributions[a]		885,051
Reimbursements from the General Fund:		
Reduction in payroll tax contributions due to P.L. 111-312, P.L. 112-78, and P.L. 112-96[a]	21	
Payroll tax credits due to P.L. 98-21[a]	[b]	
Net General Fund reimbursements[a]		21
Income based on taxation of benefit payments:		
Withheld from benefit payments to nonresident aliens	220	
All other, not subject to withholding[a]	34,797	
Total income from taxation of benefits[a]		35,017
Investment income and interest adjustments:		
Interest on investments	83,280	
Interest adjustments[c]	3	
Total investment income and interest adjustments		83,283
Gifts		[b]
Total income		1,003,373
Cost:		
Benefit payments:		
Monthly benefits and lump-sum death payments[d]	988,580	
Reimbursement from the General Fund for unnegotiated checks	-55	
Payment for costs of vocational rehabilitation services for disabled beneficiaries .	111	
Net benefit payments[d]		988,635
Financial interchange with the Railroad Retirement "Social Security Equivalent Benefit Account"		4,942
Administrative expenses:		
Costs incurred by:		
Social Security Administration	6,022	
Department of the Treasury	625	
Offsetting miscellaneous receipts	-1	
Demonstration projects	19	
Miscellaneous reimbursements from the General Fund[e]	-10	
Net administrative expenses		6,656
Total cost		1,000,233
Net increase in asset reserves		3,140
Total invested assets	2,895,175	
Undisbursed balances[f]	-246	
Total asset reserves, December 31, 2018		2,894,929

[a] Includes adjustments for prior calendar years.

[b] Between -$0.5 and $0.5 million.

[c] Includes: (1) interest on adjustments in the allocation of administrative expenses between the trust funds and the General Fund account for the Supplemental Security Income program, (2) interest arising from the revised allocation of administrative expenses among the trust funds, and (3) interest on certain reimbursements to the trust funds.

[d] Includes net reductions for the recovery of overpayments.

[e] Reimbursements for costs incurred in performing certain legislatively mandated activities not directly related to administering the OASI and DI programs.

[f] A negative balance represents a situation where the actual cash payments exceeded the amount of invested securities of the OASI and DI Trust Funds that were redeemed to make such payments. In this situation, future redemption of additional invested securities will be required to pay for this shortfall.

Note: Totals do not necessarily equal the sums of rounded components.

Table III.A4 compares estimates of total income and total cost for calendar year 2018 from the intermediate projections in the 2014 through 2018 Trustees Reports to the corresponding actual amounts for 2018.

Table III.A4.—Comparison of Actual Calendar Year 2018 Trust Fund Operations With Estimates Made in Prior Reports, Based on Intermediate Assumptions[a]
[Amounts in billions]

	Total income [b]		Total cost	
	Amount	Difference from actual (percent)	Amount	Difference from actual (percent)
OASI Trust Fund:				
Estimate in 2014 report	$965.3	16.2	$920.5	7.9
Estimate in 2015 report	949.7	14.3	909.8	6.6
Estimate in 2016 report	873.2	5.1	873.2	2.3
Estimate in 2017 report	873.6	5.1	859.0	.6
Estimate in 2018 report	828.2	-.3	853.6	[c]
Actual amount	831.0	—	853.5	—
DI Trust Fund:				
Estimate in 2014 report	[d]	[d]	167.1	13.9
Estimate in 2015 report	[d]	[d]	165.7	12.9
Estimate in 2016 report	181.4	5.3	159.4	8.6
Estimate in 2017 report	182.6	6.0	152.5	3.9
Estimate in 2018 report	172.9	.3	149.3	1.7
Actual amount	172.3	—	146.8	—
OASI and DI Trust Funds, combined:				
Estimate in 2014 report	1,105.0	10.1	1,087.6	8.7
Estimate in 2015 report	1,088.4	8.5	1,075.5	7.5
Estimate in 2016 report	1,054.7	5.1	1,032.5	3.2
Estimate in 2017 report	1,056.2	5.3	1,011.5	1.1
Estimate in 2018 report	1,001.1	-.2	1,002.8	.3
Actual amount	1,003.4	—	1,000.2	—

[a] Percentage differences are calculated prior to rounding.

[b] "Actual" income for 2018 reflects adjustments to payroll tax contributions for prior calendar years (see appendix A for description of these adjustments). "Estimated" income also includes such adjustments, but on an estimated basis.

[c] Between -0.05 and 0.05 percent.

[d] In the annual reports for 2014 and 2015, the DI Trust Fund was projected to become depleted in calendar year 2016 under the intermediate assumptions. Under those circumstances, scheduled benefits could not be paid in full on a timely basis, so that certain projected items of income such as income from taxing benefits and interest on trust fund reserves could not be meaningfully projected. Accordingly, total DI Trust Fund income was not reported for 2018 in those earlier reports. Following the tax rate reallocation enacted in the Bipartisan Budget Act of 2015, the DI Trust Fund was not projected to become depleted until after 2018 in the 2016 through 2018 reports, and thus an estimate for total income was reported. Appendix A presents a detailed description of the components of income and cost, along with complete historical values.

Note: Totals do not necessarily equal the sums of rounded components.

A number of factors contribute to differences between estimates and subsequent actual amounts, including: (1) actual values for key demographic, economic, and other variables that differ from earlier assumed levels; and (2) legislation that was enacted or other administrative initiatives that were finalized after the Trustees completed their estimates.

At the end of calendar year 2018, the OASDI program was providing monthly benefits to about 62.9 million people. The OASI Trust Fund was

providing benefits to about 52.7 million people and the DI Trust Fund was providing benefits to about 10.2 million people. The number of people receiving benefits from the OASI Trust Fund grew by 2.4 percent while the number of people receiving DI benefits fell by 2.4 percent during calendar year 2018. These changes are in large part due to the gradual aging of the population, with the earliest cohorts of the baby-boom generation now moving above normal retirement age, where DI benefits are no longer applicable. Table III.A5 shows the estimated distributions of benefit payments in calendar years 2017 and 2018, by type of beneficiary, for each trust fund separately.

Table III.A5.—Distribution of Benefit Payments by Type of Beneficiary or Payment, Calendar Years 2017 and 2018
[Amounts in millions]

	Calendar year 2017		Calendar year 2018	
	Amount	Percentage of total	Amount	Percentage of total
Total OASDI benefit payments	$941,461	100.0	$988,580	100.0
OASI benefit payments	798,722	84.8	844,924	85.5
DI benefit payments	142,740	15.2	143,656	14.5
OASI benefit payments, total	798,722	100.0	844,924	100.0
Monthly benefits:				
Retired workers and auxiliaries	680,233	85.2	723,542	85.6
Retired workers	644,181	80.7	686,099	81.2
Spouses	30,493	3.8	31,615	3.7
Children	5,559	.7	5,828	.7
Survivors of deceased workers	118,279	14.8	121,175	14.3
Aged widows and widowers	94,307	11.8	96,623	11.4
Disabled widows and widowers	2,375	.3	2,372	.3
Parents	20	a	20	a
Children	20,048	2.5	20,660	2.4
Widowed mothers and fathers caring for child beneficiaries	1,529	.2	1,500	.2
Lump-sum death payments	210	a	207	a
DI benefit payments, total	142,740	100.0	143,656	100.0
Disabled workers	133,871	93.8	134,962	93.9
Spouses	551	.4	536	.4
Children	8,318	5.8	8,158	5.7

[a] Less than 0.05 percent.

Note: Benefits are monthly benefits and lump-sum death payments. Totals do not necessarily equal the sums of rounded components.

Net administrative expenses of the OASI and DI Trust Funds in calendar year 2018 totaled $6.7 billion, equal to 0.7 percent each of total cost and total income. Table III.A6 shows corresponding percentages for each trust fund separately and for OASDI as a whole for the last 5 years.

Table III.A6.—Administrative Expenses as a Percentage of Total Income and of Total Cost, Calendar Years 2014-2018

Calendar year	OASI Trust Fund		DI Trust Fund		OASI and DI Trust Funds, combined	
	Total income	Total cost	Total income	Total cost	Total income	Total cost
2014	0.4	0.4	2.6	2.0	0.7	0.7
2015	.4	.4	2.4	1.9	.7	.7
2016	.4	.4	1.7	1.9	.7	.7
2017	.4	.5	1.6	1.9	.6	.7
2018	.5	.4	1.7	1.9	.7	.7

The acquisition and redemption of securities during calendar year 2018 changed the invested reserves of the OASI and DI Trust Funds. Table III.A7 presents investment transactions for each fund separately and combined.

Table III.A7.—Trust Fund Investment Transactions, Calendar Year 2018
[In millions]

	OASI Trust Fund	DI Trust Fund	OASI and DI Trust Funds, combined
Invested asset reserves, December 31, 2017[a]	$2,820,368	$71,624	$2,891,992
Acquisitions:			
Special issue securities:			
Certificates of indebtedness	801,981	174,308	976,289
Bonds[b]	176,890	32,617	209,507
Total acquisitions	978,870	206,925	1,185,795
Redemptions:			
Special issue securities:			
Certificates of indebtedness	797,475	172,027	969,502
Bonds	203,789	9,321	213,110
Total redemptions	1,001,265	181,348	1,182,613
Net increase in invested asset reserves	-22,394	25,577	3,183
Invested asset reserves, December 31, 2018[a]	2,797,974	97,201	2,895,175

[a] Invested asset reserves differ from total asset reserves by the amount of undisbursed balances. See tables VI.A4 and VI.A5 for details.
[b] Purchased on June 30, 2018. The interest rate on these purchases was 2.875 percent.

Note: Investments are shown at par value. Totals do not necessarily equal the sums of rounded components.

B. SOCIAL SECURITY AMENDMENTS SINCE THE 2018 REPORT

Since the Trustees submitted the 2018 report to Congress, one policy change has been implemented that is expected to have notable effects on the OASDI program.

The Social Security Administration (SSA) implemented the Disability Redesign Prototype model in ten states in 1999. Among other features, the prototype model eliminated the reconsideration step in the disability appeals process. Beginning in 2019, SSA is reinstating the reconsideration step in these states, which will make the process uniform nationwide. This reinstatement is expected to decrease disability incidence rates very slightly beginning in 2020, and thus has a small but significant positive effect on the financial status of the DI program over the short-range period and a negligible positive effect over the long-range projection period.

This report also incorporates the effects of one change in law and one change in policy with negligible effects over the short-range and long-range projection periods:

- The Tribal Social Security Fairness Act of 2018, Public Law 115-243, was enacted on September 20, 2018. At the request of any Indian tribe, the Social Security Administration is directed to enter into an agreement to extend Social Security coverage to tribal council members. Such agreements, which are irrevocable, apply to all members of the council and to all services performed in their capacity as council members.

- The Deferred Action for Childhood Arrivals, or DACA, policy was implemented on June 15, 2012, enabling certain other-than-lawful-permanent-resident immigrants who entered the United States as children to receive employment authorization. DACA was rescinded by the Administration on September 5, 2017, directing a phase out of the program to be carried out over the following two years. As of the time this report was drafted, the phase out has been held up in the court system. This year's report accordingly assumes the phase out will be completed one year later than assumed in last year's report.

Sections IV.A.4 and IV.B.6 of this report provide further description of the magnitude of effects on the financial status of the OASDI program.

IV. ACTUARIAL ESTIMATES

This chapter presents actuarial estimates of the future financial condition of the Social Security program. These estimates show the income, cost, and asset reserves or unfunded obligation of the OASI and DI Trust Funds: (1) in dollars over the 10-year short-range period; and (2) as a percentage of taxable payroll, as a percentage of gross domestic product, and in present-value dollars over the 75-year long-range period. In addition, the chapter discusses a variety of measures of the adequacy of current program financing. This report distinguishes between: (1) the cost (obligations) of the program, which includes all past and future benefits scheduled under current law; and (2) expenditures, which include actual payments for the past plus only the portion of projected program cost that would be payable with the financing provisions in current law.

This chapter presents the estimates and measures of trust fund financial adequacy for the short-range period (2019 through 2028) first, followed by estimates and measures of actuarial status for the long-range period (2019 through 2093). Summary measures are also provided for trust fund status over the infinite horizon. As described in chapter II of this report, these estimates depend upon a broad set of demographic, economic, and programmatic factors. This chapter presents estimates under three sets of assumptions to show a wide range of possible outcomes, because assumptions related to these factors are subject to uncertainty. The intermediate set of assumptions, designated as alternative II, reflects the Trustees' best estimate of future experience; the low-cost alternative I is significantly more optimistic and the high-cost alternative III is significantly more pessimistic for the trust funds' future financial outlook. The tables of this report show the intermediate estimates first, followed by the low-cost and high-cost estimates. Chapter V describes these three sets of assumptions, along with the actuarial methods used to produce the estimates. Appendix D and appendix E present two additional methods to illustrate the uncertainty of the projections. Appendix D presents sensitivity analyses of the effects of variation in individual factors and appendix E presents probability distributions generated by a stochastic model.

In this report, the DI Trust Fund reserve depletion date is again extended, as it was for the last three reports. The experience for disability beneficiaries and benefit levels following the last economic recession has not followed expectations, so substantial revisions have been required in the reports of 2016, 2017, 2018, and 2019.

In 2014, initial disability applications to the states' Disability Determination Services (DDS) dropped by 4.3 percent compared to 2013. For the 2015 report, the Trustees assumed that applications would drop by another

1.0 percent in 2015, but the decline was actually 4.8 percent. This larger-than-anticipated decline in applications extended reserve depletion by about one year, in addition to the six-year extension due to the reallocation of tax rates included in the Bipartisan Budget Act of 2015. Together, these changes extended the DI Trust Fund reserve depletion year from 2016 for the 2015 report to 2023 for the 2016 report. The change in the reserve depletion date due to DI application experience in the 2016 report was relatively modest, because the Trustees had assumed a 9.1 percent rebound in applications for 2016. However, applications instead dropped again in 2016, by 7.1 percent. Largely on this basis, the 2017 report assumed a more gradual rise in applications after the very low level in 2016, with an increase of only 2.6 percent for 2017. This more gradual path resulted in an additional five-year extension of the projected DI reserve depletion date, to 2028 for the 2017 report.

Applications once again dropped in 2017, by 4.1 percent, a yet lower starting point. For the 2018 report, the Trustees assumed a steeper rise in applications and incidence rates in order to reach the unchanged ultimate levels of incidence rates by 2027. Even with this steep rise, applications and incidence rates were lower for much of the first ten years of the projection period. The extension of the reserve depletion date from 2028 to 2032 for the 2018 report owes largely to this further drop in applications in 2017, partially mitigated by the more rapid rebound to the ultimate assumed level.

This year's projections reflect an additional 4.8 percent drop in disability applications for 2018 compared to 2017. Steady declines in applications since 2010, and the resulting lower levels of disability beneficiaries, have caused the annual cost of the DI program to become much closer to annual income, making the DI Trust Fund reserve depletion date very sensitive to small changes in income and cost. As a result, lower applications in 2018 and a slightly more gradual rise to the ultimate incidence rate have, by themselves, extended the reserve depletion date by 14 years.

In addition, the Trustees have changed the assumed ultimate age-sex-adjusted incidence rate, taking into account long-term averages of incidence rates over multiple economic cycles. The drop in incidence rates since 2010, which is due to many factors including the recent economic recovery and the declining unemployment rate, has lowered long-term average incidence rates. Therefore, the Trustees have reduced the assumed ultimate age-sex-adjusted incidence rate from 5.4 per thousand to 5.2 per thousand exposed, the same incidence rate that had been assumed for the 2008 through 2011 Trustees Reports. This change in the ultimate disability incidence rate added another five years to the reserve depletion date. Finally, restoring the reconsideration step for disability determinations added one more year to the reserve depletion date. The 20-year increase in the projected reserve deple-

tion date for the DI Trust Fund, from 2032 in last year's report to 2052 for this report, extends the projected DI depletion date beyond the projected OASI depletion date for the first time since the 1983 Trustees Report.

A. SHORT-RANGE ESTIMATES

The Trustees consider the trust funds to be solvent at any point in time if the funds can pay scheduled benefits in full on a timely basis. A standard measure for assessing solvency is the "trust fund ratio," which is the reserves in a fund at the beginning of a year (not including advance tax transfers) expressed as a percentage of the cost during the year. A positive trust fund ratio indicates that the trust fund was solvent at the end of the prior year. The trust fund ratio represents the proportion of a year's cost which the reserves available at the beginning of that year can cover. The Trustees assume that a trust fund ratio of 100 percent of annual program cost provides a reasonable "contingency reserve." Maintaining a reasonable contingency reserve is important because the trust funds do not have borrowing authority. After reserves are depleted, the trust funds would be unable to pay scheduled benefits in full on a timely basis if annual revenue were less than annual cost. Unexpected events, such as severe economic recessions, can quickly diminish reserves. In such cases, a reasonable contingency reserve can maintain the ability to pay scheduled benefits while giving lawmakers time to address possible changes to the program.

The test of short-range financial adequacy applies to the OASI and DI Trust Funds individually and combined on a hypothetical basis.[1] If the estimated trust fund ratio is at least 100 percent at the beginning of the projection period, the test requires that it remain at or above 100 percent throughout the 10-year period. If the ratio is initially less than 100 percent, then it must reach at least 100 percent within 5 years (without reserve depletion at any time during this period) and then remain at or above 100 percent throughout the remainder of the 10-year period. This test is applied using the estimates based on the intermediate assumptions. If either trust fund fails this test, then program solvency in the next 10 years is in question, and lawmakers should take prompt action to improve short-range financial adequacy.

1. Operations of the OASI Trust Fund

This subsection presents estimates, based on the assumptions described in chapter V, of the operations and financial status of the OASI Trust Fund for the period 2019 through 2028. These estimates assume that there are no further changes in the statutory provisions and regulations under which the

---

[1] The OASI and DI Trust Funds are distinct legal entities which operate independently. To illustrate the actuarial status of the program as a whole, the fund operations are often combined on a hypothetical basis.

OASDI program currently operates beyond the changes since last year's report indicated in section III.B.[1]

Estimates of the OASI Trust Fund operations presented in table IV.A1 indicate that the asset reserves of the OASI Trust Fund are projected to decrease in all years after 2019 under the intermediate assumptions, increase in all years after 2018 under the low-cost assumptions, and decrease in all years through 2028 under the high-cost assumptions. Trust fund ratios decline throughout the 10-year projection period under all three sets of assumptions. Based on the intermediate assumptions, the reserves of the OASI Trust Fund continue to exceed 100 percent of annual cost through 2028. Consequently, the OASI Trust Fund satisfies the test of short-range financial adequacy. See figure IV.A1 for an illustration of these results.

Table IV.A1.—Operations of the OASI Trust Fund, Calendar Years 2014-2028[a]
[Dollar amounts in billions]

	Income					Cost[b]				Asset Reserves[b]		
Calendar year	Total	Net payroll tax contributions	GF reimbursements[c]	Taxation of benefits[d]	Net interest	Total	Scheduled benefits	Administrative costs	RRB interest change	Net increase during year	Amount at end of year	Trust fund ratio[e]
Historical data:												
2014 ..	$769.4	$646.2	$0.4	$28.0	$94.8	$714.2	$706.8	$3.1	$4.3	$55.2	$2,729.2	374
2015 ..	801.6	679.5	.3	30.6	91.2	750.5	742.9	3.4	4.3	51.0	2,780.3	364
2016 ..	797.5	678.8	.1	31.6	87.0	776.4	768.6	3.5	4.3	21.1	2,801.3	358
2017 ..	825.6	706.5	f	35.9	83.2	806.7	798.7	3.7	4.3	19.0	2,820.3	347
2018 ..	831.0	715.9	f	34.5	80.7	853.5	844.9	3.8	4.8	-22.4	2,797.9	330
Intermediate:												
2019 ..	917.6	803.4	f	35.3	79.0	910.3	901.6	3.7	4.9	7.3	2,805.2	307
2020 ..	961.3	844.6	f	38.5	78.2	962.9	954.0	3.9	4.9	-1.6	2,803.6	291
2021 ..	1,005.2	886.0	f	42.3	76.9	1,025.7	1,016.8	4.1	4.9	-20.5	2,783.1	273
2022 ..	1,052.1	930.7	f	46.2	75.2	1,092.8	1,083.4	4.2	5.2	-40.7	2,742.4	255
2023 ..	1,100.9	976.1	f	50.2	74.6	1,164.2	1,154.6	4.3	5.3	-63.3	2,679.1	236
2024 ..	1,153.8	1,024.1	f	54.7	74.9	1,240.2	1,230.4	4.4	5.4	-86.4	2,592.7	216
2025 ..	1,206.4	1,071.9	f	59.7	74.8	1,319.2	1,309.2	4.6	5.5	-112.8	2,479.9	197
2026 ..	1,272.5	1,122.1	f	75.2	75.2	1,402.1	1,391.8	4.7	5.6	-129.7	2,350.2	177
2027 ..	1,330.3	1,173.6	f	81.7	75.0	1,489.8	1,479.3	4.9	5.6	-159.5	2,190.7	158
2028 ..	1,388.0	1,226.3	f	88.8	72.9	1,584.6	1,573.9	5.0	5.7	-196.6	1,994.1	138
Low-cost:												
2019 ..	926.6	810.8	f	35.3	80.4	909.9	901.3	3.7	4.9	16.7	2,814.5	307
2020 ..	994.3	872.6	f	38.8	82.8	969.5	960.7	3.9	4.9	24.8	2,839.3	290
2021 ..	1,061.1	933.4	f	42.8	84.9	1,037.1	1,028.2	4.1	4.9	24.0	2,863.3	274
2022 ..	1,131.9	997.1	f	46.9	87.9	1,110.5	1,101.1	4.3	5.2	21.4	2,884.7	258
2023 ..	1,207.1	1,062.8	f	51.3	92.9	1,189.0	1,179.2	4.4	5.3	18.1	2,902.8	243

---

[1] The estimates shown in this subsection reflect 12 months of scheduled benefits in each year of the short-range projection period. In practice, the actual payment dates have at times shifted over calendar year boundaries as a result of the statutory requirement for early delivery of benefit payments when the normal check delivery date is a Saturday, Sunday, or legal public holiday.

Table IV.A1.—Operations of the OASI Trust Fund, Calendar Years 2014-2028[a] (Cont.)
[Dollar amounts in billions]

Calendar year	Income					Cost[b]				Asset Reserves[b]		
	Total	Net payroll tax contributions	GF reimbursements[c]	Taxation of benefits[d]	Net interest	Total	Scheduled benefits	Administrative costs	RRB interchange	Net increase during year	Amount at end of year	Trust fund ratio[e]
2024 ..	$1,288.5	$1,133.0	f	$56.2	$99.3	$1,273.0	$1,262.9	$4.6	$5.4	$15.5	$2,918.3	228
2025 ..	1,373.2	1,205.2	f	61.6	106.4	1,361.0	1,350.6	4.9	5.5	12.2	2,930.5	214
2026 ..	1,474.4	1,281.1	f	78.0	115.4	1,454.3	1,443.6	5.1	5.6	20.1	2,950.6	202
2027 ..	1,569.7	1,359.5	f	85.2	125.0	1,554.2	1,543.2	5.3	5.7	15.6	2,966.2	190
2028 ..	1,669.5	1,442.1	f	93.2	134.2	1,662.9	1,651.6	5.5	5.7	6.6	2,972.8	178
High-cost:												
2019 ..	909.2	796.0	f	35.3	77.9	910.9	902.3	3.7	4.9	-1.7	2,796.1	307
2020 ..	918.3	806.5	f	38.4	73.4	959.4	950.5	3.9	5.0	-41.1	2,755.0	291
2021 ..	933.7	823.6	f	42.0	68.1	1,018.2	1,009.1	4.0	5.0	-84.5	2,670.5	271
2022 ..	959.7	850.9	f	45.6	63.1	1,080.6	1,071.2	4.1	5.3	-120.9	2,549.6	247
2023 ..	987.8	879.9	f	49.5	58.4	1,146.6	1,137.1	4.2	5.4	-158.8	2,390.8	222
2024 ..	1,019.3	911.4	f	53.7	54.2	1,216.4	1,206.7	4.3	5.5	-197.1	2,193.7	197
2025 ..	1,051.6	943.9	f	58.3	49.5	1,288.2	1,278.4	4.4	5.5	-236.6	1,957.1	170
2026 ..	1,095.9	978.2	f	73.1	44.6	1,363.1	1,353.1	4.4	5.6	-267.2	1,690.0	144
2027 ..	1,130.0	1,011.8	f	79.1	39.1	1,441.5	1,431.4	4.5	5.6	-311.5	1,378.5	117
2028 ..	1,160.9	1,044.4	f	85.5	31.0	1,525.6	1,515.3	4.6	5.6	-364.7	1,013.8	90

[a] Appendix A presents a detailed description of the components of income and cost, along with complete historical values.

[b] Amounts for 2015 and 2016 are adjusted to include in 2016 operations those benefit payments regularly scheduled in the law to be paid on January 3, 2016, which were actually paid on December 31, 2015 as required by the statutory provision for early benefit payments when the normal delivery date is on a weekend or holiday. Such shifts in payments across calendar years have occurred in the past and will occur periodically in the future whenever January 3rd falls on a Sunday. In order to provide a consistent perspective on trust fund operations over time, all trust fund operations in each year reflect the 12 months of benefits that are regularly scheduled for payment in that year.

[c] Includes reimbursements from the General Fund of the Treasury to the OASI Trust Fund for: (1) the cost of payroll tax credits provided to employees in 1984 and self-employed persons in 1984-89 by Public Law 98-21; (2) the cost in 2009-17 of excluding certain self-employment earnings from SECA taxes under Public Law 110-246; and (3) payroll tax revenue forgone under the provisions of Public Laws 111-147, 111-312, 112-78, and 112-96.

[d] Revenue from taxation of benefits is the amount that would be assessed on benefit amounts scheduled in the law.

[e] The "Trust fund ratio" column represents reserves at the beginning of a year (which are identical to reserves at the end of the prior year shown in the "Amount at end of year" column) as a percentage of cost for the year.

[f] Between -$50 million and $50 million.

Note: Totals do not necessarily equal the sums of rounded components.

Figure IV.A1.—Short-Range OASI and DI Trust Fund Ratios
[Asset reserves as a percentage of annual cost]
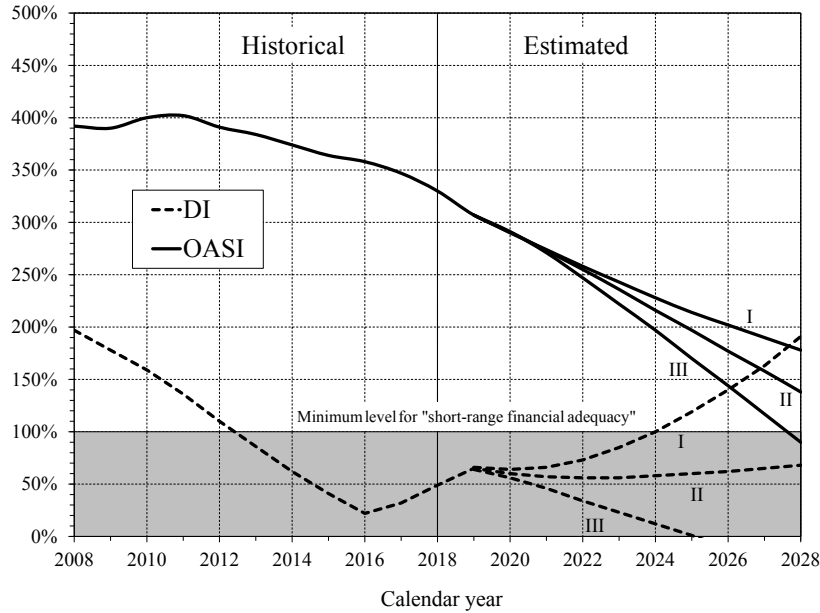
The estimated income shown in table IV.A1 increases annually under each set of assumptions throughout the short-range projection period. The estimated increases in income result primarily from the projected increases in OASDI taxable payroll. Employment increases in every year through 2028 for all three alternatives, with the exception of small decreases in covered employment in 2021 for the high-cost alternative: the number of covered workers increases under alternatives I, II, and III from 176 million during calendar year 2018 to about 190 million, 186 million, and 182 million, respectively, in 2028[1]. The total annual amount of taxable payroll increases in every year through 2028 for each alternative. Total taxable payroll increases from $7,262 billion in 2018 to $13,639 billion, $11,591 billion, and $9,865 billion in 2028, on the basis of alternatives I, II, and III, respectively.[2] These increases in taxable payroll are due primarily to: (1) projected increases in employment levels as the working age population increases; (2) trend increases in average earnings in covered employment (reflecting both real growth and price inflation); (3) increases in the contribution and benefit base under the automatic-adjustment provisions; and (4) growth in employment and average earnings, temporarily higher than trend, as the

---

[1] See table IV.B3.
[2] See table VI.G6.

economy continues to recover from the severe economic downturn that began in late 2007.

Interest earnings contribute to the overall projected level of trust fund income during this period. Interest income declines generally at a slow rate under the intermediate assumptions and much faster under the high-cost assumptions, and increases generally under the low-cost assumptions, due to the net effects of changes in reserve levels and the patterns of projected interest rates. Under the intermediate assumptions, interest also declines as a share of total OASI Trust Fund income reaching 5 percent of total trust fund income for 2028, as compared to 10 percent for 2018.

Rising OASI cost from 2018 through 2028 reflects automatic benefit increases as well as the upward trend in the number of beneficiaries and in the average monthly earnings underlying benefits. The steady growth in the number of OASI beneficiaries in the past and the expected future growth result both from the increase in the aged population and from the increase in the proportion of the population that is eligible for benefits.

The Treasury invests OASI income in financial securities, generally special public-debt obligations of the U.S. Government. The revenue used to make these purchases flows to the General Fund of the Treasury. The trust fund earns interest on these securities, and the Treasury invests the proceeds from maturing securities in new securities if not immediately needed to pay program costs. Program expenditures require the redemption of trust fund securities, generally prior to maturity, to cover the payments made by the General Fund of the Treasury on behalf of the trust fund. [1]

2. Operations of the DI Trust Fund

Table IV.A2 shows the estimated operations and financial status of the DI Trust Fund during calendar years 2019 through 2028 under the three sets of assumptions, together with values for actual experience during 2014 through 2018. Non-interest income for DI was much higher in 2016 through 2018 than in 2015, due to the temporary payroll tax rate reallocation from OASI to DI in these years. For 2019, non-interest income is less than DI cost. Non-interest income increases steadily thereafter under each alternative, with the exception of a small decrease in 2020 under the high-cost assumptions, due to most of the same factors described previously for the OASI Trust Fund beginning on page 42. DI cost grows steadily throughout the period under each alternative. Under the intermediate assumptions, reserves decline through 2020, then increase through 2028. Under the high-cost assumptions, DI reserves decline after 2018 until depletion in the first quarter of 2025.

---

[1] For an explanation of the interrelationship between the Medicare and Social Security trust funds and the overall Federal budget, see appendix F of the 2019 Medicare Trustees Report.

Actuarial Estimates

Under the low-cost assumptions, reserves increase throughout the short-range projection period except for a small decrease in 2019.

Table IV.A2.—Operations of the DI Trust Fund, Calendar Years 2014-2028[a]

[Dollar amounts in billions]

Calendar year	Total	Net payroll tax contributions	GF reimburse-ments[c]	Taxa-tion of bene-fits[d]	Net interest	Total	Sched-uled benefits	Admin-istra-tive costs	RRB inter-change	Net increase during year	Amount at end of year	Trust fund ratio[e]
Historical data:												
2014 . . .	$114.9	$109.7	$0.1	$1.7	$3.4	$145.1	$141.7	$2.9	$0.4	-$30.2	$60.2	62
2015 . . .	118.6	115.4	f	1.1	2.1	146.6	143.4	2.8	.4	-28.0	32.3	41
2016 . . .	160.0	157.4	f	1.2	1.4	145.9	142.8	2.8	.4	14.1	46.3	22
2017 . . .	171.0	167.1	f	2.0	1.9	145.8	142.8	2.8	.2	25.1	71.5	32
2018 . . .	172.3	169.2	f	.5	2.6	146.8	143.7	2.9	.2	25.6	97.1	49
Intermediate:												
2019 . . .	143.4	138.8	f	1.6	3.0	149.8	146.9	2.8	.1	-6.4	90.7	65
2020 . . .	148.1	143.4	f	1.7	3.0	150.9	147.8	3.0	.1	-2.7	87.9	60
2021 . . .	155.2	150.4	f	1.8	3.0	154.6	151.5	3.1	.1	.6	88.5	57
2022 . . .	163.0	158.0	f	1.9	3.0	159.2	155.8	3.3	.1	3.8	92.3	56
2023 . . .	171.1	165.7	f	2.0	3.3	164.5	160.8	3.6	.1	6.6	99.0	56
2024 . . .	179.9	173.9	f	2.2	3.8	171.3	167.4	3.9	f	8.6	107.5	58
2025 . . .	188.7	182.0	f	2.4	4.3	179.2	175.1	4.1	f	9.5	117.0	60
2026 . . .	198.5	190.5	f	3.0	4.9	187.7	183.3	4.4	f	10.7	127.8	62
2027 . . .	208.1	199.3	f	3.3	5.5	196.6	191.9	4.7	f	11.5	139.3	65
2028 . . .	218.1	208.2	f	3.5	6.3	204.0	199.0	4.9	f	14.1	153.4	68
Low-cost:												
2019 . . .	144.9	140.1	f	1.6	3.2	147.7	144.9	2.8	.1	-2.8	94.2	66
2020 . . .	153.4	148.2	f	1.7	3.6	148.3	145.2	3.0	.1	5.2	99.4	64
2021 . . .	164.4	158.5	f	1.8	4.2	150.9	147.7	3.1	.1	13.5	112.9	66
2022 . . .	176.3	169.3	f	1.9	5.1	154.5	151.1	3.4	.1	21.8	134.7	73
2023 . . .	189.1	180.5	f	2.0	6.7	158.8	155.1	3.7	f	30.3	165.0	85
2024 . . .	203.3	192.4	f	2.1	8.8	164.6	160.6	4.0	f	38.7	203.7	100
2025 . . .	218.3	204.6	f	2.3	11.4	171.5	167.2	4.3	f	46.8	250.5	119
2026 . . .	235.1	217.5	f	2.9	14.7	179.3	174.6	4.6	f	55.8	306.3	140
2027 . . .	252.4	230.9	f	3.1	18.5	187.5	182.5	5.0	f	65.0	371.3	163
2028 . . .	271.4	244.9	f	3.4	23.1	194.5	189.1	5.3	f	76.9	448.2	191

Table IV.A2.—Operations of the DI Trust Fund, Calendar Years 2014-2028[a] (Cont.)
[Dollar amounts in billions]

Calendar year	Total	Income				Cost[b]				Asset Reserves[b]		
		Net pay-roll tax contri-butions	GF reim-burse-ments[c]	Taxa-tion of bene-fits[d]	Net interest	Total	Sched-uled benefits	Admin-istra-tive costs	RRB inter-change	Net increase during year	Amount at end of year	Trust fund ratio[e]
High-cost:												
2019 . . .	$142.0	$137.5	f	$1.6	$2.9	$152.1	$149.3	$2.8	$0.1	-$10.1	$86.9	64
2020 . . .	141.2	136.9	f	1.7	2.5	155.2	152.1	3.0	.1	-14.0	73.0	56
2021 . . .	143.6	139.9	f	1.9	1.9	160.2	157.0	3.1	.1	-16.5	56.4	46
2022 . . .	147.8	144.5	f	2.0	1.3	165.0	161.6	3.3	.1	-17.2	39.2	34
2023 . . .	152.4	149.4	f	2.1	.9	170.3	166.7	3.5	.1	-17.9	21.3	23
2024 . . .	157.4	154.8	f	2.3	.4	177.4	173.6	3.8	.1	-20.0	1.4	12
2025 . . .	g	160.3	f	2.5	g	185.6	181.5	4.0	.1	g	g	1
2026 . . .	g	166.1	f	3.1	g	194.3	190.1	4.2	.1	g	g	g
2027 . . .	g	171.8	f	3.4	g	203.3	198.9	4.4	f	g	g	g
2028 . . .	g	177.3	f	3.7	g	210.7	206.0	4.6	.1	g	g	g

[a] The DI Trust Fund reserves become depleted in the first quarter of 2025 under the high-cost assumptions. For any period during which reserves would be depleted, scheduled benefits could not be paid in full on a timely basis, income from taxing benefits would be less than would apply to scheduled benefits, and interest on trust fund reserves would be negligible. Appendix A presents a detailed description of the components of income and cost, along with complete historical values.

[b] Amounts for 2015 and 2016 are adjusted to include in 2016 operations those benefit payments regularly scheduled in the law to be paid on January 3, 2016, which were actually paid on December 31, 2015 as required by the statutory provision for early benefit payments when the normal delivery date is on a weekend or holiday. Such shifts in payments across calendar years have occurred in the past and will occur periodically in the future whenever January 3rd falls on a Sunday. In order to provide a consistent perspective on trust fund operations over time, all trust fund operations in each year reflect the 12 months of benefits that are regularly scheduled for payment in that year.

[c] Includes reimbursements from the General Fund of the Treasury to the DI Trust Fund for: (1) the cost of payroll tax credits provided to employees in 1984 and self-employed persons in 1984-89 by Public Law 98-21; (2) the cost in 2009-17 of excluding certain self-employment earnings from SECA taxes under Public Law 110-246; and (3) payroll tax revenue forgone under the provisions of Public Laws 111-147, 111-312, 112-78, and 112-96.

[d] Revenue from taxation of benefits is the amount that would be assessed on benefit amounts scheduled in the law.

[e] The "Trust fund ratio" column represents reserves at the beginning of a year (which are identical to reserves at the end of the prior year shown in the "Amount at end of year" column) as a percentage of cost for the year.

[f] Between -$50 million and $50 million.

[g] While the fund is depleted, values under current law would reflect permissible expenditures only, which would be less than the cost of scheduled benefits shown in this table.

Note: Totals do not necessarily equal the sums of rounded components.

For the future, DI cost is projected to increase in part due to increases in average benefit levels resulting from: (1) automatic benefit increases and (2) projected increases in the amounts of average monthly earnings on which benefits are based. Future changes in DI cost also reflect changes in the number of DI beneficiaries in current-payment status. In 2018, the number of DI beneficiaries in current-payment status continued the declining trend of the prior four years. Under the intermediate assumptions, that number of DI beneficiaries is projected to drop further through the end of 2021, then increase through the remainder of the short-range projection period. The rate of increase after 2021 is much slower than was experienced on average from 1990 to 2010, when the population with the highest disability prevalence rates was growing rapidly due to the aging of the baby-boom generation. See section V.C.5 for further details.

At the beginning of calendar year 2018, the reserves of the DI Trust Fund represented 49 percent of annual cost. During 2018, DI income substantially exceeded cost due to the 2016-18 reallocation of the payroll tax rate from OASI to DI, and the estimated trust fund ratio for the beginning of 2019 increased to about 65 percent. Under the intermediate assumptions, DI total cost is projected to exceed income in 2019 and 2020, causing reserves to decrease. Thereafter, income exceeds total cost and trust fund reserves steadily increase through the remainder of the short-range projection period.

Because the reserves of the DI Trust Fund at the beginning of 2019 were less than the estimated annual cost for 2019, and are projected to remain below annual cost throughout the short-range period under the intermediate assumptions, the DI Trust Fund fails the Trustees' test of short-range financial adequacy.

3. Operations of the Combined OASI and DI Trust Funds

Table IV.A3 shows the estimated operations and status of the combined OASI and DI Trust Funds for calendar years 2019 through 2028 under the three alternatives, together with actual experience in 2014 through 2018. Income and cost for the OASI Trust Fund represent over 80 percent of the corresponding amounts for the combined OASI and DI Trust Funds. Therefore, based on the relative strength of the OASI Trust Fund over the next 10 years, the combined OASI and DI Trust Funds would have sufficient financial resources to pay all scheduled benefits through the end of the short-range period, although it is important to note that under current law, one trust fund cannot share financial resources with another trust fund. In addition, the combined OASI and DI Trust Funds would satisfy the test of short-range financial adequacy.

Table IV.A3.—Operations of the Combined OASI and DI Trust Funds,
Calendar Years 2014-2028[a]
[Dollar amounts in billions]

Calendar year	Income					Cost[b]				Asset Reserves[b]		
	Total	Net payroll tax contributions	GF reimbursements[c]	Taxation of benefits[d]	Net interest	Total	Scheduled benefits	Administrative costs	RRB interchange	Net increase during year	Amount at end of year	Trust fund ratio[e]
Historical data:												
2014 ..	$884.3	$756.0	$0.5	$29.6	$98.2	$859.2	$848.5	$6.1	$4.7	$25.0	$2,789.5	322
2015 ..	920.2	794.9	.3	31.6	93.3	897.1	886.3	6.2	4.7	23.0	2,812.5	311
2016 ..	957.5	836.2	.1	32.8	88.4	922.3	911.4	6.2	4.7	35.2	2,847.7	305
2017 ..	996.6	873.6	f	37.9	85.1	952.5	941.5	6.5	4.5	44.1	2,891.8	299
2018 ..	1,003.4	885.1	f	35.0	83.3	1,000.2	988.6	6.7	4.9	3.1	2,894.9	289

Table IV.A3.—Operations of the Combined OASI and DI Trust Funds,
Calendar Years 2014-2028[a] (Cont.)
[Dollar amounts in billions]

Calendar year	Income					Cost[b]				Asset Reserves[b]		
	Total	Net pay-roll tax contri-butions	GF reim-burse-ments[c]	Taxa-tion of bene-fits[d]	Net interest	Total	Sched-uled benefits	Admin-istra-tive costs	RRB inter-change	Net increase during year	Amount at end of year	Trust fund ratio[e]
Intermediate:												
2019 ..	$1,061.0	$942.1	f	$36.9	$82.0	$1,060.0	$1,048.6	$6.5	$5.0	$1.0	$2,895.9	273
2020 ..	1,109.4	988.0	f	40.2	81.2	1,113.7	1,101.8	6.9	5.0	-4.3	2,891.6	260
2021 ..	1,160.4	1,036.4	f	44.1	79.8	1,180.3	1,168.2	7.1	5.0	-19.9	2,871.6	245
2022 ..	1,215.1	1,088.8	f	48.1	78.2	1,252.0	1,239.2	7.5	5.3	-36.9	2,834.7	229
2023 ..	1,272.0	1,141.8	f	52.3	77.9	1,328.7	1,315.4	7.9	5.4	-56.6	2,778.0	213
2024 ..	1,333.7	1,198.0	f	56.9	78.7	1,411.5	1,397.8	8.3	5.5	-77.9	2,700.2	197
2025 ..	1,395.1	1,253.9	f	62.1	79.1	1,498.4	1,484.2	8.7	5.5	-103.3	2,596.9	180
2026 ..	1,470.9	1,312.7	f	78.2	80.1	1,589.9	1,575.1	9.1	5.6	-118.9	2,478.0	163
2027 ..	1,538.4	1,372.8	f	85.0	80.6	1,686.4	1,671.3	9.5	5.6	-148.0	2,330.0	147
2028 ..	1,606.2	1,434.6	f	92.3	79.2	1,788.6	1,773.0	9.9	5.7	-182.5	2,147.5	130
Low-cost:												
2019 ..	1,071.4	950.9	f	36.9	83.7	1,057.6	1,046.1	6.5	5.0	13.8	2,908.8	274
2020 ..	1,147.7	1,020.8	f	40.5	86.4	1,117.8	1,105.9	6.9	5.0	29.9	2,938.7	260
2021 ..	1,225.6	1,092.0	f	44.6	89.0	1,188.1	1,176.0	7.2	4.9	37.5	2,976.2	247
2022 ..	1,308.2	1,166.4	f	48.8	93.1	1,265.0	1,252.1	7.6	5.2	43.2	3,019.4	235
2023 ..	1,396.2	1,243.3	f	53.3	99.6	1,347.8	1,334.3	8.1	5.3	48.4	3,067.8	224
2024 ..	1,491.7	1,325.4	f	58.3	108.1	1,437.6	1,423.5	8.6	5.4	54.2	3,122.0	213
2025 ..	1,591.5	1,409.8	f	63.9	117.8	1,532.5	1,517.9	9.2	5.5	59.0	3,181.0	204
2026 ..	1,709.5	1,498.6	f	80.8	130.0	1,633.5	1,618.2	9.7	5.6	76.0	3,256.9	195
2027 ..	1,822.2	1,590.4	f	88.3	143.4	1,741.6	1,725.7	10.3	5.7	80.5	3,337.5	187
2028 ..	1,940.9	1,687.0	f	96.6	157.3	1,857.4	1,840.8	10.9	5.7	83.5	3,421.0	180
High-cost:												
2019 ..	1,051.2	933.5	f	37.0	80.7	1,063.0	1,051.6	6.5	5.0	-11.9	2,883.1	272
2020 ..	1,059.5	943.4	f	40.1	75.9	1,114.6	1,102.6	6.9	5.1	-55.1	2,828.0	259
2021 ..	1,077.3	963.5	f	43.9	70.0	1,178.3	1,166.1	7.1	5.1	-101.0	2,727.0	240
2022 ..	1,107.5	995.4	f	47.6	64.4	1,245.6	1,232.8	7.4	5.4	-138.2	2,588.8	219
2023 ..	1,140.3	1,029.4	f	51.6	59.3	1,316.9	1,303.8	7.7	5.5	-176.7	2,412.1	197
2024 ..	1,176.7	1,066.2	f	56.0	54.6	1,393.8	1,380.2	8.0	5.5	-217.0	2,195.1	173
2025 ..	1,214.0	1,104.1	f	60.8	49.1	1,473.8	1,459.9	8.3	5.5	-259.8	1,935.3	149
2026 ..	1,263.8	1,144.3	f	76.2	43.3	1,557.4	1,543.1	8.6	5.6	-293.6	1,641.8	124
2027 ..	1,302.7	1,183.7	f	82.5	36.6	1,644.8	1,630.3	8.9	5.6	-342.1	1,299.6	100
2028 ..	1,338.1	1,221.7	f	89.2	27.2	1,736.3	1,721.4	9.2	5.7	-398.2	901.4	75

[a] Appendix A presents a detailed description of the components of income and cost, along with complete historical values.

[b] Amounts for 2015 and 2016 are adjusted to include in 2016 operations those benefit payments regularly scheduled in the law to be paid on January 3, 2016, which were actually paid on December 31, 2015 as required by the statutory provision for early benefit payments when the normal delivery date is on a weekend or holiday. Such shifts in payments across calendar years have occurred in the past and will occur periodically in the future whenever January 3rd falls on a Sunday. In order to provide a consistent perspective on trust fund operations over time, all trust fund operations in each year reflect the 12 months of benefits that are regularly scheduled for payment in that year.

[c] Includes reimbursements from the General Fund of the Treasury to the OASI and DI Trust Funds for: (1) the cost of payroll tax credits provided to employees in 1984 and self-employed persons in 1984-89 by Public Law 98-21; (2) the cost in 2009-17 of excluding certain self-employment earnings from SECA taxes under Public Law 110-246; and (3) payroll tax revenue forgone under the provisions of Public Laws 111-147, 111-312, 112-78, and 112-96.

[d] Revenue from taxation of benefits is the amount that would be assessed on benefit amounts scheduled in the law.

[e] The "Trust fund ratio" column represents reserves at the beginning of a year (which are identical to reserves at the end of the prior year shown in the "Amount at end of year" column) as a percentage of cost for the year.

[f] Between -$50 million and $50 million.

Note: Totals do not necessarily equal the sums of rounded components.

4. Factors Underlying Changes in 10-Year Trust Fund Ratio Estimates From Last Year's Report

Table IV.A4 presents an analysis of the factors underlying the changes in the intermediate estimates over the short-range projection period for the OASI, DI, and the combined funds from last year's report to this report.

In the 2018 report under the intermediate assumptions, the trust fund ratio for OASI reached 154 percent at the beginning of 2027—the tenth projection year for that report. The change in the short-range valuation period alone, from 2018 through 2027 to 2019 through 2028, lowered the estimated trust fund ratio for the tenth year by 19 percentage points, to 135 percent. All other changes to reflect modifications in law and regulations since last year's report, the most recent data, adjustments to the assumptions for future years, and changes in projection methods combined for a net increase in the ratio for the tenth projection year of 3 percentage points. Therefore, the total change in the tenth year projected trust fund ratio from last year's report to this year's report is a reduction of 16 percentage points to 138 percent.

Legislative and regulatory changes since the 2018 report was published did not have a significant effect on the projected tenth year OASI trust fund ratio. Changes in demographic assumptions over the short-range period increased the projected tenth year trust fund ratio for OASI by 3 percentage points. Several relatively small changes in economic data and assumptions combined to cause a net reduction in the OASI trust fund ratio of 1 percentage point by the beginning of 2028. Incorporating recent programmatic data resulted in an increase of 1 percentage point in the tenth year OASI trust fund ratio. Finally, the tenth year trust fund ratio was not affected significantly by changes in the short-range methodology for this report.

Table IV.A4 also shows corresponding estimates of the factors underlying the changes in the financial projections for the DI Trust Fund and for the combined OASI and DI Trust Funds.

The 48-percentage-point increase in the DI trust fund ratio from the beginning of 2027 in last year's report to the beginning of 2028 in this year's report is the net effect of increases and decreases from the factors described above for the OASI Trust Fund, combined with a large increase of 50 points due to programmatic data and assumptions. This increase reflects lower estimated disabled-worker incidence rates throughout the short-range projection period, incorporating both more favorable recent experience and the lower ultimate disabled-worker incidence rate assumption in this report. Disability applications have been declining steadily since 2010, and the total number of disabled-worker beneficiaries in current payment status has been falling since 2014. In last year's report, the number of disabled-worker beneficiaries

was projected to remain essentially the same at 8.7 million from the end of 2017 to the end of 2018. In fact, the number dropped to around 8.5 million by the end of 2018. For this report, the ultimate disability incidence rate assumption has been lowered from 5.4 to 5.2 awards per thousand exposed population. This year's report has lower incidence rates throughout the short-range period, and a more gradual rise from recent low levels to the new ultimate DI incidence rate by the end of the short-range period. In addition, the policy change reinstating the reconsideration step in the DI adjudication process in the ten states where this step had previously been eliminated increased the tenth year DI Trust Fund ratio by 2 percentage points.

Table IV.A4.—Reasons for Change in Trust Fund (Unfunded Obligation) Ratios at the Beginning of the Tenth Year of Projection Under Intermediate Assumptions
[In percent]

Item	OASI Trust Fund	DI Trust Fund	OASI and DI Trust Funds, combined
Trust fund ratio shown in last year's report for calendar year 2027 .	154	20	137
Change in trust fund ratio due to changes in:			
Legislation and regulations	[a]	2	[a]
Valuation period.	-19	-4	-17
Demographic data and assumptions.	3	[a]	3
Economic data and assumptions	-1	[a]	[a]
Programmatic data and assumptions	1	50	7
Projection methods and data	[a]	[a]	[a]
Total change in trust fund ratio	-16	48	-7
Trust fund ratio shown in this report for calendar year 2028.	138	68	130

[a] Between -0.5 and 0.5 percent.

Note: Totals do not necessarily equal the sums of rounded components.

B. LONG-RANGE ESTIMATES

The Trustees use three types of financial measures to assess the actuarial status of the Social Security trust funds under the financing approach specified in current law: (1) annual cash-flow measures, including income rates, cost rates, and balances; (2) trust fund ratios; and (3) summary measures such as actuarial balances and unfunded obligations.

The difference between the annual income rate and annual cost rate, both expressed as percentages of taxable payroll, is the annual balance. The level and trend of the annual balances at the end of the 75-year projection period are factors that the Trustees use to assess the financial condition of the program.

The trust fund ratio for a year is the proportion of the year's projected cost that could be paid with funds available at the beginning of the year. Critical factors considered by the Trustees in assessing actuarial status include: (1) the level and year of maximum trust fund ratio, (2) the year of depletion of the fund reserves and the percent of scheduled benefits that is still payable after reserves are depleted, and (3) the stability of the trust fund ratio at the end of the long-range period.

Solvency at any point in time requires that sufficient financial resources are available to pay all scheduled benefits at that time. Solvency is generally indicated by a positive trust fund ratio. "Sustainable solvency" for the financing of the program under a specified set of assumptions is achieved when the projected trust fund ratio is positive throughout the 75-year projection period and is either stable or rising at the end of the period.

The Trustees summarize the total income and cost over valuation periods that extend through 75 years and over the infinite horizon.[1] This section presents several summarized measures, including the actuarial balance and the open-group unfunded obligation. The actuarial balance indicates the size of any surplus or shortfall as a percentage of the taxable payroll over the period. The open-group unfunded obligation indicates the size of any shortfall in present-value dollars.

This section also includes additional information that the Trustees use to assess the financial status of the Social Security program, including: (1) a comparison of the number of beneficiaries to the number of covered workers, (2) the test of long-range close actuarial balance, and (3) the reasons for the change in the actuarial balance from the last report.

---

[1] See appendix F.

1. Annual Income Rates, Cost Rates, and Balances

The concepts of income rate and cost rate, expressed as percentages of taxable payroll, are important in the consideration of the long-range actuarial status of the trust funds. The annual income rate is the ratio of all non-interest income to the OASDI taxable payroll for the year. Non-interest income includes payroll taxes, taxes on scheduled benefits, and any General Fund transfers or reimbursements. The OASDI taxable payroll consists of the total earnings subject to OASDI taxes with some relatively small adjustments.[1] The annual cost rate is the ratio of the cost of the program to the taxable payroll for the year. The cost includes scheduled benefits, administrative expenses, net interchange with the Railroad Retirement program, and payments for vocational rehabilitation services for disabled beneficiaries. For any year, the income rate minus the cost rate is the "balance" for the year.

Table IV.B1 presents a comparison of the estimated annual income rates and cost rates by trust fund and alternative. Table IV.B2 shows the separate components of the annual income rates.

Under the intermediate assumptions, the Trustees project that the OASI income rate will increase from 10.33 percent of payroll for 2018 to 11.01 percent of payroll for 2019. The OASI income rate was lower for 2016 through 2018 because of the payroll tax rate reallocation of 0.57 percentage point from OASI to DI for those years, as enacted in the Bipartisan Budget Act of 2015. After returning to the pre-reallocation level for 2019, the income rate generally rises at a very gradual rate to 11.52 percent of taxable payroll for 2093. Income from taxation of benefits causes a gradual increase in the OASI income rate for two main reasons: (1) total scheduled benefits are rising faster than payroll; and (2) the benefit-taxation threshold amounts are fixed (not indexed), and therefore an increasing share of total benefits will be subject to tax as incomes and benefits rise. There is also a one-time upward shift in the income rate, from 11.17 percent of payroll for 2025 to 11.29 percent of payroll for 2026, because of increased taxation of benefits due to expiration of the personal income tax provisions in Public Law 115-97, the Tax Cuts and Jobs Act.

From 2019 to 2038, the OASI cost rate rises rapidly because the retirement of the baby-boom generation will continue to increase the number of beneficiaries much faster than the number of workers increases, as subsequent lower-birth-rate generations replace the baby-boom generation at working

---

[1] Adjustments include adding deemed wage credits based on military service for 1983-2001 and reflecting the lower effective tax rates (as compared to the combined employee-employer rate) that apply to multiple-employer "excess wages." Lower rates also applied to net earnings from self-employment before 1984 and to income from tips before 1988.

ages. From 2039 to 2052, the cost rate declines because the aging baby-boom generation is gradually replaced at retirement ages by the subsequently lower-birth-rate generation born between 1966 and 1989. After 2052, the projected OASI cost rate generally rises, reaching 15.37 percent of taxable payroll for 2093, with the increase primarily because of projected reductions in death rates at older ages.

Projections of income rates under the low-cost and high-cost sets of assumptions are similar to those projected for the intermediate assumptions, because income rates are largely a reflection of the payroll tax rates specified in the law, with the changes from taxation of benefits noted above. In contrast, OASI cost rates for the low-cost and high-cost assumptions are significantly different from those projected for the intermediate assumptions. For the low-cost assumptions, the OASI cost rate decreases between 2019 and 2020, and then rises until it peaks in 2034 at 12.55 percent of payroll. The cost rate then declines to 11.52 percent for 2055, rises to 11.72 percent for 2072, and declines again to 11.10 percent for 2089 before rising to 11.22 percent for 2093, at which point the income rate reaches 11.26 percent. For the high-cost assumptions, the OASI cost rate rises throughout the 75-year period. It rises relatively rapidly through about 2039 because of the aging of the baby-boom generation. Thereafter, the cost rate continues to rise and reaches 21.80 percent of payroll for 2093, at which point the income rate reaches 11.91 percent.

The pattern of the projected OASI annual balance is important in the analysis of the financial condition of the program. Under the intermediate assumptions, the annual balance is negative throughout the projection period. This annual deficit was temporarily higher for 2018 in part because of the 0.57-percentage-point payroll tax rate reallocation from OASI to DI. After the annual deficit declines from 1.42 percent of payroll for 2018 to 0.94 percent for 2019, it then rises relatively rapidly to 3.29 percent for 2039. It then declines to 2.90 percent of payroll for 2052, and generally rises thereafter, reaching 3.85 percent of taxable payroll for 2093.

Under the low-cost assumptions, after the 2016 through 2018 payroll tax rate reallocation period, the OASI annual deficit decreases from 0.82 percent of payroll in 2019 to 0.69 percent in 2021, and then generally rises to 1.25 percent of payroll for 2034. Then the annual deficit declines to 0.25 percent of payroll for 2055, rises through 2072, and then declines until it becomes a positive annual balance in 2085. The annual balance increases to 0.16 percent in 2089, and then decreases to 0.05 percent of payroll in 2093. Under the high-cost assumptions, the OASI balance worsens throughout the projection period. Annual deficits rise to 1.50 percent for 2020, 6.26 percent for 2050, and 9.89 percent of payroll for 2093.

**Table IV.B1.—Annual Income Rates, Cost Rates, and Balances,
Calendar Years 1990-2095**

[As a percentage of taxable payroll]

Calendar year	OASI			DI			OASDI		
	Income rate[a]	Cost rate[b]	Balance[b]	Income rate[a]	Cost rate[b]	Balance[b]	Income rate[a]	Cost rate[b]	Balance[b]
Historical data:									
1990	11.47	9.65	1.82	1.18	1.09	0.10	12.65	10.74	1.91
1995	10.65	10.23	.42	1.87	1.44	.43	12.52	11.67	.85
2000	10.85	8.98	1.87	1.78	1.42	.36	12.63	10.40	2.23
2005	10.96	9.31	1.65	1.84	1.85	-.02	12.80	11.16	1.63
2010	10.75	11.06	-.30	1.79	2.41	-.62	12.54	13.47	-.92
2011	10.83	11.04	-.21	1.80	2.42	-.62	12.63	13.46	-.83
2012	11.05	11.35	-.30	1.81	2.47	-.66	12.85	13.82	-.96
2013	10.96	11.54	-.57	1.81	2.44	-.63	12.77	13.97	-1.20
2014	10.96	11.60	-.64	1.81	2.36	-.55	12.77	13.96	-1.19
2015	11.01	11.63	-.62	1.81	2.27	-.47	12.81	13.90	-1.09
2016	10.71	11.70	-.99	2.39	2.20	.19	13.10	13.90	-.80
2017	10.65	11.57	-.92	2.43	2.09	.33	13.07	13.66	-.59
2018	10.33	11.75	-1.42	2.34	2.02	.32	12.67	13.77	-1.10
Intermediate:									
2019	11.01	11.95	-.94	1.84	1.97	-.12	12.85	13.91	-1.06
2020	11.05	12.05	-1.00	1.82	1.89	-.07	12.87	13.94	-1.07
2021	11.08	12.24	-1.16	1.82	1.85	-.03	12.90	14.09	-1.19
2022	11.10	12.42	-1.32	1.82	1.81	.01	12.92	14.23	-1.31
2023	11.12	12.61	-1.49	1.82	1.78	.04	12.94	14.40	-1.46
2024	11.15	12.82	-1.67	1.82	1.77	.05	12.97	14.59	-1.62
2025	11.17	13.02	-1.85	1.82	1.77	.05	12.99	14.79	-1.80
2026	11.29	13.22	-1.93	1.82	1.77	.06	13.11	14.99	-1.88
2027	11.31	13.42	-2.11	1.82	1.77	.05	13.13	15.19	-2.06
2028	11.35	13.67	-2.32	1.83	1.76	.07	13.17	15.43	-2.26
2030	11.38	14.04	-2.67	1.83	1.76	.07	13.20	15.81	-2.60
2035	11.42	14.58	-3.16	1.83	1.82	.01	13.25	16.40	-3.15
2040	11.44	14.72	-3.28	1.83	1.89	-.06	13.27	16.62	-3.34
2045	11.44	14.51	-3.07	1.83	1.98	-.15	13.27	16.49	-3.22
2050	11.43	14.35	-2.92	1.84	2.01	-.18	13.27	16.37	-3.10
2055	11.44	14.38	-2.93	1.84	2.03	-.20	13.28	16.41	-3.13
2060	11.46	14.61	-3.15	1.84	2.02	-.18	13.30	16.63	-3.33
2065	11.48	14.87	-3.39	1.84	2.02	-.19	13.32	16.90	-3.58
2070	11.50	15.16	-3.66	1.84	2.03	-.20	13.34	17.20	-3.86
2075	11.52	15.42	-3.90	1.84	2.01	-.17	13.36	17.43	-4.07
2080	11.52	15.46	-3.93	1.84	2.01	-.17	13.36	17.46	-4.10
2085	11.52	15.31	-3.80	1.84	2.04	-.20	13.35	17.36	-4.00
2090	11.51	15.26	-3.74	1.84	2.10	-.26	13.35	17.36	-4.00
2095	11.53	15.48	-3.95	1.84	2.10	-.26	13.37	17.58	-4.21
First year balance becomes negative and remains negative throughout the 75-year projection period			2010	. . . .		2036	. . . .		2010

**Table IV.B1.—Annual Income Rates, Cost Rates, and Balances,
Calendar Years 1990-2095 (Cont.)**
[As a percentage of taxable payroll]

Calendar year	OASI			DI			OASDI		
	Income rate[a]	Cost rate[b]	Balance[b]	Income rate[a]	Cost rate[b]	Balance[b]	Income rate[a]	Cost rate[b]	Balance[b]
Low-cost:									
2019.	10.94	11.76	-0.82	1.83	1.91	-0.08	12.77	13.67	-0.90
2020.	11.03	11.74	-.70	1.81	1.79	.02	12.85	13.53	-.68
2021.	11.05	11.74	-.69	1.81	1.71	.11	12.86	13.45	-.58
2022.	11.07	11.77	-.71	1.81	1.64	.18	12.88	13.41	-.53
2023.	11.08	11.82	-.74	1.81	1.58	.24	12.89	13.40	-.51
2024.	11.10	11.88	-.78	1.82	1.54	.28	12.92	13.42	-.50
2025.	11.11	11.94	-.83	1.81	1.50	.31	12.92	13.44	-.52
2026.	11.21	12.00	-.79	1.82	1.48	.34	13.03	13.48	-.45
2027.	11.23	12.08	-.85	1.82	1.46	.36	13.05	13.53	-.49
2028.	11.26	12.19	-.94	1.82	1.43	.39	13.08	13.62	-.54
2030.	11.28	12.38	-1.10	1.82	1.40	.42	13.10	13.78	-.68
2035.	11.30	12.54	-1.24	1.82	1.38	.44	13.12	13.92	-.80
2040.	11.30	12.39	-1.09	1.82	1.38	.44	13.13	13.78	-.65
2045.	11.29	11.96	-.68	1.82	1.41	.41	13.11	13.37	-.26
2050.	11.27	11.65	-.37	1.82	1.40	.42	13.10	13.05	.05
2055.	11.27	11.52	-.25	1.82	1.40	.43	13.09	12.92	.17
2060.	11.28	11.59	-.31	1.82	1.37	.45	13.10	12.96	.14
2065.	11.28	11.65	-.37	1.82	1.37	.45	13.11	13.03	.08
2070.	11.29	11.71	-.42	1.82	1.37	.45	13.11	13.08	.03
2075.	11.29	11.71	-.42	1.82	1.35	.47	13.11	13.06	.05
2080.	11.28	11.51	-.23	1.82	1.35	.47	13.10	12.86	.24
2085.	11.26	11.21	.05	1.82	1.39	.43	13.09	12.60	.49
2090.	11.26	11.11	.15	1.82	1.44	.39	13.08	12.54	.54
2095.	11.27	11.33	-.06	1.82	1.44	.39	13.10	12.77	.33
First year balance becomes negative and remains negative throughout the 75-year projection period	[c]	. . . .		[c]	. . . .			. . . .	[c]
High-cost:									
2019.	11.07	12.14	-1.06	1.85	2.03	-.17	12.93	14.16	-1.23
2020.	11.09	12.59	-1.50	1.82	2.04	-.22	12.91	14.62	-1.72
2021.	11.12	13.08	-1.96	1.82	2.06	-.24	12.94	15.14	-2.20
2022.	11.16	13.45	-2.29	1.82	2.05	-.23	12.98	15.50	-2.52
2023.	11.18	13.79	-2.61	1.82	2.05	-.23	13.00	15.84	-2.84
2024.	11.21	14.13	-2.92	1.82	2.06	-.24	13.04	16.19	-3.16
2025.	11.24	14.44	-3.21	1.82	2.08	-.26	13.06	16.52	-3.46
2026.	11.37	14.75	-3.37	1.83	2.10	-.27	13.20	16.85	-3.64
2027.	11.40	15.07	-3.66	1.83	2.13	-.29	13.23	17.19	-3.96
2028.	11.45	15.46	-4.01	1.83	2.14	-.30	13.29	17.60	-4.31

**Table IV.B1.—Annual Income Rates, Cost Rates, and Balances,
Calendar Years 1990-2095 (Cont.)**
[As a percentage of taxable payroll]

Calendar year	OASI			DI			OASDI		
	Income rate[a]	Cost rate[b]	Balance[b]	Income rate[a]	Cost rate[b]	Balance[b]	Income rate[a]	Cost rate[b]	Balance[b]
High-cost (Cont.):									
2030.....	11.49	16.02	-4.53	1.84	2.18	-0.34	13.33	18.20	-4.87
2035.....	11.56	16.97	-5.41	1.84	2.34	-.50	13.40	19.30	-5.90
2040.....	11.60	17.51	-5.91	1.84	2.50	-.66	13.44	20.01	-6.56
2045.....	11.62	17.69	-6.07	1.85	2.69	-.84	13.47	20.38	-6.91
2050.....	11.64	17.90	-6.26	1.85	2.78	-.93	13.49	20.68	-7.19
2055.....	11.67	18.24	-6.57	1.85	2.85	-1.00	13.52	21.09	-7.57
2060.....	11.71	18.80	-7.09	1.85	2.85	-1.00	13.56	21.64	-8.08
2065.....	11.75	19.40	-7.65	1.85	2.88	-1.02	13.60	22.27	-8.67
2070.....	11.79	20.09	-8.29	1.85	2.90	-1.05	13.65	22.99	-9.34
2075.....	11.84	20.81	-8.97	1.85	2.87	-1.02	13.70	23.68	-9.99
2080.....	11.88	21.31	-9.43	1.85	2.85	-1.00	13.73	24.16	-10.43
2085.....	11.89	21.53	-9.64	1.85	2.87	-1.01	13.75	24.40	-10.65
2090.....	11.90	21.66	-9.75	1.86	2.92	-1.07	13.76	24.58	-10.82
2095.....	11.92	21.91	-9.99	1.86	2.93	-1.07	13.78	24.84	-11.06
First year balance becomes negative and remains negative throughout the 75-year projection period...........		2010		....		2019	....		2010

[a] Income rates include certain reimbursements from the General Fund of the Treasury.

[b] Benefit payments scheduled to be paid on January 3 are actually paid on December 31 as required by the statutory provision for early delivery of benefit payments when the normal payment delivery date is a Saturday, Sunday, or legal public holiday. For comparability with the values for historical years and the projections in this report, all trust fund operations and asset reserves reflect the 12 months of benefits scheduled for payment each year.

[c] The annual balance is projected to be negative for a temporary period and return to positive levels before the end of the projection period.

Notes:
1. The income rate excludes interest income.
2. Revisions of taxable payroll may change some historical values.
3. Totals do not necessarily equal the sums of rounded components.

Under the intermediate assumptions, the projected DI cost rate declines from 1.97 percent for 2019 to 1.77 percent for 2025, and remains relatively stable through 2032. After 2032, the DI cost rate increases gradually to 2.03 percent for 2055. From 2055 to 2078, the DI cost rate stays relatively stable before generally increasing slowly to 2.10 percent of payroll for 2093. The projected DI income rate decreases from 2.34 percent of payroll for 2018 to 1.84 percent for 2019 because the temporary payroll tax reallocation of 2016 through 2018 expires. Thereafter, the income rate remains relatively stable, reaching 1.84 percent for 2093. The annual balance is positive for years 2016 through 2018, reflecting the reallocation. The annual balance is negative from 2019 through 2021 before becoming positive in 2022, reaching a peak of 0.07 percent of payroll for 2029. The annual balance then declines and becomes negative in 2036, generally decreasing thereafter, and reaching a deficit of 0.26 percent of payroll for 2093.

Under the low-cost assumptions, the projected DI cost rate declines from 1.91 percent of payroll for 2019 to 1.38 percent for 2033, and remains rela-

tively stable thereafter, reaching 1.44 percent for 2093. The annual balance is negative for 2019 and positive throughout the remainder of the long-range period. Under the high-cost assumptions, the DI cost rate generally rises throughout the projection period, reaching 2.93 percent for 2093. The annual deficit is negative throughout the projection period, reaching 0.22 percent for 2020, 0.93 percent for 2050, and 1.07 percent for 2093.

Figure IV.B1 shows the patterns of the historical and projected OASI and DI annual cost rates. Annual DI cost rates rose substantially between 1990 and 2010 in large part due to: (1) aging of the working population as the baby-boom generation moved from ages 25-44 in 1990, where disability prevalence is low, to ages 45-64 in 2010, where disability prevalence is much higher; (2) a substantial increase in the percentage of women insured for DI benefits as a result of increased and more consistent rates of employment; and (3) increased disability incidence rates for women to a level similar to those for men by 2010. As of 2010, these three factors have largely stabilized. Other factors that are not yet fully understood have caused age-sex-adjusted incidence rates and cost rates to decline after 2010, and further declines are projected until about 2030. OASI cost rates increase rapidly through about 2040 as the baby-boom generation ages and is replaced by lower birth-rate generations at working ages. Thereafter, increasing life expectancy results in generally much more modest increases in cost rates through the balance of the projection period. Figure IV.B1 shows only the income rates for alternative II because the variation in income rates by alternative is very small. Income rates generally increase slowly for each of the alternatives over the long-range period. Taxation of benefits, which is a relatively small portion of income, is the main source of both the increases in the income rate and the variation among the alternatives. Increases in income from taxation of benefits reflect: (1) increases in the total amount of benefits scheduled to be paid and (2) the increasing share of individual benefits that will be subject to taxation because benefit taxation threshold amounts are not indexed.

Table IV.B1 shows the annual balances for OASI, DI, and OASDI. The pattern of the annual balances is important to the analysis of the financial condition of the Social Security program as a whole. As seen in figure IV.B1, the magnitude of each of the positive balances is the distance between the appropriate cost-rate curve and the income-rate curve above it. The magnitude of each of the deficits is the distance between the appropriate cost-rate curve and the income-rate curve below it. Annual balances follow closely the pattern of annual cost rates after 1990 because the payroll tax rate does not change for the OASDI program, with only small variations in the allocation between DI and OASI except for changes due to the 1994 and the 2016 through 2018 payroll tax rate reallocations.

In the future, the costs of OASI, DI, and the combined OASDI programs as a percentage of taxable payroll are unlikely to fall outside the range encompassed by alternatives I and III because alternatives I and III define a wide range of demographic and economic conditions.

Figure IV.B1.—Long-Range OASI and DI Annual Income Rates and Cost Rates
[As a percentage of taxable payroll]
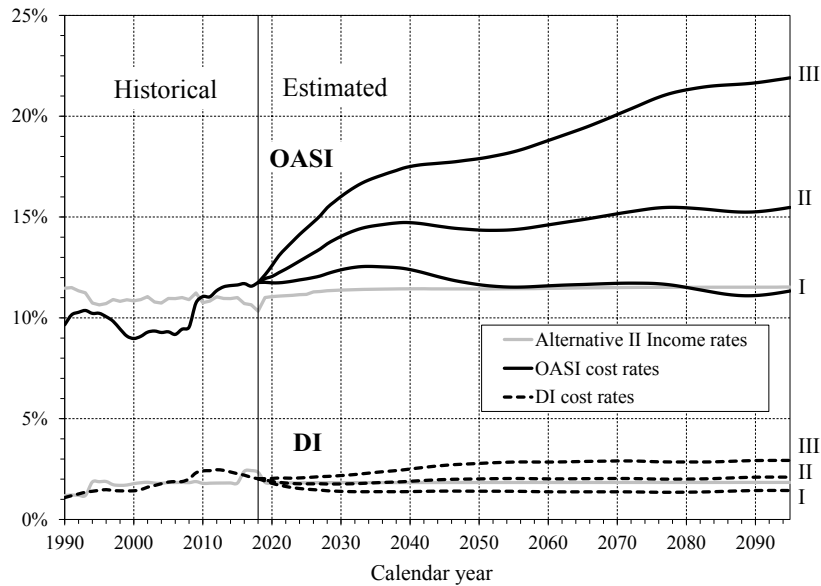
Long-range OASDI cost and income are most often expressed as percentages of taxable payroll. However, the Trustees also present cost and income as shares of gross domestic product (GDP), the value of goods and services produced during the year in the United States. Under alternative II, the Trustees project OASDI cost to increase from about 4.9 percent of GDP for 2019 to about 5.9 percent for 2039. After 2039, OASDI cost as a percentage of GDP declines to a low of about 5.8 percent for 2052 and thereafter generally increases slowly, reaching about 6.0 percent by 2093. Appendix G presents full estimates of income and cost relative to GDP.

Table IV.B2 contains historical and projected annual income rates and their components by trust fund and alternative. The annual income rates consist of the scheduled payroll tax rates, the rates of income from taxation of scheduled benefits, and the rates of income from General Fund reimbursements. Projected income from taxation of benefits increases over time for reasons discussed on page 51.

Table IV.B2.—Components of Annual Income Rates, Calendar Years 1990-2095
[As a percentage of taxable payroll]

	OASI				DI				OASDI			
Calendar year	Payroll tax	Tax-ation of bene-fits[a]	General Fund Reim-burse-ments[b]	Total[c]	Payroll tax	Tax-ation of bene-fits[a]	General Fund Reim-burse-ments[b]	Total[c]	Payroll tax	Tax-ation of bene-fits[a]	General Fund Reim-burse-ments[b]	Total[c]
Historical data:												
1990 ..	11.29	0.21	-0.03	11.47	1.21	0.01	-0.03	1.18	12.50	0.21	-0.06	12.65
1995 ..	10.46	.19	-.01	10.65	1.87	.01	-.01	1.87	12.33	.20	-.01	12.52
2000 ..	10.56	.29	d	10.85	1.78	.02	-.02	1.78	12.34	.31	-.02	12.63
2005 ..	10.68	.29	-.01	10.96	1.81	.02	d	1.84	12.49	.31	-.01	12.80
2010 ..	10.30	.42	.04	10.75	1.75	.04	.01	1.79	12.05	.45	.05	12.54
2011 ..	8.82	.41	1.61	10.83	1.50	.03	.27	1.80	10.32	.44	1.88	12.63
2012 ..	8.86	.47	1.72	11.05	1.51	.01	.29	1.81	10.37	.48	2.01	12.85
2013 ..	10.54	.35	.07	10.96	1.79	.01	.01	1.81	12.33	.36	.08	12.77
2014 ..	10.50	.45	.01	10.96	1.78	.03	d	1.81	12.28	.48	.01	12.77
2015 ..	10.53	.47	d	11.01	1.79	.02	d	1.81	12.32	.49	.01	12.81
2016 ..	10.23	.48	d	10.71	2.37	.02	d	2.39	12.60	.49	d	13.10
2017 ..	10.13	.51	d	10.65	2.40	.03	d	2.43	12.53	.54	d	13.07
2018 ..	9.86	.47	d	10.33	2.33	.01	d	2.34	12.19	.48	d	12.67
Intermediate:												
2019 ..	10.54	.46	d	11.01	1.82	.02	d	1.84	12.36	.48	d	12.85
2020 ..	10.57	.48	d	11.05	1.80	.02	d	1.82	12.37	.50	d	12.87
2021 ..	10.57	.51	d	11.08	1.80	.02	d	1.82	12.37	.53	d	12.90
2022 ..	10.58	.52	d	11.10	1.80	.02	d	1.82	12.37	.55	d	12.92
2023 ..	10.58	.54	d	11.12	1.80	.02	d	1.82	12.37	.57	d	12.94
2024 ..	10.58	.57	d	11.15	1.80	.02	d	1.82	12.38	.59	d	12.97
2025 ..	10.58	.59	d	11.17	1.80	.02	d	1.82	12.37	.61	d	12.99
2026 ..	10.58	.71	d	11.29	1.80	.03	d	1.82	12.37	.74	d	13.11
2027 ..	10.57	.74	d	11.31	1.80	.03	d	1.82	12.37	.77	d	13.13
2028 ..	10.58	.77	d	11.35	1.80	.03	d	1.83	12.38	.80	d	13.17
2030 ..	10.58	.79	d	11.38	1.80	.03	d	1.83	12.38	.83	d	13.20
2035 ..	10.58	.84	d	11.42	1.80	.03	d	1.83	12.38	.87	d	13.25
2040 ..	10.58	.86	d	11.44	1.80	.04	d	1.83	12.38	.89	d	13.27
2045 ..	10.58	.86	d	11.44	1.80	.04	d	1.83	12.38	.89	d	13.27
2050 ..	10.58	.85	d	11.43	1.80	.04	d	1.84	12.38	.89	d	13.27
2055 ..	10.58	.86	d	11.44	1.80	.04	d	1.84	12.38	.90	d	13.28
2060 ..	10.58	.88	d	11.46	1.80	.04	d	1.84	12.38	.92	d	13.30
2065 ..	10.58	.90	d	11.48	1.80	.04	d	1.84	12.38	.94	d	13.32
2070 ..	10.58	.92	d	11.50	1.80	.04	d	1.84	12.38	.96	d	13.34
2075 ..	10.58	.94	d	11.52	1.80	.04	d	1.84	12.38	.98	d	13.36
2080 ..	10.58	.94	d	11.52	1.80	.04	d	1.84	12.38	.98	d	13.36
2085 ..	10.58	.94	d	11.52	1.80	.04	d	1.84	12.38	.98	d	13.35
2090 ..	10.58	.93	d	11.51	1.80	.04	d	1.84	12.38	.98	d	13.35
2095 ..	10.58	.95	d	11.53	1.80	.04	d	1.84	12.38	.99	d	13.37
Low-cost:												
2019 ..	10.48	.46	d	10.94	1.81	.02	d	1.83	12.29	.48	d	12.77
2020 ..	10.56	.47	d	11.03	1.79	.02	d	1.81	12.36	.49	d	12.85
2021 ..	10.57	.48	d	11.05	1.79	.02	d	1.81	12.36	.50	d	12.86
2022 ..	10.57	.50	d	11.07	1.79	.02	d	1.81	12.36	.52	d	12.88
2023 ..	10.57	.51	d	11.08	1.79	.02	d	1.81	12.36	.53	d	12.89
2024 ..	10.58	.52	d	11.10	1.80	.02	d	1.82	12.37	.54	d	12.92
2025 ..	10.57	.54	d	11.11	1.79	.02	d	1.81	12.36	.56	d	12.92
2026 ..	10.57	.64	d	11.21	1.80	.02	d	1.82	12.37	.67	d	13.03
2027 ..	10.56	.66	d	11.23	1.79	.02	d	1.82	12.36	.69	d	13.05
2028 ..	10.57	.68	d	11.26	1.80	.02	d	1.82	12.37	.71	d	13.08

Table IV.B2.—Components of Annual Income Rates, Calendar Years 1990-2095 (Cont.)
[As a percentage of taxable payroll]

Calendar year	OASI				DI				OASDI			
	Payroll tax	Taxation of benefits[a]	General Fund Reimbursements[b]	Total[c]	Payroll tax	Taxation of benefits[a]	General Fund Reimbursements[b]	Total[c]	Payroll tax	Taxation of benefits[a]	General Fund Reimbursements[b]	Total[c]
Low-cost (Cont.):												
2030 ..	10.58	0.70	[d]	11.28	1.80	0.02	[d]	1.82	12.37	0.73	[d]	13.10
2035 ..	10.58	.73	[d]	11.30	1.80	.03	[d]	1.82	12.37	.75	[d]	13.12
2040 ..	10.58	.73	[d]	11.30	1.80	.03	[d]	1.82	12.37	.76	[d]	13.13
2045 ..	10.57	.71	[d]	11.29	1.80	.03	[d]	1.82	12.37	.74	[d]	13.11
2050 ..	10.57	.70	[d]	11.27	1.80	.03	[d]	1.82	12.37	.73	[d]	13.10
2055 ..	10.57	.70	[d]	11.27	1.80	.03	[d]	1.82	12.37	.72	[d]	13.09
2060 ..	10.57	.70	[d]	11.28	1.80	.03	[d]	1.82	12.37	.73	[d]	13.10
2065 ..	10.57	.71	[d]	11.28	1.80	.03	[d]	1.82	12.37	.74	[d]	13.11
2070 ..	10.57	.71	[d]	11.29	1.80	.03	[d]	1.82	12.37	.74	[d]	13.11
2075 ..	10.57	.72	[d]	11.29	1.80	.03	[d]	1.82	12.37	.74	[d]	13.11
2080 ..	10.57	.70	[d]	11.28	1.80	.03	[d]	1.82	12.37	.73	[d]	13.10
2085 ..	10.57	.69	[d]	11.26	1.80	.03	[d]	1.82	12.37	.72	[d]	13.09
2090 ..	10.57	.68	[d]	11.26	1.80	.03	[d]	1.82	12.37	.71	[d]	13.08
2095 ..	10.57	.70	[d]	11.27	1.80	.03	[d]	1.82	12.37	.73	[d]	13.10
High-cost:												
2019 ..	10.60	.47	[d]	11.07	1.83	.02	[d]	1.85	12.44	.49	[d]	12.93
2020 ..	10.58	.50	[d]	11.09	1.80	.02	[d]	1.82	12.38	.53	[d]	12.91
2021 ..	10.58	.54	[d]	11.12	1.80	.02	[d]	1.82	12.38	.56	[d]	12.94
2022 ..	10.59	.57	[d]	11.16	1.80	.02	[d]	1.82	12.39	.59	[d]	12.98
2023 ..	10.58	.60	[d]	11.18	1.80	.03	[d]	1.82	12.38	.62	[d]	13.00
2024 ..	10.59	.62	[d]	11.21	1.80	.03	[d]	1.82	12.39	.65	[d]	13.04
2025 ..	10.58	.65	[d]	11.24	1.80	.03	[d]	1.82	12.38	.68	[d]	13.06
2026 ..	10.58	.79	[d]	11.37	1.80	.03	[d]	1.83	12.38	.82	[d]	13.20
2027 ..	10.58	.83	[d]	11.40	1.80	.04	[d]	1.83	12.37	.86	[d]	13.23
2028 ..	10.59	.87	[d]	11.45	1.80	.04	[d]	1.83	12.38	.90	[d]	13.29
2030 ..	10.59	.90	[d]	11.49	1.80	.04	[d]	1.84	12.39	.94	[d]	13.33
2035 ..	10.59	.97	[d]	11.56	1.80	.04	[d]	1.84	12.39	1.01	[d]	13.40
2040 ..	10.59	1.01	[d]	11.60	1.80	.05	[d]	1.84	12.39	1.06	[d]	13.44
2045 ..	10.59	1.03	[d]	11.62	1.80	.05	[d]	1.85	12.39	1.08	[d]	13.47
2050 ..	10.59	1.05	[d]	11.64	1.80	.05	[d]	1.85	12.39	1.10	[d]	13.49
2055 ..	10.59	1.08	[d]	11.67	1.80	.05	[d]	1.85	12.39	1.13	[d]	13.52
2060 ..	10.59	1.12	[d]	11.71	1.80	.05	[d]	1.85	12.39	1.17	[d]	13.56
2065 ..	10.59	1.16	[d]	11.75	1.80	.06	[d]	1.85	12.39	1.22	[d]	13.60
2070 ..	10.59	1.21	[d]	11.79	1.80	.06	[d]	1.85	12.39	1.26	[d]	13.65
2075 ..	10.59	1.25	[d]	11.84	1.80	.06	[d]	1.85	12.39	1.31	[d]	13.70
2080 ..	10.59	1.29	[d]	11.88	1.80	.06	[d]	1.85	12.39	1.34	[d]	13.73
2085 ..	10.59	1.30	[d]	11.89	1.80	.06	[d]	1.85	12.39	1.36	[d]	13.75
2090 ..	10.59	1.32	[d]	11.90	1.80	.06	[d]	1.86	12.39	1.37	[d]	13.76
2095 ..	10.59	1.33	[d]	11.92	1.80	.06	[d]	1.86	12.39	1.39	[d]	13.78

[a] Revenue from taxation of benefits is the amount that would be assessed on benefit amounts scheduled in the law.
[b] Includes payroll tax revenue forgone under the provisions of Public Laws 111-147, 111-312, 112-78, and 112-96, and other miscellaneous reimbursements.
[c] Values exclude interest income.
[d] Between -0.005 and 0.005 percent of taxable payroll.

Note: Totals do not necessarily equal the sums of rounded components.

2. Comparison of Workers to Beneficiaries

Under the intermediate assumptions, the Trustees project the OASDI cost rate will rise rapidly between 2019 and 2038, primarily because the number of beneficiaries rises much more rapidly than the number of covered workers as the baby-boom generation retires. The ratio of OASDI beneficiaries to workers is dominated by the OASI program because all workers eventually die or retire, but only a relatively small minority become disabled. The trends described below are primarily due to demographic changes and thus affect the DI program roughly 20 years earlier than the OASI and OASDI programs. The baby-boom generation had lower fertility rates than their parents, and the Trustees expect that lower fertility rates will persist for all future generations; therefore, the ratio of OASDI beneficiaries to workers will rise rapidly and reach a permanently higher level after the baby-boom generation retires. Due to increasing longevity, the ratio of beneficiaries to workers will generally rise slowly thereafter. Table IV.B3 provides a comparison of the numbers of covered workers and beneficiaries.

Table IV.B3.—Covered Workers and Beneficiaries, Calendar Years 1945-2095

Calendar year	Covered workers[a] (in thousands)	Beneficiaries[b] (in thousands)			Covered workers per OASDI beneficiary	OASDI beneficiaries per 100 covered workers
		OASI	DI	OASDI[c]		
Historical data:						
1945	46,390	1,106	-	1,106	41.9	2
1950	48,280	2,930	-	2,930	16.5	6
1955	65,066	7,564	-	7,564	8.6	12
1960	72,371	13,740	522	14,262	5.1	20
1965	80,539	18,509	1,648	20,157	4.0	25
1970	92,963	22,618	2,568	25,186	3.7	27
1975	100,193	26,998	4,125	31,123	3.2	31
1980	112,651	30,384	4,734	35,117	3.2	31
1985	120,441	32,763	3,874	36,636	3.3	30
1990	133,008	35,255	4,204	39,459	3.4	30
1995	140,803	37,364	5,731	43,096	3.3	31
2000	154,707	38,556	6,606	45,162	3.4	29
2005	159,038	39,961	8,172	48,133	3.3	30
2010	157,058	43,440	9,958	53,398	2.9	34
2011	158,594	44,388	10,428	54,816	2.9	35
2012	160,705	45,377	10,799	56,176	2.9	35
2013	163,012	46,517	10,954	57,471	2.8	35
2014	165,429	47,603	10,971	58,574	2.8	35
2015	168,276	48,663	10,881	59,543	2.8	35
2016	170,964	49,811	10,728	60,539	2.8	35
2017	173,010	50,962	10,517	61,480	2.8	36
2018	175,999	52,168	10,296	62,464	2.8	35
Intermediate:						
2019	177,624	53,527	10,115	63,642	2.8	36
2020	178,484	54,948	9,993	64,941	2.7	36
2025	183,928	62,012	10,065	72,077	2.6	39
2030	187,117	68,517	10,404	78,921	2.4	42
2035	189,589	73,061	10,923	83,983	2.3	44
2040	192,363	75,371	11,613	86,984	2.2	45
2045	196,845	76,200	12,462	88,662	2.2	45

Table IV.B3.—Covered Workers and Beneficiaries, Calendar Years 1945-2095 (Cont.)

Calendar year	Covered workers[a] (in thousands)	Beneficiaries[b] (in thousands)			Covered workers per OASDI beneficiary	OASDI beneficiaries per 100 covered workers
		OASI	DI	OASDI[c]		
Intermediate (Cont.):						
2050	201,906	77,551	13,024	90,575	2.2	45
2055	206,737	79,664	13,512	93,176	2.2	45
2060	211,082	82,680	13,740	96,419	2.2	46
2065	215,112	85,717	14,088	99,806	2.2	46
2070	219,413	89,061	14,457	103,518	2.1	47
2075	224,375	92,441	14,662	107,103	2.1	48
2080	229,944	94,684	15,003	109,687	2.1	48
2085	235,834	95,990	15,605	111,595	2.1	47
2090	241,609	97,914	16,358	114,273	2.1	47
2095	247,016	101,389	16,757	118,146	2.1	48
Low-cost:						
2019	178,004	53,520	10,071	63,591	2.8	36
2020	179,297	54,926	9,855	64,781	2.8	36
2025	186,997	61,851	9,376	71,228	2.6	38
2030	191,232	68,052	9,233	77,285	2.5	40
2035	194,581	72,155	9,328	81,484	2.4	42
2040	198,875	73,950	9,619	83,570	2.4	42
2045	205,923	74,293	10,107	84,400	2.4	41
2050	213,973	75,206	10,445	85,651	2.5	40
2055	221,808	77,013	10,790	87,802	2.5	40
2060	229,162	79,775	10,992	90,766	2.5	40
2065	236,449	82,582	11,337	93,919	2.5	40
2070	244,586	85,659	11,749	97,408	2.5	40
2075	254,133	88,682	12,093	100,775	2.5	40
2080	264,850	90,538	12,605	103,142	2.6	39
2085	276,048	91,688	13,403	105,092	2.6	38
2090	286,989	94,286	14,311	108,598	2.6	38
2095	297,451	99,270	14,864	114,134	2.6	38
High-cost:						
2019	177,178	53,535	10,164	63,699	2.8	36
2020	177,253	54,972	10,171	65,143	2.7	37
2025	179,231	62,202	10,762	72,964	2.5	41
2030	182,816	69,219	11,558	80,776	2.3	44
2035	184,567	74,267	12,472	86,740	2.1	47
2040	186,023	77,156	13,551	90,708	2.1	49
2045	188,064	78,579	14,767	93,347	2.0	50
2050	190,269	80,500	15,557	96,056	2.0	50
2055	192,233	83,035	16,168	99,202	1.9	52
2060	193,712	86,351	16,384	102,735	1.9	53
2065	194,736	89,630	16,672	106,302	1.8	55
2070	195,577	93,239	16,906	110,144	1.8	56
2075	196,489	96,967	16,848	113,816	1.7	58
2080	197,581	99,583	16,855	116,438	1.7	59
2085	198,868	101,036	17,040	118,076	1.7	59
2090	200,175	102,206	17,425	119,630	1.7	60
2095	201,336	103,956	17,568	121,524	1.7	60

[a] Workers who are paid at some time during the year for employment on which OASDI taxes are due.

[b] Beneficiaries with monthly benefits in current-payment status as of June 30.

[c] This column is the sum of OASI and DI beneficiaries. A small number of beneficiaries receive benefits from both funds.

Notes:

1. The number of beneficiaries does not include uninsured individuals who received benefits under section 228 of the Social Security Act. The General Fund of the Treasury reimbursed the trust funds for the costs of most of these individuals.

2. Historical covered worker and beneficiary data are subject to revision.

3. Totals do not necessarily equal the sums of rounded components.

Actuarial Estimates

The effect of the demographic shift under the three alternatives on the OASDI cost rates is clear when one considers the projected number of OASDI beneficiaries per 100 covered workers. Compared to the 2018 level of 35 beneficiaries per 100 covered workers, the Trustees project that this ratio rises to 45 by 2038 under the intermediate assumptions because the growth in beneficiaries greatly exceeds the growth in workers. By 2095, this projected ratio rises further under the intermediate and high-cost assumptions, reaching 48 under the intermediate assumptions and 60 under the high-cost assumptions. Under the low-cost assumptions, this ratio rises to 42 by 2038 and then generally declines, reaching 38 by 2095. Figure IV.B2 shows beneficiaries per 100 covered workers.

For each alternative, the curve in figure IV.B2 is strikingly similar to the corresponding cost-rate curve in figure IV.B1. This similarity emphasizes the extent to which the cost rate is determined by the age distribution of the population. The cost rate is essentially the product of the number of beneficiaries and their average benefit, divided by the product of the number of covered workers and their average taxable earnings. For this reason, the pattern of the annual cost rates is similar to that of the annual ratios of beneficiaries to workers.

Figure IV.B2.—Number of OASDI Beneficiaries Per 100 Covered Workers
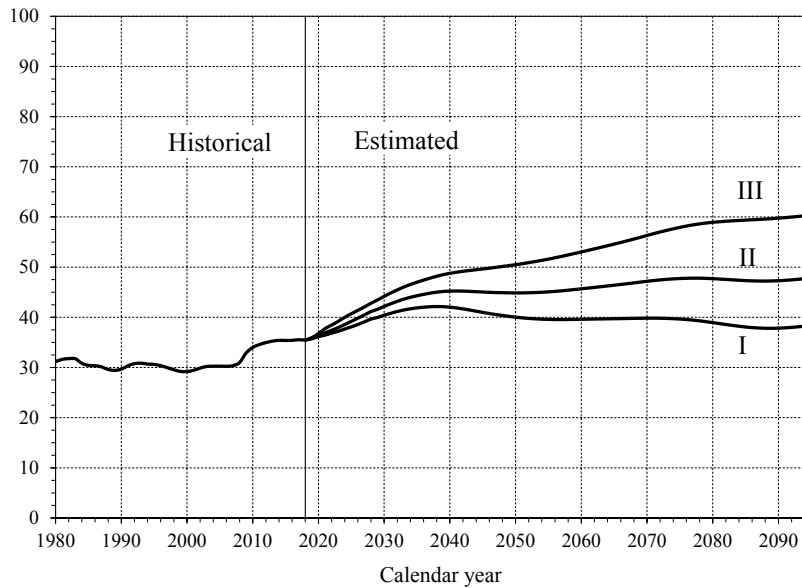
Table IV.B3 also shows the number of covered workers per OASDI beneficiary, which was about 2.8 for 2018. Under the intermediate assumptions, this ratio declines generally throughout the long-range period, reaching 2.2 for 2038 and 2.1 by 2095. Under the low-cost assumptions, this ratio declines to 2.4 for 2038, then generally rises to 2.6 by 2095. Under the high-cost assumptions, this ratio decreases steadily to 1.7 by 2095.

3. Trust Fund Ratios and Test of Long-Range Close Actuarial Balance

Trust fund ratios are critical indicators of the adequacy of the financial resources of the Social Security program. The trust fund ratio for a year is the amount of asset reserves in a fund at the beginning of a year expressed as a percentage of the cost for the year. Under present law, the OASI and DI Trust Funds do not have the authority to borrow other than in the form of advance tax transfers, which are limited to expected taxes for the current calendar month. If reserves held in either trust fund become depleted during a year, and continuing revenue falls short of the cost of scheduled benefits, then full scheduled benefits would not be payable on a timely basis. For this reason, the trust fund ratio is a critical financial measure.

The trust fund ratio serves an additional important purpose in assessing the actuarial status of the program. If the projected trust fund ratio is positive throughout the period and is either level or increasing at the end of the period, then projected adequacy for the long-range period is likely to continue for subsequent reports. Under these conditions, the program has achieved sustainable solvency.

Table IV.B4 shows the Trustees' projections of trust fund ratios by alternative, without regard to advance tax transfers that would be effected, for the separate and combined OASI and DI Trust Funds. The table also shows the years of trust fund reserve depletion and the percentage of scheduled benefits that would be payable thereafter, by alternative.

Under the intermediate assumptions, the OASI trust fund ratio is projected to decline from 307 percent at the beginning of 2019 until the trust fund reserves become depleted late in 2034 (about the same time as last year's report), at which time 77 percent of scheduled benefits would be payable. The DI trust fund ratio decreases from 65 percent at the beginning of 2019 to 56 percent by 2022. After 2022, the DI trust fund ratio increases for a time, reflecting the period of recent and near-term expected low incidence rates, reaching a peak of 91 percent by 2037. The ratio then declines until the trust fund reserves become depleted in 2052 (20 years later than projected in last year's report). At that time, 91 percent of scheduled benefits would be payable. The difference in depletion year from last year's report is largely due to a combination of a lower assumed ultimate disability incidence rate and a

more gradual assumed path from recent low rates to the ultimate incidence rate. See page 38 for additional details.

Under the intermediate assumptions, the trust fund ratio for the combined OASI and DI Trust Funds declines from 273 percent at the beginning of 2019 until the combined fund reserves become depleted in 2035 (one year later than projected in last year's report), at which time 80 percent of scheduled benefits would be payable.

Under the low-cost assumptions, the trust fund ratio for the DI program decreases from 66 percent at the beginning of 2019 to 64 percent at the beginning of 2020. The DI trust fund ratio then rises thereafter, reaching the extremely high level of 2,559 percent for 2094. For the OASI program, the trust fund ratio declines steadily, from 307 percent for 2019 until the reserves become depleted in 2057, at which time 98 percent of scheduled benefits would be payable. For the combined OASDI program, the trust fund ratio declines from 274 percent for 2019 to a low of 112 percent in 2047, then rises thereafter, reaching 228 percent by 2094. Because the trust fund ratio is positive throughout the projection period and increasing at the end of the period, under the low-cost assumptions, the DI program and the combined OASDI program achieve sustainable solvency.

Under the high-cost assumptions, the OASI trust fund ratio declines continually until reserves become depleted in 2031, at which time 69 percent of scheduled benefits would still be payable. The DI trust fund ratio declines from 64 percent for 2019 until the reserves become depleted in 2025. At that time, 88 percent of scheduled benefits would still be payable. The combined OASI and DI trust fund ratio declines from 272 percent for 2019 until reserves become depleted in 2030, at which time 72 percent of scheduled benefits would still be payable.

The Trustees project trust fund reserve depletion within the 75-year projection period with the exceptions of the combined OASI and DI Trust Funds and the DI Trust Fund under the low-cost assumptions. It is therefore very likely that lawmakers will need to increase income, reduce program costs, or both, in order to maintain solvency for the trust funds. The stochastic projections discussed in appendix E suggest that trust fund reserve depletion is highly probable by mid-century.

Even under the high-cost assumptions, however, the combined OASI and DI Trust Fund reserves on hand plus their estimated future income are sufficient to fully cover their combined cost until 2030. Under the intermediate assumptions, the combined starting fund reserves plus estimated future income are sufficient to fully cover cost until 2035. In the 2018 report, the Trustees projected that the combined trust fund reserves would become

depleted in 2030 and 2034 under the high-cost and intermediate assumptions, respectively, and would achieve sustainable solvency under the low-cost assumptions.

Table IV.B4.—Trust Fund Ratios, Calendar Years 2019-2095[a]

[In percent]

Calendar year	Intermediate			Low-cost			High-cost		
	OASI	DI	OASDI	OASI	DI	OASDI	OASI	DI	OASDI
2019	307	65	273	307	66	274	307	64	272
2020	291	60	260	290	64	260	291	56	259
2021	273	57	245	274	66	247	271	46	240
2022	255	56	229	258	73	235	247	34	219
2023	236	56	213	243	85	224	222	23	197
2024	216	58	197	228	100	213	197	12	173
2025	197	60	180	214	119	204	170	1	149
2026	177	62	163	202	140	195	144	b	124
2027	158	65	147	190	163	187	117	b	100
2028	138	68	130	178	191	180	90	b	75
2030	100	76	97	158	253	167	36	b	24
2035	b	90	10	112	422	143	b	b	b
2040	b	87	b	71	595	123	b	b	b
2045	b	61	b	38	751	113	b	b	b
2050	b	23	b	18	916	114	b	b	b
2055	b	b	b	6	1,088	123	b	b	b
2060	b	b	b	b	1,289	132	b	b	b
2065	b	b	b	b	1,489	140	b	b	b
2070	b	b	b	b	1,692	146	b	b	b
2075	b	b	b	b	1,921	152	b	b	b
2080	b	b	b	b	2,132	162	b	b	b
2085	b	b	b	b	2,284	184	b	b	b
2090	b	b	b	b	2,407	210	b	b	b
2095	b	b	b	b	2,603	231	b	b	b
Trust fund reserves permanently become depleted in	2034	2052	2035	2057	c	c	2031	2025	2030
Payable benefits as percent of scheduled benefits: At the time of permanent reserve depletion	77	91	80	98	c	c	69	88	72
For 2093	73	87	75	100	c	c	52	63	53

[a] Benefit payments scheduled to be paid on January 3 are actually paid on December 31 as required by the statutory provision for early delivery of benefit payments when the normal payment delivery date is a Saturday, Sunday, or legal public holiday. For comparability with the values for historical years and the projections in this report, all trust fund ratios reflect the 12 months of benefits scheduled for payment each year.

[b] Trust fund reserves would be depleted at the beginning of this year.

[c] Trust fund reserves would not be depleted within the projection period.

Note: The definition of trust fund ratio appears in the Glossary. The ratios shown for the combined trust funds for years after reserve depletion of either the DI or OASI Trust Fund are hypothetical.

Since 2013, when the Trustees modified the test of long-range close actuarial balance, the standard for each trust fund requires meeting two conditions: (1) the test of short-range financial adequacy is satisfied; and (2) the trust fund ratios stay above zero throughout the 75-year projection period, allow-

ing scheduled benefits to be paid in a timely manner throughout the period. Both the long-range test and the short-range test are applied based on the intermediate set of assumptions. As discussed in section IV.A, the DI Trust Fund fails the test of short-range financial adequacy because the trust fund ratio does not reach 100 percent at any time during the 10-year period. Under the intermediate assumptions, the OASI Trust Fund reserves become depleted in 2034, DI Trust Fund reserves become depleted in 2052, and the combined OASI and DI Trust Fund reserves become depleted in 2035. Therefore, the OASI, DI, and combined OASI and DI Trust Funds all fail the test of long-range close actuarial balance.

Figure IV.B3 illustrates the trust fund ratios for the separate OASI and DI Trust Funds for each of the alternative sets of assumptions. DI Trust Fund status is more uncertain than OASI Trust Fund status because there is a high degree of uncertainty associated with future disability prevalence. A graph of the trust fund ratios for the combined trust funds appears in figure II.D6.

Figure IV.B3.—Long-Range OASI and DI Trust Fund Ratios
[Asset reserves as a percentage of annual cost]
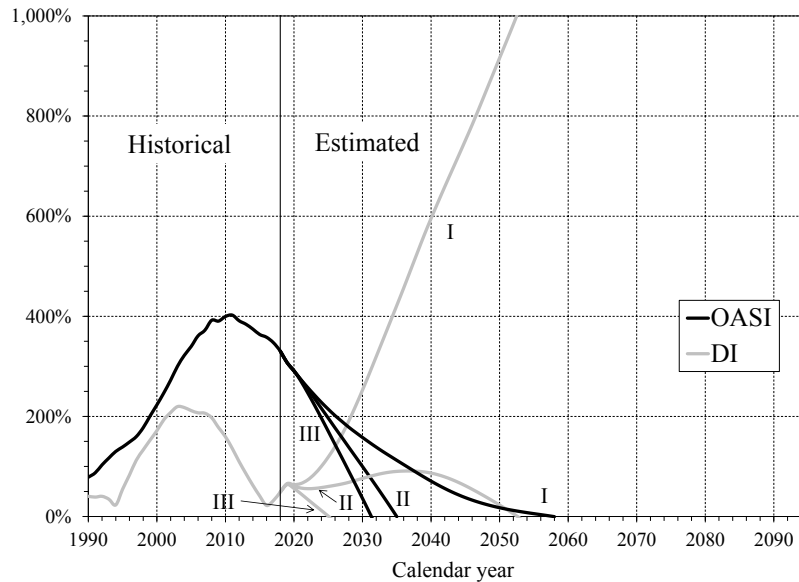
4. Summarized Income Rates, Summarized Cost Rates, and Actuarial Balances

Summarized values for the full 75-year period are useful in analyzing the program's long-range financial adequacy over the period as a whole, both

under present law and under proposed modifications to the law. All annual amounts included in a summarized value are present-value discounted to the valuation date. It is important to note that the actuarial balance indicates the solvency status of the fund only for the very end of the period.

Table IV.B5 presents summarized income rates, summarized cost rates, and actuarial balances for 25-year, 50-year, and 75-year valuation periods. Summarized income rates are the sum of the present value of non-interest income for a period (which includes scheduled payroll taxes, the projected income from the taxation of scheduled benefits, and reimbursements from the General Fund of the Treasury) and the starting trust fund asset reserves, expressed as a percentage of the present value of taxable payroll over the period. Under current law, the total OASDI payroll tax rate will remain at 12.4 percent in the future. In contrast, the Trustees expect income from taxation of benefits, expressed as a percentage of taxable payroll, to increase in most years of the long-range period for the reasons discussed earlier on page 51. Summarized cost rates are the sum of the present value of cost for a period (which includes scheduled benefits, administrative expenses, net interchange with the Railroad Retirement program, and payments for vocational rehabilitation services for disabled beneficiaries) and the present value of the cost of reaching a target trust fund of 100 percent of annual cost at the end of the period, expressed as a percentage of the present value of taxable payroll over the period.

The actuarial balance for a valuation period is equal to the difference between the summarized income rate and the summarized cost rate for the period. An actuarial balance of zero for any period indicates that cost for the period could be met for the period as a whole (but not necessarily at all points within the period), with a remaining trust fund reserve at the end of the period equal to 100 percent of the following year's cost. A negative actuarial balance for a period indicates that the present value of income to the program plus the existing trust fund is less than the present value of the cost of the program plus the cost of reaching a target trust fund reserve of one year's cost by the end of the period. Generally, a trust fund is deemed to be adequately financed for a period if the actuarial balance is zero or positive, meaning that the reserves at the end of the period are at least equal to annual cost. Note that solvency is possible with a small negative actuarial balance where reserves are still positive.[1]

---

[1] A program is solvent over any period for which the trust fund maintains a positive level of asset reserves. In contrast, the actuarial balance for a period includes the cost of having a target fund equal to 100 percent of the following year's cost at the end of the period. Therefore, if a program ends the period with reserves that are positive but not sufficient to cover the following year's costs, it will be solvent at the end of the period and yet still have a small negative actuarial balance for that period.

Table IV.B5 contains summarized rates for the intermediate, low-cost, and high-cost assumptions. The low-cost and high-cost assumptions define a wide range of possibilities. Financial outcomes as good as the low-cost scenario or as bad as the high-cost scenario are unlikely to occur.

For the 25-year valuation period, the OASDI program has an actuarial balance of 0.08 percent of taxable payroll under the low-cost assumptions, -1.73 percent under the intermediate assumptions, and -3.88 percent under the high-cost assumptions. These balances indicate that the program is adequately financed for the 25-year valuation period under only the low-cost assumptions.

For the 50-year valuation period, the OASDI program has actuarial balances of 0.11 percent under the low-cost assumptions, -2.38 percent under the intermediate assumptions, and -5.50 percent under the high-cost assumptions. These actuarial balances mean that the OASDI program is adequately financed for the 50-year valuation period under only the low-cost assumptions.

For the entire 75-year valuation period, the combined OASDI program has actuarial balances of 0.19 percent of taxable payroll under the low-cost assumptions, -2.78 percent under the intermediate assumptions, and -6.60 percent under the high-cost assumptions. These balances indicate that the combined OASDI program is adequately financed for the 75-year valuation period under only the low-cost assumptions.

Assuming the intermediate assumptions accurately capture future demographic and economic trends, solvency for the program over the next 75 years could be restored using a variety of approaches. For example, revenue could be increased in a manner equivalent to an immediate and permanent increase in the combined Social Security payroll tax rate from 12.40 percent to 15.10 percent (a relative increase of 21.8 percent), cost could be reduced in a manner equivalent to an immediate and permanent reduction in scheduled benefits of about 17 percent, or some combination of approaches could be used.

However, eliminating the actuarial deficit for the next 75-year valuation period requires raising payroll taxes or lowering benefits by more than is required just to achieve solvency, because the actuarial deficit includes the cost of attaining a target trust fund equal to 100 percent of annual program cost by the end of the period. The actuarial deficit could be eliminated for the 75-year period by increasing revenue in a manner equivalent to an immediate and permanent increase in the combined payroll tax from 12.40 percent to

15.29 percent (a relative increase of 23.3 percent),[1] reducing cost in a manner equivalent to an immediate reduction in scheduled benefits of about 18 percent, or some combination of approaches could be used.

Under the intermediate assumptions, the OASDI program has large annual deficits toward the end of the long-range period that are increasing and reach 4.11 percent of payroll for 2093 (see table IV.B1). These large deficits indicate that annual cost continues to exceed non-interest income after 2093, so continued adequate financing would require larger changes than those needed to maintain solvency for the 75-year period. Over the period extending through the infinite horizon, the actuarial deficit is 4.1 percent of payroll under the intermediate assumptions.

Table IV.B5.—Components of Summarized Income Rates and Cost Rates,
Calendar Years 2019-2093
[As a percentage of taxable payroll]

	Summarized income rate			Summarized cost rate			
Valuation period	Non-interest income	Beginning asset reserves[a]	Total	Cost[a]	Ending target fund[a]	Total	Actuarial balance
OASI:							
Intermediate:							
2019-43.	11.33	1.34	12.67	13.81	0.56	14.37	-1.70
2019-68.	11.39	.72	12.12	14.15	.25	14.41	-2.29
2019-93.	11.43	.53	11.96	14.47	.15	14.63	-2.67
Low-cost:							
2019-43.	11.24	1.21	12.45	12.23	.49	12.71	-.27
2019-68.	11.27	.62	11.89	11.95	.22	12.17	-.28
2019-93.	11.27	.44	11.71	11.80	.13	11.93	-.22
High-cost:							
2019-43.	11.44	1.50	12.94	15.71	.65	16.36	-3.43
2019-68.	11.55	.84	12.39	16.92	.30	17.22	-4.83
2019-93.	11.63	.64	12.27	17.93	.18	18.11	-5.85
DI:							
Intermediate:							
2019-43.	1.83	.05	1.88	1.83	.08	1.90	-.03
2019-68.	1.83	.03	1.86	1.92	.03	1.95	-.09
2019-93.	1.83	.02	1.85	1.95	.02	1.97	-.12
Low-cost:							
2019-43.	1.82	.04	1.86	1.47	.06	1.52	.34
2019-68.	1.82	.02	1.84	1.43	.03	1.46	.39
2019-93.	1.82	.02	1.84	1.42	.02	1.43	.41
High-cost:							
2019-43.	1.84	.05	1.89	2.25	.10	2.35	-.46
2019-68.	1.84	.03	1.87	2.50	.04	2.54	-.67
2019-93.	1.85	.02	1.87	2.59	.02	2.62	-.75

---

[1] The indicated increase in the payroll tax rate of 2.89 percent is somewhat larger than the 2.78 percent 75-year actuarial deficit because the indicated increase reflects a behavioral response to tax rate changes. In particular, the calculation assumes that an increase in payroll taxes results in a small shift of wages and salaries to forms of employee compensation that are not subject to the payroll tax.

**Table IV.B5.—Components of Summarized Income Rates and Cost Rates,
Calendar Years 2019-2093 (Cont.)**
[As a percentage of taxable payroll]

	Summarized income rate			Summarized cost rate			
Valuation period	Non-interest income	Beginning asset reserves[a]	Total	Cost[a]	Ending target fund[a]	Total	Actuarial balance
OASDI:							
Intermediate:							
2019-43.	13.16	1.39	14.55	15.64	0.64	16.28	-1.73
2019-68.	13.23	.75	13.97	16.07	.29	16.36	-2.38
2019-93.	13.27	.55	13.81	16.42	.17	16.60	-2.78
Low-cost:							
2019-43.	13.06	1.25	14.31	13.69	.54	14.23	.08
2019-68.	13.09	.65	13.74	13.38	.24	13.63	.11
2019-93.	13.10	.45	13.55	13.22	.15	13.36	.19
High-cost:							
2019-43.	13.27	1.56	14.83	17.96	.75	18.71	-3.88
2019-68.	13.39	.87	14.26	19.41	.35	19.76	-5.50
2019-93.	13.48	.66	14.13	20.52	.21	20.73	-6.60

[a] Benefit payments scheduled to be paid on January 3 are actually paid on December 31 as required by the statutory provision for early delivery of benefit payments when the normal payment delivery date is a Saturday, Sunday, or legal public holiday. For comparability with the values for historical years and the projections in this report, all trust fund operations and asset reserves reflect the 12 months of benefits scheduled for payment each year.

Note: Totals do not necessarily equal the sums of rounded components.

5. Open-Group Unfunded Obligation

Consistent with practice since 1965, this report focuses on a 75-year open-group valuation to evaluate the long-run financial status of the OASDI program. The open-group valuation includes non-interest income and cost for past, current, and future participants through the year 2093. The open-group unfunded obligation measures the adequacy of financing over the period as a whole for a program financed on a pay-as-you-go basis. On this basis, payroll taxes and scheduled benefits for all participants are included through 2093.

The open-group unfunded obligation increased from $13.2 trillion shown in last year's report to $13.9 trillion in this report. If there had been no changes in starting values, assumptions, laws, or methods for this report, then the open-group unfunded obligation would have increased to $13.7 trillion solely due to the change in the valuation period. This expected increase in the unfunded obligation occurs because: (1) the unfunded obligation is now discounted to January 1, 2019, rather than to January 1, 2018, which tends to increase the unfunded obligation by the annual nominal interest rate; and (2) the unfunded obligation now includes an additional year (2093). However, changes in the law, assumptions, methods, and starting values resulted in a net increase in the unfunded obligation that rounds to $0.1 trillion.

The 75-year unfunded obligation is equivalent to 2.61 percent of future OASDI taxable payroll and 0.9 percent of GDP through 2093.[1] These percentages were 2.68 and 1.0, respectively, for last year's report. The 75-year unfunded obligation as a percentage of taxable payroll is less than the actuarial deficit, because the unfunded obligation excludes the cost of having an ending target trust fund value.

The actuarial deficit was 2.84 percent of payroll in last year's report, and was expected to increase to a deficit of 2.90 percent of payroll solely due to the change in the valuation period. Changes in the law, assumptions, methods, and starting values combined to account for a 0.11 percent decrease (improvement) in the actuarial deficit to 2.78 percent of payroll. For additional details on these changes, see section IV.B.6.

As mentioned above, the open-group unfunded obligation expressed in dollars increased (worsened) more than would be expected from changing the valuation period alone. In large part, this increase occurred because near-term and ultimate real interest rates are significantly reduced in this report, thus discounting more distant years' annual shortfalls less. The actuarial balance, in contrast, increased (improved) relative to the change based on the valuation period alone. Lower interest rates have a much smaller worsening effect on the actuarial balance because interest rate changes affect the numerator and denominator similarly.

Table IV.B6 presents the components and the calculation of the long-range (75-year) actuarial balance under the intermediate assumptions. The present value of future cost less future non-interest income over the long-range period, minus the amount of trust fund asset reserves at the beginning of the projection period, is $13.9 trillion for the OASDI program. This amount is the 75-year "open-group unfunded obligation" (see row H). The actuarial deficit (which is the negative of the actuarial balance) combines this unfunded obligation with the present value of the ending target trust fund and expresses the total as a percentage of the present value of the taxable payroll for the period. The present value of future non-interest income minus cost, plus starting trust fund reserves, minus the present value of the ending target trust fund, is -$14.8 trillion for the OASDI program.

[1] The present value of future taxable payroll for 2019-93 is $531.2 trillion. The present value of GDP for 2019-93 is $1,497.0 trillion.

71

Table IV.B6.—Components of 75-Year Actuarial Balance and Unfunded Obligation Under Intermediate Assumptions

Item	OASI	DI	OASDI
Present value as of January 1, 2019 (in billions):			
A. Payroll tax revenue	$56,247	$9,554	$65,801
B. Reimbursements from general revenue	a	a	a
C. Taxation of benefits revenue	4,473	192	4,665
D. Non-interest income (A + B + C)	60,720	9,745	70,465
E. Cost	76,877	10,352	87,229
F. Cost minus non-interest income (E - D)	16,157	607	16,764
G. Trust fund asset reserves at start of period	2,798	97	2,895
H. Open-group unfunded obligation (F - G)	13,359	510	13,869
I. Ending target trust fund[b]	812	111	923
J. Income minus cost, plus reserves at start of period, minus ending target trust fund (D - E + G - I = - H - I)	-14,171	-621	-14,792
K. Taxable payroll	531,166	531,166	531,166
Percent of taxable payroll:			
Actuarial balance (100 × J ÷ K)	-2.67	-.12	-2.78

[a] Less than $0.5 billion.
[b] The calculation of the actuarial balance includes the cost of accumulating a target trust fund reserve equal to 100 percent of annual cost at the end of the period.

Note: Totals do not necessarily equal the sums of rounded components.

Consideration of summary measures alone (such as the actuarial balance and open-group unfunded obligation) for a 75-year period can lead to incorrect perceptions and to policy prescriptions that do not achieve sustainable solvency. These concerns can be addressed by considering the trend in trust fund ratios toward the end of the period. (See the discussion of "sustainable solvency" beginning on page 50.)

Another measure of trust fund finances, discussed in appendix F, is the infinite horizon unfunded obligation, which takes account of all annual balances, even those after 75 years. The extension of the time period past 75 years assumes that the current-law OASDI program and the demographic and economic trends used for the 75-year projection continue indefinitely. This infinite horizon unfunded obligation is estimated to be 4.1 percent of taxable payroll or 1.4 percent of GDP. These percentages were 4.0 and 1.3, respectively, for last year's report. Of course, the degree of uncertainty associated with estimates increases substantially for years further in the future.

6. Reasons for Change in Actuarial Balance From Last Report

Table IV.B7 shows the effects of changes on the long-range actuarial balance under the intermediate assumptions, by category, between last year's report and this report.

**Table IV.B7.—Reasons for Change in the 75-Year Actuarial Balance,
Based on Intermediate Assumptions**
[As a percentage of taxable payroll]

Item	OASI	DI	OASDI
Shown in last year's report:			
Income rate	11.99	1.86	13.84
Cost rate	14.62	2.07	16.69
Actuarial balance	**-2.63**	**-.21**	**-2.84**
Changes in actuarial balance due to changes in:			
Legislation / Regulation	.00	.00	.00
Valuation period[a]	-.05	-.01	-.05
Demographic data and assumptions	.06	.00	.06
Economic data and assumptions	-.03	.00	-.04
Disability data and assumptions	-.02	.09	.07
Methods and programmatic data	.00	.02	.01
Total change in actuarial balance	-.04	.09	.06
Shown in this report:			
Actuarial balance	**-2.67**	**-.12**	**-2.78**
Income rate	11.96	1.85	13.81
Cost rate	14.63	1.97	16.60

[a] The change in the 75-year valuation period from last year's report to this report means that the 75-year actuarial balance now includes the relatively large negative annual balance for 2093. This change in the valuation period results in a larger long-range actuarial deficit. The actuarial deficit includes the trust fund reserve at the beginning of the projection period.

Note: Totals do not necessarily equal the sums of rounded components.

If the law, data, assumptions, and methods had all remained unchanged from last year's Trustees Report, the long-range OASDI actuarial balance would have decreased (become more negative) by 0.05 percent of taxable payroll solely due to the change in the valuation period. However, as described below, projections in this report also reflect new data and changes in law, assumptions, and methods. These changes, including the change in the valuation period, combine to increase (improve) the long-range OASDI actuarial balance from -2.84 percent of taxable payroll in last year's report to -2.78 percent in this report.

Since the last report, there have been no new laws, regulations, or policy changes that are expected to have significant long-range financial effects on the OASDI actuarial balance. However, this year's report does incorporate one notable policy change. The Social Security Administration (SSA) started running the Disability Redesign Prototype model in ten states in 1999. Among other features, the prototype model eliminated the reconsideration step in the disability appeals process. Beginning in 2019, SSA is reinstating the reconsideration step in these states, which will make the process uniform nationwide. This reinstatement is expected to decrease disability incidence rates very slightly beginning in 2020 and has a negligible (less than 0.005 percent of taxable payroll) effect on the long-range actuarial balance.

73

Actuarial Estimates

As mentioned above, changing the 75-year valuation period from 2018 through 2092 for last year's report to 2019 through 2093 for this report decreases the projected long-range OASDI actuarial balance by 0.05 percent of taxable payroll. This decrease is mainly the result of including the relatively large negative annual balance for 2093 in this year's 75-year projection period. Note that the actuarial balance calculation includes trust fund asset reserves at the beginning of the projection period. These reserves reflect the program's net financial flows for all past years, including 2018, up to the start of the projection period.

New demographic data and changes in demographic assumptions combine to increase the long-range OASDI actuarial balance by 0.06 percent of taxable payroll. Ultimate demographic assumptions are unchanged from those in last year's report. However, this year's report does include two changes to the near-term demographic assumptions. First, for this year's report, slightly lower numbers of new lawful permanent residents (LPRs) are assumed for calendar years 2018 and 2019, due to recent lower annual refugee ceilings set by the Administration. These ceilings, 45,000 refugees for fiscal year 2018 and 30,000 refugees for fiscal year 2019, compare to annual ceilings that ranged from 70,000 to 85,000 refugees for fiscal years 2001 through 2016, and 50,000 refugees for fiscal year 2017. This change in assumed LPR immigration levels decreases the actuarial balance by a negligible amount (less than 0.005 percent of taxable payroll). Second, last year's report included a surge in the number of other-than-LPR immigrants for years 2016 through 2021 to a level above the assumed ultimate level of 1.35 million. This surge reflected the assumption that the drop in other-than-LPR immigration levels during the recent economic downturn was, in part, a deferral of migration that would be partially offset during the latter stages of the economic recovery. However, as the economic recovery has continued to near completion, recent estimates have not shown a trend toward levels above the ultimate assumption. Therefore, this year's report eliminates the temporary surge above the ultimate other-than-LPR immigration level and instead incorporates a gradual rise in 2017 and 2018, reaching the ultimate assumed level in 2019. This change in near-term assumed levels of other-than-LPR immigration decreases the actuarial balance by 0.01 percent of taxable payroll.

In addition to these assumption changes, three demographic data updates resulted in significant changes in the long-range OASDI actuarial balance. First, final fertility (birth) data for 2017 indicate somewhat lower birth rates than were assumed in last year's report for 2017. These updated data result in slightly lower birth rates during the transition period to the ultimate levels, decreasing the actuarial balance by 0.02 percent of taxable payroll. Second, incorporating 2016 mortality data for ages under 65 from the National Center

for Health Statistics (NCHS) and 2016 and preliminary 2017 mortality data for ages 65 and older from Medicare experience resulted in higher death rates for all future years than were projected in last year's report. These higher death rates increase the actuarial balance by 0.09 percent of taxable payroll. Third, updates to LPR immigration data, historical population data, and other minor data updates combine to change the actuarial balance by a negligible amount.

New economic data and changes in economic assumptions combine to decrease the long-range OASDI actuarial balance by 0.04 percent of payroll. Four ultimate economic assumptions were changed for this year's report. First, the ultimate annual rate of change in total-economy labor productivity was lowered from 1.68 percent to 1.63 percent, reflecting an expected slower rate of productivity growth in the long term. This change decreases the actuarial balance by 0.09 percent of taxable payroll. Second, the difference between the ultimate growth rates for the CPI-W and the GDP implicit price deflator (the "price differential"), was decreased from 0.40 percentage point to 0.35 percentage point. Recent data indicate that the part of the price differential that is due to the difference in the composition of the two indices is about 0.05 percentage point, slightly less than the 0.10 percentage point effect assumed for the 2018 report. This assumed change in the compositional component of the price differential increases the long-range actuarial balance by 0.09 percent of taxable payroll. Third, the average real-wage differential over the last 65 years of the projection period is 1.21 percentage points per year in this year's report, increased slightly from the 1.20 value in last year's report. This higher long-term real-wage differential assumption is due to slower assumed growth in employer-sponsored group health insurance premiums, based on updated projections by the Centers for Medicare and Medicaid Services (CMS). Because these premiums are not subject to the payroll tax, slower growth in these premiums means that a larger share of employee compensation will be in the form of wages that are subject to the payroll tax. This change to the real-wage differential assumption increases the long-range actuarial balance by 0.03 percent of taxable payroll. Fourth, the ultimate real interest rate was lowered by 0.2 percentage point, from 2.7 percent for last year's report to 2.5 percent for this year's report. Real interest rates have been low since 2000, and particularly low since the start of the most recent recession. An ongoing and much-debated question among experts is how much of this change is a temporary response to extraordinary events, versus a fundamental permanent change. The Trustees believe that lowering the long-term ultimate real interest rate somewhat is appropriate at this time. This change in the ultimate real interest rate assumption decreases the actuarial balance by 0.08 percent of payroll. Other changes to data and near-term economic assumptions, including the July 2018 revisions in histor-

ical GDP estimated by the Bureau of Economic Analysis (BEA) of the Department of Commerce, combine for a net increase in the actuarial balance of 0.01 percent of taxable payroll.

New disability data and changes in disability assumptions combine to increase the OASDI actuarial balance by 0.07 percent of payroll. Disabled-worker applications have continued to drop substantially since 2010 and have now reached levels well below those recorded at the peak of the last economic cycle, in 2007-08. As a result, disability incidence rates have continued to fall well below expectations. Based on this experience, the Trustees reduced the ultimate disability incidence rate for this report from 5.4 to 5.2 per thousand exposed, returning to the ultimate rate that was used in the 2008 through 2011 reports. This change in the ultimate disability incidence rate increases the actuarial balance by 0.04 percent of payroll. In addition, recent disability data and changes in near-term assumptions increase the long-range actuarial balance by 0.03 percent of taxable payroll. Recent data have shown significantly lower levels of disability applications and awards than expected in last year's report, and much lower levels than had been assumed in prior recent reports. Based on this experience, estimated disability incidence rates are assumed to increase somewhat more gradually toward the ultimate assumed level for this report through the short-range period. These new disability data and changes in assumptions are almost entirely responsible for the change in the DI Trust Fund reserve depletion date from 2032 in last year's report to 2052 in this year's report. The short-range effects are noted in section IV.A.4.

The projections in this report also reflect several methodological improvements and updates based on new program-specific data. These methodological changes, programmatic data updates, and interactions combine to increase the long-range OASDI actuarial balance by 0.01 percent of taxable payroll. Descriptions of six significant methodological changes and programmatic data updates follow.

First, the fertility model was improved to better incorporate detailed provisional birth rate data available from NCHS. This methodological improvement decreases the actuarial balance by 0.02 percent of taxable payroll.

Second, CMS is now providing Medicare mortality data using a modernized and improved data system. This system allowed for more complete and better specified data, including data from Puerto Rico and the Virgin Islands. This year's report also reflects a minor method change, incorporating data for all Medicare enrollees at ages 65 through 69, rather than just those receiving Social Security benefits. The combined effect of the more comprehensive data and the related method changes is an increase in the actuarial balance of 0.01 percent of taxable payroll.

The third significant change is an improvement to the way the labor force participation model incorporates projected changes in disability prevalence. In prior years' reports, the labor force model incorporated disability prevalence projections from the immediate prior report (for example, the labor force model for the 2018 Trustees Report incorporated disability prevalence projections from the 2017 Trustees Report). However, the large magnitude of changes in the assumed near-term and long-term disability incidence rates for this year's report has a direct and substantial impact on projected disability prevalence rates. In order to consistently reflect the large change in disability prevalence for this report, the labor force model has been modified to incorporate the current year's disability prevalence projections. This modification increases the actuarial balance by 0.02 percent of payroll.

The fourth significant change is in the long-range model for projecting average benefit levels of retired-worker and disabled-worker beneficiaries newly entitled for benefits. This model uses a large sample of 10 percent of all newly entitled retired-worker beneficiaries in a recent year. For this year's report, the model's projection of earnings for workers becoming newly entitled in future years was improved to better reflect the "dispersion" in taxable earnings levels observed from 1970 to 2010. Over this historical period, increases in taxable earnings were higher for workers with taxable earnings above the median than for workers with taxable earnings below the median. This improvement in the average benefits model increases the actuarial balance by 0.04 percent of payroll.

Fifth, this year's report includes an improvement in the method for projecting future benefits, to better reflect benefit levels for those who are awarded benefits more than two years after their date of initial benefit entitlement. This change mainly affects average DI benefit levels because the appeals process extends the date of disabled worker benefit award more than two years beyond the date of initial benefit entitlement in a significant number of cases. The effect on OASI benefit levels is much smaller. In general, individuals who are awarded benefits more than two years after the initial date of entitlement have lower benefit levels than those who are awarded sooner. This change results in an increase in the actuarial balance of 0.03 percent of taxable payroll.

The sixth significant change is updating of two sets of benefit adjustment factors based on new programmatic data: the post-entitlement adjustment factors and the Windfall Elimination Provision (WEP) reduction factors. Post-entitlement factors are used to account for changes in benefit levels, primarily due to differential mortality by benefit level and earnings after benefit entitlement. WEP reduction factors are used to adjust benefits for individuals who receive a pension based on specified categories of non-covered employ-

ment. These updates reflecting programmatic data combine to decrease the actuarial balance by 0.02 percent of payroll.

In addition to these six significant methodological changes and programmatic data updates, changes in starting levels and projected levels of OASI and DI beneficiaries and benefit amounts over the first 10 years of the projection period, updating other programmatic data, other small methodological improvements, and interactions among the various method changes and updates to programmatic experience combine to decrease the long-range OASDI actuarial balance by 0.05 percent of taxable payroll.

Figure IV.B4 compares the annual cash-flow balances for this report and the prior year's report for the combined OASDI program over the long-range (75-year) projection period. The figure illustrates the annual effects of the changes described earlier in this section.

Figure IV.B4.—OASDI Annual Balances: 2018 and 2019 Trustees Reports
[As a percentage of taxable payroll, under Intermediate Assumptions]
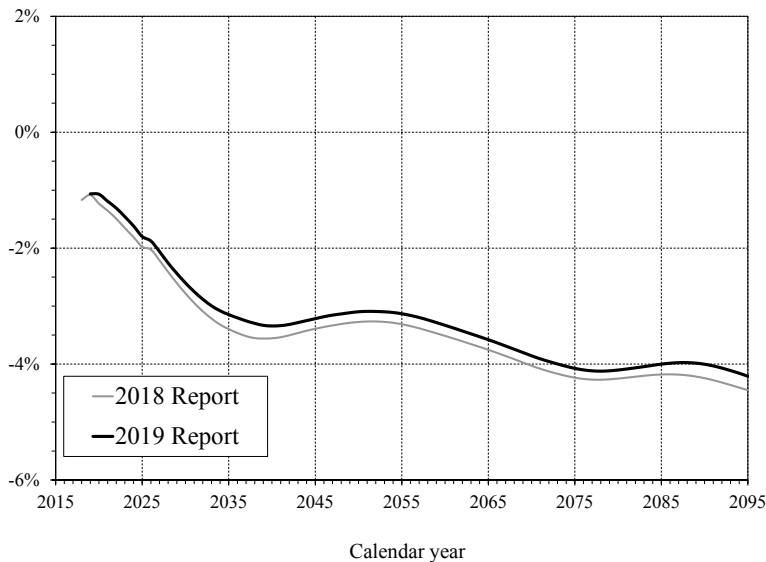
The annual balances in this year's report are higher (less negative) throughout the 75-year projection period, principally due to higher mortality rates and lower disability incidence rates. For the full 75-year projection period, the annual balances average 0.18 percentage point higher. For 2092, the projected annual deficit is 4.07 percent of taxable payroll in this report, compared to 4.32 percent in last year's report.

V. ASSUMPTIONS AND METHODS UNDERLYING ACTUARIAL ESTIMATES

The future income and cost of the OASDI program will depend on many demographic, economic, and program-specific factors. Trust fund income will depend on how these factors affect the size and composition of the working population as well as the level and distribution of earnings. Similarly, program cost will depend on how these factors affect the size and composition of the beneficiary population as well as the general level of benefits.

The Trustees make basic assumptions for several of these factors based on analysis of historical trends, historical conditions, and expected future conditions. These factors include fertility, mortality, immigration, marriage, divorce, productivity, inflation, average earnings, unemployment, real interest rates, and disability incidence and termination. Other factors depend on these basic assumptions. These other, often interdependent, factors include total population, life expectancy, labor force participation, gross domestic product, and program-specific factors. Each year the Trustees reexamine these assumptions and methods in light of new information and make appropriate revisions. The assumptions for this report were selected by the middle of January 2019.

Future levels of these factors and their interrelationships are inherently uncertain. To address these uncertainties, this report uses three sets of assumptions, designated as intermediate (alternative II), low-cost (alternative I), and high-cost (alternative III). The intermediate set represents the Trustees' best estimate of the future course of the population and the economy. With regard to the net effect on the actuarial status of the OASDI program, the low-cost set is more optimistic and the high-cost set is more pessimistic. The low-cost and high-cost sets of assumptions reflect significant potential changes in the interrelationships among factors, as well as changes in the values for individual factors.

While it is unlikely that all of the factors and interactions will differ in the specified directions from the intermediate values, many combinations of individual differences in the factors could have a similar overall effect. Outcomes with overall long-range cost as low as the low-cost scenario or as high as the high-cost scenario are very unlikely. This report also includes a section on sensitivity analysis, where factors are changed one at a time (see appendix D), and a section on stochastic projections, which provides a probability distribution of possible future outcomes, with most of the key factors being varied around the intermediate alternative (see appendix E).

Readers should interpret with care the estimates based on the three sets of alternative assumptions. These estimates are not specific predictions of the future financial status of the OASDI program. Rather, they provide a reasonable range of future income and cost.

All of the key demographic, economic, and program-specific assumptions reach their long-range ultimate values within the next 25 years. For extrapolations beyond the 75-year long-range period, the ultimate levels or trends reached by the end of the 75-year period remain unchanged. The assumed ultimate values represent average annual experience or growth rates. Actual future values will exhibit fluctuations or cyclical patterns, as in the past.

The following sections briefly discuss the various assumptions and methods used in making the estimates of trust fund actuarial status, which are the focus of this report.[1] There are, of course, many interrelationships among these factors that are important but are beyond the scope of this discussion.

A. DEMOGRAPHIC ASSUMPTIONS AND METHODS

This section of the report provides a brief overview of the demographic historical data and the assumptions used for the projections.

1. Fertility Assumptions

Birth rates by single year of age, for women aged 14 to 49,[2] are the basis for the fertility assumptions. These rates apply to the total number of women, across all marital statuses, in the midyear population at each age. Table V.A1 displays the historical and projected total fertility rates.[3]

Historically, birth rates in the United States have fluctuated widely. The total fertility rate decreased from 3.31 children per woman at the end of World War I (1918) to 2.15 during the Great Depression (1936). After 1936, the total fertility rate rose to 3.68 in 1957 and then fell to 1.74 by 1976. After 1976, the total fertility rate rose above 2.00 by 1990, where it generally

---

[1] Actuarial Studies published by the Office of the Chief Actuary, Social Security Administration, contain further details about the assumptions, methods, and actuarial estimates. A complete list of available studies may be found at www.ssa.gov/OACT/NOTES/actstud.html. To obtain copies of such studies or of this report, please submit a request at www.ssa.gov/OACT/request.html. This entire report, along with supplemental year-by-year tables and additional documentation on assumptions and methods, may be found at www.ssa.gov/OACT/TR/2019/.

[2] Birth rates at age 14 include births to women aged 14 and under, and birth rates at age 49 include births to women aged 49 and over.

[3] The total fertility rate may be interpreted as the average number of children that would be born to a woman if she were to experience, at each age of her life, the birth rate observed in, or assumed for, a specified year, and if she were to survive the entire childbearing period. A rate of about 2.1 would ultimately result in a nearly constant population if immigration and emigration were both zero, and if death rates were to remain at current levels.

remained through 2009, but dropped below 1.90 for 2011 through 2017 and is estimated to be 1.74 in 2018.

These variations in the total fertility rate resulted from changes in many factors, including social attitudes, economic conditions, birth-control practices, and the racial/ethnic composition of the population. Since the baby-boom era (1946-65), women have had higher educational attainment, higher labor force participation, an older average age at first marriage, a higher propensity to remain unmarried, and higher rates of divorce. All of these factors are consistent with continued lower total fertility rates than those experienced during the baby-boom era. Based on consideration of these factors, the Trustees expect the total fertility rate for future years to remain relatively close to the average level since the end of the baby-boom era. The assumed ultimate total fertility rates are 2.20, 2.00, and 1.80 children per woman for the low-cost, intermediate, and high-cost assumptions, respectively. These ultimate rates are unchanged from last year's report.

For the intermediate assumptions, the projected total fertility rate gradually increases from 2018 through the year the ultimate value is reached (2027) with somewhat more rapid increases in the middle of the 2018-2027 period. The assumed low-cost and high-cost total fertility rates trend away from the intermediate path and reach the ultimate values in 2027 and 2024, respectively.

2. Mortality Assumptions

For the projections in this year's report, ultimate average annual percentage reductions in future mortality rates were assumed by age group and cause of death. These assumptions were then used to estimate future central death rates by age group, sex, and cause of death. From these estimated central death rates, probabilities of death by single year of age and sex were calculated.

Historical death rates were calculated for years 1900 through 2016 for ages below 65 (and for all ages for years prior to 1968) using data from the National Center for Health Statistics (NCHS).[1] For ages 65 and over, final Medicare data on deaths for years 1968 through 2015 and preliminary data for 2016 and 2017 were used.[2] Death rates by cause of death were produced for all ages for years 1979-2016 using data from the NCHS.

---

[1] These rates reflect NCHS data on deaths and Census estimates of population.
[2] These rates reflect Medicare data on deaths and enrollments.

The total age-sex-adjusted death rate[1] declined at an average annual rate of 1.03 percent between 1900 and 2016. Between 1979 and 2016, the period for which death rates were analyzed by cause, the total age-sex-adjusted death rate, for all causes combined, declined at an average rate of 0.87 percent per year.

Death rates have declined substantially in the U.S. since 1900, with rapid declines over some periods and slow or no improvement over the other periods. Many factors are responsible for historical reductions in death rates, including medical advances, increased availability of health-care services, and improvements in sanitation and nutrition. Historical death rates generally declined more slowly for older ages and more rapidly for children and infants than for the rest of the population. Between 1900 and 2016, the age-sex-adjusted death rate declined at an average rate of 0.78 percent per year for ages 65 and over, and 3.00 percent per year for ages under 15.

Mortality assumptions differ for the low-cost, intermediate, and high-cost scenarios. Throughout the projection, the low-cost scenario contains annual percentage reductions that are smaller than those in the intermediate scenario, while those in the high-cost scenario are larger. The ultimate annual percentage reductions for each of the three alternatives are the same as those in last year's report.

The trends in the annual reductions in central death rates were calculated for the period from 2006 to 2016 for NCHS data, and 2007 to 2017 for Medicare data, by age group, sex, and cause of death.[2] These trends are the starting reductions for alternative II. For alternatives I and III, 50 and 150 percent of the starting reductions are used, respectively. These annual reductions, by alternative, are assumed to transition rapidly from the starting reductions until they reach the ultimate annual percentage reductions assumed for 2043 and later.

Table V.A1 contains historical and projected age-sex-adjusted death rates for the total population (all ages), for ages under 65, and for ages 65 and over. Age-sex adjustment eliminates the effect of a changing distribution of population by age and sex, allowing the pure effects of changes in death rates to be observed. Under the intermediate assumptions, projected age-sex-adjusted death rates are, in general, slightly higher than the death rates in last year's report for both the age group under 65 and the age group 65 and over. These

---

[1] Based on the enumerated total population as of April 1, 2010, if that population were to experience the death rates by age and sex for the selected year.

[2] Cause of death is only available for the NCHS data.

changes primarily result from incorporating more recent historical data, which continue to show low rates of improvement.

The projected average annual rate of decline for the total age-sex-adjusted death rate is about 0.41 percent, 0.77 percent, and 1.16 percent between 2018 and 2093 for alternatives I, II, and III, respectively. In keeping with the patterns observed in the historical data, the assumed future rates of decline are greater for younger ages than for older ages, but to a substantially lesser degree than in the past. Accordingly, the projected age-sex-adjusted death rates for ages 65 and over decline at average annual rates of about 0.37 percent, 0.68 percent, and 1.02 percent between 2018 and 2093 for alternatives I, II, and III, respectively. The projected age-sex-adjusted death rates for ages under 15 decline at average annual rates of about 0.80 percent, 1.58 percent, and 2.57 percent between 2018 and 2093 for alternatives I, II, and III, respectively.

Demographers express a wide range of views on the likely rate of future decline in death rates. For example, some believe that the long-standing historical tendency for mortality to decline more slowly at the oldest ages will cease in the future. Others believe that biological factors, social factors, and limitations on health care spending may slow future rates of decline in mortality.

Table V.A1.—Fertility and Mortality Assumptions,[a]
Calendar Years 1940-2095

Calendar year	Total fertility rate[b]	Age-sex-adjusted death rate[c] per 100,000		
		Total	Under 65	65 and over
Historical data:				
1940	2.23	1,919.8	750.1	9,718.8
1945	2.42	1,716.6	674.8	8,662.9
1950	3.03	1,561.9	570.2	8,173.7
1955	3.50	1,453.8	508.2	7,758.4
1960	3.61	1,454.3	503.2	7,795.4
1965	2.88	1,428.8	495.2	7,653.3
1970	2.43	1,340.0	485.7	7,036.3
1975	1.77	1,204.8	426.6	6,393.6
1980	1.82	1,136.9	384.3	6,154.3
1985	1.83	1,081.0	353.3	5,932.9
1990	2.07	1,022.9	333.6	5,618.9
1995	1.98	1,002.7	317.9	5,568.6
2000	2.05	961.5	281.0	5,498.9
2005	2.06	901.9	270.7	5,110.3
2010	1.93	820.8	248.5	4,636.1
2011	1.89	820.7	249.1	4,631.3
2012	1.87	811.7	248.6	4,565.6
2013	1.85	812.2	249.4	4,564.6
2014	1.86	804.9	251.4	4,495.1
2015	1.84	815.0	254.9	4,549.7
2016	1.82	[d]808.2	260.5	[d]4,460.0
2017	1.76	[d]802.7	[d]250.6	[d]4,483.6
2018	[e]1.74	[e]791.8	[e]249.3	[e]4,408.3
Intermediate:				
2020	1.76	779.9	245.9	4,339.7
2025	1.98	748.2	234.8	4,170.8
2030	2.00	716.5	222.6	4,009.3
2035	2.00	686.2	210.6	3,857.2
2040	2.00	657.7	199.3	3,714.4
2045	2.00	631.0	188.6	3,580.6
2050	2.00	606.0	178.7	3,455.2
2055	2.00	582.6	169.4	3,337.4
2060	2.00	560.6	160.7	3,226.7
2065	2.00	540.0	152.6	3,122.5
2070	2.00	520.6	145.0	3,024.3
2075	2.00	502.3	137.9	2,931.6
2080	2.00	485.1	131.3	2,844.0
2085	2.00	468.8	125.0	2,761.1
2090	2.00	453.5	119.1	2,682.6
2095	2.00	438.9	113.6	2,608.1
Low-cost:				
2020	1.82	792.3	250.1	4,407.3
2025	2.14	778.5	245.6	4,331.3
2030	2.20	762.3	239.5	4,248.2
2035	2.20	745.8	233.0	4,164.8
2040	2.20	729.5	226.5	4,083.1
2045	2.20	713.7	220.2	4,003.7
2050	2.20	698.3	214.1	3,926.8
2055	2.20	683.5	208.2	3,852.6
2060	2.20	669.2	202.5	3,780.7
2065	2.20	655.3	197.0	3,711.2
2070	2.20	642.0	191.7	3,643.9
2075	2.20	629.0	186.6	3,578.8
2080	2.20	616.5	181.6	3,515.7
2085	2.20	604.3	176.8	3,454.5
2090	2.20	592.6	172.2	3,395.3
2095	2.20	581.2	167.8	3,337.8

Table V.A1.—Fertility and Mortality Assumptions,[a]
Calendar Years 1940-2095 (Cont.)

Calendar year	Total fertility rate[b]	Age-sex-adjusted death rate[c] per 100,000		
		Total	Under 65	65 and over
High-cost:				
2020	1.70	766.4	241.4	4,266.7
2025	1.80	714.2	222.5	3,992.9
2030	1.80	665.3	203.4	3,744.9
2035	1.80	620.9	185.8	3,521.8
2040	1.80	580.9	169.8	3,321.2
2045	1.80	544.8	155.6	3,140.3
2050	1.80	512.4	142.8	2,976.6
2055	1.80	483.0	131.3	2,828.0
2060	1.80	456.4	121.0	2,692.6
2065	1.80	432.2	111.8	2,568.7
2070	1.80	410.1	103.4	2,455.0
2075	1.80	389.8	95.8	2,350.3
2080	1.80	371.2	88.9	2,253.5
2085	1.80	354.1	82.6	2,163.8
2090	1.80	338.2	76.9	2,080.4
2095	1.80	323.5	71.7	2,002.7

[a] This table contains basic assumptions along with key summary values that are derived from basic assumptions.

[b] The total fertility rate for any year is the average number of children that would be born to a woman if she were to experience, at each age of her life, the birth rate observed in, or assumed for, the selected year, and if she were to survive the entire childbearing period.

[c] Based on the enumerated total population as of April 1, 2010, if that population were to experience the death rates by age and sex observed in, or assumed for, the selected year.

[d] Estimated.

[e] Estimated, intermediate alternative.

3. Immigration Assumptions

Projections of the total Social Security area population reflect assumptions for annual immigration flows. For this report, four categories of immigration flows are used:

- Lawful permanent resident (LPR) immigration: Persons who enter the Social Security area and are granted LPR status, or who are already in the Social Security area and adjust their status to become LPRs.[1]

- Legal emigration: LPRs and citizens who leave the Social Security area population.

- Other-than-LPR immigration: Persons who enter the Social Security area and stay to the end of the year without being granted LPR status, such as undocumented immigrants, and foreign workers and students entering with temporary visas.

---

[1] Persons who enter the country with legal visas but without LPR status, such as temporary foreign workers and students, are not included in the "LPR immigration" category.

- Other-than-LPR emigration: Other-than-LPR immigrants who leave the Social Security area population or who adjust their status to become LPRs.

Net LPR immigration is the difference between LPR immigration and legal emigration. Net other-than-LPR immigration is the difference between other-than-LPR immigration and other-than-LPR emigration. Total net immigration refers to the sum of net LPR immigration and net other-than-LPR immigration.

Immigration assumptions differ for the low-cost, intermediate, and high-cost scenarios. The low-cost scenario includes higher annual net immigration and the high-cost scenario includes lower annual net immigration. Table V.A2 contains historical and projected levels of various immigration flows.

LPR immigration has increased significantly since World War II, due to various factors and legislative changes, including the Immigration Act of 1965 and the Immigration Act of 1990.

For the intermediate alternative, the ultimate level of annual LPR immigration, which includes residents who adjust their status to become LPRs, is assumed to be 1,050,000 persons for 2020 and later. For alternative I, ultimate annual LPR immigration is assumed to be 1,250,000 persons for 2020 and later, and for alternative III, ultimate annual LPR immigration is assumed to be 850,000 persons for 2020 and later. The ultimate levels of LPR immigration are unchanged from last year's report.

The assumed ratios of annual legal emigration to LPR immigration are 20, 25, and 30 percent for alternatives I, II, and III, respectively. This range is consistent with the limited historical data for legal emigration from the Social Security area. These ratios are unchanged from last year's report. Under the intermediate alternative, by combining the ultimate annual LPR immigration and legal emigration assumptions, ultimate annual net LPR immigration is about 788,000 persons. For the low-cost and high-cost scenarios, ultimate annual net LPR immigration is 1,000,000 persons and 595,000 persons, respectively.

The estimated number of other-than-LPR immigrants residing in the Social Security area and the annual level of other-than-LPR immigration have been affected significantly by the most recent recession. Although net other-than-LPR immigration was greatly reduced during the economic downturn, it has begun to rise since then. Under the intermediate assumptions, annual other-than-LPR immigration is expected to continue increasing, reflecting a con-

tinued recovery from levels experienced during the recession. In last year's report, other-than-LPR immigration under the intermediate assumptions was projected to increase to a peak level in 2018 and then decrease to the ultimate level in 2022, based on the expectation that the continuing economic recovery would result in other-than-LPR immigration levels that would make up for the lower levels experienced during the recession. However, recent other-than-LPR immigration levels have not followed this pattern. Under the intermediate assumptions for this year's report, other-than-LPR immigration is assumed to attain the ultimate level in 2019. The ultimate levels of other-than-LPR immigration are unchanged from last year's report: 1,350,000 persons for alternative II, 1,650,000 persons for alternative I, and 1,050,000 persons for alternative III.

Emigration from the other-than-LPR immigrant population includes those who leave the Social Security area and those who adjust their status to become LPRs. This other-than-LPR immigrant population is highly mobile and far more likely to leave the Social Security area than is the citizen or LPR population. However, as other-than-LPR immigrants stay in the country for longer periods of time, they generally become less likely to leave the country.

Under the intermediate assumptions, the total annual number of other-than-LPR immigrants who leave the Social Security area averages about 422,000 through the 75-year projection period. In addition, the ultimate annual number of other-than-LPR immigrants who adjust status to become LPRs is assumed to be 450,000 for the intermediate assumptions. For the low-cost and high-cost scenarios, the total annual number of other-than-LPR emigrants averages about 496,000 and 346,000, respectively, through the 75-year projection period. The ultimate annual number of people adjusting status to LPR status is assumed to be 550,000 persons and 350,000 persons, for the low-cost and high-cost scenarios, respectively. The ultimate annual number of people adjusting status to become LPRs is one-third as large as the assumed ultimate annual number of the other-than-LPR immigrants entering the Social Security area, and is unchanged from last year's report for all three sets of assumptions.

Under the assumptions described above, the projected size of the other-than-LPR immigrant population grows substantially. This growth reflects the excess of annual immigration over the combined annual numbers of emigrants (including adjustments of status) and deaths that occur within the other-than-LPR immigrant population.

Assumptions and Methods

Under the intermediate assumptions, projected net other-than-LPR immigration gradually decreases over time. Because the projected number of other-than-LPR immigrants leaving the Social Security area is based on rates of departure, an increase in the number of other-than-LPR immigrants residing in the Social Security area results in an increase in the number who emigrate out of the area. All other components of other-than-LPR immigration and emigration are assumed to be stable after 2019, and thus do not contribute toward any change in annual net other-than-LPR immigration. Under the intermediate assumptions, the projected average annual level of net other-than-LPR immigration over the 75-year projection period is about 478,000 persons. For the low-cost and high-cost assumptions, projected average annual net other-than-LPR immigration is about 601,000 persons and 354,000 persons, respectively.

The projected average annual level of total net immigration (LPR and other-than-LPR, combined) is about 1,265,000 persons per year during the 75-year projection period under the intermediate assumptions. For the low-cost and high-cost assumptions, projected average annual total net immigration is about 1,601,000 persons and 949,000 persons, respectively.

Demographers express a wide range of views about the future course of immigration for the United States. Some believe that net immigration will increase substantially in the future. Others believe that potential immigrants may be increasingly attracted to other countries, that the number of potential immigrants may be lower due to lower birth rates in many countries, or that changes in the law or enforcement of the law will reduce immigration.

Table V.A2.—Immigration Assumptions,[a] Calendar Years 1940-2095
[in thousands]

Calendar year	LPR immigration				Other-than-LPR immigration[b]				Total net immigration
	LPR in	Legal out	Adjustments of status[c] [d]	Net LPR	Other-than-LPR in	Other-than-LPR out	Adjustments of status[c] [d]	Net other-than-LPR	
Historical data:									
1940	61	15	-	46	-	-	-	-	-
1945	73	18	-	55	-	-	-	-	-
1950	227	57	-	171	-	-	-	-	-
1955	280	70	-	210	-	-	-	-	-
1960	268	67	-	201	-	-	-	-	-
1965	261	77	49	232	-	-	49	-	-
1970	307	93	65	279	-	-	65	-	-
1975	340	98	53	294	-	-	53	-	-
1980	431	136	112	407	-	-	112	203	610
1985	458	144	119	432	-	-	119	261	693
1990	548	166	114	497	-	-	114	623	1,120
1995	511	192	255	575	-	-	255	560	1,135
2000	482	224	413	672	1,408	294	413	701	1,373
2005	561	290	597	869	1,827	84	597	1,146	2,015
2010	622	262	426	786	681	206	426	50	835
2011	647	264	408	791	590	251	408	-69	722
2012	621	255	401	766	725	443	401	-118	648
2013	589	249	409	748	832	341	409	82	830
2014	627	256	398	769	1,327	156	398	772	1,541
2015	689	271	395	813	1,111	259	395	457	1,270
2016	763	292	407	877	1,192	695	407	90	968
2017	[e]724	[e]282	[e]403	[e]845	[f]1,250	[e]237	[e]403	[f]610	[f]1,456
2018	[f]620	[f]268	[f]450	[f]803	[f]1,300	[f]249	[f]450	[f]601	[f]1,404
Intermediate:									
2020	600	263	450	788	1,350	275	450	625	1,413
2025	600	263	450	788	1,350	329	450	571	1,359
2030	600	263	450	788	1,350	358	450	542	1,329
2035	600	263	450	788	1,350	384	450	516	1,304
2040	600	263	450	788	1,350	407	450	493	1,280
2045	600	263	450	788	1,350	424	450	476	1,263
2050	600	263	450	788	1,350	436	450	464	1,251
2055	600	263	450	788	1,350	445	450	455	1,243
2060	600	263	450	788	1,350	452	450	448	1,236
2065	600	263	450	788	1,350	457	450	443	1,231
2070	600	263	450	788	1,350	461	450	439	1,227
2075	600	263	450	788	1,350	464	450	436	1,223
2080	600	263	450	788	1,350	466	450	434	1,221
2085	600	263	450	788	1,350	468	450	432	1,220
2090	600	263	450	788	1,350	469	450	431	1,218
2095	600	263	450	788	1,350	470	450	430	1,218

Table V.A2.—Immigration Assumptions,[a] Calendar Years 1940-2095 (Cont.)
[in thousands]

Calendar year	LPR immigration				Other-than-LPR immigration[b]				Total net immigration
	LPR in	Legal out	Adjustments of status[c][d]	Net LPR	Other-than-LPR in	Other-than-LPR out	Adjustments of status[c][d]	Net other-than-LPR	
Low-cost:									
2020	700	250	550	1,000	1,600	279	550	771	1,771
2025	700	250	550	1,000	1,650	353	550	747	1,747
2030	700	250	550	1,000	1,650	396	550	704	1,704
2035	700	250	550	1,000	1,650	435	550	665	1,665
2040	700	250	550	1,000	1,650	470	550	630	1,630
2045	700	250	550	1,000	1,650	496	550	604	1,604
2050	700	250	550	1,000	1,650	515	550	585	1,585
2055	700	250	550	1,000	1,650	530	550	570	1,570
2060	700	250	550	1,000	1,650	541	550	559	1,559
2065	700	250	550	1,000	1,650	550	550	550	1,550
2070	700	250	550	1,000	1,650	556	550	544	1,544
2075	700	250	550	1,000	1,650	561	550	539	1,539
2080	700	250	550	1,000	1,650	564	550	536	1,536
2085	700	250	550	1,000	1,650	566	550	534	1,534
2090	700	250	550	1,000	1,650	568	550	532	1,532
2095	700	250	550	1,000	1,650	569	550	531	1,531
High-cost:									
2020	500	255	350	595	1,050	265	350	435	1,030
2025	500	255	350	595	1,050	300	350	400	995
2030	500	255	350	595	1,050	316	350	384	979
2035	500	255	350	595	1,050	330	350	370	965
2040	500	255	350	595	1,050	342	350	358	953
2045	500	255	350	595	1,050	350	350	350	945
2050	500	255	350	595	1,050	355	350	345	940
2055	500	255	350	595	1,050	358	350	342	937
2060	500	255	350	595	1,050	360	350	340	935
2065	500	255	350	595	1,050	362	350	338	933
2070	500	255	350	595	1,050	364	350	336	931
2075	500	255	350	595	1,050	365	350	335	930
2080	500	255	350	595	1,050	367	350	333	928
2085	500	255	350	595	1,050	368	350	332	927
2090	500	255	350	595	1,050	368	350	332	927
2095	500	255	350	595	1,050	369	350	331	926

[a] This table contains basic assumptions along with key summary values that are derived from basic assumptions.

[b] Historical other-than-LPR immigration and emigration estimates depend on a residual method. The Office of the Chief Actuary developed these estimates, as well as the resulting other-than-LPR January 1 stock estimates, for years through 2000. For years 2001 and later, the residual method uses stock estimates. For 2001 through 2004, the stock is set to values that linearly grade from the 2000 stock estimate to the DHS 2005 stock estimate. For 2005 through 2012, stock estimates come from DHS. For 2013 through 2016, stock estimates are developed by the Office of the Chief Actuary, based on the same methods used by DHS.

[c] Estimates do not include persons who attained LPR status under the special one-time provisions of the Immigration Reform and Control Act of 1986.

[d] Adjustments of status are a positive for net LPR immigration and a negative for net other-than-LPR immigration.

[e] Estimated.

[f] Estimated, intermediate alternative.

Note: Totals do not necessarily equal the sums of rounded components.

4. Total Population Estimates

The starting Social Security area population for December 31, 2016, is derived from the Census Bureau's estimate of the residents of the 50 States and D.C. and U.S. Armed Forces overseas. Adjustments are made to reflect mortality assumptions for the aged population since 2010 that are consistent with Medicare and Social Security data, net immigration assumptions for the aged population since 2010, estimates of the net undercount in the 2010 census, inclusion of U.S. citizens living abroad (including residents of U.S. territories), and inclusion of non-citizens living abroad who are insured for Social Security benefits. The Office of the Chief Actuary projects the population in the Social Security area by age, sex, and marital status for December 31 of each year from 2017 through 2095 by combining the assumptions for future fertility, mortality, and immigration with assumptions for marriage and divorce. Previous sections of this chapter present the assumptions for future fertility, mortality, and immigration. Assumptions for future rates of marriage and divorce reflect historical data from the National Center for Health Statistics, the Census Bureau, and selected individual States.

This report presents a July 1 (i.e., midyear) population for each year, which is derived from surrounding December populations. Table V.A3 shows the historical and projected population for July 1 by broad age group, for the three alternatives. It also shows the aged and total dependency ratios (see table footnotes for definitions).

**Table V.A3.—Social Security Area Population on July 1 and Dependency Ratios,
Calendar Years 1945-2095**

Calendar year	Population (in thousands)				Dependency ratio	
	Under 20	20-64	65 and over	Total	Aged[a]	Total[b]
Historical data:						
1945	49,121	88,109	10,900	148,130	0.124	0.681
1950	53,903	92,382	12,769	159,053	.138	.722
1955	63,293	96,207	15,075	174,576	.157	.815
1960	73,074	99,802	17,277	190,153	.173	.905
1965	80,020	104,885	19,071	203,975	.182	.945
1970	81,020	112,991	20,895	214,906	.185	.902
1975	78,629	122,642	23,307	224,578	.190	.831
1980	74,833	134,108	26,306	235,247	.196	.754
1985	72,946	144,579	29,132	246,656	.201	.706
1990	74,797	152,770	31,924	259,490	.209	.699
1995	79,278	160,733	34,313	274,324	.213	.707
2000	82,003	170,182	35,505	287,689	.209	.690
2005	83,982	181,065	37,172	302,219	.205	.669
2010	85,688	188,334	41,052	315,075	.218	.673
2011	85,337	189,780	42,043	317,160	.222	.671
2012	85,006	190,638	43,449	319,092	.228	.674
2013	84,738	191,364	44,932	321,034	.235	.678
2014	84,660	192,406	46,345	323,412	.241	.681
2015	84,688	193,518	47,786	325,993	.247	.685
2016[c]	84,689	194,261	49,270	328,220	.254	.690
2017[d]	84,707	194,926	50,818	330,451	.261	.695
2018[d]	84,706	195,714	52,401	332,821	.268	.701
Intermediate:						
2020	84,651	197,101	55,763	337,514	.283	.712
2025	85,927	199,694	64,590	350,212	.323	.754
2030	88,162	202,907	72,323	363,391	.356	.791
2035	91,799	206,482	77,020	375,301	.373	.818
2040	95,883	210,276	79,566	385,725	.378	.834
2045	98,211	215,250	81,363	394,824	.378	.834
2050	98,955	220,681	83,752	403,389	.380	.828
2055	100,182	225,380	86,874	412,436	.385	.830
2060	102,340	229,372	90,793	422,506	.396	.842
2065	105,241	233,562	94,459	433,262	.404	.855
2070	108,172	237,474	98,368	444,015	.414	.870
2075	110,527	241,357	102,522	454,407	.425	.883
2080	112,228	247,305	104,975	464,508	.424	.878
2085	113,842	254,297	106,550	474,688	.419	.867
2090	115,884	259,948	109,385	485,218	.421	.867
2095	118,353	264,065	113,636	496,055	.430	.879

Table V.A3.—Social Security Area Population on July 1 and Dependency Ratios,
Calendar Years 1945-2095 (Cont.)

	Population (in thousands)				Dependency ratio	
Calendar year	Under 20	20-64	65 and over	Total	Aged[a]	Total[b]
Low-cost:						
2020	85,055	197,478	55,731	338,265	0.282	0.713
2025	88,253	201,366	64,351	353,970	.320	.758
2030	93,435	205,903	71,684	371,021	.348	.802
2035	100,188	210,789	75,830	386,808	.360	.835
2040	107,246	216,061	77,748	401,055	.360	.856
2045	111,615	223,569	78,935	414,118	.353	.852
2050	113,803	232,562	80,809	427,175	.347	.837
2055	117,073	240,930	83,549	441,553	.347	.833
2060	122,042	248,563	87,195	457,799	.351	.842
2065	128,137	256,469	90,633	475,239	.353	.853
2070	134,090	264,540	94,283	492,913	.356	.863
2075	139,021	273,367	98,111	510,499	.359	.867
2080	143,022	285,036	100,253	528,311	.352	.853
2085	147,129	298,069	101,715	546,913	.341	.835
2090	152,139	309,065	105,384	566,589	.341	.833
2095	157,905	317,916	111,324	587,146	.350	.847
High-cost:						
2020	84,147	196,542	55,796	336,485	.284	.712
2025	83,515	197,900	64,866	346,280	.328	.750
2030	82,851	199,878	73,074	355,803	.366	.780
2035	83,504	202,238	78,431	364,173	.388	.801
2040	84,773	204,645	81,728	371,147	.399	.814
2045	85,306	207,138	84,256	376,699	.407	.819
2050	84,923	209,089	87,258	381,269	.417	.823
2055	84,499	210,271	90,819	385,589	.432	.834
2060	84,379	210,783	95,022	390,184	.451	.851
2065	84,701	211,446	98,881	395,028	.468	.868
2070	85,230	211,475	102,985	399,690	.487	.890
2075	85,610	210,822	107,382	403,814	.509	.915
2080	85,655	211,583	110,052	407,290	.520	.925
2085	85,547	213,173	111,607	410,327	.524	.925
2090	85,551	214,279	113,344	413,175	.529	.928
2095	85,757	214,601	115,551	415,910	.538	.938

[a] Ratio of the population at ages 65 and over to the population at ages 20-64.
[b] Ratio of the population at ages 65 and over and the population under age 20 to the population at ages 20-64.
[c] Estimated.
[d] Estimated, intermediate alternative.

Notes:
1. Historical data are subject to revision.
2. Totals do not necessarily equal the sums of rounded components.

5. Life Expectancy Estimates

Life expectancy, or the average remaining number of years expected prior to death, is an additional way to summarize the Trustees' mortality assumptions. This report includes life expectancy in two different forms (period and cohort), which are useful for two separate purposes.

- Period life expectancy for a given year incorporates the actual or expected death rates at each age for that year. It is a useful summary statistic for illustrating the overall level of the death rates experienced in a single year. Period life expectancy for a particular year provides an individual's expected average remaining lifetime at a selected age, assuming no change in death rates after that year. Table V.A4 presents historical and projected life expectancy calculated on a period basis.

- Cohort life expectancy does not incorporate death rates for a single year, but for the series of years in which the individual will actually reach each succeeding age if he or she survives. Cohort life expectancy provides an individual's expected average remaining lifetime at a selected age in a given year, using actual or expected future death rates. Table V.A5 presents historical and projected life expectancy calculated on a cohort basis. Cohort life expectancy is somewhat greater than period life expectancy for a given year because: (1) death rates at any age tend to decline over time; and (2) cohort life expectancy uses death rates from future years, while period life expectancy uses death rates only from the given year.

Life expectancy at a given age reflects death rates at that and all older ages. Period life expectancy is somewhat related to the age-sex-adjusted death rate discussed in section V.A.2. However, life expectancy places far greater weight on death rates at relatively younger ages than those at relatively older ages. Therefore, changes in death rates at younger ages have far greater effects in changing life expectancy over time. It is important to keep this concept in mind when considering trends in life expectancy.

Table V.A4.—Period Life Expectancy [a]

	Historical data			
Calendar year	At birth		At age 65	
	Male	Female	Male	Female
1940	61.4	65.7	11.9	13.4
1945	62.9	68.4	12.6	14.4
1950	65.6	71.1	12.8	15.1
1955	66.7	72.8	13.1	15.6
1960	66.7	73.2	12.9	15.9
1965	66.8	73.8	12.9	16.3
1970	67.2	74.9	13.1	17.1
1975	68.7	76.6	13.7	18.0
1980	69.9	77.5	14.0	18.4
1985	71.1	78.2	14.4	18.6
1990	71.8	78.9	15.0	19.0
1995	72.5	79.1	15.4	19.0
2000	74.0	79.4	15.9	19.0
2005	74.8	80.0	16.7	19.5
2010	76.1	80.9	17.6	20.2
2011	76.2	80.9	17.6	20.2
2012	76.3	81.0	17.7	20.3
2013	76.3	81.0	17.7	20.3
2014	76.3	81.1	17.8	20.4
2015	76.1	81.0	17.8	20.3
2016 [b] . . .	76.0	81.0	17.9	20.5
2017 [b] . . .	76.4	81.1	17.9	20.5
2018 [c] . . .	76.5	81.3	18.1	20.6

	Intermediate				Low-cost				High-cost			
Calendar year	At birth		At age 65		At birth		At age 65		At birth		At age 65	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
2020	76.7	81.4	18.2	20.7	76.5	81.3	18.1	20.6	77.0	81.6	18.4	20.8
2025	77.3	81.9	18.6	21.0	76.8	81.5	18.2	20.7	77.9	82.4	18.9	21.3
2030	77.9	82.4	18.9	21.3	77.1	81.7	18.4	20.9	78.9	83.2	19.5	21.8
2035	78.5	82.8	19.2	21.6	77.4	81.9	18.6	21.0	79.8	83.9	20.0	22.3
2040	79.0	83.3	19.6	21.9	77.7	82.2	18.7	21.2	80.6	84.6	20.5	22.7
2045	79.6	83.7	19.9	22.2	78.0	82.4	18.9	21.3	81.4	85.2	21.0	23.2
2050	80.1	84.2	20.2	22.4	78.2	82.7	19.1	21.5	82.2	85.9	21.4	23.6
2055	80.6	84.6	20.5	22.7	78.5	82.9	19.2	21.6	82.9	86.4	21.9	24.0
2060	81.1	85.0	20.7	23.0	78.8	83.1	19.4	21.8	83.5	87.0	22.3	24.3
2065	81.5	85.4	21.0	23.2	79.1	83.4	19.6	21.9	84.1	87.5	22.7	24.7
2070	82.0	85.7	21.3	23.5	79.3	83.6	19.7	22.1	84.7	88.0	23.0	25.0
2075	82.4	86.1	21.5	23.7	79.6	83.8	19.9	22.2	85.3	88.5	23.4	25.4
2080	82.8	86.4	21.8	23.9	79.9	84.0	20.0	22.3	85.8	88.9	23.7	25.7
2085	83.2	86.7	22.0	24.1	80.1	84.2	20.2	22.5	86.3	89.3	24.1	26.0
2090	83.6	87.1	22.3	24.4	80.4	84.4	20.3	22.6	86.8	89.7	24.4	26.3
2095	84.0	87.4	22.5	24.6	80.6	84.6	20.5	22.7	87.3	90.1	24.7	26.6

[a] The period life expectancy at a given age for a given year is the average remaining number of years expected prior to death for a person at that exact age, born on January 1, using the mortality rates for that year over the course of his or her remaining life.
[b] Estimated.
[c] Estimated, intermediate alternative.

Table V.A5.—Cohort Life Expectancy[a]

Calendar year	Intermediate				Low-cost				High-cost			
	At birth[b]		At age 65[c]		At birth[b]		At age 65[c]		At birth[b]		At age 65[c]	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
1940	70.3	76.5	12.7	14.7	70.2	76.4	12.7	14.7	70.4	76.6	12.7	14.7
1945	72.1	78.1	13.0	15.4	71.9	77.9	13.0	15.4	72.3	78.4	13.0	15.4
1950	73.2	79.4	13.1	16.2	72.9	79.1	13.1	16.2	73.6	79.9	13.1	16.2
1955	73.8	80.0	13.1	16.7	73.3	79.5	13.1	16.7	74.3	80.6	13.1	16.7
1960	74.4	80.4	13.2	17.4	73.8	79.7	13.2	17.4	75.2	81.1	13.2	17.4
1965	75.4	80.9	13.5	18.0	74.6	80.1	13.5	18.0	76.4	81.9	13.5	18.0
1970	76.6	81.8	13.8	18.5	75.6	80.8	13.8	18.5	77.8	83.0	13.8	18.5
1975	77.5	82.5	14.2	18.7	76.2	81.3	14.2	18.7	79.0	83.9	14.2	18.7
1980	78.3	83.1	14.7	18.8	76.9	81.8	14.7	18.8	80.0	84.7	14.7	18.8
1985	79.0	83.7	15.4	19.1	77.3	82.2	15.4	19.1	80.9	85.5	15.4	19.1
1990	79.6	84.2	16.0	19.4	77.7	82.5	16.0	19.4	81.8	86.2	16.0	19.4
1995	80.3	84.7	16.7	19.7	78.3	82.9	16.7	19.7	82.7	86.9	16.7	19.7
2000	80.9	85.2	17.4	20.1	78.6	83.2	17.4	20.0	83.5	87.5	17.5	20.2
2005	81.4	85.6	17.9	20.5	78.9	83.4	17.8	20.4	84.1	88.0	18.1	20.7
2010	81.9	86.0	18.4	20.9	79.2	83.7	18.1	20.6	84.8	88.5	18.7	21.2
2011	82.0	86.0	18.4	21.0	79.3	83.7	18.2	20.7	85.0	88.6	18.8	21.3
2012	82.1	86.1	18.5	21.0	79.3	83.7	18.2	20.7	85.1	88.7	18.9	21.4
2013	82.2	86.2	18.6	21.1	79.4	83.8	18.2	20.8	85.2	88.8	19.0	21.5
2014	82.3	86.3	18.6	21.2	79.5	83.8	18.3	20.8	85.3	88.9	19.1	21.6
2015	82.3	86.3	18.7	21.2	79.5	83.9	18.3	20.8	85.4	89.0	19.2	21.7
2016	82.4	86.4	18.8	21.3	79.6	83.9	18.3	20.9	85.6	89.1	19.3	21.8
2017	82.5	86.5	18.8	21.4	79.6	84.0	18.4	20.9	85.7	89.2	19.4	22.0
2018	82.6	86.6	18.9	21.4	79.7	84.0	18.4	20.9	85.8	89.3	19.5	22.1
2020	82.8	86.7	19.1	21.6	79.8	84.1	18.5	21.0	86.1	89.5	19.8	22.3
2025	83.3	87.1	19.4	21.9	80.1	84.3	18.6	21.2	86.7	90.0	20.3	22.8
2030	83.7	87.4	19.7	22.2	80.3	84.5	18.8	21.3	87.2	90.5	20.8	23.2
2035	84.1	87.8	20.0	22.5	80.6	84.8	19.0	21.5	87.8	90.9	21.3	23.7
2040	84.5	88.1	20.4	22.7	80.8	85.0	19.2	21.6	88.3	91.3	21.8	24.1
2045	84.9	88.4	20.7	23.0	81.1	85.2	19.3	21.8	88.8	91.7	22.3	24.5
2050	85.2	88.7	21.0	23.3	81.3	85.4	19.5	21.9	89.2	92.1	22.7	24.8
2055	85.6	89.0	21.2	23.5	81.5	85.6	19.6	22.0	89.7	92.5	23.1	25.2
2060	85.9	89.3	21.5	23.8	81.8	85.7	19.8	22.2	90.1	92.8	23.5	25.6
2065	86.3	89.5	21.8	24.0	82.0	85.9	20.0	22.3	90.5	93.2	23.8	25.9
2070	86.6	89.8	22.0	24.2	82.2	86.1	20.1	22.5	90.9	93.5	24.2	26.2
2075	86.9	90.1	22.3	24.5	82.4	86.3	20.3	22.6	91.3	93.8	24.5	26.5
2080	87.2	90.3	22.5	24.7	82.7	86.5	20.4	22.7	91.7	94.1	24.9	26.8
2085	87.5	90.6	22.8	24.9	82.9	86.6	20.6	22.9	92.0	94.4	25.2	27.1
2090	87.8	90.8	23.0	25.1	83.1	86.8	20.7	23.0	92.4	94.7	25.5	27.4
2095	88.1	91.0	23.2	25.3	83.3	87.0	20.8	23.1	92.7	95.0	25.8	27.7

[a] The cohort life expectancy at a given age for a given year is the average remaining number of years expected prior to death for a person at that exact age, born on January 1, using the mortality rates for the series of years in which the individual will actually reach each succeeding age if he or she survives.

[b] Cohort life expectancy at birth for those born in the calendar year is based on a combination of actual, estimated, and projected death rates for birth years 1940 through 2016. For birth years after 2016, these values depend on estimated and projected death rates.

[c] Age 65 cohort life expectancy for those attaining age 65 in calendar years 1940 though 2015 depends on actual death rates or on a combination of actual, estimated, and projected death rates. After 2015, these values depend on estimated and projected death rates.

B. ECONOMIC ASSUMPTIONS AND METHODS

The three alternative sets of economic assumptions provide a reasonable range for estimating the financial status of the trust funds. The intermediate assumptions reflect the Trustees' consensus expectation of sustained moderate economic growth after completion of the recovery from the last recession and their best estimate for other economic parameters. The low-cost assumptions represent a more optimistic outlook with recovery to a higher level of economic output, stronger long-term economic growth, and relatively optimistic levels for other parameters. The high-cost assumptions represent a more pessimistic scenario with weaker economic growth interrupted by a recession in the near term, slower economic growth in the long term, and relatively pessimistic levels for other parameters.

Actual economic data were available through the third quarter of 2018 at the time the assumptions for this report were set. The data indicated that economic activity peaked in the fourth quarter of 2007.[1] A severe recession followed, with a low point in the economic cycle reached in the second quarter of 2009 with gross domestic product (GDP) about 7 percent below the estimated sustainable trend level. The annual growth rate in real GDP has been positive in all years since then, but not as rapid as in most past recoveries.

The economy is projected to return to the assumed sustainable trend level of output within the first 10 years of the projection period under all three alternatives and to remain on that trend thereafter. However, the speed of the return varies by alternative. The economy is projected to fully return to its sustainable trend level of output in 2021 under the intermediate assumptions, four years earlier than in last year's report, mainly because economic growth in 2018 exceeded projections from last year's report. Under the low-cost assumptions, the economy is also projected to return to its sustainable trend level of output by 2021, one year earlier than in last year's report. Under the high-cost assumptions, the estimated sustainable trend level of output is lower, and actual output has already exceeded that level. However, due to the assumed recession, GDP is projected to drop to 2.5 percent below the sustainable trend level in the second half of 2020, and the subsequent recovery is assumed to return GDP to the sustainable trend level in 2028. Complete economic cycles have little effect on the long-range estimates of financial status, so the assumptions do not include cycles beyond the short-range period (2019 through 2028).

---

[1] See www.nber.org/cycles/cyclesmain.html.

The key economic assumptions underlying the three sets of projections of the future financial status of the OASI and DI Trust Funds are discussed in the remainder of this section.

1. Productivity Assumptions

Total U.S. economy productivity is defined as the ratio of real GDP to hours worked by all workers.[1] The rate of change in total-economy productivity is a major determinant of the growth of average earnings. Over the last five complete economic cycles (1969-73, 1973-79, 1979-90, 1990-2001, and 2001-07, measured peak to peak), the annual increases in total-economy productivity averaged 2.65, 1.07, 1.41, 1.85, and 2.19 percent, respectively. For the period from 1969 to 2007, covering those last five complete economic cycles, the annual increase in total-economy productivity averaged 1.73 percent.

The assumed ultimate annual increases in total-economy productivity are 1.93, 1.63, and 1.33 percent for the low-cost, intermediate, and high-cost assumptions, respectively.[2] These rates of increase are 0.05 percentage point lower than in the 2018 report.

The average annual rate of change in total-economy productivity from 2007 (the end of the last complete economic cycle) to 2018 is estimated to be 1.01 percent. For the intermediate assumptions, the annual change in productivity is 1.82 percent for 2019, 2.17 percent for 2020, and declines to its ultimate value of 1.63 percent by 2023. For the low-cost assumptions, the annual change in productivity is 2.45 percent for 2019, then increases to 2.96 percent for 2020, and gradually approaches its ultimate value of 1.93 percent for 2023 and thereafter. For the high-cost assumptions, the annual change in productivity is 1.24 percent for 2019, 1.17 percent for 2020 due to the assumed recession, rebounds to 1.85 percent for 2021, and then averages 1.34 for 2022 through 2028, and stabilizes at its ultimate value of 1.33 thereafter.

2. Price Inflation Assumptions

Changes in the Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI) directly affect the OASDI program through the automatic

---

[1] Historical levels of real GDP are from the National Income and Product Accounts (NIPA) produced by the Bureau of Economic Analysis (BEA). Historical total hours worked are provided by the Bureau of Labor Statistics (BLS) and cover all U.S. Armed Forces and civilian employment.

[2] These assumptions are consistent with ultimate annual increases in private non-farm business productivity of 2.36, 2.00, and 1.63 percent. Compared to total-economy productivity, private non-farm business productivity is a more widely known concept that excludes the farm, government, non-profit institution, and private household sectors.

cost-of-living benefit increases. Changes in the GDP price index (GDP deflator) affect the nominal levels of GDP, wages, self-employment income, average earnings, and taxable payroll.

The annual increases in the CPI averaged 4.91, 8.54, 5.30, 2.73, and 2.63 percent over the economic cycles 1969-73, 1973-79, 1979-90, 1990-2001, and 2001-07, respectively. The annual increases in the GDP deflator averaged 5.04, 7.54, 4.61, 2.08, and 2.49 percent for the respective economic cycles. For the period from 1969 to 2007, covering the last five complete economic cycles, the annual increases in the CPI and GDP deflator averaged 4.59 and 4.03 percent, respectively. The estimated average annual change from 2007 (the end of the last complete economic cycle) to 2018 is 1.74 percent for the CPI and 1.62 percent for the GDP deflator.

The assumed ultimate annual increases in the CPI are 3.20, 2.60, and 2.00 percent for the low-cost, intermediate, and high-cost assumptions, respectively.[1] These assumptions are unchanged from the 2018 report. For a given rate of growth in average real earnings, a higher price inflation rate results in faster nominal earnings and revenue growth immediately, while the resulting added growth in benefit levels occurs with a delay, causing an overall improvement in the actuarial balance. Similarly, a lower price inflation rate causes an overall decline in the actuarial balance.

The Federal Reserve Board's monetary policy changed in the 1980s toward more vigilance in preventing high inflation. Consistent with the Board's continued emphasis on containing inflation, as indicated by their current target for the Personal Consumption Expenditures (PCE) price index,[2] the Trustees lowered the assumed ultimate annual rate of increase in the CPI for the intermediate assumptions from 4.00 percent for the 1996 report to 2.80 percent for the 2004 through 2013 reports, to 2.70 percent for the 2014 and 2015 reports, and to 2.60 percent for the 2016 through 2019 reports.

For the intermediate assumptions, the annual change in the CPI is 1.83 percent for 2019, 2.63 percent for 2020, and reaches the ultimate growth rate of 2.60 percent for 2021 and later. For the low-cost assumptions,

---

[1] BLS produces a series called the Consumer Price Index Research Series Using Current Methods (CPI-U-RS) that approximates the measured rate of inflation over the 1978-2018 period had the method currently used been in effect since 1978. BLS does not revise the CPI values published in earlier years, for which different methods were used. These CPI published values are shown in table V.B1. The Trustees use an adjusted CPI series based on the CPI-U-RS when setting the ultimate price inflation assumption because it provides a time series that is consistent with the current method for computing the CPI.

[2] The Trustees' assumed ultimate annual growth rate for the GDP deflator of 2.25 percent is based on an assumed 2.30 percent annual growth rate for the PCE price index. The Trustees' assumption takes into account the Federal Open Market Committee target, as well as the potential for inflationary shocks during the 2028-2093 projection period.

the annual change in the CPI is 2.40 percent for 2019, increases to 3.23 percent for 2020, and reaches its ultimate annual growth rate of 3.20 percent for 2021 and later. For the high-cost assumptions, the annual rate of change in the CPI is 1.27 percent for 2019, increases to 2.02 percent for 2020, and reaches its ultimate annual change of 2.00 percent for 2021 and later.

The annual increase in the GDP deflator differs from the annual increase in the CPI because the two indices are constructed using different computational methods and coverage. The difference between the rate of change in the CPI and the rate of change in the GDP deflator is called the price differential in this report. For the period including 1969 through 2007, covering the last five complete economic cycles, the average annual price differential was 0.57 percentage point. From 2007 (the end of the last complete economic cycle) to 2018, the average annual price differential is estimated to be 0.14 percentage point.

The assumed ultimate price differentials are 0.25, 0.35, and 0.45 percentage point for the low-cost, intermediate, and high-cost alternatives, respectively. Varying the ultimate projected price differential across alternatives recognizes the historical variation in this measure. Accordingly, the assumed ultimate annual increases in the GDP deflator are 2.95 (3.20 less 0.25), 2.25 (2.60 less 0.35), and 1.55 (2.00 less 0.45) percent for the low-cost, intermediate, and high-cost alternatives, respectively. The ultimate price differentials for the three alternatives are 0.05 percentage point lower than in the 2018 report.

The price differential was 0.21 percentage point in 2017, is estimated to be 0.36 in 2018, and is assumed to be -0.17 for 2019. The negative price differential assumed for 2019 primarily reflects a recent decline in oil prices. Changes in oil prices affect the CPI much more than the GDP deflator because oil represents a much larger share of U.S. consumption than of U.S. production. For 2020 and later, oil prices are assumed to grow at a relatively stable rate. For the intermediate assumptions, the price differential is 0.30 percentage point for 2020 and 0.35 for 2021 and later.

3. Average Earnings Assumptions

The average level of nominal earnings in OASDI covered employment for each year has a direct effect on the size of the taxable payroll and on the future level of average benefits. In addition, under the automatic adjustment provisions in the law, growth in the average wage in the U.S. economy directly affects certain parameters used in the OASDI benefit formulas as well as the contribution and benefit base, the exempt amounts under the

retirement earnings test, the amount of earnings required for a quarter of coverage, and in certain circumstances, the automatic cost-of-living benefit increases.

Projected growth rates in average covered earnings are derived from projections of the most inclusive measure, average U.S. earnings. Average U.S. earnings is defined as the ratio of the sum of total U.S. wages and net proprietors' income to the sum of total U.S. civilian employment and Armed Forces. The growth rate in average U.S. earnings for any period is equal to the combined growth rates for total U.S. economy productivity, average hours worked, the ratio of earnings to total labor compensation (which includes fringe benefits), the ratio of total labor compensation to GDP, and the GDP deflator.

The average annual change in average hours worked was -0.26 percent over the last five complete economic cycles covering the period from 1969 to 2007. The annual change in average hours worked averaged -0.87, -0.54, -0.10, 0.10, and -0.50 percent over the economic cycles 1969-73, 1973-79, 1979-90, 1990-2001, and 2001-07, respectively. From 2007 (the end of the last complete economic cycle) to 2018, the average annual change in average hours worked is estimated to be 0.00 percent.

The assumed ultimate annual rates of change for average hours worked are 0.05, -0.05, and -0.15 percent for the low-cost, intermediate, and high-cost assumptions, respectively. These values are unchanged from the 2018 report.

The average annual change in the ratio of earnings to total labor compensation was -0.20 percent from 1969 to 2007. Most of this decrease was due to the relative increase in the cost of employer-sponsored group health insurance for wage workers. Assuming that the level of total employee compensation is not affected by the amount of employer-sponsored group health insurance, any increase or decrease in the cost of employer-sponsored group health insurance leads to a commensurate decrease or increase in other components of employee compensation, including wages. Projections of future ratios of earnings to total labor compensation follow this principle. The Trustees assume that the total amount of future employer-sponsored group health insurance premiums will increase more slowly than in the past due to provisions of the Affordable Care Act of 2010, as described in the 2010 report. Data from BEA indicate that the other significant component of non-wage employee compensation is employer contributions to retirement plans. This component is assumed to grow faster than employee compensation in the future as life expectancy and potential time in retirement increase.

The average annual rates of change in the ratio of wages to employee compensation from 2028 to 2093 are about 0.04, -0.06, and -0.16 percent for the low-cost, intermediate, and high-cost assumptions, respectively. These assumed rates are about 0.02 percentage point higher (less negative) than those assumed for the 2018 report. Under the intermediate assumptions, the ratio of wages to employee compensation declines from 0.814 for 2018 to 0.780 for 2093.

Because earnings and compensation are the same for self-employed workers, the ratio of earnings to total labor compensation includes self-employment income both in the numerator and in the denominator. As a result, the rate of decline in the ratio of earnings to total labor compensation (which, under the intermediate assumptions, averages 0.05 percent from 2028 to 2093) is less than the rate of decline in the ratio of wages to employee compensation.

The ratio of total labor compensation (i.e., employee compensation and net proprietors' income) to GDP varies over the economic cycle and with changes in the relative sizes of different sectors of the economy. Over the last five economic cycles from 1969 to 2007, this ratio has averaged 0.627. The ratio declined from 0.649 for 2001 to 0.602 in 2009, increased to 0.612 in 2012, and is 0.611 in 2017. This ratio is assumed to rise as the economy recovers, reaching a level of 0.632 for 2028. For years after 2028, relative sizes of different sectors of the economy are assumed to remain about constant,[1] and therefore the ratio of total labor compensation to GDP remains at about the 2028 level for each set of assumptions. The ultimate level of this ratio is 0.001 higher than in last year's report due to an upward revision of proprietors' income in the NIPA.[2]

The projected average annual growth rate in average nominal U.S. earnings from 2028 to 2093 is about 3.81 percent for the intermediate assumptions. This growth rate reflects the average annual growth rate of approximately -0.05 percent for the ratio of earnings to total labor compensation, and also reflects the assumed ultimate annual growth rates of 1.63 percent for productivity, -0.05 percent for average hours worked, and 2.25 percent for the GDP deflator. Similarly, the projected average annual growth rates in average nominal U.S. earnings are 5.03 percent for the low-cost assumptions and 2.61 percent for the high-cost assumptions.

---

[1] However, employment in the uniformed military sector has declined in size over the last 40 years, and is assumed to remain at its 2018 level throughout the 75-year projection period.

[2] In July 2018, BEA released a comprehensive revision to NIPA. Under the revision, BEA increased the estimate of the amount of proprietors' income that goes unreported for tax purposes. Thus, the estimated ratio of reported income to GDP is unchanged from last year's report.

Over long periods, the average annual growth rate in the average wage in OASDI covered employment (henceforth the "average covered wage") is expected to be very close to the average annual growth rate in average U.S. earnings. The projected average annual growth rates in the average covered wage from 2028 to 2093 are 5.04, 3.81, and 2.60 percent for the low-cost, intermediate, and high-cost assumptions, respectively. The estimated annual rate of change in the average covered wage is 2.98 percent for 2018. For the intermediate assumptions, as the economy continues to recover, the annual rate of change in the average covered wage averages 4.23 percent from 2018 to 2028. Thereafter, the average annual rate of change in the average covered wage is 3.81 percent.

4. Assumed Real-Wage Differential

The real increase in the average covered wage has traditionally been expressed in the form of a real-wage differential—the annual percentage change in the average covered wage minus the annual percentage change in the CPI. For the period from 1969 to 2007, covering the last five complete economic cycles, the real-wage differential averaged 0.80 percentage point, the result of averages of 1.02, 0.04, 0.44, 1.47, and 0.83 percentage points over the economic cycles 1969-73, 1973-79, 1979-90, 1990-2001, and 2001-07, respectively.

For the years 2029-93, the projected average annual real-wage differentials for OASDI covered employment are 1.84, 1.21, and 0.60 percentage points for the low-cost, intermediate, and high-cost assumptions, respectively. The rounded average annual real-wage differentials are 0.02, 0.01, and 0.02 percentage point higher than in the 2018 report.

The estimated real-wage differential averaged 0.56 percentage point for 2008 through 2018 (the years since the peak of the last complete economic cycle). The real-wage differential increased from 0.05 percentage point in 2016 to 1.19 percentage points in 2017, an increase that reflects faster growth in GDP and productivity. For the intermediate assumptions, the real-wage differential is projected to rise from 0.40 in 2018 to 2.19 in 2019 before reaching its long-run average of 1.21 percentage points for 2029 through 2093. For the low-cost assumptions, the real-wage differential is 2.96 percentage points for 2019, increases to 3.29 percentage points in 2020, and reaches its long-run average of 1.84 percentage points for 2029 through 2093. For the high-cost assumptions, the real-wage differential is 1.42 percentage points for 2019, drops to -1.02 percentage points in 2020 due to the assumed recession, and rises to 1.59 percentage points in 2022 before gradually declining to its long-run average of 0.60 percentage point for 2029 through 2093.

Table V.B1.—Principal Economic Assumptions

Calendar year	Annual percentage change[a] in—						Real-wage differ-ential[b]
	Productivity (Total U.S. economy)	Earnings as a percent of total labor compensation	Average hours worked	GDP price index	Average annual wage in covered employment	Consumer Price Index	
Historical data:							
5-year periods:							
1960 to 1965 . . .	3.28	-0.18	0.15	1.36	3.22	1.24	1.98
1965 to 1970 . . .	2.06	-.30	-.68	4.02	5.84	4.23	1.61
1970 to 1975 . . .	2.08	-.49	-.88	6.61	6.58	6.76	-.22
1975 to 1980 . . .	.95	-.33	-.17	7.21	8.89	8.91	-.04
1980 to 1985 . . .	1.74	-.36	.01	5.24	6.52	5.22	1.29
1985 to 1990 . . .	1.34	-.20	-.06	3.14	4.79	3.83	.96
1990 to 1995 . . .	1.31	-.11	.33	2.45	3.54	3.03	.51
1995 to 2000 . . .	2.32	.28	.14	1.67	5.31	2.43	2.88
2000 to 2005 . . .	2.66	-.38	-.79	2.29	2.69	2.49	.20
2005 to 2010 . . .	1.76	-.02	-.47	1.92	2.51	2.30	.22
2010 to 2015 . . .	.49	.15	.37	1.74	2.93	1.61	1.32
Economic cycles:[c]							
1969 to 1973 . . .	2.65	-.34	-.87	5.04	5.93	4.91	1.02
1973 to 1979 . . .	1.07	-.43	-.54	7.54	8.58	8.54	.04
1979 to 1990 . . .	1.41	-.29	-.10	4.61	5.78	5.30	.44
1990 to 2001 . . .	1.85	.05	.10	2.08	4.19	2.73	1.47
2001 to 2007 . . .	2.19	-.18	-.50	2.49	3.45	2.63	.83
2007 to 2018 . . .	1.01	.05	d	1.62	2.30	1.74	.56
Single years:							
2008	1.07	-.22	-.75	1.91	2.42	4.09	-1.66
2009	3.12	-.57	-1.86	.78	-1.56	-.67	-.89
2010	2.59	.21	.55	1.17	2.59	2.07	.53
2011	.04	.32	.94	2.08	3.14	3.56	-.41
2012	.48	.47	-.04	1.92	3.36	2.10	1.26
2013	.60	-.33	.24	1.77	1.20	1.37	-.17
2014	.56	.26	.27	1.88	3.57	1.50	2.07
2015	.76	.03	.43	1.03	3.42	-.41	3.83
2016	.25	.10	-.39	1.09	1.03	.98	.05
2017	.86	.10	.11	1.92	3.32	2.13	1.19
2018[e]	.82	.17	.55	2.22	2.98	2.58	.40
Intermediate:							
2019	1.82	.01	-.04	2.00	4.02	1.83	2.19
2020	2.17	-.01	-.35	2.33	4.71	2.63	2.08
2021	1.88	.02	-.21	2.25	4.45	2.60	1.85
2022	1.66	.02	-.08	2.25	4.21	2.60	1.61
2023	1.63	-.06	-.05	2.25	4.09	2.60	1.49
2024	1.63	-.06	-.05	2.25	4.15	2.60	1.55
2025	1.63	-.04	-.05	2.25	4.21	2.60	1.61
2026	1.63	-.04	-.05	2.25	4.25	2.60	1.65
2027	1.63	-.04	-.05	2.25	4.26	2.60	1.66
2028	1.63	-.04	-.05	2.25	4.01	2.60	1.41
2028 to 2093 . . .	1.63	-.05	-.05	2.25	3.81	2.60	1.21

Table V.B1.—Principal Economic Assumptions (Cont.)

	Annual percentage change[a] in—						
Calendar year	Productivity (Total U.S. economy)	Earnings as a percent of total labor compensation	Average hours worked	GDP price index	Average annual wage in covered employment	Consumer Price Index	Real-wage differ-ential[b]
Low-cost:							
2019	2.45	0.02	0.04	2.43	5.36	2.40	2.96
2020	2.96	d	-.25	2.97	6.52	3.23	3.29
2021	2.41	.05	-.11	2.95	5.99	3.20	2.79
2022	1.99	.05	.02	2.95	5.47	3.20	2.27
2023	1.93	-.02	.05	2.95	5.26	3.20	2.06
2024	1.93	d	.05	2.95	5.28	3.20	2.08
2025	1.93	.02	.05	2.95	5.35	3.20	2.15
2026	1.93	.03	.05	2.95	5.42	3.20	2.22
2027	1.93	.04	.05	2.95	5.46	3.20	2.26
2028	1.93	.04	.05	2.95	5.25	3.20	2.05
2028 to 2093 . . .	1.93	.03	.05	2.95	5.04	3.20	1.84
High-cost:							
2019	1.24	d	-.14	1.54	2.69	1.27	1.42
2020	1.17	-.02	-1.04	1.69	1.00	2.02	-1.02
2021	1.85	.01	-.36	1.55	2.79	2.00	.79
2022	1.43	-.02	-.09	1.55	3.59	2.00	1.59
2023	1.41	-.11	-.06	1.55	3.52	2.00	1.52
2024	1.38	-.11	-.05	1.55	3.49	2.00	1.49
2025	1.33	-.11	-.05	1.55	3.38	2.00	1.38
2026	1.32	-.11	-.05	1.55	3.28	2.00	1.28
2027	1.30	-.12	-.05	1.55	3.24	2.00	1.24
2028	1.30	-.13	-.08	1.55	2.90	2.00	.90
2028 to 2093 . . .	1.33	-.13	-.15	1.55	2.60	2.00	.60

[a] For rows with a single year listed, the value is the annual percentage change from the prior year. For rows with a range of years listed, the value is the compound average annual percentage change.

[b] For rows with a single year listed, the value is the annual percentage change in the average annual wage in covered employment less the annual percentage change in the Consumer Price Index. For rows with a range of years listed, the value is the average of annual values of the real wage differential, beginning with the year following the first year of the range. Values are rounded after all computations.

[c] Economic cycles are shown from peak to peak, except for the last cycle, which is not yet complete.

[d] Greater than -0.005 and less than 0.005.

[e] Historical data are not available for the full year. Estimated values vary slightly by alternative and are shown for the intermediate assumptions.

5. Labor Force and Unemployment Projections

The model used by the Office of the Chief Actuary projects the civilian labor force by age, sex, marital status, and presence of children. Projections of the labor force participation rates reflect changes in disability prevalence, educational attainment, the average level of Social Security retirement benefits, the state of the economy, and the change in life expectancy. The projections also include a "cohort effect," which reflects an upward trend in female participation rates across cohorts born through 1948.

The annual rate of growth in the size of the labor force decreased from an average of about 2.6 percent during the 1969-73 economic cycle and 2.7 percent during the 1973-79 cycle to 1.7 percent during the 1979-90 cycle,

1.2 percent during the 1990-2001 cycle, and 1.1 percent during the 2001-07 cycle. Further slowing of labor force growth is expected to follow from a substantial slowing of growth in the working age population in the future—a consequence of the baby-boom generation reaching retirement ages and succeeding lower-birth-rate cohorts reaching working ages. Under the intermediate assumptions, the labor force is projected to increase by an average of 0.8 percent per year from 2018 to 2028 and 0.4 percent per year over the remainder of the 75-year projection period.

Labor force participation rates are projected with a model that uses demographic and economic assumptions specific to each alternative. More optimistic economic assumptions in the low-cost alternative are consistent with higher labor force participation rates, while demographic assumptions in the low-cost alternative (such as slower improvement in longevity) are consistent with lower labor force participation rates. These economic and demographic influences have largely offsetting effects. Therefore, the projected labor force participation rates do not vary substantially across alternatives.

Historically, labor force participation rates reflect trends in demographics and pensions. Between the mid-1960s and the mid-1980s, labor force participation rates at ages 50 and over declined for males but were fairly stable for females. During this period, the baby-boom generation reached working age and more women entered the labor force. This increasing supply of labor allowed employers to offer attractive early retirement options. Between the mid-1980s and the mid-1990s, participation rates at ages 55 and older roughly stabilized for males and increased for females. Since the mid-1990s, however, participation rates for both sexes at ages 50 and over have generally risen.

Many economic and demographic factors, including longevity, health, disability prevalence, the business cycle, incentives for retirement in Social Security and private pensions, education, and marriage patterns, will influence future labor force participation rates. The Office of the Chief Actuary models some of these factors explicitly. To model the effects of other factors related to increases in life expectancy, projected participation rates are adjusted upward for mid-career and older ages to reflect projected increases in life expectancy. For the intermediate projections, this adjustment increases the total labor force by 2.8 percent for 2093.

For men age 16 and over, the projected age-adjusted labor force participation rates[1] for 2093 are 73.3, 73.3, and 73.0 percent for the low-cost, intermedi-

---

[1] The Office of the Chief Actuary adjusts the labor force participation rates to the 2011 age distribution of the civilian noninstitutional U.S. population.

ate, and high-cost assumptions, respectively. The low-cost assumptions result in a larger working-age population and a larger labor force when compared to the intermediate assumptions, but a slightly lower labor force participation rate for men. This occurs because the low-cost assumptions include shorter life expectancies and relatively higher numbers of never-married individuals in the population. Shorter life expectancies tend to reduce work at older ages, while labor force participation rates tend to be lower for never-married men and higher for never-married women compared to their married counterparts.[1] For women age 16 and over, the projected age-adjusted labor force participation rates for 2093 are 62.3, 61.7, and 60.8 percent for the low-cost, intermediate, and high-cost assumptions, respectively.

The age-adjusted rates for 2093 are higher under all three alternatives than the age-adjusted rates for 2017 of 70.7 percent for men and 58.5 percent for women (based on actual age-specific rates published by the Bureau of Labor Statistics), primarily due to the Trustees' projected increases in life expectancy.

The total civilian unemployment rates are presented in table V.B2. For years through 2028, the table presents total civilian rates without adjustment for the changing age-sex distribution of the population. For years after 2028, the table presents age-sex-adjusted rates, using the age-sex distribution of the 2011 civilian labor force. Age-sex-adjusted rates allow for more meaningful comparisons across longer time periods.

The total civilian unemployment rate reflects the projected levels of unemployment for various age-sex groups of the population. Each group's unemployment rate is projected in relation to changes in the economic cycle, as measured by the ratio of actual to potential GDP.[2] For each alternative, the total civilian unemployment rate moves toward the ultimate assumed rate as the economy moves toward the long-range sustainable growth path.

The assumed ultimate age-sex-adjusted unemployment rates are 4.5, 5.5, and 6.5 percent for the low-cost, intermediate, and high-cost assumptions, respectively. These values are unchanged from the 2018 report. Improvements in labor market conditions will eventually draw more nonparticipants back into the labor force and unemployment rate will increase from an estimated 3.9 percent for 2018 to the assumed 5.5 percent for 2023 under the

---

[1] The labor force participation rate under the high-cost assumptions is also lower than under the intermediate assumptions because life expectancy has a non-linear effect on labor force participation rates in the Office of the Chief Actuary's model.

[2] Potential GDP is the level of GDP assuming the economy is operating at the underlying sustainable trend rate of growth.

intermediate assumptions. Under the low-cost assumptions, the ultimate unemployment rate is reached in 2022.[1] Under the high-cost assumptions, the ultimate unemployment rate is reached in 2025.

6. Gross Domestic Product Projections

The value of real GDP equals the product of three components: (1) average weekly total employment,[2] (2) productivity, and (3) average hours worked per week. Consequently, the growth rate in real GDP is approximately equal to the sum of the growth rates for total employment, productivity, and average hours worked. For the period from 1969 to 2007, which covers the last five complete economic cycles, the average growth rate in real GDP was 3.1 percent. This average growth rate approximately equals the sum of the average growth rates of 1.6 percent for total employment, 1.7 percent for productivity, and -0.3 percent for average hours worked. The real GDP for 2017 was 15.5 percent above the 2007 level. The estimated real GDP growth from 2017 to 2018 is 2.9 percent.

For the intermediate assumptions, the average annual growth in real GDP is 2.3 percent from 2018 to 2028, the approximate sum of component growth rates of 0.6 percent for total employment, 1.7 percent for productivity, and -0.1 percent for average hours worked. The projected average annual growth in real GDP of 2.3 percent for this period is approximately 0.1 percentage point higher than the underlying sustainable trend rate. This growth of 0.1 percentage point above trend reflects a relatively rapid increase in employment and total economy productivity. After 2028, the assumptions do not explicitly reflect economic cycles. The projected annual growth rate in real GDP combines the projected growth rates for total employment, total U.S. economy productivity, and average hours worked. After 2028, the annual growth in real GDP averages 2.0 percent, based on the projected average annual growth rate of 0.4 percent for total employment and the assumed ultimate growth rates of 1.63 percent for productivity and -0.05 percent for average hours worked. The projected growth rate of real GDP is slower than the past average growth rate mainly because the working-age population is expected to grow more slowly than in the past.

For the low-cost assumptions, the annual growth in real GDP averages 3.0 percent over the decade ending in 2028. The relatively fast growth is due mostly to high assumed rates of growth for employment and worker produc-

---

[1] The assumed ultimate unemployment rate is an age-sex-adjusted rate.

[2] Total employment is the sum of the U.S. Armed Forces and total civilian employment, which depends on the total civilian labor force and unemployment rate.

tivity. For the high-cost assumptions, the annual growth in real GDP averages 1.5 percent for the decade ending in 2028.

7. Interest Rates

Table V.B2 presents average annual nominal and real interest rates for newly issued trust fund securities. The nominal rate is the average of the nominal interest rates for special U.S. Government obligations issuable to the trust funds in each of the 12 months of the year. Interest for these securities is generally compounded semiannually. The real interest rate is defined as the annual yield rate for investments in these securities divided by the annual rate of growth in the CPI for the first year after issuance. The real rate shown for each year reflects the actual realized (historical) or expected (future) real yield on securities issuable in the prior year.

To develop a reasonable range of assumed ultimate future real interest rates for the three alternatives, the Office of the Chief Actuary examined historical experience for the last five complete economic cycles. For the period from 1969 to 2007, the real interest rate averaged 2.9 percent per year. The real interest rates averaged 1.6, -1.0, 5.1, 4.1, and 2.0 percent per year over the economic cycles 1969-73, 1973-79, 1979-90, 1990-2001, and 2001-07, respectively. The assumed ultimate real interest rates are 3.0 percent, 2.5 percent, and 2.0 percent for the low-cost, intermediate, and high-cost assumptions, respectively. These rates are 0.2 percentage point lower than in the 2018 report.

The actual average annual nominal interest rate was approximately 2.3 percent for 2017, which means that securities newly issued in 2017 would yield 2.3 percent if held one year. Estimated average prices rose from 2017 to 2018 by approximately 2.6 percent. The annual real interest rate for 2018 is -0.2 percent, the approximate difference between the nominal interest rate and the rate of price increase. For the 10-year short-range projection period, projected nominal interest rates depend on changes in the economic cycle and in the CPI. When combined with the ultimate CPI assumptions of 3.2, 2.6, and 2.0 percent, the assumed ultimate real interest rates produce ultimate nominal interest rates of 6.2 percent for the low-cost assumptions, 5.1 percent for the intermediate assumptions, and 4.0 percent for the high-cost assumptions. These nominal rates for newly issued trust fund securities reach their ultimate levels by 2028, the end of the short-range period.

Table V.B2.—Additional Economic Factors

Calendar year	Average annual unemployment rate[a]	Annual percentage change[b] in—			Average annual interest rate	
		Labor force[c]	Total employment[d]	Real GDP[e]	Nominal[f]	Real[g]
Historical data:						
5-year periods:						
1960 to 1965.....	5.5	1.3	1.6	5.1	4.0	2.5
1965 to 1970.....	3.9	2.2	2.1	3.5	5.9	1.0
1970 to 1975.....	6.1	2.5	1.5	2.7	6.7	[h]
1975 to 1980.....	6.8	2.7	2.9	3.7	8.5	-.9
1980 to 1985.....	8.3	1.5	1.5	3.3	12.1	6.9
1985 to 1990.....	5.9	1.7	2.0	3.3	8.5	5.1
1990 to 1995.....	6.6	1.0	.9	2.6	7.0	4.3
1995 to 2000.....	4.6	1.5	1.8	4.3	6.2	3.9
2000 to 2005.....	5.4	.9	.7	2.6	4.6	2.4
2005 to 2010.....	6.8	.6	-.4	.9	3.8	1.8
2010 to 2015.....	7.2	.4	1.3	2.2	2.0	.5
Economic cycles:[i]						
1969 to 1973.....	5.3	2.6	1.8	3.6	6.5	1.6
1973 to 1979.....	6.8	2.7	2.4	3.0	7.7	-1.0
1979 to 1990.....	7.1	1.7	1.7	3.0	10.3	5.1
1990 to 2001.....	5.5	1.2	1.2	3.2	6.5	4.1
2001 to 2007.....	5.3	1.1	1.1	2.8	4.5	2.0
2007 to 2018.....	6.7	.5	.6	1.6	2.4	.8
Single years:						
2008	5.8	.8	-.4	-.1	3.6	.6
2009	9.3	-.1	-3.7	-2.5	2.9	4.4
2010	9.6	-.2	-.6	2.6	2.8	.9
2011	8.9	-.2	.6	1.6	2.4	-.7
2012	8.1	.9	1.8	2.2	1.5	.3
2013	7.4	.3	1.0	1.8	1.9	.1
2014	6.2	.3	1.6	2.5	2.3	.4
2015	5.3	.8	1.7	2.9	2.0	2.7
2016	4.9	1.3	1.7	1.6	1.8	1.0
2017	4.4	.7	1.2	2.2	2.3	-.3
2018[j]...........	3.9	1.1	1.5	2.9	2.9	-.2

Table V.B2.—Additional Economic Factors (Cont.)

Calendar year	Average annual unemployment rate[a]	Annual percentage change[b] in—			Average annual interest rate	
		Labor force[c]	Total employment[d]	Real GDP[e]	Nominal[f]	Real[g]
Intermediate:						
2019	4.1	1.1	1.0	2.8	3.3	1.0
2020	4.5	1.0	.6	2.4	3.5	.7
2021	4.9	1.0	.6	2.3	3.7	.9
2022	5.3	1.0	.6	2.2	4.0	1.1
2023	5.5	.9	.7	2.2	4.3	1.4
2024	5.5	.7	.7	2.3	4.6	1.7
2025	5.5	.6	.6	2.2	4.8	2.0
2026	5.5	.5	.5	2.1	4.9	2.2
2027	5.5	.5	.5	2.1	5.0	2.3
2028	5.5	.5	.5	2.1	5.1	2.4
2030	5.5	.4	.4	2.0	5.1	2.5
2035	5.5	.4	.4	2.0	5.1	2.5
2040	5.5	.4	.4	2.0	5.1	2.5
2045	5.5	.5	.5	2.1	5.1	2.5
2050	5.5	.5	.5	2.1	5.1	2.5
2055	5.5	.5	.5	2.1	5.1	2.5
2060	5.5	.4	.4	2.0	5.1	2.5
2065	5.5	.4	.4	2.0	5.1	2.5
2070	5.5	.4	.4	2.0	5.1	2.5
2075	5.5	.5	.5	2.0	5.1	2.5
2080	5.5	.5	.5	2.1	5.1	2.5
2085	5.5	.5	.5	2.1	5.1	2.5
2090	5.5	.4	.4	2.0	5.1	2.5
2095	5.5	.4	.4	2.0	5.1	2.5
Low-cost:						
2019	3.8	1.2	1.3	3.8	4.2	.5
2020	4.0	1.2	1.0	3.7	4.6	.9
2021	4.2	1.3	1.0	3.4	4.8	1.4
2022	4.5	1.1	.8	2.9	5.1	1.6
2023	4.5	1.0	.9	2.9	5.4	1.9
2024	4.5	.9	.9	2.9	5.6	2.2
2025	4.6	.9	.9	2.9	5.9	2.4
2026	4.6	.7	.7	2.7	6.0	2.7
2027	4.6	.6	.6	2.6	6.1	2.8
2028	4.5	.6	.6	2.6	6.2	2.9
2030	4.5	.5	.5	2.5	6.2	3.0
2035	4.5	.5	.5	2.5	6.2	3.0
2040	4.5	.6	.6	2.6	6.2	3.0
2045	4.5	.8	.7	2.7	6.2	3.0
2050	4.5	.8	.8	2.8	6.2	3.0
2055	4.5	.7	.7	2.7	6.2	3.0
2060	4.5	.6	.7	2.6	6.2	3.0
2065	4.5	.6	.6	2.6	6.2	3.0
2070	4.5	.7	.7	2.7	6.2	3.0
2075	4.5	.8	.8	2.8	6.2	3.0
2080	4.5	.8	.8	2.8	6.2	3.0
2085	4.5	.8	.8	2.8	6.2	3.0
2090	4.5	.7	.7	2.7	6.2	3.0
2095	4.5	.7	.7	2.7	6.2	3.0

Table V.B2.—Additional Economic Factors (Cont.)

Calendar year	Average annual unemployment rate[a]	Annual percentage change[b] in—			Average annual interest rate	
		Labor force[c]	Total employment[d]	Real GDP[e]	Nominal[f]	Real[g]
High-cost:						
2019	4.3	1.0	0.6	1.7	2.3	1.6
2020	6.1	1.6	-.4	-.3	1.4	.3
2021	7.2	.5	-.6	.9	2.4	-.6
2022	7.0	.3	.5	1.8	3.2	.4
2023	6.8	.3	.5	1.8	3.5	1.2
2024	6.6	.3	.5	1.8	3.7	1.5
2025	6.5	.5	.6	1.9	3.9	1.7
2026	6.5	.7	.6	1.9	4.0	1.9
2027	6.5	.6	.6	1.8	4.0	2.0
2028	6.5	.5	.5	1.7	4.0	2.0
2030	6.5	.3	.3	1.5	4.0	2.0
2035	6.5	.3	.3	1.5	4.0	2.0
2040	6.5	.3	.3	1.5	4.0	2.0
2045	6.5	.3	.2	1.4	4.0	2.0
2050	6.5	.3	.3	1.4	4.0	2.0
2055	6.5	.2	.2	1.4	4.0	2.0
2060	6.5	.1	.1	1.3	4.0	2.0
2065	6.5	.1	.1	1.3	4.0	2.0
2070	6.5	.1	.1	1.3	4.0	2.0
2075	6.5	.1	.1	1.3	4.0	2.0
2080	6.5	.1	.1	1.3	4.0	2.0
2085	6.5	.1	.1	1.3	4.0	2.0
2090	6.5	.1	.1	1.3	4.0	2.0
2095	6.5	.1	.1	1.3	4.0	2.0

[a] The Office of the Chief Actuary adjusts the civilian unemployment rates for 2029 and later to the age-sex distribution of the civilian labor force in 2011. For years through 2028, the values are the total rates without adjustment for the changing age-sex distribution.

[b] For rows with a single year listed, the value is the annual percentage change from the prior year. For rows with a range of years listed, the value is the compounded average annual percentage change.

[c] The U.S. civilian labor force.

[d] Total U.S. military and civilian employment.

[e] The value of the total output of goods and services in 2012 dollars.

[f] The average of the nominal interest rates, compounded semiannually, for special public-debt obligations issuable to the trust funds in each of the 12 months of the year.

[g] The realized or expected annual real yield for each year on securities issuable in the prior year.

[h] Greater than -0.05 and less than 0.05 percent.

[i] Economic cycles are shown from peak to peak, except for the last cycle, which is not yet complete.

[j] Historical data are not available for the full year. Estimated values vary slightly by alternative and are shown for the intermediate assumptions.

C. PROGRAM-SPECIFIC ASSUMPTIONS AND METHODS

The Office of the Chief Actuary at the Social Security Administration uses a set of models to project future income and cost under the OASDI program. These models rely not only on the demographic and economic assumptions described in the previous sections, but also on a number of program-specific assumptions and methods. Values of many program parameters change from year to year as prescribed by formulas set out in the Social Security Act. These program parameters affect the level of payroll taxes collected and the level of benefits paid. The office uses more complex models to project the numbers of future workers covered under OASDI and the levels of their covered earnings, as well as the numbers of future beneficiaries and the expected levels of their benefits. The following subsections provide descriptions of these program-specific assumptions and methods.

1. Automatically Adjusted Program Parameters

The Social Security Act requires that certain parameters affecting the determination of OASDI benefits and taxes be adjusted annually to reflect changes in particular economic measures. Formulas prescribed in the law, applied to reported statistics, change these program parameters annually. The law bases these automatic adjustments on measured changes in the national average wage index (AWI) and the Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI).[1] This section shows values for program parameters adjusted using these indices from the time that these adjustments became effective through 2028. Projected values for future years depend on the economic assumptions described in the preceding section of this report.

Tables V.C1 and V.C2 present the historical and projected values of the CPI-based benefit increases, the AWI series, and the values of many of the wage-indexed program parameters. Each table shows projections under the three alternative sets of assumptions. Table V.C1 includes:

- *The annual cost-of-living benefit increase percentages.* The automatic cost-of-living adjustment provisions in the Social Security Act specify increases in OASDI benefits based on increases in the CPI. Volatility in oil prices has resulted in substantial volatility in recent cost-of-living adjustments. A large cost-of-living adjustment for December 2008 was followed by no cost-of-living adjustments for December 2009 and December 2010. More recent volatility in oil prices again affected the

---

[1] The *Federal Register* publishes details of these indexation procedures annually. Also see www.ssa.gov/OACT/COLA/.

CPI, resulting in no cost-of-living adjustment for December 2015. Cost-of-living adjustments resumed in December 2016. All three sets of assumptions include annual cost-of-living adjustments for all future years.

- *The annual levels of and percentage increases in the AWI.* Under section 215(b)(3) of the Social Security Act, Social Security benefit computations index taxable earnings (for most workers first becoming eligible for benefits in 1979 or later) using the AWI for each year after 1950. This procedure converts a worker's past earnings to approximately average-wage-indexed equivalent values near the time of his or her benefit eligibility. Other program parameters presented in this section that are subject to the automatic-adjustment provisions also rely on the AWI.

- *The wage-indexed contribution and benefit base.* For any year, the contribution and benefit base is the maximum amount of earnings subject to the OASDI payroll tax and creditable toward benefit computation. The Social Security Act defers any increase in the contribution and benefit base if there is no cost-of-living adjustment effective for December of the preceding year. There was no increase in the contribution and benefit base for 2010, 2011, or 2016 because there was no cost-of-living adjustment for the immediate prior December in each case. Under all three sets of assumptions, the contribution and benefit base is projected to increase for all future years.

- *The wage-indexed retirement earnings test exempt amounts.* The exempt amounts are the annual amount of earnings below which beneficiaries do not have benefits withheld. A lower exempt amount applies for years prior to the year of attaining normal retirement age. A higher exempt amount applies beginning with the year in which a beneficiary attains normal retirement age. Starting in 2000, the retirement earnings test no longer applies beginning with the month of attaining normal retirement age. The Social Security Act defers any increase in these exempt amounts if there is no cost-of-living adjustment effective for December of the preceding year. There was no increase in these exempt amounts for 2010, 2011, or 2016 because there was no cost-of-living adjustment for the immediate prior December. Under all three sets of assumptions, the exempt amounts increase for all future years.

Table V.C1.—Cost-of-Living Benefit Increases, Average Wage Index, Contribution and Benefit Bases, and Retirement Earnings Test Exempt Amounts, 1975-2028

Calendar year	Cost-of-living benefit increase[a] (percent)	Average wage index (AWI)[b] Amount	Increase (percent)	Contribution and benefit base[c]	Retirement earnings test exempt amount Under NRA[d]	At NRA[e]
Historical data:						
1975	8.0	$8,630.92	7.5	$14,100	$2,520	$2,520
1976	6.4	9,226.48	6.9	15,300	2,760	2,760
1977	5.9	9,779.44	6.0	16,500	3,000	3,000
1978	6.5	10,556.03	7.9	17,700	3,240	4,000
1979	9.9	11,479.46	8.7	22,900	3,480	4,500
1980	14.3	12,513.46	9.0	25,900	3,720	5,000
1981	11.2	13,773.10	10.1	29,700	4,080	5,500
1982	7.4	14,531.34	5.5	32,400	4,440	6,000
1983	3.5	15,239.24	4.9	35,700	4,920	6,600
1984	3.5	16,135.07	5.9	37,800	5,160	6,960
1985	3.1	16,822.51	4.3	39,600	5,400	7,320
1986	1.3	17,321.82	3.0	42,000	5,760	7,800
1987	4.2	18,426.51	6.4	43,800	6,000	8,160
1988	4.0	19,334.04	4.9	45,000	6,120	8,400
1989	4.7	20,099.55	4.0	48,000	6,480	8,880
1990	5.4	21,027.98	4.6	51,300	6,840	9,360
1991	3.7	21,811.60	3.7	53,400	7,080	9,720
1992	3.0	22,935.42	5.2	55,500	7,440	10,200
1993	2.6	23,132.67	.9	57,600	7,680	10,560
1994	2.8	23,753.53	2.7	60,600	8,040	11,160
1995	2.6	24,705.66	4.0	61,200	8,160	11,280
1996	2.9	25,913.90	4.9	62,700	8,280	12,500
1997	2.1	27,426.00	5.8	65,400	8,640	13,500
1998	1.3	28,861.44	5.2	68,400	9,120	14,500
1999	[f]2.5	30,469.84	5.6	72,600	9,600	15,500
2000	3.5	32,154.82	5.5	76,200	10,080	17,000
2001	2.6	32,921.92	2.4	80,400	10,680	25,000
2002	1.4	33,252.09	1.0	84,900	11,280	30,000
2003	2.1	34,064.95	2.4	87,000	11,520	30,720
2004	2.7	35,648.55	4.6	87,900	11,640	31,080
2005	4.1	36,952.94	3.7	90,000	12,000	31,800
2006	3.3	38,651.41	4.6	94,200	12,480	33,240
2007	2.3	40,405.48	4.5	97,500	12,960	34,440
2008	5.8	41,334.97	2.3	102,000	13,560	36,120
2009	.0	40,711.61	-1.5	106,800	14,160	37,680
2010	.0	41,673.83	2.4	106,800	14,160	37,680
2011	3.6	42,979.61	3.1	106,800	14,160	37,680
2012	1.7	44,321.67	3.1	110,100	14,640	38,880
2013	1.5	44,888.16	1.3	113,700	15,120	40,080
2014	1.7	46,481.52	3.5	117,000	15,480	41,400
2015	.0	48,098.63	3.5	118,500	15,720	41,880
2016	.3	48,642.15	1.1	118,500	15,720	41,880
2017	2.0	50,321.89	3.5	127,200	16,920	44,880
Intermediate:						
2018	[g]2.8	51,794.15	2.9	[g]128,400	[g]17,040	[g]45,360
2019	1.8	53,863.71	4.0	[g]132,900	[g]17,640	[g]46,920
2020	2.7	56,396.34	4.7	136,800	18,120	48,360
2021	2.6	58,914.00	4.5	142,200	18,840	50,280
2022	2.6	61,399.77	4.2	149,100	19,800	52,560
2023	2.6	63,918.72	4.1	155,700	20,640	54,960
2024	2.6	66,573.32	4.2	162,300	21,480	57,240
2025	2.6	69,374.02	4.2	168,900	22,440	59,640
2026	2.6	72,318.20	4.2	175,800	23,280	62,160
2027	2.6	75,397.14	4.3	183,300	24,360	64,680
2028	2.6	78,425.26	4.0	191,100	25,320	67,440

115

Table V.C1.—Cost-of-Living Benefit Increases, Average Wage Index, Contribution and Benefit Bases, and Retirement Earnings Test Exempt Amounts, 1975-2028 (Cont.)

Calendar year	Cost-of-living benefit increase[a] (percent)	Average wage index (AWI) [b]		Contribution and benefit base [c]	Retirement earnings test exempt amount	
		Amount	Increase (percent)		Under NRA[d]	At NRA[e]
Low-cost:						
2018	[g]2.8	$51,842.68	3.0	[g]$128,400	[g]$17,040	[g]$45,360
2019	2.6	54,589.52	5.3	[g]132,900	[g]17,640	[g]46,920
2020	3.2	58,130.23	6.5	137,100	18,120	48,360
2021	3.2	61,621.98	6.0	144,300	19,080	50,880
2022	3.2	65,003.71	5.5	153,600	20,400	54,240
2023	3.2	68,429.04	5.3	162,900	21,600	57,480
2024	3.2	72,040.30	5.3	171,900	22,800	60,600
2025	3.2	75,890.46	5.3	180,900	24,000	63,840
2026	3.2	79,999.01	5.4	190,200	25,200	67,200
2027	3.2	84,362.57	5.5	200,400	26,640	70,800
2028	3.2	88,796.52	5.3	211,500	28,080	74,640
High-cost:						
2018	[g]2.8	51,774.91	2.9	[g]128,400	[g]17,040	[g]45,360
2019	1.2	53,181.27	2.7	[g]132,900	[g]17,640	[g]46,920
2020	2.1	53,756.15	1.1	136,800	18,120	48,360
2021	2.0	55,258.23	2.8	140,400	18,600	49,560
2022	2.0	57,220.89	3.6	141,900	18,840	50,160
2023	2.0	59,231.07	3.5	146,100	19,320	51,600
2024	2.0	61,293.18	3.5	151,200	20,040	53,400
2025	2.0	63,356.81	3.4	156,600	20,760	55,320
2026	2.0	65,432.29	3.3	162,000	21,480	57,240
2027	2.0	67,555.34	3.2	167,400	22,200	59,160
2028	2.0	69,521.87	2.9	172,800	22,920	61,080

[a] Effective with benefits payable for June in each year 1975-82, and for December in each year after 1982.

[b] See table VI.G6 for projected dollar amounts of the AWI for years beyond the last year of this table.

[c] Public Law 95-216 specified amounts for 1978-81. Public Law 101-239 changed the indexing procedure and caused slightly higher bases after 1989.

[d] Normal retirement age. See table V.C3 for specific values.

[e] In 1955-82, the retirement earnings test did not apply at ages 72 and over. In 1983-99, the test did not apply at ages 70 and over. Beginning in 2000, the test does not apply beginning with the month of normal retirement age attainment. In the year of normal retirement age attainment, the higher exempt amount applies to earnings prior to the month of normal retirement age attainment. Public Law 95-216 specified amounts for 1978-82. Public Law 104-121 specified amounts for 1996-2002.

[f] Originally determined as 2.4 percent. Pursuant to Public Law 106-554, effectively 2.5 percent.

[g] Actual amount, as determined under automatic-adjustment provisions.

Table V.C2 shows values for other wage-indexed parameters. The table provides historical values from 1978, when indexing of the amount of earnings required for a quarter of coverage first began, through 2019, and also shows projected values through 2028. These other wage-indexed program parameters are:

- *The bend points in the formula for computing the primary insurance amount (PIA) for workers who reach age 62, become disabled, or die in a given year.* As figure V.C1 illustrates, these two bend points define three ranges in a worker's average indexed monthly earnings (AIME). The formula for the worker's PIA multiplies a 90, 32, or 15 percent fac-

tor by the portion of the worker's AIME that falls within the three respective ranges, and then adds the resulting products together.

Figure V.C1.—Primary-Insurance-Amount Formula for Those Newly Eligible in 2019
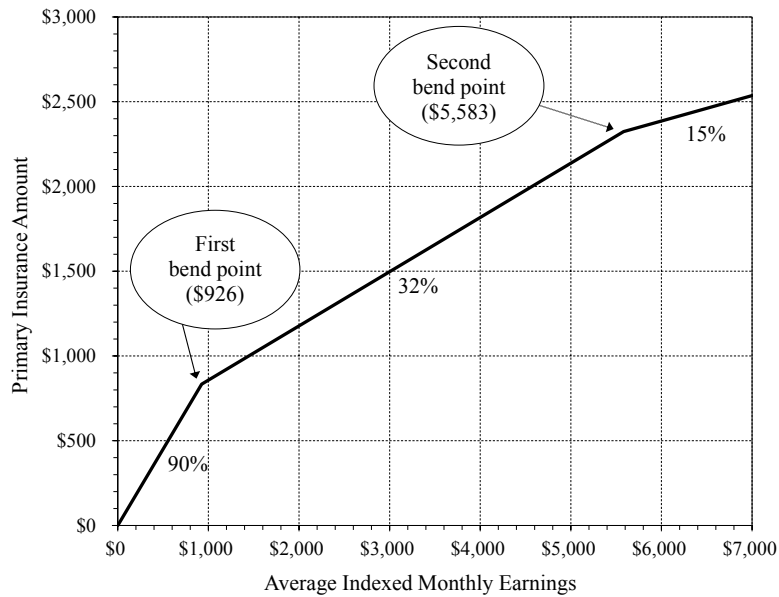
- *The bend points in the formula for computing the maximum total amount of monthly benefits payable based on the earnings record of a retired or deceased worker (maximum family benefit).* As figure V.C2 illustrates, these three bend points define four ranges in a worker's PIA. The formula for the maximum family benefit multiplies a 150, 272, 134, or 175 percent factor by the portion of the worker's PIA that falls within the four respective ranges, and then adds the resulting products together.

**Figure V.C2.—OASI Maximum-Family-Benefit Formula
for Those Newly Eligible in 2019**
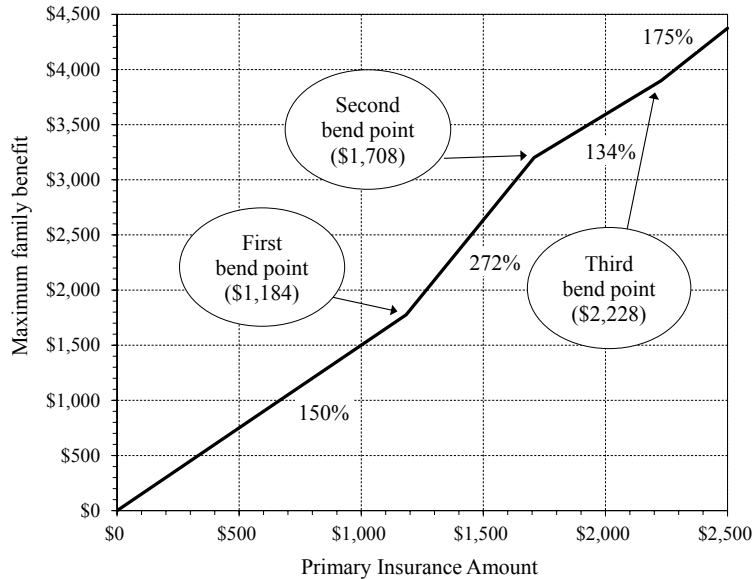
* *The amount of earnings required in a year to earn a quarter of coverage (QC).* The number and timing of QCs earned determines an individual's insured status—the basic requirement for benefit eligibility under OASDI.

* *The old-law contribution and benefit base—the contribution and benefit base that would have been in effect without enactment of the 1977 amendments.* This old-law base is used in determining special-minimum benefits for certain workers who have many years of low earnings in covered employment. Since 1986, the calculation of OASDI benefits for certain workers who are eligible to receive pensions based on non-covered employment uses the old-law base. In addition, the Railroad Retirement program and the Employee Retirement Income Security Act of 1974 use the old-law base for certain purposes.

Table V.C2.—Values for Selected Wage-Indexed Program Parameters, Calendar Years 1978-2028

Calendar year	AIME bend points in PIA formula[a]		PIA bend points in OASI maximum-family-benefit formula[b]			Earnings required for a quarter of coverage	Old-law contribution and benefit base[c]
	First	Second	First	Second	Third		
Historical data:							
1978	[d]	[d]	[d]	[d]	[d]	[e] $250	[e] $17,700
1979	[e] $180	[e] $1,085	[e] $230	[e] $332	[e] $433	260	18,900
1980	194	1,171	248	358	467	290	20,400
1981	211	1,274	270	390	508	310	22,200
1982	230	1,388	294	425	554	340	24,300
1983	254	1,528	324	468	610	370	26,700
1984	267	1,612	342	493	643	390	28,200
1985	280	1,691	358	517	675	410	29,700
1986	297	1,790	379	548	714	440	31,500
1987	310	1,866	396	571	745	460	32,700
1988	319	1,922	407	588	767	470	33,600
1989	339	2,044	433	626	816	500	35,700
1990	356	2,145	455	656	856	520	38,100
1991	370	2,230	473	682	890	540	39,600
1992	387	2,333	495	714	931	570	41,400
1993	401	2,420	513	740	966	590	42,900
1994	422	2,545	539	779	1,016	620	45,000
1995	426	2,567	544	785	1,024	630	45,300
1996	437	2,635	559	806	1,052	640	46,500
1997	455	2,741	581	839	1,094	670	48,600
1998	477	2,875	609	880	1,147	700	50,700
1999	505	3,043	645	931	1,214	740	53,700
2000	531	3,202	679	980	1,278	780	56,700
2001	561	3,381	717	1,034	1,349	830	59,700
2002	592	3,567	756	1,092	1,424	870	63,000
2003	606	3,653	774	1,118	1,458	890	64,500
2004	612	3,689	782	1,129	1,472	900	65,100
2005	627	3,779	801	1,156	1,508	920	66,900
2006	656	3,955	838	1,210	1,578	970	69,900
2007	680	4,100	869	1,255	1,636	1,000	72,600
2008	711	4,288	909	1,312	1,711	1,050	75,900
2009	744	4,483	950	1,372	1,789	1,090	79,200
2010	761	4,586	972	1,403	1,830	1,120	79,200
2011	749	4,517	957	1,382	1,803	1,120	79,200
2012	767	4,624	980	1,415	1,845	1,130	81,900
2013	791	4,768	1,011	1,459	1,903	1,160	84,300
2014	816	4,917	1,042	1,505	1,962	1,200	87,000
2015	826	4,980	1,056	1,524	1,987	1,220	88,200
2016	856	5,157	1,093	1,578	2,058	1,260	88,200
2017	885	5,336	1,131	1,633	2,130	1,300	94,500
2018	895	5,397	1,144	1,651	2,154	1,320	95,400
2019	926	5,583	1,184	1,708	2,228	1,360	98,700
Intermediate:							
2020	953	5,746	1,218	1,758	2,293	1,400	101,700
2021	991	5,976	1,267	1,829	2,385	1,460	105,600
2022	1,038	6,257	1,326	1,915	2,497	1,530	110,700
2023	1,084	6,536	1,386	2,000	2,609	1,600	115,500
2024	1,130	6,812	1,444	2,084	2,719	1,660	120,600
2025	1,176	7,092	1,503	2,170	2,830	1,730	125,400
2026	1,225	7,386	1,566	2,260	2,948	1,800	130,500
2027	1,277	7,697	1,632	2,355	3,072	1,880	136,200
2028	1,331	8,023	1,701	2,455	3,202	1,960	141,900

**Table V.C2.—Values for Selected Wage-Indexed Program Parameters,
Calendar Years 1978-2028 (Cont.)**

Calendar year	AIME bend points in PIA formula[a]		PIA bend points in OASI maximum-family-benefit formula[b]			Earnings required for a quarter of coverage	Old-law contribution and benefit base[c]
	First	Second	First	Second	Third		
Low-cost:							
2020	$954	$5,752	$1,219	$1,760	$2,295	$1,400	$101,700
2021	1,005	6,057	1,284	1,853	2,417	1,480	107,100
2022	1,070	6,449	1,367	1,973	2,574	1,580	114,000
2023	1,134	6,837	1,449	2,092	2,728	1,670	120,900
2024	1,196	7,212	1,529	2,207	2,878	1,760	127,500
2025	1,260	7,592	1,609	2,323	3,030	1,850	134,400
2026	1,326	7,993	1,694	2,446	3,190	1,950	141,300
2027	1,397	8,420	1,785	2,576	3,360	2,060	148,800
2028	1,472	8,876	1,881	2,716	3,542	2,170	156,900
High-cost:							
2020	953	5,744	1,218	1,758	2,292	1,400	101,700
2021	979	5,900	1,251	1,805	2,355	1,440	104,400
2022	989	5,964	1,264	1,825	2,380	1,460	105,600
2023	1,017	6,131	1,300	1,876	2,447	1,500	108,300
2024	1,053	6,348	1,346	1,943	2,534	1,550	112,200
2025	1,090	6,572	1,393	2,011	2,623	1,600	116,100
2026	1,128	6,800	1,442	2,081	2,714	1,660	120,300
2027	1,166	7,029	1,490	2,151	2,805	1,720	124,200
2028	1,204	7,260	1,539	2,221	2,897	1,770	128,400

[a] The formula to compute a PIA is: (1) 90% of AIME below the first bend point, plus (2) 32% of AIME in excess of the first bend point but not in excess of the second, plus (3) 15% of AIME in excess of the second bend point. The bend points are determined based on the first year a beneficiary becomes eligible for benefits.

[b] The formula to compute an OASI family maximum is: (1) 150% of PIA below the first bend point, plus (2) 272% of PIA in excess of the first bend point but not in excess of the second, plus (3) 134% of PIA in excess of the second bend point but not in excess of the third, plus (4) 175% of PIA in excess of the third bend point. This formula also determines family maximums for disabled workers first eligible after 1978 and entitled before July 1980.

[c] Contribution and benefit base that would have been in effect without enactment of the Social Security Amendments of 1977. Public Law 101-239 changed the indexing procedure and caused slightly higher bases after 1989.

[d] No provision in law for this amount in this year.

[e] Amount specified by Social Security Amendments of 1977.

In addition to the economic factors that affect the determination of OASDI benefits, there are certain legislated changes that affect current and future benefit amounts. Two such changes are the scheduled increases in the normal retirement age and in the delayed retirement credits. Table V.C3 shows the scheduled changes in these parameters and the resulting effects on benefit levels expressed as a percentage of PIA.

Table V.C3.—Legislated Changes in Normal Retirement Age and Delayed Retirement Credits for Persons Attaining Age 62 in Each Year 1986 and Later

Year of birth	Year of attainment of age 62	Normal retirement age (NRA)	Credit for each year of delayed retirement after NRA (percent)	Benefit, as a percentage of PIA, beginning at age —				
				62	65	66	67	70
1924	1986	65	3	80	100	103	106	115
1925	1987	65	$3\,^1/_2$	80	100	$103\,^1/_2$	107	$117\,^1/_2$
1926	1988	65	$3\,^1/_2$	80	100	$103\,^1/_2$	107	$117\,^1/_2$
1927	1989	65	4	80	100	104	108	120
1928	1990	65	4	80	100	104	108	120
1929	1991	65	$4\,^1/_2$	80	100	$104\,^1/_2$	109	$122\,^1/_2$
1930	1992	65	$4\,^1/_2$	80	100	$104\,^1/_2$	109	$122\,^1/_2$
1931	1993	65	5	80	100	105	110	125
1932	1994	65	5	80	100	105	110	125
1933	1995	65	$5\,^1/_2$	80	100	$105\,^1/_2$	111	$127\,^1/_2$
1934	1996	65	$5\,^1/_2$	80	100	$105\,^1/_2$	111	$127\,^1/_2$
1935	1997	65	6	80	100	106	112	130
1936	1998	65	6	80	100	106	112	130
1937	1999	65	$6\,^1/_2$	80	100	$106\,^1/_2$	113	$132\,^1/_2$
1938	2000	65, 2 mo	$6\,^1/_2$	$79\,^1/_6$	$98\,^8/_9$	$105\,^5/_{12}$	$111\,^{11}/_{12}$	$131\,^5/_{12}$
1939	2001	65, 4 mo	7	$78\,^1/_3$	$97\,^7/_9$	$104\,^2/_3$	$111\,^2/_3$	$132\,^2/_3$
1940	2002	65, 6 mo	7	$77\,^1/_2$	$96\,^2/_3$	$103\,^1/_2$	$110\,^1/_2$	$131\,^1/_2$
1941	2003	65, 8 mo	$7\,^1/_2$	$76\,^2/_3$	$95\,^5/_9$	$102\,^1/_2$	110	$132\,^1/_2$
1942	2004	65, 10 mo	$7\,^1/_2$	$75\,^5/_6$	$94\,^4/_9$	$101\,^1/_4$	$108\,^3/_4$	$131\,^1/_4$
1943-54	2005-16	66	8	75	$93\,^1/_3$	100	108	132
1955	2017	66, 2 mo	8	$74\,^1/_6$	$92\,^2/_9$	$98\,^8/_9$	$106\,^2/_3$	$130\,^2/_3$
1956	2018	66, 4 mo	8	$73\,^1/_3$	$91\,^1/_9$	$97\,^7/_9$	$105\,^1/_3$	$129\,^1/_3$
1957	2019	66, 6 mo	8	$72\,^1/_2$	90	$96\,^2/_3$	104	128
1958	2020	66, 8 mo	8	$71\,^2/_3$	$88\,^8/_9$	$95\,^5/_9$	$102\,^2/_3$	$126\,^2/_3$
1959	2021	66, 10 mo	8	$70\,^5/_6$	$87\,^7/_9$	$94\,^4/_9$	$101\,^1/_3$	$125\,^1/_3$
1960 & later	2022 & later	67	8	70	$86\,^2/_3$	$93\,^1/_3$	100	124

2. Covered Employment

Projections of the total U.S. civilian labor force and unemployment rate (see table V.B2) are based on Bureau of Labor Statistics definitions from the Current Population Survey (CPS). These projections represent the average weekly number of employed and unemployed persons, age 16 and over, in the U.S. in a calendar year. Covered employment for a calendar year is defined as the total number of persons who have any OASDI covered earnings (that is, earnings subject to the OASDI payroll tax) at any time during that year. For those age 16 and over, projected covered employment is the sum of age-sex groups, each reflecting the growth projected for the group's total U.S employment and average weeks worked per year.[1] For the short-range period, the age-sex-adjusted average weeks worked declines slightly as the age-sex-adjusted unemployment rate rises to its ultimate assumed value of 5.5 percent. After 2028, the average weeks worked for each age-sex group

---

[1] For those under age 16, projected covered employment is the sum of age-sex components, each of which is projected as a ratio to the Social Security area population.

is assumed to remain constant. The projection method also accounts for changes in non-OASDI-covered employment and the increase in coverage of Federal civilian employment as a result of the 1983 Social Security Amendments. It also reflects changes in the number and employment status of other-than-LPR immigrants residing within the Social Security coverage area, such as undocumented immigrants and foreign workers and students with temporary visas.

The covered-worker rate is the ratio of OASDI covered workers to the Social Security area population. For men age 16 and over, the projected age-adjusted covered-worker rates[1] for 2093 are 69.7, 69.3, and 68.6 percent for the low-cost, intermediate, and high-cost assumptions, respectively. For women age 16 and over, the projected age-adjusted covered-worker rates for 2093 are 67.0, 65.8, and 64.3 percent for the low-cost, intermediate, and high-cost assumptions, respectively. For men, the intermediate projected rate for 2093 is slightly lower than the 2017 age-adjusted rate of 69.6 percent primarily due to the projected increase in the portion of the Social Security area population that consists of other-than-LPR immigrants. For women, the intermediate projected rate for 2093 is higher than the 2017 age-adjusted rate of 64.2 percent because the projected increase in the age-adjusted labor force participation rate more than offsets the projected increase in the portion of the population that will be other-than-LPR immigrants.

3. Insured Population

Eligibility for worker benefits under the OASDI program requires some threshold level of work in covered employment. A worker satisfies this requirement by his or her accumulation of quarters of coverage (QCs). Prior to 1978, a worker earned one QC for each calendar quarter in which he or she earned at least $50. In 1978, when annual earnings reporting replaced quarterly reporting, the amount required to earn a QC (up to a maximum of four per year) was set at $250. As specified in the law, the Social Security Administration has adjusted this amount each year since then according to changes in the AWI. Its value in 2019 is $1,360.

There are three types of insured status that a worker can earn under the OASDI program. The number and recency of QCs earned determine each status. A worker is fully insured when his or her total number of QCs is greater than or equal to the number of years elapsed after the year of attainment of age 21 (but not less than six). After a worker has accumulated

---

[1] Age-adjusted covered-worker rates are adjusted to the 2011 age distribution of the Social Security area population.

40 QCs, he or she remains permanently fully insured. A worker is disability insured if he or she is: (1) a fully insured worker who has accumulated 20 QCs during the 40-quarter period ending with the current quarter, (2) a fully insured worker aged 24-30 who has accumulated QCs during one-half of the quarters elapsed after the quarter of attainment of age 21 and up to and including the current quarter, or (3) a fully insured worker under age 24 who has accumulated six QCs during the 12-quarter period ending with the current quarter. A worker is currently insured when he or she has accumulated six QCs during the 13-quarter period ending with the current quarter. Periods of disability reduce the number of quarters required for insured status, but not below the minimum of six QCs.

There are many types of benefits payable to workers and their family members under the OASDI program. A worker must be fully insured to be eligible for a primary retirement benefit and for his or her spouse or children to be eligible for auxiliary retirement benefits. A deceased worker must have been either currently insured or fully insured at the time of death for his or her children (and their mother or father) to be eligible for benefits. If there are no eligible surviving children, the deceased worker must have been fully insured at the time of death for his or her surviving spouse to be eligible. A worker must be disability insured to be eligible for a primary disability benefit and for his or her spouse or children to be eligible for auxiliary disability benefits.

The Office of the Chief Actuary estimates the fully insured population, as a percentage of the Social Security area population, by single year of age and sex starting in 1969. The short-range model extrapolates the historical trend in these rates from data in the Continuous Work History Sample (CWHS). The model uses information on quarters of coverage earned due to employment covered by Social Security derived from tabulations of the CWHS. The model also uses historical administrative data on beneficiaries in force and estimated historical mortality rates. The model combines this information to estimate the proportion of individuals who were alive and fully insured as of the end of each historical year. Using projected mortality rates and covered workers, the model extrapolates these rates into the future and applies them to the historical and projected population to arrive at the fully insured population by age and sex through the end of the short-range period.

The long-range fully insured model uses 30,000 simulated work histories for each sex and birth cohort, representing everyone except the other-than-LPR immigrant population. For the other-than-LPR immigrant population, the model generates substantially lower percentages attaining fully insured status. The model constructs simulated work histories using past coverage rates,

earnings distributions, and amounts required for crediting QCs, and develops them in a manner that replicates historical individual variations in work patterns. The probability of covered employment in any year is assumed to be higher for those who have worked more consistently in the recent past. Model parameters are selected so that simulated fully insured percentages are consistent with the fully insured percentages estimated by the short-range model for the recent historical period.

The Office of the Chief Actuary estimates the disability insured population, as a percentage of the fully insured population, by age and sex starting in 1969. The office bases historical values on a tabulation of the disability insured population from the CWHS and estimates of the fully insured population. The short-range model projects these percentages by using the relationship between the historical percentages and covered-worker rates. The long-range model projects these percentages by using the same simulated work histories used to project the fully insured percentages. The long-range model makes additional adjustments to the model simulations in order to bring the disability insured percentages in the historical and short-range periods into close agreement with those estimated from the CWHS and the short-range model.

The office does not project the currently insured population because the number of beneficiaries who are entitled to benefits based solely on currently insured status has been very small recently and is likely to remain small in the future.

Using these insured models, the percentage of the Social Security area population aged 62 and over that is fully insured is projected to increase from its estimated level of 87.0 for December 31, 2016, to 87.1, 87.8, and 88.7 for December 31, 2095, under the low-cost, intermediate, and high-cost alternatives, respectively. Over the projection period, the percentages for both males and females change significantly. The percentage for males declines, reflecting, in part, increases in the percent of the population that is classified as other-than-LPR immigrants and is thus less likely to have earnings reported and credited to them. The percentage for females increases, reflecting the past substantial growth in the employment of younger cohorts of women. Under the intermediate assumptions, for example, the percentage for males decreases from 93.7 to 87.3, and the percentage for females increases from 81.5 to 88.4.

4. Old-Age and Survivors Insurance Beneficiaries

The Office of the Chief Actuary projects the number of OASI beneficiaries for each type of benefit separately by the sex of the worker on whose earnings the benefits are based and by the age of the beneficiary. For the long-range period, the office also projects the number of beneficiaries by marital status for several types of benefits. The office uses two separate models in making these projections. The short-range model makes projections during the first 10 years of the projection period and the long-range model makes projections thereafter.

The short-range model develops the number of retired-worker beneficiaries by applying award rates to the aged fully insured population, excluding those already receiving retired-worker, disabled-worker, aged-widow(er), or aged-spouse benefits, and by applying termination rates to the number of retired-worker beneficiaries.

The long-range model projects the number of retired-worker beneficiaries who were not previously converted from disabled-worker beneficiary status as a percentage of the exposed population.[1] For age 62, the model projects this percentage by using a linear regression based on the historical relationship between this percentage, the labor force participation rate at age 62, and the number of months from age 62 to normal retirement age. The percentage for ages 70 and over is nearly 100 because delayed retirement credits cannot be earned after age 70. The long-range model projects the percentage for each age 63 through 69 based on historical experience with an adjustment for changes in the portion of the primary insurance amount that is payable at each age of entitlement. The model adjusts these percentages for ages 62 through 69 to reflect changes in the normal retirement age.

The long-range model calculates the number of retired-worker beneficiaries previously converted from disabled-worker beneficiary status using an extension of disabled-worker death rates by age, sex, and duration.

The Office of the Chief Actuary estimates the number of aged-spouse beneficiaries, excluding those who are also receiving a retired-worker benefit, from the population projected by age and sex. Benefits of aged-spouse beneficiaries depend on the earnings records of their husbands or wives, who are referred to as "earners." The short-range model projects insured aged-spouse beneficiaries in conjunction with the retired-worker beneficiaries. This model projects uninsured aged-spouse beneficiaries by applying award rates

---

[1] The exposed population is the fully insured population age 62 and over, excluding persons entitled to or converted from disabled-worker benefits and fully insured persons entitled only to widow(er) benefits.

to the aged uninsured male or female population and by applying termination rates to the population already receiving such benefits.

The long-range model estimates aged-spouse beneficiaries separately for those married and divorced. The model projects the number of married aged-spouse beneficiaries, by age and sex, by applying a series of factors to the number of spouses, aged 62 and over, in the population. These factors are the probabilities that the spouse and the earner meet all of the conditions of eligibility—that is, the probabilities that: (1) the earner is 62 or over, (2) the earner is insured, (3) the earner is either receiving benefits or has suspended benefits, (4) the spouse is not receiving a benefit for the care of an entitled child, (5) the spouse is either not insured or is insured but not receiving benefits, and (6) the spouse is not eligible to receive a significant government pension based on earnings from noncovered employment. To calculate the estimated number of aged-spouse beneficiaries, the model applies a projected prevalence rate to the resulting number of spouses. Due to the Bipartisan Budget Act of 2015, aged spouses are no longer eligible to receive an aged-spouse benefit if the earner suspends their benefit after April 29, 2016. Additionally, for those turning age 62 in 2016 and later, deemed filing now applies to all retired workers and spouses even after initial entitlement, regardless of age. Thus, spouses who are insured are no longer eligible to delay their retired-worker benefit while receiving an aged-spouse benefit.

The long-range model estimates the number of divorced aged-spouse beneficiaries, by age and sex, by applying the same factors to the number of divorced persons aged 62 and over in the population, with three differences. First, the model applies a factor to reflect the probability that the earner (former spouse) is still alive. If the former spouse is not alive, the person may be entitled to a divorced widow(er) benefit. Second, the model applies a factor to reflect the probability that the marriage to the former spouse lasted at least 10 years. Third, the model does not apply factor (3) in the previous paragraph because, effective January 1985, a divorced person is generally no longer required to wait for the former spouse to receive benefits.

The Office of the Chief Actuary bases the projected numbers of children under age 18, and students aged 18 and 19, who are eligible for benefits as children of retired-worker beneficiaries, on the projected number of children in the population. The short-range model develops the number of entitled children by applying award rates to the number of children in the population who have two living parents and by applying termination rates to the number of children already receiving benefits.

The long-range model projects separately the number of entitled children by sex of the earner parent. For each age under 18, the model multiplies the projected number of children with a parent aged 62 and over by the ratio of the number of retired workers aged 62 to 71 to the number of members of the population aged 62 to 71. For student beneficiaries, the model multiplies the number of children aged 18 and 19 in the population by the probabilities that: (1) the parent is alive, aged 62 or over, insured, and receiving a retired-worker benefit; and (2) the child is attending high school.

The Office of the Chief Actuary projects the number of disabled children, aged 18 and over, of retired-worker beneficiaries from the adult population. The short-range model applies award rates to the population and applies termination rates to the number of disabled children already receiving benefits. The long-range model projects the number of disabled children in a manner similar to that used for student children except for a factor that reflects the probability of being disabled before age 22.

The short-range model develops the number of spouses of retired workers, who are entitled to spouse benefits because they are caring for a child who is under age 16 or disabled, by applying award rates to the number of awards to children of retired workers and by applying termination rates to the number of young spouses with a child in their care who are already receiving benefits. The long-range model projects the number of young-spouse beneficiaries with a child in their care as a proportion of the number of child beneficiaries of retired workers, including projected changes in average family size.

The Office of the Chief Actuary projects the number of aged-widow(er) beneficiaries, excluding those who are also receiving a retired-worker benefit, from the population by age and sex. The short-range model projects fully insured aged-widow(er) beneficiaries in conjunction with the retired-worker beneficiaries. The model projects the number of uninsured aged-widow(er) beneficiaries by applying award rates to the aged uninsured male or female population and by applying termination rates to the population already receiving such benefits. The long-range model projects uninsured aged-widow(er) beneficiaries by marital status. The model multiplies the number of widow(er)s in the population aged 60 and over by the probabilities that: (1) the deceased earner is fully insured at death, (2) the widow(er) is not receiving a benefit for the care of an entitled child, (3) the widow(er) is not fully insured, and (4) the widow(er) benefits are not withheld because of receipt of a significant government pension based on earnings in noncovered employment. In addition, the model applies the same factors to the number of divorced persons aged 60 and over in the population and includes addi-

tional factors representing the probability that the person's former earner spouse has died and that the marriage lasted at least 10 years. The model projects the number of insured aged-widow(er) beneficiaries who are ages 60 through 70 in a manner similar to that for uninsured aged-widow(er) beneficiaries. In addition, the model assumes that some insured widow(er)s who had not applied for their retired-worker benefits will receive widow(er) benefits. The model projects insured aged-widow(er) beneficiaries over age 70 by applying termination rates to the population that started receiving such benefits prior to age 70.

The short-range model develops the number of disabled-widow(er) beneficiaries by applying award rates to the uninsured male or female population and by applying termination rates to the population already receiving a disabled-widow(er) benefit. The long-range model projects the number for each cohort by age from 50 to normal retirement age as percentages of the widowed and divorced populations, adjusted for the insured status of the deceased spouse, the prevalence of disability, and the probability that the disabled spouse is not receiving another type of benefit.

The Office of the Chief Actuary bases the projected number of children under age 18, and students aged 18 and 19, who are entitled to benefits as survivors of deceased workers, on the number of children in the population whose mothers or fathers are deceased. The short-range model develops the number of entitled children by applying award rates to the number of orphaned children and by applying termination rates to the number of children already receiving benefits.

The long-range model projects the number of surviving-child beneficiaries in a manner similar to that for student beneficiaries of retired workers, except that the model replaces the probability that the parent is aged 62 or over with the probability that the parent is deceased.

The Office of the Chief Actuary projects the number of surviving-disabled-child beneficiaries, aged 18 and over, from the adult population. The short-range model applies award rates to the population and applies termination rates to the number of surviving-disabled-child beneficiaries already receiving benefits. The long-range model projects the number of surviving-disabled-child beneficiaries in a manner similar to that for surviving-student-child beneficiaries, except for including an additional factor to reflect the probability of being disabled before age 22.

The short-range model develops the numbers of entitled surviving-mother and surviving-father beneficiaries by applying award rates to the number of awards to surviving-child beneficiaries, in cases where the children are either

under age 16 or disabled, and by applying termination rates to the number of surviving-mother and surviving-father beneficiaries already receiving benefits. The long-range model estimates the numbers of surviving-mother and surviving-father beneficiaries, assuming they are not remarried, from the number of surviving-child beneficiaries.

The Office of the Chief Actuary projects the number of surviving-parent beneficiaries based on the historical pattern of the number of such beneficiaries.

Table V.C4 shows the projected number of beneficiaries under the OASI program by type of benefit. The retired-worker beneficiary counts include those persons who receive a residual auxiliary benefit in addition to their retired-worker benefit. The office makes estimates of the number and amount of residual payments separately for spouses and widow(er)s.

Table V.C4.—OASI Beneficiaries With Benefits in Current-Payment Status
at the End of Calendar Years 1945-2095
[In thousands]

	Retired workers and auxiliaries			Survivors				
Calendar year	Worker[a]	Spouse	Child	Widow-widower	Mother-father	Child	Parent	Total
Historical data:								
1945	518	159	13	94	121	377	6	1,288
1950	1,771	508	46	314	169	653	15	3,477
1955	4,474	1,192	122	701	292	1,154	25	7,961
1960	8,061	2,269	268	1,544	401	1,577	36	14,157
1965	11,101	2,614	461	2,371	472	2,074	35	19,128
1970	13,349	2,668	546	3,227	523	2,688	29	23,030
1975	16,589	2,867	643	3,888	582	2,919	21	27,509
1980	19,564	3,018	639	4,415	563	2,610	15	30,823
1985	22,435	3,069	456	4,862	372	1,918	10	33,122
1990	24,841	3,104	421	5,098	304	1,777	6	35,551
1995	26,679	3,027	441	5,213	275	1,884	4	37,522
2000	28,505	2,798	459	4,901	203	1,878	3	38,747
2005	30,461	2,524	488	4,569	178	1,903	2	40,126
2010	34,593	2,316	580	4,285	159	1,913	2	43,847
2011	35,600	2,291	594	4,239	158	1,907	2	44,791
2012	36,720	2,280	612	4,193	154	1,907	1	45,868
2013	37,893	2,285	625	4,139	150	1,899	1	46,992
2014	39,009	2,303	635	4,092	143	1,892	1	48,075
2015	40,089	2,335	648	4,050	140	1,893	1	49,155
2016	41,233	2,370	661	4,004	133	1,893	1	50,296
2017	42,447	2,375	675	3,961	128	1,904	1	51,491
2018	43,721	2,391	690	3,908	121	1,911	1	52,743
Intermediate:								
2019	45,120	2,395	710	3,877	117	1,926	1	54,146
2020	46,637	2,297	728	3,853	114	1,941	1	55,571
2025	53,990	1,868	808	3,753	107	1,998	1	62,525
2030	60,589	1,852	928	3,576	111	2,056	1	69,112
2035	64,924	1,837	1,037	3,361	125	2,081	1	73,366
2040	67,204	1,741	1,112	3,161	132	2,131	1	75,482

**Table V.C4.—OASI Beneficiaries With Benefits in Current-Payment Status
at the End of Calendar Years 1945-2095 (Cont.)**
[In thousands]

	Retired workers and auxiliaries			Survivors				
Calendar year	Worker[a]	Spouse	Child	Widow-widower	Mother-father	Child	Parent	Total
Intermediate (Cont.):								
2045	68,246	1,680	1,109	3,015	129	2,110	1	76,288
2050	69,838	1,662	1,132	2,894	124	2,058	1	77,709
2055	72,179	1,664	1,162	2,802	119	1,997	1	79,924
2060	75,346	1,670	1,193	2,724	115	1,940	1	82,989
2065	78,439	1,685	1,203	2,679	114	1,908	1	86,029
2070	81,781	1,722	1,235	2,660	113	1,904	1	89,416
2075	85,073	1,751	1,277	2,637	111	1,902	1	92,754
2080	87,183	1,766	1,293	2,593	108	1,888	1	94,833
2085	88,496	1,792	1,298	2,557	105	1,862	1	96,111
2090	90,512	1,863	1,325	2,556	103	1,838	1	98,199
2095	93,982	1,929	1,377	2,557	101	1,824	1	101,771
Low-cost:								
2019	45,107	2,395	710	3,876	117	1,927	1	54,133
2020	46,606	2,297	729	3,850	115	1,944	1	55,541
2025	53,788	1,871	814	3,743	109	2,026	1	62,352
2030	59,932	1,840	950	3,606	108	2,170	1	68,607
2035	63,664	1,834	1,080	3,423	122	2,289	1	72,413
2040	65,291	1,726	1,179	3,248	130	2,438	1	74,013
2045	65,768	1,645	1,191	3,117	128	2,483	1	74,334
2050	66,886	1,605	1,233	3,003	126	2,474	1	75,328
2055	68,897	1,573	1,286	2,909	125	2,457	1	77,248
2060	71,766	1,548	1,346	2,820	125	2,454	1	80,060
2065	74,578	1,527	1,380	2,759	128	2,495	1	82,870
2070	77,593	1,518	1,440	2,723	133	2,576	1	85,984
2075	80,469	1,495	1,514	2,683	136	2,654	1	88,953
2080	82,166	1,466	1,548	2,630	138	2,704	1	90,652
2085	83,314	1,465	1,568	2,608	138	2,732	1	91,827
2090	85,981	1,521	1,632	2,643	140	2,767	1	94,687
2095	90,842	1,589	1,737	2,694	142	2,821	1	99,827
High-cost:								
2019	45,134	2,395	709	3,879	117	1,924	1	54,160
2020	46,671	2,297	727	3,855	114	1,938	1	55,603
2025	54,224	1,865	803	3,765	105	1,970	1	62,732
2030	61,495	1,882	911	3,524	113	1,934	1	69,859
2035	66,486	1,879	1,000	3,269	124	1,864	1	74,622
2040	69,483	1,805	1,046	3,043	127	1,821	1	77,326
2045	71,178	1,771	1,025	2,883	120	1,747	1	78,725
2050	73,356	1,784	1,028	2,760	112	1,667	1	80,708
2055	76,122	1,817	1,031	2,671	104	1,581	1	83,328
2060	79,603	1,860	1,031	2,599	96	1,495	1	86,685
2065	82,944	1,924	1,018	2,562	90	1,425	1	89,964
2070	86,579	2,013	1,024	2,546	85	1,377	1	93,625
2075	90,239	2,092	1,039	2,532	80	1,337	1	97,320
2080	92,712	2,150	1,039	2,490	75	1,298	1	99,764
2085	94,145	2,202	1,031	2,438	70	1,253	1	101,140
2090	95,376	2,275	1,031	2,401	65	1,211	1	102,361
2095	97,152	2,340	1,043	2,367	62	1,174	1	104,139

[a] Retired-worker beneficiaries include persons who also receive a residual benefit consisting of the excess of
an auxiliary benefit over their retired-worker benefit.

Notes:
1. The number of beneficiaries does not include uninsured individuals who receive benefits under
section 228 of the Social Security Act. Transfers from the General Fund of the Treasury reimburse the OASI
Trust Fund for the cost of most of these individuals.
2. Totals do not necessarily equal the sums of rounded components.

5. Disability Insurance Beneficiaries

The DI Trust Fund pays for benefits to disabled workers who: (1) satisfy the disability insured requirements, (2) are unable to engage in any substantial gainful activity due to a medically determinable physical or mental impairment severe enough to satisfy the requirements of the program, and (3) have not yet attained normal retirement age. Spouses and children of such disabled workers may also receive DI benefits provided they satisfy certain criteria, primarily age and earnings requirements.

The Office of the Chief Actuary projects the number of disabled-worker beneficiaries in current-payment status (disability prevalence) for each future year. The projections start with the number in current-payment status as of December 2018. Projections of the number of new beneficiaries awarded benefits each year (disability incidence) and the number of beneficiaries leaving the disability rolls each year then determine the number in current-payment status in later years. Beneficiaries leave the rolls due to death and recovery (disability terminations) and due to conversion from disabled-worker to retired-worker beneficiary status at normal retirement age, after which the OASI Trust Fund pays for benefits. The remainder of this section describes the concepts of disability incidence, termination, and prevalence.

a. Disability Incidence

The disability incidence rate is the ratio of the number of new beneficiaries awarded benefits each year to the number of individuals who meet insured requirements but are not yet receiving benefits (the disability-exposed population[1]). The Office of the Chief Actuary projects the number of newly awarded beneficiaries for each future year by multiplying assumed age-sex-specific disability incidence rates and the projected disability-exposed population by age and sex.

Figure V.C3 illustrates the historical and estimated incidence rates under the three alternatives. Incidence rates have varied substantially during the historical period since 1970 due to a variety of demographic and economic factors, along with changes in legislation and program administration. The solid lines in figure V.C3 show the incidence rate adjusted to the age-sex distribution of the disability-exposed population for 2000. This adjustment allows a comparison of incidence rates over time by focusing on the likelihood of becom-

---

[1] The disability-exposed population excludes those receiving benefits, while the disability insured population includes them. Section V.C.3 of this report describes the projection of the disability insured population.

ing disabled, and by excluding the effects of a changing distribution of the population toward ages where disability is more or less likely.

The dashed lines in figure V.C3 represent the gross (unadjusted) incidence rates. The changing age-sex distribution of the exposed population over time influences these unadjusted rates. The gross incidence rate fell below the age-sex-adjusted rate between 1975 and 2000 as the baby-boom generation increased the size of the younger working-age population, where disability incidence is lower than in older populations. After 1995, the gross rate generally increased relative to the age-sex-adjusted rate as the baby-boom generation moved into an age range where disability incidence peaks. The projected gross incidence rate generally declines relative to the age-sex-adjusted rate as the baby-boom generation moves above the normal retirement age and the lower-birth-rate cohorts of the 1970s enter prime disability ages (50 to normal retirement age). As these smaller cohorts age beyond normal retirement age, by about 2050, the gross incidence rate returns to a higher relative level under the intermediate assumptions. Thereafter, the gross rate remains higher than the age-sex-adjusted rate, and reflects the persistently higher average age of the working-age population, which is largely due to lower birth rates since 1965, and to the increase in the normal retirement age.

For the first 10 years of the projection period (through 2028), incidence rates reflect several factors including: (1) aspects of program administration, such as efforts to reduce the disability determination backlogs and recent changes in procedures for adjudicating claims; (2) assumed future unemployment rates; and (3) recent trends in incidence. At the beginning of the recent period of high unemployment, disability incidence rates were well above the general trend level, with rates reaching a peak in 2010. Over the last few years, incidence rates have subsided as the economy has recovered, and have persisted at levels well below those expected over the long-term. Some of the elevation of disability incidence rates experienced during the recession and the lowering of incidence rates experienced during the recovery are likely due to many individuals applying for disability benefits earlier than they would have otherwise. For 2018, the actual incidence rate (4.1 per thousand) was below the level projected in last year's report (4.6 per thousand). In this year's report, incidence rates are assumed to rise more gradually early in the short-range period than in last year's report, and are lower later in the period. Incidence rates are assumed to be somewhat elevated during the period 2019 through 2022, when the Social Security Administration is expected to eliminate a backlog of individuals who have appealed for a hearing on a prior disability claim denial. In 2028, at the end of the short-range period, age-sex-specific incidence rates reach the ultimate rates assumed for the long-range

projections. These ultimate age-sex-specific disability incidence rates were selected based on careful analysis of historical levels and patterns and expected future conditions, including the impact of scheduled increases in the normal retirement age.[1] The ultimate incidence rates represent the expected average rates of incidence for the future.

For the intermediate alternative, the Trustees assume that the ultimate age-sex-adjusted incidence rate (adjusted to the disability-exposed population for the year 2000) will be 5.2 awards per thousand exposed, which is lower than in last year's report by 0.2 awards per thousand exposed. See page 37 for more information. Figure V.C3 illustrates that the assumed ultimate age-sex-adjusted incidence rate of 5.2 is slightly higher than the average rate for the historical period 1970 through 2018 (5.1 per thousand). However, a similar comparison using gross incidence rates gives a very different result. The estimated ultimate gross incidence rate is substantially greater than the average gross rate over the historical period due to the large changes in the age-sex distribution of the disability-exposed population between 1970 and 2010.

The Trustees assume that the ultimate age-sex-adjusted incidence rates for the low-cost and high-cost alternatives will be 4.2 and 6.2 awards per thousand exposed, or about 1.0 awards per thousand lower and 1.0 awards per thousand higher, respectively, than the ultimate incidence rate for the intermediate alternative. The low-cost and high-cost ultimate age-sex-adjusted incidence rates are lower than those in last year's report by 0.1 and 0.2 awards per thousand exposed, respectively.

---

[1] Projected incidence rates are adjusted upward to account for additional workers who are expected to file for disability benefits (rather than retirement benefits) in response to reductions in retirement benefits as the normal retirement age rises.

Figure V.C3.—DI Disability Incidence Rates, 1970-2095
[Awards per thousand disability-exposed]
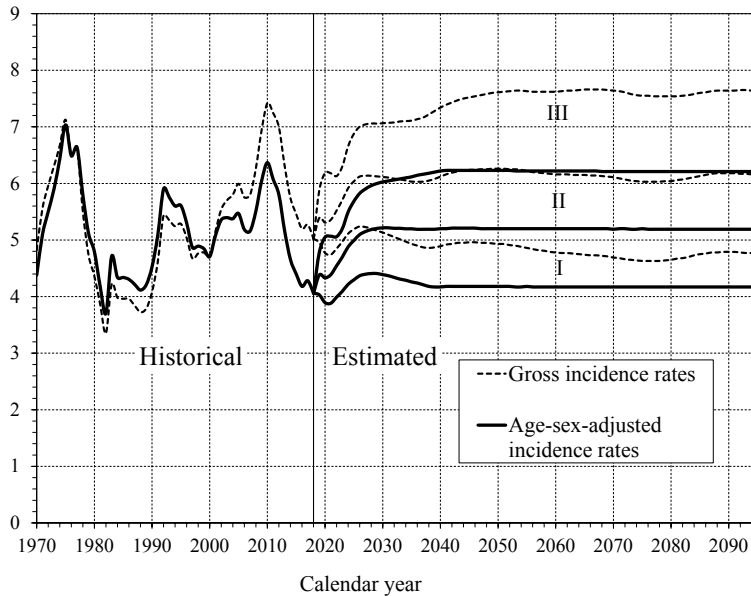
b. Disability Termination

Beneficiaries stop receiving disability benefits when they die, recover from their medically-determinable disabling condition, or return to substantial work. Disabled-worker beneficiaries who return to substantial work for an extended period are deemed to have recovered, and their benefits are then terminated. The termination rate is the ratio of the number of terminations for these reasons to the average number of disabled-worker beneficiaries during the year.

The Office of the Chief Actuary projects termination rates by age, sex, and reason for termination. In addition, the office projects termination rates by duration of entitlement to disabled-worker benefits in the long-range period (post-2028).

In the short-range period (through 2028), the projected age-sex-adjusted death rate (adjusted to the 2000 disabled-worker population) under the intermediate assumptions gradually declines from 25.2 deaths per thousand beneficiaries for 2018 to about 24.3 per thousand for 2028. The projected age-sex-adjusted recovery rate (medical improvement and return to work) under the intermediate assumptions decreases from the relatively high level of

20.2 per thousand beneficiaries for 2018 to 11.4 per thousand beneficiaries for 2028. The recovery rate has been high in recent years due to an ongoing administrative effort to work down a backlog of continuing disability reviews. The rate is expected to decrease as the backlog is reduced. Under the low-cost and high-cost assumptions, total age-sex-adjusted termination rates due to death and recovery are roughly 10-15 percent higher or lower, respectively, than under the intermediate assumptions.

For the long-range period (post-2028), the Office of the Chief Actuary projects death and recovery rates by age, sex, and duration of entitlement relative to the average level of rates experienced over the base period 2006 through 2010. The assumed ultimate age-sex-adjusted recovery rate for disabled workers is about 10.3 per thousand beneficiaries. The assumed ultimate age-sex-adjusted recovery rates for the low-cost and high-cost alternatives are about 12.5 and 8.2 recoveries per thousand beneficiaries, respectively. Recovery rates by age, sex, and duration of entitlement reach ultimate levels in the twentieth year of the projection period (2038) for all three sets of assumptions. In contrast, death rates by age and sex change throughout the long-range period at the same rate as death rates in the general population. From the age-sex-adjusted death rate of 25.2 per thousand beneficiaries in 2018, this rate decreases to 18.7, 11.8, and 6.9 per thousand disabled-worker beneficiaries for 2095 under the low-cost, intermediate, and high-cost assumptions, respectively.

Figure V.C4 illustrates gross and age-sex-adjusted total termination rates (including both recoveries and deaths) for disabled-worker beneficiaries for the historical period since 1970, and for the projection period through 2095. As with incidence rates, the age-sex-adjusted termination rate illustrates the real change in the tendency to terminate benefits. Changes in the age-sex distribution of the beneficiary population influence the gross termination rate. A shift in the disabled-worker beneficiary population to older ages, as occurred over the past 20 years when the baby-boom generation moved into pre-retirement ages, increases gross death termination rates relative to the age-sex-adjusted rates.

Figure V.C4.—DI Disability Termination Rates, 1970-2095
[Terminations per thousand disabled-worker beneficiaries]
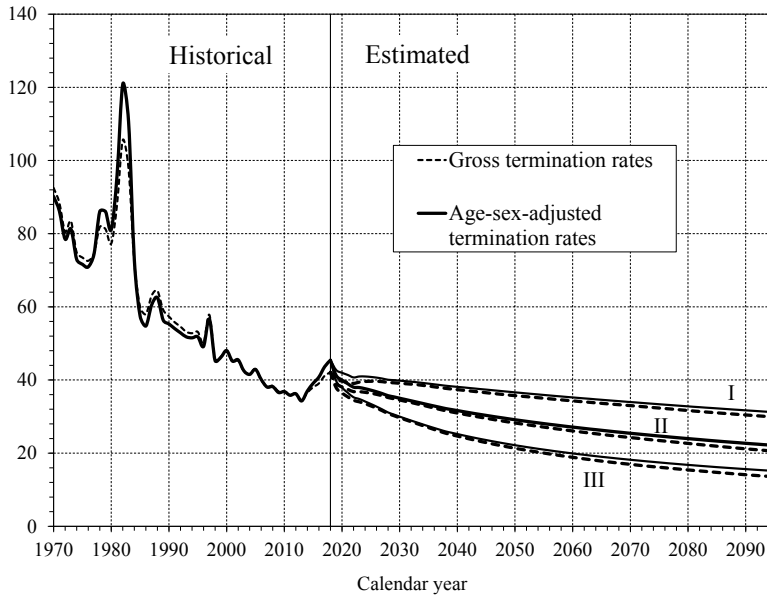
c.   Comparison of Incidence, Termination, and Conversion

Incidence and termination rates are the foundation for projecting the number of disabled-worker beneficiaries in current-payment status. At normal retirement age, all disabled-worker beneficiaries convert to retired-worker status and leave the DI rolls.

Figure V.C5 compares the historical and projected (intermediate) levels of incidence, termination, and conversion on both a gross basis and an age-sex-adjusted basis. Incidence rates have varied widely, and the Trustees expect the age-sex adjusted rates under the intermediate assumptions to remain near the middle of the high and low extremes experienced since 1970. Termination rates have declined and the Trustees expect them to continue to decline, largely because of declining death rates.

Conversions are a transfer of beneficiaries at normal retirement age from the DI program to the OASI program. Therefore, the disability "conversion" rate is 100 percent for disabled-worker beneficiaries reaching normal retirement age in a given year and zero at all other ages. After conversion, recovery from the disabling condition is no longer relevant for benefit eligibility. The conversion ratio is the number of conversions in a given year (that is, benefi-

ciaries who reach normal retirement age) divided by the average number of disabled-worker beneficiaries at all ages in that year. The ratio is constant on an age-sex-adjusted basis, except for the two periods during which normal retirement age increases under current law. On a gross basis, however, the conversion ratio rises and falls with the changing proportion of all disabled-worker beneficiaries who attain normal retirement age in a given year. The gross conversion ratio generally increases from 2005 to 2030 due to aging of the beneficiary population.

Figure V.C5.—Comparison of DI Disability Incidence Rates, Termination Rates and Conversion Ratios Under Intermediate Assumptions, 1970-2095
[Awards per thousand disability-exposed;
terminations and conversions per thousand disabled-worker beneficiaries]
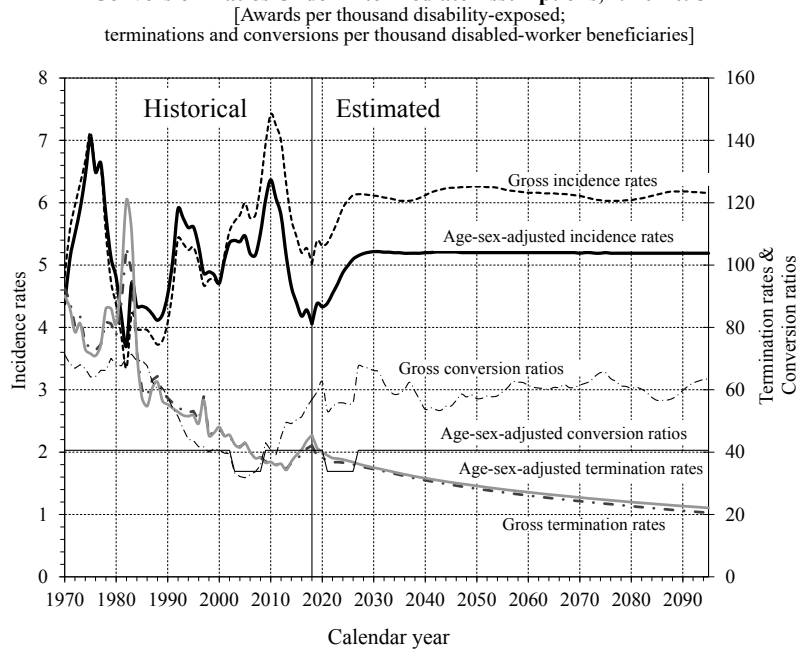
d. DI Beneficiaries and Disability Prevalence Rates

The Office of the Chief Actuary makes detailed projections of disabled-worker awards, terminations, and conversions and combines these to project the number of disabled workers receiving benefits over the next 75 years. Table V.C5 presents the projected numbers of disabled workers in current-payment status. The number of disabled workers in current-payment status grows from 8.5 million at the end of 2018, to 12.0 million, 13.8 million, and 14.8 million at the end of 2095, under the low-cost, intermediate, and high-cost assumptions, respectively. Of course, much of this growth results from

the growth and aging of the population described earlier in this chapter. Table V.C5 also presents projected numbers of auxiliary beneficiaries and disability prevalence rates on both a gross basis and an age-sex-adjusted basis.

Table V.C5.—DI Beneficiaries With Benefits in Current-Payment Status
at the End of Calendar Years 1960-2095
[Beneficiaries in thousands; prevalence rates per thousand persons insured for disability benefits]

Calendar year	Disabled-worker beneficiaries	Auxiliary beneficiaries		Total beneficiaries	Disability prevalence rates	
		Spouse	Child		Gross	Age-sex-adjusted[a]
Historical data:						
1960.	455	77	155	687		
1965.	988	193	558	1,739		
1970.	1,493	283	889	2,665	20	18
1975.	2,488	453	1,411	4,351	29	28
1980.	2,856	462	1,359	4,677	28	31
1985.	2,653	306	945	3,904	24	26
1990.	3,007	266	989	4,261	25	28
1995.	4,179	264	1,409	5,852	33	35
2000.	5,036	165	1,466	6,667	36	36
2005.	6,519	157	1,633	8,309	45	40
2010.	8,204	161	1,820	10,185	55	44
2011.	8,576	164	1,874	10,614	58	45
2012.	8,827	163	1,900	10,890	59	46
2013.	8,941	157	1,889	10,987	60	46
2014.	8,955	150	1,828	10,932	59	46
2015.	8,909	143	1,756	10,808	59	45
2016.	8,809	136	1,667	10,612	58	44
2017.	8,695	127	1,590	10,412	56	42
2018.	8,537	119	1,507	10,164	55	41
Intermediate:						
2019.	8,465	115	1,474	10,054	54	40
2020.	8,370	115	1,447	9,932	54	40
2025.	8,597	134	1,437	10,167	54	39
2030.	8,734	135	1,563	10,433	54	41
2035.	9,078	137	1,774	10,989	55	42
2040.	9,557	139	2,011	11,708	56	43
2045.	10,246	155	2,135	12,536	59	44
2050.	10,719	157	2,204	13,080	61	45
2055.	11,142	159	2,247	13,549	61	45
2060.	11,331	156	2,279	13,766	61	46
2065.	11,630	162	2,334	14,125	62	46
2070.	11,899	169	2,423	14,491	62	46
2075.	11,986	168	2,518	14,672	62	47
2080.	12,288	170	2,594	15,052	62	47
2085.	12,857	178	2,651	15,686	62	47
2090.	13,518	191	2,706	16,415	64	47
2095.	13,829	192	2,769	16,789	64	47

**Table V.C5.—DI Beneficiaries With Benefits in Current-Payment Status
at the End of Calendar Years 1960-2095 (Cont.)**
[Beneficiaries in thousands; prevalence rates per thousand persons insured for disability benefits]

| | | Auxiliary beneficiaries | | | Disability prevalence rates | |
Calendar year	Disabled-worker beneficiaries	Spouse	Child	Total beneficiaries	Gross	Age-sex-adjusted[a]
Low-cost:						
2019.	8,395	115	1,457	9,967	54	40
2020.	8,217	114	1,412	9,743	53	39
2025.	7,965	131	1,326	9,423	50	36
2030.	7,695	117	1,405	9,217	47	35
2035.	7,669	112	1,573	9,355	46	35
2040.	7,797	106	1,768	9,672	45	35
2045.	8,179	113	1,859	10,151	46	35
2050.	8,466	111	1,906	10,482	46	35
2055.	8,764	110	1,944	10,818	46	35
2060.	8,921	107	1,990	11,018	45	35
2065.	9,192	108	2,075	11,375	45	35
2070.	9,476	112	2,203	11,791	45	36
2075.	9,676	111	2,336	12,123	44	36
2080.	10,113	113	2,445	12,671	44	36
2085.	10,847	122	2,533	13,501	45	36
2090.	11,629	133	2,623	14,385	46	36
2095.	12,047	134	2,729	14,910	46	36
High-cost:						
2019.	8,543	116	1,493	10,151	55	41
2020.	8,578	116	1,497	10,191	55	41
2025.	9,241	135	1,540	10,916	59	43
2030.	9,764	157	1,707	11,628	62	46
2035.	10,477	169	1,931	12,577	64	49
2040.	11,337	181	2,170	13,688	68	51
2045.	12,358	206	2,308	14,873	74	54
2050.	13,025	214	2,391	15,630	77	55
2055.	13,560	221	2,429	16,210	79	56
2060.	13,753	219	2,435	16,407	80	57
2065.	14,030	228	2,441	16,699	82	57
2070.	14,215	239	2,468	16,922	82	58
2075.	14,087	235	2,502	16,824	82	58
2080.	14,104	234	2,529	16,867	82	58
2085.	14,299	239	2,543	17,081	83	58
2090.	14,647	249	2,552	17,448	84	59
2095.	14,767	251	2,560	17,578	84	59

[a] Adjusted to the age-sex distribution of the disability insured population for the year 2000.

Note: Totals do not necessarily equal the sums of rounded components.

The disability prevalence rate is the ratio of the number of disabled-worker beneficiaries in current-payment status to the number of persons insured for disability benefits. Figure V.C6 illustrates the historical and projected disability prevalence rates on both a gross basis and on an age-sex-adjusted basis (adjusted to the age-sex distribution of the disability insured population for the year 2000).

Changes in prevalence rates are a direct result of changes in incidence rates and termination rates. Figure V.C5 depicts patterns for incidence and termi-

nation rates, which are helpful for understanding the trend in prevalence rates. Annual incidence and termination rates are not directly comparable or combinable because their denominators differ.

Figure V.C6.—DI Disability Prevalence Rates, 1970-2095
[Rate per thousand persons insured for disability benefits]
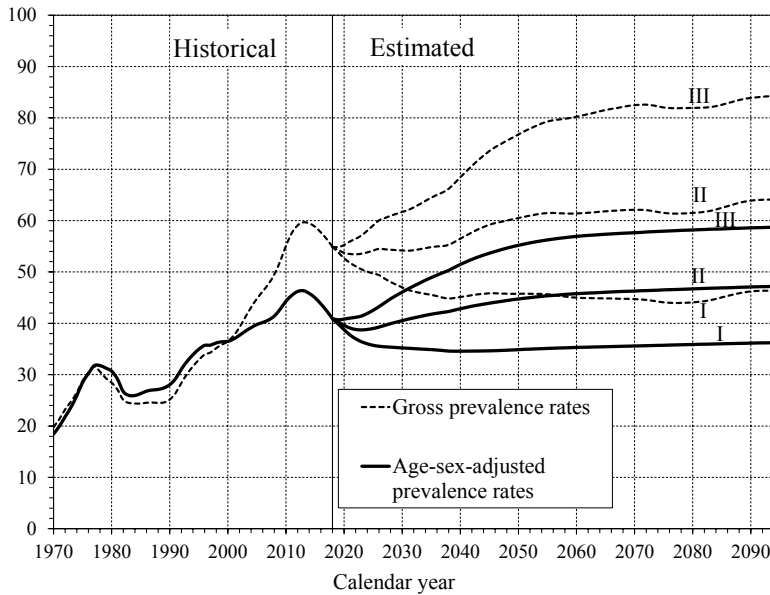
Age-sex-adjusted prevalence rates have increased primarily because: (1) termination rates, in particular death termination rates, have declined, (2) incidence rates at younger ages have increased relative to rates at older ages (new beneficiaries at younger ages have more potential years on the disability rolls), and (3) incidence rates have increased substantially for women to parity with men. Gross prevalence rates have increased more than age-sex-adjusted prevalence rates since the baby-boom generation began to reach ages 45 through normal retirement age, a time of life when disability incidence rates are relatively high. The Office of the Chief Actuary projects both gross and age-sex adjusted prevalence rates to grow at a slower pace based on assumed stabilization in three factors: (1) the age distribution of the general population, (2) the age distribution of the disability insured population, and (3) incidence rates by age and gender. As these factors gradually stabilize, the declining death termination rate continues to have a small influence toward higher disability prevalence rates.

As mentioned above in the discussion of incidence and termination rates, the age-sex-adjusted prevalence rate isolates the changing trend in the underlying likelihood of receiving benefits for the insured population, without reflecting changes in the age distribution of the population. As with incidence rates, gross disability prevalence rates declined relative to the age-sex-adjusted rate when the baby-boom generation reached working age between 1970 and 1990; this trend reflects the lower disability prevalence rates associated with younger ages. Conversely, the gross rate of disability prevalence has increased relative to the age-sex-adjusted rate after 1990 due to the aging of the baby-boom generation into ages with higher disability prevalence rates.

Under the intermediate assumptions, the projected age-sex-adjusted disability prevalence rate grows from 40.9 per thousand disability insured at the end of 2018 to 47.2 per thousand at the end of 2095. As mentioned above, the Office of the Chief Actuary projects that the growth in prevalence will slow relative to the historical period.

Under the low-cost and high-cost assumptions, the age-sex-adjusted disability prevalence rate decreases to 36.3 per thousand and increases to 58.8 per thousand insured workers at the end of 2095, respectively.

Table V.C5 presents projections of the numbers of auxiliary beneficiaries paid from the DI Trust Fund. As indicated at the beginning of this subsection, auxiliary beneficiaries are qualifying spouses and children of disabled workers. A spouse must either be at least age 62 or have an eligible child beneficiary in his or her care who is either under age 16 or disabled prior to age 22. A child must be: (1) under age 18, (2) age 18 or 19 and still a student in high school, or (3) age 18 or older and disabled prior to age 22.

The projection of the number of auxiliary beneficiaries relies on the projected number of disabled-worker beneficiaries. In the short-range period (2019 through 2028), the Office of the Chief Actuary projects incidence and termination rates for each category of auxiliary beneficiary. After 2028, the office projects child beneficiaries at ages 18 and under in relation to the projected number of children in the population using the probability that either of their parents is a disabled-worker beneficiary. The office projects the remaining categories of children and spouses in a similar manner.

6. Covered and Taxable Earnings, Taxable Payroll, and Payroll Tax Contributions

Covered earnings include both covered wages and covered self-employment net earnings. The Office of the Chief Actuary projects covered wages for

component sectors of the economy (i.e., private, State and local, Federal civilian, and military) based on the projected overall growth of sectoral and total wages in the U.S. economy. The projections of covered wages also reflect changes in covered employment due to a relative increase in non-covered undocumented immigrants and to the mandatory coverage of new hires in the Federal civilian sector. The office projects covered self-employment net earnings based on the growth in net proprietors' income in the U.S. economy.

Taxable earnings are the portion of covered earnings subject to the Social Security payroll tax. Taxable wages for an employee are total covered wages from all wage employment up to the contribution and benefit base. Taxable wages for an employer are the sum of all covered wages paid to each employee up to the base. Employees with multiple jobs whose total wages exceed the base are eligible for a refund of excess employee taxes withheld; employers are not eligible for a refund on this basis. For self-employed workers with no taxable wages, taxable earnings are the amount of covered self-employment net earnings up to the base. For self-employed workers with taxable wages less than the base, covered self-employment net earnings are taxable up to the difference between the base and their taxable wages. For projection purposes, the Office of the Chief Actuary computes taxable earnings based on a proportion of covered earnings that is at or below the base.

The OASDI taxable payroll (see table VI.G6) for a year is computed as the amount of earnings which, when multiplied by the combined OASDI employee-employer payroll tax rate for that year, yields the total amount of payroll taxes due from wages paid and self-employment net earnings for the year. The Trustees use taxable payroll to determine income rates, cost rates, and actuarial balances. Taxable payroll is derived by adjusting total taxable earnings to account for categories of earnings that are taxed at rates other than the combined employee-employer rate and to take into account amounts credited as wages that were not included in normally reported wages. For 1951 and later, taxable earnings are reduced by one-half of the amount of wages paid to employees with multiple jobs that exceed the contribution and benefit base. For 1983 through 2001, deemed wage credits for military service after 1956 are added to taxable earnings. The self-employment tax rates for 1951 through 1983 were less than the combined employee-employer rates; therefore, the self-employment component of taxable payroll for those years is reduced by multiplying the ratio of the self-employment rate to the combined employee-employer rate times the taxable self-employment net earnings. Finally, for 1966 through 1979, employers were exempt from pay-

ing their share of payroll tax on their employees' tips and, for 1980 through 1987, employers paid tax on only part of their employees' tips. For those years, the taxable payroll is reduced by half of the amount of tips for which the employer owed no payroll tax.

The ratio of taxable payroll to covered earnings (the taxable ratio) fell from 88.7 percent for 1984 to 82.6 percent for 2000, mostly due to much higher increases in wage levels for very high earners than for all other earners. From 2000 to 2010, the taxable ratio varied with the business cycle, rising during economic downturns and falling during recoveries. Specifically, the taxable ratio rose to 85.7 percent for 2002, declined to 82.4 percent for 2007, rose to 85.2 percent for 2009, and was 83.2 percent for 2017.

For this report, the Trustees assume a level for the taxable ratio at the end of the short-range period (2028) of 82.5 percent for the intermediate assumptions, 81.0 percent for the high-cost assumptions, and 84.0 percent for the low-cost assumptions. These are the same assumptions that the Trustees made for the end of the short-range period (2027) for the 2018 report.

The Office of the Chief Actuary projects payroll tax contributions using the patterns of tax collection required by Federal laws and regulations. The office determines payroll tax liabilities by multiplying the scheduled tax rates for each year by the amount of taxable wages and self-employment net earnings for that year. The office then splits these liabilities into amounts by collection period. For wages, Federal law requires that employers withhold OASDI and HI payroll taxes and Federal individual income taxes from employees' pay. As an employer's accumulation of such taxes (including the employer share of payroll taxes) meets certain thresholds, which the Department of the Treasury determines, the employer must deposit these taxes with the U.S. Treasury by a specific day, depending on the amount of money involved.[1] For projection purposes, the office splits the payroll tax contributions related to wages into amounts paid in the same quarter as incurred and in the following quarter. Self-employed workers must make estimated tax payments on their earnings four times during the year and make up any underestimate on their individual income tax returns. The projection splits the self-employed tax liabilities by collection quarter to reflect this pattern.

The projected tax contributions also reflect the method used to ensure that money transferred to the trust funds is adjusted, over time, to equal the actual

---

[1] Generally, the higher the amount of liability, the sooner the taxes must be paid. For smaller employers, payment is due by the middle of the month following when the liability was incurred. Medium-size employers have three banking days in which to make their deposits. Larger employers must make payment on the next business day after paying their employees.

liability owed. Because payers generally make tax payments without identifying the separate OASDI contribution amounts, Treasury makes daily transfers of money from the General Fund to the trust funds on an initial estimated basis. The Social Security Administration periodically certifies the amounts of wages and self-employment net earnings on which tax contributions are owed for each year, at which time Treasury determines adjustments to appropriations to reconcile tax liabilities with deposits in the trust funds. This process also includes periodic transfers from the trust funds to the General Fund for contributions on wages in excess of the contribution and benefit base.

Table V.C6 shows the payroll tax contribution rates applicable under current law in each calendar year and the allocation of these rates between the OASI and DI Trust Funds.[1] It also shows the contribution and benefit base for each year through 2019.

---

[1] Table VI.G1 shows the payroll tax contribution rates for the Hospital Insurance (HI) program.

Table V.C6.—Contribution and Benefit Base and Payroll Tax Contribution Rates

Calendar years	Contribution and benefit base	Payroll tax contribution rates (percent)					
		Employees and employers, combined[a]			Self-employed[b]		
		OASDI	OASI	DI	OASDI	OASI	DI
1937-49	$3,000	2.00	2.00	—	—	—	—
1950.	3,000	3.00	3.00	—	—	—	—
1951-53	3,600	3.00	3.00	—	2.2500	2.2500	—
1954.	3,600	4.00	4.00	—	3.0000	3.0000	—
1955-56	4,200	4.00	4.00	—	3.0000	3.0000	—
1957-58	4,200	4.50	4.00	0.50	3.3750	3.0000	0.3750
1959.	4,800	5.00	4.50	.50	3.7500	3.3750	.3750
1960-61	4,800	6.00	5.50	.50	4.5000	4.1250	.3750
1962.	4,800	6.25	5.75	.50	4.7000	4.3250	.3750
1963-65	4,800	7.25	6.75	.50	5.4000	5.0250	.3750
1966.	6,600	7.70	7.00	.70	5.8000	5.2750	.5250
1967.	6,600	7.80	7.10	.70	5.9000	5.3750	.5250
1968.	7,800	7.60	6.65	.95	5.8000	5.0875	.7125
1969.	7,800	8.40	7.45	.95	6.3000	5.5875	.7125
1970.	7,800	8.40	7.30	1.10	6.3000	5.4750	.8250
1971.	7,800	9.20	8.10	1.10	6.9000	6.0750	.8250
1972.	9,000	9.20	8.10	1.10	6.9000	6.0750	.8250
1973.	10,800	9.70	8.60	1.10	7.0000	6.2050	.7950
1974.	13,200	9.90	8.75	1.15	7.0000	6.1850	.8150
1975.	14,100	9.90	8.75	1.15	7.0000	6.1850	.8150
1976.	15,300	9.90	8.75	1.15	7.0000	6.1850	.8150
1977.	16,500	9.90	8.75	1.15	7.0000	6.1850	.8150
1978.	17,700	10.10	8.55	1.55	7.1000	6.0100	1.0900
1979.	22,900	10.16	8.66	1.50	7.0500	6.0100	1.0400
1980.	25,900	10.16	9.04	1.12	7.0500	6.2725	.7775
1981.	29,700	10.70	9.40	1.30	8.0000	7.0250	.9750
1982.	32,400	10.80	9.15	1.65	8.0500	6.8125	1.2375
1983.	35,700	10.80	9.55	1.25	8.0500	7.1125	.9375
1984[c].	37,800	11.40	10.40	1.00	11.4000	10.4000	1.0000
1985[c].	39,600	11.40	10.40	1.00	11.4000	10.4000	1.0000
1986[c].	42,000	11.40	10.40	1.00	11.4000	10.4000	1.0000
1987[c].	43,800	11.40	10.40	1.00	11.4000	10.4000	1.0000
1988[c].	45,000	12.12	11.06	1.06	12.1200	11.0600	1.0600
1989[c].	48,000	12.12	11.06	1.06	12.1200	11.0600	1.0600
1990	51,300	12.40	11.20	1.20	12.4000	11.2000	1.2000
1991.	53,400	12.40	11.20	1.20	12.4000	11.2000	1.2000
1992.	55,500	12.40	11.20	1.20	12.4000	11.2000	1.2000
1993.	57,600	12.40	11.20	1.20	12.4000	11.2000	1.2000
1994.	60,600	12.40	10.52	1.88	12.4000	10.5200	1.8800
1995.	61,200	12.40	10.52	1.88	12.4000	10.5200	1.8800
1996.	62,700	12.40	10.52	1.88	12.4000	10.5200	1.8800
1997.	65,400	12.40	10.70	1.70	12.4000	10.7000	1.7000
1998.	68,400	12.40	10.70	1.70	12.4000	10.7000	1.7000
1999.	72,600	12.40	10.70	1.70	12.4000	10.7000	1.7000
2000.	76,200	12.40	10.60	1.80	12.4000	10.6000	1.8000
2001.	80,400	12.40	10.60	1.80	12.4000	10.6000	1.8000
2002.	84,900	12.40	10.60	1.80	12.4000	10.6000	1.8000
2003.	87,000	12.40	10.60	1.80	12.4000	10.6000	1.8000
2004.	87,900	12.40	10.60	1.80	12.4000	10.6000	1.8000
2005.	90,000	12.40	10.60	1.80	12.4000	10.6000	1.8000

Table V.C6.—Contribution and Benefit Base and Payroll Tax Contribution Rates (Cont.)

| Calendar years | Contribution and benefit base | Payroll tax contribution rates (percent) | | | | | |
| | | Employees and employers, combined[a] | | | Self-employed[b] | | |
		OASDI	OASI	DI	OASDI	OASI	DI
2006.	$94,200	12.40	10.60	1.80	12.4000	10.6000	1.8000
2007.	97,500	12.40	10.60	1.80	12.4000	10.6000	1.8000
2008.	102,000	12.40	10.60	1.80	12.4000	10.6000	1.8000
2009.	106,800	12.40	10.60	1.80	12.4000	10.6000	1.8000
2010[d].	106,800	12.40	10.60	1.80	12.4000	10.6000	1.8000
2011[d]	106,800	10.40	8.89	1.51	10.4000	8.8900	1.5100
2012[d].	110,100	10.40	8.89	1.51	10.4000	8.8900	1.5100
2013.	113,700	12.40	10.60	1.80	12.4000	10.6000	1.8000
2014.	117,000	12.40	10.60	1.80	12.4000	10.6000	1.8000
2015.	118,500	12.40	10.60	1.80	12.4000	10.6000	1.8000
2016[e].	118,500	12.40	10.03	2.37	12.4000	10.0300	2.3700
2017[e].	127,200	12.40	10.03	2.37	12.4000	10.0300	2.3700
2018[e].	128,400	12.40	10.03	2.37	12.4000	10.0300	2.3700
2019.	132,900	12.40	10.60	1.80	12.4000	10.6000	1.8000
2020 and later	[f]	12.40	10.60	1.80	12.4000	10.6000	1.8000

[a] Except as noted below, the combined employee/employer rate is divided equally between employees and employers.

[b] Beginning in 1990, self-employed persons receive a deduction, for purposes of computing their net earnings, equal to half of the combined OASDI and HI contributions that would be payable without regard to the contribution and benefit base. The OASDI contribution rate then applies to net earnings after this deduction, but subject to the OASDI base.

[c] In 1984 only, employees received an immediate credit of 0.3 percent of taxable wages against their OASDI payroll tax contributions. The self-employed received similar credits of 2.7 percent, 2.3 percent, and 2.0 percent against their combined OASDI and Hospital Insurance (HI) contributions on net earnings from self-employment in 1984, 1985, and 1986-89, respectively. The General Fund of the Treasury reimbursed the trust funds for these credits.

[d] Public Law 111-147 exempted most employers from paying the employer share of OASDI payroll tax on wages paid during the period March 19, 2010 through December 31, 2010 to certain qualified individuals hired after February 3, 2010. Public Law 111-312 reduced the OASDI payroll tax rate for 2011 by 2 percentage points for employees and for self-employed workers. Public Law 112-96 extended the 2011 rate reduction through 2012. These laws require that the General Fund of the Treasury reimburse the OASI and DI Trust Funds for these temporary reductions in 2010 through 2012 payroll tax revenue, in order to "replicate to the extent possible" revenue that would have been received if the combined employee/employer payroll tax rates had remained at 12.4 percent for OASDI (10.6 percent for OASI and 1.8 percent for DI).

[e] Section 833 of the Bipartisan Budget Act of 2015 reallocated payroll tax rates on a temporary basis. For earnings in calendar years 2016 through 2018, 0.57 percentage point of the 12.40 percent OASDI payroll tax rate is reallocated from OASI to DI.

[f] Subject to automatic adjustment based on increases in average wages.

7. Income From Taxation of Benefits

Under current law, the OASI and DI Trust Funds are credited with income tax revenue from the taxation of up to the first 50 percent of taxpayers' OASI and DI benefit payments. (The HI Trust Fund receives the remainder of the income tax revenue from the taxation of up to 85 percent of taxpayers' OASI and DI benefit payments.) Benefits are taxed for beneficiaries with "combined income" (adjusted gross income, plus half of benefits and all non-taxable interest) exceeding specified threshold amounts. The threshold amounts are $25,000 for single filers, $32,000 for joint filers, and $0 for those married but filing separately.

For the short-range period, the Office of the Chief Actuary estimates the income to the trust funds from taxation of benefits by applying the following two factors (projected by the Office of Tax Analysis, Department of the Treasury) to total OASI and DI scheduled benefits: (1) the percentage of taxpayers' scheduled benefits (limited to 50 percent) that is taxable and (2) the average marginal tax rate applicable to those benefits.

For the long-range period, the office estimates the income to the trust funds from taxation of benefits by applying projected ratios of taxation of OASI and DI benefits to total OASI and DI scheduled benefits. The income thresholds used for benefit taxation are, by law, constant in the future, while income and benefit levels continue to rise. Accordingly, projected ratios of income from taxation of benefits to the amount of benefits increase gradually. Ultimate tax ratios for OASI and DI benefits used in the projection rely on estimates from the Office of Tax Analysis in the Department of the Treasury.

8. Average Benefits

Projections of average benefits for each benefit type reflect recent historical averages, projected average primary insurance amounts (PIAs), and projected ratios of average benefits to average PIAs. Calculations of average PIAs are based on projected distributions of beneficiaries by duration from year of initial entitlement, average PIAs at initial entitlement, and increases in PIAs after initial entitlement. Projected increases in average PIAs after initial entitlement depend on automatic benefit increases, recomputations to reflect additional covered earnings, and differences in mortality by level of lifetime earnings. Calculations of future average PIAs at initial entitlement are based on projected earnings histories, which in turn reflect a combination of the actual earnings histories associated with a sample of 2015 initial entitlements and more recent actual earnings levels by age and sex for covered workers.

For retired-worker, aged-spouse, and aged-widow(er) benefits, the percentage of the PIA that is payable depends on the age at initial entitlement to benefits. Projected ratios of average benefits to average PIAs for these types of benefits are based on projections of age distributions at initial entitlement.

9. Scheduled Benefits

For each type of benefit, scheduled benefits are the product of the number of beneficiaries and the corresponding average monthly benefit. The short-range model calculates scheduled benefits on a quarterly basis. The long-

range model calculates all scheduled benefits on an annual basis, using the number of beneficiaries at the beginning and end of the year. Adjustments to these annual scheduled benefits include retroactive payments to newly awarded beneficiaries and other amounts not reflected in the regular monthly scheduled benefits.

Scheduled lump-sum death benefits are estimated as the product of: (1) the number of lump-sum death payments projected on the basis of the assumed death rates, the projected fully insured population, and the estimated percentage of the fully insured population that will qualify for lump-sum death payments; and (2) the amount of the lump-sum death payment, which is $255 (unindexed since 1973).

10. Illustrative Scheduled Benefit Amounts

Table V.C7 shows, under the intermediate assumptions, future benefit amounts payable upon retirement at the normal retirement age and at age 65, for various hypothetical workers attaining age 65 in 2019 and subsequent years. The illustrative benefit amounts in table V.C7 are presented in CPI-indexed 2019 dollars—that is, adjusted to 2019 levels by the CPI indexing series shown in table VI.G6. As a point of comparison, table V.C7 also shows the national average wage index (AWI) for 2019 and subsequent years in CPI-indexed 2019 dollars.

The normal retirement age was 65 for individuals who reached age 62 before 2000. It increased to age 66 during the period 2000 through 2005, at a rate of 2 months per year as workers attained age 62. Under current law, the normal retirement age increases to age 67 during the period 2017 through 2022, also by 2 months per year as workers attain age 62. The illustrative benefit amounts shown in table V.C7 for retirees at age 65 are lower than the amounts shown for retirees at normal retirement age because the statute requires an actuarial reduction for monthly benefits taken before normal retirement age to reflect the expected additional years benefits will be collected. For example, those who collect benefits starting in 2027 at age 65 will receive benefits for two more years than if they instead claim benefits at the normal retirement age (age 67) unless they die between the ages of 65 and 67.

Table V.C7 shows five different pre-retirement earnings patterns. Four of these patterns assume the earnings history of workers with scaled-earnings patterns[1] and reflect very low, low, medium, and high career-average levels

---

[1] Actuarial Note 2019.3 has more details on scaled-earnings patterns. See www.ssa.gov/OACT/NOTES/ran3/.

of pre-retirement earnings starting at age 21. The fifth pattern assumes the earnings history of a steady maximum earner starting at age 22. The four scaled-earnings patterns derive from earnings experienced by insured workers during 1996-2015. These earnings levels differ by age. The career-average level of earnings for each scaled case targets a percent of the AWI.

For the scaled medium earner, the career-average earnings level is about equal to the AWI (or $53,864 for 2019). For the scaled very low, low, and high earners, the career-average earnings level is about 25 percent, 45 percent, and 160 percent of the AWI, respectively (or $13,466, $24,239, and $86,182, respectively, for 2019). The steady maximum earner has earnings at or above the contribution and benefit base for each year starting at age 22 through the year prior to retirement (or $132,900 for 2019).

Table V.C7.—Annual Scheduled Benefit Amounts for Retired Workers
With Various Pre-Retirement Earnings Patterns
Based on Intermediate Assumptions, Calendar Years 2019-2095

Year attain age 65[b]	Age at retirement	Scaled very low earnings[c]	Scaled low earnings[d]	Scaled medium earnings[e]	Scaled high earnings[f]	Steady maximum earnings[g]	National Average Wage Index in 2019 dollars[h]
Benefits in 2019 dollars[a] with retirement at normal retirement age							
2019	66:0	$10,125	$13,243	$21,843	$28,934	$35,355	$53,864
2020	66:2	10,451	13,671	22,545	29,867	36,513	54,951
2025	67:0	10,917	14,294	23,586	31,212	38,428	59,454
2030	67:0	11,807	15,466	25,516	33,757	41,601	63,817
2035	67:0	12,672	16,595	27,366	36,220	44,642	67,950
2040	67:0	13,497	17,668	29,133	38,560	47,493	72,155
2045	67:0	14,327	18,756	30,933	40,947	50,445	76,437
2050	67:0	15,183	19,873	32,773	43,384	53,389	81,136
2055	67:0	16,119	21,097	34,796	46,051	56,568	86,237
2060	67:0	17,129	22,424	36,984	48,949	60,058	91,656
2065	67:0	18,208	23,833	39,305	52,024	63,786	97,297
2070	67:0	19,327	25,299	41,721	55,221	67,711	103,121
2075	67:0	20,486	26,812	44,216	58,527	71,769	109,179
2080	67:0	21,688	28,386	46,813	61,963	75,991	115,493
2085	67:0	22,942	30,028	49,517	65,543	80,390	122,122
2090	67:0	24,258	31,753	52,360	69,308	85,012	129,158
2095	67:0	25,657	33,584	55,380	73,302	89,920	136,637
Benefits in 2019 dollars[a] with retirement at age 65							
2019	65:0	9,518	12,451	20,538	27,208	33,134	53,864
2020	65:0	9,621	12,598	20,766	27,515	33,539	54,951
2025	65:0	9,461	12,378	20,427	27,034	33,043	59,454
2030	65:0	10,234	13,398	22,092	29,244	35,789	63,817
2035	65:0	10,979	14,375	23,705	31,382	38,423	67,950
2040	65:0	11,691	15,302	25,240	33,416	40,878	72,155
2045	65:0	12,416	16,253	26,801	35,480	43,425	76,437
2050	65:0	13,156	17,220	28,396	37,592	45,958	81,136
2055	65:0	13,963	18,281	30,144	39,902	48,692	86,237
2060	65:0	14,845	19,429	32,041	42,412	51,700	91,656
2065	65:0	15,778	20,651	34,055	45,078	54,912	97,297
2070	65:0	16,748	21,920	36,145	47,850	58,296	103,121

Table V.C7.—Annual Scheduled Benefit Amounts for Retired Workers
With Various Pre-Retirement Earnings Patterns
Based on Intermediate Assumptions, Calendar Years 2019-2095 (Cont.)

2075	65:0	$17,749	$23,233	$38,309	$50,714	$61,792	$109,179
2080	65:0	18,792	24,597	40,560	53,692	65,428	115,493
2085	65:0	19,880	26,020	42,904	56,796	69,217	122,122
2090	65:0	21,022	27,513	45,367	60,058	73,195	129,158
2095	65:0	22,233	29,099	47,982	63,519	77,422	136,637

[a] Annual amounts are the total for the 12-month period starting with the month of retirement, adjusted to be in 2019 dollars by using the CPI indexing series from table VI.G6.

[b] Attains age 65 on January 1 of the year.

[c] Career-average earnings at about 25 percent of the AWI.

[d] Career-average earnings at about 45 percent of the AWI.

[e] Career-average earnings at about 100 percent of the AWI. Such a worker would have career-average earnings at approximately the 56th percentile of all new retired-worker beneficiaries.

[f] Career-average earnings at about 160 percent of the AWI.

[g] Earnings for each year at or above the contribution and benefit base.

[h] Average Wage Index from table VI.G6, adjusted to be in 2019 dollars by using the CPI indexing series from table VI.G6.

Note: Benefits shown at age 65 reflect adjustments for early retirement. For early retirement as early as age 62, the benefit amount is reduced 5/9 of one percent for each month before normal retirement age, up to 36 months. If the number of months exceeds 36, then the benefit is further reduced 5/12 of one percent per month. For example, if the number of reduction months is 60 (the maximum number for retirement at 62 when normal retirement age is 67), then the benefit is reduced by 30 percent. *Delayed retirement credit* is generally given for retirement after the normal retirement age. The delayed retirement credit is 2/3 of one percent per month for persons born in 1943 and later. No credit is given for delaying benefits after attaining age 70. See table V.C3 for additional details, including adjustments applying to other birth years.

11. Administrative Expenses

The projection of administrative expenses through the short-range period is based on historical experience and the projected growth in average wages. The Office of Budget of the Social Security Administration provides estimates for the first several years of the projection. For years after the short-range period, projected administrative expenses reflect increases in the number of beneficiaries in current-payment status, and increases in the average wage. However, the increases in average wage are partially offset by assumed administrative productivity gains.

12. Railroad Retirement Financial Interchange

Railroad workers are covered under a separate multi-tiered benefit plan, with a first tier of coverage similar to OASDI coverage. An annual financial interchange between the Railroad Retirement fund and the OASI and DI Trust Funds is made to resolve the difference between: (1) the amount of OASDI benefits that would be paid to railroad workers and their families if railroad employment had been covered under the OASDI program, plus administrative expenses associated with these benefits; and (2) the amount of OASDI payroll tax and income tax that would be received with allowances for interest from railroad workers.

Calculation of the financial interchange with the Railroad Retirement reflects trends similar to those used in estimating the cost of OASDI benefits. The annual short-range net cost for the OASI and DI Trust Funds is about $5-$6 billion and the long-range summarized net cost for the OASI and DI Trust Funds is 0.05 percent of taxable payroll.

VI. APPENDICES

A. HISTORY OF OASI AND DI TRUST FUND OPERATIONS

The Federal Old-Age and Survivors Insurance (OASI) Trust Fund was established on January 1, 1940 as a separate account in the United States Treasury. The Federal Disability Insurance (DI) Trust Fund, another separate account in the United States Treasury, was established on August 1, 1956. These funds conduct the financial operations of the OASI and DI programs. The Board of Trustees is responsible for overseeing the financial operations of these funds. The following paragraphs describe the various components of trust fund income and cost. Following this description, tables VI.A1 and VI.A2 present the historical operations of the separate trust funds since their inception, and table VI.A3 presents the operations of the hypothetical combined trust funds[1] during the period when they have co-existed.

The primary income of these two funds comes from appropriations under permanent authority on the basis of payroll tax contributions. Federal law requires that all employees who work in OASDI covered employment, and their employers, make payroll tax contributions on their wages. Employees and their employers must also make payroll tax contributions on monthly cash tips if such tips are at least $20. Self-employed persons must make payroll tax contributions on their covered net earnings from self-employment. The Federal Government pays amounts equivalent to the combined employer and employee contributions that would be paid on deemed wage credits attributable to military service performed between 1957 and 2001, if such wage credits were covered wages. Treasury initially deposits payroll tax contributions to the trust funds each day on an estimated basis. Subsequently, Treasury makes adjustments based on the certified amount of wages and self-employment earnings in the records of the Social Security Administration.

Income also includes various reimbursements from the General Fund of the Treasury, such as: (1) the cost of noncontributory wage credits for military service before 1957, and periodic adjustments to previous determinations of this cost; (2) the cost in 1971 through 1982 of deemed wage credits for military service performed after 1956; (3) the cost of benefits to certain uninsured persons who attained age 72 before 1968; (4) the cost of payroll tax credits provided to employees in 1984 and self-employed persons in 1984 through 1989 by Public Law 98-21; (5) the cost in 2009 through 2017 of excluding certain self-employment earnings from SECA taxes under Public

---

[1] The OASI and DI Trust Funds are distinct legal entities which operate independently. To illustrate the actuarial status of the program as a whole, the fund operations are often combined on a hypothetical basis.

Law 110-246; and (6) payroll tax revenue forgone under the provisions of Public Laws 111-147, 111-312, 112-78, and 112-96.

Beginning in 1984, Federal law subjected up to 50 percent of an individual's or couple's OASDI benefits to Federal income taxation under certain circumstances. Effective for taxable years beginning after 1993, the law increased the maximum percentage from 50 percent to 85 percent. Treasury credits the proceeds from this taxation of up to 50 percent of benefits to the OASI and DI Trust Funds in advance, on an estimated basis, at the beginning of each calendar quarter, with no reimbursement to the General Fund for interest costs attributable to the advance transfers.[1] Treasury makes subsequent adjustments based on the actual amounts shown on annual income tax records. Each of the OASI and DI Trust Funds receives the income taxes paid on the benefits from that trust fund.[2]

Another source of income to the trust funds is interest received on investments held by the trust funds. On a daily basis, Treasury invests trust fund income not required to meet current operating expenses, primarily in interest-bearing obligations of the U.S. Government. These investments include the special public-debt obligations described in the next paragraph. The Social Security Act also authorizes the trust funds to hold obligations guaranteed as to both principal and interest by the United States. The act therefore permits the trust funds to hold certain Federally sponsored agency obligations and marketable obligations.[3] The trust funds may acquire any of these obligations on original issue at the issue price or by purchase of outstanding obligations at their market price.

The Social Security Act authorizes the issuance of special public-debt obligations for purchase exclusively by the trust funds. The act provides that the interest rate for special obligations newly issued in any month is the average market yield, as of the last business day of the prior month, on all of the outstanding marketable U.S. obligations that are due or callable more than 4 years in the future. This rate is rounded to the nearest one-eighth of one percent. Beginning January 1999, in calculating the average market yield rate for this purpose, the Treasury incorporates the yield to the call date when a callable bond's market price is above par.

Although the Social Security Act does not authorize the purchase or sale of special issue securities in the open market, Treasury redeems special issue

---

[1] The HI Trust Fund receives the additional tax revenue resulting from the increase to 85 percent.

[2] A special provision applies to benefits paid to nonresident aliens. Effective for taxable years beginning after 1994, Public Law 103-465 subjects benefits to a flat-rate tax, usually 25.5 percent, before they are paid. Therefore, this tax remains in the trust funds. From 1984 to 1994, the flat-rate tax was usually 15 percent.

[3] The Social Security Act requires the trust funds to acquire special-issue obligations unless the Managing Trustee determines that the purchase of marketable obligations is in the public interest. The purchase of marketable obligations has been quite limited and has not occurred since 1980.

securities prior to maturity at par value when needed to meet current operating expenses. As a result, changes in market yield rates after issuance of special issue securities do not cause fluctuations in the principal value of these securities. As is true for marketable Treasury securities held by the public, the full faith and credit of the U.S. Government backs all of the investments held by the trust funds.

Annual cost for the OASI and DI Trust Funds primarily consists of: (1) OASDI benefit payments[1], net of any reimbursements from the General Fund of the Treasury for unnegotiated benefit checks; and (2) expenses incurred by the Social Security Administration and the Department of the Treasury in administering the OASDI program and the provisions of the Internal Revenue Code relating to the collection of contributions. Such administrative expenses include, among other items, the cost of (1) payroll, (2) construction, rental, lease, or purchase of office buildings and related facilities for the Social Security Administration, and (3) information technology systems. The Social Security Act prohibits payments from the OASI and DI Trust Funds for any purpose not related to the payment of benefits or administrative costs for the OASDI program.

Annual cost also includes: (1) the costs of vocational rehabilitation services furnished to disabled persons receiving cash benefits because of their disabilities, where such services contributed to their successful rehabilitation; and (2) net costs of the provisions of the Railroad Retirement Act that provide for a system of coordination and financial interchange between the Railroad Retirement program and the Social Security program. Under the financial interchange provisions, the Railroad Retirement program's Social Security Equivalent Benefit Account and the trust funds interchange amounts on an annual basis so that each trust fund is in the same position it would have been had railroad employment always been covered under Social Security.

The statements of the operations of the trust funds in this report do not include the net worth of facilities and other fixed capital assets because the value of fixed capital assets is not available in the form of a financial asset redeemable for the payment of benefits or administrative costs. As a result of this unavailability, the actuarial status of the trust funds does not take these assets into account.

---

[1] Periodically, benefit payments which were scheduled to be paid on January 3 were actually paid on December 31 of the preceding year as required by the statutory provision included in the 1977 Social Security Amendments for early delivery of benefit payments when the normal payment delivery date is a Saturday, Sunday, or legal public holiday. Such advance payments have occurred about every 7 years, first for benefits scheduled for January 3, 1982. The most recent such accelerated payment affected benefits scheduled to be paid on January 3, 2016. For comparability with the values for historical years and the projections in this report, all trust fund operations and asset reserves reflect the 12 months of benefits scheduled for payment each year without regard to the accelerated payments described above.

Table VI.A1.— Operations of the OASI Trust Fund, Calendar Years 1937-2018
[Dollar amounts in billions]

Calendar year	Income					Cost				Asset Reserves[a]		
	Total	Net pay-roll tax contri-butions	GF reim-burse-ments[b]	Taxa-tion of benefits	Net interest[c]	Total[a]	Benefit pay-ments[a,d]	Admin-istra-tive costs	RRB inter-change	Net increase during year	Amount at end of year	Trust fund ratio[e]
1937[f]..	$0.8	$0.8	—	—	g	g	g	—	—	$0.8	$0.8	—
1938[f]..	.4	.4	—	—	g	g	g	—	—	.4	1.1	7,660
1939[f]..	.6	.6	—	—	g	g	g	—	—	.6	1.7	8,086
1940 ..	.4	.3	—	—	g	$0.1	g	g	—	.3	2.0	2,781
1941 ..	.8	.8	—	—	$0.1	.1	$0.1	g	—	.7	2.8	1,782
1942 ..	1.1	1.0	—	—	.1	.2	.1	g	—	.9	3.7	1,737
1943 ..	1.3	1.2	—	—	.1	.2	.2	g	—	1.1	4.8	1,891
1944 ..	1.4	1.3	—	—	.1	.2	.2	g	—	1.2	6.0	2,025
1945 ..	1.4	1.3	—	—	.1	.3	.3	g	—	1.1	7.1	1,975
1946 ..	1.4	1.3	—	—	.2	.4	.4	g	—	1.0	8.1	1,704
1947 ..	1.7	1.6	g	—	.2	.5	.5	g	—	1.2	9.4	1,592
1948 ..	2.0	1.7	g	—	.3	.6	.6	$0.1	—	1.4	10.7	1,542
1949 ..	1.8	1.7	g	—	.1	.7	.7	.1	—	1.1	11.8	1,487
1950 ..	2.9	2.7	g	—	.3	1.0	1.0	.1	—	1.9	13.7	1,156
1951 ..	3.8	3.4	g	—	.4	2.0	1.9	.1	—	1.8	15.5	698
1952 ..	4.2	3.8	—	—	.4	2.3	2.2	.1	—	1.9	17.4	681
1953 ..	4.4	3.9	—	—	.4	3.1	3.0	.1	—	1.3	18.7	564
1954 ..	5.6	5.2	—	—	.4	3.7	3.7	.1	g	1.9	20.6	500
1955 ..	6.2	5.7	—	—	.5	5.1	5.0	.1	g	1.1	21.7	405
1956 ..	6.7	6.2	—	—	.5	5.8	5.7	.1	g	.9	22.5	371
1957 ..	7.4	6.8	—	—	.6	7.5	7.3	.2	g	-.1	22.4	300
1958 ..	8.1	7.6	—	—	.6	8.6	8.3	.2	$0.1	-.5	21.9	259
1959 ..	8.6	8.1	—	—	.5	10.3	9.8	.2	.3	-1.7	20.1	212
1960 ..	11.4	10.9	—	—	.5	11.2	10.7	.2	.3	.2	20.3	180
1961 ..	11.8	11.3	—	—	.5	12.4	11.9	.2	.3	-.6	19.7	163
1962 ..	12.6	12.1	—	—	.5	14.0	13.4	.3	.4	-1.4	18.3	141
1963 ..	15.1	14.5	—	—	.5	14.9	14.2	.3	.4	.1	18.5	123
1964 ..	16.3	15.7	—	—	.6	15.6	14.9	.3	.4	.6	19.1	118
1965 ..	16.6	16.0	—	—	.6	17.5	16.7	.3	.4	-.9	18.2	109
1966 ..	21.3	20.6	$0.1	—	.6	19.0	18.3	.3	.4	2.3	20.6	96
1967 ..	24.0	23.1	.1	—	.8	20.4	19.5	.4	.5	3.7	24.2	101
1968 ..	25.0	23.7	.4	—	.9	23.6	22.6	.5	.4	1.5	25.7	103
1969 ..	29.6	27.9	.4	—	1.2	25.2	24.2	.5	.5	4.4	30.1	102
1970 ..	32.2	30.3	.4	—	1.5	29.8	28.8	.5	.6	2.4	32.5	101
1971 ..	35.9	33.7	.5	—	1.7	34.5	33.4	.5	.6	1.3	33.8	94
1972 ..	40.1	37.8	.5	—	1.8	38.5	37.1	.7	.7	1.5	35.3	88
1973 ..	48.3	46.0	.4	—	1.9	47.2	45.7	.6	.8	1.2	36.5	75
1974 ..	54.7	52.1	.4	—	2.2	53.4	51.6	.9	.9	1.3	37.8	68
1975 ..	59.6	56.8	.4	—	2.4	60.4	58.5	.9	1.0	-.8	37.0	63
1976 ..	66.3	63.4	.6	—	2.3	67.9	65.7	1.0	1.2	-1.6	35.4	54
1977 ..	72.4	69.6	.6	—	2.2	75.3	73.1	1.0	1.2	-2.9	32.5	47
1978 ..	78.1	75.5	.6	—	2.0	83.1	80.4	1.1	1.6	-5.0	27.5	39
1979 ..	90.3	87.9	.6	—	1.8	93.1	90.6	1.1	1.4	-2.9	24.7	30
1980 ..	105.8	103.5	.5	—	1.8	107.7	105.1	1.2	1.4	-1.8	22.8	23
1981 ..	125.4	122.6	.7	—	2.1	126.7	123.8	1.3	1.6	-1.3	21.5	18
1982 ..	125.2	123.7	.7	—	.8	142.1	138.8	1.5	1.8	[h] .6	22.1	15
1983 ..	150.6	138.3	5.5	—	6.7	153.0	149.2	1.5	2.3	-2.4	19.7	14
1984 ..	169.3	159.5	4.7	$2.8	2.3	161.9	157.8	1.6	2.4	7.4	27.1	[i]20
1985 ..	184.2	175.1	4.0	3.2	1.9	171.2	167.2	1.6	2.3	[h]8.7	35.8	[i]24
1986 ..	197.4	189.1	1.8	3.4	3.1	181.0	176.8	1.6	2.6	[h]3.2	39.1	[i]28
1987 ..	210.7	201.1	1.7	3.3	4.7	187.7	183.6	1.5	2.6	23.1	62.1	[i]30
1988 ..	240.8	227.7	2.1	3.4	7.6	200.0	195.5	1.8	2.8	40.7	102.9	[i]41
1989 ..	264.7	248.1	2.1	2.4	12.0	212.5	208.0	1.7	2.8	52.2	155.1	[i]59
1990 ..	286.7	266.1	-.7	4.8	16.4	227.5	223.0	1.6	3.0	59.1	214.2	[i]78
1991 ..	299.3	272.5	.1	5.9	20.8	245.6	240.5	1.8	3.4	53.7	267.8	87
1992 ..	311.2	281.1	-.1	5.9	24.3	259.9	254.9	1.8	3.1	51.3	319.1	103
1993 ..	323.3	290.9	g	5.3	27.0	273.1	267.8	2.0	3.4	50.2	369.3	117
1994 ..	328.3	293.3	g	5.0	29.9	284.1	279.1	1.6	3.4	44.1	413.5	130

155

Table VI.A1.— Operations of the OASI Trust Fund, Calendar Years 1937-2018 (Cont.)
[Dollar amounts in billions]

Calendar year	Income					Cost				Asset Reserves[a]		
	Total	Net pay-roll tax contri-butions	GF reim-burse-ments[b]	Taxa-tion of benefits	Net interest[c]	Total[a]	Benefit pay-ments[a d]	Admin-istra-tive costs	RRB inter-change	Net increase during year	Amount at end of year	Trust fund ratio[e]
1995 ..	$342.8	$304.7	-$0.2	$5.5	$32.8	$297.8	$291.6	$2.1	$4.1	$45.0	$458.5	139
1996 ..	363.7	321.6	g	6.5	35.7	308.2	302.9	1.8	3.6	55.5	514.0	149
1997 ..	397.2	349.9	g	7.4	39.8	322.1	316.3	2.1	3.7	75.1	589.1	160
1998 ..	424.8	371.2	g	9.1	44.5	332.3	326.8	1.9	3.7	92.5	681.6	177
1999 ..	457.0	396.4	g	10.9	49.8	339.9	334.4	1.8	3.7	117.2	798.8	201
2000 ..	490.5	421.4	g	11.6	57.5	358.3	352.7	2.1	3.5	132.2	931.0	223
2001 ..	518.1	441.5	g	11.9	64.7	377.5	372.3	2.0	3.3	140.6	1,071.5	247
2002 ..	539.7	455.2	.4	12.9	71.2	393.7	388.1	2.1	3.5	146.0	1,217.5	272
2003 ..	543.8	456.1	g	12.5	75.2	406.0	399.8	2.6	3.6	137.8	1,355.3	300
2004 ..	566.3	472.8	g	14.6	79.0	421.0	415.0	2.4	3.6	145.3	1,500.6	322
2005 ..	604.3	506.9	-.3	13.8	84.0	441.9	435.4	3.0	3.6	162.4	1,663.0	340
2006 ..	642.2	534.8	g	15.6	91.8	461.0	454.5	3.0	3.5	181.3	1,844.3	361
2007 ..	675.0	560.9	g	17.2	97.0	495.7	489.1	3.1	3.6	179.3	2,023.6	372
2008 ..	695.5	574.6	g	15.6	105.3	516.2	509.3	3.2	3.6	179.3	2,202.9	392
2009 ..	698.2	570.4	g	19.9	107.9	564.3	557.2	3.4	3.7	133.9	2,336.8	390
2010 ..	677.1	544.8	2.0	22.1	108.2	584.9	577.4	3.5	3.9	92.2	2,429.0	400
2011 ..	698.8	482.4	87.8	22.2	106.5	603.8	596.2	3.5	4.1	95.0	2,524.1	402
2012 ..	731.1	503.9	97.7	26.7	102.8	645.5	637.9	3.4	4.1	85.6	2,609.7	391
2013 ..	743.8	620.8	4.2	20.7	98.1	679.5	672.1	3.4	3.9	64.3	2,674.0	384
2014 ..	769.4	646.2	.4	28.0	94.8	714.2	706.8	3.1	4.3	55.2	2,729.2	374
2015 ..	801.6	679.5	.3	30.6	91.2	750.5	742.9	3.4	4.3	51.0	2,780.3	364
2016 ..	797.5	678.8	.1	31.6	87.0	776.4	768.6	3.5	4.3	21.1	2,801.3	358
2017 ..	825.6	706.5	g	35.9	83.2	806.7	798.7	3.7	4.3	19.0	2,820.3	347
2018 ..	831.0	715.9	g	34.5	80.7	853.5	844.9	3.8	4.8	-22.4	2,797.9	330

[a] Beginning in 1979, benefit payments scheduled to be paid on January 3 of a given year were paid on December 31 of the preceding year as required by the statutory provision included in the 1977 Social Security Amendments for early delivery of benefit payments when the normal payment delivery date is a Saturday, Sunday, or legal public holiday. Such advance payments have occurred about every 7 years, first for benefits scheduled for January 3, 1982. For comparability with other historical years and the projections in this report, all trust fund operations and asset reserves reflect the 12 months of benefits scheduled for payment in each year without regard to the accelerated payments described above.

[b] Includes net reimbursements from the General Fund of the Treasury to the OASI Trust Fund for: (1) the cost of noncontributory wage credits for military service before 1957; (2) the cost in 1971-82 of deemed wage credits for military service performed after 1956; (3) the cost of benefits to certain uninsured persons who attained age 72 before 1968; (4) the cost of payroll tax credits provided to employees in 1984 and self-employed persons in 1984-89 by Public Law 98-21; (5) the cost in 2009-17 of excluding certain self-employment earnings from SECA taxes under Public Law 110-246; and (6) payroll tax revenue forgone under the provisions of Public Laws 111-147, 111-312, 112-78, and 112-96.

[c] Net interest includes net profits or losses on marketable investments. Beginning in 1967, the trust fund pays administrative expenses on an estimated basis, with a final adjustment including interest made in the following fiscal year. Net interest includes the amounts of these interest adjustments. The 1970 report describes the accounting for administrative expenses for years prior to 1967. Beginning in October 1973, figures include relatively small amounts of gifts to the fund. Net interest for 1983-86 reflects payments for interest on amounts owed under the interfund borrowing provisions. During 1983-90, net interest reflects interest reimbursements paid from the trust fund to the General Fund on advance tax transfers.

[d] Beginning in 1966, includes payments for vocational rehabilitation services furnished to disabled persons receiving benefits because of their disabilities. Beginning in 1983, net benefit amounts include reimbursements paid from the General Fund to the trust fund for unnegotiated benefit checks. Excluding the portion attributable to vocational rehabilitation services and unnegotiated benefit checks, amounts are the same as benefits scheduled under law at that time for all historical years.

[e] The "Trust fund ratio" column represents asset reserves at the beginning of a year as a percentage of cost during the year. The table shows no ratio for 1937 because no reserves existed at the beginning of the year.

[f] Operations prior to 1940 are for the Old-Age Reserve Account established by the original Social Security Act. The 1939 Amendments transferred the asset reserves of the Account to the OASI Trust Fund effective January 1, 1940.

[g] Between -$50 million and $50 million.

[h] Reflects interfund borrowing and subsequent repayment of loans. The OASI Trust Fund borrowed $17.5 billion from the DI and HI Trust Funds in 1982 and repaid the loans in 1985 ($4.4 billion) and 1986 ($13.2 billion).

[i] Reserves used for the trust fund ratio calculation include January advance tax transfers.

Note: Totals do not necessarily equal the sums of rounded components.

Table VI.A2.— Operations of the DI Trust Fund, Calendar Years 1957-2018
[Dollar amounts in billions]

Calendar year	Income					Cost				Asset Reserves[a]		
	Total	Net payroll tax contributions	GF reimbursements[b]	Taxation of benefits	Net interest[c]	Total[a]	Benefit payments[a d]	Administrative costs	RRB interchange	Net increase during year	Amount at end of year	Trust fund ratio[e]
1957...	$0.7	$0.7	—	—	f	$0.1	$0.1	f	—	$0.6	$0.6	—
1958...	1.0	1.0	—	—	f	.3	.2	f	—	.7	1.4	249
1959...	.9	.9	—	—	f	.5	.5	f	f	.4	1.8	284
1960...	1.1	1.0	—	—	$0.1	.6	.6	f	f	.5	2.3	304
1961...	1.1	1.0	—	—	.1	1.0	.9	$0.1	f	.1	2.4	239
1962...	1.1	1.0	—	—	.1	1.2	1.1	.1	f	-.1	2.4	206
1963...	1.2	1.1	—	—	.1	1.3	1.2	.1	f	-.1	2.2	183
1964...	1.2	1.2	—	—	.1	1.4	1.3	.1	f	-.2	2.0	159
1965...	1.2	1.2	—	—	.1	1.7	1.6	.1	f	-.4	1.6	121
1966...	2.1	2.0	f	—	.1	1.9	1.8	.1	f	.1	1.7	82
1967...	2.4	2.3	f	—	.1	2.1	1.9	.1	f	.3	2.0	83
1968...	3.5	3.3	f	—	.1	2.5	2.3	.1	f	1.0	3.0	83
1969...	3.8	3.6	f	—	.2	2.7	2.6	.1	f	1.1	4.1	111
1970...	4.8	4.5	f	—	.3	3.3	3.1	.2	f	1.5	5.6	126
1971...	5.0	4.6	$0.1	—	.4	4.0	3.8	.2	f	1.0	6.6	140
1972...	5.6	5.1	.1	—	.4	4.8	4.5	.2	f	.8	7.5	140
1973...	6.4	5.9	.1	—	.5	6.0	5.8	.2	f	.5	7.9	125
1974...	7.4	6.8	.1	—	.5	7.2	7.0	.2	f	.2	8.1	110
1975...	8.0	7.4	.1	—	.5	8.8	8.5	.3	f	-.8	7.4	92
1976...	8.8	8.2	.1	—	.4	10.4	10.1	.3	f	-1.6	5.7	71
1977...	9.6	9.1	.1	—	.3	11.9	11.5	.4	f	-2.4	3.4	48
1978...	13.8	13.4	.1	—	.3	13.0	12.6	.3	f	.9	4.2	26
1979...	15.6	15.1	.1	—	.4	14.2	13.8	.4	f	1.4	5.6	30
1980...	13.9	13.3	.1	—	.5	15.9	15.5	.4	f	-2.0	3.6	35
1981...	17.1	16.7	.2	—	.2	17.7	17.2	.4	f	-.6	3.0	21
1982...	22.7	22.0	.2	—	.5	18.0	17.4	.6	f	g -.4	2.7	17
1983...	20.7	18.0	1.1	—	1.6	18.2	17.5	.6	f	2.5	5.2	15
1984...	17.3	15.5	.4	$0.2	1.2	18.5	17.9	.6	f	-1.2	4.0	h35
1985...	19.3	17.0	1.2	.2	.9	19.5	18.8	.6	f	g2.4	6.3	h27
1986...	19.4	18.2	.2	.2	.8	20.5	19.9	.6	$0.1	g1.5	7.8	h38
1987...	20.3	19.5	.2	f	.6	21.4	20.5	.8	.1	-1.1	6.7	h44
1988...	22.7	21.8	.2	.1	.6	22.5	21.7	.7	.1	.2	6.9	h38
1989...	24.8	23.8	.2	.1	.7	23.8	22.9	.8	.1	1.0	7.9	h38
1990...	28.8	28.4	-.6	.1	.9	25.6	24.8	.7	.1	3.2	11.1	h40
1991...	30.4	29.1	f	.2	1.1	28.6	27.7	.8	.1	1.8	12.9	39
1992...	31.4	30.1	f	.2	1.1	32.0	31.1	.8	.1	-.6	12.3	40
1993...	32.3	31.2	f	.3	.8	35.7	34.6	1.0	.1	-3.4	9.0	35
1994...	52.8	51.4	f	.3	1.2	38.9	37.7	1.0	.1	14.0	22.9	23
1995...	56.7	54.4	-.2	.3	2.2	42.1	40.9	1.1	.1	14.6	37.6	55
1996...	60.7	57.3	f	.4	3.0	45.4	44.2	1.2	f	15.4	52.9	83
1997...	60.5	56.0	f	.5	4.0	47.0	45.7	1.3	.1	13.5	66.4	113
1998...	64.4	59.0	f	.6	4.8	49.9	48.2	1.6	.2	14.4	80.8	133
1999...	69.5	63.2	f	.7	5.7	53.0	51.4	1.5	.1	16.5	97.3	152
2000...	77.9	71.1	-.8	.7	6.9	56.8	55.0	1.6	.2	21.1	118.5	171
2001...	83.9	74.9	f	.8	8.2	61.4	59.6	1.7	f	22.5	141.0	193
2002...	87.4	77.3	f	.9	9.2	67.9	65.7	2.0	.2	19.5	160.5	208
2003...	88.1	77.4	f	.9	9.7	73.1	70.9	2.0	.2	15.0	175.4	219
2004...	91.4	80.3	f	1.1	10.0	80.6	78.2	2.2	.2	10.8	186.2	218
2005...	97.4	86.1	f	1.1	10.3	88.0	85.4	2.3	.3	9.4	195.6	212
2006...	102.6	90.8	f	1.2	10.6	94.5	91.7	2.3	.4	8.2	203.8	207
2007...	109.9	95.2	f	1.4	13.2	98.8	95.9	2.5	.4	11.1	214.9	206
2008...	109.8	97.6	f	1.3	11.0	109.0	106.0	2.5	.4	.9	215.8	197
2009...	109.3	96.9	f	2.0	10.5	121.5	118.3	2.7	.4	-12.2	203.5	178

157

Table VI.A2.— Operations of the DI Trust Fund, Calendar Years 1957-2018 (Cont.)
[Dollar amounts in billions]

Calendar year	Total	Income				Cost				Asset Reserves[a]		
		Net pay-roll tax contri-butions	GF reim-burse-ments[b]	Taxa-tion of benefits	Net interest[c]	Total[a]	Benefit pay-ments[a d]	Admin-istra-tive costs	RRB inter-change	Net increase during year	Amount at end of year	Trust fund ratio[e]
2010 ..	$104.0	$92.5	$0.4	$1.9	$9.3	$127.7	$124.2	$3.0	$0.5	-$23.6	$179.9	159
2011 ..	106.3	81.9	14.9	1.6	7.9	132.3	128.9	2.9	.5	-26.1	153.9	136
2012 ..	109.1	85.6	16.5	.6	6.4	140.3	136.9	2.9	.5	-31.2	122.7	110
2013 ..	111.2	105.4	.7	.4	4.7	143.4	140.1	2.8	.6	-32.2	90.4	86
2014 ..	114.9	109.7	.1	1.7	3.4	145.1	141.7	2.9	.4	-30.2	60.2	62
2015 ..	118.6	115.4	f	1.1	2.1	146.6	143.4	2.8	.4	-28.0	32.3	41
2016 ..	160.0	157.4	f	1.2	1.4	145.9	142.8	2.8	.4	14.1	46.3	22
2017 ..	171.0	167.1	f	2.0	1.9	145.8	142.8	2.8	.2	25.1	71.5	32
2018 ..	172.3	169.2	f	.5	2.6	146.8	143.7	2.9	.2	25.6	97.1	49

[a] Beginning in 1979, benefit payments scheduled to be paid on January 3 of a given year were paid on December 31 of the preceding year as required by the statutory provision included in the 1977 Social Security Amendments for early delivery of benefit payments when the normal payment delivery date is a Saturday, Sunday, or legal public holiday. Such advance payments have occurred about every 7 years, first for benefits scheduled for January 3, 1982. For comparability with other historical years and the projections in this report, all trust fund operations and asset reserves reflect the 12 months of benefits scheduled for payment in each year without regard to the accelerated payments described above.

[b] Includes net reimbursements from the General Fund of the Treasury to the DI Trust Fund for: (1) the cost of noncontributory wage credits for military service before 1957; (2) the cost in 1971-82 of deemed wage credits for military service performed after 1956; (3) the cost of payroll tax credits provided to employees in 1984 and self-employed persons in 1984-89 by Public Law 98-21; (4) the cost in 2009-17 of excluding certain self-employment earnings from SECA taxes under Public Law 110-246; and (5) payroll tax revenue forgone under the provisions of Public Laws 111-147, 111-312, 112-78, and 112-96.

[c] Net interest includes net profits or losses on marketable investments. Beginning in 1967, the trust fund pays administrative expenses on an estimated basis, with a final adjustment including interest made in the following fiscal year. Net interest includes the amounts of these interest adjustments. The 1970 report describes the accounting for administrative expenses for years prior to 1967. Beginning in July 1974, figures include relatively small amounts of gifts to the fund. Net interest for 1983-86 reflects payments for interest on amounts owed under the interfund borrowing provisions. During 1983-90, net interest reflects interest reimbursements paid from the trust fund to the General Fund on advance tax transfers.

[d] Beginning in 1966, includes payments for vocational rehabilitation services furnished to disabled persons receiving benefits because of their disabilities. Beginning in 1983, net benefit amounts include reimbursements paid from the General Fund to the trust fund for unnegotiated benefit checks. Excluding the portion attributable to vocational rehabilitation services and unnegotiated benefit checks, amounts are the same as benefits scheduled under law at that time for all historical years.

[e] The "Trust fund ratio" column represents asset reserves at the beginning of a year as a percentage of cost during the year. The table shows no ratio for 1957 because no reserves existed at the beginning of the year.

[f] Between -$50 million and $50 million.

[g] Reflects interfund borrowing and subsequent repayment of loans. The DI Trust Fund loaned $5.1 billion to the OASI Trust Fund in 1982. The OASI Trust Fund repaid the loan in 1985 ($2.5 billion) and 1986 ($2.5 billion).

[h] Reserves used for the trust fund ratio calculation include January advance tax transfers.

Note: Totals do not necessarily equal the sums of rounded components.

Table VI.A3.— Operations of the Combined OASI and DI Trust Funds, Calendar Years 1957-2018

[Dollar amounts in billions]

Calendar year	Income					Cost				Asset Reserves[a]		
	Total	Net payroll tax contributions	GF reimbursements[b]	Taxation of benefits	Net interest[c]	Total[a]	Benefit payments[a d]	Administrative costs	RRB interchange	Net increase during year	Amount at end of year	Trust fund ratio[e]
1957 ..	$8.1	$7.5	—	—	$0.6	$7.6	$7.4	$0.2	f	$0.5	$23.0	298
1958	9.1	8.5	—	—	.6	8.9	8.6	.2	$0.1	.2	23.2	259
1959 ..	9.5	8.9	—	—	.6	10.8	10.3	.2	.3	-1.3	22.0	215
1960 ..	12.4	11.9	—	—	.6	11.8	11.2	.2	.3	.6	22.6	186
1961 ..	12.9	12.3	—	—	.6	13.4	12.7	.3	.3	-.5	22.2	169
1962 ..	13.7	13.1	—	—	.6	15.2	14.5	.3	.4	-1.5	20.7	146
1963 ..	16.2	15.6	—	—	.6	16.2	15.4	.3	.4	f	20.7	128
1964 ..	17.5	16.8	—	—	.6	17.0	16.2	.4	.4	.5	21.2	122
1965 ..	17.9	17.2	—	—	.7	19.2	18.3	.4	.5	-1.3	19.8	110
1966 ..	23.4	22.6	$0.1	—	.7	20.9	20.1	.4	.5	2.5	22.3	95
1967 ..	26.4	25.4	.1	—	.9	22.5	21.4	.5	.5	3.9	26.3	99
1968 ..	28.5	27.0	.4	—	1.0	26.0	25.0	.6	.5	2.5	28.7	101
1969 ..	33.3	31.5	.5	—	1.3	27.9	26.8	.6	.5	5.5	34.2	103
1970 ..	37.0	34.7	.5	—	1.8	33.1	31.9	.6	.6	3.9	38.1	103
1971 ..	40.9	38.3	.5	—	2.0	38.5	37.2	.7	.6	2.4	40.4	99
1972 ..	45.6	42.9	.5	—	2.2	43.3	41.6	.9	.7	2.3	42.8	93
1973 ..	54.8	51.9	.5	—	2.4	53.1	51.5	.8	.8	1.6	44.4	80
1974 ..	62.1	58.9	.5	—	2.7	60.6	58.6	1.1	.9	1.5	45.9	73
1975 ..	67.6	64.3	.5	—	2.9	69.2	67.0	1.2	1.0	-1.5	44.3	66
1976 ..	75.0	71.6	.7	—	2.7	78.2	75.8	1.2	1.2	-3.2	41.1	57
1977 ..	82.0	78.7	.7	—	2.5	87.3	84.7	1.4	1.2	-5.3	35.9	47
1978 ..	91.9	88.9	.8	—	2.3	96.0	93.1	1.4	1.6	-4.1	31.7	37
1979 ..	105.9	103.0	.7	—	2.2	107.3	104.4	1.5	1.5	-1.5	30.3	30
1980 ..	119.7	116.7	.7	—	2.3	123.5	120.6	1.5	1.4	-3.8	26.5	25
1981 ..	142.4	139.4	.8	—	2.2	144.4	141.0	1.7	1.6	-1.9	24.5	18
1982 ..	147.9	145.7	.9	—	1.4	160.1	156.2	2.1	1.8	g .2	24.8	15
1983 ..	171.3	156.3	6.7	—	8.3	171.2	166.7	2.2	2.3	.1	24.9	14
1984 ..	186.6	175.0	5.2	$3.0	3.4	180.4	175.7	2.3	2.4	6.2	31.1	h21
1985 ..	203.5	192.1	5.2	3.4	2.7	190.6	186.1	2.2	2.4	g11.1	42.2	h24
1986 ..	216.8	207.4	1.9	3.7	3.9	201.5	196.7	2.2	2.7	g 4.7	46.9	h29
1987 ..	231.0	220.6	1.9	3.2	5.3	209.1	204.1	2.4	2.6	21.9	68.8	h31
1988 ..	263.5	249.5	2.3	3.4	8.2	222.5	217.1	2.5	2.9	41.0	109.8	h41
1989 ..	289.4	271.9	2.3	2.5	12.7	236.2	230.9	2.4	2.9	53.2	163.0	h57
1990 ..	315.4	294.5	-1.3	5.0	17.2	253.1	247.8	2.3	3.0	62.3	225.3	h75
1991 ..	329.7	301.6	.1	6.1	21.9	274.2	268.2	2.6	3.5	55.5	280.7	82
1992 ..	342.6	311.3	-.1	6.1	25.4	291.9	286.0	2.7	3.2	50.7	331.5	96
1993 ..	355.6	322.0	.1	5.6	27.9	308.8	302.4	3.0	3.4	46.8	378.3	107
1994 ..	381.1	344.7	f	5.3	31.1	323.0	316.8	2.7	3.5	58.1	436.4	117
1995 ..	399.5	359.1	-.4	5.8	35.0	339.8	332.6	3.1	4.1	59.7	496.1	128
1996 ..	424.5	378.9	f	6.8	38.7	353.6	347.0	3.0	3.6	70.9	567.0	140
1997 ..	457.7	406.0	f	7.9	43.8	369.1	362.0	3.4	3.7	88.6	655.5	154
1998 ..	489.2	430.2	f	9.7	49.3	382.3	375.0	3.5	3.8	106.9	762.5	171
1999 ..	526.6	459.6	f	11.6	55.5	392.9	385.8	3.3	3.8	133.7	896.1	194
2000 ..	568.4	492.5	-.8	12.3	64.5	415.1	407.6	3.8	3.7	153.3	1,049.4	216
2001 ..	602.0	516.4	f	12.7	72.9	438.9	431.9	3.7	3.3	163.1	1,212.5	239
2002 ..	627.1	532.5	.4	13.8	80.4	461.7	453.8	4.2	3.6	165.4	1,378.0	263
2003 ..	631.9	533.5	f	13.4	84.9	479.1	470.8	4.6	3.7	152.8	1,530.8	288
2004 ..	657.7	553.0	f	15.7	89.0	501.6	493.3	4.5	3.8	156.1	1,686.8	305

**Table VI.A3.— Operations of the Combined OASI and DI Trust Funds,
Calendar Years 1957-2018 (Cont.)**
[Dollar amounts in billions]

Calendar year	Income					Cost				Asset Reserves[a]		
	Total	Net pay-roll tax contri-butions	GF reim-burse-ments[b]	Taxa-tion of benefits	Net interest[c]	Total[a]	Benefit pay-ments[a d]	Admin-istra-tive costs	RRB inter-change	Net increase during year	Amount at end of year	Trust fund ratio[e]
2005 ..	$701.8	$592.9	-$0.3	$14.9	$94.3	$529.9	$520.7	$5.3	$3.9	$171.8	$1,858.7	318
2006 ..	744.9	625.6	f	16.9	102.4	555.4	546.2	5.3	3.8	189.5	2,048.1	335
2007 ..	784.9	656.1	f	18.6	110.2	594.5	584.9	5.5	4.0	190.4	2,238.5	345
2008 ..	805.3	672.1	f	16.9	116.3	625.1	615.3	5.7	4.0	180.2	2,418.7	358
2009 ..	807.5	667.3	f	21.9	118.3	685.8	675.5	6.2	4.1	121.7	2,540.3	353
2010 ..	781.1	637.3	2.4	23.9	117.5	712.5	701.6	6.5	4.4	68.6	2,609.0	357
2011 ..	805.1	564.2	102.7	23.8	114.4	736.1	725.1	6.4	4.6	69.0	2,677.9	354
2012 ..	840.2	589.5	114.3	27.3	109.1	785.8	774.8	6.3	4.7	54.4	2,732.3	341
2013 ..	855.0	726.2	4.9	21.1	102.8	822.9	812.3	6.2	4.5	32.1	2,764.4	332
2014 ..	884.3	756.0	.5	29.6	98.2	859.2	848.5	6.1	4.7	25.0	2,789.5	322
2015 ..	920.2	794.9	.3	31.6	93.3	897.1	886.3	6.2	4.7	23.0	2,812.5	311
2016 ..	957.5	836.2	.1	32.8	88.4	922.3	911.4	6.2	4.7	35.2	2,847.7	305
2017 ..	996.6	873.6	f	37.9	85.1	952.5	941.5	6.5	4.5	44.1	2,891.8	299
2018 ..	1,003.4	885.1	f	35.0	83.3	1,000.2	988.6	6.7	4.9	3.1	2,894.9	289

[a] Beginning in 1979, benefit payments scheduled to be paid on January 3 of a given year were paid on December 31 of the preceding year as required by the statutory provision included in the 1977 Social Security Amendments for early delivery of benefit payments when the normal payment delivery date is a Saturday, Sunday, or legal public holiday. Such advance payments have occurred about every 7 years, first for benefits scheduled for January 3, 1982. For comparability with other historical years and the projections in this report, all trust fund operations and asset reserves reflect the 12 months of benefits scheduled for payment in each year without regard to the accelerated payments described above.
[b] Includes net reimbursements from the General Fund of the Treasury to the OASI and DI Trust Funds for: (1) the cost of noncontributory wage credits for military service before 1957; (2) the cost in 1971-82 of deemed wage credits for military service performed after 1956; (3) the cost of benefits to certain uninsured persons who attained age 72 before 1968; (4) the cost of payroll tax credits provided to employees in 1984 and self-employed persons in 1984-89 by Public Law 98-21; (5) the cost in 2009-17 of excluding certain self-employment earnings from SECA taxes under Public Law 110-246; and (6) payroll tax revenue forgone under the provisions of Public Laws 111-147, 111-312, 112-78, and 112-96.
[c] Net interest includes net profits or losses on marketable investments. Beginning in 1967, the trust funds pay administrative expenses on an estimated basis, with a final adjustment including interest made in the following fiscal year. Net interest includes the amounts of these interest adjustments. The 1970 report describes the accounting for administrative expenses for years prior to 1967. Beginning in October 1973, figures include relatively small amounts of gifts to the funds. Net interest for 1983-86 reflects payments for interest on amounts owed under the interfund borrowing provisions. During 1983-90, net interest reflects interest reimbursements paid from the trust funds to the General Fund on advance tax transfers.
[d] Beginning in 1966, includes payments for vocational rehabilitation services furnished to disabled persons receiving benefits because of their disabilities. Beginning in 1983, net benefit amounts include reimbursements paid from the General Fund to the trust funds for unnegotiated benefit checks. Excluding the portion attributable to vocational rehabilitation services and unnegotiated benefit checks, amounts are the same as benefits scheduled under law at that time for all historical years.
[e] The "Trust fund ratio" column represents asset reserves at the beginning of a year as a percentage of cost during the year.
[f] Between -$50 million and $50 million.
[g] Reflects interfund borrowing and subsequent repayment of loans. The OASI Trust Fund borrowed $12.4 billion from the HI Trust Fund in 1982 and repaid the loan in 1985 ($1.8 billion) and 1986 ($10.6 billion).
[h] Reserves used for the trust fund ratio calculation include January advance tax transfers.

Note: Totals do not necessarily equal the sums of rounded components.

Tables VI.A4 and VI.A5 show the total asset reserves of the OASI Trust Fund and the DI Trust Fund, respectively, at the end of calendar years 2017 and 2018. The tables show the invested asset reserves by interest rate and year of maturity. Bonds issued to the trust funds in 2018 had an interest rate of 2.875 percent, compared with an interest rate of 2.250 percent for bonds issued in 2017.

**Table VI.A4.—OASI Trust Fund Asset Reserves, End of
Calendar Years 2017 and 2018**
[In thousands]

	December 31, 2017	December 31, 2018
Obligations sold only to the trust funds (special issue securities):		
Certificates of indebtedness:		
2.375 percent, 2018	$48,361,532	—
3.000 percent, 2019	—	$52,867,020
Bonds:		
1.375 percent, 2019	6,693,020	—
1.375 percent, 2020-25	40,158,120	40,158,120
1.375 percent, 2026	6,693,019	6,693,019
1.375 percent, 2027	173,240,401	173,240,401
1.750 percent, 2019	4,908,185	—
1.750 percent, 2020-25	29,449,110	29,449,110
1.750 percent, 2026-27	9,816,372	9,816,372
1.750 percent, 2028	178,148,587	178,148,587
1.875 percent, 2019	2,320,955	—
1.875 percent, 2020-27	18,567,648	18,567,648
1.875 percent, 2028-30	6,962,865	6,962,865
1.875 percent, 2031	188,111,583	188,111,583
2.000 percent, 2019	3,655,629	—
2.000 percent, 2020-25	21,933,768	21,933,768
2.000 percent, 2026-29	14,622,516	14,622,516
2.000 percent, 2030	185,790,628	185,790,628
2.250 percent, 2019	5,582,927	—
2.250 percent, 2020-25	33,497,562	33,497,562
2.250 percent, 2026-27	11,165,852	11,165,852
2.250 percent, 2028	5,582,927	5,582,927
2.250 percent, 2029	183,731,514	183,731,514
2.250 percent, 2030-31	3,193,030	3,193,030
2.250 percent, 2032	189,708,097	189,708,097
2.500 percent, 2019	5,971,787	—
2.500 percent, 2020-25	35,830,722	35,830,722
2.500 percent, 2026	166,547,382	166,547,382
2.875 percent, 2019	7,264,432	—
2.875 percent, 2020-24	36,322,160	36,322,160
2.875 percent, 2025	160,575,595	160,575,595
2.875 percent, 2032	—	1
2.875 percent, 2033	—	176,889,560
3.250 percent, 2019	10,628,270	—
3.250 percent, 2020-23	42,513,080	42,513,080
3.250 percent, 2024	153,311,163	153,311,163
3.500 percent, 2018	60,311,343	—
4.000 percent, 2018	12,075,192	—
4.000 percent, 2019	12,075,192	—
4.000 percent, 2020-22	36,225,576	36,225,576
4.000 percent, 2023	142,682,893	142,682,893
4.125 percent, 2018	10,516,946	—
4.125 percent, 2019	10,516,946	—
4.125 percent, 2020	106,585,700	106,585,700
4.625 percent, 2018	9,167,663	—

**Table VI.A4.—OASI Trust Fund Asset Reserves, End of
Calendar Years 2017 and 2018 (Cont.)**
[In thousands]

	December 31, 2017	December 31, 2018
4.625 percent, 2019	96,068,657	77,990,001
5.000 percent, 2018	12,454,232	—
5.000 percent, 2019-21	37,362,696	37,362,696
5.000 percent, 2022	130,607,701	130,607,701
5.125 percent, 2018	11,567,866	—
5.125 percent, 2019	11,567,866	11,567,866
5.125 percent, 2020	11,567,769	11,567,769
5.125 percent, 2021	118,153,469	118,153,469
Total investments	2,820,368,145	2,797,973,953
Undisbursed balances[a]	-58,948	-102,175
Total asset reserves	2,820,309,197	2,797,871,778

[a] A negative amount for a given year represents a situation where actual program cost exceeded the amount of invested securities of the OASI Trust Fund that were redeemed to cover such cost. In this situation, future redemption of additional invested securities will be required to pay for this shortfall.

Note: Amounts of special issue securities are at par value. The trust fund purchases and redeems special issue securities at par value. The table groups equal amounts that mature in two or more years at a given interest rate.

Table VI.A5.—DI Trust Fund Asset Reserves, End of Calendar Years 2017 and 2018
[In thousands]

	December 31, 2017	December 31, 2018
Obligations sold only to the trust funds (special issue securities):		
Certificates of indebtedness:		
2.375 percent, 2018	$14,830,708	—
3.000 percent, 2019	—	$9,771,433
3.125 percent, 2019	—	7,340,572
Bonds:		
1.875 percent, 2019	3,011,390	—
1.875 percent, 2020-22	9,034,170	9,034,170
2.250 percent, 2019	6,309,802	—
2.250 percent, 2020	6,309,802	6,309,802
2.250 percent, 2021	6,309,801	6,309,801
2.875 percent, 2024-25	—	7,248,238
2.875 percent, 2026-32	—	25,368,826
4.000 percent, 2023	14,675,554	14,675,554
5.000 percent, 2022	11,142,596	11,142,596
Total investments	71,623,823	97,200,992
Undisbursed balances[a]	-143,810	-143,908
Total asset reserves	71,480,013	97,057,084

[a] A negative amount for a given year represents a situation where actual program cost exceeded the amount of invested securities of the DI Trust Fund that were redeemed to cover such cost. In this situation, future redemption of additional invested securities will be required to pay for this shortfall.

Note: Amounts of special issue securities are at par value. The trust fund purchases and redeems special issue securities at par value. The table groups equal amounts that mature in two or more years at a given interest rate.

B. HISTORY OF ACTUARIAL STATUS ESTIMATES

This appendix chronicles the history of the OASDI actuarial balance and the year of combined OASI and DI Trust Fund reserve depletion since 1982 under the intermediate assumptions. The actuarial balance is the principal summary measure of actuarial status for the long-range period as a whole. The year of trust fund reserve depletion is also critical, as it indicates the year by which legislative action would be needed in order to maintain timely payment of scheduled benefits.

The 1983 report was the last report for which the actuarial balance was positive. The two basic components of actuarial balance are the summarized income rate and the summarized cost rate, both of which are expressed as percentages of taxable payroll over the period. Section IV.B.4 defines the summarized income rate, summarized cost rate, and actuarial balance in detail. For any given period, the actuarial balance includes the difference between the present value of non-interest income for the period and the present value of the cost for the period, each divided by the present value of taxable payroll for all years in the period. The computation of the actuarial balance also includes:

- In the reports for 1988 and later, the amount of the trust fund asset reserves on hand at the beginning of the valuation period; and

- In the reports for 1991 and later, the present value of a target trust fund asset reserve equal to 100 percent of the annual cost to be reached and maintained at the end of the valuation period.

Reports of 1973-87 used the average-cost method, a simpler method which approximates the results of the present-value approach for computing the actuarial balance. Under the average-cost method, the sum of the annual cost rates over the 75-year projection period was divided by the total number of years, 75, to obtain the average cost rate per year. A similar computation produced the average income rate. The actuarial balance was the difference between the average income rate and the average cost rate.

When the 1973 report introduced the average-cost method, the financing of the program was more nearly on a pay-as-you-go basis over the long-range. Also, the long-range demographic and economic assumptions in that report produced an annual rate of growth in total taxable payroll which was about the same as the annual rate at which the trust funds earned interest. In either circumstance (i.e., pay-as-you-go financing, where the annual income rate is the same as the annual cost rate, or an annual rate of growth in total taxable payroll equal to the annual interest rate), the average-cost method produces

the same result as the present-value method. However, by 1988, neither of these circumstances still existed.

After the 1977 and 1983 Social Security Amendments, projections indicated substantial increases in the trust fund reserves continuing well into the 21st century. These laws changed the program's financing from essentially pay-as-you-go to partial advance funding through the 75-year period. Also, for the reports from 1973 through 1987, long-range fertility rates and average real-wage growth assumptions were gradually reduced, resulting in an annual rate of growth in taxable payroll that was significantly lower than the assumed interest rate by 1987. As a result of the difference between this rate of growth and the assumed interest rate, the results of the average-cost method and the present-value method began to diverge in the reports for 1973 through 1987, and by 1988 they were quite different. While the average-cost method reflected most of the effects of assumed interest rates, it no longer reflected all interest effects. The present-value method, by contrast, accurately reflects the implications of assumed interest rates. As a result, the 1988 report reintroduced the present-value method of calculating the actuarial balance.

A positive actuarial balance indicates that estimated income (plus starting reserves, beginning with the 1988 report) is more than sufficient to meet estimated trust fund obligations (plus the ending target fund, beginning with the 1991 report) for the period as a whole. Even with a positive actuarial balance, it is possible for reserves to become temporarily depleted within the long-range period. An actuarial balance of zero indicates that the estimated income (plus starting reserves, beginning with the 1988 report) exactly matches estimated trust fund obligations (plus the ending target fund, beginning with the 1991 report) for the period as a whole. A negative actuarial balance indicates that estimated income (plus starting reserves, beginning with the 1988 report) is insufficient to meet estimated trust fund obligations (plus the ending target fund, beginning with the 1991 report) for the entire period.

Table VI.B1 contains the estimated OASDI actuarial balances, summarized income rates, and summarized cost rates for the 1982 report through the current report. The reports presented these values on the basis of the intermediate assumptions, which recent reports refer to as alternative II and reports from 1982 to 1990 referred to as alternative II-B.

Table VI.B1.—Long-Range OASDI Actuarial Balances and Trust Fund Reserve Depletion Dates as Shown in the Trustees Reports for 1982-2019 under Intermediate Assumptions[a]

[As a percentage of taxable payroll]

Year of report	Summarized income rate	Summarized cost rate	Actuarial balance[b]	Change from previous year[c]	Year of combined trust fund reserve depletion
1982	12.27	14.09	-1.82	[d]	1983
1983	12.87	12.84	+.02	+1.84	solvent
1984	12.90	12.95	-.06	-.08	solvent
1985	12.94	13.35	-.41	-.35	2049
1986	12.96	13.40	-.44	-.03	2051
1987	12.89	13.51	-.62	-.18	2051
1988	12.94	13.52	-.58	+.04	2048
1989	13.02	13.72	-.70	-.13	2046
1990	13.04	13.95	-.91	-.21	2043
1991	13.11	14.19	-1.08	-.17	2041
1992	13.16	14.63	-1.46	-.38	2036
1993	13.21	14.67	-1.46	[d]	2036
1994	13.24	15.37	-2.13	-.66	2029
1995	13.27	15.44	-2.17	-.04	2030
1996	13.33	15.52	-2.19	-.02	2029
1997	13.37	15.60	-2.23	-.03	2029
1998	13.45	15.64	-2.19	+.04	2032
1999	13.49	15.56	-2.07	+.12	2034
2000	13.51	15.40	-1.89	+.17	2037
2001	13.58	15.44	-1.86	+.03	2038
2002	13.72	15.59	-1.87	-.01	2041
2003	13.78	15.70	-1.92	-.04	2042
2004	13.84	15.73	-1.89	+.03	2042
2005	13.87	15.79	-1.92	-.04	2041
2006	13.88	15.90	-2.02	-.09	2040
2007	13.92	15.87	-1.95	+.06	2041
2008	13.94	15.63	-1.70	+.26	2041
2009	14.02	16.02	-2.00	-.30	2037
2010	14.01	15.93	-1.92	+.08	2037
2011	14.02	16.25	-2.22	-.30	2036
2012	14.02	16.69	-2.67	-.44	2033
2013	13.88	16.60	-2.72	-.05	2033
2014	13.89	16.77	-2.88	-.16	2033
2015	13.86	16.55	-2.68	+.20	2034
2016	13.84	16.50	-2.66	+.02	2034
2017	13.84	16.67	-2.83	-.17	2034
2018	13.84	16.69	-2.84	-.02	2034
2019	13.81	16.60	-2.78	+.06	2035

[a] This table shows the actuarial balance and year of trust fund reserve depletion based on the intermediate assumptions, which the 1982-90 reports referred to as alternative II-B and the 1991 and later reports refer to as alternative II.

[b] The definition and method of calculating the actuarial balance were changed in 1988 and 1991. See text for details.

[c] A detailed year-by-year breakdown of the reasons for the changes in the actuarial balance since the 1983 Trustees Report may be found in Actuarial Note 2019.8 at www.ssa.gov/OACT/NOTES/ran8/.

[d] Between -0.005 and 0.005 percent of taxable payroll.

Note: Totals do not necessarily equal the sums of rounded components.

For several of the years included in the table, significant legislative changes or definitional changes affected the estimated actuarial balance. The Social Security Amendments of 1983 account for the largest single change shown in the table: the actuarial balance of -1.82 for the 1982 report improved to +0.02 for the 1983 report. In 1985, the estimated actuarial balance changed largely because of an adjustment made to the method for estimating the age distribution of immigrants.

Rebenchmarking of the National Income and Product Accounts and changes in demographic assumptions contributed to the change in the actuarial balance for 1987. Various changes in assumptions and methods for the 1988 report had roughly offsetting effects on the actuarial balance. In 1989 and 1990, changes in economic assumptions accounted for most of the changes in the estimated actuarial balance.

In 1991, the effect of legislation, changes in economic assumptions, and the introduction of the cost of reaching and maintaining an ending target trust fund level combined to produce the change in the actuarial balance. In 1992, changes in disability assumptions and the method for projecting average benefit levels accounted for most of the change in the actuarial balance. In 1993, numerous small changes in assumptions and methods had offsetting effects on the actuarial balance. In 1994, changes in the real-wage assumptions, disability rates, and the earnings sample used for projecting average benefit levels accounted for most of the change in the actuarial balance. In 1995, numerous small changes had largely offsetting effects on the actuarial balance, including a substantial reallocation of the payroll tax rate, which reduced the OASI actuarial balance, but increased the DI actuarial balance.

In 1996, a change in the method of projecting dually-entitled beneficiaries produced a large increase in the actuarial balance, which almost totally offset decreases produced by changes in the valuation period and in the demographic and economic assumptions. Various changes in assumptions and methods for the 1997 report had roughly offsetting effects on the actuarial balance. In 1998, increases caused by changes in the economic assumptions, although partially offset by decreases produced by changes in the valuation period and in the demographic assumptions, accounted for most of the changes in the estimated actuarial balance. In 1999, increases caused by changes in the economic assumptions (related to improvements in the CPI by the Bureau of Labor Statistics) accounted for most of the changes in the estimated actuarial balance. For the 2000 report, changes in economic assumptions and methodology caused increases in the actuarial balance, although reductions in the balance caused by the change in valuation period and changes in demographic assumptions partially offset these increases.

For the 2001 report, increases caused by changes in the demographic starting values, although partially offset by a decrease produced by the change in the valuation period, accounted for most of the changes in the estimated actuarial balance. For the 2002 report, changes in the valuation period and the demographic assumptions—both decreases in the actuarial balance—were offset by changes in the economic assumptions, while an increase due to disability assumptions was slightly more than offset by a decrease due to changes in the projection methods and data. For the 2003 report, an increase due to the change in program assumptions was more than offset by decreases due to the change in valuation period and changes in demographic assumptions. In the 2004 report, increases due to changing the method of projecting benefit levels for higher earners more than offset decreases in the actuarial balance arising from the change in the valuation period and the net effect of other changes in programmatic data and methods. For the 2005 report, an increase due to changing the method of projecting future average benefit levels was more than offset by decreases due to changes in the valuation period, updated starting values for the economic assumptions, and other methodological changes.

In 2006, decreases in the actuarial balance due to the change in the valuation period, a reduction in the ultimate annual real interest rate, and improvements in calculating mortality for disabled workers, were greater in aggregate than increases in the actuarial balance due to changes in demographic starting values and the ultimate total fertility rate, as well as other programmatic data and method changes. For the 2007 report, increases in the actuarial balance arising from revised disability incidence rate assumptions, improvements in average benefit level projections, and changes in near-term economic projections, more than offset decreases in the balance due to the valuation period change and updated historical mortality data. For the 2008 report, the large increase in the actuarial balance was primarily due to changes in immigration projection methods and assumptions. These changes more than offset the decreases in the actuarial balance due to the change in the valuation period and the lower starting and ultimate mortality rates. In 2009, changes in starting values and near-term economic assumptions due to the economic recession, faster ultimate rates of decline in death rates for ages 65-84, and the change in the valuation period accounted for most of the large decrease in the actuarial balance. Legislative changes, in particular the estimated effects of the Patient Protection and Affordable Care Act and the Health Care and Education Reconciliation Act of 2010, were the main reason for the increase in the actuarial balance for the 2010 report. The change in the valuation period partially offset this increase; there were also changes in

several assumptions, methods, and recent data which had largely offsetting effects.

For the 2011 report, changes in mortality projections, due to new starting values and revised methods, were the most significant of several factors contributing to the increase in the deficit. In 2012, changes in economic assumptions and starting values accounted for about half of the decrease in actuarial balance. Other factors worsening the actuarial balance were the change in valuation period, changes to starting demographic values, changes to ultimate disability incidence assumptions, and methodology changes and data updates. For the 2013 report, the change in valuation period accounted for the entire net change in the actuarial balance. The effects of substantially lower death rates for 2009 than previously projected and the American Taxpayer Relief Act of 2012 (which lowered the Federal marginal income tax rates) were offset by updates of program-specific data and methodology improvements. In 2014, changes in economic data and assumptions accounted for the majority of the net change in the actuarial balance. Other factors worsening the actuarial balance were the change in the valuation period and various methodology improvements and data updates. For the 2015 report, methodological improvements and updates of programmatic data accounted for the majority of the net increase in the actuarial balance. Also increasing the actuarial balance were a lower assumed ultimate average wage differential and changes in near-term economic assumptions. These increases were offset somewhat by the change in the valuation period and updates to historical and near-term projected birth rates.

For the 2016 report, the actuarial balance increased primarily due to the effects of the Bipartisan Budget Act of 2015 and improvements made to immigration methods. The most notable immigration change was a revision to the method for projecting emigration of the never-authorized population to reflect lower rates of emigration for those who have resided here longer. These increases in the actuarial balance were largely offset by the effects of changes in ultimate economic assumptions, including a lower real interest rate and a lower annual increase in the rate of price inflation. In 2017, the change in the valuation period and various methodology improvements accounted for most of the net reduction in the actuarial balance. Other economic factors also contributed to worsening the actuarial balance, including a lower real-wage differential assumption and an assumed weaker recovery from the recent recession. These reductions were offset somewhat by lower estimated disability incidence rates over the short-range period.

For the 2018 report, incorporating the effects of lower-than-expected birth rates, lower near-term fertility assumptions, and the change in the valuation

period decreased the actuarial balance. Offsetting these factors to a large degree were the effects of higher-than-expected death rates and several methods improvements, most notably an update to the sample used to project average benefit levels for newly-entitled worker beneficiaries.

Section IV.B.6 describes changes affecting the actuarial balance shown for the 2019 report.

C. FISCAL YEAR HISTORICAL AND PROJECTED TRUST FUND
OPERATIONS THROUGH 2028

Tables VI.C1, VI.C2, and VI.C3 contain details of the fiscal year 2018 opera-
tions of the OASI, DI, and the combined OASI and DI Trust Funds, respec-
tively. The fiscal year for the U.S. Government is the 12-month period
ending September 30. Fiscal year 2018 is the most recent fiscal year for
which complete information is available. The descriptions of the values in
these tables are similar to the corresponding descriptions and values in the
calendar year operations tables in section III.A. Please see that section for a
description of the various items of income and cost.

Table VI.C1.—Operations of the OASI Trust Fund, Fiscal Year 2018
[In millions]

Total asset reserves, September 30, 2017		$2,820,101
Income:		
Net payroll tax contributions:		
Payroll tax contributions[a]	$708,547	
Payments from the General Fund of the Treasury for payroll tax contributions subject to refund[a]	-2,420	
Net payroll tax contributions[a]		706,127
Reimbursements from the General Fund:		
Reduction in payroll tax contributions due to P.L.s 111-312, 112-78, and 112-96[a]	11	
Payroll tax credits due to P.L. 98-21[a]	b	
Net General Fund reimbursements[a]		11
Income based on taxation of benefit payments:		
Withheld from benefit payments to nonresident aliens	214	
All other, not subject to withholding[a]	34,504	
Total income from taxation of benefits[a]		34,718
Investment income and interest adjustments:		
Interest on investments	81,583	
Interest adjustments[c]	b	
Total investment income and interest adjustments		81,583
Gifts		b
Total income		822,440
Cost:		
Benefit payments:		
Monthly benefits and lump-sum death payments[d]	833,063	
Reimbursement from the General Fund for unnegotiated checks	-37	
Payment for costs of vocational rehabilitation services for disabled beneficiaries	8	
Net benefit payments[d]		833,034
Financial interchange with the Railroad Retirement "Social Security Equivalent Benefit Account"		4,769
Administrative expenses:		
Costs incurred by:		
Social Security Administration	3,167	
Department of the Treasury	512	
Offsetting miscellaneous receipts	-2	
Miscellaneous reimbursements from the General Fund [e]	-6	
Net administrative expenses		3,672
Total cost		841,474
Net increase in asset reserves		-19,034
Total invested assets	2,801,254	
Undisbursed balances[f]	-188	
Total asset reserves, September 30, 2018		2,801,066

[a] Includes adjustments for prior years

[b] Between -$0.5 and $0.5 million.

[c] Includes: (1) interest on adjustments in the allocation of administrative expenses between the trust fund and the General Fund account for the Supplemental Security Income program, (2) interest arising from the revised allocation of administrative expenses among the trust funds, and (3) interest on certain reimbursements to the trust fund.

[d] Includes net reductions for the recovery of overpayments.

[e] Reimbursements for costs incurred in performing certain legislatively mandated activities not directly related to administering the OASI program.

[f] A negative balance represents a situation where the actual program cash payments exceeded the amount of invested securities of the OASI Trust Fund that were redeemed to make such payments. In this situation, future redemption of additional invested securities will be required to pay for this shortfall.

Note: Totals do not necessarily equal the sums of rounded components.

Table VI.C2.—Operations of the DI Trust Fund, Fiscal Year 2018
[In millions]

Total asset reserves, September 30, 2017.		$69,444
Income:		
Net payroll tax contributions:		
Payroll tax contributions[a].	$167,627	
Payments from the General Fund of the Treasury for payroll tax contributions subject to refund[a]	-583	
Net payroll tax contributions[a].		167,043
Reimbursements from the General Fund:		
Reduction in payroll tax contributions due to P.L.s 111-312, 112-78, and 112-96[a].	2	
Payroll tax credits due to P.L. 98-21[a].	[b]	
Net General Fund reimbursements[a]		2
Income based on taxation of benefit payments:		
Withheld from benefit payments to nonresident aliens	4	
All other, not subject to withholding[a]	996	
Total income from taxation of benefits[a].		1,000
Investment income and interest adjustments:		
Interest on investments.	2,225	
Interest adjustments[c]	3	
Total investment income and interest adjustments.		2,227
Gifts		—
Total income.		170,272
Cost:		
Benefit payments:		
Monthly benefits[d].	143,550	
Reimbursement from the General Fund for unnegotiated checks	-20	
Payment for costs of vocational rehabilitation services for disabled beneficiaries .	112	
Net benefit payments[d]		143,642
Financial interchange with the Railroad Retirement "Social Security Equivalent Benefit Account".		174
Administrative expenses:		
Costs incurred by:		
Social Security Administration.	2,651	
Department of the Treasury	93	
Demonstration projects.	18	
Miscellaneous reimbursements from the General Fund[e].	-3	
Net administrative expenses.		2,759
Total cost		146,575
Net increase in asset reserves.		23,698
Total invested assets.	93,401	
Undisbursed balances[f]	-259	
Total asset reserves, September 30, 2018.		93,141

[a] Includes adjustments for prior years.
[b] Between -$0.5 and $0.5 million.
[c] Includes: (1) interest on adjustments in the allocation of administrative expenses between the trust fund and the General Fund account for the Supplemental Security Income program, (2) interest arising from the revised allocation of administrative expenses among the trust funds, and (3) interest on certain reimbursements to the trust fund.
[d] Includes net reductions for the recovery of overpayments.
[e] Reimbursements for costs incurred in performing certain legislatively mandated activities not directly related to administering the DI program.
[f] A negative balance represents a situation where the actual program cash payments exceeded the amount of invested securities of the DI Trust Fund that were redeemed to make such payments. In this situation, future redemption of additional invested securities will be required to pay for this shortfall.

Note: Totals do not necessarily equal the sums of rounded components.

Table VI.C3.—Operations of the Combined OASI and DI Trust Funds, Fiscal Year 2018
[In millions]

Total asset reserves, September 30, 2017.		$2,889,545
Income:		
Net payroll tax contributions:		
Payroll tax contributions[a].	$876,174	
Payments from the General Fund of the Treasury for payroll tax contributions subject to refund[a]	-3,003	
Net payroll tax contributions[a].		873,171
Reimbursements from the General Fund:		
Reduction in payroll tax contributions due to P.L.s 111-312, 112-78, and 112-96[a].	13	
Payroll tax credits due to P.L. 98-21[a].	b	
Net General Fund reimbursements[a]		13
Income based on taxation of benefit payments:		
Withheld from benefit payments to nonresident aliens	218	
All other, not subject to withholding[a]	35,500	
Total income from taxation of benefits[a].		35,718
Investment income and interest adjustments:		
Interest on investments.	83,808	
Interest adjustments[c]	3	
Total investment income and interest adjustments.		83,811
Gifts		b
Total income.		992,712
Cost:		
Benefit payments:		
Monthly benefits and lump-sum death payments[d].	976,613	
Reimbursement from the General Fund for unnegotiated checks	-56	
Payment for costs of vocational rehabilitation services for disabled beneficiaries .	119	
Net benefit payments[d]		976,676
Financial interchange with the Railroad Retirement "Social Security Equivalent Benefit Account".		4,942
Administrative expenses:		
Costs incurred by:		
Social Security Administration.	5,818	
Department of the Treasury	606	
Offsetting miscellaneous receipts.	-2	
Demonstration projects.	18	
Miscellaneous reimbursements from the General Fund[e]	-10	
Net administrative expenses.		6,430
Total cost		988,049
Net increase in asset reserves.		4,663
Total invested assets.	2,894,654	
Undisbursed balances[f]	-447	
Total asset reserves, September 30, 2018.		2,894,208

[a] Includes adjustments for prior years.
[b] Between -$0.5 and $0.5 million.
[c] Includes: (1) interest on adjustments in the allocation of administrative expenses between the trust funds and the General Fund account for the Supplemental Security Income program, (2) interest arising from the revised allocation of administrative expenses among the trust funds, and (3) interest on certain reimbursements to the trust funds.
[d] Includes net reductions for the recovery of overpayments.
[e] Reimbursements for costs incurred in performing certain legislatively mandated activities not directly related to administering the OASI and DI programs.
[f] A negative net balance represents a situation where the actual combined program cash payments exceeded the amount of invested securities of the OASI and DI Trust Funds that were redeemed to make such payments. In this situation, future net redemption of additional invested securities will be required to pay for this shortfall.

Note: Totals do not necessarily equal the sums of rounded components.

Tables VI.C4, VI.C5, and VI.C6 show estimates of the operations and status of the OASI, DI, and the hypothetical combined OASI and DI Trust Funds, respectively, during fiscal years 2014 through 2028.

Table VI.C4.—Operations of the OASI Trust Fund, Fiscal Years 2014-2028
[Dollar amounts in billions]

		Income					Cost				Asset Reserves		
Fiscal year	Total	Net pay-roll tax contri-butions	GF reim-burse-ments[a]	Taxa-tion of bene-fits[b]	Net interest	Total	Sched-uled benefits	Admin-istra-tive costs	RRB inter-change	Net increase during year	Amount at end of year	Trust fund ratio[c]
Historical data:												
2014 .	$763.3	$642.3	$0.1	$24.6	$96.3	$705.6	$698.2	$3.2	$4.3	$57.6	$2,712.7	376
2015 .	795.3	672.2	.2	29.6	93.2	741.5	733.7	3.5	4.3	53.9	2,766.6	366
2016 .	799.9	679.6	.1	31.1	89.1	769.8	762.1	3.4	4.3	30.1	2,796.6	359
2017 .	822.4	702.1	d	35.4	84.9	799.0	791.1	3.6	4.3	23.5	2,820.1	350
2018 .	822.4	706.1	d	34.7	81.6	841.5	833.0	3.7	4.8	-19.0	2,801.1	335
Intermediate:												
2019 .	898.6	783.8	d	35.0	79.7	896.0	887.2	3.9	4.9	2.6	2,803.6	313
2020 .	948.6	832.5	d	37.7	78.5	949.4	940.5	3.9	4.9	-0.8	2,802.9	295
2021 .	997.3	878.2	d	41.4	77.8	1,009.7	1,000.8	4.0	4.9	-12.4	2,790.5	278
2022 .	1,045.6	923.5	d	45.2	76.9	1,076.0	1,066.6	4.1	5.2	-30.4	2,760.1	259
2023 .	1,089.4	965.7	d	49.2	74.5	1,146.3	1,136.7	4.3	5.3	-56.9	2,703.2	241
2024 .	1,141.6	1,013.2	d	53.6	74.8	1,221.3	1,211.4	4.4	5.4	-79.7	2,623.6	221
2025 .	1,192.9	1,059.5	d	58.5	75.0	1,299.2	1,289.3	4.5	5.5	-106.3	2,517.2	202
2026 .	1,257.0	1,111.1	d	71.3	74.6	1,381.1	1,370.8	4.7	5.6	-124.1	2,393.1	182
2027 .	1,315.1	1,159.4	d	80.0	75.6	1,467.3	1,456.8	4.8	5.6	-152.2	2,240.9	163
2028 .	1,379.8	1,218.7	d	87.0	74.1	1,560.9	1,550.2	5.0	5.7	-181.1	2,059.9	144
Low-cost:												
2019 .	903.4	787.7	d	35.0	80.7	895.8	887.0	3.9	4.9	7.6	2,808.7	313
2020 .	976.1	857.1	d	37.9	81.1	954.2	945.4	3.9	4.9	21.8	2,830.5	294
2021 .	1,047.5	921.7	d	41.8	84.0	1,020.0	1,011.1	4.0	4.9	27.5	2,858.0	278
2022 .	1,118.4	985.6	d	45.9	86.9	1,092.1	1,082.7	4.2	5.2	26.3	2,884.4	262
2023 .	1,187.9	1,047.6	d	50.2	90.1	1,169.3	1,159.6	4.4	5.3	18.6	2,903.0	247
2024 .	1,267.9	1,116.9	d	55.0	96.0	1,252.0	1,242.0	4.6	5.4	15.8	2,918.8	232
2025 .	1,349.9	1,187.0	d	60.2	102.7	1,338.7	1,328.5	4.8	5.5	11.2	2,930.1	218
2026 .	1,448.6	1,264.4	d	73.8	110.3	1,430.6	1,419.9	5.0	5.6	18.0	2,948.0	205
2027 .	1,542.7	1,338.9	d	83.4	120.5	1,528.5	1,517.6	5.3	5.7	14.2	2,962.3	193
2028 .	1,649.3	1,428.3	d	91.2	129.8	1,635.7	1,624.4	5.5	5.7	13.6	2,975.9	181
High-cost:												
2019 .	894.9	780.3	d	35.1	79.5	896.4	887.6	3.9	4.9	-1.5	2,799.5	312
2020 .	915.0	801.4	d	37.6	76.0	946.9	938.0	3.9	5.0	-31.9	2,767.6	296
2021 .	930.4	818.6	d	41.1	70.7	1,003.2	994.2	4.0	5.0	-72.8	2,694.8	276
2022 .	958.8	848.5	d	44.7	65.7	1,064.9	1,055.5	4.1	5.3	-106.1	2,588.8	253
2023 .	983.1	873.5	d	48.5	61.1	1,130.1	1,120.5	4.2	5.4	-147.0	2,441.8	229
2024 .	1,013.1	904.2	d	52.6	56.2	1,199.0	1,189.3	4.2	5.5	-185.9	2,255.8	204
2025 .	1,043.9	934.8	d	57.2	51.9	1,270.1	1,260.3	4.3	5.5	-226.2	2,029.7	178
2026 .	1,086.7	970.7	d	69.3	46.7	1,344.1	1,334.1	4.4	5.6	-257.4	1,772.3	151
2027 .	1,122.2	1,002.2	d	77.5	42.5	1,421.3	1,411.2	4.5	5.6	-299.2	1,473.1	125
2028 .	1,160.4	1,041.0	d	83.9	35.6	1,504.6	1,494.3	4.6	5.6	-344.1	1,129.0	98

[a] Includes reimbursements from the General Fund of the Treasury to the OASI Trust Fund for: (1) the cost of payroll tax credits provided to employees in 1984 and self-employed persons in 1984-89 by Public Law 98-21; (2) the cost in 2009-17 of excluding certain self-employment earnings from SECA taxes under Public Law 110-246; and (3) payroll tax revenue forgone under the provisions of Public Laws 111-147, 111-312, 112-78, and 112-96.

[b] Revenue from taxation of benefits is the amount that would be assessed on benefit amounts scheduled in the law.

[c] The "Trust fund ratio" column represents asset reserves at the beginning of a year (which are identical to reserves at the end of the prior year shown in the "Amount at end of year" column) as a percentage of cost for the year.

[d] Between -$50 million and $50 million.

Note: Totals do not necessarily equal the sums of rounded components.

Table VI.C5.—Operations of the DI Trust Fund, Fiscal Years 2014-2028[a]
[Dollar amounts in billions]

Fiscal year	Income					Cost				Asset Reserves		
	Total	Net pay-roll tax contri-butions	GF reim-burse-ments[b]	Taxa-tion of bene-fits[c]	Net interest	Total	Sched-uled benefits	Admin-istra-tive costs	RRB inter-change	Net increase during year	Amount at end of year	Trust fund ratio[d]
Historical data:												
2014 .	$114.1	$109.1	e	$1.0	$4.0	$144.7	$141.3	$2.9	$0.4	-$30.6	$69.9	69
2015 .	118.0	114.2	e	1.0	2.7	146.2	142.9	2.9	.4	-28.3	41.7	48
2016 .	150.3	147.6	e	1.2	1.5	146.2	143.1	2.8	.4	4.1	45.7	28
2017 .	169.5	165.9	e	2.0	1.6	145.8	142.9	2.7	.2	23.7	69.4	31
2018 .	170.3	167.0	e	1.0	2.2	146.6	143.6	2.8	.2	23.7	93.1	47
Intermediate:												
2019 .	150.5	146.3	e	1.2	2.9	148.6	145.6	2.9	.1	1.9	95.0	63
2020 .	146.0	141.4	e	1.7	3.0	150.6	147.6	2.9	.1	-4.6	90.4	63
2021 .	153.9	149.1	e	1.8	3.0	153.6	150.5	3.0	.1	.3	90.8	59
2022 .	161.7	156.8	e	1.9	3.0	157.9	154.6	3.3	.1	3.7	94.5	57
2023 .	169.1	164.0	e	2.0	3.1	163.0	159.5	3.5	.1	6.1	100.6	58
2024 .	177.8	172.1	e	2.2	3.6	169.4	165.6	3.8	e	8.3	108.9	59
2025 .	186.3	179.9	e	2.3	4.0	177.3	173.2	4.1	e	9.0	117.9	61
2026 .	196.1	188.7	e	2.9	4.6	185.7	181.3	4.3	e	10.5	128.4	64
2027 .	205.3	196.9	e	3.2	5.2	194.5	189.9	4.6	e	10.8	139.2	66
2028 .	216.3	206.9	e	3.5	5.9	202.1	197.2	4.9	e	14.2	153.4	69
Low-cost:												
2019 .	151.2	147.0	e	1.2	3.0	147.2	144.2	2.9	.1	4.0	97.2	63
2020 .	150.6	145.5	e	1.6	3.4	148.2	145.2	2.9	.1	2.4	99.6	66
2021 .	162.1	156.5	e	1.7	3.8	150.2	147.1	3.0	.1	11.9	111.5	66
2022 .	173.8	167.4	e	1.8	4.6	153.5	150.1	3.3	.1	20.3	131.8	73
2023 .	185.7	177.9	e	1.9	5.8	157.6	154.0	3.6	e	28.0	159.9	84
2024 .	199.4	189.7	e	2.1	7.7	163.0	159.0	3.9	e	36.5	196.4	98
2025 .	213.8	201.6	e	2.2	10.0	169.8	165.6	4.2	e	44.0	240.3	116
2026 .	230.4	214.7	e	2.7	13.0	177.4	172.8	4.6	e	53.0	293.4	135
2027 .	246.9	227.4	e	3.1	16.5	185.5	180.6	4.9	e	61.4	354.8	158
2028 .	266.5	242.5	e	3.3	20.6	192.7	187.4	5.3	e	73.8	428.6	184
High-cost:												
2019 .	149.8	145.7	e	1.2	2.9	150.2	147.3	2.9	.1	-.4	92.8	62
2020 .	140.5	136.1	e	1.7	2.7	154.4	151.3	2.9	.1	-13.9	78.9	60
2021 .	143.1	139.0	e	1.8	2.3	158.9	155.7	3.0	.1	-15.7	63.1	50
2022 .	147.6	144.1	e	2.0	1.6	163.8	160.4	3.3	.1	-16.2	46.9	39
2023 .	151.5	148.3	e	2.1	1.1	168.9	165.3	3.5	.1	-17.4	29.6	28
2024 .	156.4	153.6	e	2.2	.6	175.4	171.6	3.7	.1	-19.0	10.6	17
2025 .	f	158.7	e	2.4	f	183.5	179.6	3.9	.1	f	f	6
2026 .	f	164.8	e	3.0	f	192.2	188.0	4.1	.1	f	f	f
2027 .	f	170.2	e	3.3	f	201.2	196.8	4.4	e	f	f	f
2028 .	f	176.8	e	3.6	f	208.9	204.2	4.6	.1	f	f	f

[a] The DI Trust Fund becomes depleted in fiscal year 2025 under the high-cost assumptions. For any period during which reserves would be depleted, scheduled benefits could not be paid in full on a timely basis, income from taxing benefits would be less than would apply to scheduled benefits, and interest on trust fund reserves would be negligible.

[b] Includes reimbursements from the General Fund of the Treasury to the DI Trust Fund for: (1) the cost of pay-roll tax credits provided to employees in 1984 and self-employed persons in 1984-89 by Public Law 98-21; (2) the cost in 2009-17 of excluding certain self-employment earnings from SECA taxes under Public Law 110-246; and (3) payroll tax revenue forgone under the provisions of Public Laws 111-147, 111-312, 112-78, and 112-96.

[c] Revenue from taxation of benefits is the amount that would be assessed on benefit amounts scheduled in the law.

[d] The "Trust fund ratio" column represents asset reserves at the beginning of a year (which are identical to reserves at the end of the prior year shown in the "Amount at end of year" column) as a percentage of cost for the year.

[e] Between -$50 million and $50 million.

[f] While the fund is depleted, values under current law would reflect permissible expenditures only, which are inconsistent with the cost of scheduled benefits shown in this table.

Note: Totals do not necessarily equal the sums of rounded components.

Table VI.C6.—Operations of the Combined OASI and DI Trust Funds,
Fiscal Years 2014-2028
[Dollar amounts in billions]

	Income					Cost				Asset Reserves		
Fiscal year	Total	Net pay-roll tax contri-butions	GF reim-burse-ments[a]	Taxa-tion of bene-fits[b]	Net interest	Total	Sched-uled benefits	Admin-istra-tive costs	RRB inter-change	Net increase during year	Amount at end of year	Trust fund ratio[c]
Historical data:												
2014. .	$877.4	$751.3	$0.2	$25.7	$100.3	$850.3	$839.6	$6.0	$4.7	$27.1	$2,782.6	324
2015. .	913.3	786.4	.3	30.7	96.0	887.7	876.6	6.4	4.7	25.6	2,808.2	313
2016. .	950.2	827.1	.2	32.3	90.6	916.0	905.2	6.2	4.7	34.1	2,842.4	307
2017. .	991.9	868.0	d	37.4	86.5	944.7	934.0	6.2	4.5	47.2	2,889.5	301
2018. .	992.7	873.2	d	35.7	83.8	988.0	976.7	6.4	4.9	4.7	2,894.2	292
Intermediate:												
2019. .	1,049.1	930.2	d	36.3	82.6	1,044.6	1,032.9	6.7	5.0	4.5	2,898.7	277
2020. .	1,094.7	973.8	d	39.3	81.5	1,100.0	1,088.1	6.9	5.0	-5.4	2,893.3	264
2021. .	1,151.2	1,027.3	d	43.1	80.8	1,163.3	1,151.3	7.0	5.0	-12.1	2,881.3	249
2022. .	1,207.3	1,080.3	d	47.1	79.9	1,233.9	1,221.2	7.4	5.3	-26.6	2,854.6	234
2023. .	1,258.5	1,129.6	d	51.2	77.6	1,309.3	1,296.1	7.8	5.4	-50.9	2,803.8	218
2024. .	1,319.4	1,185.2	d	55.8	78.4	1,390.7	1,377.0	8.2	5.5	-71.3	2,732.5	202
2025. .	1,379.2	1,239.4	d	60.8	79.0	1,476.5	1,462.4	8.6	5.5	-97.3	2,635.2	185
2026. .	1,453.1	1,299.8	d	74.1	79.2	1,566.8	1,552.1	9.0	5.6	-113.6	2,521.5	168
2027. .	1,520.4	1,356.3	d	83.2	80.9	1,661.8	1,646.7	9.4	5.6	-141.4	2,380.1	152
2028. .	1,596.2	1,425.7	d	90.5	80.0	1,763.0	1,747.5	9.8	5.7	-166.9	2,213.3	135
Low-cost:												
2019. .	1,054.6	934.7	d	36.2	83.7	1,042.9	1,031.2	6.7	5.0	11.7	2,905.9	278
2020. .	1,126.6	1,002.7	d	39.5	84.4	1,102.4	1,090.6	6.9	5.0	24.2	2,930.1	264
2021. .	1,209.6	1,078.3	d	43.5	87.8	1,170.1	1,158.1	7.0	4.9	39.4	2,969.5	250
2022. .	1,292.2	1,153.0	d	47.7	91.5	1,245.6	1,232.8	7.5	5.2	46.7	3,016.2	238
2023. .	1,373.5	1,225.5	d	52.1	95.9	1,326.9	1,313.5	8.0	5.3	46.7	3,062.9	227
2024. .	1,467.3	1,306.6	d	57.0	103.7	1,415.0	1,401.0	8.5	5.4	52.3	3,115.2	216
2025. .	1,563.8	1,388.5	d	62.5	112.8	1,508.6	1,494.1	9.0	5.5	55.2	3,170.4	206
2026. .	1,679.0	1,479.1	d	76.5	123.3	1,608.0	1,592.8	9.6	5.6	71.0	3,241.4	197
2027. .	1,789.6	1,566.2	d	86.4	137.0	1,714.0	1,698.2	10.2	5.7	75.6	3,317.1	189
2028. .	1,915.7	1,670.8	d	94.5	150.4	1,828.3	1,811.8	10.7	5.7	87.4	3,404.5	181
High-cost:												
2019. .	1,044.7	926.0	d	36.3	82.4	1,046.6	1,034.9	6.7	5.0	-1.9	2,892.3	277
2020. .	1,055.5	937.5	d	39.3	78.7	1,101.3	1,089.4	6.9	5.1	-45.8	2,846.5	263
2021. .	1,073.6	957.6	d	42.9	73.0	1,162.1	1,149.9	7.0	5.1	-88.5	2,758.0	245
2022. .	1,106.5	992.5	d	46.7	67.2	1,228.7	1,216.0	7.3	5.4	-122.3	2,635.7	224
2023. .	1,134.6	1,021.9	d	50.6	62.2	1,299.0	1,285.9	7.7	5.5	-164.3	2,471.4	203
2024. .	1,169.5	1,057.8	d	54.9	56.9	1,374.4	1,361.0	8.0	5.5	-204.9	2,266.4	180
2025. .	1,205.0	1,093.6	d	59.6	51.9	1,453.6	1,439.8	8.3	5.5	-248.6	2,017.8	156
2026. .	1,253.7	1,135.5	d	72.3	45.9	1,536.3	1,522.1	8.6	5.6	-282.6	1,735.2	131
2027. .	1,293.7	1,172.3	d	80.9	40.5	1,622.5	1,608.0	8.9	5.6	-328.8	1,406.4	107
2028. .	1,337.7	1,217.8	d	87.5	32.4	1,713.4	1,698.6	9.2	5.7	-375.8	1,030.6	82

[a] Includes reimbursements from the General Fund of the Treasury to the OASI and DI Trust Funds for: (1) the cost of payroll tax credits provided to employees in 1984 and self-employed persons in 1984-89 by Public Law 98-21; (2) the cost in 2009-17 of excluding certain self-employment earnings from SECA taxes under Public Law 110-246; and (3) payroll tax revenue forgone under the provisions of Public Laws 111-147, 111-312, 112-78, and 112-96.

[b] Revenue from taxation of benefits is the amount that would be assessed on benefit amounts scheduled in the law.

[c] The "Trust fund ratio" column represents asset reserves at the beginning of a year (which are identical to reserves at the end of the prior year shown in the "Amount at end of year" column) as a percentage of cost for the year.

[d] Between -$50 million and $50 million.

D. LONG-RANGE SENSITIVITY ANALYSIS

This appendix presents estimates that illustrate the sensitivity of the long-range actuarial status of the OASDI program to changes in selected individual assumptions. The estimates based on the three alternative sets of assumptions, which were presented earlier in this report, illustrate the effects of varying all of the principal assumptions simultaneously, in order to portray a significantly more optimistic or pessimistic future. For each sensitivity analysis presented in this appendix, the intermediate alternative II projection is the reference point, and one assumption is varied within that alternative. The variation used for each individual assumption is the same as the level used for that assumption in the low-cost alternative I and high-cost alternative III projections.

Each table in this section shows the effects of changing a particular assumption on the OASDI summarized income rates, summarized cost rates, and actuarial balances for 25-year, 50-year, and 75-year valuation periods. Following each table is a discussion of the estimated changes in cost rates. The change in each of the actuarial balances is approximately equal to the change in the corresponding cost rate, but in the opposite direction. This appendix does not discuss income rates following each table because income rates vary only slightly with changes in assumptions that affect revenue from taxation of benefits.

1. Total Fertility Rate

Table VI.D1 shows OASDI income rates, cost rates, and actuarial balances on the basis of alternative II with three different assumptions about the ultimate total fertility rate. The Trustees assume that total fertility will ultimately be 1.8, 2.0, and 2.2 children per woman under alternatives III, II, and I, respectively. The total fertility rate reaches ultimate values in 2024, 2027, and 2027 under alternatives III, II, and I, respectively.

Table VI.D1.—Sensitivity of OASDI Measures to Fertility Assumptions
[As a percentage of taxable payroll]

Valuation period	Ultimate total fertility rate[a] [b]		
	1.8	2.0	2.2
Summarized income rate:			
25-year: 2019-43	14.55	14.55	14.55
50-year: 2019-68	13.99	13.97	13.96
75-year: 2019-93	13.86	13.81	13.77
Summarized cost rate:			
25-year: 2019-43	16.26	16.28	16.29
50-year: 2019-68	16.55	16.36	16.17
75-year: 2019-93	17.07	16.60	16.14
Actuarial balance:			
25-year: 2019-43	-1.71	-1.73	-1.74
50-year: 2019-68	-2.55	-2.38	-2.22
75-year: 2019-93	-3.22	-2.78	-2.37
Annual balance for 2093	-5.63	-4.11	-2.82
Year of combined trust fund reserve depletion	2035	2035	2035

[a] The total fertility rate for any year is the average number of children that would be born to a woman if she were to experience, at each age of her life, the birth rate observed in, or assumed for, the selected year, and if she were to survive the entire childbearing period. The ultimate total fertility rate is reached in 2024, 2027, and 2027 under alternatives III, II, and I, respectively.
[b] Ultimate total fertility rates used for this analysis are: 1.8 from the alternative III assumptions, 2.0 from the alternative II assumptions, and 2.2 from the alternative I assumptions. All other assumptions used for this analysis are from alternative II.

For the 25-year period, the cost rate for the three fertility assumptions varies by only about 0.03 percent of taxable payroll. In contrast, the 75-year cost rate varies over a wide range, decreasing from 17.07 to 16.14 percent, as the assumed ultimate total fertility rate increases from 1.8 to 2.2. Similarly, while the 25-year actuarial balance varies by only 0.03 percent of taxable payroll, the 75-year actuarial balance varies over a much wider range, from -3.22 to -2.37 percent.

During the 25-year period, the very slight increases in the working population resulting from higher fertility (than that experienced in an alternative scenario) are more than offset by decreases in the female labor force and increases in the number of child beneficiaries. Therefore, program cost increases slightly with higher fertility. For the 75-year long-range period, however, changes in fertility have a relatively greater effect on the labor force than on the beneficiary population. As a result, an increase in fertility significantly reduces the cost rate. Each increase of 0.1 in the ultimate total fertility rate increases the long-range actuarial balance by about 0.21 percent of taxable payroll.

2. Death Rates

Table VI.D2 shows OASDI income rates, cost rates, and actuarial balances on the basis of alternative II with three different assumptions about future

reductions in death rates for the period from 2018 to 2093. These assumptions are described in section V.A.2. The Trustees assume that the age-sex-adjusted death rates will decline at average annual rates of 0.41 percent, 0.77 percent, and 1.16 percent for alternatives I, II, and III, respectively.

Table VI.D2.—Sensitivity of OASDI Measures to Death-Rate Assumptions
[As a percentage of taxable payroll]

Valuation period	Average annual death-rate reduction[a] [b]		
	0.41 percent	0.77 percent	1.16 percent
Summarized income rate:			
25-year: 2019-43	14.55	14.55	14.55
50-year: 2019-68	13.96	13.97	13.99
75-year: 2019-93	13.79	13.81	13.83
Summarized cost rate:			
25-year: 2019-43	16.14	16.28	16.43
50-year: 2019-68	16.02	16.36	16.73
75-year: 2019-93	16.10	16.60	17.13
Actuarial balance:			
25-year: 2019-43	-1.59	-1.73	-1.89
50-year: 2019-68	-2.06	-2.38	-2.74
75-year: 2019-93	-2.31	-2.78	-3.29
Annual balance for 2093	-3.12	-4.11	-5.11
Year of combined trust fund reserve depletion	2035	2035	2035

[a] The average annual death-rate reduction is the average annual geometric rate of decline in the age-sex-adjusted death rate between 2018 and 2093. The overall age-sex-adjusted death rate decreases from 2018 to 2093 by 26 percent, 44 percent, and 58 percent for alternatives I, II, and III, respectively.
[b] The average annual death-rate reductions used for this analysis are: 0.41 percent from the alternative I assumptions, 0.77 percent from the alternative II assumptions, and 1.16 percent from the alternative III assumptions. All other assumptions used for this analysis are from alternative II.

The variation in cost for the 25-year period is less pronounced than the variation for the 75-year period because decreases in death rates have cumulative effects. The 25-year cost rate increases from 16.14 percent (for an average annual death-rate reduction of 0.41 percent over the entire long-range period) to 16.43 percent (for an average annual death-rate reduction of 1.16 percent over the entire long-range period). The 75-year cost rate increases from 16.10 to 17.13 percent. The actuarial balance decreases from -1.59 to -1.89 percent for the 25-year period, and from -2.31 to -3.29 percent for the 75-year period.

Lower death rates raise both the income (through increased taxable payroll) and the cost of the OASDI program. The relative increase in cost, however, exceeds the relative increase in taxable payroll. For any given year, reductions in the death rates for people who are age 62 and over (ages at which death rates are the highest) increase the number of retired-worker beneficiaries (and, therefore, the amount of retirement benefits paid) without adding significantly to the number of covered workers (and, therefore, to the taxable

payroll). Reductions for people at age 50 to retirement eligibility age result in significant increases to the taxable payroll. However, those increases are not large enough to offset the sum of the additional retirement benefits mentioned above and the disability benefits paid to additional beneficiaries at these pre-retirement ages, which are ages of high disability incidence. At ages under 50, death rates are so low that even substantial reductions in death rates do not result in significant increases in the numbers of covered workers or beneficiaries. Consequently, if death rates decline by about the same relative amount for all ages, the cost increases faster than the rate of growth in payroll, which results in higher cost rates and lower actuarial balances. Each additional 0.1-percentage-point increase in the average annual rate of decline in the death rate decreases the long-range actuarial balance by about 0.13 percent of taxable payroll.

3. Immigration

Table VI.D3 shows OASDI income rates, cost rates, and actuarial balances under alternative II with three different assumptions about the magnitude of total net immigration (sum of net lawful permanent resident (LPR) immigration and net other-than-LPR immigration). See section V.A.3 for more information on immigration assumptions and methods. The Trustees assume annual levels of immigration and emigration, with total net annual immigration averaging 949,000 persons, 1,265,000 persons, and 1,601,000 persons over the long-range period under alternatives III, II, and I, respectively.

Table VI.D3.—Sensitivity of OASDI Measures to Total Net Immigration Assumptions
[As a percentage of taxable payroll]

	Average annual total net immigration[a] [b]		
Valuation period	949,000	1,265,000	1,601,000
Summarized income rate:			
25-year: 2019-43	14.57	14.55	14.52
50-year: 2019-68	14.01	13.97	13.94
75-year: 2019-93	13.84	13.81	13.78
Summarized cost rate:			
25-year: 2019-43	16.44	16.28	16.11
50-year: 2019-68	16.59	16.36	16.12
75-year: 2019-93	16.87	16.60	16.33
Actuarial balance:			
25-year: 2019-43	-1.87	-1.73	-1.59
50-year: 2019-68	-2.59	-2.38	-2.18
75-year: 2019-93	-3.03	-2.78	-2.55
Annual balance for 2093	-4.56	-4.11	-3.72
Year of combined trust fund reserve depletion	2035	2035	2036

[a] Average annual total net immigration is the annual total net immigration to the Social Security area, including both LPR and other-than-LPR immigration, averaged over the 75-year projection period.
[b] The average annual total net immigration assumptions used for this analysis are: 949,000 from the alternative III assumptions, 1,265,000 from the alternative II assumptions, and 1,601,000 from the alternative I assumptions. All other assumptions used for this analysis are from alternative II.

For all three periods, when total net immigration increases, the cost rate decreases. For the 25-year period, the cost rate decreases from 16.44 percent of taxable payroll (for an average annual total net immigration of 949,000 persons over the entire long-range period) to 16.11 percent (for an average annual total net immigration of 1,601,000 persons over the entire long-range period). For the 50-year period, it decreases from 16.59 percent to 16.12 percent, and for the 75-year period, it decreases from 16.87 percent to 16.33 percent. The actuarial balance increases from -1.87 to -1.59 percent for the 25-year period, from -2.59 to -2.18 percent for the 50-year period, and from -3.03 to -2.55 percent for the 75-year period.

The cost rate decreases with an increase in total net immigration because immigration occurs at relatively young ages, thereby increasing the numbers of covered workers earlier than the numbers of beneficiaries. Increasing average annual total net immigration by 100,000 persons improves the long-range actuarial balance by about 0.07 percent of taxable payroll.

4. Real-Wage Differential

Table VI.D4 shows OASDI income rates, cost rates, and actuarial balances on the basis of alternative II with three different assumptions about the real-wage differential. The Trustees assume the ultimate real-wage differential will be 0.60 percentage point, 1.21 percentage points, and 1.84 percentage points under alternatives III, II, and I, respectively. In each case, the ultimate annual increase in the CPI is 2.60 percent (consistent with alternative II). Therefore, the ultimate percentage increases in average annual wages in covered employment are 3.20, 3.81, and 4.44 percent.

For the 25-year period, the cost rate decreases from 17.07 percent (for a real-wage differential of 0.60 percentage point) to 15.49 percent (for a differential of 1.84 percentage points). For the 50-year period, it decreases from 17.51 to 15.23 percent, and for the 75-year period it decreases from 17.87 to 15.34 percent. The actuarial balance increases from -2.39 to -1.07 percent for the 25-year period, from -3.37 to -1.41 percent for the 50-year period, and from -3.88 to -1.70 percent for the 75-year period.

Table VI.D4.—Sensitivity of OASDI Measures to Real-Wage Assumptions
[As a percentage of taxable payroll]

Valuation period	Ultimate percentage increase in wages-CPI[a][b]		
	3.20-2.60	3.81-2.60	4.44-2.60
Summarized income rate:			
25-year: 2019-43	14.67	14.55	14.42
50-year: 2019-68	14.14	13.97	13.82
75-year: 2019-93	13.99	13.81	13.64
Summarized cost rate:			
25-year: 2019-43	17.07	16.28	15.49
50-year: 2019-68	17.51	16.36	15.23
75-year: 2019-93	17.87	16.60	15.34
Actuarial balance:			
25-year: 2019-43	-2.39	-1.73	-1.07
50-year: 2019-68	-3.37	-2.38	-1.41
75-year: 2019-93	-3.88	-2.78	-1.70
Annual balance for 2093	-6.03	-4.11	-2.42
Year of combined trust fund reserve depletion	2033	2035	2038

[a] The first value in each pair is the ultimate annual percentage increase in average wages in covered employment. The second value is the ultimate annual percentage increase in the Consumer Price Index. The difference between the two values is the ultimate real-wage differential.
[b] The ultimate real-wage differentials of 0.60, 1.21, and 1.84 percentage points are the same as in alternatives III, II, and I, respectively. All other assumptions used for this analysis are from alternative II.

The cost rate decreases with increasing real-wage differentials. Higher wages increase taxable payroll immediately, but they increase benefit levels only gradually as new beneficiaries become entitled. In addition, cost-of-living adjustments (COLAs) to benefits depend not on changes in wages, but on changes in prices. Each 0.1-percentage-point increase in the real-wage differential increases the long-range actuarial balance by about 0.18 percent of taxable payroll.

5. Consumer Price Index

Table VI.D5 shows OASDI income rates, cost rates, and actuarial balances on the basis of alternative II with three different assumptions about the rate of increase for the Consumer Price Index (CPI). The Trustees assume the annual increase in the CPI will be 3.20 percent, 2.60 percent, and 2.00 percent under alternatives I, II, and III, respectively.[1] In each case, the ultimate real-wage differential is 1.21 percentage points (consistent with alternative II), yielding ultimate percentage increases in average annual wages in covered employment of 4.41, 3.81, and 3.21 percent.

---

[1] Prior to the 2014 report, alternative I included a lower ultimate annual change in the CPI and alternative III included a higher ultimate annual change in the CPI than was included for alternative II.

Table VI.D5.—Sensitivity of OASDI Measures to CPI-Increase Assumptions
[As a percentage of taxable payroll]

Valuation period	Ultimate percentage increase in wages-CPI[a][b]		
	4.41-3.20	3.81-2.60	3.21-2.00
Summarized income rate:			
25-year: 2019-43	14.53	14.55	14.57
50-year: 2019-68	13.96	13.97	13.99
75-year: 2019-93	13.80	13.81	13.83
Summarized cost rate:			
25-year: 2019-43	16.18	16.28	16.38
50-year: 2019-68	16.23	16.36	16.50
75-year: 2019-93	16.46	16.60	16.75
Actuarial balance:			
25-year: 2019-43	-1.65	-1.73	-1.81
50-year: 2019-68	-2.27	-2.38	-2.50
75-year: 2019-93	-2.66	-2.78	-2.92
Annual balance for 2093	-3.95	-4.11	-4.29
Year of combined trust fund reserve depletion	2035	2035	2035

[a] The first value in each pair is the ultimate annual percentage increase in average wages in covered employment. The second value is the ultimate annual percentage increase in the Consumer Price Index. The difference between the two values is the ultimate real-wage differential.
[b] The ultimate CPI increases of 3.20, 2.60, and 2.00 percent are the same as in alternatives I, II, and III, respectively. The ultimate real-wage differential of 1.21 percentage points is the same as in alternative II. All other assumptions used for this analysis are also from alternative II.

For all three periods, the cost rate increases when the assumed rates of increase in the CPI are smaller. For the 25-year period, the cost rate increases from 16.18 (for CPI increases of 3.20 percent) to 16.38 percent (for CPI increases of 2.00 percent). For the 50-year period, it increases from 16.23 to 16.50 percent, and for the 75-year period, it increases from 16.46 to 16.75 percent. The actuarial balance decreases from -1.65 to -1.81 percent for the 25-year period, from -2.27 to -2.50 percent for the 50-year period, and from -2.66 to -2.92 percent for the 75-year period.

The time lag between the effects of the CPI changes on taxable payroll and on scheduled benefits explains these patterns. When the rate of increase in the CPI is greater and the real-wage differential is constant, then: (1) the effect on taxable payroll due to a greater rate of increase in average wages occurs immediately and (2) the effect on benefits due to a larger COLA occurs with a lag of about 1 year. As a result of these effects, the higher taxable payrolls have a stronger effect than the higher benefits, which results in lower cost rates. Each 0.1-percentage-point decrease in the rate of the change in the CPI decreases the long-range actuarial balance by about 0.02 percent of taxable payroll.

Appendices

6. Real Interest Rate

Table VI.D6 shows OASDI income rates, cost rates, and actuarial balances under alternative II with three different assumptions about the annual real interest rate (compounded semiannually) for special public-debt obligations issuable to the trust funds. The Trustees assume that the ultimate annual real interest rate will be 2.0 percent, 2.5 percent, and 3.0 percent under alternatives III, II, and I, respectively. In each case, the ultimate annual increase in the CPI is 2.60 percent, which is consistent with alternative II. Therefore, the ultimate annual yields are 4.7, 5.2, and 5.7 percent, respectively.

Table VI.D6.—Sensitivity of OASDI Measures to Real-Interest Assumptions
[As a percentage of taxable payroll]

Valuation period	Ultimate annual real interest rate[a][b]		
	2.0 percent	2.5 percent	3.0 percent
Summarized income rate:			
25-year: 2019-43	14.50	14.55	14.60
50-year: 2019-68	13.91	13.97	14.04
75-year: 2019-93	13.74	13.81	13.88
Summarized cost rate:			
25-year: 2019-43	16.34	16.28	16.21
50-year: 2019-68	16.44	16.36	16.28
75-year: 2019-93	16.71	16.60	16.48
Actuarial balance:			
25-year: 2019-43	-1.84	-1.73	-1.61
50-year: 2019-68	-2.53	-2.38	-2.24
75-year: 2019-93	-2.97	-2.78	-2.60
Annual balance for 2093	-4.11	-4.11	-4.11
Year of combined trust fund reserve depletion	2035	2035	2035

[a] The ultimate real interest rate is the effective annual yield on asset reserves held by the trust funds divided by the annual rate of growth in the CPI.
[b] The ultimate annual real interest rates used for this analysis are: 2.0 percent from the alternative III assumptions, 2.5 percent from the alternative II assumptions, and 3.0 percent from the alternative I assumptions. All other assumptions used for this analysis are from alternative II.

For the 25-year period, the cost rate decreases with increasing real interest rates from 16.34 percent (for an ultimate real interest rate of 2.0 percent) to 16.21 percent (for an ultimate real interest rate of 3.0 percent). For the 50-year period, it decreases from 16.44 to 16.28 percent and, for the 75-year period, it decreases from 16.71 to 16.48 percent. The actuarial balance increases from -1.84 to -1.61 percent for the 25-year period, from -2.53 to -2.24 percent for the 50-year period, and from -2.97 to -2.60 percent for the 75-year period. Each 0.1-percentage-point increase in the real interest rate increases the long-range actuarial balance by about 0.04 percent of taxable payroll.

7. Taxable Ratio

Table VI.D7 shows OASDI income rates, cost rates, and actuarial balances under alternative II with three different assumptions about the ratio of taxable payroll to covered earnings (the taxable ratio). Note that covered earnings are the sum of wages and net self-employment earnings covered by Social Security, and taxable payroll is essentially the amount of covered earnings subject to the Social Security payroll tax up to the contribution and benefit base ($132,900 for 2019). The Trustees assume that the ultimate taxable ratio will be 81.0 percent, 82.5 percent, and 84.0 percent under alternatives III, II, and I, respectively.

Table VI.D7.—Sensitivity of OASDI Measures to Taxable Ratio Assumptions
[As a percentage of taxable payroll]

Valuation period	Ultimate taxable ratio[a] [b]		
	81.0 percent	82.5 percent	84.0 percent
Summarized income rate:			
25-year: 2019-43	14.58	14.55	14.52
50-year: 2019-68	14.00	13.97	13.95
75-year: 2019-93	13.83	13.81	13.79
Summarized cost rate:			
25-year: 2019-43	16.51	16.28	16.05
50-year: 2019-68	16.57	16.36	16.15
75-year: 2019-93	16.78	16.60	16.41
Actuarial balance:			
25-year: 2019-43	-1.92	-1.73	-1.54
50-year: 2019-68	-2.57	-2.38	-2.20
75-year: 2019-93	-2.95	-2.78	-2.62
Annual balance for 2093	-4.23	-4.11	-4.00
Year of combined trust fund reserve depletion	2034	2035	2036

[a] The taxable ratio is the ratio of taxable payroll to covered earnings. These concepts are described in further detail in section V.C.6 of this report.
[b] The ultimate taxable ratios used for this analysis are: 81.0 percent from the alternative III assumptions, 82.5 percent from the alternative II assumptions, and 84.0 percent from the alternative I assumptions. All other assumptions used for this analysis are from alternative II.

Because the combined employee-employer tax rate of 12.4 percent is unchanged across all alternatives, the income rate changes a relatively small amount as the taxable ratio increases, due to changes in taxation of benefits and the initial fund as a percentage of taxable payroll.

For the 25-year period, the cost rate decreases with increasing taxable ratios, from 16.51 percent (for an ultimate taxable ratio of 81.0 percent) to 16.05 percent (for an ultimate taxable ratio of 84.0 percent). For the 50-year period, it decreases from 16.57 to 16.15 percent and, for the 75-year period, it decreases from 16.78 to 16.41 percent. The actuarial balance increases from -1.92 to -1.54 percent for the 25-year period, from -2.57 to

-2.20 percent for the 50-year period, and from -2.95 to -2.62 for the 75-year period.

The cost rate decreases with an increase in taxable payroll because the increase in taxable payroll occurs immediately. The increase in benefit amounts occurs much more gradually as new beneficiaries become entitled. In addition, the change in the taxable ratio does not affect COLAs or AWIs. Each 1.0 percentage-point increase in the ultimate taxable ratio increases (improves) the long-range actuarial balance by about 0.11 percent of taxable payroll.

8. Disability Incidence Rates

Table VI.D8 shows OASDI income rates, cost rates, and actuarial balances on the basis of alternative II with three different assumptions concerning future disability incidence rates. The Trustees assume that the ultimate age-sex-adjusted[1] incidence rates will be 4.2, 5.2, and 6.2 awards per thousand exposed for alternatives I, II, and III, respectively. For all three alternatives, the Trustees assume that incidence rates by age and sex will vary during the early years of the projection period before attaining ultimate levels.

Table VI.D8.—Sensitivity of OASDI Measures to Disability Incidence Assumptions
[As a percentage of taxable payroll]

	Disability incidence rates[a] based on alternative—		
Valuation period	I	II	III
Summarized income rate:			
25-year: 2019-43	14.55	14.55	14.55
50-year: 2019-68	13.97	13.97	13.98
75-year: 2019-93	13.81	13.81	13.81
Summarized cost rate:			
25-year: 2019-43	16.09	16.28	16.46
50-year: 2019-68	16.11	16.36	16.60
75-year: 2019-93	16.34	16.60	16.84
Actuarial balance:			
25-year: 2019-43	-1.54	-1.73	-1.91
50-year: 2019-68	-2.14	-2.38	-2.62
75-year: 2019-93	-2.53	-2.78	-3.03
Annual balance for 2093	-3.82	-4.11	-4.39
Year of combined trust fund reserve depletion	2036	2035	2034

[a] The ultimate age-sex-adjusted incidence rates used for this analysis are: 4.2 awards per thousand exposed for the alternative I assumptions, 5.2 awards per thousand exposed for the alternative II assumptions, and 6.2 awards per thousand exposed for the alternative III assumptions. All other assumptions used for this analysis are from alternative II.

For the 25-year period, the cost rate increases with increasing disability incidence rates, from 16.09 percent (for the relatively low rates assumed for

---

[1] Age-sex-adjusted to the disability-exposed population as of the year 2000.

alternative I) to 16.46 percent (for the relatively high rates assumed for alternative III). For the 50-year period, it increases from 16.11 to 16.60 percent, and for the 75-year period, it increases from 16.34 to 16.84 percent. The actuarial balance decreases from -1.54 to -1.91 percent for the 25-year period, from -2.14 to -2.62 percent for the 50-year period, and from -2.53 to -3.03 percent for the 75-year period.

9. Disability Termination Rates

Table VI.D9 shows OASDI income rates, cost rates, and actuarial balances on the basis of alternative II with three different assumptions about future disability termination rates, including deaths and recoveries up to the age at which disabled-worker beneficiaries convert to retired-worker status.

For all three alternatives, the Trustees assume that death rates for disabled-worker beneficiaries will decline throughout the long-range period. The Trustees assume that the age-sex-adjusted[1] death rate of 25.2 deaths per thousand disabled-worker beneficiaries in 2018 will decline to 18.9, 12.0, and 7.1 deaths per thousand in 2093 for alternatives I, II, and III, respectively. These levels are about 25 percent, 52 percent, and 72 percent lower, respectively, than the level in 2018.

For all three alternatives, ultimate recovery rates by age, sex, and duration are attained in the twentieth year of the projection period. The ultimate age-sex-adjusted[1] recovery rates used for this analysis are 12.5 recoveries per thousand disabled-worker beneficiaries for the alternative I assumptions, 10.3 recoveries per thousand disabled-worker beneficiaries for the alternative II assumptions, and 8.2 recoveries per thousand disabled-worker beneficiaries for the alternative III assumptions.

---

[1] Age-sex-adjusted to the disabled-worker population as of the year 2000.

Appendices

Table VI.D9.—Sensitivity of OASDI Measures to Disability Termination Assumptions
[As a percentage of taxable payroll]

Valuation period	Disability termination rates[a] based on alternative—		
	I	II	III
Summarized income rate:			
25-year: 2019-43	14.55	14.55	14.55
50-year: 2019-68	13.98	13.97	13.97
75-year: 2019-93	13.81	13.81	13.81
Summarized cost rate:			
25-year: 2019-43	16.25	16.28	16.30
50-year: 2019-68	16.33	16.36	16.38
75-year: 2019-93	16.57	16.60	16.61
Actuarial balance:			
25-year: 2019-43	-1.70	-1.73	-1.76
50-year: 2019-68	-2.35	-2.38	-2.41
75-year: 2019-93	-2.76	-2.78	-2.80
Annual balance for 2093	-4.11	-4.11	-4.08
Year of combined trust fund reserve depletion	2035	2035	2035

[a] The age-sex-adjusted death rates in 2093 used for this analysis are: 18.9 deaths per thousand disabled-worker beneficiaries for the alternative I assumptions, 12.0 deaths per thousand disabled-worker beneficiaries for the alternative II assumptions, and 7.1 deaths per thousand disabled-worker beneficiaries for the alternative III assumptions. The ultimate age-sex-adjusted recovery rates used for this analysis are: 12.5 recoveries per thousand disabled-worker beneficiaries for the alternative I assumptions, 10.3 recoveries per thousand disabled-worker beneficiaries for the alternative II assumptions, and 8.2 recoveries per thousand disabled-worker beneficiaries for the alternative III assumptions. All other assumptions used for this analysis are from alternative II.

For the 25-year period, the cost rate increases with decreasing disability termination rates, from 16.25 percent (for the relatively high termination rates assumed for alternative I) to 16.30 percent (for the relatively low termination rates assumed for alternative III). For the 50-year period, it increases from 16.33 to 16.38 percent, and for the 75-year period, it increases from 16.57 to 16.61 percent. The actuarial balance decreases from -1.70 to -1.76 percent for the 25-year period, from -2.35 to -2.41 percent for the 50-year period, and from -2.76 to -2.80 percent for the 75-year period.

E. STOCHASTIC PROJECTIONS AND UNCERTAINTY

Significant uncertainty surrounds the estimates under the intermediate assumptions, especially for a period as long as 75 years. This appendix presents stochastic projections, a way to illustrate the uncertainty of these estimates. The stochastic projections supplement the traditional methods of examining such uncertainty.

1. Background

The Trustees have traditionally shown estimates using the low-cost and high-cost sets of specified assumptions to illustrate the potential implications of uncertainty. These alternative estimates provide a range of possible outcomes for the projections. However, they do not provide an indication of the probability that actual future experience will be inside or outside this range. This appendix presents the results of a model, based on stochastic modeling techniques, that estimates a probability distribution of future outcomes of the financial status of the combined OASI and DI Trust Funds. This model, which was first included in the 2003 report, is in the process of further development for the future, most notably by incorporating parameter uncertainty. This will allow the stochastic model to better reflect the uncertainty in the estimates of the underlying factors for these projections.

2. Stochastic Methodology

Other sections of this report provide estimates of the financial status of the combined OASI and DI Trust Funds using a scenario-based model. For the scenario-based model, the Trustees use three alternative scenarios (low-cost, intermediate, and high-cost) that use specific assumptions about levels of fertility, rates of change in mortality, lawful permanent resident (LPR) and other-than-LPR immigration levels, legal and other-than-LPR emigration levels, changes in the Consumer Price Index, changes in average real wages, unemployment rates, trust fund real yield rates, and disability incidence and recovery rates. In general, the Trustees assume that each of these variables will reach an ultimate value at a specific point during the long-range period, and will maintain that value throughout the remainder of the period. The three alternative scenarios assume separate, specified values for each of these variables. Chapter V contains more details about each of these assumptions.

This appendix presents estimates of the probability that key measures of OASDI solvency will fall in certain ranges, based on 5,000 independent stochastic simulations. Each simulation allows the above variables to vary throughout the long-range period. The fluctuation of each variable over time

is simulated using historical data and standard time-series techniques. Generally, each variable is modeled using an equation that: (1) captures a relationship between current and prior years' values of the variable, and (2) introduces year-by-year random variation based on variation observed in the historical period. For some variables, the equations also reflect relationships with other variables. The equations contain parameters that are estimated using historical data for periods from 12 years to over 110 years, depending on the nature and quality of the available data. Each time-series equation is designed so that, in the absence of random variation over time, the value of the variable for each year equals its value under the intermediate assumptions.[1]

For each simulation, the stochastic method develops year-by-year random variation for each variable using Monte Carlo techniques. Each simulation produces an estimate of the financial status of the combined OASI and DI Trust Funds. This appendix shows the distribution of results from 5,000 simulations of the model.

Readers should interpret the results from this model with caution and with an understanding of the model's limitations. Results are sensitive to equation specifications, degrees of interdependence among variables, and the historical periods used for estimating model coefficients. For some variables, recent historical variation may not provide a realistic representation of the potential variation for the future. Also, results would differ if additional variables (such as labor force participation rates, retirement rates, marriage rates, and divorce rates) were also allowed to vary randomly. Furthermore, more variability would result if statistical approaches were used to model uncertainty in the central tendencies of the variables. Time-series modeling reflects only what occurred in the historical period. Future uncertainty exists not only for the underlying central tendency but also for the frequency and size of occasional longer-term shifts in the central tendency. Many experts predict, and history suggests, that the future will likely bring substantial shifts that are not fully reflected in the historical period used for the current model. As a result, readers should understand that the true range of uncertainty is larger than indicated in this appendix.

---

[1] More detail on this model, and stochastic modeling in general, is available at www.ssa.gov/OACT/stochastic/index.html.

3. Stochastic Results

This section illustrates the results for the stochastic simulations of two fundamental measures of actuarial status: the annual cost rates and the trust fund ratio. The latter measure is highlighted in the Overview of this report. Section 4 follows with a comparison of stochastic results to results from the alternative scenarios for these and other measures, and an analysis of the differences.

Figure VI.E1 displays the probability distribution of the year-by-year OASDI cost rates (that is, cost as a percentage of taxable payroll). The range of the annual cost rates widens as the projections move further into the future, which reflects increasing uncertainty. Because there is relatively little variation in income rates across the 5,000 stochastic simulations, the figure includes the income rate only under the intermediate assumptions. The two outermost lines in this figure indicate the range within which future annual cost rates are projected to occur 95 percent of the time (i.e., a 95-percent confidence interval). In other words, the current model estimates that there is a 2.5 percent probability that the cost rate for a given year will exceed the upper end of this range and a 2.5 percent probability that it will fall below the lower end of this range. Other lines in the figure delineate additional confidence intervals (80-percent, 60-percent, 40-percent, and 20-percent) around future annual cost rates. The median (50th percentile) cost rate for each year is the rate for which half of the simulated outcomes are higher and half are lower for that year. These lines do not represent the results of individual stochastic simulations. Instead, for each given year, they represent the percentile distribution of annual cost rates based on all stochastic simulations for that year.

Figure VI.E1.—Long-Range OASDI Cost Rates From Stochastic Modeling

Projection year
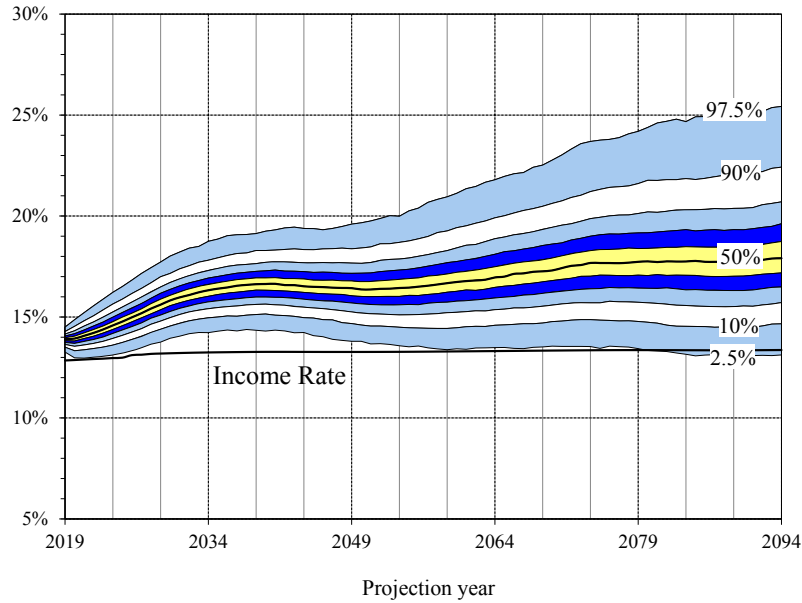
Figure VI.E2 presents the simulated probability distribution of the annual trust fund ratios for the combined OASI and DI Trust Funds. The lines in this figure display the median set (50th percentile) of estimated annual trust fund ratios and delineate the 95-percent, 80-percent, 60-percent, 40-percent, and 20-percent confidence intervals estimated for future annual trust fund ratios. Again, none of these lines represent the path of a single simulation. For each given year, they represent the percentile distribution of trust fund ratios based on all stochastic simulations for that year.

Figure VI.E2 shows that the 95-percent confidence interval for the trust fund depletion year ranges from 2031 to 2044, and that there is a 50-percent probability of trust fund depletion by the end of 2035 (the median depletion year). The median depletion year is the same as the Trustees project under the intermediate assumptions. The figure also shows confidence intervals for the trust fund ratio in each year. For example, the 95-percent confidence interval for the trust fund ratio at the beginning of 2025 ranges from 216 to 145 percent of annual cost.

Figure VI.E2.—Long-Range OASDI Trust Fund Ratios From Stochastic Modeling
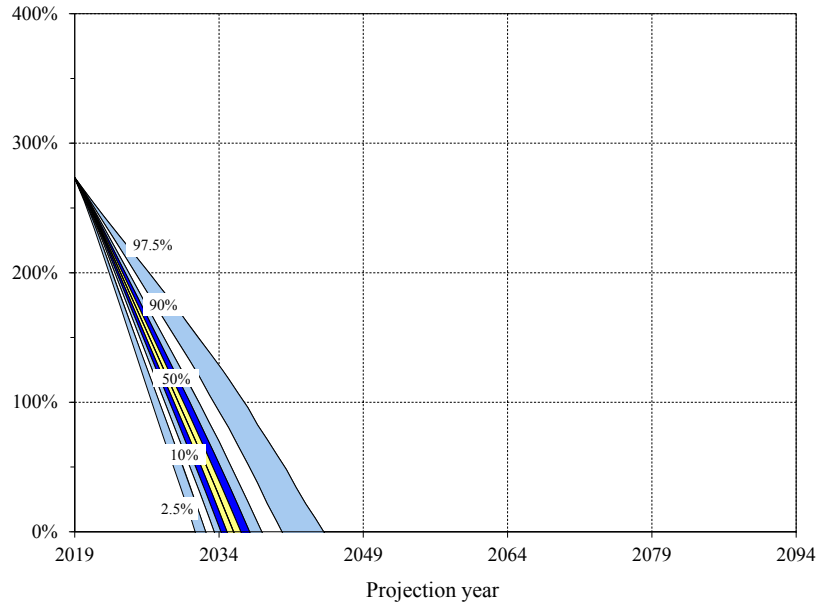
4. Comparison of Results: Stochastic to Low-Cost, Intermediate, and High-Cost Alternatives

This section compares results from two different approaches for illustrating ranges of uncertainty for trust fund actuarial status. One approach uses results from the low-cost, intermediate, and high-cost alternative scenarios. The other approach uses distributions of results from the stochastic simulations. Each of these approaches provides insights into uncertainty. Comparing the results requires an understanding of fundamental differences in the approaches.

One fundamental difference relates to the presentation of distributional results. Figure VI.E3 shows projected OASDI annual cost rates for the low-cost, intermediate, and high-cost alternatives along with the annual cost rates at the 97.5th percentile, 50th percentile, and 2.5th percentile for the stochastic simulations. While all values on each line for the alternatives are results from a single specified scenario, the values on each stochastic line may be results from different simulations for different years. The one stochastic simulation (from the 5,000 simulations) that yields results closest to a particular

percentile for one projected year may yield results that are distant from that percentile in another projected year.

Because each stochastic simulation shows substantial variability from year to year, the range shown between the 97.5th and 2.5th percentiles is broader than would be seen if simulations followed a smooth trend like in the alternatives. In spite of this effect, the range from high-cost to low-cost annual rates for the stochastic distribution is generally contained slightly within the range for the high-cost and low-cost alternatives. With introduction of parameter uncertainty for the stochastic simulations expected in future reports, the range for the 95-percent confidence interval is expected to expand.

Both the alternatives and the stochastic results suggest that the range of potential cost rates above the central levels (those for the intermediate alternative and for the median, respectively) is larger than the range below these central results. The difference between the central results and the higher cost levels (the high-cost alternative and the upper end of the 95-percent confidence range, respectively) is about 1.5 times as large as the difference between the central and lower cost levels for both models by the end of the projection period.

Figure VI.E3.—OASDI Cost Rates: Comparison of Stochastic to Low-Cost, Intermediate, and High-Cost Alternatives
[As a percentage of taxable payroll]
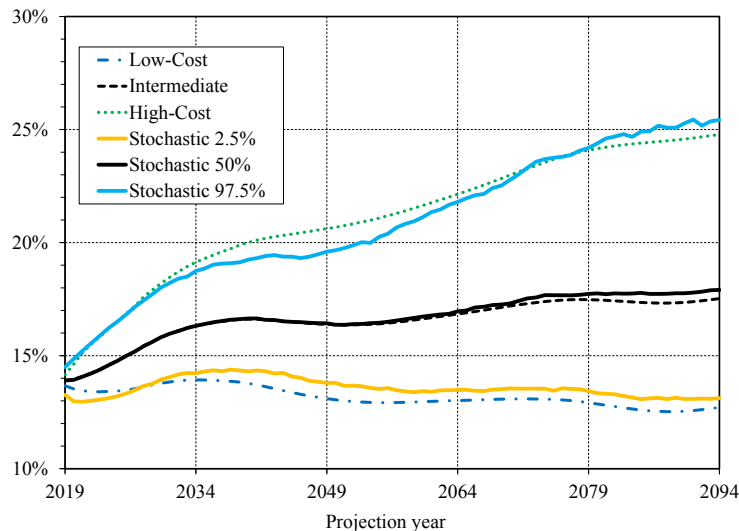
Another fundamental difference between the alternatives and the stochastic simulations is the method of assigning values for assumptions. For the alternatives, specific values are assigned for each of the key demographic, economic, and program-specific variables. The high-cost alternative uses parameter values that increase estimated annual cost as a percent of payroll, while the low-cost alternative uses parameter values that decrease annual cost as a percent of payroll. (One parameter, the interest rate, has no effect on annual cost as a percent of payroll for either the alternatives or the stochastic simulations.) In contrast, the stochastic method essentially randomly assigns values for each of the key demographic and economic variables for each year in each of the 5,000 independent stochastic simulations. For each of the stochastic simulations, randomly assigned values for different variables result in varying and often offsetting effects on projected cost as a percent of payroll, with some tending toward higher cost and some tending toward lower cost. This difference tends to reduce the range of cost as a percent of payroll across the 95-percent confidence interval. Again, the future introduction of parameter uncertainty is expected to broaden this range.

It is important to understand that the stochastic model's 95-percent confidence intervals for any summary measure of trust fund finances would tend to be narrower than the range produced for the low-cost and high-cost alternatives, even if the stochastic model's 95-percent confidence interval for annual cost rates were identical to the range defined by the low-cost and high-cost projections. This is true because summary measures of trust fund finances depend on cost rates for many years, and the probability that annual cost rates, on average for individual stochastic simulations, will be at least as low (high) as the 2.5 (97.5) percentile line is significantly lower than 2.5 percent. As a result, the relationship between the ranges presented for annual cost rates and summary measures of trust fund finances is fundamentally different for the stochastic model than it is for the low-cost and high-cost alternatives.

Figure VI.E4 compares the ranges of trust fund (unfunded obligation) ratios for the alternative scenarios to the 95-percent confidence interval of the stochastic simulations. This figure extends figure VI.E2 to show unfunded obligation ratios, expressed as negative values below the zero percent line. An unfunded obligation ratio is the ratio of the unfunded obligation accumulated through the beginning of the year to the cost for that year.

Figure VI.E4.—OASDI Trust Fund (Unfunded Obligation) Ratios: Comparison of Stochastic to Low-Cost, Intermediate, and High-Cost Alternatives[a]
[Asset reserves (unfunded obligation) as a percentage of annual cost]
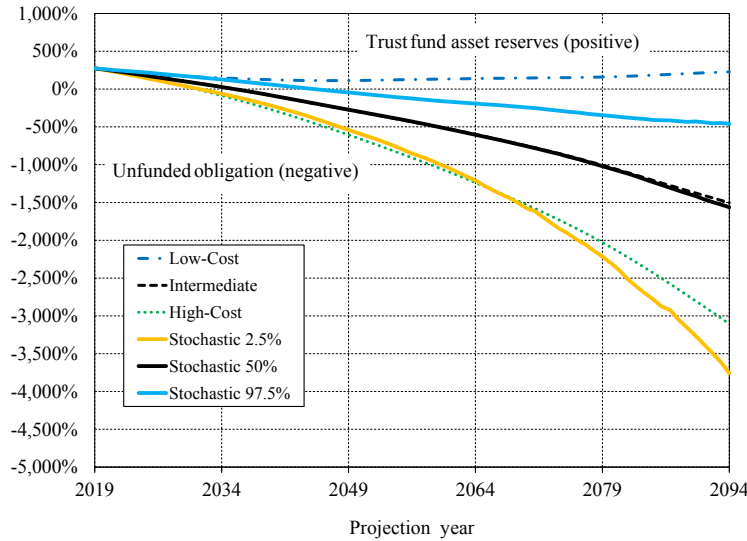
[a] An unfunded obligation, shown as a negative value in this figure, is equivalent to the amount the trust funds would need to have borrowed to date in order to pay all scheduled benefits (on a timely basis) after trust fund asset reserves are depleted. Note that current law does not permit the trust funds to borrow.

As mentioned above, a summary measure that accumulates annual values tends to smooth the kind of annual fluctuations that occur in stochastic simulations. Therefore, one might expect the range across the stochastic confidence interval for trust fund (unfunded obligation) ratios to be narrower and fall within the range seen across the high-cost and low-cost alternatives, as it does for the actuarial balance measure. But this is not the case, largely due to the way interest rates are assigned.

For the stochastic model, real interest rates for each simulation are assigned essentially randomly, so the rate for compounding of trust fund reserves (unfunded obligations) is essentially uncorrelated with the level of cost as a percent of payroll. On the other hand, real interest rates are assigned to be higher for the low-cost alternative and lower for the high-cost alternative. High interest rates raise the level of the positive trust fund ratio in the low-cost alternative somewhat, but this effect is limited because the magnitude of reserves is small. However, low interest rates substantially reduce the magnitude of the unfunded obligation ratio for the high-cost alternative because the

magnitude of unfunded obligations is relatively large. As a result, the trust fund (unfunded obligation) ratios are shifted, albeit unevenly, higher (or less negative) for both the high-cost and low-cost alternatives.

This interest rate effect on the alternatives is not as evident for some other summary measures of actuarial status, such as the actuarial balance. Because the actuarial balance reflects the cumulative effects of interest in both its numerator and denominator, the interest rate effect is much less pronounced. In contrast, cumulative interest affects only the numerator of the trust fund (unfunded obligation) ratio. There is also no significant interest rate effect on the trust fund depletion date.

Other factors also contribute, to varying degrees, to the difference in ranges between the results of the alternative scenarios and the stochastic simulations. The contrasts in results and methods do not mean that either approach to illustrating ranges of uncertainty is superior to the other. The ranges are different and explainable.

Table VI.E1 displays long-range actuarial estimates for the combined OASDI program using the two methods of illustrating uncertainty: alternative scenarios and stochastic simulations. The table shows scenario-based estimates for the intermediate, low-cost, and high-cost assumptions. It also shows stochastic estimates for the median (50th percentile) and for the 80-percent and 95-percent confidence intervals. Each individual stochastic estimate in the table is the level at that percentile from the distribution of the 5,000 simulations. For each given percentile, the values in the table for each long-range actuarial measure are generally from different stochastic simulations.

The median stochastic estimates displayed in table VI.E1 are similar to the intermediate scenario-based estimates. The median estimate of the long-range actuarial balance is -2.83 percent of taxable payroll, about 0.05 percentage point lower (more negative) than projected under the intermediate assumptions. The median estimate for the open-group unfunded obligation is $14.2 trillion, about $0.3 trillion larger than the $13.9 trillion estimate under the intermediate assumptions. The median first projected year for which cost exceeds non-interest income (as it did in 2010 through 2018), and remains in excess of non-interest income throughout the remainder of the long-range period, is 2019. This is the same year as projected under the intermediate assumptions. The median projected year in which asset reserves first become depleted is 2035, also the same as projected under the intermediate assumptions. The median estimates of the annual cost rate for the 75th year of the projection period are 17.89 percent of taxable payroll and 6.19 percent of gross domestic product (GDP). The comparable estimates

Appendices

under the intermediate assumptions are 17.47 percent of payroll and 6.05 percent of GDP.

For three measures in table VI.E1 (the actuarial balance, the first projected year cost exceeds non-interest income and remains in excess through 2093, and the first year asset reserves become depleted), the 95-percent stochastic confidence interval falls within the range defined by the low-cost and high-cost alternatives. For the remaining three measures (the open-group unfunded obligation, the annual cost in the 75th year as a percent of taxable payroll, and the annual cost in the 75th year as a percent of GDP), one or both of the bounds of the 95-percent stochastic confidence interval fall outside the range defined by the low-cost and high-cost alternatives.

Table VI.E1.—Long-Range Estimates Relating to the Actuarial Status of the Combined OASDI Program
[Comparison of scenario-based and stochastic results]

| | Traditional scenario-based model | | | Stochastic model | | | | |
| | | | | Median | 80-percent confidence interval | | 95-percent confidence interval | |
	Interme-diate	Low-cost	High-cost	50th percentile	10th percentile	90th percentile	2.5th percentile	97.5th percentile
Actuarial balance	-2.78	0.19	-6.60	-2.83	-4.27	-1.63	-5.12	-1.00
Open-group unfunded obligation (in trillions)	$13.9	-$2.1	$28.1	$14.2	$7.2	$25.0	$4.3	$33.3
First projected year cost exceeds non-interest income and remains in excess through 2093	2019	[a]	2019	2019	2019	2058	2019	[b]
First year asset reserves become depleted[c]	2035	[d]	2030	2035	2032	2040	2031	2044
Annual cost in 75th year (percent of taxable payroll)	17.47	12.66	24.73	17.89	14.65	22.36	13.09	25.37
Annual cost in 75th year (percent of GDP).	6.05	4.77	7.86	6.19	5.10	7.68	4.57	8.64

[a] The annual balance is projected to be negative for a temporary period, returning to positive levels before the end of the projection period.
[b] For this percentile, cost does not exceed tax income in 2093.
[c] For some stochastic simulations, the first year in which trust fund reserves become depleted does not indicate a permanent depletion of reserves.
[d] Trust fund reserves are not estimated to be depleted within the projection period.

F. INFINITE HORIZON PROJECTIONS

Another measure of trust fund financial status is the infinite horizon unfunded obligation, which takes account of all past and future annual balances, even those after the next 75 years. The extension of the time period past 75 years assumes that the current law for the OASDI program and the demographic and economic trends used for the 75-year projection continue indefinitely.

Table VI.F1 shows that the OASDI open-group unfunded obligation over the infinite horizon is $43.2 trillion in present value, which is $29.3 trillion larger than for the 75-year period. The $29.3 trillion increment reflects a significant financing gap projected for OASDI for years after 2093 into perpetuity. Of course, the degree of uncertainty associated with estimates increases substantially for years further in the future.

The $43.2 trillion infinite horizon open-group unfunded obligation is equivalent to 4.1 percent of taxable payroll or 1.4 percent of GDP. These relative measures of the unfunded obligation over the infinite horizon express its magnitude in relation to the resources potentially available to finance the shortfall.

The summarized shortfalls for the 75-year period and through the infinite horizon both reflect annual cash-flow shortfalls for all years after trust fund reserve depletion. The annual shortfalls after trust fund reserve depletion rise slowly and reflect increases in life expectancy. The summarized shortfalls over the infinite horizon, as percentages of taxable payroll and GDP, are larger than the shortfalls for the 75-year period.

To illustrate the magnitude of the projected infinite horizon shortfall, consider that it could be eliminated with additional revenue equivalent to an immediate increase in the combined payroll tax rate from 12.4 percent to about 16.7 percent,[1] or with cost reductions equivalent to an immediate and permanent reduction in benefits for all current and future beneficiaries by about 25 percent.

---

[1] The indicated increase in the payroll tax rate of 4.3 percent is somewhat larger than the 4.1 percent infinite horizon actuarial deficit because the indicated increase reflects a behavioral response to tax rate changes. In particular, the calculation assumes that an increase in payroll taxes results in a small shift of wages and salaries to forms of employee compensation that are not subject to the payroll tax.

Appendices

**Table VI.F1.—Unfunded OASDI Obligations Through the Infinite Horizon and
the 75-Year Projection Period, Based on Intermediate Assumptions**
[Present values as of January 1, 2019; dollar amounts in trillions]

	Present value	Expressed as a percentage of future payroll and GDP	
		Taxable payroll	GDP
Unfunded obligation through the infinite horizon[a]	$43.2	4.1	1.4
Unfunded obligation through 2093[b]	13.9	2.6	.9

[a] Present value of future cost less future non-interest income, reduced by the amount of trust fund asset reserves at the beginning of 2019. Expressed as a percentage of payroll and GDP for the period 2019 through the infinite horizon.
[b] Present value of future cost less future non-interest income through 2093, reduced by the amount of trust fund reserves at the beginning of 2019. Expressed as a percentage of payroll and GDP for the period 2019 through 2093.

Notes:
1. The present values of future taxable payroll for 2019-93 and for 2019 through the infinite horizon are $531.2 trillion and $1,050.1 trillion, respectively.
2. The present values of GDP for 2019-93 and for 2019 through the infinite horizon are $1,497.0 trillion and $3,158.3 trillion, respectively. Present values of GDP shown in the Medicare Trustees Report differ slightly due to the use of discount rates that are specific to each program's trust fund holdings.

Last year, the Trustees projected that the infinite horizon unfunded obligation was $34.3 trillion in present value. If the assumptions, methods, and starting values had not changed, moving the valuation date forward by 1 year would have increased the unfunded obligation by about $1.0 trillion, to $35.3 trillion. The net effects of changes in assumptions, methods, law, and starting values increased the infinite horizon unfunded obligation by $7.8 trillion. The major change affecting the infinite horizon unfunded obligation for this report is the reduction in the ultimate real interest rate from 2.7 percent to 2.5 percent, which provides less discounting of annual shortfalls in the future. The same interest rate change also increased the present values of future taxable payroll and GDP for this report.

The infinite horizon unfunded obligation expressed as a share of taxable payroll is higher than in last year's report by 0.1 percentage point. The infinite horizon unfunded obligation expressed as a share of GDP is higher than in last year's report by less than 0.05 percentage point. The infinite horizon unfunded obligation as a share of both taxable payroll and GDP changed relatively little, because the reduction in the ultimate real interest rate increased the present value of taxable payroll and of GDP by almost as much as it increased the present value of the unfunded obligation. See section IV.B.6 for details regarding changes in law, data, methods, and assumptions.

a. Unfunded Obligations for Past, Current, and Future Participants

Table VI.F2 separates the components of the infinite horizon unfunded obligation (with the exception of General Fund reimbursements) among past,

current, and future participants. The table does not separate past General Fund reimbursements among participants because there is no clear basis for attributing the reimbursements across generations.

Past participants are defined as those no longer alive as of the valuation date. Current participants are those age 15 and older as of 2019. Future participants are those under age 15 or not yet born.

The excess of the present value of cost for past and current participants over the present value of dedicated tax income for past and current participants produces an unfunded obligation for past and current participants of $35.9 trillion. Table VI.F2 also shows an unfunded obligation of $35.2 trillion for past and current participants, including past and future General Fund reimbursements. Future participants are scheduled to pay dedicated taxes of $7.9 trillion less into the system than the cost of their scheduled benefits ($105.2 trillion of dedicated tax income as compared to $113.1 trillion of cost). The unfunded obligation for all participants through the infinite horizon thus equals $43.2 trillion.

Making Social Security solvent over the infinite horizon requires some combination of increased revenue or reduced benefits for current and future participants amounting to $43.2 trillion in present value, 4.1 percent of future taxable payroll, or 1.4 percent of future GDP.

Appendices

**Table VI.F2.—Present Values Through the Infinite Horizon
for Various Categories of Program Participants, Based on Intermediate Assumptions**
[Present values as of January 1, 2019; dollar amounts in trillions]

		Expressed as a percentage of future payroll and GDP	
	Present value	Taxable payroll	GDP
Present value of past cost	$62.8	6.0	2.0
Less present value of past dedicated tax income	65.0	6.2	2.1
Plus present value of future cost for current participants	73.3	7.0	2.3
Less present value of future dedicated tax income for current participants	35.2	3.4	1.1
Equals unfunded obligation for past and current participants excluding General Fund reimbursements	35.9	3.4	1.1
Less present value of past General Fund reimbursements[a]	.7	.1	b
Less present value of future General Fund reimbursements through the infinite horizon[a]	c	d	b
Equals unfunded obligation for past and current participants including General Fund reimbursements	35.2	3.4	1.1
Plus present value of cost for future participants through the infinite horizon	113.1	10.8	3.6
Less present value of dedicated tax income for future participants through the infinite horizon	105.2	10.0	3.3
Equals unfunded obligation for all participants through the infinite horizon	43.2	4.1	1.4

[a] Distribution of General Fund reimbursements among past, current, and future participants cannot be determined.
[b] Less than 0.05 percent of GDP.
[c] Less than $50 billion.
[d] Less than 0.05 percent of taxable payroll.

Notes:
1. The present value of future taxable payroll for 2019 through the infinite horizon is $1,050.1 trillion.
2. The present value of GDP for 2019 through the infinite horizon is $3,158.3 trillion.
3. Totals do not necessarily equal the sums of rounded components.

G. ESTIMATES FOR OASDI AND HI, SEPARATE AND COMBINED

In this appendix, the Trustees present long-range actuarial estimates for the OASDI and Hospital Insurance (HI) programs both separately and on a combined basis. These estimates facilitate analysis of the adequacy of the income and asset reserves of these programs relative to their cost under current law. This appendix does not include estimates for the Supplementary Medical Insurance (SMI) program because adequate financing is guaranteed in the law and because the SMI program is not financed through a payroll tax. For more information on Medicare estimates, please see the 2019 Medicare Trustees Report.

The information in this appendix on combined operations, while significant, should not obscure the analysis of the financial status of the individual trust funds, which are legally separate and cannot be commingled. In addition, the factors which determine the costs of the OASI, DI, and HI programs differ substantially.

1. Estimates as a Percentage of Taxable Payroll

Comparing cost and income rates for the OASDI and HI programs as percentages of taxable payroll requires a note of caution. The taxable payrolls for the HI program are larger than those estimated for the OASDI program because: (1) a larger maximum taxable amount was established for the HI program in 1991, with the maximum eliminated altogether for the HI program in 1994; (2) larger proportions of Federal, State, and local government employees are covered under the HI program; and (3) the earnings of railroad workers are included directly in the HI taxable payroll but are not included in the OASDI taxable payroll. (Railroad worker contributions for the equivalent of OASDI benefits are accounted for in a net interchange that occurs annually between the OASDI and Railroad Retirement programs.) As a result, the HI taxable payroll is about 25 percent larger than the OASDI taxable payroll throughout the long-range period.

As with the OASI and DI Trust Funds, income to the HI Trust Fund comes primarily from contributions paid by employees, employers, and self-employed persons. Table VI.G1 shows the OASDI and HI contribution rates that are authorized in the Federal Insurance Contributions Act.

Appendices

Table VI.G1.—Payroll Tax Contribution Rates for the OASDI and HI Programs
[In percent]

| Calendar years | Employees and employers, combined[a] | | Employees only | Self employed[b] | | |
	OASDI up to base[c]	HI all earnings[d]	HI over limit[e]	OASDI up to base[c]	HI all earnings[d]	HI over limit[e]
1966	7.70	0.70	—	5.80	0.35	—
1967	7.80	1.00	—	5.90	.50	—
1968	7.60	1.20	—	5.80	.60	—
1969-70	8.40	1.20	—	6.30	.60	—
1971-72	9.20	1.20	—	6.90	.60	—
1973	9.70	2.00	—	7.00	1.00	—
1974-77	9.90	1.80	—	7.00	.90	—
1978	10.10	2.00	—	7.10	1.00	—
1979-80	10.16	2.10	—	7.05	1.05	—
1981	10.70	2.60	—	8.00	1.30	—
1982-83	10.80	2.60	—	8.05	1.30	—
1984[f]	11.40	2.60	—	11.40	2.60	—
1985[f]	11.40	2.70	—	11.40	2.70	—
1986-87[f]	11.40	2.90	—	11.40	2.90	—
1988-89[f]	12.12	2.90	—	12.12	2.90	—
1990-2010[g]	12.40	2.90	—	12.40	2.90	—
2011-2012[h]	10.40	2.90	—	10.40	2.90	—
2013 and later.	12.40	2.90	0.90	12.40	2.90	0.90

[a] Except as noted below, the combined employee/employer rate is divided equally between employees and employers.

[b] Beginning in 1990, self-employed persons receive a deduction, for purposes of computing their net earnings, equal to half of the combined OASDI and HI contributions that would be payable without regard to the contribution and benefit base. The OASDI contribution rate then applies to net earnings after this deduction, but subject to the OASDI base.

[c] The payroll tax on earnings for the OASDI program applies to annual earnings up to a contribution and benefit base indexed to the average wage level. The base is $132,900 for 2019.

[d] Prior to 1994, the payroll tax on earnings for the HI program applied to annual earnings up to a contribution base. The HI contribution base was eliminated beginning in 1994.

[e] Starting with Federal personal income tax returns for tax year 2013, earned income exceeding $200,000 for individual filers and $250,000 for married couples filing jointly is subject to an additional HI tax of 0.9 percent. These income limits are not indexed after 2013.

[f] In 1984 only, employees received an immediate credit of 0.3 percent of taxable wages against their OASDI payroll tax contributions. The self-employed received similar credits of 2.7 percent, 2.3 percent, and 2.0 percent against their combined OASDI and Hospital Insurance (HI) contributions on net earnings from self-employment in 1984, 1985, and 1986-89, respectively. The General Fund of the Treasury reimbursed the trust funds for these credits.

[g] Public Law 111-147 exempted most employers from paying the employer share of OASDI payroll tax on wages paid during the period March 19, 2010 through December 31, 2010 to certain qualified individuals hired after February 3, 2010. The General Fund of the Treasury reimbursed the trust funds for the payroll tax revenue forgone under this law.

[h] Public Law 111-312, Public Law 112-78, and Public Law 112-96 reduced the OASDI payroll tax rate for 2011 and 2012 by 2 percentage points for employees and for self-employed workers. The General Fund of the Treasury reimbursed the trust funds for the payroll tax revenue forgone under these laws.

Table VI.G2 shows the Trustees' estimates of annual income rates and cost rates for the OASDI program and the HI program under the low-cost, intermediate, and high-cost sets of assumptions described earlier in this report. The income rates reflect the payroll tax rates shown in table VI.G1, revenue from taxation of scheduled OASDI benefits for both the OASDI and HI

Trust Funds, and any reimbursements from the General Fund of the Treasury. For the HI program, the income rates also reflect: (1) the additional 0.9-percent tax on employees for relatively high earnings and the portion of total payroll to which the 0.9-percent rate applies; (2) premium revenues; and (3) monies from fraud and abuse control activities. Annual income and cost rates indicate the cash-flow operation of the programs. Therefore, income rates exclude interest earned on trust fund asset reserves. Table VI.G2 also shows annual balances, which are the differences between annual income rates and cost rates.

The Trustees project that the OASDI and HI cost rates will rise generally above current levels under the intermediate and high-cost sets of assumptions. The greatest increase occurs from 2019 to 2038 under both sets of assumptions for OASDI and under the intermediate assumptions for HI. Under the intermediate assumptions, the OASDI cost rate increases by 26 percent from its current level by 2093, while under the high-cost assumptions, the cost rate increases by 75 percent by 2093. For HI, cost rates increase by 53 percent and 218 percent from 2019 to 2093 under the intermediate and high-cost assumptions, respectively. Under the low-cost assumptions, the OASDI and HI cost rates decrease from 2019 to 2093 by 7 percent and 26 percent, respectively.

The Trustees project annual deficits for every year of the projection period under the intermediate and high-cost assumptions for both the OASDI and HI programs. Under the low-cost assumptions, OASDI annual balances are negative through 2049, and are positive thereafter, increasing to 0.17 percent of payroll for 2056, declining to 0.02 percent for 2071, and then generally increasing through the remainder of the 75-year projection period. After a 0.01 deficit in 2019, HI annual balances as a percent of payroll are positive for 2020 through the remainder of the projection period under the low-cost assumptions.

**Table VI.G2.—OASDI and HI Annual Income Rates, Cost Rates, and Balances,
Calendar Years 2019-2095**

[As a percentage of taxable payroll[a]]

	OASDI			HI		
Calendar year	Income rate	Cost rate[b]	Balance[b]	Income rate	Cost rate	Balance
Intermediate:						
2019	12.85	13.91	-1.06	3.35	3.47	-0.12
2020	12.87	13.94	-1.07	3.37	3.52	-.15
2021	12.90	14.09	-1.19	3.39	3.58	-.19
2022	12.92	14.23	-1.31	3.40	3.66	-.26
2023	12.94	14.40	-1.46	3.42	3.75	-.32
2024	12.97	14.59	-1.62	3.44	3.82	-.38
2025	12.99	14.79	-1.80	3.46	3.90	-.43
2026	13.11	14.99	-1.88	3.55	3.97	-.43
2027	13.13	15.19	-2.06	3.57	4.03	-.46
2028	13.17	15.43	-2.26	3.60	4.21	-.61
2030	13.20	15.81	-2.60	3.64	4.37	-.73
2035	13.25	16.40	-3.15	3.73	4.70	-.96
2040	13.27	16.62	-3.34	3.81	4.90	-1.09
2045	13.27	16.49	-3.22	3.86	4.99	-1.13
2050	13.27	16.37	-3.10	3.92	5.02	-1.10
2055	13.28	16.41	-3.13	3.99	5.02	-1.03
2060	13.30	16.63	-3.33	4.06	5.03	-.97
2065	13.32	16.90	-3.58	4.14	5.09	-.96
2070	13.34	17.20	-3.86	4.21	5.19	-.98
2075	13.36	17.43	-4.07	4.27	5.28	-1.01
2080	13.36	17.46	-4.10	4.32	5.33	-1.01
2085	13.35	17.36	-4.00	4.35	5.33	-.98
2090	13.35	17.36	-4.00	4.39	5.32	-.93
2095	13.37	17.58	-4.21	4.43	5.33	-.89
Low-cost:						
2019	12.77	13.67	-.90	3.34	3.36	-.01
2020	12.85	13.53	-.68	3.36	3.31	.05
2021	12.86	13.45	-.58	3.37	3.30	.07
2022	12.88	13.41	-.53	3.39	3.31	.08
2023	12.89	13.40	-.51	3.40	3.32	.08
2024	12.92	13.42	-.50	3.42	3.32	.10
2025	12.92	13.44	-.52	3.44	3.32	.11
2026	13.03	13.48	-.45	3.51	3.32	.19
2027	13.05	13.53	-.49	3.53	3.30	.23
2028	13.08	13.62	-.54	3.56	3.39	.17
2030	13.10	13.78	-.68	3.60	3.38	.22
2035	13.12	13.92	-.80	3.70	3.30	.40
2040	13.13	13.78	-.65	3.78	3.12	.66
2045	13.11	13.37	-.26	3.84	2.87	.97
2050	13.10	13.05	.05	3.91	2.66	1.25
2055	13.09	12.92	.17	3.98	2.49	1.49
2060	13.10	12.96	.14	4.05	2.40	1.66
2065	13.11	13.03	.08	4.12	2.38	1.74
2070	13.11	13.08	.03	4.18	2.41	1.76
2075	13.11	13.06	.05	4.22	2.46	1.77
2080	13.10	12.86	.24	4.26	2.48	1.78
2085	13.09	12.60	.49	4.28	2.48	1.80
2090	13.08	12.54	.54	4.31	2.48	1.84
2095	13.10	12.77	.33	4.36	2.50	1.86

Table VI.G2.—OASDI and HI Annual Income Rates, Cost Rates, and Balances,
Calendar Years 2019-2095 (Cont.)
[As a percentage of taxable payroll[a]]

Calendar year	OASDI			HI		
	Income rate	Cost rate[b]	Balance[b]	Income rate	Cost rate	Balance
High-cost:						
2019	12.93	14.16	-1.23	3.35	3.58	-0.22
2020	12.91	14.62	-1.72	3.38	3.75	-.37
2021	12.94	15.14	-2.20	3.41	3.90	-.49
2022	12.98	15.50	-2.52	3.43	4.05	-.63
2023	13.00	15.84	-2.84	3.45	4.23	-.78
2024	13.04	16.19	-3.16	3.48	4.39	-.92
2025	13.06	16.52	-3.46	3.50	4.57	-1.07
2026	13.20	16.85	-3.64	3.59	4.74	-1.15
2027	13.23	17.19	-3.96	3.62	4.91	-1.29
2028	13.29	17.60	-4.31	3.66	5.23	-1.57
2030	13.33	18.20	-4.87	3.70	5.64	-1.94
2035	13.40	19.30	-5.90	3.80	6.68	-2.88
2040	13.44	20.01	-6.56	3.88	7.67	-3.80
2045	13.47	20.38	-6.91	3.94	8.62	-4.68
2050	13.49	20.68	-7.19	4.00	9.43	-5.43
2055	13.52	21.09	-7.57	4.06	10.03	-5.97
2060	13.56	21.64	-8.08	4.13	10.49	-6.36
2065	13.60	22.27	-8.67	4.21	10.85	-6.64
2070	13.65	22.99	-9.34	4.28	11.08	-6.80
2075	13.70	23.68	-9.99	4.36	11.28	-6.92
2080	13.73	24.16	-10.43	4.42	11.38	-6.96
2085	13.75	24.40	-10.65	4.47	11.39	-6.92
2090	13.76	24.58	-10.82	4.52	11.37	-6.85
2095	13.78	24.84	-11.06	4.57	11.37	-6.80

[a] The taxable payroll for HI is significantly larger than the taxable payroll for OASDI because the HI taxable maximum amount was eliminated beginning in 1994, and because HI covers all Federal civilian employees, all State and local government employees hired after April 1, 1986, and railroad employees.

[b] OASDI benefit payments which were scheduled to be paid on January 3 for some past and future years were actually paid on December 31 as required by the statutory provision for early delivery of benefit payments when the normal payment delivery date is a Saturday, Sunday, or legal public holiday. For comparability with the values for historical years and the projections in this report, all trust fund operations and asset reserves reflect the 12 months of benefits scheduled for payment each year.

Notes:

1. The income rate excludes interest income.

2. The Trustees show income and cost estimates generally on a cash basis for the OASDI program and on an incurred basis for the HI program.

3. Totals do not necessarily equal the sums of rounded components.

Table VI.G3 shows summarized values over the 25-year, 50-year, and 75-year valuation periods. For each of those periods, the summarized income rates include beginning trust fund asset reserves, and the summarized cost rates include the cost of accumulating an ending fund reserve equal to 100 percent of annual cost at the end of the period.

Table VI.G3.—Summarized OASDI and HI Income Rates and Cost Rates for Valuation Periods,[a] Calendar Years 2019-2093

[As a percentage of taxable payroll[b]]

Valuation period	OASDI			HI		
	Income rate	Cost rate[c]	Actuarial balance	Income rate	Cost rate	Actuarial balance
Intermediate:						
25-year:						
2019-43	14.55	16.28	-1.73	3.71	4.51	-0.80
50-year:						
2019-68	13.97	16.36	-2.38	3.84	4.73	-.89
75-year:						
2019-93	13.81	16.60	-2.78	3.97	4.88	-.91
Low-cost:						
25-year:						
2019-43	14.31	14.23	.08	3.67	3.38	.29
50-year:						
2019-68	13.74	13.63	.11	3.83	2.97	.86
75-year:						
2019-93	13.55	13.36	.19	3.96	2.81	1.14
High-cost:						
25-year:						
2019-43	14.83	18.71	-3.88	3.76	6.07	-2.31
50-year:						
2019-68	14.26	19.76	-5.50	3.90	7.74	-3.84
75-year:						
2019-93	14.13	20.73	-6.60	4.02	8.58	-4.55

[a] Income rates include beginning trust fund asset reserves and cost rates include the cost of reaching an ending target trust fund equal to 100 percent of annual cost at the end of the period.

[b] The taxable payroll for HI is significantly larger than the taxable payroll for OASDI because the HI taxable maximum amount was eliminated beginning 1994, and because HI covers all Federal civilian employees, all State and local government employees hired after April 1, 1986, and railroad employees.

[c] OASDI benefit payments which were scheduled to be paid on January 3 for some past and future years were actually paid on December 31 as required by the statutory provision for early delivery of benefit payments when the normal payment delivery date is a Saturday, Sunday, or legal public holiday. For comparability with the values for historical years and the projections in this report, all trust fund operations and asset reserves reflect the 12 months of benefits scheduled for payment each year.

Note: Totals do not necessarily equal the sums of rounded components.

The Trustees project that the OASDI and HI programs will each experience large actuarial deficits for the 25-year, 50-year, and 75-year valuation periods under the high-cost assumptions. Actuarial deficits under the intermediate assumptions are smaller than those for the high-cost assumptions for all three valuation periods. Under the low-cost assumptions, the OASDI and HI programs have positive actuarial balances for all three valuation periods.

2. Estimates as a Percentage of Gross Domestic Product

This section presents long-range projections of the operations of the combined Old-Age and Survivors Insurance and Disability Insurance (OASI and DI) Trust Funds and of the Hospital Insurance (HI) Trust Fund, expressed as a percentage of gross domestic product (GDP). While expressing fund operations as a percentage of taxable payroll is a very useful approach for assessing the financial status of the programs (see section IV.B.1), expressing them as a percentage of the total value of goods and services produced in the United States provides an additional perspective.

Table VI.G4 shows non-interest income, total cost, and the resulting balance of the combined OASI and DI Trust Funds, of the HI Trust Fund, and of the combined OASI, DI, and HI Trust Funds, expressed as percentages of GDP on the basis of each of the three alternative sets of assumptions. Table VI.G4 also contains estimates of GDP. For OASDI, non-interest income consists of payroll tax contributions, proceeds from taxation of scheduled OASDI benefits, and any reimbursements from the General Fund of the Treasury. Cost consists of scheduled benefits, administrative expenses, financial interchange with the Railroad Retirement program, and payments for vocational rehabilitation services for disabled beneficiaries. For HI, non-interest income consists of payroll tax contributions (including contributions from railroad employment), up to an additional 0.9 percent tax on earned income for relatively high earners, proceeds from taxation of scheduled OASDI benefits, premium revenues, monies from fraud and abuse control activities, and any reimbursements from the General Fund of the Treasury. Cost consists of outlays (benefits and administrative expenses) for beneficiaries. The Trustees show income and cost estimates generally on a cash basis for the OASDI program[1] and on an incurred basis for the HI program.

The Trustees project the OASDI annual balance (non-interest income less cost) as a percentage of GDP to be negative throughout the projection period under the intermediate and high-cost assumptions. Under the low-cost assumptions, the OASDI annual deficit as a percentage of GDP generally decreases through 2026. After 2026, deficits increase to a peak in 2034 and then decrease through 2049. The deficit decreases in 2026 in part because of a one-time upward shift in taxation of benefits income due to the expiration of the personal income tax provisions in Public Law 115-97, the Tax Cuts

---

[1] OASDI benefits paid for entitlement for a particular month are generally paid in the succeeding month. There are two primary exceptions to this general rule. First, payments can occur with a greater delay when a benefit award is made after the month of initial benefit entitlement. At the time of benefit award, benefits owed for months of prior entitlement are then also paid to the beneficiary. For the projections in this report, such retroactive payments are included in the period where they are paid (at time of award). Second, when benefit payments scheduled for January 3 are paid on the prior December 31, because January 3 falls on a Sunday, such payments are shown in this report for the period they were scheduled to be paid.

and Jobs Act. The annual balances are then positive for 2050 through the remainder of the projection period. The positive annual balances increase through 2056, decline through 2071, and then generally increase through 2093. Under the intermediate assumptions, the annual deficits increase through 2040, decrease through 2051, and then generally increase thereafter. Under the high-cost assumptions, annual deficits increase throughout the projection period.

The Trustees project that the HI annual balance as a percentage of GDP will be negative in 2019, and then positive throughout the rest of the projection period, under the low-cost assumptions. Under the intermediate and the high-cost assumptions, the HI annual balance is negative for all years of the projection period. Under the intermediate assumptions, annual deficits generally increase through 2046, and then generally decline thereafter. Under the high-cost assumptions, annual deficits reach a peak in 2076 and decline slowly thereafter.

The combined OASDI and HI annual balance as a percentage of GDP is negative throughout the projection period under both the intermediate and high-cost assumptions. Under the low-cost assumptions, the combined OASDI and HI annual balance is negative through 2038, and then positive and mostly rising thereafter. Under the intermediate assumptions, the combined OASDI and HI annual deficits increase from 2019 through 2041, decrease through 2054, increase through 2078, and then generally decline thereafter, reaching 1.82 percent of GDP by 2093. Under the high-cost assumptions, combined annual deficits rise to a peak of 6.31 percent in 2082 and mostly decrease thereafter.

By 2093, the combined OASDI and HI annual balances as percentages of GDP range from a positive annual balance of 1.03 percent for the low-cost assumptions to an annual deficit of 6.27 percent for the high-cost assumptions. Annual balances differ by a much smaller amount for the tenth projection year, 2028, ranging from an annual deficit of 0.12 percent for the low-cost assumptions to an annual deficit of 2.24 percent for the high-cost assumptions.

The summarized long-range (75-year) actuarial balance as a percentage of GDP for the combined OASDI and HI programs varies among the three alternatives by a relatively large amount, from a positive actuarial balance of 0.59 percent under the low-cost assumptions to an actuarial deficit of 4.23 percent under the high-cost assumptions. The 25-year summarized actuarial balance varies by a smaller amount, from a positive actuarial balance of 0.16 percent to an actuarial deficit of 2.40 percent. Summarized rates are calculated on a present-value basis. They include the trust fund reserve balances on January 1, 2019 and the cost of reaching a target trust fund level equal to

100 percent of the following year's annual cost at the end of the period. (See section IV.B.4 for further explanation.)

Table VI.G4.—OASDI and HI Annual and Summarized Income, Cost, and Balance as a Percentage of GDP, Calendar Years 2019-2095

Calendar year	OASDI Income[a]	Cost[b]	Balance[b]	HI Income[a]	Cost	Balance	Combined Income[a]	Cost[b]	Balance[b]	GDP in dollars (billions)
Intermediate:										
2019	4.56	4.93	-0.38	1.49	1.54	-0.05	6.04	6.47	-0.43	$21,485
2020	4.57	4.94	-.38	1.50	1.57	-.07	6.07	6.51	-.45	22,523
2021	4.59	5.01	-.42	1.52	1.60	-.09	6.10	6.61	-.51	23,558
2022	4.62	5.09	-.47	1.53	1.65	-.12	6.15	6.73	-.58	24,616
2023	4.64	5.16	-.52	1.54	1.69	-.15	6.18	6.85	-.67	25,735
2024	4.66	5.25	-.58	1.55	1.73	-.17	6.22	6.97	-.75	26,907
2025	4.68	5.33	-.65	1.57	1.76	-.20	6.25	7.10	-.85	28,109
2026	4.74	5.42	-.68	1.61	1.80	-.19	6.35	7.22	-.87	29,349
2027	4.76	5.50	-.75	1.62	1.83	-.21	6.38	7.34	-.95	30,637
2028	4.78	5.59	-.82	1.64	1.92	-.28	6.41	7.51	-1.10	31,972
2030	4.78	5.72	-.94	1.65	1.98	-.33	6.43	7.70	-1.27	34,800
2035	4.76	5.89	-1.13	1.68	2.12	-.43	6.44	8.01	-1.56	42,963
2040	4.74	5.93	-1.19	1.71	2.19	-.49	6.44	8.12	-1.68	52,965
2045	4.72	5.86	-1.14	1.72	2.23	-.50	6.44	8.09	-1.65	65,548
2050	4.71	5.81	-1.10	1.75	2.24	-.49	6.45	8.04	-1.59	81,297
2055	4.71	5.82	-1.11	1.77	2.23	-.46	6.48	8.05	-1.57	100,694
2060	4.71	5.89	-1.18	1.81	2.23	-.43	6.51	8.12	-1.61	124,381
2065	4.70	5.97	-1.26	1.83	2.26	-.42	6.54	8.22	-1.69	153,328
2070	4.70	6.05	-1.36	1.86	2.29	-.43	6.56	8.35	-1.79	189,023
2075	4.69	6.12	-1.43	1.88	2.33	-.45	6.57	8.44	-1.88	233,480
2080	4.67	6.10	-1.43	1.89	2.34	-.44	6.56	8.44	-1.88	289,008
2085	4.65	6.04	-1.39	1.90	2.33	-.43	6.55	8.37	-1.82	357,936
2090	4.63	6.02	-1.39	1.91	2.32	-.41	6.54	8.34	-1.79	442,655
2095	4.62	6.07	-1.45	1.92	2.31	-.39	6.54	8.38	-1.84	546,331
Summarized rates: [c]										
25-year: 2019-43	5.22	5.84	-.62	1.67	2.03	-.36	6.89	7.87	-.98	
50-year: 2019-68	4.99	5.84	-.85	1.72	2.12	-.40	6.71	7.96	-1.25	
75-year: 2019-93	4.90	5.89	-.99	1.77	2.17	-.40	6.67	8.06	-1.39	
Low-cost:										
2019	4.53	4.85	-.32	1.49	1.49	-.01	6.01	6.34	-.33	21,807
2020	4.56	4.80	-.24	1.50	1.48	.02	6.06	6.28	-.22	23,282
2021	4.59	4.80	-.21	1.51	1.48	.03	6.10	6.28	-.17	24,774
2022	4.63	4.82	-.19	1.53	1.49	.03	6.16	6.31	-.16	26,239
2023	4.66	4.85	-.18	1.54	1.50	.04	6.20	6.35	-.15	27,796
2024	4.70	4.88	-.18	1.55	1.50	.04	6.25	6.39	-.14	29,448
2025	4.73	4.91	-.19	1.56	1.51	.05	6.28	6.42	-.14	31,188
2026	4.79	4.95	-.16	1.60	1.51	.09	6.38	6.46	-.08	32,986
2027	4.82	5.00	-.18	1.61	1.51	.10	6.43	6.50	-.08	34,852
2028	4.85	5.05	-.20	1.62	1.55	.08	6.47	6.59	-.12	36,806
2030	4.85	5.10	-.25	1.64	1.54	.10	6.49	6.64	-.15	41,032
2035	4.84	5.14	-.29	1.68	1.50	.18	6.52	6.64	-.11	53,775
2040	4.83	5.07	-.24	1.71	1.41	.30	6.54	6.49	.06	70,485
2045	4.83	4.92	-.10	1.74	1.30	.44	6.57	6.23	.34	93,041
2050	4.83	4.82	.02	1.78	1.21	.57	6.61	6.03	.59	123,297
2055	4.85	4.79	.06	1.82	1.14	.68	6.67	5.92	.74	163,160
2060	4.87	4.82	.05	1.86	1.10	.76	6.73	5.92	.81	215,224
2065	4.89	4.86	.03	1.89	1.09	.80	6.78	5.95	.83	283,386
2070	4.90	4.89	.01	1.92	1.11	.81	6.82	6.00	.82	373,605
2075	4.92	4.90	.02	1.95	1.13	.81	6.86	6.03	.83	494,275
2080	4.92	4.83	.09	1.97	1.14	.82	6.88	5.97	.91	655,836
2085	4.92	4.74	.18	1.98	1.15	.83	6.90	5.88	1.02	870,185
2090	4.93	4.72	.20	2.00	1.15	.85	6.92	5.87	1.05	1,151,359
2095	4.94	4.82	.12	2.02	1.16	.86	6.96	5.98	.98	1,518,880

**Table VI.G4.—OASDI and HI Annual and Summarized Income, Cost, and Balance
as a Percentage of GDP, Calendar Years 2019-2095 (Cont.)**

| | Percentage of GDP | | | | | | | | | GDP in dollars (billions) |
| | OASDI | | | HI | | | Combined | | | |
Calendar year	Income[a]	Cost[b]	Balance[b]	Income[a]	Cost	Balance	Income[a]	Cost[b]	Balance[b]	
Low-cost (Cont.):										
Summarized rates: [c]										
25-year:										
2019-43 . .	5.25	5.22	0.03	1.67	1.53	0.13	6.91	6.75	0.16	
50-year:										
2019-68 . .	5.07	5.02	.04	1.74	1.35	.39	6.81	6.37	.43	
75-year:										
2019-93 . .	5.02	4.95	.07	1.81	1.29	.52	6.83	6.24	.59	
High-cost:										
2019	4.59	5.03	-.44	1.49	1.59	-.10	6.08	6.61	-.54	21,152
2020	4.59	5.20	-.61	1.50	1.66	-.17	6.08	6.86	-.78	21,450
2021	4.58	5.36	-.78	1.51	1.73	-.22	6.09	7.09	-1.00	21,982
2022	4.59	5.48	-.89	1.53	1.81	-.28	6.11	7.29	-1.17	22,731
2023	4.60	5.60	-1.00	1.54	1.89	-.35	6.14	7.49	-1.35	23,507
2024	4.62	5.74	-1.12	1.56	1.97	-.41	6.18	7.71	-1.53	24,300
2025	4.63	5.86	-1.23	1.58	2.06	-.48	6.21	7.92	-1.71	25,146
2026	4.69	5.98	-1.29	1.62	2.15	-.52	6.31	8.13	-1.82	26,027
2027	4.70	6.11	-1.41	1.64	2.23	-.58	6.35	8.34	-1.99	26,919
2028	4.71	6.24	-1.53	1.66	2.37	-.71	6.37	8.61	-2.24	27,813
2030	4.71	6.43	-1.72	1.67	2.55	-.88	6.38	8.98	-2.60	29,560
2035	4.69	6.75	-2.06	1.70	2.99	-1.29	6.39	9.74	-3.35	34,391
2040	4.66	6.93	-2.27	1.72	3.40	-1.68	6.37	10.33	-3.95	39,884
2045	4.63	7.00	-2.37	1.73	3.79	-2.06	6.36	10.79	-4.43	46,244
2050	4.60	7.06	-2.45	1.75	4.12	-2.37	6.35	11.17	-4.82	53,611
2055	4.59	7.15	-2.57	1.76	4.35	-2.59	6.35	11.51	-5.16	62,053
2060	4.57	7.30	-2.73	1.78	4.53	-2.74	6.36	11.83	-5.47	71,647
2065	4.55	7.46	-2.90	1.80	4.65	-2.85	6.35	12.10	-5.75	82,537
2070	4.53	7.63	-3.10	1.82	4.71	-2.89	6.35	12.34	-5.99	94,955
2075	4.51	7.79	-3.29	1.84	4.75	-2.92	6.34	12.55	-6.20	109,251
2080	4.47	7.87	-3.40	1.85	4.75	-2.91	6.32	12.63	-6.31	125,836
2085	4.44	7.87	-3.44	1.85	4.71	-2.86	6.29	12.58	-6.30	145,048
2090	4.40	7.86	-3.46	1.85	4.66	-2.81	6.25	12.52	-6.27	167,148
2095	4.37	7.87	-3.50	1.86	4.62	-2.76	6.22	12.49	-6.27	192,458
Summarized rates: [c]										
25-year:										
2019-43 . .	5.21	6.58	-1.36	1.68	2.71	-1.03	6.90	9.29	-2.40	
50-year:										
2019-68 . .	4.93	6.83	-1.90	1.72	3.42	-1.70	6.65	10.25	-3.60	
75-year:										
2019-93 . .	4.82	7.06	-2.25	1.75	3.73	-1.98	6.57	10.80	-4.23	

[a] Income for individual years excludes interest on the trust funds. Interest is implicit in all summarized values.
[b] OASDI benefit payments which were scheduled to be paid on January 3 for some past and future years were actually paid on December 31 as required by the statutory provision for early delivery of benefit payments when the normal payment delivery date is a Saturday, Sunday, or legal public holiday. For comparability with the values for historical years and the projections in this report, all trust fund operations and asset reserves reflect the 12 months of benefits scheduled for payment each year.
[c] Summarized rates are calculated on a present-value basis. They include the value of the trust funds on January 1, 2019 and the cost of reaching a target trust fund level equal to 100 percent of annual cost at the end of the period.

Notes:
1. The Trustees show income and cost estimates generally on a cash basis for the OASDI program and on an incurred basis for the HI program.

2. Totals do not necessarily equal the sums of rounded components.

Table VI.G5 displays annual ratios of OASDI taxable payroll to GDP. These ratios facilitate comparisons of trust fund operations expressed as percent-

ages of taxable payroll and those expressed as percentages of GDP. HI taxable payroll is about 25 percent larger than the OASDI taxable payroll throughout the long-range period; see section 1 of this appendix for a detailed description of the difference. For each year, the cost as a percentage of GDP is equal to the cost as a percentage of taxable payroll multiplied by the ratio of taxable payroll to GDP.

Table VI.G5.—Ratio of OASDI Taxable Payroll to GDP, Calendar Years 2019-2095

Calendar year	Intermediate	Low-cost	High-cost
2019	0.355	0.355	0.355
2020	.355	.355	.355
2021	.356	.357	.354
2022	.357	.360	.353
2023	.359	.362	.354
2024	.360	.364	.354
2025	.361	.366	.355
2026	.361	.367	.355
2027	.362	.369	.355
2028	.363	.371	.355
2030	.362	.370	.353
2035	.359	.369	.350
2040	.357	.368	.346
2045	.355	.368	.343
2050	.355	.369	.341
2055	.354	.371	.339
2060	.354	.372	.337
2065	.353	.373	.335
2070	.352	.374	.332
2075	.351	.375	.329
2080	.350	.375	.326
2085	.348	.376	.323
2090	.347	.377	.320
2095	.346	.377	.317

Projections of GDP reflect projected increases in U.S. employment, labor productivity, average hours worked, and the GDP price index (GDP deflator). Projections of taxable payroll reflect the components of growth in GDP along with assumed changes in the ratio of total labor compensation to GDP, the ratio of earnings to total labor compensation, the ratio of OASDI covered earnings to total earnings, and the ratio of taxable to total covered earnings.

Over the long-range period, the ratio of OASDI taxable payroll to GDP is projected to decline mostly due to a projected decline in the ratio of wages and salaries to employee compensation. Over the last five complete economic cycles, the ratio of wages and salaries to employee compensation declined at an average annual rate of 0.23 percent. Over the 65-year period ending in 2093, the ratio of wages and salaries to employee compensation is projected to decline at an average annual rate of 0.06 and 0.16 percent for the intermediate and high-cost assumptions, respectively, and to increase at an average annual rate of 0.04 percent for the low-cost assumptions.

3. Estimates in Dollars

This section presents long-range projections, in dollars, of the operations of the combined OASI and DI Trust Funds and in some cases the HI Trust Fund. Comparing current dollar values over long periods of time is difficult because of the effect of inflation. In order to compare dollar values in a meaningful way, table VI.G6 provides several economic series or indices which can be used to adjust current dollars for changes in prices, wages, or other aspects of economic growth during the projection period. Any series of values can be adjusted by dividing the value for each year by the corresponding index value for the year.

One of the most common forms of standardization is price indexing, which uses some measure of change in the prices of consumer goods. The Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W, hereafter referred to as CPI), published by the Bureau of Labor Statistics, Department of Labor, is one such price index. Consistent with the law, the Social Security Administration (SSA) uses this index to determine the annual cost-of-living increases for OASDI monthly benefits. The ultimate annual rate of increase in the CPI is assumed to be 3.2, 2.6, and 2.0 percent for the low-cost, intermediate, and high-cost sets of assumptions, respectively. Table VI.G7 provides CPI-indexed dollar values (those adjusted using the CPI in table VI.G6), which indicate the relative purchasing power of the values over time.

Wage indexing is another type of standardization. It combines the effects of price inflation and real-wage growth. The wage index presented here is the national average wage index, as defined in section 209(k)(1) of the Social Security Act. SSA uses this index to annually adjust the contribution and benefit base and other earnings-related program amounts. The average wage is assumed to grow by an average rate of 5.0, 3.8, and 2.6 percent under the low-cost, intermediate, and high-cost assumptions, respectively, between 2028 and 2093. Wage-indexed values indicate the level of a series of values relative to the changing standard of living of workers over time.

The taxable payroll series is used as an index to adjust for the effects of changes in the number of workers and changes in the proportion of earnings that are taxable, as well as for the effects of price inflation and real-wage growth. The OASDI taxable payroll consists of all earnings subject to OASDI taxation, with an adjustment for the lower effective tax rate on multiple-employer excess wages. A series of values, divided by the taxable payroll, indicates the percentage of payroll that each value represents, and thus

the extent to which the series of values increases or decreases as a percent of payroll over time.

The GDP series is used as an index to adjust for the growth in the aggregate amount of goods and services produced in the United States. Values adjusted by GDP (see section 2 of this appendix) indicate their relative share of the total output of the economy. No direct assumption is made about growth in taxable payroll or GDP. These series reflect the basic demographic and economic assumptions, as discussed in sections V.A and V.B, respectively.

Discounting at the rate of interest is another way of standardizing current dollars. The compound new-issue interest factor shown in table VI.G6 increases each year by the assumed effective annual nominal yield for special public-debt obligations issuable to the trust funds in the 12 months of the prior year. The compound effective trust-fund interest factor shown in table VI.G6 uses the effective annual yield on all currently-held securities in the combined OASI and DI Trust Funds. The reciprocal of the compound effective trust-fund interest factor approximates the cumulative discount factor used to convert nominal dollar values to present values as of the start of the valuation period in order to create summarized values for this report.

Table VI.G6.—Selected Economic Variables, Calendar Years 2018-2095
[GDP and taxable payroll in billions]

Calendar year	Adjusted CPI[a]	Average wage index	Taxable payroll[b]	Gross domestic product	Compound new-issue interest factor[c]	Compound effective trust-fund interest factor[d]
Intermediate:						
2018........	98.21	$51,794.15	$7,262	$20,502	0.9720	0.9857
2019........	100.00	53,863.71	7,620	21,485	1.0000	1.0143
2020........	102.63	56,396.34	7,989	22,523	1.0331	1.0431
2021........	105.30	58,914.00	8,379	23,558	1.0692	1.0724
2022........	108.04	61,399.77	8,799	24,616	1.1092	1.1021
2023........	110.85	63,918.72	9,229	25,735	1.1543	1.1327
2024........	113.73	66,573.32	9,677	26,907	1.2049	1.1648
2025........	116.68	69,374.02	10,135	28,109	1.2607	1.1991
2026........	119.72	72,318.20	10,608	29,349	1.3220	1.2360
2027........	122.83	75,397.14	11,101	30,637	1.3882	1.2764
2028........	126.02	78,425.26	11,591	31,972	1.4591	1.3204
2030........	132.66	84,662.22	12,587	34,800	1.6137	1.4248
2035........	150.83	102,489.49	15,436	42,963	2.0758	1.8085
2040........	171.48	123,733.59	18,906	52,965	2.6702	2.3263
2045........	194.97	149,026.69	23,302	65,548	3.4348	2.9924
2050........	221.67	179,849.99	28,843	81,297	4.4184	3.8493
2055........	252.02	217,333.50	35,685	100,694	5.6835	4.9515
2060........	286.53	262,623.84	44,025	124,381	7.3109	6.3693
2065........	325.77	316,963.19	54,150	153,328	9.4044	8.1931
2070........	370.38	381,935.36	66,559	189,023	12.0972	10.5391
2075........	421.10	459,748.85	81,944	233,480	15.5611	13.5569
2080........	478.76	552,934.51	101,017	289,008	20.0169	17.4388
2085........	544.32	664,737.33	124,578	357,936	25.7486	22.4323
2090........	618.86	799,309.08	153,496	442,655	33.1215	28.8556
2095........	703.60	961,385.84	188,790	546,331	42.6055	37.1181
Low-cost:						
2018........	97.66	51,842.68	7,268	20,517	.9720	.9857
2019........	100.00	54,589.52	7,736	21,807	1.0000	1.0145
2020........	103.23	58,130.23	8,260	23,282	1.0420	1.0444
2021........	106.54	61,621.98	8,835	24,774	1.0907	1.0758
2022........	109.95	65,003.71	9,433	26,239	1.1438	1.1089
2023........	113.47	68,429.04	10,057	27,796	1.2023	1.1445
2024........	117.10	72,040.30	10,713	29,448	1.2676	1.1835
2025........	120.84	75,890.46	11,403	31,188	1.3402	1.2267
2026........	124.71	79,999.01	12,118	32,986	1.4200	1.2748
2027........	128.70	84,362.57	12,868	34,852	1.5070	1.3288
2028........	132.82	88,796.52	13,639	36,806	1.6008	1.3893
2030........	141.46	98,170.95	15,192	41,032	1.8083	1.5330
2035........	165.59	126,117.08	19,849	53,775	2.4538	2.0540
2040........	193.83	161,366.55	25,949	70,485	3.3299	2.7873
2045........	226.89	205,782.68	34,259	93,041	4.5187	3.7824
2050........	265.59	263,208.08	45,520	123,297	6.1320	5.1328
2055........	310.90	337,375.59	60,464	163,160	8.3212	6.9653
2060........	363.93	432,505.17	80,058	215,224	11.2920	9.4520
2065........	426.00	553,676.86	105,722	283,386	15.3234	12.8265
2070........	498.67	707,474.36	139,719	373,605	20.7941	17.4058
2075........	583.73	902,928.45	185,267	494,275	28.2179	23.6199
2080........	683.29	1,151,407.63	246,211	655,836	38.2921	32.0525
2085........	799.85	1,467,816.54	327,140	870,185	51.9630	43.4957
2090........	936.28	1,871,567.68	433,656	1,151,359	70.5145	59.0244
2095........	1095.98	2,386,543.23	573,141	1,518,880	95.6893	80.0969

Table VI.G6.—Selected Economic Variables, Calendar Years 2018-2095 (Cont.)
[GDP and taxable payroll in billions]

Calendar year	Adjusted CPI[a]	Average wage index	Taxable payroll[b]	Gross domestic product	Compound new-issue interest factor[c]	Compound effective trust-fund interest factor[d]
High-cost:						
2018........	98.74	$51,774.91	$7,259	$20,485	0.9720	0.9857
2019........	100.00	53,181.27	7,507	21,152	1.0000	1.0141
2020........	102.02	53,756.15	7,622	21,450	1.0236	1.0419
2021........	104.06	55,258.23	7,785	21,982	1.0376	1.0691
2022........	106.14	57,220.89	8,035	22,731	1.0627	1.0956
2023........	108.27	59,231.07	8,313	23,507	1.0971	1.1219
2024........	110.43	61,293.18	8,606	24,300	1.1357	1.1486
2025........	112.64	63,356.81	8,920	25,146	1.1782	1.1758
2026........	114.89	65,432.29	9,243	26,027	1.2242	1.2040
2027........	117.19	67,555.34	9,567	26,919	1.2731	1.2333
2028........	119.53	69,521.87	9,865	27,813	1.3245	1.2635
2030........	124.36	73,276.90	10,448	29,560	1.4337	1.3288
2035........	137.31	83,566.28	12,031	34,391	1.7477	1.6025
2040........	151.60	95,162.62	13,811	39,884	2.1304	1.9534
2045........	167.38	108,223.12	15,882	46,244	2.5970	2.3812
2050........	184.80	123,189.65	18,293	53,611	3.1657	2.9027
2055........	204.03	140,293.38	21,051	62,053	3.8590	3.5384
2060........	225.27	159,734.03	24,157	71,647	4.7041	4.3133
2065........	248.71	181,663.13	27,627	82,537	5.7343	5.2579
2070........	274.60	206,322.83	31,523	94,955	6.9900	6.4093
2075........	303.18	234,124.79	35,952	109,251	8.5208	7.8129
2080........	334.74	265,463.17	41,007	125,836	10.3868	9.5239
2085........	369.58	300,872.52	46,800	145,048	12.6615	11.6096
2090........	408.04	341,102.29	53,429	167,148	15.4343	14.1520
2095........	450.51	386,879.11	60,976	192,458	18.8143	17.2512

[a] CPI-W indexed to calendar year 2019.

[b] Total earnings subject to OASDI contribution rates, adjusted to reflect the lower effective contribution rates (compared to the combined employee-employer rate) that apply to multiple-employer "excess wages."

[c] For each alternative, incorporates the average of the assumed annual yield for special public-debt obligations issuable to the trust funds in the 12 months of the prior year.

[d] For each alternative, incorporates the annual effective yield for all outstanding special public-debt obligations held by the trust fund, with a half-year's interest effect in each row. The effective yield for a period equals total interest earned during the period divided by the total exposure to interest on asset reserves and all income and cost items during the period. The reciprocals of the factors approximate the discounting/ accumulation factors that are used to calculate summarized rates and balances in this report.

Table VI.G7 shows the operations of the combined OASI and DI Trust Funds in CPI-indexed 2019 dollars—that is, adjusted by the CPI indexing series as discussed above. The following items are presented in the table: (1) non-interest income, (2) interest income, (3) total income, (4) cost, and (5) asset reserves at the end of the year. Non-interest income consists of payroll tax contributions, income from taxation of scheduled OASDI benefits, and any reimbursements from the General Fund of the Treasury. Cost consists of scheduled benefits, administrative expenses, financial interchange with the Railroad Retirement program, and payments for vocational rehabilitation services for disabled beneficiaries. Table VI.G7 shows trust fund operations under the low-cost, intermediate, and high-cost sets of assumptions.

**Table VI.G7.—Operations of the Combined OASI and DI Trust Funds,
in CPI-indexed 2019 Dollars,[a] Calendar Years 2019-2095**

[In billions]

Calendar year	Non-interest income	Interest income	Total income	Cost[b]	Asset reserves at end of year[b]
Intermediate:					
2019	$979.0	$82.0	$1,061.0	$1,060.0	$2,895.9
2020	1,001.9	79.1	1,081.0	1,085.2	2,817.4
2021	1,026.2	75.8	1,102.0	1,120.9	2,727.1
2022	1,052.3	72.4	1,124.7	1,158.9	2,623.8
2023	1,077.3	70.3	1,147.6	1,198.7	2,506.2
2024	1,103.5	69.2	1,172.7	1,241.2	2,374.3
2025	1,127.8	67.8	1,195.6	1,284.1	2,225.6
2026	1,161.8	66.9	1,228.7	1,328.0	2,069.9
2027	1,186.9	65.6	1,252.4	1,373.0	1,896.9
2028	1,211.6	62.9	1,274.5	1,419.3	1,704.0
2030[c]	1,252.8	57.5	1,310.2	1,499.5	1,267.2
Low-cost:					
2019	987.8	83.7	1,071.4	1,057.6	2,908.8
2020	1,028.0	83.7	1,111.7	1,082.7	2,846.6
2021	1,066.8	83.6	1,150.4	1,115.1	2,793.6
2022	1,105.2	84.6	1,189.8	1,150.6	2,746.2
2023	1,142.7	87.8	1,230.5	1,187.8	2,703.7
2024	1,181.6	92.3	1,273.9	1,227.6	2,666.1
2025	1,219.5	97.5	1,317.0	1,268.2	2,632.3
2026	1,266.5	104.3	1,370.8	1,309.9	2,611.6
2027	1,304.4	111.5	1,415.8	1,353.2	2,593.2
2028	1,342.8	118.4	1,461.3	1,398.4	2,575.6
2030	1,406.7	133.0	1,539.8	1,479.7	2,537.9
2035	1,573.2	149.7	1,722.9	1,669.0	2,438.8
2040	1,757.3	143.3	1,900.6	1,844.3	2,331.0
2045	1,979.3	145.3	2,124.6	2,018.8	2,384.1
2050	2,244.3	164.5	2,408.8	2,236.2	2,724.5
2055	2,546.3	199.3	2,745.5	2,512.9	3,316.9
2060	2,881.8	243.2	3,125.0	2,852.0	4,048.8
2065	3,252.7	291.5	3,544.3	3,233.0	4,849.8
2070	3,673.8	344.1	4,017.9	3,666.1	5,720.8
2075	4,161.8	403.7	4,565.6	4,146.1	6,718.6
2080	4,721.0	484.3	5,205.3	4,635.5	8,099.6
2085	5,351.9	610.1	5,961.9	5,152.8	10,265.5
2090	6,058.7	786.9	6,845.5	5,809.1	13,258.1
2095	6,848.2	987.4	7,835.7	6,676.7	16,584.7
High-cost:					
2019	970.4	80.7	1,051.2	1,063.0	2,883.1
2020	964.1	74.4	1,038.5	1,092.5	2,771.9
2021	968.0	67.2	1,035.3	1,132.3	2,620.5
2022	982.7	60.7	1,043.4	1,173.5	2,439.0
2023	998.4	54.8	1,053.2	1,216.4	2,228.0
2024	1,016.1	49.4	1,065.6	1,262.1	1,987.7
2025	1,034.2	43.6	1,077.8	1,308.4	1,718.2
2026	1,062.3	37.7	1,100.0	1,355.5	1,428.9
2027	1,080.4	31.2	1,111.6	1,403.5	1,109.0
2028[c]	1,096.7	22.8	1,119.5	1,452.6	754.1

[a] CPI-indexed 2019 dollars equal current dollars adjusted by the CPI indexing series in table VI.G6.
[b] Benefit payments which were scheduled to be paid on January 3 for some past and future years were actually paid on December 31 as required by the statutory provision for early delivery of benefit payments when the normal payment delivery date is a Saturday, Sunday, or legal public holiday. For comparability with the values for historical years and the projections in this report, all trust fund operations and asset reserves reflect the 12 months of benefits scheduled for payment each year.
[c] The combined OASI and DI Trust Funds become depleted in 2035 under the intermediate assumptions and in 2030 under the high-cost assumptions, so estimates for later years are not shown.

Note: Totals do not necessarily equal the sums of rounded components.

Figure VI.G1 compares annual cost with annual total income and annual non-interest income. The figure shows only the OASDI program under intermediate assumptions, and presents values in CPI-indexed 2019 dollars, consistent with table VI.G7. The difference between the income values for each year is equal to the trust fund interest earnings. The figure illustrates that, under intermediate assumptions, annual cost exceeds both total income and non-interest income for 2020 through the end of the projection period. In 2019, total income slightly exceeds annual cost. For 2020 through 2034 (the year preceding the year of trust fund reserve depletion), annual cost is covered by drawing down combined trust fund reserves.

Figure VI.G1.—Estimated OASDI Income and Cost in CPI-indexed 2019 Dollars, Based on Intermediate Assumptions
[In billions]
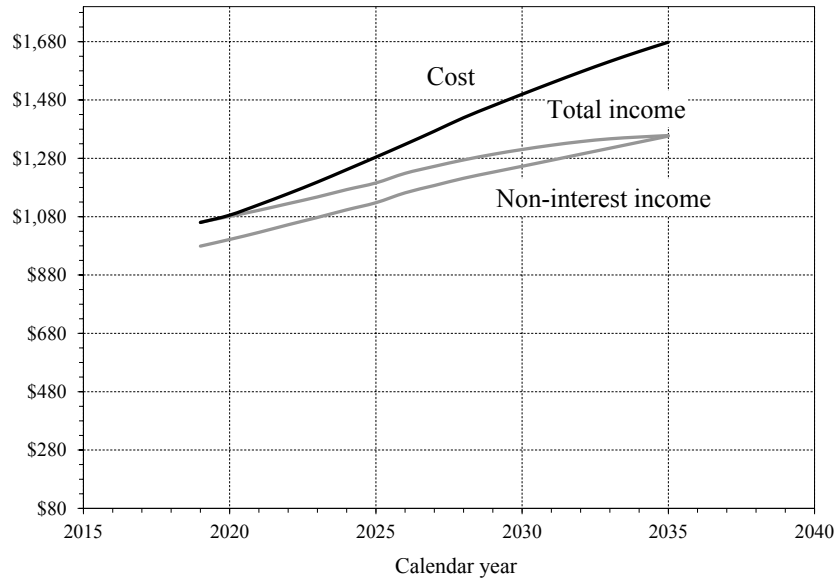
Table VI.G8 presents the operations of the combined OASI and DI Trust Funds in current, or nominal, dollars—that is, in dollars unadjusted for inflation. The following items are presented in the table: (1) non-interest income, (2) interest income, (3) total income, (4) cost, and (5) asset reserves at the end of the year. These estimates are presented using the low-cost, intermediate, and high-cost sets of demographic and economic assumptions to facilitate independent analysis.

**Table VI.G8.—Operations of the Combined OASI and DI Trust Funds,
in Current Dollars, Calendar Years 2019-2095**

[In billions]

Calendar year	Non-interest income	Interest income	Total income	Cost[a]	Asset reserves at end of year[a]
Intermediate:					
2019	$979.0	$82.0	$1,061.0	$1,060.0	$2,895.9
2020	1,028.2	81.2	1,109.4	1,113.7	2,891.6
2021	1,080.5	79.8	1,160.4	1,180.3	2,871.6
2022	1,136.8	78.2	1,215.1	1,252.0	2,834.7
2023	1,194.1	77.9	1,272.0	1,328.7	2,778.0
2024	1,255.0	78.7	1,333.7	1,411.5	2,700.2
2025	1,316.0	79.1	1,395.1	1,498.4	2,596.9
2026	1,390.8	80.1	1,470.9	1,589.9	2,478.0
2027	1,457.8	80.6	1,538.4	1,686.4	2,330.0
2028	1,526.9	79.2	1,606.2	1,788.6	2,147.5
2030[b]	1,662.0	76.2	1,738.2	1,989.3	1,681.2
Low-cost:					
2019	987.8	83.7	1,071.4	1,057.6	2,908.8
2020	1,061.3	86.4	1,147.7	1,117.8	2,938.7
2021	1,136.5	89.0	1,225.6	1,188.1	2,976.2
2022	1,215.1	93.1	1,308.2	1,265.0	3,019.4
2023	1,296.6	99.6	1,396.2	1,347.6	3,067.8
2024	1,383.7	108.1	1,491.7	1,437.6	3,122.0
2025	1,473.7	117.8	1,591.5	1,532.5	3,181.0
2026	1,579.5	130.0	1,709.5	1,633.5	3,256.9
2027	1,678.7	143.4	1,822.2	1,741.6	3,337.5
2028	1,783.6	157.3	1,940.9	1,857.4	3,421.0
2030	1,989.9	188.2	2,178.1	2,093.1	3,590.1
2035	2,605.0	247.8	2,852.9	2,763.6	4,038.3
2040	3,406.1	277.8	3,683.8	3,574.8	4,518.1
2045	4,490.8	329.8	4,820.6	4,580.5	5,409.2
2050	5,960.8	436.8	6,397.7	5,939.3	7,236.2
2055	7,916.2	619.5	8,535.7	7,812.6	10,312.1
2060	10,487.5	885.2	11,372.7	10,379.0	14,734.5
2065	13,856.7	1,242.0	15,098.7	13,772.6	20,660.3
2070	18,320.0	1,716.1	20,036.1	18,281.8	28,527.7
2075	24,293.8	2,356.8	26,650.5	24,202.1	39,217.9
2080	32,258.1	3,309.1	35,567.2	31,673.9	55,343.8
2085	42,806.5	4,879.8	47,686.3	41,214.1	82,108.2
2090	56,725.8	7,367.2	64,093.1	54,389.4	124,132.6
2095	75,055.4	10,822.2	85,877.6	73,175.3	181,765.0
High-cost:					
2019	970.4	80.7	1,051.2	1,063.0	2,883.1
2020	983.6	75.9	1,059.5	1,114.6	2,828.0
2021	1,007.4	70.0	1,077.3	1,178.3	2,727.0
2022	1,043.1	64.4	1,107.5	1,245.6	2,588.8
2023	1,081.0	59.3	1,140.3	1,316.9	2,412.1
2024	1,122.1	54.6	1,176.7	1,393.8	2,195.1
2025	1,164.9	49.1	1,214.0	1,473.8	1,935.3
2026	1,220.5	43.3	1,263.8	1,557.4	1,641.8
2027	1,266.1	36.6	1,302.7	1,644.8	1,299.6
2028[b]	1,310.9	27.2	1,338.1	1,736.3	901.4

[a] Benefit payments which were scheduled to be paid on January 3 for some past and future years were actually paid on December 31 as required by the statutory provision for early delivery of benefit payments when the normal payment delivery date is a Saturday, Sunday, or legal public holiday. For comparability with the values for historical years and the projections in this report, all trust fund operations and asset reserves reflect the 12 months of benefits scheduled for payment each year.

[b] The combined OASI and DI Trust Funds become depleted in 2035 under the intermediate assumptions and in 2030 under the high-cost assumptions, so estimates for later years are not shown.

Note: Totals do not necessarily equal the sums of rounded components.

Table VI.G9 presents values in CPI-indexed 2019 dollars—that is, adjusted by the CPI indexing series discussed at the beginning of this section. This table contains the annual non-interest income and cost of the combined OASI and DI Trust Funds, of the HI Trust Fund, and of the combined OASI, DI, and HI Trust Funds, based on the low-cost, intermediate, and high-cost sets of assumptions. For OASDI, non-interest income consists of payroll tax contributions, proceeds from taxation of scheduled OASDI benefits, and any reimbursements from the General Fund of the Treasury. Cost consists of scheduled benefits, administrative expenses, financial interchange with the Railroad Retirement program, and payments for vocational rehabilitation services for disabled beneficiaries. For HI, non-interest income consists of payroll tax contributions (including contributions from railroad employment), up to an additional 0.9 percent tax on earned income for relatively high earners, proceeds from the taxation of scheduled OASDI benefits, premium revenues, monies from fraud and abuse control activities, and any reimbursements from the General Fund of the Treasury. Total cost consists of scheduled benefits and administrative expenses. The Trustees show income and cost estimates generally on a cash basis for the OASDI program[1] and on an incurred basis for the HI program. Table VI.G9 also shows the annual balance, which equals the difference between non-interest income and cost.

---

[1] OASDI benefits paid for entitlement for a particular month are generally paid in the succeeding month. There are two primary exceptions to this general rule. First, payments can occur with a greater delay when a benefit award is made after the month of initial benefit entitlement. At the time of benefit award, benefits owed for months of prior entitlement are then also paid to the beneficiary. For the projections in this report, such retroactive payments are included in the period where they are paid (at time of award). Second, when benefit payments scheduled for January 3 are paid on the prior December 31, because January 3 falls on a Sunday, such payments are shown in this report for the period they were scheduled to be paid.

Table VI.G9.—OASDI and HI Annual Non-interest Income, Cost, and Balance in CPI-Indexed 2019 Dollars,[a] Calendar Years 2019-2095

[In billions]

Calendar year	OASDI			HI			Combined		
	Non-interest income	Cost[b]	Balance[b]	Non-interest income	Cost	Balance	Non-interest income	Cost[b]	Balance[b]
Intermediate:									
2019	$979	$1,060	-$81	$319	$331	-$12	$1,298	$1,391	-$93
2020	1,002	1,085	-83	329	344	-15	1,331	1,429	-98
2021	1,026	1,121	-95	339	358	-19	1,365	1,479	-114
2022	1,052	1,159	-107	349	375	-27	1,401	1,534	-133
2023	1,077	1,199	-121	358	392	-34	1,435	1,591	-155
2024	1,103	1,241	-138	368	408	-40	1,471	1,649	-178
2025	1,128	1,284	-156	378	425	-47	1,506	1,709	-204
2026	1,162	1,328	-166	394	442	-47	1,556	1,770	-214
2027	1,187	1,373	-186	405	457	-52	1,592	1,830	-238
2028	1,212	1,419	-208	415	486	-71	1,627	1,905	-278
2030	1,253	1,500	-247	434	520	-86	1,687	2,020	-333
2035	1,356	1,678	-322	480	603	-123	1,836	2,281	-445
2040	1,463	1,832	-368	527	677	-151	1,990	2,509	-519
2045	1,586	1,971	-384	580	748	-169	2,166	2,719	-553
2050	1,727	2,130	-403	641	820	-179	2,367	2,950	-582
2055	1,880	2,324	-443	709	891	-182	2,589	3,215	-626
2060	2,043	2,555	-512	784	970	-186	2,827	3,525	-698
2065	2,214	2,809	-595	863	1,062	-199	3,077	3,871	-795
2070	2,397	3,090	-693	949	1,170	-221	3,346	4,260	-915
2075	2,599	3,392	-793	1,043	1,290	-247	3,642	4,682	-1,040
2080	2,819	3,685	-866	1,144	1,412	-268	3,963	5,096	-1,133
2085	3,056	3,972	-916	1,251	1,532	-281	4,308	5,504	-1,197
2090	3,312	4,305	-993	1,367	1,658	-290	4,680	5,963	-1,283
2095	3,587	4,717	-1,130	1,494	1,794	-300	5,081	6,511	-1,430
Low-cost:									
2019	988	1,058	-70	324	325	-1	1,312	1,383	-71
2020	1,028	1,083	-55	338	333	5	1,366	1,416	-49
2021	1,067	1,115	-48	352	344	8	1,419	1,459	-41
2022	1,105	1,151	-45	364	356	8	1,469	1,507	-37
2023	1,143	1,188	-45	376	367	9	1,519	1,555	-36
2024	1,182	1,228	-46	389	378	11	1,571	1,606	-35
2025	1,220	1,268	-49	402	389	13	1,622	1,657	-35
2026	1,267	1,310	-43	422	399	23	1,689	1,709	-20
2027	1,304	1,353	-49	436	408	28	1,740	1,761	-21
2028	1,343	1,398	-56	450	428	21	1,792	1,827	-34
2030	1,407	1,480	-73	476	447	29	1,883	1,927	-44
2035	1,573	1,669	-96	546	487	59	2,119	2,156	-37
2040	1,757	1,844	-87	623	514	109	2,380	2,358	22
2045	1,979	2,019	-40	714	534	180	2,694	2,553	140
2050	2,244	2,236	8	825	561	264	3,069	2,797	272
2055	2,546	2,513	33	953	596	357	3,500	3,109	390
2060	2,882	2,852	30	1,098	649	449	3,979	3,501	479
2065	3,253	3,233	20	1,258	725	532	4,511	3,958	552
2070	3,674	3,666	8	1,439	832	608	5,113	4,498	615
2075	4,162	4,146	16	1,649	959	690	5,810	5,105	706
2080	4,721	4,635	85	1,886	1,098	788	6,607	5,734	873
2085	5,352	5,153	199	2,154	1,247	906	7,505	6,400	1,105
2090	6,059	5,809	250	2,457	1,410	1,047	8,516	7,219	1,296
2095	6,848	6,677	172	2,803	1,610	1,193	9,652	8,287	1,365

**Table VI.G9.—OASDI and HI Annual Non-interest Income, Cost, and
Balance in CPI-Indexed 2019 Dollars,[a] Calendar Years 2019-2095 (Cont.)**
[In billions]

Calendar year	OASDI			HI			Combined		
	Non-interest income	Cost[b]	Balance[b]	Non-interest income	Cost	Balance	Non-interest income	Cost[b]	Balance[b]
High-cost:									
2019	$970	$1,063	-$93	$315	$336	-$21	$1,285	$1,399	-$114
2020	964	1,093	-128	315	350	-35	1,279	1,442	-163
2021	968	1,132	-164	319	365	-46	1,287	1,497	-211
2022	983	1,174	-191	327	387	-60	1,310	1,560	-251
2023	998	1,216	-218	335	410	-75	1,333	1,627	-293
2024	1,016	1,262	-246	343	434	-91	1,359	1,696	-337
2025	1,034	1,308	-274	352	460	-107	1,386	1,768	-382
2026	1,062	1,356	-293	368	486	-118	1,430	1,842	-411
2027	1,080	1,404	-323	377	511	-134	1,458	1,915	-457
2028	1,097	1,453	-356	386	552	-166	1,483	2,004	-522
2030	1,120	1,529	-409	398	606	-208	1,517	2,135	-617
2035	1,174	1,691	-517	426	748	-323	1,600	2,439	-840
2040	1,225	1,823	-598	452	894	-442	1,677	2,717	-1,040
2045	1,278	1,934	-656	478	1,047	-568	1,756	2,981	-1,224
2050	1,335	2,047	-711	506	1,195	-688	1,842	3,241	-1,400
2055	1,395	2,176	-781	536	1,324	-788	1,931	3,500	-1,569
2060	1,454	2,321	-867	567	1,440	-873	2,021	3,761	-1,740
2065	1,511	2,474	-963	598	1,542	-944	2,109	4,016	-1,907
2070	1,567	2,639	-1,072	629	1,629	-1,000	2,196	4,268	-2,072
2075	1,624	2,808	-1,184	662	1,713	-1,051	2,286	4,521	-2,235
2080	1,682	2,960	-1,278	694	1,787	-1,093	2,376	4,746	-2,370
2085	1,741	3,090	-1,349	726	1,848	-1,122	2,467	4,938	-2,471
2090	1,802	3,218	-1,417	759	1,909	-1,150	2,560	5,127	-2,567
2095	1,865	3,362	-1,497	793	1,974	-1,180	2,658	5,335	-2,677

[a] CPI-indexed 2019 dollars equal current dollars adjusted by the CPI indexing series in table VI.G6.
[b] OASDI benefit payments which were scheduled to be paid on January 3 for some past and future years were actually paid on December 31 as required by the statutory provision for early delivery of benefit payments when the normal payment delivery date is a Saturday, Sunday, or legal public holiday. For comparability with the values for historical years and the projections in this report, all trust fund operations and asset reserves reflect the 12 months of benefits scheduled for payment each year.

Note: Totals do not necessarily equal the sums of rounded components.

Table VI.G10 shows values in current, or nominal, dollars—that is, in dollars unadjusted for inflation. This table presents the annual non-interest income, cost, and balance of the combined OASI and DI Trust Funds, of the HI Trust Fund, and of the combined OASI, DI, and HI Trust Funds, based on the low-cost, intermediate, and high-cost sets of assumptions.

**Table VI.G10.—OASDI and HI Annual Non-interest Income, Cost, and
Balance in Current Dollars, Calendar Years 2019-2095**
[In billions]

Calendar year	OASDI Non-interest income	OASDI Cost[a]	OASDI Balance[a]	HI Non-interest income	HI Cost	HI Balance	Combined Non-interest income	Combined Cost[a]	Combined Balance[a]
Intermediate:									
2019	$979	$1,060	-$81	$319	$331	-$12	$1,298	$1,391	-$93
2020	1,028	1,114	-86	338	353	-15	1,366	1,467	-101
2021	1,081	1,180	-100	357	377	-20	1,438	1,558	-120
2022	1,137	1,252	-115	377	405	-29	1,513	1,657	-144
2023	1,194	1,329	-135	397	434	-38	1,591	1,763	-172
2024	1,255	1,412	-157	418	464	-46	1,673	1,876	-203
2025	1,316	1,498	-182	441	496	-55	1,757	1,994	-238
2026	1,391	1,590	-199	472	529	-57	1,863	2,119	-256
2027	1,458	1,686	-229	498	562	-64	1,955	2,248	-293
2028	1,527	1,789	-262	523	612	-89	2,050	2,401	-351
2030	1,662	1,989	-327	575	690	-115	2,237	2,679	-442
2035	2,045	2,531	-486	723	909	-186	2,769	3,441	-672
2040	2,509	3,141	-632	903	1,161	-258	3,413	4,303	-890
2045	3,092	3,842	-750	1,130	1,459	-329	4,222	5,301	-1,079
2050	3,827	4,721	-893	1,420	1,817	-397	5,248	6,538	-1,291
2055	4,738	5,856	-1,118	1,787	2,246	-459	6,525	8,102	-1,577
2060	5,854	7,320	-1,467	2,245	2,780	-534	8,099	10,100	-2,001
2065	7,211	9,150	-1,938	2,811	3,461	-650	10,022	12,611	-2,588
2070	8,878	11,445	-2,567	3,514	4,334	-820	12,392	15,779	-3,387
2075	10,944	14,283	-3,339	4,391	5,431	-1,040	15,336	19,714	-4,378
2080	13,496	17,641	-4,144	5,475	6,758	-1,282	18,972	24,398	-5,427
2085	16,637	21,621	-4,985	6,810	8,339	-1,528	23,447	29,960	-6,513
2090	20,498	26,642	-6,144	8,462	10,259	-1,797	28,960	36,901	-7,941
2095	25,239	33,187	-7,948	10,512	12,623	-2,111	35,751	45,809	-10,059
Low-cost:									
2019	988	1,058	-70	324	325	-1	1,312	1,383	-71
2020	1,061	1,118	-56	349	344	5	1,410	1,461	-51
2021	1,137	1,188	-52	375	367	8	1,511	1,555	-43
2022	1,215	1,265	-50	400	391	9	1,616	1,656	-41
2023	1,297	1,348	-51	427	417	10	1,724	1,765	-41
2024	1,384	1,438	-54	456	443	13	1,839	1,880	-41
2025	1,474	1,533	-59	486	470	16	1,960	2,003	-43
2026	1,579	1,634	-54	527	498	29	2,106	2,131	-25
2027	1,679	1,742	-63	561	525	36	2,240	2,267	-27
2028	1,784	1,857	-74	597	569	28	2,381	2,426	-46
2030	1,990	2,093	-103	674	632	41	2,663	2,725	-62
2035	2,605	2,764	-159	903	806	97	3,508	3,569	-61
2040	3,406	3,575	-169	1,207	996	210	4,613	4,571	42
2045	4,491	4,581	-90	1,621	1,212	408	6,112	5,793	318
2050	5,961	5,939	22	2,191	1,489	702	8,152	7,429	723
2055	7,916	7,813	104	2,964	1,854	1,109	10,880	9,667	1,213
2060	10,488	10,379	108	3,995	2,361	1,634	14,482	12,740	1,742
2065	13,857	13,773	84	5,358	3,090	2,268	19,215	16,863	2,352
2070	18,320	18,282	38	7,178	4,147	3,031	25,498	22,429	3,069
2075	24,294	24,202	92	9,623	5,596	4,027	33,917	29,798	4,119
2080	32,258	31,674	584	12,887	7,505	5,382	45,145	39,179	5,967
2085	42,807	41,214	1,592	17,225	9,976	7,249	60,031	51,190	8,841
2090	56,726	54,389	2,336	23,003	13,202	9,801	79,729	67,591	12,138
2095	75,055	73,175	1,880	30,724	17,645	13,079	105,779	90,820	14,959

**Table VI.G10.—OASDI and HI Annual Non-interest Income, Cost, and
Balance in Current Dollars, Calendar Years 2019-2095 (Cont.)**
[In billions]

Calendar year	OASDI			HI			Combined		
	Non-interest income	Cost[a]	Balance[a]	Non-interest income	Cost	Balance	Non-interest income	Cost[a]	Balance[a]
High-cost:									
2019	$970	$1,063	-$93	$315	$336	-$21	$1,285	$1,399	-$114
2020	984	1,115	-131	321	357	-36	1,305	1,472	-167
2021	1,007	1,178	-171	332	380	-48	1,339	1,558	-219
2022	1,043	1,246	-203	347	410	-63	1,390	1,656	-266
2023	1,081	1,317	-236	363	444	-81	1,444	1,761	-317
2024	1,122	1,394	-272	379	479	-100	1,501	1,873	-372
2025	1,165	1,474	-309	397	518	-121	1,562	1,991	-430
2026	1,221	1,557	-337	423	558	-136	1,643	2,116	-472
2027	1,266	1,645	-379	442	599	-157	1,708	2,244	-536
2028	1,311	1,736	-425	461	660	-198	1,772	2,396	-624
2030	1,392	1,901	-509	495	753	-259	1,887	2,655	-768
2035	1,612	2,322	-710	584	1,027	-443	2,196	3,350	-1,153
2040	1,857	2,763	-907	685	1,355	-671	2,542	4,119	-1,577
2045	2,139	3,237	-1,098	801	1,752	-952	2,940	4,989	-2,049
2050	2,468	3,782	-1,315	936	2,208	-1,272	3,404	5,990	-2,586
2055	2,846	4,439	-1,593	1,094	2,702	-1,608	3,940	7,141	-3,201
2060	3,276	5,229	-1,953	1,278	3,244	-1,966	4,553	8,473	-3,919
2065	3,758	6,153	-2,395	1,487	3,836	-2,348	5,245	9,989	-4,744
2070	4,303	7,247	-2,944	1,728	4,473	-2,745	6,031	11,720	-5,689
2075	4,924	8,515	-3,590	2,006	5,193	-3,187	6,930	13,708	-6,778
2080	5,631	9,907	-4,277	2,323	5,980	-3,657	7,953	15,888	-7,934
2085	6,434	11,420	-4,986	2,683	6,831	-4,148	9,117	18,251	-9,134
2090	7,352	13,133	-5,781	3,096	7,788	-4,692	10,448	20,921	-10,473
2095	8,401	15,144	-6,743	3,573	8,891	-5,318	11,974	24,035	-12,061

[a] OASDI benefit payments which were scheduled to be paid on January 3 for some past and future years were actually paid on December 31 as required by the statutory provision for early delivery of benefit payments when the normal payment delivery date is a Saturday, Sunday, or legal public holiday. For comparability with the values for historical years and the projections in this report, all trust fund operations and asset reserves reflect the 12 months of benefits scheduled for payment each year.

Note: Totals do not necessarily equal the sums of rounded components.

H. ANALYSIS OF BENEFIT PAYMENTS FROM THE OASI TRUST FUND WITH RESPECT TO DISABLED BENEFICIARIES
(Required by section 201(c) of the Social Security Act)

Effective January 1957, the OASI Trust Fund pays monthly benefits to disabled children aged 18 and over of retired and deceased workers if the disability began before age 18. The age by which disability must have begun was later changed to age 22. Effective February 1968, the OASI Trust Fund pays reduced monthly benefits to disabled widows and widowers at ages 50 and over. Effective January 1991, the requirements for the disability of the widow or widower were made less restrictive.

At the end of 2018, the OASI Trust Fund was providing monthly benefit payments to about 1,139,000 people because of their disabilities or the disabilities of children. This total includes approximately 24,000 mothers and fathers (wives or husbands under normal retirement age of retired-worker beneficiaries and widows or widowers of deceased insured workers) who met all other qualifying requirements and were receiving unreduced benefits solely because they had disabled-child beneficiaries (or disabled children aged 16 or 17) in their care. In calendar year 2018, the OASI Trust Fund paid a total of $11,898 million to the people described above. Table VI.H1 shows OASI scheduled benefits for disability for selected calendar years during 1960 through 2018 and estimates for 2019 through 2028 based on the intermediate set of assumptions.

**Table VI.H1.—Scheduled Benefit Payments From the OASI Trust Fund
With Respect to Disabled Beneficiaries**
[Beneficiaries in thousands; scheduled benefits in millions]

Calendar year	Disabled beneficiaries, end of year			Amount of scheduled benefits[a] [b]		
	Total	Children[c]	Widows-widowers[d]	Total	Children[c]	Widows-widowers[e]
Historical data:						
1960	117	117	—	$59	$59	—
1965	214	214	—	134	134	—
1970	316	281	36	301	260	$41
1975	435	376	58	664	560	104
1980	519	460	59	1,223	1,097	126
1985	594	547	47	2,072	1,885	187
1990	662	613	49	2,882	2,649	233
1995	772	681	91	4,202	3,672	531
2000	811	707	104	5,203	4,523	680
2005	836	728	108	6,449	5,556	834
2010	996	879	117	8,858	7,848	1,008
2011	1,020	899	121	9,136	8,085	1,050
2012	1,045	920	125	9,698	8,595	1,102
2013	1,065	939	126	9,953	8,840	1,109
2014	1,079	954	125	10,326	9,217	1,108
2015	1,096	972	124	10,736	9,624	1,109
2016	1,109	988	121	11,025	9,933	1,087
2017	1,124	1,006	117	11,355	10,288	1,061
2018	1,139	1,027	112	11,898	10,860	1,031
Estimates under the intermediate assumptions:						
2019	1,154	1,046	108	12,450	11,429	1,014
2020	1,169	1,065	103	12,916	11,915	993
2021	1,184	1,084	100	13,503	12,509	985
2022	1,199	1,103	96	14,107	13,119	979
2023	1,215	1,121	93	14,720	13,740	970
2024	1,231	1,140	91	15,385	14,400	974
2025	1,247	1,158	89	16,089	15,101	977
2026	1,263	1,176	87	16,842	15,839	992
2027	1,279	1,193	86	17,634	16,617	1,006
2028	1,295	1,209	85	18,457	17,415	1,030

[a] Beginning in 1966, includes payments for vocational rehabilitation services.

[b] Amounts for 2015 and 2016 are adjusted to include in 2016 operations those benefit payments regularly scheduled in the law to be paid on January 3, 2016, which were actually paid on December 31, 2015 as required by the statutory provision for early benefit payments when the normal delivery date is on a Saturday, Sunday, or public holiday. Such shifts in payments across calendar years occur periodically whenever January 3rd falls on a Sunday. In order to provide a consistent perspective on scheduled benefits over time, scheduled benefits in each year reflect the 12 months of benefits that are regularly scheduled for payment in that year.

[c] Also includes certain mothers and fathers (see text).

[d] In 1984 and later years, includes only disabled widows and widowers aged 50-59, because disabled widows and widowers age 60 and older are eligible for the same benefit as a nondisabled aged widow or widower. Therefore, they are not receiving benefits solely because of a disability.

[e] In 1983 and prior years, includes the offsetting effect of lower benefits payable to disabled widows and widowers who continued to receive benefits after attaining age 60 (62, for disabled widowers prior to 1973), compared to the higher nondisabled widow's and widower's benefits that would otherwise be payable. In 1984 and later years, includes only scheduled benefits to disabled widows and widowers aged 50-59 (see footnote d).

Note: Totals do not necessarily equal the sums of rounded components.

Under the intermediate assumptions, estimated total scheduled benefits paid from the OASI Trust Fund with respect to disabled beneficiaries will increase from $12,450 million in calendar year 2019 to $18,457 million in calendar year 2028.

In calendar year 2018, benefit payments (including payments for vocational rehabilitation services) with respect to disabled persons from the OASI Trust Fund and from the DI Trust Fund (including payments from the DI fund to all children and spouses of disabled-worker beneficiaries) totaled $155,658 million. Of this amount, $11,898 million, or 7.6 percent, represented payments from the OASI Trust Fund. Table VI.H2 contains these and similar figures for selected calendar years during 1960 through 2018 and estimates for calendar years 2019 through 2028.

**Table VI.H2.—Scheduled Benefit Payments[a] Under the OASDI Program
With Respect to Disabled Beneficiaries**
[Amounts in millions]

Calendar year	Total[b]	DI Trust Fund[c]	OASI Trust Fund Amount[d]	OASI Trust Fund Percentage of total
Historical data:				
1960	$627	$568	$59	9.4
1965	1,707	1,573	134	7.9
1970	3,386	3,085	301	8.9
1975	9,169	8,505	664	7.2
1980	16,738	15,515	1,223	7.3
1985	20,908	18,836	2,072	9.9
1990	27,717	24,835	2,882	10.4
1995	45,140	40,937	4,202	9.3
2000	60,204	55,001	5,203	8.6
2005	91,835	85,386	6,449	7.0
2010	133,103	124,245	8,858	6.7
2011	138,115	128,979	9,136	6.6
2012	146,623	136,925	9,698	6.6
2013	150,108	140,155	9,953	6.6
2014	152,031	141,705	10,326	6.8
2015	154,124	143,388	10,736	7.0
2016	153,824	142,800	11,025	7.2
2017	154,181	142,826	11,355	7.4
2018	155,658	143,760	11,898	7.6
Estimates under the intermediate assumptions:				
2019	159,397	146,947	12,450	7.8
2020	160,740	147,824	12,916	8.0
2021	164,979	151,476	13,503	8.2
2022	169,903	155,797	14,107	8.3
2023	175,572	160,852	14,720	8.4
2024	182,832	167,448	15,385	8.4
2025	191,183	175,094	16,089	8.4
2026	200,189	183,347	16,842	8.4
2027	209,582	191,947	17,634	8.4
2028	217,518	199,061	18,457	8.5

[a] Amounts for 2015 and 2016 are adjusted to include in 2016 operations those benefit payments regularly scheduled in the law to be paid on January 3, 2016, which were actually paid on December 31, 2015 as required by the statutory provision for early benefit payments when the normal delivery date is on a Saturday, Sunday, or public holiday. Such shifts in payments across calendar years occur periodically whenever January 3rd falls on a Sunday. In order to provide a consistent perspective on scheduled benefits over time, scheduled benefits in each year reflect the 12 months of benefits that are regularly scheduled for payment in that year.

[b] Beginning in 1966, includes payments for vocational rehabilitation services.

[c] Scheduled benefits for disabled workers and their children and spouses.

[d] Scheduled benefits for disabled children aged 18 and over, for certain mothers and fathers (see text), and for disabled widows and widowers (see footnote e, table VI.H1).

Note: Totals do not necessarily equal the sums of rounded components.

I. GLOSSARY

Actuarial balance. The difference between the summarized income rate and the summarized cost rate as a percentage of taxable payroll over a given valuation period.

Actuarial deficit. A negative actuarial balance.

Administrative expenses. Expenses incurred by the Social Security Administration and the Department of the Treasury in administering the OASDI program and the provisions of the Internal Revenue Code relating to the collection of contributions. Such administrative expenses are paid from the OASI and DI Trust Funds.

Advance tax transfers. Amounts representing the estimated total OASDI tax contributions for a given month. From May 1983 through November 1990, such amounts were credited to the OASI and DI Trust Funds at the beginning of each month. The trust funds reimbursed the General Fund of the Treasury for the associated loss of interest. Advance tax transfers are no longer made unless needed in order to pay benefits.

Alternatives I, II, or III. See "Assumptions."

Annual balance. The difference between the income rate and the cost rate for a given year.

Asset reserves. The cumulative excess of trust fund income over trust fund cost over all years to date. These reserves are held by the trust funds in the form of Treasury notes and bonds, other securities guaranteed by the Federal Government, certain Federally sponsored agency obligations, and cash.

Assumptions. Values related to future trends in key factors that affect the trust funds. Demographic assumptions include fertility, mortality, net immigration, marriage, and divorce. Economic assumptions include unemployment rates, average earnings, inflation, interest rates, and productivity. Program-specific assumptions include retirement patterns, and disability incidence and termination rates. This report presents three sets of demographic, economic, and program-specific assumptions:

- Alternative II is the intermediate set of assumptions, and represents the Trustees' best estimates of likely future demographic, economic, and program-specific conditions.

- Alternative I is a low-cost set of assumptions—it assumes relatively rapid economic growth, high inflation, and favorable (from the standpoint of program financing) demographic and program-specific conditions.

- Alternative III is a high-cost set of assumptions—it assumes relatively slow economic growth, low inflation, and unfavorable (from the standpoint of program financing) demographic and program-specific conditions.

See tables V.A2, V.B1, and V.B2.

Automatic cost-of-living benefit increase. The annual increase in benefits, effective for December, reflecting the increase, if any, in the cost of living. A benefit increase is applicable only after a beneficiary becomes eligible for benefits. In general, the benefit increase equals the percentage increase in the Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W) measured from the third quarter of the previous year to the third quarter of the current year. If there is no increase in the CPI-W, there is no cost-of-living benefit increase. See table V.C1.

Auxiliary benefits. Monthly benefits payable to a spouse or child of a retired or disabled worker, or to a survivor of a deceased worker.

Average indexed monthly earnings—AIME. The measure of lifetime earnings used in determining the primary insurance amount (PIA) for most workers who attain age 62, become disabled, or die after 1978. A worker's actual past earnings are adjusted by changes in the average wage index, in order to bring them up to their approximately equivalent value at the time of retirement or other eligibility for benefits.

Average wage index—AWI. A series that generally increases with the average amount of total wages for each year after 1950, including wages in non-covered employment and wages in covered employment in excess of the OASDI contribution and benefit base. (See Title 20, Chapter III, section 404.211(c) of the Code of Federal Regulations for a more precise definition.) These average wage amounts are used to index the taxable earnings of most workers first becoming eligible for benefits in 1979 or later, and for automatic adjustments in the contribution and benefit base, bend points, earnings test exempt amounts, and other wage-indexed amounts. See tables V.C1 and VI.G6.

Award. An administrative determination that an individual is entitled to receive a specified type of OASDI benefit. Awards can represent not only new entrants to the benefit rolls but also persons already on the rolls who become entitled to a different type of benefit. Awards usually result in the immediate payment of benefits, although payments may be deferred or withheld depending on the individual's particular circumstances.

Baby boom. The period from the end of World War II (1946) through 1965 marked by unusually high birth rates.

Bend points. The dollar amounts defining the AIME or PIA brackets in the benefit formulas. For the bend points for years 1979 and later, see table V.C2.

Beneficiary. A person who has been awarded benefits on the basis of his or her own or another's earnings record. The benefits may be either in current-payment status or withheld.

Benefit award. See "Award."

Benefit conversion. See "Disability conversion."

Benefit payments. The amounts disbursed for OASI and DI benefits by the Department of the Treasury.

Benefit termination. See "Termination."

Best estimate assumptions. See "Assumptions."

Board. See "Board of Trustees."

Board of Trustees. A Board established by the Social Security Act to oversee the financial operations of the Federal Old-Age and Survivors Insurance Trust Fund and the Federal Disability Insurance Trust Fund. The Board is composed of six members. Four members serve by virtue of their positions in the Federal Government: the Secretary of the Treasury, who is the Managing Trustee; the Secretary of Labor; the Secretary of Health and Human Services; and the Commissioner of Social Security. The President appoints and the Senate confirms the other two members to serve as public representatives. Also referred to as the "Board" or the "Trustees."

Cash flow. Actual or projected revenue and costs reflecting the levels of payroll tax contribution rates and benefits scheduled in the law. Net cash flow is the difference between non-interest income and cost.

Consumer Price Index—CPI. An official measure of inflation in consumer prices. In this report, CPI refers to the Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W). The Bureau of Labor Statistics, Department of Labor, publishes historical values for the CPI-W.

Contribution and benefit base. Annual dollar amount above which earnings in employment covered under the OASDI program are neither taxable nor creditable for benefit-computation purposes. (Also referred to as maximum contribution and benefit base, annual creditable maximum, taxable maximum, and maximum taxable.) See tables V.C1 and V.C6. See "Hospital Insurance (HI) contribution base."

Contributions. See "Payroll tax contributions."

Conversion. See "Disability conversion."

Cost. The cost shown for a year includes benefits scheduled for payment in the year, administrative expenses, financial interchange with the Railroad Retirement program, and payments for vocational rehabilitation services for disabled beneficiaries.

Cost-of-living adjustment. See "Automatic cost-of-living benefit increase."

Cost rate. The cost rate for a year is the ratio of the cost of the program to the taxable payroll for the year.

Covered earnings. Wages or earnings from self-employment covered by the OASDI program.

Covered employment. All employment for which earnings are creditable for Social Security purposes. The program covers almost all employment. Some exceptions are:

- State and local government employees whose employer has not elected to be covered under Social Security and who are participating in an employer-provided pension plan.
- Current Federal civilian workers hired before 1984 who have not elected to be covered.
- Self-employed workers earning less than $400 in a calendar year.

Covered worker. A person who has earnings creditable for Social Security purposes based on services for wages in covered employment or income from covered self-employment.

CPI-indexed dollars. Amounts adjusted by the CPI to the value of the dollar in a particular year.

Creditable earnings. Wages or self-employment earnings posted to a worker's earnings record. Such earnings determine eligibility for benefits and the amount of benefits on that worker's record. The contribution and benefit base is the maximum amount of creditable earnings for each worker in a calendar year.

Current-cost financing. See "Pay-as-you-go financing."

Current dollars. Amounts expressed in nominal dollars with no adjustment for inflation.

Currently insured status. A worker acquires currently insured status when he or she has accumulated six quarters of coverage during the 13-quarter period ending with the current quarter.

Current-payment status. Status of a beneficiary to whom a benefit is being paid for a given month (with or without deductions, provided the deductions add to less than a full month's benefit).

Deemed filing. Under certain circumstances, a person applying for or receiving either an aged-spouse benefit or a retired-worker benefit is required to also file for the other of these two types of benefits. For those first eligible for benefits before 2016, this requirement applies to any person under normal retirement age who is eligible for the other benefit as of the starting month for the first benefit. For those first eligible for benefits in 2016 and later, this requirement applies whenever the person is eligible for the other benefit. This can occur at any age, and in months after the starting month of the first benefit.

Deemed wage credit. See "Military service wage credits."

Delayed retirement credits. Increases in the benefit amount for certain individuals who did not receive benefits for months after attaining normal retirement age but before age 70. Delayed retirement credits apply to benefits for

January of the year following the year they are earned or for the month of attainment of age 70, whichever comes first. See table V.C3.

Demographic assumptions. See "Assumptions."

Disability. For Social Security purposes, the inability to engage in any substantial gainful activity (see "Substantial gainful activity—SGA") by reason of any medically determinable physical or mental impairment that can be expected to result in death or to last for a continuous period of not less than 12 months. Special rules apply for workers at ages 55 and over whose disability is based on blindness.

The law generally requires that a person be disabled continuously for 5 months before he or she can qualify for a disabled-worker benefit.

Disability conversion ratio. For a given year, the ratio of the number of disability conversions to the average number of disabled-worker beneficiaries at all ages during the year.

Disability conversion. Upon attainment of normal retirement age, a disabled-worker beneficiary is automatically converted to retired-worker status.

Disability incidence rate. The proportion of workers in a given year, insured for but not receiving disability benefits, who apply for and are awarded disability benefits.

Disability Insurance (DI) Trust Fund. See "Trust fund."

Disability insured status. A worker acquires disability insured status if he or she is: (1) a fully insured worker who has accumulated 20 quarters of coverage during the 40-quarter period ending with the current quarter, (2) a fully insured worker aged 24-30 who has accumulated quarters of coverage during one-half of the quarters elapsed after the quarter of attainment of age 21 and up to and including the current quarter, or (3) a fully insured worker under age 24 who has accumulated six quarters of coverage during the 12-quarter period ending with the current quarter.

Disability prevalence rate. The proportion of persons insured for disability benefits who are disabled-worker beneficiaries in current-payment status.

Disability termination rate. The proportion of disabled-worker beneficiaries in a given year whose disability benefits terminate as a result of their recovery or death.

Disabled-worker benefit. A monthly benefit payable to a disabled worker under normal retirement age and insured for disability. Before November 1960, disability benefits were limited to disabled workers aged 50-64.

Dual entitlement. A person may be entitled to more than one benefit at the same time. For example, a person may be entitled as a retired worker on his or her own record and as a spouse on another record. However, a person's benefit amount can never exceed the highest single benefit to which that per-

son is entitled. Some benefits are calculated independently with the larger benefit being paid or the smaller benefit being paid plus the excess amount of the larger one.

Earnings. Unless otherwise qualified, all wages from employment and net earnings from self-employment, whether or not they are taxable or covered.

Earnings test. The provision requiring the withholding of benefits if beneficiaries under normal retirement age have earnings in excess of certain exempt amounts. See table V.C1.

Economic assumptions. See "Assumptions."

Effective interest rate. See "Interest rate."

Excess wages. Wages in excess of the contribution and benefit base on which a worker initially makes payroll tax contributions, usually as a result of working for more than one employer during a year. Employee payroll taxes on excess wages are refundable to affected employees, while the employer taxes are not refundable.

Expenditures. Actual payments made or expected to be made under current law, including benefits paid or payable, administrative expenses, financial interchange with the Railroad Retirement program, and payments for vocational rehabilitation services for disabled beneficiaries.

Federal Insurance Contributions Act—FICA. Provision authorizing payroll taxes on the wages of employed persons to provide for Old-Age, Survivors, and Disability Insurance, and for Hospital Insurance. Workers and their employers generally pay the tax in equal amounts.

File and suspend. The ability to apply for a retired-worker benefit at or after normal retirement age, then voluntarily suspend it, allowing the worker to earn delayed retirement credits and a spouse or child to receive benefits on the worker's record. Voluntary suspensions requested after April 29, 2016 no longer allow spouses (other than divorced spouses) and children to receive benefits while the worker's benefit is suspended.

Financial interchange. Provisions of the Railroad Retirement Act providing for transfers between the trust funds and the Social Security Equivalent Benefit Account of the Railroad Retirement program in order to place each trust fund in the same financial position it would have been had railroad employment always been covered under Social Security.

Fiscal year. The accounting year of the United States Government. Starting in 1976, a fiscal year is the 12-month period ending September 30. For example, fiscal year 2019 began October 1, 2018, and will end September 30, 2019.

Full advance funding. A financing method in which contributions are established to match the full cost of future benefits as these costs are incurred through current service. Such financing methods also provide for amortiza-

tion over a fixed period of any financial obligation that is incurred at the beginning of the program (or subsequent modification) as a result of granting credit for past service.

Fully insured status. A worker acquires fully insured status when his or her total number of quarters of coverage is greater than or equal to the number of years elapsed after the year of attainment of age 21 (but not less than six). Once a worker has accumulated 40 quarters of coverage, he or she remains permanently fully insured.

General Fund of the Treasury. Funds held by the Treasury of the United States, other than income collected for a specific purpose (such as Social Security), and maintained in a separate account for that purpose.

General Fund reimbursements. Payments from the General Fund of the Treasury to the trust funds for specific purposes defined in the law, including:

- The cost of noncontributory wage credits for military service before 1957, and periodic adjustments of previous determinations.
- The cost in 1971-82 of deemed wage credits for military service performed after 1956.
- The cost of benefits to certain uninsured persons who attained age 72 before 1968.
- The cost of payroll tax credits provided to employees in 1984 and self-employed persons in 1984-89 by Public Law 98-21.
- The cost in 2009-17 of excluding certain self-employment earnings from SECA taxes under Public Law 110-246.
- Payroll tax revenue forgone under the provisions of Public Laws 111-147, 111-312, 112-78, and 112-96.

The General Fund also reimburses the trust funds for various other items, including interest on checks which are not negotiated 6 months after the month of issue and costs incurred in performing certain legislatively mandated activities not directly related to administering the OASI and DI programs.

Gross domestic product—GDP. The total dollar value of all goods and services produced by labor and property located in the United States, regardless of who supplies the labor or property.

Hospital Insurance (HI) contribution base. Annual dollar amount above which earnings in employment covered under the HI program are not taxable. (Also referred to as maximum contribution base, taxable maximum, and maximum taxable.) Beginning in 1994, the HI contribution base was eliminated.

High-cost assumptions. See "Assumptions."

Hospital Insurance (HI) Trust Fund. See "Trust fund."

Immigration. See "Lawful permanent resident (LPR) immigration" and "Other-than-LPR immigration."

Income. Income for a given year is the sum of tax revenue on a cash basis (payroll tax contributions and income from the taxation of scheduled benefits), reimbursements from the General Fund of the Treasury, if any, and interest credited to the trust funds.

Income rate. Ratio of non-interest income to the OASDI taxable payroll for the year.

Infinite horizon. The period extending indefinitely into the future.

Inflation. An increase in the general price level of goods and services.

Insured status. The state or condition of having sufficient quarters of coverage to meet the eligibility requirements for retired-worker or disabled-worker benefits, or to permit the worker's spouse and children or survivors to establish eligibility for benefits in the event of his or her disability, retirement, or death. See "Quarter of coverage."

Interest. A payment in exchange for the use of money during a specified period.

Interest rate. Interest rates on new public-debt obligations issuable to Federal trust funds (see "Special public-debt obligation") are determined monthly. Such rates are equal to the average market yield on all outstanding marketable U.S. securities not due or callable until after 4 years from the date the rate is determined. See table V.B2 for historical and assumed future interest rates on new special-issue securities. The effective interest rate for a trust fund is the ratio of the interest earned by the fund over a given period of time to the average level of asset reserves held by the fund during the period. The effective rate of interest thus represents a measure of the overall average interest earnings on the fund's portfolio of investments. See table VI.G6 for projected compound new-issue interest factors and compound effective trust-fund interest factors.

Interfund borrowing. The borrowing of asset reserves by a trust fund (OASI, DI, or HI) from another trust fund when the first fund is in danger of depletion. The Social Security Act permitted interfund borrowing only during 1982 through 1987, and required all amounts borrowed to be repaid prior to the end of 1989. The only exercise of this authority occurred in 1982, when the OASI Trust Fund borrowed from the DI and HI Trust Funds. The final repayment of borrowed amounts occurred in 1986.

Intermediate assumptions. See "Assumptions."

Lawful permanent resident (LPR) immigration. Persons who enter the Social Security area population and are granted LPR status, or who are already in the Social Security area population and adjust their status to become LPRs. Persons who enter the country with legal visas but without LPR status, such as temporary foreign workers and students, are not included in the "LPR immigration" category.

Legal emigration. Lawful permanent residents and citizens who leave the Social Security area population.

Life expectancy. Average remaining number of years expected prior to death. Period life expectancy is calculated for a given year using the actual or expected death rates at each age for that year. Cohort life expectancy, sometimes referred to as generational life expectancy, is calculated for individuals at a specific age in a given year using actual or expected death rates from the years in which the individuals would actually reach each succeeding age if they survive.

Long-range. The next 75 years. The Trustees make long-range actuarial estimates for this period because it covers approximately the maximum remaining lifetime for virtually all current Social Security participants.

Low-cost assumptions. See "Assumptions."

Lump-sum death payment. A lump sum, generally $255, payable on the death of a fully or currently insured worker. The lump sum is payable to the surviving spouse of the worker, under most circumstances, or to the worker's children.

Maximum family benefit. The maximum monthly amount that can be paid on a worker's earnings record. Whenever the total of the individual monthly benefits payable to all the beneficiaries entitled on one earnings record exceeds the maximum, each dependent's or survivor's benefit is proportionately reduced. Benefits payable to divorced spouses or surviving divorced spouses are not reduced under the family maximum provision.

Medicare. A nationwide, Federally administered health insurance program authorized in 1965 under Title XVIII of the Social Security Act to cover the cost of hospitalization, medical care, and some related services for most persons age 65 and over. In 1972, lawmakers extended coverage to persons receiving Social Security Disability Insurance payments for 2 years and persons with End-Stage Renal Disease. (For beneficiaries whose primary or secondary diagnosis is Amyotrophic Lateral Sclerosis, the 2-year waiting period is waived.) In 2010, persons exposed to environmental health hazards within areas under a corresponding emergency declaration became Medicare-eligible. In 2006, prescription drug coverage was added as well. Medicare consists of two separate but coordinated trust funds—Hospital Insurance (HI, Part A) and Supplementary Medical Insurance (SMI). The SMI Trust Fund is composed of two separate accounts—the Part B account and the Part D account. Almost all persons who are aged 65 and over or disabled and who are entitled to HI are eligible to enroll in Part B and Part D on a voluntary basis by paying monthly premiums.

Military service wage credits. Credits toward OASDI earnings records for benefit computation purposes, recognizing that military personnel receive non-wage compensation (such as food and shelter) in addition to their basic

pay and other cash payments. Military personnel do not pay payroll taxes on these credits. Noncontributory wage credits of $160 were provided for each month of active military service from September 16, 1940, through December 31, 1956. For years after 1956, the basic pay of military personnel is covered under the Social Security program on a contributory basis. In addition to the contributory credits for basic pay, noncontributory wage credits of $300 were granted for each calendar quarter, from January 1957 through December 1977, in which a person received pay for military service. Noncontributory wage credits of $100 were granted for each $300 of military wages, up to a maximum credit of $1,200 per calendar year, from January 1978 through December 2001.

National average wage index—AWI. See "Average wage index—AWI."

Non-interest income. Non-interest income for a given year is the sum of tax revenue on a cash basis (payroll tax contributions and income from the taxation of scheduled benefits) and reimbursements from the General Fund of the Treasury, if any.

Nonresident alien beneficiary. An OASDI beneficiary who is not a U.S. citizen and who is living abroad while receiving benefits.

Normal retirement age—NRA. The age at which a person may first become entitled to retirement benefits without reduction based on age. For persons reaching age 62 before 2000, the normal retirement age is 65. It will increase gradually to 67 for persons reaching that age in 2027 or later, beginning with an increase to 65 years and 2 months for persons reaching age 65 in 2003. See table V.C3.

Old-Age and Survivors Insurance (OASI) Trust Fund. See "Trust fund."

Old-law base. Amount the contribution and benefit base would have been if the 1977 amendments had not provided for ad hoc increases. The Social Security Amendments of 1972 provided for automatic annual indexing of the contribution and benefit base. The Social Security Amendments of 1977 specified ad hoc bases for 1978-81, with subsequent bases updated in accordance with the normal indexing procedure. See table V.C2.

Open-group unfunded obligation. See "Unfunded obligation."

Other-than-LPR emigration. Other-than-LPR immigrants who leave the Social Security area population or who adjust their status to become LPRs.

Other-than-LPR immigration. Persons who enter the Social Security area population and stay to the end of the year without being granted LPR status, such as undocumented immigrants, and foreign workers and students entering with temporary visas.

Par value. The value printed on the face of a bond. For both public and special issues held by the trust funds, par value is also the redemption value at maturity.

Partial advance funding. A financing method in which contributions are established to provide a substantial accumulation of trust fund asset reserves, thereby generating additional interest income to the trust funds and reducing the need for payroll tax increases in periods when costs are relatively high. Higher general contributions or additional borrowing may be required, however, to support the payment of such interest. While substantial, the trust fund buildup under partial advance funding is much smaller than it would be with full advance funding.

Pay-as-you-go financing. A financing method in which contributions are established to produce just as much income as required to pay current benefits, with trust fund asset reserves built up only to the extent needed to prevent depletion of the fund by random economic fluctuations.

Payroll tax contributions. The amount based on a percent of earnings, up to an annual maximum, that must be paid by:

- employers and employees on wages from employment under the Federal Insurance Contributions Act,
- the self-employed on net earnings from self-employment under the Self-Employment Contributions Act, and
- States on the wages of State and local government employees covered under the Social Security Act through voluntary agreements under section 218 of the act.

Also referred to as payroll taxes.

Population in the Social Security area. See "Social Security area population."

Present value. The equivalent value, at the present time, of a stream of values (either income or cost, past or future). Present values are used widely in calculations involving financial transactions over long periods of time to account for the time value of money, by discounting or accumulating these transactions at the rate of interest. Present-value calculations for this report use the effective yield on trust fund asset reserves.

Primary insurance amount—PIA. The monthly amount payable to a retired worker who begins to receive benefits at normal retirement age or, generally, to a disabled worker. This amount, which is typically related to the worker's average monthly wage or average indexed monthly earnings, is also used as a base for computing all types of benefits payable on an individual's earnings record.

Primary-insurance-amount formula. The mathematical formula relating the PIA to the AIME for workers who attain age 62, become disabled, or die after 1978. The PIA is equal to the sum of 90 percent of AIME up to the first bend point, plus 32 percent of AIME above the first bend point up to the second bend point, plus 15 percent of AIME in excess of the second bend point.

Automatic benefit increases are applied beginning with the year of eligibility. See table V.C2 for historical and assumed future bend points and table V.C1 for historical and assumed future benefit increases.

Quarter of coverage. Basic unit of measurement for determining insured status. In 2019, a worker receives one quarter of coverage (up to a total of four) for each $1,360 of annual covered earnings. For years after 1978, the amount of earnings required for a quarter of coverage increases automatically with increases in the national average wage index. See table V.C2.

Railroad Retirement. A Federal insurance program, similar to Social Security, designed for workers in the railroad industry. The provisions of the Railroad Retirement Act provide for a system of coordination and financial interchange between the Railroad Retirement program and the Social Security program.

Reallocation of payroll tax rates. An increase in the payroll tax rate for either the OASI or DI Trust Fund, with a corresponding reduction in the rate for the other fund, so that the total OASDI payroll tax rate is not changed.

Real-wage differential. The difference between the percentage increases in: (1) the average annual wage in covered employment and (2) the average annual Consumer Price Index. See table V.B1.

Recession. A period of adverse economic conditions, generally defined as two or more successive calendar quarters of negative real growth in gross domestic product.

Reserves. See "Asset reserves."

Retired-worker benefit. A monthly benefit payable to a fully insured retired worker aged 62 or older or to a person entitled under the transitionally insured status provision in the law.

Retirement earnings test. See "Earnings test."

Retirement eligibility age. The age, currently age 62, at which a fully insured individual first becomes eligible to receive retired-worker benefits.

Scheduled benefits. The level of benefits specified under current law.

Scenario-based model. A model with specified assumptions for and relationships among variables. Under such a model, any specified set of assumptions determines a single outcome directly reflecting the specifications.

Self-employment. Operation of a trade or business by an individual or by a partnership in which an individual is a member.

Self-Employment Contributions Act−SECA. Provision authorizing Social Security payroll taxes on the net earnings of most self-employed persons.

Short-range. The next 10 years. The Trustees prepare short-range actuarial estimates for this period because of the test of short-range financial adequacy. The Social Security Act requires estimates for 5 years; the Trustees

prepare estimates for an additional 5 years to help clarify trends which are only starting to develop in the mandated first 5-year period.

Social Security Act. Provisions of the law governing most operations of the Social Security program. The original Social Security Act is Public Law 74-271, enacted August 14, 1935. With subsequent amendments, the Social Security Act consists of 21 titles, of which three have been repealed. Title II of the Social Security Act authorized the Old-Age, Survivors, and Disability Insurance program.

Social Security area population. The population composed of: (1) residents of the 50 States and the District of Columbia (adjusted for net census undercount); (2) civilian residents of Puerto Rico, the Virgin Islands, Guam, American Samoa, and the Northern Mariana Islands; (3) Federal civilian employees and persons in the U.S. Armed Forces abroad and their dependents; (4) non-citizens living abroad who are insured for Social Security benefits; and (5) all other U.S. citizens abroad.

Solvency. A program is solvent at a point in time if it is able to pay scheduled benefits when due with scheduled financing. For example, the OASDI program is solvent over any period for which the trust funds maintain a positive level of asset reserves.

Special public-debt obligation. Securities of the United States Government issued exclusively to the OASI, DI, HI, and SMI Trust Funds and other Federal trust funds. Section 201(d) of the Social Security Act provides that the public-debt obligations issued for purchase by the OASI and DI Trust Funds shall have maturities fixed with due regard for the needs of the funds. The usual practice has been to spread the holdings of special issues, as of each June 30, so that the amounts maturing in each of the next 15 years are approximately equal. Special public-debt obligations are redeemable at par value at any time and carry interest rates determined by law (see "Interest rate"). See tables VI.A4 and VI.A5 for a listing of the obligations held by the OASI and DI Trust Funds, respectively.

Stochastic model. A model used for projecting a probability distribution of potential outcomes. Such models allow for random variation in one or more variables through time. The random variation is generally based on fluctuations observed in historical data for a selected period. A large number of simulations, each of which reflects random variation in the variable(s), produce a distribution of potential outcomes.

Substantial gainful activity—SGA. The level of work activity used to establish disability. A finding of disability requires that a person be unable to engage in substantial gainful activity. A person who earns more than a certain monthly amount (net of impairment-related work expenses) is ordinarily considered to be engaging in SGA. The amount of monthly earnings considered as SGA depends on the nature of a person's disability. The Social Security Act specifies a higher SGA amount for statutorily blind individuals;

Federal regulations specify a lower SGA amount for non-blind individuals. Both SGA amounts increase with increases in the national average wage index.

Summarized balance. The difference between the summarized income rate and the summarized cost rate, expressed as a percentage of GDP. The difference between the summarized income rate and cost rate as a percentage of taxable payroll is referred to as the actuarial balance.

Summarized cost rate. The ratio of the present value of cost to the present value of the taxable payroll (or GDP) for the years in a given period, expressed as a percentage. To evaluate the financial adequacy of the program, the summarized cost rate is adjusted to include the cost of reaching and maintaining a target trust fund level. A trust fund level of about 1 year's cost is considered to be an adequate reserve for unforeseen contingencies; therefore, the targeted trust fund ratio is 100 percent of annual cost. Accordingly, the adjusted summarized cost rate is equal to the ratio of: (1) the sum of the present value of the cost during the period plus the present value of the targeted ending trust fund level to (2) the present value of the taxable payroll (or GDP) during the projection period.

Summarized income rate. The ratio of the present value of scheduled non-interest income to the present value of taxable payroll (or GDP) for the years in a given period, expressed as a percentage. To evaluate the financial adequacy of the program, the summarized income rate is adjusted to include asset reserves on hand at the beginning of the period. Accordingly, the adjusted summarized income rate equals the ratio of: (1) the sum of the trust fund reserve at the beginning of the period plus the present value of non-interest income during the period to (2) the present value of the taxable payroll (or GDP) for the years in the period.

Supplemental Security Income—SSI. A Federally administered program (often with State supplementation) of cash assistance for needy aged, blind, or disabled persons. The General Fund of the Treasury funds Federal expenditures for the SSI program. The Social Security Administration administers it.

Supplementary Medical Insurance (SMI) Trust Fund. See "Trust fund."

Survivor benefit. Benefit payable to a survivor of a deceased worker.

Sustainable solvency. Sustainable solvency for the financing of the program under a specified set of assumptions is achieved when the projected trust fund ratio is positive throughout the 75-year projection period and is either stable or rising at the end of the period.

Taxable earnings. Wages or self-employment income, in employment covered by the OASDI or HI programs, that is under the applicable annual maxi-

mum taxable limit. For 1994 and later, no maximum taxable limit applies to the HI program.

Taxable payroll. A weighted sum of taxable wages and taxable self-employment income. When multiplied by the combined employee-employer payroll tax rate, taxable payroll yields the total amount of payroll taxes incurred by employees, employers, and the self-employed for work during the period.

Taxable self-employment income. The maximum amount of net earnings from self-employment by an earner which, when added to any taxable wages, does not exceed the contribution and benefit base. For HI beginning in 1994, all net earnings from self-employment.

Taxable wages. See "Taxable earnings."

Taxation of benefits. Beginning in 1984, Federal law subjected up to 50 percent of an individual's or a couple's OASDI benefits to Federal income taxation under certain circumstances. Treasury allocates the revenue derived from this provision to the OASI and DI Trust Funds on the basis of the income taxes paid on the benefits from each fund. Beginning in 1994, the law increased the maximum percentage from 50 percent to 85 percent. The HI Trust Fund receives the additional tax revenue resulting from the increase to 85 percent.

Taxes. See "Payroll tax contributions" and "Taxation of benefits."

Termination. Cessation of payment because the beneficiary is no longer entitled to receive a specific type of benefit. For example, benefits might terminate as a result of the death of the beneficiary, the recovery of a disabled beneficiary, or the attainment of age 18 by a child beneficiary. In some cases, an individual may cease one benefit and this is not a termination because they become immediately entitled to another type of benefit, such as the conversion of a disabled-worker beneficiary at normal retirement age to a retired-worker beneficiary.

Test of long-range close actuarial balance. The conditions required to meet this test are:

- The trust fund satisfies the test of short-range financial adequacy; and
- The trust fund ratios stay above zero throughout the 75-year projection period, such that benefits would be payable in a timely manner throughout the period.

The Trustees apply the test to OASI, DI, and the combined OASDI program based on the intermediate set of assumptions.

Test of short-range financial adequacy. The conditions required to meet this test are:

- If the trust fund ratio is at least 100 percent at the beginning of the projection period, then it must remain at or above 100 percent throughout the 10-year projection period;

- If the ratio is initially less than 100 percent, then it must reach at least 100 percent within 5 years (without asset reserve depletion at any time during this period) and then remain at or above 100 percent throughout the remainder of the 10-year period.

The Trustees apply the test to OASI, DI, and the combined OASDI program based on the intermediate set of assumptions.

Total-economy productivity. The ratio of real GDP to hours worked by all workers. Also referred to as "labor productivity."

Total fertility rate. The sum of the single year of age birth rates for women aged 14 through 49, where the rate for age 14 includes births to women aged 14 and under, and the rate for age 49 includes births to women aged 49 and over. The total fertility rate may be interpreted as the average number of children that would be born to a woman if she were to experience, at each age of her life, the birth rate observed in, or assumed for, a specified year, and if she were to survive the entire childbearing period.

Trust fund. Separate accounts in the United States Treasury which hold the payroll taxes received under the Federal Insurance Contributions Act and the Self-Employment Contributions Act; payroll taxes resulting from coverage of State and local government employees; any sums received under the financial interchange with the railroad retirement account; voluntary hospital and medical insurance premiums; and reimbursements or payments from the General Fund of the Treasury. As required by law, the Department of the Treasury invests funds not required to meet current expenditures in interest-bearing securities backed by the full faith and credit of the U.S. Government. The interest earned is also deposited in the trust funds.

- **Old-Age and Survivors Insurance (OASI).** The trust fund used for paying monthly benefits to retired-worker (old-age) beneficiaries, their spouses and children, and to survivors of deceased insured workers.

- **Disability Insurance (DI).** The trust fund used for paying monthly benefits to disabled-worker beneficiaries, their spouses and children, and for providing rehabilitation services to the disabled.

- **Hospital Insurance (HI).** The Medicare trust fund that covers specified inpatient hospital services, posthospital skilled nursing care, home health services, and hospice care for aged and disabled individuals who meet the eligibility requirements. Also known as Medicare Part A.

- **Supplementary Medical Insurance (SMI).** The Medicare trust fund composed of the Part B Account, the Part D Account, and the Transitional Assistance Account. The Part B Account pays for a portion of the costs of physicians' services, outpatient hospital services, and other related medical and health services for voluntarily enrolled aged and disabled individuals. The Part D Account pays private plans to provide

prescription drug coverage, beginning in 2006. The Transitional Assistance Account paid for transitional assistance under the prescription drug card program in 2004 and 2005.

The trust funds are distinct legal entities which operate independently. Fund operations are sometimes combined on a hypothetical basis.

Trust fund ratio. A measure of trust fund adequacy. The asset reserves at the beginning of a year, which do not include advance tax transfers, expressed as a percentage of the cost for the year. The trust fund ratio represents the proportion of a year's cost which could be paid solely with the reserves at the beginning of the year.

Trustees. See "Board of Trustees."

Undisbursed balances. In general, refers to the cumulative differences between the actual cash payments for a month compared to security redemptions from the trust fund reserves made on a preliminary basis to cover such cash payments during the same month. On a monthly basis, the Social Security Administration (SSA) pays benefits and makes payments for other programmatic expenses associated with the trust funds. During each month, SSA draws cash from the trust funds on a preliminary basis, which results in Treasury redeeming invested securities to cover such payments. This monthly difference can be either positive or negative depending on net monthly activity, and is added to the balance at the end of the prior month.

A net positive undisbursed balance represents a situation where cumulative redemptions from the trust fund's securities are more than was needed to cover actual program cash payments through the end of the month. A net negative balance represents a situation where cumulative program cash payments exceeded the amount redeemed from the invested securities. A negative value requires future redemption of additional invested securities.

In addition, about every seven years, when January 3 falls on a Sunday, benefit payments scheduled to be paid on January 3rd are actually paid on December 31 of the preceding year, as required by the statutory provision included in the 1977 Social Security Amendments for early delivery of benefit payments when the normal payment delivery date is a Saturday, Sunday, or legal public holiday. Consistent with practice in prior reports and for comparability with other historical years and the projections in this report, all trust fund operations and asset reserves reflect the 12 months of benefits scheduled for payment in each year. Therefore, such advance payments are included as positive values in the undisbursed balance at the end of the calendar years in which the advance payments are made.

Unfunded obligation. A measure of the shortfall of trust fund income to fully cover program cost through a specified date after depletion of trust fund asset reserves. This measure can be expressed in present value dollars, discounted to the beginning of the valuation period, by computing the excess of

the present value of the projected cost of the program through a specified date over the sum of: (1) the value of trust fund reserves at the beginning of the valuation period; and (2) the present value of the projected non-interest income of the program through a specified date, assuming scheduled tax rates and benefit levels. This measure can apply for all participants through a specified date, i.e., the open group, or be limited to a specified subgroup of participants.

Unfunded obligation ratio. The unfunded obligation accumulated through the beginning of a year expressed as a percentage of the cost for the year.

Unnegotiated check. A check which has not been cashed 6 months after the end of the month in which the check was issued. When a check has been outstanding for a year, the Department of the Treasury administratively cancels the check and reimburses the issuing trust fund separately for the amount of the check and interest for the period the check was outstanding. The appropriate trust fund also receives an interest adjustment for the time the check was outstanding if it is cashed 6 to 12 months after the month of issue. If a check is presented for payment after it has been administratively canceled, a replacement check is issued.

Valuation period. A period of years which is considered as a unit for purposes of calculating the financial status of a trust fund.

Vocational rehabilitation (VR). Services provided to disabled persons to help them to return to gainful employment. VR services are designed to provide an individual with the training or other services that are needed to return to work, to begin working, or to enter a new line of work. The trust funds, and the General Fund in the case of individuals also receiving Supplemental Security Income disability benefits, reimburse the providers of such services only in those cases where the services contributed to the successful rehabilitation of the beneficiaries.

Year of depletion. The year in which a trust fund becomes unable to pay benefits when due because the fund's asset reserves have been used up.

V. ASSUMPTIONS AND METHODS UNDERLYING ACTUARIAL ESTIMATES

VI. APPENDICES

A. HISTORY OF OASI AND DI TRUST FUND OPERATIONS

B. HISTORY OF ACTUARIAL STATUS ESTIMATES

C. FISCAL YEAR HISTORICAL AND PROJECTED
TRUST FUND OPERATIONS THROUGH 2028

D. LONG-RANGE SENSITIVITY ANALYSIS

H. ANALYSIS OF BENEFIT PAYMENTS FROM THE OASI TRUST FUND WITH RESPECT TO DISABLED BENEFICIARIES

II. OVERVIEW

IV. ACTUARIAL ESTIMATES

V. ASSUMPTIONS AND METHODS UNDERLYING
ACTUARIAL ESTIMATES

VI. APPENDICES

STATEMENT OF ACTUARIAL OPINION

It is my opinion that, with the important caveat noted below: (1) the techniques and methodology used herein to evaluate the actuarial status of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds are based upon sound principles of actuarial practice and are generally accepted within the actuarial profession; and (2) the assumptions used and the resulting actuarial estimates are, individually and in the aggregate, reasonable for the purpose of evaluating the actuarial status of the trust funds, taking into consideration the past experience and future expectations for the population, the economy, and the program. I am an Associate of the Society of Actuaries, a member of the American Academy of Actuaries, and I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Federal Budget Accounting

This report focuses on the actuarial status of the OASI and DI Trust Funds, as required by law. It includes important information on (1) the years in which trust fund asset reserves are projected to be depleted and (2) the degree to which benefits scheduled in the law would no longer be fully payable on a timely basis after reserve depletion. However, the footnote on page 43 of this report directs the reader to an appendix in the Medicare Trustees Report, which states, "The trust fund perspective does not encompass the interrelationship between the Medicare and Social Security trust funds and the overall Federal budget." The reader of this report should consider this "overall" Federal unified budget perspective with care because the assumptions underlying unified budget accounting are inconsistent with the assumptions of trust fund accounting.

In particular, trust fund accounting accurately reflects the law, under which benefits cannot be paid in full on a timely basis after reserve depletion. In contrast, unified budget accounting assumes that full scheduled benefits will continue to be paid through transfers from the General Fund of the Treasury, thus representing "a draw on other Federal resources for which there is no earmarked source of revenue from the public." Not only are such "draws" not permissible under current law, no precedent exists for a change in the Social Security Act to finance unfunded trust fund obligations with such draws on other Federal resources. Under this unified budget accounting assumption, $13.9 trillion of OASDI unfunded obligations, which are not payable under the law over the next 75 years, are referred to as "expenditures" requiring a "draw" from the General Fund of the Treasury.

In addition, unified budget accounting treats redemptions of trust fund reserves as an addition to annual Federal deficits, referring to these redemptions also as "a draw on other Federal resources." In fact, redemptions of trust fund reserves represent a deferred use of revenues earmarked for the trust fund program alone, which have been collected in prior years and saved for later use. These redemptions utilize the entire $2.9 trillion accumulation of net past earmarked revenue for OASDI, but are referred to as draws on the General Fund of the Treasury under the unified budget perspective.

Therefore, the actual operations of the trust funds under current law do not draw on other Federal resources. Expenditures can only be paid from current or deferred earmarked resources for the specific program financed from the trust fund. Assertions that trust fund reserve redemption and shortfalls after reserve depletion represent draws on other Federal resources are based on assumptions that are inconsistent with the law and with actual trust fund annual cash-flow operations.

In addition to Federal budget annual cash flows, the budget perspective is equally concerned with the build-up of Federal debt. The total Federal debt subject to limit includes trust fund reserves. Thus, as trust fund reserves are accumulated or redeemed, they are offset in the total Federal debt by securities issued to the public, with no net effect on the total Federal debt. Moreover, even in considering the Federal debt owed to (held by) the public, there is no net direct effect on that debt from accumulating and then redeeming trust fund asset reserves. However, budget analysis frequently refers to both trust fund reserve redemptions and trust fund obligations not payable under the law after reserve depletion as factors that increase the Federal debt held by the public in the future. This assertion is not consistent with a full assessment of the investment and redemption flows of the trust funds or with the limitations in the law on paying benefits after trust fund reserves are depleted.

Stephen C. Goss

Associate of the Society of Actuaries
Member of the American Academy of Actuaries
Chief Actuary, Social Security Administration