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THE 2016 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 2016 ANNUAL REPORT OF THE BOARD OF TRUSTEES OF THE FEDERAL OLD-AGE AND SURVIVORS INSURANCE AND FEDERAL DISABILITY INSURANCE TRUST FUNDS

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BOARD OF TRUSTEES OF THE
FEDERAL OLD-AGE AND SURVIVORS INSURANCE AND
FEDERAL DISABILITY INSURANCE TRUST FUNDS,
Washington, D.C., June 22, 2016

HON. PAUL D. RYAN,
Speaker of the House of Representatives.

HON. JOSEPH R. BIDEN, JR.,
President of the Senate.

DEAR MR. SPEAKER AND MR. PRESIDENT:

We have the honor of transmitting to you the 2016 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Federal Disability Insurance Trust Funds, the 76th such report.

Respectfully,

JACOB J. LEW,
Secretary of the Treasury,
and Managing Trustee of the Trust Funds.

THOMAS E. PEREZ,
Secretary of Labor, and Trustee.

SYLVIA M. BURWELL,
Secretary of Health and Human Services,
and Trustee.

CAROLYN W. COLVIN,
Acting Commissioner
of Social Security, and Trustee.

VACANT,
Public Trustee.

VACANT,
Public Trustee.

VIRGINIA P. RENO,
Deputy Commissioner
for Retirement and Disability Policy,
Social Security Administration,
and Acting Secretary, Board of Trustees.

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THE 2016 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 2016 report is the 76th such report.

II. OVERVIEW

A. HIGHLIGHTS

This section summarizes the report's major findings.

In 2015

At the end of 2015, the OASDI program was providing benefit payments[1] to about 60 million people: 43 million retired workers and dependents of retired workers, 6 million survivors of deceased workers, and 11 million disabled workers and dependents of disabled workers. During the year, an estimated 169 million people had earnings covered by Social Security and paid payroll taxes on those earnings. Total expenditures in 2015 were $897 billion. Total income was $920 billion, which consisted of $827 billion in non-interest income and $93 billion in interest earnings. Asset reserves held in special issue U.S. Treasury securities grew from $2,789 billion at the beginning of the year to $2,813 billion at the end of the year. Consistent with practice in prior reports, asset reserves at the end of 2015 reflect the 12 months of benefits scheduled for payment, and exclude from operations shown for 2015 the benefits scheduled for payment on January 3, 2016, which were actually paid on December 31, 2015 as required by the law.[2]

Short-Range Results

Under the Trustees' intermediate assumptions, Social Security's total income is projected to exceed its total cost through 2019, as it has since 1982. The 2015 surplus of total income relative to cost was $23 billion. However, when interest income is excluded, Social Security's cost is projected to exceed its non-interest income throughout the projection period, as it has since 2010. The 2015 deficit of non-interest income relative to cost was $70 billion. For 2016, the program is projected to have a total-income surplus of $16 billion, and a non-interest-income deficit of $73 billion.[3]

The Trustees project that the asset reserves of the OASI Trust Fund, together with continuing program income, will be adequate to cover program costs over the next 10 years under the intermediate assumptions. However, the

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

[2] Benefit payments which were scheduled to be paid on January 3, 2016 were actually paid on December 31, 2015 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. The amount of these payments made on an accelerated basis was approximately $19.7 billion for the OASI Trust Fund and $6.1 billion for the DI Trust Fund. 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.

[3] 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.

projected reserves of the DI Trust Fund increase from 21 percent of annual cost at the beginning of 2016 to 48 percent at the beginning of 2019, largely due to the temporary payroll tax rate reallocation described below, and then decline steadily until the trust fund reserves become depleted in the third quarter of 2023. At the time reserves become depleted, continuing income to the DI Trust Fund would be sufficient to pay 89 percent of scheduled DI benefits. The DI Trust Fund does not satisfy the test of short-range financial adequacy.[1] Figure II.D3 illustrates the implications of reserve depletion for the DI Trust Fund.

The Bipartisan Budget Act of 2015 provides for a temporary reallocation of a portion of the 12.40 percent payroll tax rate between the OASI and the DI Trust Funds. For 2016 through 2018, the tax rate directed to the DI Trust Fund increases from 1.80 percent to 2.37 percent, with a corresponding decrease in the rate directed to the OASI Trust Fund. Beginning in 2019, the allocations return to 1.80 percent for DI and 10.60 percent for OASI. The reallocation alone extends the projected date of DI reserve depletion by about 6 years. The projected year of DI reserve depletion in this report is 2023. The reallocation does not affect the operations of the combined OASDI Trust Funds.

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. Importantly, combined trust fund reserves are clearly hypothetical after one fund becomes depleted, because under current law the funds cannot borrow from each other.[2]

The projected reserves of the hypothetical combined OASI and DI Trust Funds are adequate over the next 10 years under the intermediate assumptions. The ratio of reserves to cost remains above 100 percent through 2025, declining from 303 percent of annual cost at the beginning of 2016[3] to 165 percent at the beginning of 2025. For last year's report, the Trustees pro-

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[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] For example, if the DI Trust Fund reserves were to become depleted in 2023 as is currently projected, the operations of the OASDI Trust Funds, shown in this report on a hypothetical combined basis, would not reflect the aggregated operation of the OASI and DI Trust Funds because part of the DI 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.

[3] Amounts for 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.

jected that combined reserves would be 298 percent of annual cost at the beginning of 2016 and 157 percent at the beginning of 2025.

The combined reserves are projected to increase from $2,813 billion at the beginning of 2016[1] to $2,892 billion at the beginning of 2020. Reserves increase through 2019 because annual cost is less than total income for 2016 through 2019. At the same time, however, the ratio of reserves to cost declines, from 303 percent of annual cost for 2016 to 246 percent for 2020. Beginning in 2020, annual cost exceeds total income, and therefore the combined reserves begin to decline, reaching $2,527 billion at the end of 2025.

Long-Range Results

Under the Trustees' intermediate assumptions, projected OASDI cost will exceed total income by increasing amounts starting in 2020, and the dollar level of the combined trust fund reserves declines until reserves become depleted in 2034. Figure II.D2 shows the implications of reserve depletion for the combined OASDI Trust Funds. Considered separately, the DI Trust Fund reserves become depleted in the third quarter of 2023 and the OASI Trust Fund reserves become depleted in 2035. In last year's report, the projected reserve depletion years were 2034 for OASDI, 2016 for DI, and 2035 for OASI. The change in the depletion date for DI is largely due to the temporary tax rate reallocation enacted in the Bipartisan Budget Act of 2015.

Projected OASDI cost generally increases more rapidly than projected non-interest income through 2038 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 2039 to 2050, the cost rate (the ratio of program cost to taxable payroll) generally declines because the aging baby-boom generation is gradually replaced at retirement ages by historically low-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 2038.

The projected OASDI annual cost rate increases from 14.05 percent of taxable payroll for 2016[1] to 16.61 percent for 2038 and to 17.68 percent for 2090, a level that is 4.35 percent of taxable payroll more than the projected income rate (the ratio of non-interest income to taxable payroll) for 2090. For last year's report, the Trustees estimated the OASDI cost for 2090 at 18.01 percent, or 4.69 percent of payroll more than the annual income rate

[1] Amounts for 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.

for that year. Expressed in relation to the projected gross domestic product (GDP), OASDI cost generally rises from 5.0 percent of GDP for 2016 to about 6.0 percent by 2035, then declines to 5.9 percent by 2050, and then generally increases to 6.1 percent by 2090.

For the 75-year projection period, the actuarial deficit is 2.66 percent of taxable payroll, 0.02 percentage point smaller than in last year's report. The closely-related open group unfunded obligation for OASDI over the 75-year period is 2.49 percent of taxable payroll, which is 0.04 percentage point smaller than in last year's report. However, the open group unfunded obligation for OASDI over the 75-year period is $11.4 trillion in present value and is $0.7 trillion more than the measured level of $10.7 trillion a year ago. If the assumptions, methods, starting values, and the law had all remained unchanged, the actuarial deficit would have increased to 2.74 percent of taxable payroll and the unfunded obligation would have risen to about 2.53 percent of taxable payroll and $11.2 trillion in present value due to the change in the valuation date. The remaining changes in the actuarial deficit and the unfunded obligation are due to changes in the law, methods, starting values, and assumptions.

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) revenues would have to increase by an amount equivalent to an immediate and permanent payroll tax rate increase of 2.58 percentage points[1] to 14.98 percent, (2) scheduled benefits would have to be reduced by an amount equivalent to an immediate and permanent reduction of about 16 percent applied to all current and future beneficiaries, or about 19 percent if the reductions were applied only to those who become initially eligible for benefits in 2016 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 2034. For example, maintaining 75-year solvency with policies that begin in 2034 would require: (1) an increase in revenues by an amount equivalent to a

[1] The necessary tax rate of 2.58 percent differs from the 2.66 percent actuarial deficit for two reasons. First, the necessary tax rate is the rate required to maintain solvency throughout the period that does not result in any trust fund reserve at the end of the period, whereas the actuarial deficit incorporates an ending trust fund reserve equal to 1 year's cost. Second, the necessary tax rate reflects a behavioral response to tax rate changes, whereas the actuarial deficit does not. In particular, the calculation of the necessary tax rate 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.

3.58 percentage point payroll tax rate increase starting in 2034, (2) a reduction in scheduled benefits by an amount equivalent to a 21 percent reduction in all benefits starting in 2034, or (3) some combination of these approaches would have to be adopted.

Conclusion

Under the intermediate assumptions, DI Trust Fund asset reserves are projected to become depleted in the third quarter of 2023, at which time continuing income to the DI Trust Fund would be sufficient to pay 89 percent of DI scheduled benefits. Therefore, legislative action is needed soon to address the DI program's financial imbalance. The OASI Trust Fund reserves are projected to become depleted in 2035, at which time OASI income would be sufficient to pay 77 percent of OASI scheduled benefits.

The Trustees also project that annual cost for the OASDI program will exceed non-interest income throughout the projection period, and will exceed total income beginning in 2020 under the intermediate assumptions. The projected hypothetical combined OASI and DI Trust Fund asset reserves increase through 2019, begin to decline in 2020, and become depleted and unable to pay scheduled benefits in full on a timely basis in 2034. At the time of depletion of these combined reserves, continuing income to the combined trust funds would be sufficient to pay 79 percent of 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 and could preserve more trust fund reserves to help finance future benefits. Social Security will play a critical role in the lives of 61 million beneficiaries and 171 million covered workers and their families in 2016. With informed discussion, creative thinking, and timely legislative action, Social Security can continue to protect future generations.

B. TRUST FUND FINANCIAL OPERATIONS IN 2015

Table II.B1 shows the income, expenditures, and asset reserves for the OASI, the DI, and the combined OASI and DI Trust Funds in calendar year 2015.

Table II.B1.—Summary of 2015 Trust Fund Financial Operations
[In billions]

	OASI	DI	OASDI
Asset reserves at the end of 2014	$2,729.2	$60.2	$2,789.5
Total income in 2015	801.6	118.6	920.2
Net payroll tax contributions	679.5	115.4	794.9
Reimbursement from General Fund of the Treasury	.3	[a]	.3
Taxation of benefits	30.6	1.1	31.6
Interest	91.2	2.1	93.3
Total expenditures in 2015[b]	750.5	146.6	897.1
Benefit payments[b]	742.9	143.4	886.3
Railroad Retirement financial interchange	4.3	.4	4.7
Administrative expenses	3.4	2.8	6.2
Net increase in asset reserves in 2015[b]	51.0	-28.0	23.0
Asset reserves at the end of 2015[b]	2,780.3	32.3	2,812.5

[a] Less than $50 million.
[b] Benefit payments which were scheduled to be paid on January 3, 2016 were actually paid on December 31, 2015 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. The amount of these payments made on an accelerated basis was approximately $19.7 billion for the OASI Trust Fund and $6.1 billion for the DI Trust Fund. 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.

In 2015, net payroll tax contributions accounted for 86 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 $118,500 in 2015. Table II.B2 shows the tax rates for 2015.

In 2015, approximately 0.04 percent of OASI and DI combined Trust Fund income came from reimbursements from the General Fund of the Treasury. 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.

Three percent of OASI and DI combined Trust Fund income in 2015 came from subjecting up to 50 percent of Social Security benefits to Federal per-

sonal income taxation for beneficiaries with income (including half of benefits and all non-taxable interest) exceeding specified levels. Interest earned on invested trust fund asset reserves accounted for 10 percent of OASDI income. The Department of the Treasury invests trust fund reserves in interest-bearing securities issued by the U.S. Government. In 2015, the combined trust fund reserves earned interest at an effective annual rate of 3.4 percent.

Almost 99 percent of expenditures from the combined OASI and DI Trust Funds in 2015 were retirement, survivor, and disability benefits totaling $886.3 billion. A net payment of $4.7 billion was made to the Railroad Retirement Social Security Equivalent Benefit Account from the combined OASI and DI Trust Funds, which was about 0.5 percent of total OASDI expenditures. The administrative expenses of the Social Security program were $6.2 billion, which was about 0.7 percent of total expenditures.

The trust fund investments provide a reserve to pay benefits whenever total program cost exceeds income. Trust fund reserves increased by $23.0 billion for 2015 because total income to the combined funds, including interest earned on trust fund reserves, exceeded total expenditures.[1] At the end of 2015, the combined reserves of the OASI and the DI Trust Funds were $2,813 billion, or 303 percent of estimated expenditures[2] for 2016. In comparison, the combined reserves at the end of 2014 were 311 percent of expenditures for 2015.

Table II.B2.—Payroll Tax Contribution Rates for 2015
[In percent]

	OASI	DI	OASDI
Payroll tax contribution rate for employees	5.30	0.90	6.20
Payroll tax contribution rate for employers	5.30	.90	6.20
Payroll tax contribution rate for self-employed persons	10.60	1.80	12.40

[1] As noted in footnote b of table II.B1 and elsewhere in this report, asset reserves shown for the end of 2015 reflect the 12 months of benefits scheduled for payment in 2015 and thus exclude the benefits scheduled for payment on January 3, 2016, which were actually paid on December 31, 2015 as required by the law.

[2] Estimated expenditures are based on the intermediate set of assumptions.

C. ASSUMPTIONS ABOUT THE FUTURE

The future income and expenditures 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 and economic 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 19, 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.—Long-Range Values[a] of Key Assumptions for the 75-year Projection Period

Long-range assumptions	Intermediate	Low-cost	High-cost
Demographic:			
Total fertility rate (children per woman), for 2032 and later	2.0	2.2	1.8
Average annual percentage reduction in total age-sex-adjusted death rates from 2015 to 2090	.78	.42	1.16
Average annual net immigration (in thousands) for 2016 to 2090	1,291	1,629	961
Economic:			
Average annual percentage change in:			
Productivity (total U.S. economy), for 2026 and later	1.68	1.98	1.38
Average wage in covered employment from 2026 to 2090	3.80	5.03	2.59
Consumer Price Index (CPI-W), for 2019 and later	2.60	3.20	2.00
Average annual real-wage differential (percent) for 2026 to 2090	1.20	1.83	.59
Unemployment rate (percent, age-sex-adjusted), for 2022 and later	5.5	4.5	6.5
Annual trust fund real interest rate (percent), for 2026 and later	2.7	3.2	2.2
Programmatic:			
Disability incidence rate (per 1,000 exposed, age-sex-adjusted) in 2090	5.4	4.3	6.4
Disability recovery rate (per 1,000 beneficiaries, age-sex-adjusted) in 2090	10.4	12.6	8.3

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

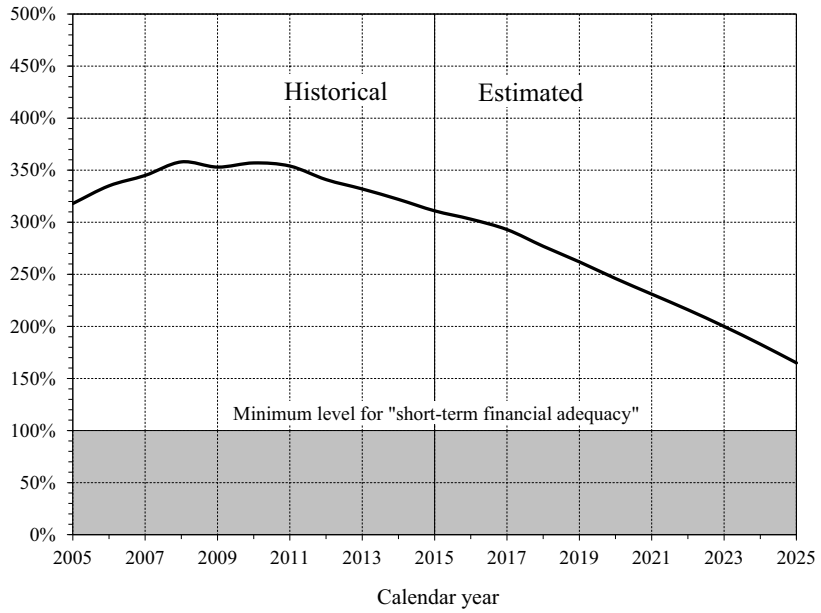
D. PROJECTIONS OF FUTURE FINANCIAL STATUS

Short-Range Actuarial Estimates

For the short-range period (2016 through 2025), 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 OASI alone, and for OASI and DI combined, exceed 100 percent throughout the short-range period. Therefore, OASI and OASDI satisfy the Trustees' short-term test of financial adequacy. However, the DI Trust Fund fails the Trustees' short-term test of financial adequacy. The Trustees estimate that the DI trust fund ratio was at 21 percent at the beginning of 2016. The projected DI trust fund ratio increases to 48 percent at the beginning of 2019, largely due to the temporary payroll tax rate reallocation for 2016 through 2018 from OASI to DI enacted in the Bipartisan Budget Act of 2015, and then declines until the trust fund reserves become depleted in the third quarter of 2023. Figure II.D1 shows that the trust fund ratio for the combined OASI and DI Trust Funds declines consistently after 2010. Figure II.D2 illustrates some of the implications of reserve depletion for the combined OASI and DI Trust Funds; figure II.D3 illustrates similar information for the DI Trust Fund alone.

Projected OASDI cost is less than total income until 2020, when cost begins to exceed total income. While trust fund reserves continue to grow through 2019, they grow more slowly than cost, causing the trust fund ratio to decline, as shown in figure II.D1. OASDI cost exceeds non-interest income throughout the short-range period.

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, which are subject to much greater uncertainty, 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

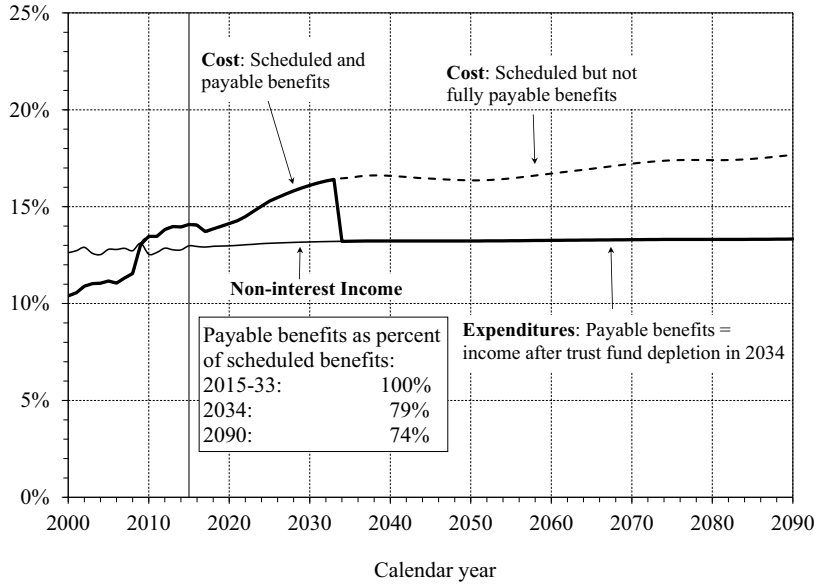
OASI, DI, and combined OASI and DI Trust Funds all fail the test of long-range close actuarial balance under the intermediate assumptions.

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 (2016 through 2090). 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 2035. However, the recent recession led to lower taxable earnings than expected and more beneficiaries than expected, which in turn sharply, but temporarily, increased the cost rate starting in 2009. From a peak in 2015, the cost rate declines 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 exceeded non-interest income in 2010 for the first time since 1983. The Trustees project that cost will continue to exceed non-interest income throughout the 75-year valuation period. Nevertheless, total trust fund income, including interest income, is more than sufficient to cover costs through 2019, so trust fund asset reserves continue to grow. Beginning in 2020, cost exceeds total income, and combined OASI and DI Trust Fund reserves diminish until they become depleted in 2034. After trust fund reserve depletion, continuing income is sufficient to support expenditures at a level of 79 percent of program cost for the rest of 2034, declining to 74 percent for 2090. 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 2023 for DI and in 2035 for OASI.

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



To illustrate the more immediate challenges specific to the DI program, figure II.D3 presents the year-by-year relationship among income, cost, and expenditures for the 75-year projection period. The temporary increase in the income rate shown in the figure for 2016 through 2018 reflects the tax rate reallocation enacted in the Bipartisan Budget Act of 2015. The DI Trust Fund reserves are expected to become depleted in the third quarter of 2023 if no legislative action is taken before then. After DI Trust Fund reserve depletion, continuing income is sufficient to support expenditures at a level of 89 percent of program cost for the rest of 2023, rising to a somewhat higher level for 2024 through 2040, then declining to 82 percent by 2090.

Figure II.D3.—DI Income, Cost, and Expenditures as Percentages of Taxable Payroll
[Under Intermediate Assumptions]

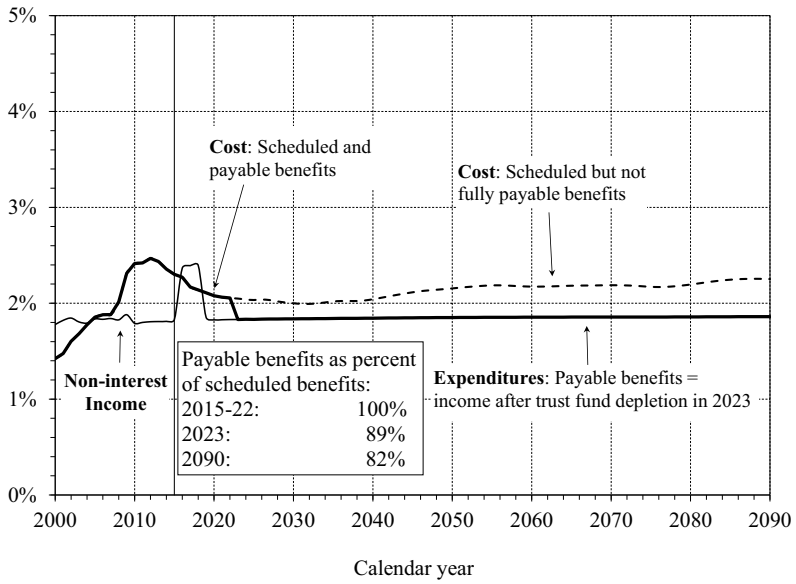
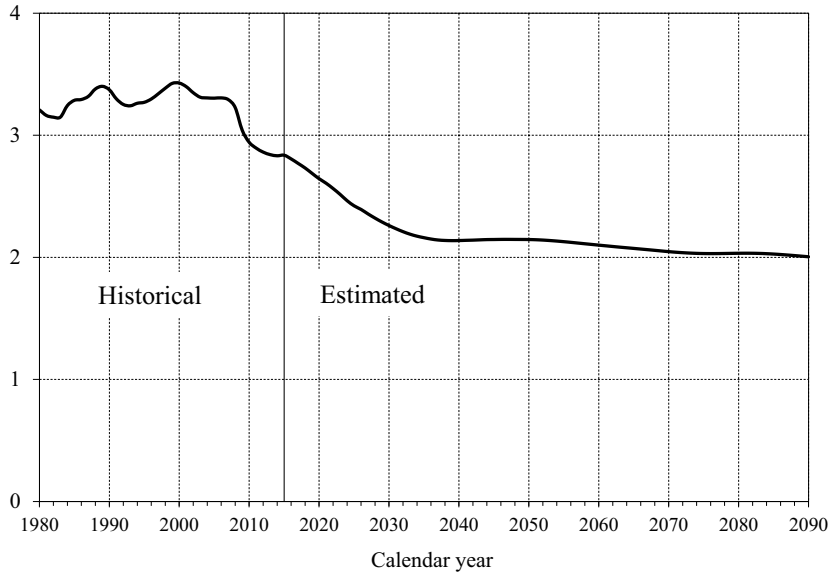


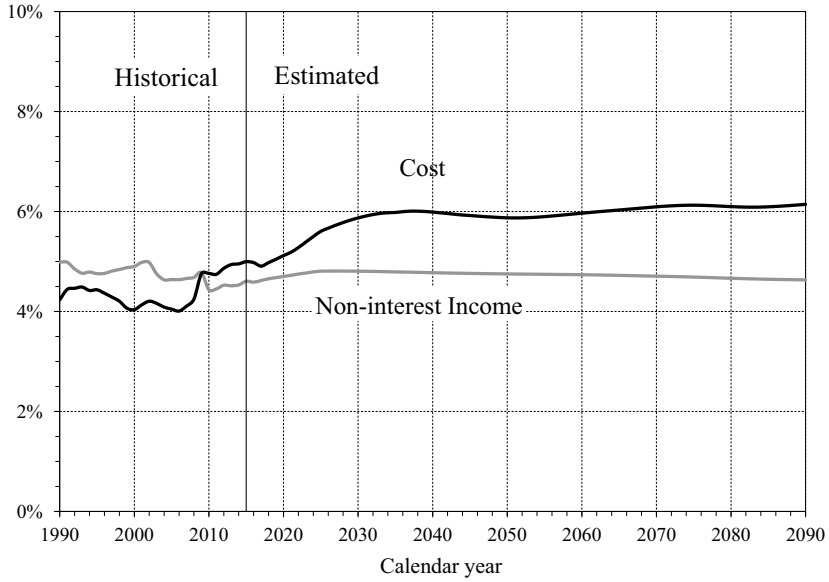
Figure II.D4 shows the estimated number of covered workers per OASDI beneficiary. Figures II.D2 and II.D4 illustrate the inverse relationship between cost rates and the number of workers per beneficiary. In particular, the projected future increase in the cost rate reflects a projected decline in the number of covered workers per beneficiary. There were about 2.8 workers for every OASDI beneficiary in 2015. This ratio had been extremely stable, remaining between 3.2 and 3.4 from 1974 through 2008, and has declined since then due to the economic recession and the beginning of the demographic shift that will drive this ratio down over the next 20 years. The Trustees project that the ratio of workers to beneficiaries will continue to decline, even as the economy recovers, 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, with a further gradual decline thereafter due to increasing longevity.

Figure II.D4.—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.D5, the Trustees project that Social Security's cost as a percent of GDP will grow from 5.0 percent in 2016 to about 6.0 percent by 2035, then decline to 5.9 percent by 2050, and generally increase to 6.1 percent by 2090. As the economy recovers, Social Security's non-interest income, which reflects scheduled tax rates, increases from its current level of about 4.6 percent of GDP to about 4.8 percent of GDP for 2025. Thereafter, non-interest income as a percent of GDP declines gradually, to about 4.6 percent by 2090, because the Trustees expect the share of employee compensation provided as noncovered fringe benefits to increase gradually.

Figure II.D5.—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 (2016 through 2090) and the year of trust fund reserve depletion. Each trust fund ratio has been generally declining in recent years. OASI reached a peak level of 402 in 2011, DI reached a peak level of 219 in 2003, and OASDI reached a peak level of 358 in 2008.

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

	OASI	DI	OASDI
Maximum projected trust fund ratio (percent)	357	48	303
Year attained	2016	2019	2016
Projected year of trust fund reserve depletion	2035	2023	2034

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 2.66 percent of taxable payroll. The actuarial deficit was 2.68 percent in the 2015 report. If the assumptions, methods, starting values, and the law had all remained unchanged from last year, the actuarial deficit would have increased to 2.74 percent of payroll solely due to advancing the valuation period by 1 year.

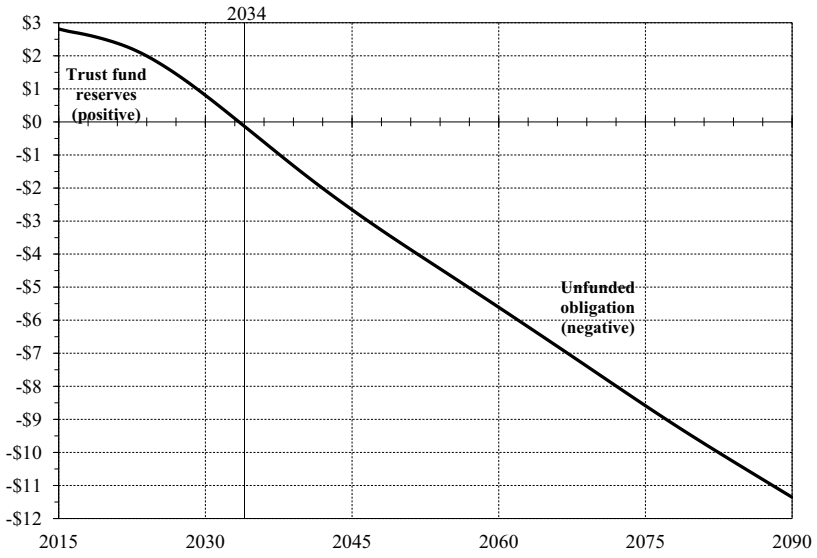
Another way to illustrate the projected financial shortfall of the OASDI program is to examine the cumulative present value of scheduled income less cost. Figure II.D6 shows the present value of cumulative OASDI income less cost from the inception of the program through each of the years from 2015 to 2090. 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 $2.8 trillion at the end of 2015. The trust fund reserves decline on a present value basis after 2015, but remain positive through 2033. However, after 2033 this cumulative amount becomes negative, which means that the combined OASI and DI Trust Funds have a net unfunded obligation through each year after 2033. Through the end of 2090, the combined funds have a present-value unfunded obligation of $11.4 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 $11.2 trillion due to the change in the valuation date.

This unfunded obligation represents 2.49 percent of taxable payroll (reduced from 2.53 percent in last year's report) and 0.9 percent of GDP (unchanged from last year's report) for the 75-year valuation period. The unfunded obligation as a share of taxable payroll (2.49 percent) and the actuarial deficit

(2.66 percent) are similar measures, but differ because the actuarial deficit includes the cost of having an ending trust fund reserve equal to 1 year's cost.

Figures II.D2, II.D5, and II.D6 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.D6.—Cumulative Scheduled OASDI Income Less Cost, From Program Inception Through Years 2015-2090
[Present value as of January 1, 2016, in trillions, under Intermediate Assumptions]



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.

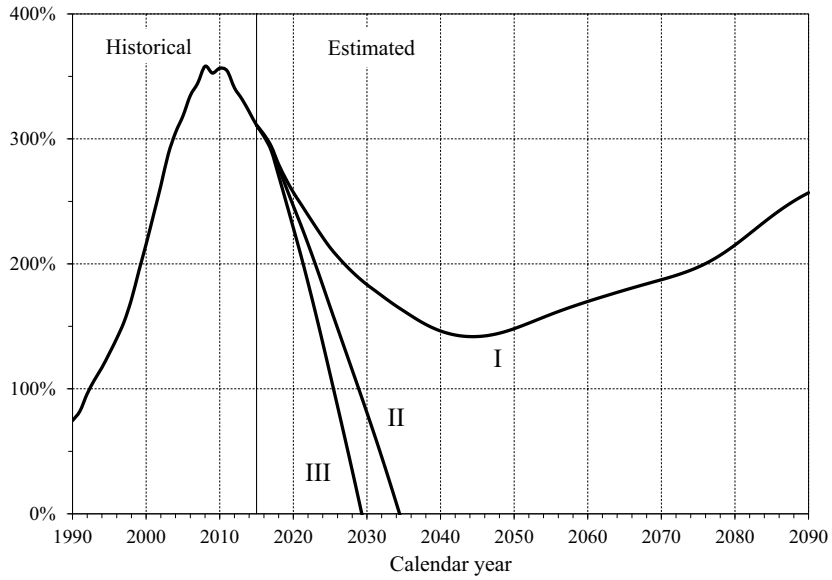
much greater uncertainty. Extending the horizon beyond 75 years increases the measured unfunded obligation. Through the infinite horizon, the unfunded obligation, or shortfall, is equivalent to 4.0 percent of future taxable payroll or 1.4 percent of future GDP.

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.D7 shows the projected trust fund ratios for the combined OASI and DI Trust Funds under the intermediate, low-cost, and high-cost assumptions. 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.D7.—Long-Range OASI and DI Combined Trust Fund Ratios Under Alternative Scenarios
[Asset reserves as a percentage of annual cost]



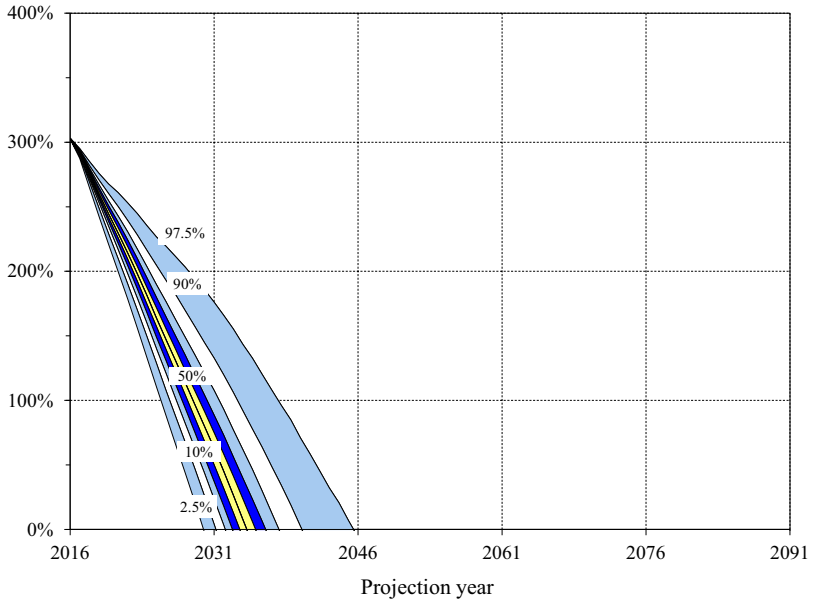
Appendix D of this report presents long-range sensitivity analysis for the OASDI program. By varying one parameter at a time, sensitivity analysis provides a second approach for illustrating the uncertainty surrounding projections into the future.

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.D8 suggests that based on these stochastic simulations, trust fund asset reserves will become depleted between 2029 and 2045 with a 95-percent probability.

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.D8.—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 2.68 percent of taxable payroll for last year's report to 2.66 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 2.74 percent. 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]

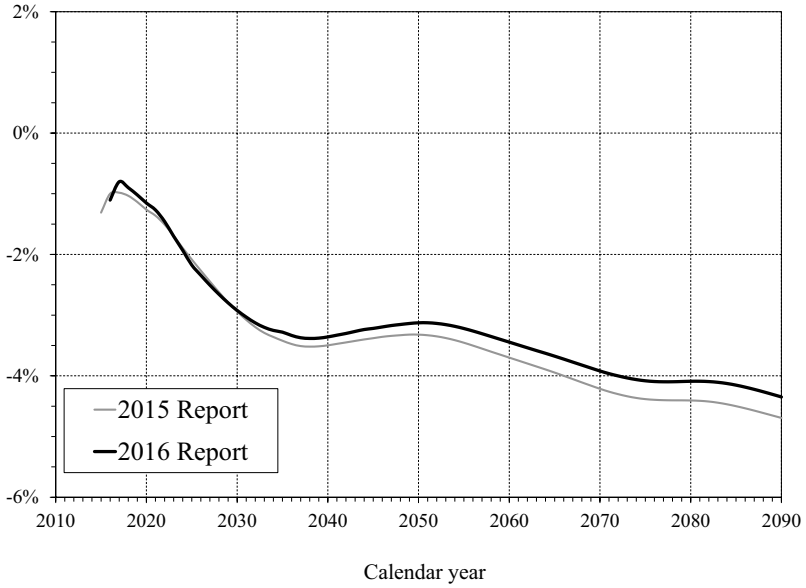
Item	OASI	DI	OASDI
Shown in last year's report:			
Income rate	12.00	1.86	13.86
Cost rate	14.37	2.17	16.55
Actuarial balance	**-2.37**	**-.31**	**-2.68**
Changes in actuarial balance due to changes in:			
Legislation / Regulation	-.01	.04	.03
Valuation period[a]	-.05	-.01	-.06
Demographic data and assumptions	.00	.00	.00
Economic data and assumptions	-.06	-.01	-.07
Disability data and assumptions	.00	.00	.00
Methods and programmatic data	.08	.03	.11
Total change in actuarial balance	-.02	.05	.02
Shown in this report:			
Actuarial balance	**-2.39**	**-.26**	**-2.66**
Income rate	11.96	1.88	13.84
Cost rate	14.36	2.14	16.50

[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 2090. 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.D9 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 significantly higher (less negative) for most of the projection period. See page 81 for details.

Figure II.D9.—OASDI Annual Balances: 2015 and 2016 Trustees Reports
[As a percentage of taxable payroll, under the intermediate assumptions]



E. CONCLUSION

Under current law, the projected cost of Social Security increases faster than projected income through 2038 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 birth-rate generations. While the effects of the aging baby boom and subsequent lower birth rates will have stabilized after 2038, 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 total income exceeds its total cost in 2016, and surpluses continue through 2019. However, cost exceeds non-interest income for 2016, as it has since 2010, and remains higher than non-interest income throughout the remainder of the 75-year projection period.

The OASI Trust Fund and DI Trust Fund are projected to have sufficient reserves to pay full benefits on time until 2035 and 2023, respectively. Legislative action will be needed soon to prevent depletion of the DI Trust Fund reserves in the third quarter of 2023, at which time continuing income to the DI Trust Fund would be sufficient to pay 89 percent of DI benefits.

Social Security's combined trust funds increase with the help of interest income through 2019 and allow full payment of scheduled benefits on a timely basis until the trust fund asset reserves become depleted in 2034. (Full payment of benefits 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 79 percent of the program cost. By 2090, continuing income equals about 74 percent of the program cost.

The 75-year actuarial deficit for the combined trust funds under the intermediate assumptions is 2.66 percent of taxable payroll—0.02 percentage point smaller than the 2.68 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) revenues would have to be increased by an amount equivalent to an immediate and permanent payroll tax rate increase of 2.58 percentage points to 14.98 percent; (2) scheduled benefits would have to be reduced by an amount equivalent to an immediate and permanent reduction of about 16 percent applied to all current and future beneficiaries, or about 19 percent if the reductions were applied only to those who become initially eligible for benefits in 2016 or later; or (3) some combination of these approaches would have to be adopted. If actions are deferred for several years, the changes nec-

essary 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 patterns, 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 revenues from workers and employers by raising the tax rate or the maximum level of taxable earnings, or by dedicating revenues 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 change(s) 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 and could preserve more trust fund reserves to help finance future benefits. Social Security will play a critical role in the lives of 61 million beneficiaries and 171 million covered workers and their families in 2016. 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/2016/
- 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/social_security.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 2015

This section presents detailed information on the operations of the OASI and DI Trust Funds[1] during calendar year 2015. Chapter IV provides projections for calendar years 2016 through 2090.

1. OASI Trust Fund

Table III.A1 presents a statement of the income and disbursements of the Federal Old-Age and Survivors Insurance Trust Fund in calendar year 2015, 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 receipts in 2015 amounted to $801.6 billion, while disbursements totaled $750.5 billion, an increase in trust fund reserves during 2015 of $51.0 billion.[2]

Total receipts during calendar year 2015 included $681.9 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 receipts. 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 $679.5 billion in 2015.

Net reimbursements from the General Fund of the Treasury amounted to $0.3 billion in 2015. As shown in the table, adjustments to prior year receipts 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, account for almost all of the reimbursement for the year, or about $266 million. These acts specified General Fund reimbursement for tempo-

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

[2] In order to provide values that are comparable with other years, asset reserves shown for the end of 2015 reflect the 12 months of benefits scheduled for payment in 2015 and thus exclude the benefits scheduled for payment on January 3, 2016, which were actually paid on December 31, 2015 as required by the law.

rary reductions in employee and self-employment payroll taxes for earnings in 2011 and 2012.

The remainder was a reimbursement of $12 million in 2015 under the provisions of Public Law 110-246, the Food, Conservation, and Energy Act of 2008.

Income based on taxation of OASI benefits amounted to $30.6 billion in 2015. About 99 percent of this income represents amounts credited to the trust funds, generally in advance of the actual receipt of taxes by the Treasury. These credited amounts represent the net amount of initial estimated taxes transferred for tax liabilities in 2015 and adjustments to initial amounts transferred for prior periods. The remaining one percent of the total income from taxation of benefits represents amounts withheld from the benefits paid to nonresident aliens.

In 2015, the OASI Trust Fund earned $91.2 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 Social Security Act authorizes the deposit of monetary gifts or bequests in the trust funds. In 2015, there were no such receipts by the OASI Trust Fund.

Table III.A1.—Operations of the OASI Trust Fund, Calendar Year 2015
[In millions]

Total asset reserves, December 31, 2014		$2,729,233
Receipts:		
Net payroll tax contributions:		
Payroll tax contributions[a]	$681,896	
Payments from the General Fund of the Treasury for payroll tax contributions subject to refund[a]	-2,393	
Net payroll tax contributions[a]		679,503
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]	266	
Reimbursements directed by P.L. 110-246	12	
Payroll tax credits due to P.L. 98-21[a]	[b]	
Net General Fund reimbursements[a]		278
Income based on taxation of benefit payments:		
Withheld from benefit payments to nonresident aliens	191	
All other, not subject to withholding[a]	30,363	
Total income from taxation of benefits[a]		30,554
Investment income and interest adjustments:		
Interest on investments	91,225	
Interest adjustments[c]	2	
Total investment income and interest adjustments		91,227
Gifts		—
Total receipts		801,561
Disbursements:		
Benefit payments:		
Monthly benefits and lump-sum death payments[d e]	742,939	
Reimbursement from the General Fund for unnegotiated checks	-33	
Payment for costs of vocational rehabilitation services for disabled beneficiaries	2	
Net benefit payments[d e]		742,908
Financial interchange with the Railroad Retirement "Social Security Equivalent Benefit Account"		4,258
Administrative expenses:		
Costs incurred by:		
Social Security Administration	2,996	
Department of the Treasury	390	
Offsetting miscellaneous receipts	-4	
Miscellaneous reimbursements from the General Fund [f]	-6	
Net administrative expenses		3,376
Total disbursements[e]		750,542
Net increase in asset reserves[e]		51,019
Total invested assets[e]	2,760,518	
Undisbursed balances[e g]	19,734	
Total asset reserves, December 31, 2015[e]		2,780,251

[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] Benefit payments which were scheduled to be paid on January 3, 2016 were actually paid on December 31, 2015 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. The amount of these payments made on an accelerated basis was approximately $19.7 billion. 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 in each year.

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

[g] Primarily consists of benefit payments designated to be paid on January 3, 2016 that were actually paid on December 31, 2015, as well as a relatively small amount of cash held by the Department of Treasury for payment of benefits.

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

Of the $750.5 billion in total OASI disbursements in 2015, $742.9 billion was for net benefit payments,[1] including recovered overpayments, reimbursements from the General Fund for unnegotiated checks, and the reimbursable costs of vocational rehabilitation services.[2] Net benefit payments increased by 5.1 percent from calendar year 2014 to calendar year 2015. This increase is due primarily to: (1) an increase in the total number of beneficiaries and (2) an increase in the average benefit amount. The increase in the average benefit amount in 2015 was due in large part to the automatic cost-of-living benefit increase of 1.7 percent which became effective for December 2014 under the automatic-adjustment provisions in section 215(i) of the Social Security Act. In addition, new beneficiaries tend to have higher benefits than previous cohorts.

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 $4.3 billion from the OASI Trust Fund to the Social Security Equivalent Benefit Account for June 2015.

The remaining $3.4 billion of disbursements from the OASI Trust Fund represents 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, they adjust the allocations of administrative expenses for prior periods. These adjustments affect the OASI Trust Fund, the DI Trust Fund, the HI Trust Fund, the 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 2015, the cost incurred by the Social Security Administration to administer the OASI program was 89 percent of OASI net administrative expenses. The Social Security Administration charges such costs to the trust fund ($3.0 billion in 2015). In addition, the Department of the Treasury charges to

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[1] As noted in footnote e of table III.A1 and elsewhere in this report, benefit payments shown for 2015 reflect the 12 months of benefits scheduled for payment in 2015 and thus exclude the benefits scheduled for payment on January 3, 2016, which were actually paid on December 31, 2015 as required by the law.

[2] Vocational rehabilitation services 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 trust fund expenses ($0.4 billion in 2015) for services provided in administering the OASI program. A relatively small offset ($4 million in 2015) to administrative expenses 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 legislatively mandated activities that are not directly related to the OASI program. These reimbursements include the costs associated with union activities related to administering the OASI program ($4 million in 2015) and with the provision of information to participants in certain pension plans ($2 million in 2015). These miscellaneous reimbursements totaled $6 million in 2015.

The asset reserves shown for the OASI Trust Fund at the end of calendar year 2015 totaled $2,780.3 billion, consisting of $2,760.5 billion in U.S. Government obligations and cash totaling $19.7 billion that would have been invested at the end of the year except for the advance payment of benefits scheduled for payment on January 3, 2016.[1] The effective annual rate of interest earned by the reserves in the OASI Trust Fund during calendar year 2015 was 3.3 percent, slightly lower than the 3.6 percent earned during calendar year 2014. 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 2014 and 2015.

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. Those securities currently held by the OASI Trust Fund are special issues, that is, securities sold only to the trust funds. These special issues are of two types: short-term certificates of indebtedness and longer-term bonds. Daily receipts are 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 issues 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 issues maturing (including accrued interest earnings), plus tax receipts for that day, less amounts required to meet expenditures on that day.

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[1] As noted in footnotes e and g of table III.A1 and elsewhere in this report, asset reserves shown for the end of 2015 reflect the 12 months of benefits scheduled for payment in 2015 and thus exclude the benefits scheduled for payment on January 3, 2016, which were actually paid on December 31, 2015 as required by the law.

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 issues, as of each June 30, so that the value of the 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, 2015, so that the maturity dates of the total portfolio of special issues were spread evenly over the 15-year period 2016 through 2030. The bonds purchased on that date have an interest rate of 2.000 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 2015, including the amounts of bonds purchased on June 30, 2015.

2. DI Trust Fund

Table III.A2 presents a statement of the income and disbursements of the Federal Disability Insurance Trust Fund in calendar year 2015, 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 $118.6 billion in total receipts, $115.4 billion was net payroll tax contributions.

Of the $146.6 billion of total disbursements, $143.4 billion was net benefit payments.[1] Net benefit payments increased by 1.2 percent from calendar year 2014 to calendar year 2015. This increase in DI benefit payments was due to the same factors described earlier for OASI benefit payments. Total DI disbursements exceeded non-interest income in years 2005 through 2015 and exceeded total income in years 2009 through 2015.

[1] As noted in footnote e of table III.A2, and elsewhere in this report, benefit payments shown for 2015 reflect the 12 months of benefits scheduled for payment in 2015 and thus exclude the benefits scheduled for payment on January 3, 2016, which were actually paid on December 31, 2015 as required by the law.

Table III.A2.—Operations of the DI Trust Fund, Calendar Year 2015
[In millions]

Total asset reserves, December 31, 2014		$60,244
Receipts:		
Net payroll tax contributions:		
Payroll tax contributions[a]	$115,796	
Payments from the General Fund of the Treasury for payroll tax contributions subject to refund[a]	-406	
Net payroll tax contributions[a]		115,389
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]	45	
Reimbursements directed by P.L. 110-246	2	
Payroll tax credits due to P.L. 98-21[a]	[b]	
Net General Fund reimbursements[a]		47
Income based on taxation of benefit payments:		
Withheld from benefit payments to nonresident aliens	4	
All other, not subject to withholding[a]	1,067	
Total income from taxation of benefits[a]		1,071
Investment income and interest adjustments:		
Interest on investments	2,087	
Interest adjustments[c]	1	
Total investment income and interest adjustments		2,088
Total receipts		118,595
Disbursements:		
Benefit payments:		
Monthly benefits[d e]	143,282	
Reimbursement from the General Fund for unnegotiated checks	-19	
Payment for costs of vocational rehabilitation services for disabled beneficiaries	107	
Net benefit payments[d e]		143,370
Financial interchange with the Railroad Retirement "Social Security Equivalent Benefit Account"		419
Administrative expenses:		
Costs incurred by:		
Social Security Administration	2,715	
Department of the Treasury	68	
Demonstration projects	14	
Miscellaneous reimbursements from the General Fund[f]	-4	
Net administrative expenses		2,792
Total disbursements[e]		146,581
Net increase in asset reserves[e]		-27,985
Total invested assets[e]	26,101	
Undisbursed balances[e g]	6,157	
Total asset reserves, December 31, 2015[e]		32,259

[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] Benefit payments which were scheduled to be paid on January 3, 2016 were actually paid on December 31, 2015 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. The amount of these payments made on an accelerated basis was approximately $6.1 billion. 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 in each year.

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

[g] Primarily consists of benefit payments designated to be paid on January 3, 2016 that were actually paid on December 31, 2015, as well as a relatively small amount of cash held by the Department of Treasury for payment of benefits.

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

During 2015, the reserves in the DI Trust Fund decreased by $28.0 billion, from $60.2 billion at the end of 2014 to $32.3 billion at the end of 2015. The $32.3 billion reserves in the DI Trust Fund at the end of calendar year 2015 consisted of $26.1 billion in U.S. Government obligations and cash totaling $6.2 billion. The effective annual rate of interest earned by the asset reserves in the DI Trust Fund during calendar year 2015 was 4.6 percent, slightly higher than the 4.5 percent earned during calendar year 2014. Table VI.A5, presented in appendix A, 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 2014 and 2015.

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. The usual practice has been to reinvest the maturing special issues, 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 2015, 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, 2015, so that the amount of special issues would mature on June 30, 2016. The bonds purchased have an interest rate of 2.000 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. As of June 30, 2015, the DI Trust Fund had already redeemed all of the bonds coming due on June 30, 2016, so this investment approach required that all bond purchases on June 30, 2015 be invested in bonds with a maturity date of June 30, 2016. Table III.A7 shows additional details on the investment transactions during 2015.

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 expenditure 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.

Table III.A3.—Operations of the Combined OASI and DI Trust Funds, Calendar Year 2015
[In millions]

Total asset reserves, December 31, 2014		$2,789,476
Receipts:		
Net payroll tax contributions:		
Payroll tax contributions[a]	$797,691	
Payments from the General Fund of the Treasury for payroll tax contributions subject to refund[a]	-2,800	
Net payroll tax contributions[a]		794,892
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]	311	
Reimbursements directed by P.L. 110-246	14	
Payroll tax credits due to P.L. 98-21[a]	[b]	
Net General Fund reimbursements[a]		325
Income based on taxation of benefit payments:		
Withheld from benefit payments to nonresident aliens	195	
All other, not subject to withholding[a]	31,430	
Total income from taxation of benefits[a]		31,625
Investment income and interest adjustments:		
Interest on investments	93,312	
Interest adjustments[c]	3	
Total investment income and interest adjustments		93,314
Gifts		—
Total receipts		920,157
Disbursements:		
Benefit payments:		
Monthly benefits and lump-sum death payments[d e]	886,221	
Reimbursement from the General Fund for unnegotiated checks	-52	
Payment for costs of vocational rehabilitation services for disabled beneficiaries	109	
Net benefit payments[d e]		886,278
Financial interchange with the Railroad Retirement "Social Security Equivalent Benefit Account"		4,677
Administrative expenses:		
Costs incurred by:		
Social Security Administration	5,711	
Department of the Treasury	457	
Offsetting miscellaneous receipts	-4	
Demonstration projects	14	
Miscellaneous reimbursements from the General Fund[f]	-9	
Net administrative expenses		6,169
Total disbursements[e]		897,123
Net increase in asset reserves[e]		23,034
Total invested assets[e]	2,786,619	
Undisbursed balances[e g]	25,891	
Total asset reserves, December 31, 2015[e]		2,812,510

[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] Benefit payments which were scheduled to be paid on January 3, 2016 were actually paid on December 31, 2015 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. The amount of these payments made on an accelerated basis was approximately $25.9 billion. 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 in each year.

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

[g] Primarily consists of benefit payments designated to be paid on January 3, 2016 that were actually paid on December 31, 2015, as well as a relatively small amount of cash held by the Department of Treasury for payment of benefits.

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

Table III.A4 compares estimates of total income and total expenditures for calendar year 2015 from the 2011 through 2015 Trustees Reports to the corresponding actual amounts for 2015.

Table III.A4.—Comparison of Actual Calendar Year 2015 Trust Fund Operations With Estimates Made in Prior Reports, Based on Intermediate Assumptions[a]
[Amounts in billions]

	Total income[b]		Total expenditures[c]	
	Amount	Difference from actual (percent)	Amount	Difference from actual (percent)
OASI Trust Fund:				
Estimate in 2011 report	$893.7	11.5	$757.2	0.9
Estimate in 2012 report	851.6	6.2	773.8	3.1
Estimate in 2013 report	826.9	3.2	770.3	2.6
Estimate in 2014 report	816.8	1.9	758.7	1.1
Estimate in 2015 report	796.3	-.7	754.7	.6
Actual amount	801.6	—	750.5	—
DI Trust Fund:				
Estimate in 2011 report	129.7	9.4	153.8	5.0
Estimate in 2012 report	124.7	5.2	159.3	8.7
Estimate in 2013 report	123.1	3.8	155.2	5.9
Estimate in 2014 report	121.2	2.2	151.0	3.0
Estimate in 2015 report	117.6	-.8	149.9	2.3
Actual amount	118.6	—	146.6	—
OASI and DI Trust Funds, combined:				
Estimate in 2011 report	1,023.4	11.2	911.0	1.5
Estimate in 2012 report	976.3	6.1	933.2	4.0
Estimate in 2013 report	950.0	3.2	925.5	3.2
Estimate in 2014 report	938.0	1.9	909.7	1.4
Estimate in 2015 report	913.9	-.7	904.7	.8
Actual amount	920.2	—	897.1	—

[a] Percentage differences are calculated prior to rounding.
[b] "Actual" income for 2015 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] Benefit payments which were scheduled to be paid on January 3, 2016 were actually paid on December 31, 2015 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. The amount of these payments made on an accelerated basis was approximately $19.7 billion for the OASI Trust Fund and $6.1 billion for the DI Trust Fund. 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 in each year.

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 2015, the OASDI program was providing monthly benefits to about 60.0 million people. The OASI Trust Fund was

providing benefits to about 49.2 million people and the DI Trust Fund was providing benefits to about 10.8 million people. The number of people receiving benefits from the OASI Trust Fund grew by 2.2 percent while the number of people receiving DI benefits fell by 1.1 percent during calendar year 2015. These changes reflect the gradual aging of the population, with the baby-boom generation 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 2014 and 2015, by type of beneficiary, for each trust fund separately.

Table III.A5.—Distribution of Benefit Payments[a] by Type of Beneficiary or Payment, Calendar Years 2014 and 2015
[Amounts in millions]

	Calendar year 2014		Calendar year 2015	
	Amount	Percentage of total	Amount	Percentage of total
Total OASDI benefit payments	$848,443	100.0	$886,221	100.0
OASI benefit payments	706,821	83.3	742,939	83.8
DI benefit payments	141,622	16.7	143,282	16.2
OASI benefit payments, total	706,821	100.0	742,939	100.0
Monthly benefits:				
Retired workers and auxiliaries	592,578	83.8	626,378	84.3
Retired workers	560,120	79.2	592,423	79.7
Spouses	27,484	3.9	28,760	3.9
Children	4,974	.7	5,195	.7
Survivors of deceased workers	114,044	16.1	116,352	15.7
Aged widows and widowers	90,862	12.9	92,748	12.5
Disabled widows and widowers	2,330	.3	2,368	.3
Parents	21	[b]	21	[b]
Children	19,192	2.7	19,597	2.6
Widowed mothers and fathers caring for child beneficiaries	1,638	.2	1,618	.2
Lump-sum death payments	199	[b]	209	[b]
DI benefit payments, total	141,622	100.0	143,282	100.0
Disabled workers	132,154	93.3	133,945	93.5
Spouses	598	.4	588	.4
Children	8,870	6.3	8,749	6.1

[a] Benefit payments which were scheduled to be paid on January 3, 2016 were actually paid on December 31, 2015 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. The amount of these payments made on an accelerated basis was approximately $19.7 billion for the OASI Trust Fund and $6.1 billion for the DI Trust Fund. 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 in each year.
[b] 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 2015 totaled $6.2 billion. This amount is equal to 0.7 percent of total expenditures and 0.7 percent of non-interest income. Table III.A6 shows cor-

responding percentages for each trust fund separately and for the OASDI program as a whole for each of the last 5 years.

Table III.A6.—Administrative Expenses as a Percentage of Non-interest Income and of Total Expenditures, Calendar Years 2011-2015

	OASI Trust Fund		DI Trust Fund		OASI and DI Trust Funds, combined	
Calendar year	Non-interest income	Total expenditures	Non-interest income	Total expenditures	Non-interest income	Total expenditures
2011	0.6	0.6	3.0	2.2	0.9	0.9
2012	.5	.5	2.8	2.1	.9	.8
2013	.5	.5	2.6	1.9	.8	.7
2014	.5	.4	2.6	2.0	.8	.7
2015	.5	.4	2.4	1.9	.7	.7

The acquisition and disposition of securities during calendar year 2015 changed the invested reserves of the OASI Trust Fund and the DI Trust Fund. Table III.A7 presents these investment transactions for each trust fund separately and for the trust funds combined.

Table III.A7.—Trust Fund Investment Transactions, Calendar Year 2015
[In millions]

	OASI Trust Fund	DI Trust Fund	OASI and DI Trust Funds, combined
Invested asset reserves, December 31, 2014[a]	$2,729,270	$60,311	$2,789,582
Acquisitions:			
Special issues:			
Certificates of indebtedness	741,358	117,740	859,098
Bonds[b]	236,969	4,502	241,471
Total acquisitions	978,328	122,242	1,100,570
Dispositions:			
Special issues:			
Certificates of indebtedness[c]	759,732	121,234	880,966
Bonds	187,349	35,218	222,566
Total dispositions[c]	947,080	156,452	1,103,532
Net increase in invested asset reserves[c]	31,247	-34,210	-2,962
Invested asset reserves, December 31, 2015[a c]	2,760,518	26,101	2,786,619

[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, 2015. The interest rate on these purchases was 2.00 percent.

[c] Benefit payments which were scheduled to be paid on January 3, 2016 were actually paid on December 31, 2015 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. The amount of these payments made on an accelerated basis was approximately $19.7 billion for the OASI Trust Fund and $6.1 billion for the DI Trust Fund. 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 in each year. Redemptions of special issues and invested asset reserves reflect the early redemption required in order to pay benefits on a timely basis as required by law.

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

B. SOCIAL SECURITY AMENDMENTS SINCE THE 2015 REPORT

Since the Trustees submitted the 2015 report to Congress, one law has been enacted that is expected to have notable effects on the OASDI program.

On November 2, 2015, the President signed into law Public Law 114-74, the Bipartisan Budget Act of 2015. Several sections of the law directly affect the actuarial status of the Social Security program:

- Section 811. Expansion of cooperative disability investigations (CDI) units. This section requires the establishment of CDI units to cover each of the 50 States, the District of Columbia, Puerto Rico, Guam, the Northern Mariana Islands, the Virgin Islands, and American Samoa by 2022. The additional units established under this provision would roughly double CDI capacity and will enhance the Social Security Administration's (SSA) efforts to reduce fraud and overpayments.
- Section 824. Use of electronic payroll data to improve program administration. Access to more timely data on earnings from commercial databases will allow SSA to reduce improper payments.
- Section 831. Closure of unintended loopholes. This provision eliminates (1) the ability to receive only a retired-worker benefit or an aged-spouse benefit when eligible for both, for those attaining age 62 in 2016 and later, and (2) the ability of a family member other than a divorced spouse to receive a benefit based on the earnings of a worker with a voluntarily suspended benefit, for voluntary suspensions requested after April 29, 2016. This provision is expected to have negligible net cost effect through 2025, with increasing net cost reductions thereafter.
- Section 832. Requirement for medical review. This section requires that the medical portion of the case review and any applicable residual functional capacity assessment for an initial disability determination be completed by an appropriate physician, psychiatrist, or psychologist. This provision is projected to reduce DI program cost.
- Section 833. Reallocation of payroll tax rates. 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 rate directed to the OASI Trust Fund. This reallocation of the payroll tax rates is projected to extend the date for DI reserve depletion by about 6 years.
- Section 834. Access to financial information for waivers and adjustments of recovery. This provision provides for access to information that would allow SSA to better determine an individual's ability to repay any past overpayment.

- Section 842. Elimination of quinquennial determinations relating to wage credits for military service prior to 1957. This provision eliminates the requirement that the Commissioner make quinquennial determinations for pre-1957 military service wage credits after the 2010 determination.

In total, this law is expected to have a small but significant net positive financial impact over both the short-range and long-range projection periods. In addition, it significantly improves the status of the DI Trust Fund in the short term, largely due to a temporary tax rate reallocation from the OASI Trust Fund to the DI Trust Fund.

In addition to the change in law, estimates in this report reflect an assumed delay in implementation of portions of the President's 2014 executive actions on immigration. Specifically, the courts have held up implementation of the provision of legal work and residence status for certain individuals who entered the country as children (deferred action for childhood arrivals, or DACA) and the provision for similar status for certain parents of children born in the U.S. or otherwise living in the country legally (deferred action for parents of Americans, or DAPA). As of the time this report was drafted, the Administration is pursuing remedy through the Supreme Court. Last year's report assumed that these actions would become effective late in 2015, with individuals gaining authorization starting around the beginning of 2016. This report assumes that these actions will be implemented one year later, with authorizations beginning at the start of 2017. This assumed delay in implementation has a negligible effect on the financial status of the OASDI program.

Sections IV.A.4 and IV.B.6 of this report provide further description of the magnitude of the effects of these changes 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 future benefits scheduled under current law; and (2) expenditures (disbursements), 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 (2016 through 2025) first, followed by estimates and measures of actuarial status for the long-range period (2016 through 2090). 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.

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 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 2016 through 2025. These estimates assume that there are no further changes in the statutory provisions and regulations under which the OASDI program currently operates beyond the changes since last year's report indicated in section III.B.[2]

Estimates of the OASI Trust Fund operations presented in Table IV.A1 indicate that the asset reserves of the OASI Trust Fund increase through 2021 under the intermediate assumptions, increase throughout the next 10 years under the low-cost assumptions, and decrease throughout the next 10 years under the high-cost assumptions. However, trust fund ratios decline throughout the 10-year period under all three sets of assumptions. Based on the intermediate assumptions, the reserves of the OASI Trust Fund continue to

[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.

[2] 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.

exceed 100 percent of annual cost by a large amount through the end of 2025. Consequently, the OASI Trust Fund satisfies the test of short-range financial adequacy by a wide margin. Table IV.A1 also indicates that the OASI Trust Fund would satisfy the short-range test even under the high-cost assumptions. See figure IV.A1 for an illustration of these results.

Table IV.A1.—Operations of the OASI Trust Fund, Calendar Years 2011-2025[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 interchange	Net increase during year	Amount at end of year	Trust fund ratio[e]
Historical data:												
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
Intermediate:												
2016	786.7	667.3	.1	32.0	87.4	778.6	771.0	3.4	4.2	8.1	2,788.4	357
2017	826.3	703.5	[f]	37.2	85.6	812.9	805.4	3.3	4.1	13.5	2,801.8	343
2018	873.2	746.0	[f]	40.8	86.4	873.2	865.3	3.4	4.5	.1	2,801.9	321
2019	963.4	830.7	[f]	44.7	88.0	935.5	927.4	3.5	4.6	27.9	2,829.8	300
2020	1,017.1	878.2	[f]	48.7	90.3	1,001.8	993.4	3.6	4.7	15.4	2,845.1	282
2021	1,069.2	924.8	[f]	52.8	91.6	1,067.9	1,059.5	3.8	4.7	1.2	2,846.4	266
2022	1,121.7	971.3	[f]	57.5	92.9	1,141.9	1,133.0	3.9	5.0	-20.2	2,826.2	249
2023	1,174.1	1,016.8	[f]	62.6	94.6	1,221.9	1,212.7	4.0	5.1	-47.8	2,778.4	231
2024	1,229.3	1,065.3	[f]	68.1	95.9	1,307.0	1,297.6	4.2	5.2	-77.7	2,700.7	213
2025	1,283.4	1,113.4	[f]	73.9	96.0	1,395.1	1,385.6	4.3	5.2	-111.7	2,589.0	194
Low-cost:												
2016	792.3	672.0	.1	32.0	88.2	778.1	770.5	3.4	4.2	14.1	2,794.4	357
2017	851.5	724.2	[f]	37.3	90.0	815.6	808.2	3.3	4.1	35.9	2,830.3	343
2018	917.3	781.3	[f]	41.2	94.8	881.8	873.9	3.4	4.5	35.5	2,865.8	321
2019	1,030.0	884.1	[f]	45.3	100.6	949.0	940.8	3.6	4.6	81.0	2,946.8	302
2020	1,105.5	948.0	[f]	49.6	107.9	1,020.7	1,012.2	3.8	4.7	84.8	3,031.6	289
2021	1,180.0	1,010.6	[f]	54.1	115.2	1,093.0	1,084.3	3.9	4.7	87.0	3,118.6	277
2022	1,258.8	1,075.3	[f]	59.2	124.3	1,173.8	1,164.6	4.1	5.0	85.0	3,203.6	266
2023	1,342.0	1,142.1	[f]	64.6	135.2	1,261.7	1,252.3	4.3	5.2	80.2	3,283.8	254
2024	1,431.7	1,214.1	[f]	70.6	147.0	1,356.0	1,346.3	4.5	5.3	75.7	3,359.5	242
2025	1,523.6	1,287.7	[f]	77.1	158.9	1,454.8	1,444.8	4.7	5.3	68.9	3,428.3	231

Table IV.A1.—Operations of the OASI Trust Fund, Calendar Years 2011-2025[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]
High-cost:												
2016. . .	$777.7	$659.2	$0.1	$32.0	$86.4	$779.1	$771.5	$3.4	$4.2	-$1.4	$2,778.9	357
2017. . .	781.2	662.6	[f]	37.2	81.4	812.4	805.0	3.3	4.2	-31.3	2,747.6	342
2018. . .	814.6	695.8	[f]	40.4	78.4	865.2	857.3	3.3	4.6	-50.6	2,697.0	318
2019. . .	884.5	764.3	[f]	44.1	76.1	923.4	915.3	3.4	4.7	-39.0	2,658.0	292
2020. . .	919.3	797.8	[f]	47.8	73.8	984.3	976.0	3.5	4.8	-65.0	2,593.1	270
2021. . .	951.4	829.8	[f]	51.7	70.0	1,044.4	1,036.1	3.6	4.7	-93.0	2,500.1	248
2022. . .	983.3	862.1	[f]	56.0	65.2	1,111.5	1,102.8	3.7	5.0	-128.2	2,371.9	225
2023. . .	1,014.9	893.8	[f]	60.6	60.5	1,183.5	1,174.6	3.8	5.1	-168.6	2,203.3	200
2024. . .	1,047.2	926.3	[f]	65.6	55.3	1,259.3	1,250.3	3.9	5.2	-212.1	1,991.2	175
2025. . .	1,077.1	956.8	[f]	70.8	49.4	1,336.8	1,327.8	3.9	5.1	-259.7	1,731.5	149

[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 noncontributory wage credits for military service before 1957; (2) the cost of benefits to certain uninsured persons who attained age 72 before 1968; (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.

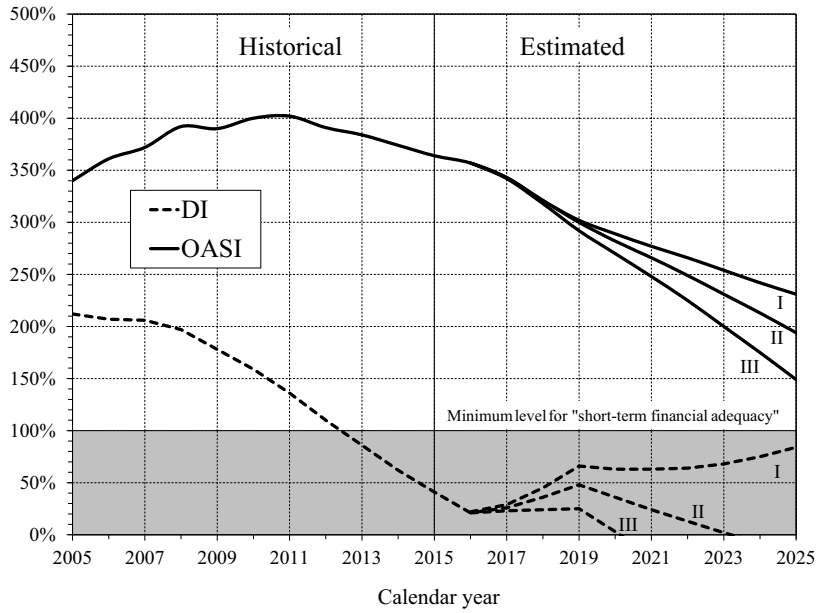
[d] Revenue from taxation of benefits is the amount that would be assessed on benefit amounts scheduled in the law.

[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]



After slightly decreasing in 2016 due to the temporary tax rate reallocation from OASI to DI, 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 reflect increases in estimated OASDI taxable earnings and growth in interest earnings on the invested reserves in the trust fund, as well as a return to pre-reallocation tax rates in 2019. Employment increases in every year through 2025 for all three alternatives: the number of persons with taxable earnings increases on the basis of alternatives I, II, and III from 169 million during calendar year 2015 to about 189 million, 185 million, and 180 million, respectively, in 2025. The total annual amount of taxable earnings increases in every year through 2025 for each alternative. Total earnings increase from $6,395 billion in 2015 to $12,228 billion, $10,569 billion, and $9,080 billion in 2025, on the basis of alternatives I, II, and III, respectively. These increases in taxable earnings 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 economy continues to recover from the severe economic downturn that began in late 2007.

Interest earnings contribute to the overall projected increase in trust fund income during this period. In the first few years of the projection period, annual interest earnings decline slightly under all three sets of assumptions due to historically low interest rates assumed for newly-issued bonds. Thereafter, interest income increases under the intermediate and low-cost assumptions due to the net effects of changes in reserve levels and the patterns of projected interest rates. Under the high-cost assumptions, declining reserves cause interest income to continue to decrease throughout the short-range period. Although interest earnings generally increase over the short-range period, interest declines as a share of total OASI Trust Fund income under the intermediate assumptions. By 2025, OASI interest income under the intermediate assumptions is about 7 percent of total trust fund income, as compared to 11 percent in 2015.

Rising OASI cost during 2016 through 2025 reflects automatic benefit increases as well as the upward trend in the number of beneficiaries and in the average monthly earnings underlying benefits. The growth in the number of beneficiaries since 2009 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 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 2016 through 2025 under the three sets of assumptions, together with values for actual experience during 2011 through 2015. Non-interest income for DI is much higher in 2016 through 2018 than in 2015, due to the temporary payroll tax rate reallocation from OASI to DI. As a result, DI Trust Fund reserves increase through 2018 under each alternative. After returning to the ultimate allocation of tax rates in 2019, non-interest income is again less than DI cost except under the low-cost alternative. Non-interest income increases steadily thereafter under each alternative, due to most of the same factors described previously for the OASI Trust Fund. DI cost grows steadily throughout the period under each alternative.

[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 2016 Medicare Trustees Report.

Under the intermediate assumptions, reserves decline after 2018 until their projected depletion in the third quarter of 2023. Under the high-cost assumptions, DI reserves decline until depletion in the first quarter of 2020. Under the low-cost assumptions, after decreasing slightly in 2019, reserves increase through the remainder of the short-range period.

Table IV.A2.—Operations of the DI Trust Fund, Calendar Years 2011-2025[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 interchange	Net increase during year	Amount at end of year	Trust fund ratio[e]
Historical data:												
2011 . . .	$106.3	$81.9	$14.9	$1.6	$7.9	$132.3	$128.9	$2.9	$0.5	-$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
Intermediate:												
2016 . . .	157.9	155.2	[f]	1.2	1.4	150.2	146.7	3.2	.3	7.6	39.9	21
2017 . . .	170.3	166.2	[f]	2.1	1.9	152.7	149.4	3.1	.2	17.6	57.5	26
2018 . . .	181.4	176.3	[f]	2.3	2.9	159.4	156.1	3.2	.1	22.1	79.6	36
2019 . . .	149.0	143.5	[f]	2.5	3.1	166.1	162.5	3.6	[f]	-17.1	62.4	48
2020 . . .	154.2	149.1	[f]	2.7	2.3	172.7	168.8	3.9	.1	-18.6	43.9	36
2021 . . .	161.4	157.0	[f]	2.9	1.5	180.5	176.2	4.2	.1	-19.0	24.8	24
2022 . . .	168.7	164.9	[f]	3.1	.7	188.6	184.1	4.5	.1	-19.9	4.9	13
2023 . . .	[g]	172.7	[f]	3.3	[g]	197.0	192.2	4.7	[f]	[g]	[g]	2
2024 . . .	[g]	180.9	[f]	3.6	[g]	205.3	200.2	5.0	[f]	[g]	[g]	[g]
2025 . . .	[g]	189.1	[f]	3.8	[g]	214.1	208.8	5.3	[f]	[g]	[g]	[g]
Low-cost:												
2016 . . .	159.1	156.3	[f]	1.2	1.5	148.2	144.7	3.2	.3	10.9	43.1	22
2017 . . .	175.8	171.1	[f]	2.1	2.6	149.5	146.2	3.1	.2	26.3	69.4	29
2018 . . .	191.1	184.6	[f]	2.2	4.2	155.1	151.8	3.2	.1	36.0	105.4	45
2019 . . .	160.2	152.6	[f]	2.4	5.2	160.6	156.9	3.6	[f]	-.3	105.0	66
2020 . . .	168.8	161.0	[f]	2.6	5.3	166.0	161.9	4.0	.1	2.8	107.9	63
2021 . . .	180.0	171.6	[f]	2.7	5.6	172.5	168.1	4.4	.1	7.4	115.3	63
2022 . . .	191.9	182.6	[f]	2.9	6.4	179.6	174.9	4.7	[f]	12.3	127.6	64
2023 . . .	204.6	193.9	[f]	3.1	7.6	187.0	181.9	5.1	[f]	17.7	145.3	68
2024 . . .	218.5	206.2	[f]	3.4	9.0	194.4	189.0	5.4	[f]	24.1	169.4	75
2025 . . .	233.1	218.7	[f]	3.6	10.8	202.5	196.8	5.8	[f]	30.5	199.9	84

Table IV.A2.—Operations of the DI Trust Fund, Calendar Years 2011-2025[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]
High-cost:												
2016 . . .	$155.9	$153.3	[f]	$1.3	$1.3	$152.2	$148.6	$3.2	$0.3	$3.7	$36.0	21
2017 . . .	160.2	156.6	[f]	2.2	1.4	156.7	153.4	3.1	.2	3.4	39.4	23
2018 . . .	168.4	164.4	[f]	2.4	1.6	165.1	161.7	3.2	.1	3.3	42.8	24
2019 . . .	135.7	132.1	[f]	2.6	1.0	173.3	169.7	3.5	.1	-37.5	5.2	25
2020 . . .	[g]	135.5	[f]	2.8	[g]	180.3	176.4	3.8	.1	[g]	[g]	3
2021 . . .	[g]	140.9	[f]	3.0	[g]	188.1	184.0	4.0	.1	[g]	[g]	[g]
2022 . . .	[g]	146.4	[f]	3.2	[g]	196.5	192.3	4.2	.1	[g]	[g]	[g]
2023 . . .	[g]	151.8	[f]	3.5	[g]	205.1	200.6	4.4	.1	[g]	[g]	[g]
2024 . . .	[g]	157.3	[f]	3.7	[g]	213.5	208.9	4.6	[f]	[g]	[g]	[g]
2025 . . .	[g]	162.5	[f]	4.0	[g]	222.5	217.7	4.8	[f]	[g]	[g]	[g]

[a] The DI Trust Fund becomes depleted in the third quarter of 2023 and the first quarter of 2020 under the intermediate and high-cost assumptions, respectively. 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 noncontributory wage credits for military service before 1957; (2) the cost of payroll tax credits provided to employees in 1984 and self-employed persons in 1984-89 by Public Law 98-21; (3) the cost in 2009-17 of excluding certain self-employment earnings from SECA taxes under Public Law 110-246; and (4) 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 are inconsistent with the cost of scheduled benefits shown in this table.

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

In the future, DI cost increases 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. The number of DI beneficiaries in current-payment status increases but at a much slower rate during the short-range projection period than over the past 20 years, largely due to long-anticipated demographic trends and expected economic conditions. In addition, certain provisions in the Bipartisan Budget Act of 2015 are expected to reduce the number of future new DI beneficiaries by slightly less than 1 percent.

At the beginning of calendar year 2015, the reserves of the DI Trust Fund represented 41 percent of annual cost. During 2015, DI cost exceeded income, and the trust fund ratio for the beginning of 2016 decreased to about

21 percent. Under the intermediate assumptions, the reallocation of the payroll tax rate from OASI to DI causes DI total income to exceed cost through 2018, and reserves to increase to a level of 48 percent of annual cost at the beginning of 2019. Thereafter, cost exceeds total income throughout the short-range projection period. The projected cost in excess of income results in the estimated depletion of the DI Trust Fund reserves in the third quarter of 2023.

Because the reserves of the DI Trust Fund at the beginning of 2016 were less than the estimated annual cost for 2016, and they are projected to remain below annual cost throughout the short-range period, the DI Trust Fund fails the Trustees' test of short-range financial adequacy under all three alternatives.

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 2016 through 2025 under the three alternatives, together with actual experience in 2011 through 2015. 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 under the intermediate and low-cost assumptions. However, under the high-cost assumptions, reserves are projected to drop to about 86 percent of annual cost by the end of 2025, and hence the combined funds would not satisfy the test of short-range financial adequacy.

Table IV.A3.—Operations of the Combined OASI and DI Trust Funds, Calendar Years 2011-2025[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 interchange	Net increase during year	Amount at end of year	Trust fund ratio[e]
Historical data:												
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

Table IV.A3.—Operations of the Combined OASI and DI Trust Funds, Calendar Years 2011-2025[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]
Intermediate:												
2016 . .	944.6	822.5	.1	33.2	88.8	928.9	917.7	6.6	4.6	15.7	2,828.2	303
2017 . .	996.6	869.8	[f]	39.3	87.6	965.5	954.8	6.4	4.3	31.1	2,859.3	293
2018 . .	1,054.7	922.3	[f]	43.1	89.2	1,032.5	1,021.4	6.6	4.6	22.1	2,881.5	277
2019 . .	1,112.4	974.1	[f]	47.2	91.1	1,101.6	1,089.9	7.1	4.7	10.7	2,892.2	262
2020 . .	1,171.3	1,027.4	[f]	51.3	92.6	1,174.5	1,162.2	7.5	4.8	-3.2	2,889.0	246
2021 . .	$1,230.6	$1,081.8	[f]	$55.7	$93.1	$1,248.4	$1,235.7	$8.0	$4.8	$-17.8	$2,871.2	231
2022 . .	1,290.4	1,136.2	[f]	60.6	93.6	1,330.5	1,317.1	8.4	5.1	-40.1	2,831.1	216
2023 . .	1,349.8	1,189.5	[f]	65.9	94.4	1,418.8	1,404.9	8.8	5.1	-69.0	2,762.1	200
2024 . .	1,412.4	1,246.2	[f]	71.6	94.6	1,512.2	1,497.8	9.1	5.2	-99.9	2,662.2	183
2025 . .	1,473.7	1,302.5	[f]	77.8	93.5	1,609.2	1,594.4	9.5	5.2	-135.5	2,526.7	165
Low-cost:												
2016 . .	951.4	828.4	.1	33.2	89.7	926.3	915.2	6.6	4.6	25.0	2,837.5	304
2017 . .	1,027.3	895.4	[f]	39.4	92.5	965.1	954.4	6.4	4.3	62.2	2,899.7	294
2018 . .	1,108.4	965.9	[f]	43.5	99.0	1,036.9	1,025.8	6.6	4.6	71.5	2,971.2	280
2019 . .	1,190.2	1,036.8	[f]	47.7	105.8	1,109.6	1,097.7	7.2	4.7	80.7	3,051.9	268
2020 . .	1,274.3	1,109.0	[f]	52.2	113.2	1,186.7	1,174.1	7.8	4.8	87.6	3,139.5	257
2021 . .	1,359.9	1,182.3	[f]	56.8	120.8	1,265.5	1,252.4	8.3	4.8	94.4	3,233.9	248
2022 . .	1,450.7	1,257.9	[f]	62.1	130.7	1,353.4	1,339.5	8.8	5.1	97.3	3,331.2	239
2023 . .	1,546.6	1,336.0	[f]	67.8	142.8	1,448.7	1,434.2	9.4	5.2	97.9	3,429.1	230
2024 . .	1,650.2	1,420.2	[f]	74.0	156.0	1,550.4	1,535.3	9.9	5.3	99.8	3,528.9	221
2025 . .	1,756.7	1,506.4	[f]	80.7	169.6	1,657.3	1,641.5	10.5	5.3	99.4	3,628.3	213
High-cost:												
2016 . .	933.6	812.5	.1	33.3	87.7	931.2	920.1	6.6	4.6	2.4	2,814.9	302
2017 . .	941.3	819.2	[f]	39.3	82.8	969.2	958.4	6.4	4.3	-27.8	2,787.1	290
2018 . .	983.0	860.2	[f]	42.8	80.0	1,030.3	1,019.0	6.5	4.7	-47.3	2,739.8	271
2019 . .	1,020.2	896.3	[f]	46.7	77.2	1,096.7	1,085.0	6.9	4.8	-76.5	2,663.3	250
2020 . .	1,057.0	933.2	[f]	50.6	73.2	1,164.5	1,152.4	7.3	4.9	-107.6	2,555.7	229
2021 . .	1,093.0	970.7	[f]	54.7	67.7	1,232.6	1,220.1	7.6	4.8	-139.6	2,416.2	207
2022 . .	1,128.6	1,008.5	[f]	59.2	60.9	1,308.1	1,295.1	7.9	5.1	-179.4	2,236.7	185
2023 . .	1,163.6	1,045.6	[f]	64.1	53.9	1,388.6	1,375.2	8.2	5.1	-225.0	2,011.8	161
2024 . .	1,199.2	1,083.7	[f]	69.3	46.2	1,472.8	1,459.1	8.5	5.2	-273.7	1,738.1	137
2025 . .	1,231.8	1,119.3	[f]	74.8	37.6	1,559.4	1,545.4	8.7	5.2	-327.6	1,410.5	111

[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 noncontributory wage credits for military service before 1957; (2) the cost of benefits to certain uninsured persons who attained age 72 before 1968; (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.

[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 the 2015 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 2015 report under intermediate assumptions, the trust fund ratio for OASI reached 216 percent at the beginning of 2024—the tenth projection year for that report. The change in the short-range valuation period alone, from 2015 through 2024 to 2016 through 2025, lowered the estimated trust fund ratio for the tenth year by 17 percentage points, to 199 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 decrease in the ratio for the tenth projection year of 5 percentage points. Therefore, the total change for this report is a reduction of 22 percentage points to 194 percent.

The Bipartisan Budget Act of 2015 is projected to decrease the tenth year OASI trust fund ratio by 12 percentage points, primarily due to the temporary reallocation of payroll tax rates from OASI to DI for 2016 through 2018. Changes in demographic assumptions over the short-range period increased the projected tenth-year trust fund ratio for OASI by 4 percentage points. Changes in economic data and assumptions, primarily the combined effects of lower cost-of-living adjustments, lower interest rates, and lower payroll tax revenues over the ten year period, caused a net reduction in the OASI trust fund ratio of 3 percentage points by the beginning of 2025. Incorporating recent programmatic data resulted in an increase of 10 percentage points in the tenth year OASI trust fund ratio. This increase was primarily due to recent data showing that retired workers have been starting benefits at later ages, which in turn led to lower beneficiary counts, somewhat offset by higher average benefit amounts, throughout the short-range period. Finally, an improvement in the short-range methodology for projecting average benefits for newly awarded retired workers decreased the tenth year trust fund ratio by 4 percentage points.

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 ratios at the beginning of 2024 for the DI Trust Fund and the combined OASI and DI Trust Funds in last year's report, as well as the corresponding ratios for the beginning of 2025 in this year's report, are hypothetical because the Trustees project that the DI Trust Fund reserves will be depleted prior to the end of the short-range projection period. The 77-percentage-point increase in the DI trust fund ratio is the net effect of increases and decreases from the factors described in the prior para-

graph for the OASI Trust Fund, the largest of which was the increase caused by the Bipartisan Budget Act of 2015. For the DI Trust Fund, the effect of this law was an increase of about 81 percentage points, which is a combination of a 79-percentage-point increase due to the temporary tax rate reallocation and an increase of about 2 percentage points caused by other provisions affecting DI benefits. For the combined OASI and DI Trust Funds, the payroll tax rate reallocation has no net effect; the remaining change due to other provisions is an increase of slightly less than 0.5 percentage point in the trust fund ratio.

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 2024[a]	216	-95	173
Change in trust fund ratio due to changes in:			
Legislation and regulations	-12	81	[b]
Valuation period	-17	-11	-15
Demographic data and assumptions	4	[b]	3
Economic data and assumptions	-3	-9	-4
Programmatic data and assumptions	10	16	12
Projection methods and data	-4	-1	-3
Total change in trust fund ratio	-22	77	-8
Trust fund ratio shown in this report for calendar year 2025[a]	194	-18	165

[a] Figures for DI, and OASI and DI combined, are hypothetical because the DI Trust Fund reserves are depleted before the beginning of the tenth year under the assumptions of each report. The magnitudes of the negative values for DI represent the ratios of the unfunded obligation at the beginning of the tenth year to cost for that year.
[b] 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 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.

Summarized measures for any period indicate whether projected income is sufficient, on average, for the whole period. Summarized measures can only indicate the solvency status of a fund for 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 two summarized measures: 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,

[1] See appendix F.

(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. 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 decline from 11.15 percent of payroll for 2015 to 10.58 percent of payroll for 2016. This temporary reduction results from the payroll tax rate reallocation of 0.57 percentage point from OASI to DI for 2016 through 2018 enacted in the Bipartisan Budget Act of 2015. After returning to the pre-reallocation level for 2019, the income rate will rise at a very gradual rate to 11.47 percent of taxable payroll for 2090. Income from taxation of benefits causes this increase for two main reasons: (1) total 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.

The pattern of the cost rate is much different. The OASI cost rate is projected to decrease from 2016[2] to 2017 primarily because the projected percentage

[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.

[2] 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.

increase in average taxable earnings is greater than the projected increase in the average benefit from 2016 to 2017, largely due to the small 0.2 percentage point projected COLA for December 2016. From 2017 to 2035, the cost rate rises rapidly because the retirement of the baby-boom generation will 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 ages. From 2038 to 2051, the cost rate declines because the aging baby-boom generation is gradually replaced at retirement ages by the historically low-birth-rate generation born between 1966 and 1989. After 2051, the projected OASI cost rate generally rises slowly, reaching 15.42 percent of taxable payroll for 2090, primarily because of projected reductions in death rates at higher 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 gradual change 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 through 2017, and then rises until it peaks in 2033 at 12.43 percent of payroll. The cost rate then declines to 11.41 percent for 2054, rises to 11.57 percent for 2070, and declines again to 11.17 percent for 2084 before rising to 11.31 percent for 2090, at which point the income rate reaches 11.23 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 21.71 percent of payroll for 2090, at which point the income rate reaches 11.83 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 is temporarily higher for years 2016 through 2018 because of the 0.57-percentage-point payroll tax rate reallocation from OASI to DI. After returning to the pre-reallocation level for 2019, the annual deficit then rises relatively rapidly from 0.76 percent for 2019 to 3.20 percent for 2038. It then declines to 2.81 percent of payroll for 2051, and generally rises thereafter, reaching 3.96 percent of taxable payroll for 2090.

Under the low-cost assumptions, after the 2016-2018 payroll tax rate reallocation period, the annual deficit rises from 0.23 percent of payroll for 2019 to 1.17 percent of payroll for 2033. Then the annual deficit generally declines until it becomes a positive annual balance for 2082. The annual balance turns negative again for 2088, reaching a deficit of 0.09 percent of payroll for

2090. Under the high-cost assumptions, the OASI balance worsens throughout the projection period. Annual deficits rise to 1.84 percent for 2020, 6.22 percent for 2050, and 9.87 percent of payroll for 2090.

Table IV.B1.—Annual Income Rates, Cost Rates, and Balances, Calendar Years 1990-2090
[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	9.66	1.82	1.18	1.09	0.10	12.66	10.74	1.91
1995	10.64	10.22	.42	1.87	1.44	.43	12.51	11.67	.85
2000	10.85	8.98	1.87	1.78	1.42	.36	12.62	10.40	2.23
2001	10.90	9.08	1.82	1.82	1.48	.35	12.73	10.56	2.17
2002	11.06	9.29	1.76	1.85	1.60	.24	12.90	10.89	2.01
2003	10.79	9.35	1.44	1.80	1.68	.12	12.59	11.03	1.56
2004	10.73	9.27	1.46	1.79	1.78	.02	12.53	11.05	1.48
2005	10.96	9.31	1.65	1.84	1.85	-.02	12.80	11.16	1.63
2006	10.96	9.18	1.78	1.83	1.88	-.05	12.79	11.06	1.73
2007	11.01	9.44	1.57	1.84	1.88	-.04	12.85	11.32	1.53
2008	10.90	9.54	1.37	1.83	2.01	-.19	12.73	11.55	1.18
2009	11.23	10.74	.50	1.88	2.31	-.43	13.11	13.05	.06
2010	10.75	11.06	-.30	1.79	2.41	-.62	12.54	13.47	-.92
2011	10.84	11.05	-.21	1.80	2.42	-.62	12.64	13.47	-.83
2012	11.05	11.35	-.30	1.81	2.47	-.66	12.86	13.82	-.96
2013	10.97	11.54	-.57	1.81	2.44	-.63	12.77	13.98	-1.20
2014	10.96	11.60	-.64	1.81	2.36	-.55	12.77	13.96	-1.19
2015	11.15	11.78	-.63	1.83	2.30	-.47	12.98	14.08	-1.10
Intermediate:									
2016	10.58	11.78	-1.20	2.37	2.27	.09	12.94	14.05	-1.10
2017	10.52	11.55	-1.02	2.39	2.17	.22	12.92	13.72	-.80
2018	10.56	11.72	-1.16	2.40	2.14	.26	12.96	13.86	-.90
2019	11.11	11.88	-.76	1.85	2.11	-.26	12.97	13.99	-1.02
2020	11.15	12.05	-.90	1.83	2.08	-.25	12.98	14.13	-1.15
2021	11.18	12.21	-1.03	1.83	2.06	-.24	13.00	14.27	-1.27
2022	11.20	12.44	-1.23	1.83	2.05	-.22	13.03	14.49	-1.46
2023	11.23	12.71	-1.48	1.83	2.05	-.22	13.06	14.76	-1.70
2024	11.26	12.98	-1.72	1.83	2.04	-.21	13.09	15.02	-1.93
2025	11.28	13.25	-1.97	1.83	2.03	-.20	13.11	15.29	-2.17
2030	11.34	14.10	-2.76	1.84	2.00	-.16	13.18	16.10	-2.92
2035	11.37	14.48	-3.10	1.84	2.02	-.18	13.22	16.50	-3.28
2040	11.39	14.55	-3.16	1.84	2.04	-.20	13.23	16.59	-3.36
2045	11.38	14.34	-2.95	1.85	2.11	-.27	13.23	16.45	-3.22
2050	11.38	14.20	-2.82	1.85	2.15	-.30	13.23	16.36	-3.13
2055	11.39	14.28	-2.89	1.85	2.19	-.33	13.24	16.46	-3.22
2060	11.41	14.53	-3.13	1.85	2.17	-.32	13.26	16.71	-3.44
2065	11.42	14.77	-3.35	1.86	2.18	-.33	13.28	16.96	-3.68
2070	11.44	15.03	-3.59	1.86	2.19	-.33	13.30	17.22	-3.92
2075	11.45	15.22	-3.77	1.86	2.17	-.31	13.31	17.39	-4.08
2080	11.45	15.21	-3.75	1.86	2.20	-.34	13.31	17.40	-4.09
2085	11.46	15.22	-3.77	1.86	2.25	-.39	13.32	17.47	-4.15
2090	11.47	15.42	-3.96	1.86	2.25	-.39	13.33	17.68	-4.35
First year balance becomes negative and remains negative throughout the projection period			2010			2019			2010

Table IV.B1.—Annual Income Rates, Cost Rates, and Balances, Calendar Years 1990-2090 (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:									
2016	10.53	11.64	-1.11	2.36	2.22	0.14	12.89	13.86	-0.97
2017	10.50	11.25	-.75	2.39	2.06	.33	12.89	13.31	-.42
2018	10.53	11.29	-.76	2.39	1.99	.41	12.93	13.28	-.35
2019	11.08	11.31	-.23	1.85	1.91	-.07	12.93	13.23	-.30
2020	11.11	11.37	-.26	1.82	1.85	-.03	12.94	13.22	-.28
2021	11.13	11.43	-.30	1.82	1.80	.02	12.95	13.23	-.28
2022	11.15	11.54	-.39	1.82	1.77	.06	12.98	13.31	-.33
2023	11.17	11.68	-.51	1.82	1.73	.09	12.99	13.41	-.42
2024	11.19	11.81	-.62	1.83	1.69	.13	13.02	13.51	-.49
2025	11.20	11.94	-.74	1.82	1.66	.16	13.03	13.60	-.58
2030	11.25	12.35	-1.10	1.83	1.54	.28	13.07	13.89	-.82
2035	11.26	12.38	-1.12	1.83	1.50	.33	13.09	13.88	-.79
2040	11.25	12.15	-.90	1.83	1.47	.36	13.08	13.62	-.53
2045	11.24	11.74	-.51	1.83	1.49	.35	13.07	13.23	-.16
2050	11.22	11.47	-.25	1.83	1.49	.34	13.06	12.96	.10
2055	11.22	11.42	-.19	1.84	1.49	.34	13.06	12.91	.15
2060	11.23	11.51	-.28	1.84	1.47	.36	13.07	12.98	.09
2065	11.24	11.55	-.32	1.84	1.47	.37	13.07	13.02	.05
2070	11.24	11.57	-.34	1.84	1.46	.37	13.07	13.04	.04
2075	11.24	11.51	-.27	1.84	1.45	.39	13.07	12.96	.11
2080	11.22	11.28	-.06	1.84	1.47	.37	13.06	12.75	.31
2085	11.22	11.17	.05	1.84	1.52	.32	13.05	12.68	.37
2090	11.23	11.31	-.09	1.84	1.53	.31	13.06	12.84	.22
First year balance becomes negative and remains negative throughout the projection period			2088			[c]			[c]
High-cost:									
2016	10.66	12.01	-1.35	2.38	2.35	.04	13.04	14.35	-1.32
2017	10.58	12.28	-1.70	2.40	2.37	.03	12.97	14.65	-1.67
2018	10.59	12.45	-1.86	2.40	2.37	.02	12.99	14.82	-1.83
2019	11.16	12.75	-1.59	1.86	2.39	-.53	13.02	15.15	-2.12
2020	11.21	13.05	-1.84	1.83	2.39	-.56	13.04	15.44	-2.40
2021	11.24	13.31	-2.08	1.83	2.40	-.56	13.07	15.71	-2.64
2022	11.27	13.65	-2.37	1.84	2.41	-.58	13.11	16.06	-2.95
2023	11.30	14.01	-2.71	1.84	2.43	-.59	13.14	16.44	-3.30
2024	11.34	14.39	-3.06	1.84	2.44	-.60	13.18	16.83	-3.66
2025	11.37	14.78	-3.42	1.84	2.46	-.62	13.21	17.24	-4.04

Table IV.B1.—Annual Income Rates, Cost Rates, and Balances, Calendar Years 1990-2090 (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	11.45	16.12	-4.67	1.85	2.54	-0.69	13.30	18.66	-5.36
2035	11.51	16.95	-5.45	1.85	2.65	-.80	13.36	19.61	-6.24
2040	11.55	17.49	-5.95	1.86	2.75	-.89	13.41	20.24	-6.84
2045	11.56	17.64	-6.07	1.87	2.90	-1.04	13.43	20.54	-7.11
2050	11.58	17.80	-6.22	1.87	3.00	-1.13	13.45	20.79	-7.34
2055	11.61	18.14	-6.53	1.87	3.08	-1.21	13.48	21.22	-7.74
2060	11.64	18.69	-7.05	1.88	3.09	-1.21	13.52	21.78	-8.27
2065	11.68	19.27	-7.59	1.88	3.13	-1.25	13.56	22.39	-8.84
2070	11.72	19.93	-8.21	1.88	3.15	-1.27	13.60	23.09	-9.48
2075	11.76	20.58	-8.82	1.88	3.13	-1.25	13.64	23.71	-10.07
2080	11.79	21.00	-9.21	1.88	3.14	-1.26	13.67	24.14	-10.47
2085	11.81	21.33	-9.52	1.88	3.19	-1.30	13.69	24.52	-10.82
2090	11.83	21.71	-9.87	1.88	3.18	-1.30	13.72	24.89	-11.17
First year balance becomes negative and remains negative throughout the projection period			2010			2019			2010

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

The DI cost rate rose substantially from 1.09 percent of taxable payroll for 1990 to 1.88 percent of taxable payroll for 2007 as the baby boom generation moved into prime disability ages, and further to a peak of 2.47 percent for 2012 due to the recent economic recession. Under the intermediate assumptions, the projected DI cost rate generally declines to 1.99 percent for 2032, and then generally increases gradually to 2.19 percent for 2056. From 2056 to 2079, the DI cost rate stays relatively stable before increasing slowly to 2.25 percent of payroll for 2090. Because of the temporary 2016-18 payroll tax rate reallocation, the income rate increases to between 2.37 and 2.40 percent of payroll for those years. The income rate drops to 1.85 percent of payroll for 2019 and then increases only very slightly to 1.86 percent for 2090. The annual balance is positive for years 2016 through 2018, reflecting the reallocation. Thereafter, the annual deficit reappears, but generally declines from 0.26 percent for 2019 to a low of 0.15 percent for 2032, and then generally increases to 0.39 percent for 2090.

Under the low-cost assumptions, the DI cost rate declines from 2.47 percent of payroll for 2012 to 1.47 percent for 2039, and remains relatively stable

thereafter, reaching 1.53 percent for 2090. The annual balance is positive for 2016 through 2018, negative for 2019 through 2020, and is 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 3.18 percent for 2090. The annual deficit is negative from 2019 through the remainder of the projection period, reaching 0.53 percent for 2019, 1.13 percent for 2050, and 1.30 percent for 2090.

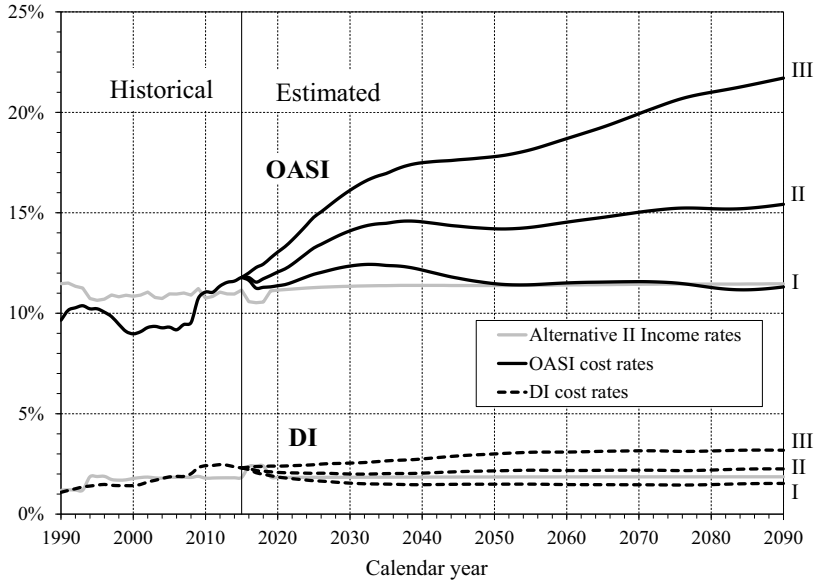
Figure IV.B1 shows the patterns of the OASI and DI annual cost rates. Annual DI cost rates rose substantially between 1990 and 2010 in large part due to: (1) aging of the working population as the baby-boom generation moved from ages 25-44 in 1990, where disability prevalence is low, to ages 45-64 in 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. After 2010, all of these factors stabilize, and therefore the DI cost rate stabilizes also. Annual OASI cost rates follow a similar pattern to that for DI, but displaced 20 to 25 years later, because the baby-boom generation enters retirement ages 20 to 25 years after entering prime disability ages. 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 paid and (2) the increasing share of individual benefits that will be subject to taxation because benefit taxation threshold amounts are not indexed.

Figure IV.B1 shows the patterns of the annual balances for OASI and DI. For each alternative and for historical data, the magnitude of each of the positive balances, as a percentage of taxable payroll, 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 the 2016-2018 payroll tax rate reallocation. The pattern of the projected OASDI annual balances is important to the analysis of the financial condition of the Social Security program as a whole.

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 encom-

passed 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 the OASDI cost to decrease from about 5.0 percent of GDP for 2016 to about 4.9 percent of GDP for 2017, and then increase to a peak of about 6.0 percent for 2037. After 2037, OASDI cost as a percentage of GDP declines to a low of about 5.9 percent for 2051 and thereafter generally increases slowly, reaching about 6.1 percent by 2090. 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 benefits, and the rates of income from General Fund reimbursements. Projected income from taxation of benefits increases over time for reasons discussed on page 56. Historical General Fund reimbursements include temporary reductions in revenue due to reduced payroll tax rates and certain other miscellaneous items.

Table IV.B2.—Components of Annual Income Rates, Calendar Years 1990-2090
[As a percentage of taxable payroll]

Calendar year	OASI				DI				OASDI			
	Payroll tax	Taxation of benefits	General Fund Reimbursements[a]	Total[b]	Payroll tax	Taxation of benefits	General Fund Reimbursements[a]	Total[b]	Payroll tax	Taxation of benefits	General Fund Reimbursements[a]	Total[b]
Historical:												
1990 . .	11.29	0.21	-0.03	11.47	1.21	0.01	-0.03	1.18	12.50	0.21	-0.06	12.66
1995 . .	10.46	.19	-.01	10.64	1.87	.01	-.01	1.87	12.33	.20	-.01	12.51
2000 . .	10.56	.29	[c]	10.85	1.78	.02	-.02	1.78	12.34	.31	-.02	12.62
2001 . .	10.62	.29	[c]	10.90	1.80	.02	[c]	1.82	12.42	.31	[c]	12.73
2002 . .	10.74	.30	.01	11.06	1.82	.02	[c]	1.85	12.56	.33	.01	12.90
2003 . .	10.50	.29	[c]	10.79	1.78	.02	[c]	1.80	12.28	.31	[c]	12.59
2004 . .	10.41	.32	[c]	10.73	1.77	.02	[c]	1.79	12.18	.35	[c]	12.53
2005 . .	10.68	.29	-.01	10.96	1.81	.02	[c]	1.84	12.49	.31	-.01	12.80
2006 . .	10.65	.31	[c]	10.96	1.81	.02	[c]	1.83	12.46	.34	[c]	12.79
2007 . .	10.68	.33	[c]	11.01	1.81	.03	[c]	1.84	12.50	.35	[c]	12.85
2008 . .	10.61	.29	[c]	10.90	1.80	.02	[c]	1.83	12.42	.31	[c]	12.73
2009 . .	10.85	.38	[c]	11.23	1.84	.04	[c]	1.88	12.70	.42	[c]	13.11
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	10.84	1.50	.03	.27	1.80	10.32	.44	1.88	12.64
2012 . .	8.86	.47	1.72	11.05	1.51	.01	.29	1.81	10.37	.48	2.01	12.86
2013 . .	10.54	.35	.07	10.97	1.79	.01	.01	1.81	12.33	.36	.08	12.77
2014 . .	10.50	.45	.01	10.96	1.78	.03	[c]	1.81	12.28	.48	.01	12.77
2015	10.67	.48	[c]	11.15	1.81	.02	[c]	1.83	12.48	.50	.01	12.98
Intermediate:												
2016 . .	10.09	.48	[c]	10.58	2.35	.02	[c]	2.37	12.44	.50	[c]	12.94
2017 . .	10.00	.53	[c]	10.52	2.36	.03	[c]	2.39	12.36	.56	[c]	12.92
2018 . .	10.01	.55	[c]	10.56	2.37	.03	[c]	2.40	12.38	.58	[c]	12.96
2019 . .	10.55	.57	[c]	11.11	1.82	.03	[c]	1.85	12.37	.60	[c]	12.97
2020 . .	10.57	.59	[c]	11.15	1.79	.03	[c]	1.83	12.36	.62	[c]	12.98
2021 . .	10.57	.60	[c]	11.18	1.80	.03	[c]	1.83	12.37	.64	[c]	13.00
2022 . .	10.58	.63	[c]	11.20	1.80	.03	[c]	1.83	12.37	.66	[c]	13.03
2023 . .	10.58	.65	[c]	11.23	1.80	.03	[c]	1.83	12.37	.69	[c]	13.06
2024 . .	10.58	.68	[c]	11.26	1.80	.04	[c]	1.83	12.38	.71	[c]	13.09
2025 . .	10.58	.70	[c]	11.28	1.80	.04	[c]	1.83	12.37	.74	[c]	13.11
2030 . .	10.58	.77	[c]	11.34	1.80	.04	[c]	1.84	12.37	.81	[c]	13.18
2035 . .	10.58	.80	[c]	11.37	1.80	.05	[c]	1.84	12.37	.84	[c]	13.22
2040 . .	10.58	.81	[c]	11.39	1.80	.05	[c]	1.84	12.37	.86	[c]	13.23
2045 . .	10.58	.81	[c]	11.38	1.80	.05	[c]	1.85	12.37	.86	[c]	13.23
2050 . .	10.58	.80	[c]	11.38	1.80	.05	[c]	1.85	12.37	.86	[c]	13.23
2055 . .	10.58	.81	[c]	11.39	1.80	.06	[c]	1.85	12.37	.87	[c]	13.24
2060 . .	10.58	.83	[c]	11.41	1.80	.06	[c]	1.85	12.37	.89	[c]	13.26
2065 . .	10.58	.85	[c]	11.42	1.80	.06	[c]	1.86	12.37	.91	[c]	13.28
2070 . .	10.58	.86	[c]	11.44	1.80	.06	[c]	1.86	12.37	.92	[c]	13.30
2075 . .	10.58	.88	[c]	11.45	1.80	.06	[c]	1.86	12.37	.94	[c]	13.31
2080 . .	10.58	.88	[c]	11.45	1.80	.06	[c]	1.86	12.37	.94	[c]	13.31
2085 . .	10.58	.88	[c]	11.46	1.80	.06	[c]	1.86	12.37	.94	[c]	13.32
2090 . .	10.58	.89	[c]	11.47	1.80	.06	[c]	1.86	12.37	.95	[c]	13.33

Table IV.B2.—Components of Annual Income Rates, Calendar Years 1990-2090 (Cont.)
[As a percentage of taxable payroll]

Calendar year	OASI				DI				OASDI			
	Payroll tax	Taxation of benefits	General Fund Reimbursements[a]	Total[b]	Payroll tax	Taxation of benefits	General Fund Reimbursements[a]	Total[b]	Payroll tax	Taxation of benefits	General Fund Reimbursements[a]	Total[b]
Low-cost:												
2016 . .	10.05	0.48	[c]	10.53	2.34	0.02	[c]	2.36	12.39	0.50	[c]	12.89
2017 . .	9.99	.51	[c]	10.50	2.36	.03	[c]	2.39	12.35	.54	[c]	12.89
2018 . .	10.00	.53	[c]	10.53	2.36	.03	[c]	2.39	12.37	.56	[c]	12.93
2019 . .	10.54	.54	[c]	11.08	1.82	.03	[c]	1.85	12.36	.57	[c]	12.93
2020 . .	10.56	.55	[c]	11.11	1.79	.03	[c]	1.82	12.35	.58	[c]	12.94
2021 . .	10.57	.57	[c]	11.13	1.79	.03	[c]	1.82	12.36	.59	[c]	12.95
2022 . .	10.57	.58	[c]	11.15	1.80	.03	[c]	1.82	12.37	.61	[c]	12.98
2023 . .	10.57	.60	[c]	11.17	1.79	.03	[c]	1.82	12.37	.63	[c]	12.99
2024 . .	10.58	.62	[c]	11.19	1.80	.03	[c]	1.83	12.37	.64	[c]	13.02
2025 . .	10.57	.63	[c]	11.20	1.79	.03	[c]	1.82	12.36	.66	[c]	13.03
2030 . .	10.57	.67	[c]	11.25	1.80	.03	[c]	1.83	12.37	.71	[c]	13.07
2035 . .	10.57	.69	[c]	11.26	1.80	.03	[c]	1.83	12.37	.72	[c]	13.09
2040 . .	10.57	.68	[c]	11.25	1.80	.04	[c]	1.83	12.37	.72	[c]	13.08
2045 . .	10.57	.67	[c]	11.24	1.80	.04	[c]	1.83	12.37	.70	[c]	13.07
2050 . .	10.57	.65	[c]	11.22	1.80	.04	[c]	1.83	12.37	.69	[c]	13.06
2055 . .	10.57	.65	[c]	11.22	1.80	.04	[c]	1.84	12.37	.69	[c]	13.06
2060 . .	10.57	.66	[c]	11.23	1.80	.04	[c]	1.84	12.37	.70	[c]	13.07
2065 . .	10.57	.66	[c]	11.24	1.80	.04	[c]	1.84	12.37	.71	[c]	13.07
2070 . .	10.57	.67	[c]	11.24	1.80	.04	[c]	1.84	12.37	.71	[c]	13.07
2075 . .	10.57	.66	[c]	11.24	1.80	.04	[c]	1.84	12.37	.71	[c]	13.07
2080 . .	10.57	.65	[c]	11.22	1.80	.04	[c]	1.84	12.37	.69	[c]	13.06
2085 . .	10.57	.65	[c]	11.22	1.80	.04	[c]	1.84	12.37	.69	[c]	13.05
2090 . .	10.57	.65	[c]	11.23	1.80	.04	[c]	1.84	12.37	.70	[c]	13.06

Table IV.B2.—Components of Annual Income Rates, Calendar Years 1990-2090 (Cont.)
[As a percentage of taxable payroll]

Calendar year	OASI				DI				OASDI			
	Payroll tax	Taxation of benefits	General Fund Reimbursements[a]	Total[b]	Payroll tax	Taxation of benefits	General Fund Reimbursements[a]	Total[b]	Payroll tax	Taxation of benefits	General Fund Reimbursements[a]	Total[b]
High-cost:												
2016 . .	10.16	0.49	[c]	10.66	2.36	0.02	[c]	2.38	12.53	0.51	[c]	13.04
2017 . .	10.01	.56	[c]	10.58	2.37	.03	[c]	2.40	12.38	.59	[c]	12.97
2018 . .	10.01	.58	[c]	10.59	2.36	.03	[c]	2.40	12.37	.62	[c]	12.99
2019 . .	10.55	.61	[c]	11.16	1.82	.04	[c]	1.86	12.38	.64	[c]	13.02
2020 . .	10.57	.63	[c]	11.21	1.80	.04	[c]	1.83	12.37	.67	[c]	13.04
2021 . .	10.58	.66	[c]	11.24	1.80	.04	[c]	1.83	12.37	.70	[c]	13.07
2022 . .	10.58	.69	[c]	11.27	1.80	.04	[c]	1.84	12.38	.73	[c]	13.11
2023 . .	10.58	.72	[c]	11.30	1.80	.04	[c]	1.84	12.38	.76	[c]	13.14
2024 . .	10.59	.75	[c]	11.34	1.80	.04	[c]	1.84	12.39	.79	[c]	13.18
2025 . .	10.58	.78	[c]	11.37	1.80	.04	[c]	1.84	12.38	.83	[c]	13.21
2030 . .	10.58	.87	[c]	11.45	1.80	.05	[c]	1.85	12.38	.92	[c]	13.30
2035 . .	10.58	.92	[c]	11.51	1.80	.06	[c]	1.85	12.38	.98	[c]	13.36
2040 . .	10.58	.96	[c]	11.55	1.80	.06	[c]	1.86	12.38	1.03	[c]	13.41
2045 . .	10.58	.98	[c]	11.56	1.80	.07	[c]	1.87	12.38	1.05	[c]	13.43
2050 . .	10.58	1.00	[c]	11.58	1.80	.07	[c]	1.87	12.38	1.07	[c]	13.45
2055 . .	10.58	1.02	[c]	11.61	1.80	.08	[c]	1.87	12.38	1.10	[c]	13.48
2060 . .	10.58	1.06	[c]	11.64	1.80	.08	[c]	1.88	12.38	1.14	[c]	13.52
2065 . .	10.59	1.09	[c]	11.68	1.80	.08	[c]	1.88	12.38	1.17	[c]	13.56
2070 . .	10.59	1.14	[c]	11.72	1.80	.08	[c]	1.88	12.38	1.22	[c]	13.60
2075 . .	10.59	1.18	[c]	11.76	1.80	.08	[c]	1.88	12.38	1.26	[c]	13.64
2080 . .	10.59	1.20	[c]	11.79	1.80	.08	[c]	1.88	12.38	1.29	[c]	13.67
2085 . .	10.59	1.22	[c]	11.81	1.80	.09	[c]	1.88	12.38	1.31	[c]	13.69
2090 . .	10.59	1.25	[c]	11.83	1.80	.09	[c]	1.88	12.38	1.33	[c]	13.72

[a] Includes payroll tax revenue forgone under the provisions of Public Laws 111-147, 111-312, 112-78, and 112-96, and other miscellaneous reimbursements.
[b] Values exclude interest income.
[c] 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 2017 and 2035, 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 1945-2090

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	120,398	32,763	3,874	36,636	3.3	30
1990	133,087	35,255	4,204	39,459	3.4	30
1995	140,929	37,364	5,731	43,096	3.3	31
2000	154,805	38,556	6,606	45,162	3.4	29
2001	155,189	38,888	6,780	45,668	3.4	29
2002	154,615	39,117	7,060	46,176	3.3	30
2003	154,827	39,315	7,438	46,753	3.3	30
2004	156,599	39,558	7,810	47,368	3.3	30
2005	159,030	39,961	8,172	48,133	3.3	30
2006	161,549	40,435	8,428	48,863	3.3	30
2007	163,314	40,863	8,739	49,603	3.3	30
2008	162,704	41,355	9,065	50,420	3.2	31
2009	157,729	42,385	9,475	51,860	3.0	33
2010	157,112	43,440	9,958	53,398	2.9	34
2011	158,674	44,388	10,428	54,816	2.9	35
2012	160,777	45,377	10,799	56,176	2.9	35
2013	163,302	46,517	10,954	57,471	2.8	35
2014	165,885	47,603	10,971	58,574	2.8	35
2015	168,899	48,663	10,881	59,543	2.8	35
Intermediate:						
2016	170,822	50,019	10,853	60,872	2.8	36
2020	179,102	56,505	11,231	67,736	2.6	38
2025	184,836	64,643	11,664	76,307	2.4	41
2030	188,769	71,615	11,890	83,506	2.3	44
2035	192,233	76,637	12,321	88,957	2.2	46
2040	197,022	79,319	12,849	92,168	2.1	47
2045	202,482	80,709	13,640	94,349	2.1	47
2050	207,610	82,520	14,226	96,746	2.1	47
2055	212,456	85,075	14,747	99,823	2.1	47
2060	217,070	88,345	15,021	103,366	2.1	48
2065	221,854	91,566	15,445	107,011	2.1	48
2070	227,089	95,079	15,874	110,953	2.0	49
2075	232,692	98,376	16,184	114,560	2.0	49
2080	238,422	100,509	16,744	117,253	2.0	49
2085	244,162	102,982	17,475	120,457	2.0	49
2090	249,698	106,626	17,931	124,557	2.0	50

Table IV.B3.—Covered Workers and Beneficiaries, Calendar Years 1945-2090 (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]		
Low-cost:						
2016	171,545	50,004	10,803	60,807	2.8	35
2020	182,507	56,386	10,676	67,062	2.7	37
2025	188,925	64,318	10,539	74,857	2.5	40
2030	193,605	70,713	10,291	81,004	2.4	42
2035	198,130	75,146	10,319	85,465	2.3	43
2040	204,791	77,208	10,499	87,708	2.3	43
2045	212,901	78,079	10,985	89,064	2.4	42
2050	220,970	79,491	11,379	90,870	2.4	41
2055	228,799	81,803	11,783	93,585	2.4	41
2060	236,623	84,883	12,057	96,940	2.4	41
2065	245,082	87,931	12,500	100,431	2.4	41
2070	254,625	91,227	12,996	104,223	2.4	41
2075	265,145	94,186	13,464	107,649	2.5	41
2080	276,175	96,031	14,196	110,227	2.5	40
2085	287,265	98,727	15,124	113,850	2.5	40
2090	298,093	103,444	15,819	119,264	2.5	40
High-cost:						
2016	170,151	50,032	10,897	60,929	2.8	36
2020	174,217	56,604	11,873	68,476	2.5	39
2025	180,301	64,991	12,773	77,763	2.3	43
2030	183,821	72,638	13,531	86,168	2.1	47
2035	186,485	78,324	14,375	92,699	2.0	50
2040	189,536	81,713	15,246	96,959	2.0	51
2045	192,741	83,742	16,338	100,080	1.9	52
2050	195,267	86,050	17,086	103,136	1.9	53
2055	197,241	88,921	17,699	106,619	1.8	54
2060	198,857	92,412	17,921	110,333	1.8	55
2065	200,311	95,812	18,251	114,063	1.8	57
2070	201,750	99,581	18,507	118,088	1.7	59
2075	203,168	103,215	18,512	121,727	1.7	60
2080	204,403	105,645	18,704	124,349	1.6	61
2085	205,569	107,833	19,016	126,849	1.6	62
2090	206,635	110,312	19,105	129,417	1.6	63

[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.

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 2015 level of 35 beneficiaries per 100 covered workers, the Trustees project that this ratio rises to 46 by 2035 under the intermediate assumptions because the growth in beneficiaries greatly exceeds the growth in workers. By 2090, this projected ratio rises further under the intermediate and high-cost assumptions, reaching 50 under the intermediate assumptions and 63 under the high-

cost assumptions. Under the low-cost assumptions, this ratio rises to 43 by 2035 and then declines, reaching 40 by 2090. 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

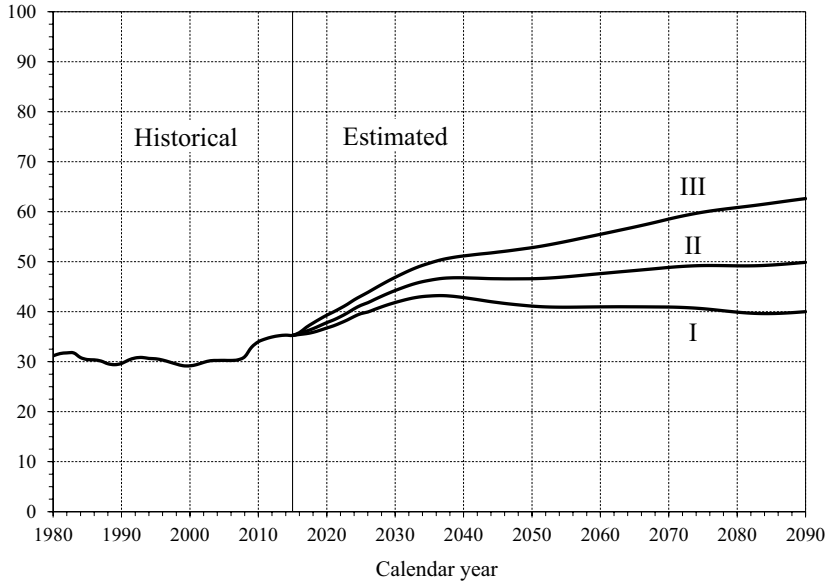


Table IV.B3 also shows the number of covered workers per OASDI beneficiary, which was about 2.8 for 2015. Under the low-cost assumptions, this ratio declines to 2.3 for 2035, generally rises from 2035 through 2080, and remains relatively stable at 2.5 through 2090. Under the intermediate assumptions, this ratio declines generally throughout the long-range period, reaching 2.2 for 2035 and 2.0 by 2090. Under the high-cost assumptions, this ratio decreases steadily to 1.6 by 2090.

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 tax revenues fall 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 very 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 has declined since 2011 and continues to decline from 357 percent at the beginning of 2016[1] until the trust fund reserves become depleted in 2035 (the same year as projected in last year's report), at which time 77 percent of scheduled benefits would be payable. The DI trust fund ratio has been declining steadily since 2003 (at first slowly and then more rapidly due to reduced employment and increased disability claims during the recent recession), reaching 21 percent at the beginning of 2016. The 0.57-percentage-point reallocation of payroll tax rate (for 2016 through 2018) from OASI to DI will increase the trust fund ratio to 48 percent at the beginning of 2019. After 2019, the trust fund ratio declines until the trust fund reserves become depleted in 2023, at which time 89 percent of scheduled benefits would be payable.

Under the intermediate assumptions, the trust fund ratio for the combined OASI and DI Trust Funds declines from 303 percent at the beginning of 2016 until the combined fund reserves become depleted in 2034 (the same

[1] If the scheduled January 3, 2016 payment, actually paid on December 31, 2015, were counted as reducing trust fund reserves at the end of 2015 for presentation in this report, then the OASI trust fund ratio shown for 2016 would be 355 percent.

year as projected in last year's report), at which time 79 percent of scheduled benefits would be payable.

Under the low-cost assumptions, the trust fund ratio for the DI program increases from 22 percent at the beginning of 2016 to 66 percent at the beginning of 2019, again reflecting the temporary payroll tax rate reallocation. The DI trust fund ratio is then stable through 2023 and thereafter increases through the end of the long-range projection period, reaching the extremely high level of 1,930 percent for 2091. For the OASI program, the trust fund ratio generally declines steadily, from 357 percent for 2016 to 35 percent for 2091. The expectation would be for the OASI Trust Fund reserves to become depleted several years after the 75-year projection period. For the combined OASDI program, the trust fund ratio declines from 304 percent for 2016 to a low of 142 percent in 2044, then rises thereafter reaching 260 percent by 2091. 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 2030, at which time 69 percent of scheduled benefits would still be payable. The DI trust fund ratio stays relatively stable between 21 and 25 percent through 2019 because of the payroll tax rate reallocation, but reserves decline quickly after that and become depleted in 2020. At that time, 76 percent of scheduled benefits would still be payable. The combined OASI and DI trust fund ratio declines from 302 percent for 2016 until reserves become depleted in 2029, at which time 71 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 OASDI Trust Funds and the individual OASI and DI Trust Funds 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 2029. Under the intermediate assumptions, the combined starting fund reserves plus estimated future income are sufficient to fully cover cost until 2034. In the 2015 report, the Trustees projected that the combined trust fund reserves would become depleted in 2028 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 2016-2090[a]
[In percent]

Calendar year	Intermediate			Low-cost			High-cost		
	OASI	DI	OASDI	OASI	DI	OASDI	OASI	DI	OASDI
2016	357	21	303	357	22	304	357	21	302
2017	343	26	293	343	29	294	342	23	290
2018	321	36	277	321	45	280	318	24	271
2019	300	48	262	302	66	268	292	25	250
2020	282	36	246	289	63	257	270	3	229
2021	266	24	231	277	63	248	248	[b]	207
2022	249	13	216	266	64	239	225	[b]	185
2023	231	2	200	254	68	230	200	[b]	161
2024	213	[b]	183	242	75	221	175	[b]	137
2025	194	[b]	165	231	84	213	149	[b]	111
2030	102	[b]	81	186	160	183	17	[b]	[b]
2035	3	[b]	[b]	149	276	162	[b]	[b]	[b]
2040	[b]	[b]	[b]	114	410	146	[b]	[b]	[b]
2045	[b]	[b]	[b]	92	536	142	[b]	[b]	[b]
2050	[b]	[b]	[b]	81	665	148	[b]	[b]	[b]
2055	[b]	[b]	[b]	76	800	160	[b]	[b]	[b]
2060	[b]	[b]	[b]	69	959	170	[b]	[b]	[b]
2065	[b]	[b]	[b]	59	1,121	179	[b]	[b]	[b]
2070	[b]	[b]	[b]	48	1,288	187	[b]	[b]	[b]
2075	[b]	[b]	[b]	37	1,471	197	[b]	[b]	[b]
2080	[b]	[b]	[b]	31	1,625	215	[b]	[b]	[b]
2085	[b]	[b]	[b]	34	1,745	238	[b]	[b]	[b]
2090	[b]	[b]	[b]	36	1,895	257	[b]	[b]	[b]
Trust fund reserves permanently become depleted in	2035	2023	2034	[c]	[c]	[c]	2030	2020	2029
Payable benefits as percent of scheduled benefits:									
At the time of permanent reserve depletion	77	89	79	[c]	[c]	[c]	69	76	71
For 2090	73	82	74	[c]	[c]	[c]	52	58	53

[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 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.

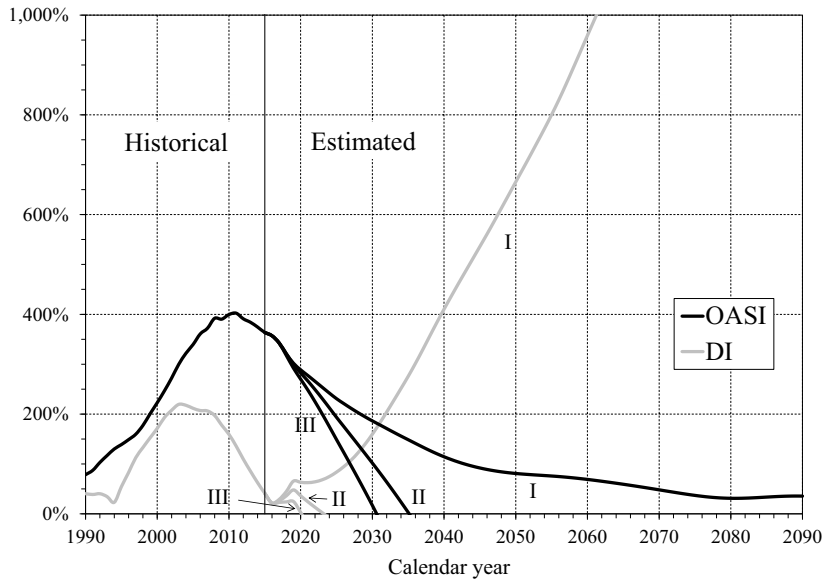
Note: The definition of trust fund ratio appears in the Glossary. The ratios shown for the combined trust funds for years after reserve depletion of either the DI or OASI Trust Fund are hypothetical.

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, allowing scheduled benefits to be paid in a timely manner throughout the period.

As discussed in section IV.A, the DI Trust Fund fails the test of short-range financial adequacy under the intermediate assumptions because trust fund reserves become depleted in the third quarter of 2023. Under the intermediate assumptions, the OASI Trust Fund reserves become depleted in 2035, and the combined OASI and DI Trust Fund reserves become depleted in 2034. Therefore, the OASI, DI, and combined OASI and DI Trust Funds all fail the long-range test of 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.D7.

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 two reasons discussed earlier on page 53. 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 1 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]

Table IV.B5 contains summarized rates for the intermediate, low-cost, and high-cost assumptions. The low-cost and high-cost assumptions define a

[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.

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 0.24 percent of taxable payroll under the low-cost assumptions, -1.48 percent under the intermediate assumptions, and -3.53 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 0.19 percent under the low-cost assumptions, -2.23 percent under the intermediate assumptions, and -5.23 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 0.22 percent of taxable payroll under the low-cost assumptions, -2.66 percent under the intermediate assumptions, and -6.30 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, revenues 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 14.98 percent (a relative increase of 20.8 percent), cost could be reduced in a manner equivalent to an immediate and permanent reduction in scheduled benefits of about 16 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 revenues in a manner equivalent to an immediate and permanent increase in the combined payroll tax from 12.40 percent

to 15.15 percent (a relative increase of 22.2 percent),[1] reducing cost in a manner equivalent to an immediate reduction in scheduled benefits of about 17 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 4.35 percent of payroll for 2090 (see table IV.B1). These large deficits indicate that annual cost continues to exceed non-interest income after 2090, 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 4.0 percent of payroll under the intermediate assumptions.

Under the intermediate assumptions, the financial shortfall of the DI program is larger than that of the OASI program for the first 25 years when measured relative to the level of program cost. Summarized over the full 75-year period, however, the financial shortfall for the OASI program is larger than that of the DI program, measured relative to the level of program cost. Increases in longevity after 2027, when the age of conversion from disabled-worker benefits to retired-worker benefits remains fixed, have a greater effect on OASI cost than on DI cost. As a result of this greater effect on OASI cost, the financial shortfall for the OASI program in the later portion of the 75-year projection period is larger than the financial shortfall for the DI program.

Table IV.B5.—Components of Summarized Income Rates and Cost Rates, Calendar Years 2016-2090
[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:							
2016-40.	11.24	1.51	12.75	13.46	0.56	14.02	-1.27
2016-65.	11.31	.82	12.14	13.89	.24	14.13	-1.99
2016-90.	11.35	.61	11.96	14.21	.14	14.36	-2.39
Low-cost:							
2016-40.	11.16	1.38	12.54	12.00	.48	12.49	.05
2016-65.	11.20	.72	11.93	11.81	.21	12.01	-.08
2016-90.	11.21	.52	11.73	11.69	.12	11.81	-.08
High-cost:							
2016-40.	11.33	1.69	13.01	15.21	.64	15.85	-2.84
2016-65.	11.45	.95	12.40	16.47	.29	16.76	-4.35
2016-90.	11.53	.73	12.26	17.44	.17	17.61	-5.35

[1] The indicated increase in the payroll tax rate of 2.75 percent is somewhat larger than the 2.66 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 2016-2090 (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
DI:							
Intermediate:							
2016-40.	1.90	0.02	1.92	2.05	0.08	2.13	-0.21
2016-65.	1.88	.01	1.89	2.10	.04	2.13	-.24
2016-90.	1.87	.01	1.88	2.12	.02	2.14	-.26
Low-cost:							
2016-40.	1.89	.02	1.90	1.65	.06	1.71	.19
2016-65.	1.86	.01	1.87	1.57	.03	1.60	.27
2016-90.	1.86	.01	1.86	1.55	.02	1.56	.30
High-cost:							
2016-40.	1.91	.02	1.93	2.52	.10	2.63	-.69
2016-65.	1.89	.01	1.91	2.73	.05	2.78	-.87
2016-90.	1.89	.01	1.90	2.83	.02	2.86	-.95
OASDI:							
Intermediate:							
2016-40.	13.14	1.53	14.67	15.51	.64	16.15	-1.48
2016-65.	13.19	.83	14.03	15.98	.28	16.26	-2.23
2016-90.	13.23	.62	13.84	16.34	.16	16.50	-2.66
Low-cost:							
2016-40.	13.05	1.39	14.44	13.66	.54	14.20	.24
2016-65.	13.07	.73	13.80	13.38	.23	13.61	.19
2016-90.	13.07	.52	13.59	13.23	.14	13.37	.22
High-cost:							
2016-40.	13.24	1.71	14.95	17.73	.75	18.48	-3.53
2016-65.	13.35	.96	14.31	19.20	.33	19.53	-5.23
2016-90.	13.42	.74	14.16	20.27	.19	20.46	-6.30

[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.

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 2090. 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 2090.

The open group unfunded obligation increased from $10.7 trillion shown in last year's report to $11.4 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 $11.2 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, 2016, rather than to January 1, 2015, which tends to increase the unfunded obligation by the annual nominal interest rate; and (2) the unfunded obligation now includes an additional year (2090). However, changes in the law, assumptions, methods, and starting values resulted in a net $0.2 trillion increase in the unfunded obligation.

The 75-year unfunded obligation is equivalent to 2.49 percent of future OASDI taxable payroll and 0.9 percent of GDP through 2090. These percentages were 2.53 and 0.9, 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 2.68 percent of payroll in last year's report, and was expected to increase to a deficit of 2.74 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 0.08 percent decrease (improvement) in the actuarial deficit to 2.66 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 effect 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, amounts to $11.4 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 -$12.1 trillion for the OASDI program.

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, 2016 (in billions):			
A. Payroll tax revenue	$48,095	$8,301	$56,396
B. Reimbursements from general revenue	[a]	[a]	[a]
C. Taxation of benefits revenue	3,606	230	3,836
D. Non-interest income (A + B + C)	51,701	8,531	60,232
E. Cost	64,730	9,672	74,401
F. Cost minus non-interest income (E - D)	13,028	1,141	14,169
G. Trust fund asset reserves at start of period	2,780	32	2,813
H. Open group unfunded obligation (F - G)	10,248	1,109	11,357
I. Ending target trust fund[b]	649	94	743
J. Income minus cost, plus reserves at start of period, minus ending target trust fund (D - E + G - I = - H - I)	-10,897	-1,203	-12,100
K. Taxable payroll	455,364	455,364	455,364
Percent of taxable payroll:			
Actuarial balance (100 × J ÷ K)	-2.39	-.26	-2.66

[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 52.)

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 4.0 percent of taxable payroll or 1.4 percent of GDP. These percentages were 3.9 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	12.00	1.86	13.86
Cost rate	14.37	2.17	16.55
Actuarial balance	**-2.37**	**-.31**	**-2.68**
Changes in actuarial balance due to changes in:			
Legislation / Regulation	-.01	.04	.03
Valuation period[a]	-.05	-.01	-.06
Demographic data and assumptions	.00	.00	.00
Economic data and assumptions	-.06	-.01	-.07
Disability data and assumptions	.00	.00	.00
Methods and programmatic data	.08	.03	.11
Total change in actuarial balance	-.02	.05	.02
Shown in this report:			
Actuarial balance	**-2.39**	**-.26**	**-2.66**
Income rate	11.96	1.88	13.84
Cost rate	14.36	2.14	16.50

[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 2090. 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 assumptions, methods, starting values, and the law had all remained unchanged from last year's Trustees Report, the long-range OASDI actuarial balance would have decreased (become more negative) by 0.06 percent of taxable payroll solely due to the change in the valuation period. However, as described below, projections in this report also reflect changes in law, data, assumptions, and methods. These changes, including the change in the valuation period, combined to improve the long-range OASDI actuarial balance, from -2.68 percent of taxable payroll in last year's report to -2.66 percent in this report.

Since the last report, one law was enacted that is expected to have a significant effect on the long-range cost of the OASDI program. On November 2, 2015, the President signed into law Public Law 114-74, the Bipartisan Budget Act of 2015. Several sections of the law had significant effects on long-range actuarial status, including:

- Section 831. Closure of unintended loopholes. This provision eliminates (1) the ability to receive only a retired-worker benefit or an aged-spouse benefit when eligible for both, for those attaining age 62 in 2016 and later, and (2) the ability of a family member other than a divorced spouse to receive a benefit based on the earnings of a worker with a voluntarily suspended benefit, for voluntary suspensions requested after April 29, 2016. This provision is expected to increase (improve) the long-range actuarial balance by 0.02 percent of taxable payroll.
- Section 832. Requirement for medical review. This section requires that the medical portion of the case review and any applicable residual functional capacity assessment for an initial disability determination be completed by an appropriate physician, psychiatrist, or psychologist. This provision increased the long-range actuarial balance by 0.01 percent of payroll.
- Section 833. Reallocation of payroll tax rates. 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. This reallocation of the payroll tax rates had no cost effect on the combined OASDI program, but extended projected DI Trust Fund reserve depletion by about 6 years.

Overall, the effects of this law are projected to increase the long-range OASDI actuarial balance by 0.03 percent of taxable payroll.

Changing the 75-year valuation period from 2015 through 2089 to 2016 through 2090 decreased (worsened) the projected long-range OASDI actuarial balance by 0.06 percent of taxable payroll. This decrease is mainly the result of including the relatively large negative annual balance for 2090 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 at the start of the period reflect the program's net financial flows for all past years up to the start of the projection period, including 2015.

With the exception of a small change in marriage rates, ultimate demographic assumptions are unchanged from those in last year's report. All changes in demographic data and assumptions combined to have a negligible net effect on the long-range OASDI actuarial balance. The following paragraph describes four of the demographic assumptions and data changes that, individually, had significant effects on the long-range OASDI actuarial balance.

First, final fertility (birth) data for 2013 and 2014 indicate slightly lower birth rates than were assumed for last year's report for these years. The data

also show an increase in birth rates starting in 2014, one year later than assumed in last year's report. As in last year's report, the estimates reflect: (1) the effect of the recent economic recession on the total fertility rate for recent years and (2) the assumption that the total fertility rate will rebound to a level temporarily above the ultimate level and will subsequently decline to the ultimate level. This year's estimates use a slightly smaller rebound in the path to the ultimate total fertility rate, which is again reached in 2027. These changes in historical and projected birth rates decreased the long-range OASDI actuarial balance by about 0.03 percent of taxable payroll. Second, incorporating mortality data obtained from the National Center for Health Statistics at ages under 65 for 2012 and 2013 and from Medicare experience at ages 65 and older for 2013 resulted in slightly higher death rates than were projected in last year's report. These updated data combined to increase the long-range OASDI actuarial balance by about 0.04 percent of taxable payroll. Third, the assumed ultimate marriage rates were decreased somewhat to reflect a continuation of recent trends. This change increased the actuarial balance by 0.01 percent of taxable payroll. Fourth, including more recent legal and other-than-legal immigration data and updating historical population data combined to decrease the long-range OASDI actuarial balance by 0.02 percent of taxable payroll.

Overall, changes in ultimate and near-term economic data and assumptions decreased the actuarial balance by 0.07 percent of payroll. The following paragraph describes the ultimate economic assumptions that had significant effects on the long-range OASDI actuarial balance.

Three ultimate economic assumptions in this year's report were changed from the values used in last year's report. First, the ultimate rate of price inflation (CPI-W) was lowered by 0.1 percentage point, from 2.7 percent for last year's report to 2.6 percent for this year's report. While very low inflation in recent years is reflective of U.S. and international supply and demand factors that have been affected by the global recession, the average rate of change in the CPI-W over the last two complete business cycles (from 1989 to 2007) is 2.63 percent. This change decreases the OASDI actuarial balance by 0.02 percent of payroll. Second, the ultimate average real wage differential is 1.20 percent per year in this report, increased from the 1.17 percent in last year's report. This change increased the long-range OASDI actuarial balance by 0.05 percent of taxable payroll. The higher real wage differential assumption is based on new projections by the Centers for Medicare and Medicaid Services of slower growth in employer sponsored group health insurance premiums. Because these premiums are not subject to the payroll tax, slower growth in these premiums means that a greater share of employee compensation will be in the form of wages that are subject to the payroll tax. Third, the ultimate real interest rate was lowered by 0.2 percentage point,

from 2.9 percent for last year's report to 2.7 percent for this year's report. Real interest rates have been low since 2000, and particularly low since the start of the recent recession. An ongoing and much-debated question among experts is how much of this change is cyclic or 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 decreased the OASDI actuarial balance by 0.08 percent of payroll.

In addition to the three changes in ultimate economic assumptions, updated starting values and changes in near-term economic assumptions combined to decrease the long-range OASDI actuarial balance slightly. In particular, this report reflects the July 2015 revisions in historical GDP estimated by the Bureau of Economic Analysis of the Department of Commerce and further assumed reductions in the ultimate level of actual and potential GDP of about 0.8 percent. Beyond this revision, a further reduction in the ultimate level of actual and potential GDP of about 1 percent is assumed. Thus, by the end of the short-range period (2025) and for all years thereafter, projected GDP in 2009 dollars is about 1.8 percent below the level in last year's report. These changes to assumed actual and potential GDP decreased the actuarial balance by about 0.03 percent of taxable payroll. Other changes to starting values and near-term economic assumptions combined for a net increase the actuarial balance of 0.02 percent of taxable payroll.

The projections in this report also reflect several methodological improvements and updates of program-specific data. These methodological changes, programmatic data updates, and interactions combined to increase the long-range OASDI actuarial balance by 0.11 percent of taxable payroll. Descriptions of six significant methodological changes and programmatic data updates follow.

First, for this year's report, the transition from recent mortality rates to the ultimate rates starts sooner, immediately after the year of final data. The approach used for the 2015 report extended the trend of the last 10 years through the valuation year for the report and only thereafter started the transition to assumed ultimate rates of decline. The new approach will make the projections less influenced by recent fluctuations in the rate of improvement in mortality, thus diminishing volatility from one report to the next. This methodological improvement increased the long-range OASDI actuarial balance by 0.03 percent of taxable payroll.

Second, several improvements were made to immigration methods. Historical non-immigrant population counts were revised to match recent totals provided by the Department of Homeland Security. In addition, emigration rates for the never-authorized and visa-overstayer populations were recalibrated to

reflect a longer historical period and to be less influenced by the high emigration rates experienced during the recent recession. Finally, the method for projecting emigration of the never-authorized population was altered to reflect lower rates of emigration for those who have resided here longer. These methodological improvements increased the long-range OASDI actuarial balance by 0.09 percent of taxable payroll.

The third significant change was an improvement in the method for disaggregating the other-than-legal population in order to assign them appropriate earnings and quarters of coverage. This change led to a small decrease in the number of covered workers and number of insured workers, and decreased the actuarial balance by 0.01 percent of payroll.

Fourth, enhancements were made to methods for modeling the number of beneficiaries utilizing "claiming strategies" to better reflect their growing popularity and the growth in the underlying population eligible to use the strategies. This year's report also incorporates new historical data, which allowed projection of "deemed filer" aged spouses by sex and marital status. These improved methods for modeling claiming strategies were incorporated prior to estimating the effects of elimination of such strategies per the Bipartisan Budget Act of 2015, described above. These methodological changes decreased the actuarial balance by 0.01 percent of payroll, which was offset by the changes made as a part of the Bipartisan Budget Act of 2015.

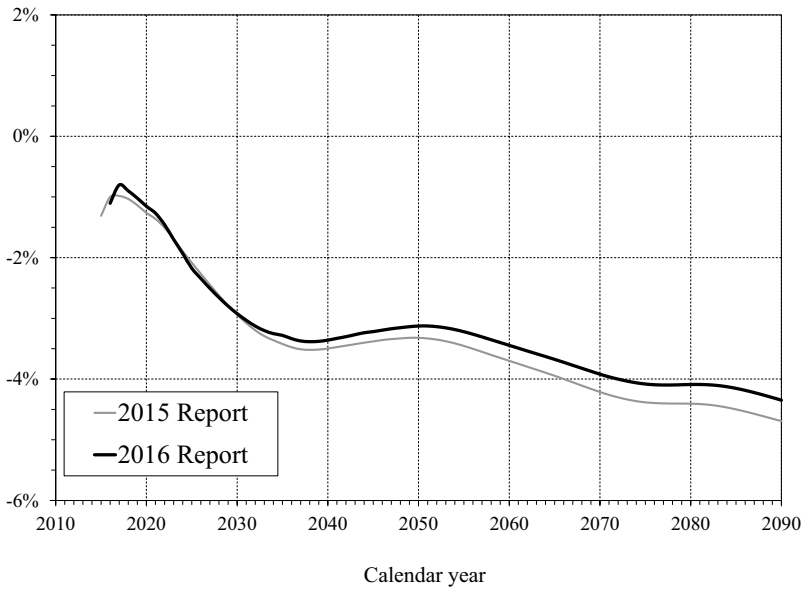
The fifth significant change relates to the long-range model for projecting average benefit levels of retired worker and disabled-worker beneficiaries newly entitled for benefits, which is based on a large sample of 10 percent of all newly entitled retired-worker beneficiaries in a recent year. The sample used in the 2015 report was for worker beneficiaries newly entitled in 2008. This year's report uses the results from worker beneficiaries newly entitled in 2013. In addition, the method used to determine initial entitlements was improved, primarily to take into account the recent increase of "file and suspend" cases, which were not fully included under the previous methodology. Using this more recent sample and the associated method improvement increased the OASDI actuarial balance by 0.02 percent of payroll.

The sixth significant change is a programmatic data update that resulted in an increase in income from taxation of benefits in this year's report. Recent data and estimates provided by the Office of Tax Analysis at the Department of Treasury indicate higher levels of revenue from taxation of OASDI benefits than projected in last year's report. The increase in the near-term and ultimate projected ratios of income from taxation of benefits to benefits resulted in an increase in the long-range OASDI actuarial balance of 0.03 percent of taxable payroll.

In addition to these six significant methodological changes and programmatic data updates, changes in projected OASI and DI beneficiaries and benefit levels over the first 10 years of the projection period, updating other programmatic data, other small methodological improvements, and interactions combined to decrease the long-range OASDI actuarial balance by 0.04 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: 2015 and 2016 Trustees Reports
[As a percentage of taxable payroll, based on intermediate assumptions]



This pattern of differences between the annual balances (income rate minus cost rate) in the two reports is due to the changes described earlier in this section. The annual balances are higher (less negative) each year in this year's report, with the exception of 2016 and 2023 through 2029, and average 0.20 percentage point higher over the 75-year projection period. For 2089, the projected annual deficit is 4.30 percent of taxable payroll in this report, compared to 4.65 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 rate, 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 Trustees selected the assumptions for this report by the end of December 2015.

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 sensitivity analysis, where factors are changed one at a time (see appendix D), and a stochastic projection, which provides a probability distribution of possible future outcomes, with each input assumption centered 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 bounded by two plausible, albeit very unlikely, demographic and economic scenarios.

The Trustees assume that values for each of the demographic, economic, and program-specific factors change toward long-range ultimate values from recent levels or trends 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 required to make the estimates of trust fund financial status, which are the heart 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

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[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 or write to: Office of the Chief Actuary, 700 Altmeyer Building, 6401 Security Boulevard, Baltimore, MD 21235. 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/2016/.

[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 in her lifetime 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.

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 slightly through 2007, reaching 2.12, but dropped to 1.85 by 2013. The recession and high unemployment are likely reasons for this drop.

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. The Trustees expect future total fertility rates to remain close to recent levels. Certain population characteristics, such as the higher percentages of women who have never married, of women who are divorced, and of young women who are in the labor force, are consistent with continued lower total fertility rates than experienced during the baby-boom era (1946-65). Based on consideration of these factors, the Trustees assume ultimate total fertility rates of 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 rises until it reaches 2.05 for 2023. This reflects the assumption that the drop in the total fertility rate below 2.0 children per woman during the recent economic downturn was in part a deferral in childbearing that will be partially offset with full economic recovery. Thereafter, the total fertility rate follows a linear trend toward the ultimate level in 2027. The assumed low-cost and high-cost total fertility rates trend away from the intermediate path and reach the ultimate values in 2024 and 2032, 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 are calculated for years 1900 through 2013 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 and enrollments for years 1968 through 2012 and

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

preliminary data for 2013 are used. Death rates by cause of death are produced for all ages for years 1979-2013 using data from the NCHS.

The total age-sex-adjusted death rate[1] declined at an average annual rate of 1.05 percent between 1900 and 2013. Between 1979 and 2013, 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 0.93 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. 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 2013, the age-sex-adjusted death rate for ages 65 and over declined at an average rate of 0.78 percent per year, while declining at an average rate of 3.08 percent per year for ages under 15.

Many factors are responsible for historical reductions in death rates, including increased medical knowledge, increased availability of health-care services, and improvements in sanitation and nutrition. Considering the expected rate of future progress in these and other areas, the Trustees present three alternative sets of ultimate annual percentage reductions in central death rates by age group and cause of death, for 2040 and later. The intermediate set, alternative II, represents the Trustees' best estimate. The average annual percentage reductions for alternative I (low-cost) are smaller than those for alternative II, while those for alternative III (high-cost) are larger. These ultimate annual percentage reductions are the same as those in last year's report.

The trends in the annual reductions in central death rates are calculated for the period from 2003 to 2013 by age group, sex, and cause of death. 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 2040 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

[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.

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. These changes primarily result from incorporating additional historical data and from beginning the transition to the ultimate rates of improvement immediately after the final historical data year. Prior to this year's report, rates of improvement after the last historical data year and before the first year of the projection period were assumed to be the same as the average annual rates of improvement over the prior 10 years.

The projected average annual rate of decline for the total age-sex-adjusted death rate is about 0.42 percent, 0.78 percent, and 1.16 percent between 2015 and 2090 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, 0.69 percent, and 1.02 percent between 2015 and 2090 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, 1.59 percent, and 2.59 percent between 2015 and 2090 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 highest 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.[1]

The Trustees periodically revise the assumed ultimate rates of decline in mortality based on experience, new conditions, and expert opinion. Evolving trends in health care and lifestyle will determine what modifications to the assumed ultimate rates of decline in mortality will be warranted for future reports. The Trustees intend to carefully consider the mortality assumptions for the 2017 report.

[1] The 2015 Technical Panel on Assumptions and Methods, appointed by the Social Security Advisory Board, recommended retaining ultimate rates of improvement that vary by age and cause of death as assumed by the Trustees, but with an overall rate of improvement on an age-sex-adjusted basis of 1.00 percent.

Table V.A1.—Fertility and Mortality Assumptions,[a] Calendar Years 1940-2090

Calendar year	Total fertility rate[b]	Age-sex-adjusted death rate[c] per 100,000, by age		
		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	1,021.3	333.6	5,606.3
1995	1.98	1,001.5	317.9	5,559.5
1996	1.98	987.8	306.6	5,529.1
1997	1.97	971.9	293.3	5,496.4
1998	2.00	963.8	285.4	5,487.1
1999	2.01	970.6	283.2	5,553.6
2000	2.05	960.7	281.0	5,492.3
2001	2.03	951.1	280.4	5,422.8
2002	2.03	947.0	279.0	5,400.6
2003	2.05	933.4	277.2	5,308.6
2004	2.06	898.9	269.7	5,093.9
2005	2.06	901.3	270.7	5,105.4
2006	2.11	876.1	267.6	4,933.5
2007	2.12	856.8	261.6	4,825.2
2008	2.07	857.0	258.8	4,845.5
2009	2.00	827.1	255.3	4,639.7
2010	1.93	821.3	248.5	4,640.1
2011	1.89	819.3	249.1	4,621.4
2012	1.87	811.9	248.5	4,568.2
2013	1.85	[d] 812.2	249.1	[d] 4,566.1
2014	1.86	[d] 790.4	[d] 242.6	[d] 4,442.9
2015	[e] 1.87	[e] 781.4	[e] 239.8	[e] 4,392.3
Intermediate:				
2020	2.00	742.8	226.5	4,185.1
2025	2.03	709.5	213.8	4,014.5
2030	2.00	679.1	201.8	3,861.1
2035	2.00	650.8	190.6	3,719.3
2040	2.00	624.5	180.2	3,586.9
2045	2.00	599.9	170.5	3,462.8
2050	2.00	576.8	161.4	3,346.3
2055	2.00	555.1	153.0	3,236.6
2060	2.00	534.8	145.1	3,133.2
2065	2.00	515.7	137.7	3,035.7
2070	2.00	497.6	130.8	2,943.6
2075	2.00	480.7	124.3	2,856.5
2080	2.00	464.6	118.2	2,774.0
2085	2.00	449.5	112.5	2,695.7
2090	2.00	435.1	107.2	2,621.5

Table V.A1.—Fertility and Mortality Assumptions,[a] Calendar Years 1940-2090 (Cont.)

Calendar year	Total fertility rate[b]	Age-sex-adjusted death rate[c] per 100,000, by age		
		Total	Under 65	65 and over
Low-cost:				
2020	2.09	777.4	237.2	4,378.5
2025	2.20	760.5	230.7	4,292.9
2030	2.20	743.8	224.1	4,208.6
2035	2.20	727.5	217.7	4,126.4
2040	2.20	711.7	211.5	4,046.8
2045	2.20	696.4	205.5	3,969.7
2050	2.20	681.7	199.7	3,895.1
2055	2.20	667.4	194.1	3,823.0
2060	2.20	653.6	188.7	3,753.1
2065	2.20	640.2	183.5	3,685.5
2070	2.20	627.3	178.5	3,620.0
2075	2.20	614.8	173.6	3,556.6
2080	2.20	602.7	168.9	3,495.1
2085	2.20	591.0	164.4	3,435.5
2090	2.20	579.7	160.0	3,377.7
High-cost:				
2020	1.91	706.0	214.6	3,982.4
2025	1.89	655.1	195.1	3,722.7
2030	1.82	610.9	177.6	3,500.4
2035	1.80	571.7	162.0	3,303.3
2040	1.80	536.5	148.0	3,126.2
2045	1.80	504.7	135.6	2,965.8
2050	1.80	476.0	124.5	2,820.0
2055	1.80	450.0	114.5	2,686.7
2060	1.80	426.3	105.5	2,564.6
2065	1.80	404.6	97.4	2,452.4
2070	1.80	384.7	90.1	2,348.8
2075	1.80	366.4	83.5	2,252.9
2080	1.80	349.6	77.5	2,163.9
2085	1.80	334.0	72.0	2,081.1
2090	1.80	319.6	67.0	2,003.7

[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 in her lifetime 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 legal immigration, legal emigration, "other immigration," and "other emigration." Legal immigration consists of persons who are granted legal permanent resident status. Legal emigration consists of legal permanent residents and citizens who leave the Social Security area population. Net legal immigration is the difference between legal immigration and legal emigration. "Other immigration" consists of immigrants who enter the Social

Security area in a given year and stay to the end of that year without having legal permanent resident status, such as undocumented immigrants and temporary foreign workers and students. "Other emigration" consists of other immigrants who leave the Social Security area population or who adjust their status to become legal permanent residents. Net other immigration is the difference between other immigration and other emigration. Net immigration refers to the sum of net legal immigration and net other 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.

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

The assumed ratios of annual legal emigration to legal 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 legal immigration and emigration assumptions, ultimate annual net legal immigration is 795,000 persons. For the low-cost and high-cost scenarios, ultimate annual net legal immigration is about 1,008,000 persons and 602,000 persons, respectively.

The estimated number of other immigrants residing in the Social Security area and the annual level of other immigration have been affected significantly by the recent recession. Net immigration was greatly reduced during the economic downturn. Under the intermediate assumptions, annual other immigration is expected to increase from recent levels, reflecting a continued recovery from levels experienced during the recession.

Emigration from the other-immigrant population includes those who leave the Social Security area and those who adjust their status to become legal permanent residents. This other-immigrant population is highly mobile and far more likely to leave the Social Security area than is the citizen or legal permanent resident population. This year's report reflects lower assumed departure rates for the unauthorized portion of the other immigrant population. As individuals from this population reside in the country for extended periods of time, they generally become less likely to leave the country.

Under the intermediate assumptions, the total annual number of other emigrants who leave the Social Security area averages about 415,000 through the 75-year projection period. In addition, the ultimate annual number of other immigrants who adjust status to become legal permanent residents is assumed to be 450,000 for the intermediate assumptions. This is one-third of the assumed ultimate annual number of other immigrants entering the Social Security area. For the low-cost and high-cost scenarios, the total annual number of other emigrants averages about 488,000 and 325,000, respectively, through the 75-year projection period. The ultimate annual number of people adjusting status to legal permanent resident status is assumed to be 550,000 persons and 350,000 persons, for the low-cost and high-cost scenarios, respectively. While the ultimate annual number of people adjusting status to become legal permanent residents is unchanged from last year's report, the annual number of other emigrants who leave the Social Security area is about 110,000 to 163,000 lower than in last year's report for each alternative. This lower level of other emigration reflects revisions in the assumed departure rates of the unauthorized portion of the other immigrant population.

Under the assumptions and methods described above, the projected size of the other-immigrant population grows substantially. This growth reflects the excess of annual other immigration over the combined annual numbers of emigrants and deaths that occur within the other-immigrant population.

Under the intermediate assumptions, projected net other immigration reaches a peak in 2018, reflecting the recovering economy, then sharply decreases over the next few years, primarily due to the decline in the number of other immigrants entering the country, to a stable long-term level. This is followed by a gradual decrease in net other immigration after 2022, due to the increasing number of other immigrants residing in the Social Security area. Because the number of other immigrants leaving the Social Security area is based on rates of departure, an increase in the number of other 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 immigration and emigration are assumed to be stable after 2022, and thus do not contribute toward any change in net other immigration. Under the intermediate assumptions, the projected average annual level of net other immigration over the 75-year projection period is about 496,000 persons. For the low-cost and high-cost assumptions, projected average annual net other immigration is about 621,000 persons and 359,000 persons, respectively.

The projected average total level of net immigration (legal and other, combined) is about 1,291,000 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 1,629,000 persons and 961,000 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 could reduce immigration. The average of the 2015 Technical Panel's recommended annual levels of total net immigration is very close to the average projected in this year's report.

Table V.A2.—Immigration Assumptions,[a] Calendar Years 1940-2090
[in thousands]

Calendar year	Legal immigration				Other-than-legal immigration[b]				Total net immigration
	Legal in	Legal out	Adjustments of status[c d]	Net legal	Other in	Other out	Adjustments of status[c d]	Net other	
Historical data:									
1940	-	-	-	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	208	614
1985	458	144	119	432	-	-	119	264	696
1990	548	166	114	497	-	-	114	620	1,116
1995	511	192	255	575	-	-	255	557	1,132
1996	535	221	349	663	-	-	349	473	1,137
1997	468	190	294	571	-	-	294	545	1,117
1998	418	163	233	488	-	-	233	605	1,093
1999	451	174	243	521	1,307	438	243	625	1,146
2000	482	224	413	672	1,408	338	413	657	1,329
2001	517	265	542	794	1,322	122	542	658	1,453
2002	483	243	487	728	1,259	112	487	660	1,388
2003	414	192	354	575	1,139	123	354	662	1,237
2004	466	250	533	749	1,304	108	533	662	1,411
2005	561	290	597	869	1,791	52	597	1,141	2,010
2006	639	303	573	910	1,450	76	573	801	1,710
2007	584	267	482	800	883	328	482	72	872
2008	635	278	478	835	672	948	478	-754	81
2009	633	277	475	832	752	170	475	106	938
2010	622	262	426	786	678	199	426	53	838
2011	647	264	408	791	606	263	408	-66	725
2012	621	255	401	766	776	131	401	244	1,011
2013	589	249	409	748	939	184	409	346	1,094
2014[e]	616	254	401	762	1,200	245	401	554	1,316
2015[f]	610	265	450	795	1,400	188	450	762	1,557
Intermediate:									
2020	610	265	450	795	1,450	287	450	713	1,508
2025	610	265	450	795	1,350	333	450	567	1,362
2030	610	265	450	795	1,350	363	450	537	1,332
2035	610	265	450	795	1,350	390	450	510	1,305
2040	610	265	450	795	1,350	411	450	489	1,284
2045	610	265	450	795	1,350	426	450	474	1,269
2050	610	265	450	795	1,350	436	450	464	1,259
2055	610	265	450	795	1,350	445	450	455	1,250
2060	610	265	450	795	1,350	451	450	449	1,244
2065	610	265	450	795	1,350	456	450	444	1,239
2070	610	265	450	795	1,350	460	450	440	1,235
2075	610	265	450	795	1,350	463	450	437	1,232
2080	610	265	450	795	1,350	465	450	435	1,230
2085	610	265	450	795	1,350	466	450	434	1,229
2090	610	265	450	795	1,350	467	450	433	1,228

Table V.A2.—Immigration Assumptions,[a] Calendar Years 1940-2090 (Cont.)
[in thousands]

Calendar year	Legal immigration				Other-than-legal immigration[b]				Total net immigration
	Legal in	Legal out	Adjustments of status[c d]	Net legal	Other in	Other out	Adjustments of status[c d]	Net other	
Low-cost:									
2020	710	252	550	1,008	1,750	304	550	896	1,904
2025	710	252	550	1,008	1,650	366	550	734	1,742
2030	710	252	550	1,008	1,650	409	550	691	1,699
2035	710	252	550	1,008	1,650	448	550	652	1,660
2040	710	252	550	1,008	1,650	480	550	620	1,628
2045	710	252	550	1,008	1,650	502	550	598	1,606
2050	710	252	550	1,008	1,650	519	550	581	1,589
2055	710	252	550	1,008	1,650	532	550	568	1,576
2060	710	252	550	1,008	1,650	543	550	557	1,565
2065	710	252	550	1,008	1,650	550	550	550	1,558
2070	710	252	550	1,008	1,650	556	550	544	1,552
2075	710	252	550	1,008	1,650	560	550	540	1,548
2080	710	252	550	1,008	1,650	562	550	538	1,546
2085	710	252	550	1,008	1,650	564	550	536	1,544
2090	710	252	550	1,008	1,650	565	550	535	1,543
High-cost:									
2020	510	258	350	602	850	231	350	269	871
2025	510	258	350	602	1,050	259	350	441	1,043
2030	510	258	350	602	1,050	282	350	418	1,020
2035	510	258	350	602	1,050	302	350	398	1,000
2040	510	258	350	602	1,050	318	350	382	984
2045	510	258	350	602	1,050	330	350	370	972
2050	510	258	350	602	1,050	339	350	361	963
2055	510	258	350	602	1,050	345	350	355	957
2060	510	258	350	602	1,050	351	350	349	951
2065	510	258	350	602	1,050	356	350	344	946
2070	510	258	350	602	1,050	359	350	341	943
2075	510	258	350	602	1,050	362	350	338	940
2080	510	258	350	602	1,050	364	350	336	938
2085	510	258	350	602	1,050	365	350	335	937
2090	510	258	350	602	1,050	366	350	334	936

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

[b] Historical other immigration and emigration estimates depend on a residual method, using Department of Homeland Security January 1 stock estimates for 2005 through 2012.

[c] Estimates do not include persons who attained legal permanent resident 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 legal immigration and a negative for net other 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, 2013, 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 2014 through 2090 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 1945-2090

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	81,019	112,995	20,898	214,912	.185	.902
1975	78,623	122,663	23,316	224,602	.190	.831
1980	74,844	134,100	26,307	235,251	.196	.754
1985	72,997	144,545	29,144	246,686	.202	.707
1990	74,800	152,764	31,924	259,489	.209	.699
1995	79,285	160,718	34,316	274,318	.214	.707
2000	82,006	170,160	35,505	287,671	.209	.691
2005	84,014	180,875	37,163	302,052	.205	.670
2010	85,699	188,331	41,050	315,080	.218	.673
2015[c]	85,146	193,941	47,841	326,928	.247	.686
Intermediate:						
2020	87,420	198,796	56,165	342,381	.283	.722
2025	90,466	201,895	65,471	357,831	.324	.772
2030	92,811	205,362	73,686	371,859	.359	.811
2035	96,512	209,092	78,803	384,407	.377	.838
2040	98,987	214,843	81,678	395,509	.380	.841
2045	100,113	221,772	83,745	405,630	.378	.829
2050	101,761	227,380	86,376	415,517	.380	.827
2055	104,060	232,085	89,709	425,854	.387	.835
2060	106,735	236,185	93,823	436,743	.397	.849
2065	109,355	240,929	97,653	447,938	.405	.859
2070	111,631	245,765	101,733	459,129	.414	.868
2075	113,540	250,737	105,899	470,176	.422	.875
2080	115,432	257,432	108,244	481,108	.420	.869
2085	117,605	263,085	111,404	492,095	.423	.870
2090	120,005	267,398	115,804	503,208	.433	.882
Low-cost:						
2020	88,667	199,947	55,919	344,534	.280	.723
2025	93,942	204,348	64,816	363,106	.317	.777
2030	99,315	209,133	72,464	380,911	.346	.821
2035	106,148	214,176	76,902	397,226	.359	.855
2040	111,278	221,815	79,068	412,161	.356	.858
2045	114,401	231,604	80,496	426,502	.348	.842
2050	117,880	240,838	82,638	441,356	.343	.833
2055	122,679	249,205	85,653	457,538	.344	.836
2060	128,391	257,024	89,562	474,977	.348	.848
2065	134,132	265,779	93,208	493,119	.351	.855
2070	139,256	275,263	97,031	511,550	.353	.858
2075	143,747	285,674	100,849	530,270	.353	.856
2080	148,245	298,408	102,869	549,523	.345	.842
2085	153,333	309,988	106,232	569,554	.343	.837
2090	158,959	319,693	111,699	590,351	.349	.847

Table V.A3.—Social Security Area Population on July 1 and Dependency Ratios, Calendar Years 1945-2090 (Cont.)

Calendar year	Population (in thousands)				Dependency ratio	
	Under 20	20-64	65 and over	Total	Aged[a]	Total[b]
High-cost:						
2020	85,533	196,457	56,404	338,393	0.287	0.722
2025	86,427	198,104	66,151	350,682	.334	.770
2030	86,390	200,376	74,993	361,760	.374	.805
2035	87,190	202,934	80,865	370,988	.398	.828
2040	87,293	206,890	84,529	378,713	.409	.830
2045	86,731	211,116	87,297	385,144	.414	.824
2050	86,536	213,757	90,444	390,737	.423	.828
2055	86,922	215,078	94,053	396,054	.437	.841
2060	87,314	215,747	98,263	401,323	.455	.860
2065	87,566	216,819	102,143	406,527	.471	.875
2070	87,645	217,476	106,352	411,473	.489	.892
2075	87,597	217,638	110,760	415,994	.509	.911
2080	87,596	219,055	113,343	419,994	.517	.917
2085	87,765	219,694	116,105	423,564	.528	.928
2090	88,025	219,606	119,175	426,805	.543	.944

[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, 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) for two separate purposes.

- Period life expectancy for a given year uses 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 use 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 changes in 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 lower ages than at higher ages. Therefore, changes in death rates at lower 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]

Calendar year	Historical data			
	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	15.1	19.1
1995	72.5	79.1	15.4	19.1
2000	74.0	79.4	15.9	19.0
2001	74.1	79.5	16.1	19.1
2002	74.2	79.5	16.2	19.1
2003	74.4	79.6	16.3	19.2
2004	74.8	80.0	16.7	19.5
2005	74.8	80.0	16.7	19.5
2006	75.1	80.2	17.0	19.7
2007	75.4	80.5	17.2	19.9
2008	75.5	80.5	17.2	19.9
2009	75.9	80.8	17.5	20.2
2010	76.1	80.9	17.6	20.2
2011	76.2	81.0	17.7	20.2
2012	76.3	81.0	17.8	20.3
2013[b] . . .	76.3	81.1	17.8	20.3
2014[b] . . .	76.6	81.2	18.0	20.5
2015[c] . . .	76.8	81.5	18.1	20.6

Calendar year	Intermediate				Low-cost				High-cost			
	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	77.5	82.0	18.6	21.0	77.0	81.5	18.2	20.6	78.2	82.5	19.0	21.3
2025	78.2	82.5	19.0	21.3	77.3	81.8	18.4	20.8	79.2	83.3	19.6	21.9
2030	78.8	83.0	19.3	21.6	77.6	82.0	18.6	20.9	80.1	84.1	20.1	22.3
2035	79.3	83.4	19.6	21.9	77.9	82.3	18.8	21.1	80.9	84.8	20.6	22.8
2040	79.8	83.9	19.9	22.2	78.2	82.5	18.9	21.3	81.7	85.4	21.1	23.2
2045	80.4	84.3	20.2	22.4	78.5	82.8	19.1	21.4	82.5	86.0	21.5	23.6
2050	80.9	84.7	20.5	22.7	78.7	83.0	19.2	21.5	83.2	86.6	22.0	24.0
2055	81.3	85.1	20.8	23.0	79.0	83.2	19.4	21.7	83.8	87.2	22.4	24.4
2060	81.8	85.5	21.1	23.2	79.3	83.4	19.6	21.8	84.4	87.7	22.8	24.7
2065	82.2	85.8	21.3	23.4	79.6	83.7	19.7	22.0	85.0	88.2	23.1	25.1
2070	82.7	86.2	21.6	23.7	79.8	83.9	19.9	22.1	85.6	88.6	23.5	25.4
2075	83.1	86.5	21.9	23.9	80.1	84.1	20.0	22.2	86.1	89.1	23.8	25.7
2080	83.5	86.9	22.1	24.1	80.3	84.3	20.2	22.4	86.6	89.5	24.2	26.0
2085	83.8	87.2	22.3	24.3	80.6	84.5	20.3	22.5	87.1	89.9	24.5	26.3
2090	84.2	87.5	22.6	24.6	80.8	84.7	20.5	22.6	87.6	90.3	24.8	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	70.5	76.7	12.7	14.7	70.3	76.4	12.7	14.7	70.7	77.0	12.7	14.7
1945	72.3	78.4	13.0	15.4	72.0	78.0	13.0	15.4	72.7	78.8	13.0	15.4
1950	73.5	79.7	13.1	16.2	73.0	79.2	13.1	16.2	74.1	80.3	13.1	16.2
1955	74.2	80.3	13.1	16.7	73.5	79.6	13.1	16.7	75.0	81.1	13.1	16.7
1960	74.9	80.7	13.2	17.4	74.1	79.9	13.2	17.4	75.9	81.8	13.2	17.4
1965	75.9	81.3	13.5	18.0	74.8	80.3	13.5	18.0	77.1	82.6	13.5	18.0
1970	77.1	82.2	13.8	18.5	75.8	81.0	13.8	18.5	78.6	83.6	13.8	18.5
1975	78.1	82.9	14.2	18.7	76.6	81.5	14.2	18.7	79.8	84.6	14.2	18.7
1980	78.9	83.6	14.7	18.8	77.2	82.0	14.7	18.8	80.9	85.4	14.7	18.8
1985	79.7	84.2	15.4	19.1	77.7	82.4	15.4	19.1	81.9	86.2	15.4	19.1
1990	80.4	84.7	16.1	19.4	78.2	82.8	16.1	19.4	82.8	86.9	16.1	19.5
1995	81.1	85.3	16.8	19.8	78.8	83.2	16.7	19.7	83.7	87.6	16.8	19.9
2000	81.7	85.7	17.6	20.3	79.1	83.5	17.4	20.1	84.5	88.2	17.7	20.5
2001	81.8	85.8	17.7	20.4	79.2	83.5	17.5	20.2	84.6	88.3	17.9	20.6
2002	81.8	85.8	17.8	20.5	79.2	83.6	17.6	20.2	84.7	88.4	18.1	20.8
2003	81.9	85.9	18.0	20.6	79.3	83.6	17.7	20.3	84.8	88.5	18.2	20.9
2004	82.0	86.0	18.1	20.7	79.4	83.7	17.8	20.4	85.0	88.6	18.4	21.0
2005	82.1	86.1	18.2	20.8	79.4	83.7	17.9	20.5	85.1	88.7	18.5	21.1
2006	82.2	86.1	18.3	20.9	79.5	83.8	18.0	20.5	85.2	88.8	18.7	21.3
2007	82.3	86.2	18.4	20.9	79.5	83.8	18.1	20.6	85.3	88.9	18.8	21.4
2008	82.4	86.3	18.5	21.0	79.6	83.9	18.1	20.6	85.5	89.0	18.9	21.5
2009	82.5	86.4	18.6	21.1	79.7	83.9	18.2	20.7	85.6	89.1	19.1	21.6
2010	82.6	86.5	18.7	21.2	79.7	84.0	18.2	20.7	85.8	89.2	19.2	21.7
2011	82.7	86.5	18.8	21.3	79.8	84.0	18.3	20.8	85.9	89.3	19.3	21.8
2012	82.8	86.6	18.8	21.3	79.8	84.1	18.3	20.8	86.0	89.4	19.5	22.0
2013	82.9	86.7	18.9	21.4	79.9	84.1	18.4	20.8	86.1	89.5	19.6	22.1
2014	83.0	86.8	19.0	21.5	80.0	84.1	18.4	20.9	86.2	89.6	19.7	22.2
2015	83.1	86.8	19.1	21.5	80.0	84.2	18.5	20.9	86.4	89.7	19.9	22.3
2020	83.5	87.2	19.5	21.9	80.3	84.4	18.6	21.1	87.0	90.2	20.4	22.8
2025	83.9	87.5	19.8	22.1	80.5	84.6	18.8	21.2	87.5	90.6	21.0	23.3
2030	84.3	87.9	20.1	22.4	80.8	84.8	19.0	21.4	88.1	91.1	21.4	23.7
2035	84.7	88.2	20.4	22.7	81.0	85.0	19.2	21.5	88.6	91.5	21.9	24.1
2040	85.1	88.5	20.7	23.0	81.3	85.2	19.3	21.7	89.1	91.9	22.4	24.5
2045	85.5	88.8	21.0	23.2	81.5	85.4	19.5	21.8	89.5	92.2	22.8	24.9
2050	85.8	89.1	21.3	23.5	81.8	85.6	19.6	22.0	90.0	92.6	23.2	25.2
2055	86.2	89.4	21.6	23.7	82.0	85.8	19.8	22.1	90.4	93.0	23.6	25.6
2060	86.5	89.6	21.8	24.0	82.2	86.0	20.0	22.2	90.8	93.3	23.9	25.9
2065	86.8	89.9	22.1	24.2	82.4	86.2	20.1	22.4	91.2	93.6	24.3	26.3
2070	87.1	90.2	22.3	24.4	82.7	86.4	20.3	22.5	91.5	93.9	24.6	26.6
2075	87.4	90.4	22.6	24.7	82.9	86.5	20.4	22.6	91.9	94.2	25.0	26.9
2080	87.7	90.6	22.8	24.9	83.1	86.7	20.6	22.8	92.3	94.5	25.3	27.2
2085	88.0	90.9	23.1	25.1	83.3	86.9	20.7	22.9	92.6	94.8	25.6	27.5
2090	88.3	91.1	23.3	25.3	83.5	87.0	20.8	23.0	92.9	95.1	25.9	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 2013. For birth years after 2013, 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 2012 depends on actual death rates or on a combination of actual, estimated, and projected death rates. After 2012, 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 and their best estimate for various other economic parameters. The low-cost assumptions represent a more optimistic outlook: a faster recovery, stronger long-term economic growth, and relatively optimistic levels for other parameters. The high-cost assumptions represent a more pessimistic scenario: a slower recovery, interrupted by a brief recession, weaker long-term economic growth, and relatively pessimistic levels for other parameters.

Actual economic data were available through the third quarter of 2015 at the time the Trustees set the assumptions for this report. The data indicated that economic activity peaked in the fourth quarter of 2007[1] with the level of gross domestic product (GDP) about 1 percent above the estimated long-term sustainable trend level. A severe recession followed, with a low point in the economic cycle reached in the second quarter of 2009 with 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 strong as in most past recoveries. The Trustees project that the economy will return to its sustainable trend level of output within the first 10 years of the projection period and remain on that trend thereafter. However, the speed of the return varies by alternative. The economy is projected to return to its sustainable trend level of output by 2022 for the intermediate assumptions, and 2020 for the low-cost assumptions, the same as in last year's report. The economy is projected to return to its sustainable trend level of output by 2025 for the high-cost assumption, about 1 year later than in last year's report. 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 (2016 through 2025).

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

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 in the growth of average earnings. Over the last five complete economic cycles (1966-73, 1973-79, 1979-89, 1989-2000, and 2000-07, measured peak to peak), the annual increases in total productivity averaged 2.27, 1.10, 1.38, 1.78 and 2.15 percent, respectively. For the 41-year period from 1966 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 1.98, 1.68, and 1.38 percent for the low-cost, intermediate, and high-cost assumptions, respectively.[2] These rates of increase are unchanged from the 2015 report.

The average annual rate of change in total economy productivity from 2007 (the end of the last complete economic cycle) to 2015 is estimated to be 0.98 percent. For the intermediate assumptions, the annual change in productivity is assumed to be 1.68 percent for 2016, then increase to 2.03 percent for 2017, gradually decline to 1.67 percent for 2022 and 2023, and then rise to its ultimate value of 1.68 percent for 2024 and later. For the low-cost assumptions, the assumed annual change in productivity is 1.95 percent for 2016, then increases to 2.26 percent for 2017, averages 2.06 percent for 2018 through 2021, and reaches its ultimate value of 1.98 percent for 2022. For the high-cost assumptions, the assumed annual change in productivity is 0.91 percent for 2016, 1.36 percent for 2017, then averages 1.70 percent for 2018 through 2021, 1.46 percent for 2022 through 2025, and reaches its ultimate value of 1.38 percent after 2025.

2. Price Inflation Assumptions

Future changes in the Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI) will directly affect the OASDI program through the automatic cost-of-living benefit increases. Future changes in the GDP price

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[1] Historical levels of real GDP are from the Bureau of Economic Analysis' National Income and Product Accounts. Historical total hours worked are provided by the Bureau of Labor Statistics 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 2.42, 2.06, and 1.69 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.

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 4.61, 8.54, 5.31, 2.96, and 2.65 percent over the economic cycles 1966-73, 1973-79, 1979-89, 1989-2000, and 2000-07, respectively. The annual increases in the GDP deflator averaged 4.60, 7.52, 4.68, 2.20, and 2.50 percent for the same respective economic cycles. For the 41 years from 1966 to 2007, covering the last five complete economic cycles, the annual increases in the CPI and GDP deflator averaged 4.56 and 4.03 percent, respectively. The estimated average annual change from 2007 (the end of the last complete economic cycle) to 2015 is 1.68 percent for the CPI and 1.52 percent for the GDP deflator.

The assumed ultimate annual increases in the CPI are 3.2, 2.6, and 2.0 percent for the low-cost, intermediate, and high-cost assumptions, respectively. When compared to the 2015 report, the low-cost assumption is 0.2 percentage point lower and the intermediate assumption is 0.1 percentage point lower. The high-cost assumption is unchanged from the 2015 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 GDP deflator,[1] the Trustees lowered the assumed ultimate annual rate of increase in the CPI for the intermediate case from 4.0 percent for the 1996 report to 2.8 percent for the 2004 through 2013 reports, to 2.7 percent for the 2014 and 2015 reports, and to 2.6 percent for this report.

For the intermediate assumptions, the assumed annual change in the CPI is 0.86 percent for 2016, 2.76 percent for 2017, 2.65 percent for 2018, and reaches the ultimate growth rate of 2.60 percent for 2019 and later. For the low-cost assumptions, the assumed annual change in the CPI is 1.23 percent for 2016, increases to 3.63 percent for 2017, declines to 3.28 percent in 2018, and drops to its ultimate annual growth rate of 3.20 percent for 2019 and later. For the high-cost assumptions, the assumed annual rate of change in the CPI is 0.02 percent for 2016, increases to 2.44 percent for 2017, declines to

[1] The Federal Open Market Committee (FOMC) targets a rate of 2 percent for the price index for Personal Consumption Expenditures, which is similar to the GDP deflator. See www.federalreserve.gov/newsevents/press/monetary/20150128a.htm.

2.13 percent in 2018, and drops to the ultimate annual change of 2.00 percent for 2019 and later. The projections for the first two years are influenced by changes in the price of oil.

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 41-year period including 1967 through 2007, covering the last five complete economic cycles, the average annual price differential was 0.54 percentage point. From 2007 (the end of the last complete economic cycle) to 2015, the average annual price differential is estimated to be 0.18 percentage point.

The assumed ultimate price differential is 0.3, 0.4, and 0.5 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 increase in the GDP deflator is 2.9 (3.2 less 0.3), 2.2 (2.6 less 0.4), and 1.5 (2.0 less 0.5) percent for the low-cost, intermediate, and high-cost alternatives, respectively. The ultimate price differentials for the three alternatives are unchanged from the 2015 report.

The price differential was 0.26 percentage point for 2012, -0.26 percentage point for 2013, -0.14 percentage point for 2014, and is estimated to be -1.44 for 2015 and assumed to be -0.26 for 2016. The negative price differential since 2013 primarily reflects a general decline in oil prices in recent years. 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 2017 and later, oil prices are assumed to grow at a relatively stable rate. For the intermediate assumptions, the assumed price differential is 0.51 percentage point for 2017 and 0.40 percentage point for 2018 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 cov-

erage, and in certain circumstances, the automatic cost-of-living benefit increases.

Projected growth rates in average covered earnings and average wages 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. wage and salary disbursements 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 compensation (which includes fringe benefits), the ratio of total compensation to GDP, and the GDP deflator.

The average annual change in average hours worked was -0.27 percent over the last five complete economic cycles covering the period from 1966 to 2007. The annual change in average hours worked averaged -0.71, -0.56, 0.00, 0.16, and -0.63 percent over the economic cycles 1966-73, 1973-79, 1979-89, 1989-2000, and 2000-07, respectively. From 2007 (the end of the last complete economic cycle) to 2015, the average annual change in average hours worked is estimated to be 0.00 percent.

The ultimate annual rates of change for average hours worked are assumed to be 0.05, -0.05, and -0.15 percent for the low-cost, intermediate, and high-cost assumptions, respectively. These ultimate annual rates of change for average hours worked are unchanged from the 2015 report.

The average annual change in the ratio of earnings to total compensation was -0.20 percent from 1966 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 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 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 the Bureau of Economic Analysis (BEA) indicate that the other significant component of non-wage employee compensation is employer contributions to retirement plans. The other component is assumed to grow faster than employee compensation in the future as life expectancy and potential time in retirement increase.

The average annual rate of change in the ratio of wages to employee compensation from 2030 to 2090 is assumed to be about 0.03, -0.07, and -0.17 percent for the low-cost, intermediate, and high-cost assumptions, respectively. These assumed rates are 0.02 percentage point higher (less negative) than those assumed in the 2015 report. The change is due to updated estimates from the Centers for Medicare and Medicaid Services that produce slower growth in the total amount of employer-sponsored health insurance premiums. Under the intermediate assumptions, the ratio of wages to employee compensation is assumed to decline from 0.810 for 2015 to 0.775 for 2090. The assumed ultimate annual rate of this decline, now 0.07 percent, compares with 0.09 percent assumed for the 2015 report, 0.13 percent assumed for the 2014 report, and 0.20 percent assumed for the 2009 report, prior to enactment of the Affordable Care Act of 2010. The ratio of earnings to compensation includes self-employment income both in the numerator and in the denominator. As a result, the rate of decline in earnings to compensation (which, under the intermediate assumptions, averages 0.06 percent from 2030 to 2090) is less than the rate of decline in wages to employee compensation.

The ratio of total 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 1966 to 2007, this ratio has averaged 0.627. The ratio declined from 0.648 for 2001 to 0.601 in 2010, and is 0.611 in 2014. This ratio is assumed to rise as the economy recovers, reaching a level of 0.633 for 2025. For years after 2025, relative sizes of different sectors of the economy are assumed to remain constant, and therefore the ratio of total compensation to GDP remains at the 2025 level for each alternative.

The projected average annual growth rate in average nominal U.S. earnings from 2030 to 2090 is about 3.81 percent for the intermediate alternative. This growth rate reflects the average annual growth rate of approximately -0.06 percent for the ratio of earnings to total compensation, and also reflects the assumed ultimate annual growth rates of 1.68, -0.05, and 2.20 percent for productivity, average hours worked, and the GDP deflator, respectively. Similarly, the projected average annual growth rate in average nominal U.S. earnings is 5.02 percent for the low-cost assumptions and 2.60 percent for the high-cost assumptions.

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 assumed average annual growth rates in the average covered

wage from 2030 to 2090 are 5.02, 3.80, and 2.50 percent for the low-cost, intermediate, and high-cost assumptions, respectively. The estimated annual rate of change in the average covered wage is 2.74 percent for 2015. For the intermediate assumptions, as the economy recovers, the annual rate of change in the average covered wage is projected to average 4.16 percent from 2015 to 2025. Thereafter, the assumed average annual rate of change in the average covered wage is 3.80 percent.

4. Assumed Real-Wage Differential

For these reports, 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 41-year period from 1966 to 2007, covering the last five complete economic cycles, the real-wage differential averaged 0.89 percentage point, the result of averages of 1.48, -0.01, 0.47, 1.55, and 0.61 percentage points over the economic cycles 1966-73, 1973-79, 1979-89, 1989-2000, and 2000-07, respectively.

For the years 2030-90, the assumed annual real-wage differentials for OASDI covered employment average 1.82, 1.20, and 0.58 percentage points for the low-cost, intermediate, and high-cost assumptions, respectively. The real-wage differential is higher than the assumed values from last year's report by about 0.03 percentage point for each alternative.

The estimated real-wage differential averaged 0.45 percentage point for 2008 through 2015 (the years since the last complete economic cycle ending in a peak). For the intermediate assumptions, the real-wage differential increased from 1.94 percentage points in 2014 to 3.17 percentage points in 2015, an improvement that reflects both the economic recovery and low inflation. The wage differential is projected to rise from 2.08 in 2016 to 2.17 in 2018, and then gradually decline to an average of 1.20 percentage points for 2030 through 2090. For the low-cost assumptions, the real-wage differential is 2.41 percentage points for 2016, increases to 2.83 percentage points in 2018, declines to 1.95 percentage points in 2021, and reaches its long-run average of 1.82 percentage points for 2030 through 2090. For the high-cost assumptions, the real-wage differential is 1.22 percentage points for 2016, drops to 0.10 percentage point in 2017, and rises to 1.73 percentage points in 2018 before gradually declining to its long-run average of 0.58 percentage point for 2030 through 2090.

Table V.B1.—Principal Economic Assumptions

Calendar year	Annual percentage change[a] in— Productivity (Total U.S. economy)	Earnings as a percent of compensation	Average hours worked	GDP price index	Average annual wage in covered employment	Consumer Price Index	Real-wage differential[b]
Historical data:							
5-year periods:							
1960 to 1965 . . .	3.27	-0.18	0.16	1.36	3.22	1.24	1.98
1965 to 1970 . . .	2.06	-.31	-.68	4.03	5.84	4.23	1.61
1970 to 1975 . . .	2.07	-.50	-.87	6.60	6.58	6.76	-.22
1975 to 1980 . . .	.95	-.32	-.17	7.19	8.89	8.91	-.04
1980 to 1985 . . .	1.74	-.33	.02	5.21	6.53	5.22	1.30
1985 to 1990 . . .	1.37	-.19	-.07	3.11	4.77	3.83	.94
1990 to 1995 . . .	1.25	-.11	.41	2.44	3.54	3.03	.51
1995 to 2000 . . .	2.31	.28	.15	1.67	5.32	2.43	2.89
2000 to 2005 . . .	2.63	-.41	-.80	2.35	2.70	2.49	.22
2005 to 2010 . . .	1.61	-.08	-.46	1.93	2.50	2.30	.22
Economic cycles:[c]							
1966 to 1973 . . .	2.27	-.29	-.71	4.60	6.09	4.61	1.48
1973 to 1979 . . .	1.10	-.43	-.56	7.52	8.53	8.54	-.01
1979 to 1989 . . .	1.38	-.28	[d]	4.68	5.82	5.31	.47
1989 to 2000 . . .	1.78	.05	.16	2.20	4.50	2.96	1.55
2000 to 2007 . . .	2.15	-.23	-.63	2.50	3.25	2.65	.61
2007 to 2015 . . .	.98	.05	[d]	1.52	2.14	1.68	.45
Single years:							
2005	1.83	-.22	-.23	3.22	3.71	3.52	.19
2006	.84	.49	-.03	3.07	4.74	3.19	1.54
2007	1.04	-.05	-.38	2.67	4.49	2.88	1.62
2008	.75	-.06	-.60	1.93	2.41	4.09	-1.68
2009	2.87	-.66	-1.85	.79	-1.59	-.67	-.91
2010	2.55	-.10	.56	1.23	2.58	2.07	.51
2011	.07	.28	.97	2.06	3.12	3.56	-.43
2012	.47	.40	-.05	1.84	3.35	2.10	1.25
2013	.21	.01	.29	1.63	1.13	1.37	-.24
2014	.49	.39	.31	1.64	3.44	1.50	1.94
2015[e]	.44	.11	.37	1.01	2.74	-.43	3.17
Intermediate:							
2016	1.68	.14	-.05	1.12	2.94	.86	2.08
2017	2.03	.18	-.07	2.25	4.86	2.76	2.10
2018	1.91	.10	-.07	2.25	4.82	2.65	2.17
2019	1.84	-.06	-.07	2.20	4.46	2.60	1.86
2020	1.77	-.10	-.06	2.20	4.28	2.60	1.68
2021	1.77	-.08	-.06	2.20	4.23	2.60	1.63
2022	1.67	-.07	-.06	2.20	4.07	2.60	1.47
2023	1.67	-.06	-.05	2.20	3.98	2.60	1.38
2024	1.68	-.03	-.05	2.20	4.04	2.60	1.44
2025	1.68	-.03	-.05	2.20	3.93	2.60	1.33
2025 to 2030 . . .	1.68	-.03	-.05	2.20	3.89	2.60	1.29
2030 to 2090 . . .	1.68	-.06	-.05	2.20	3.80	2.60	1.20

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

Calendar year	Annual percentage change[a] in— Productivity (Total U.S. economy)	Earnings as a percent of compensation	Average hours worked	GDP price index	Average annual wage in covered employment	Consumer Price Index	Real-wage differential[b]
Low-cost:							
2016	1.95	0.14	0.01	1.25	3.64	1.23	2.41
2017	2.26	.20	.02	2.95	6.22	3.63	2.59
2018	2.23	.12	.03	2.98	6.11	3.28	2.83
2019	2.06	-.03	.04	2.90	5.54	3.20	2.34
2020	2.00	-.05	.04	2.90	5.29	3.20	2.09
2021	1.96	-.03	.05	2.90	5.15	3.20	1.95
2022	1.98	-.01	.05	2.90	5.16	3.20	1.96
2023	1.98	[d]	.05	2.90	5.21	3.20	2.01
2024	1.98	.05	.05	2.90	5.28	3.20	2.08
2025	1.98	.06	.05	2.90	5.18	3.20	1.98
2025 to 2030	1.98	.05	.05	2.90	5.14	3.20	1.94
2030 to 2090	1.98	.03	.05	2.90	5.02	3.20	1.82
High-cost:							
2016	.91	.14	-.11	.71	1.24	.02	1.22
2017	1.36	.19	-.12	1.91	2.54	2.44	.10
2018	1.89	.08	-.17	1.63	3.87	2.13	1.73
2019	1.73	-.10	-.18	1.50	3.66	2.00	1.66
2020	1.59	-.14	-.18	1.50	3.40	2.00	1.40
2021	1.58	-.13	-.17	1.50	3.36	2.00	1.36
2022	1.50	-.14	-.17	1.50	3.24	2.00	1.24
2023	1.47	-.14	-.16	1.50	3.13	2.00	1.13
2024	1.45	-.11	-.16	1.50	3.08	2.00	1.08
2025	1.40	-.12	-.16	1.50	2.87	2.00	.87
2025 to 2030	1.38	-.12	-.15	1.50	2.66	2.00	.66
2030 to 2090	1.38	-.14	-.15	1.50	2.58	2.00	.58

[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 differential. 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 percent.

[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 at the Social Security Administration for this report 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 2.4 percent during the 1966-73 economic cycle and 2.7 percent during the 1973-79 cycle to 1.7 percent during the 1979-89 cycle, 1.3 percent during the 1989-2000 cycle, and 1.0 percent during the 2000-07 cycle. Further slowing of labor force growth will follow from a substantial slowing of growth in the working age population in the future—a consequence of the baby-boom generation reaching retirement and succeeding lower-birth-rate cohorts reaching working age. Under the intermediate assumptions, the labor force is projected to increase by an average of 1.0 percent per year from 2015 to 2025 and 0.5 percent per year over the remainder of the 75-year projection period.

The projected labor force participation rates are derived from a model reflecting the historically based structural relationship 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, but demographic assumptions in the low-cost alternative (such as slower improvement in longevity) are consistent with lower labor force participation rates. These relationships with various basic assumptions move the labor force participation rates in opposite directions. 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 directly. 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 2.9 percent for 2090.

For men age 16 and over, the projected age-adjusted labor force participation rate[1] for 2090 is 72.9, 73.0, and 72.9 percent for the low-cost, intermediate, 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 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.[2] For women age 16 and over, the projected age-adjusted labor force participation rates for 2090 are 61.6, 61.0, and 60.1 percent for the low-cost, intermediate, and high-cost assumptions, respectively. The age-adjusted rates for 2090 are higher under all three alternatives than the age-adjusted rates for 2014 of 70.1 percent for men and 57.7 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. In the first ten years, the assumed labor force participation rates also increase as the economic recovery draws more people into the labor force. Increasing disability prevalence rates offset these increases somewhat in the intermediate and high-cost assumptions, but a decrease in disability prevalence further contributes to increases in labor force participation in the low-cost assumptions.

The unemployment rates presented in table V.B2 are in the most commonly cited form, the civilian rate. For years through 2025, the table presents total civilian rates without adjustment for the changing age-sex distribution of the population. For years after 2025, the table presents unemployment rates as 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 age-sex adjusted unemployment rate is about 0.1 percentage point lower than the unadjusted rate for 2026.

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

[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.

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

measured by the ratio of actual to potential GDP.[1] 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 ultimate assumed 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 2015 report. The decline in the overall rate from 5.3 for 2015 to 5.1 for 2016 under intermediate assumptions reflects a rapid increase in employment with a relatively small change in labor force participation. Improvements in labor market conditions will eventually draw more nonparticipants back into the labor force and unemployment will reach the ultimate rate in 2020 under the intermediate assumptions. Under low-cost assumptions the ultimate unemployment rate is reached in 2018. Under the high-cost assumptions, unemployment will reach the ultimate rate in 2022.[2]

6. Gross Domestic Product Projections

The value of real GDP equals the product of three components: (1) average weekly total employment,[3] (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 1966 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, 1.7, and -0.3 percent for total employment, productivity, and average hours worked, respectively. As a result of the 2007-2009 recession, the real GDP in 2014 was only 7.3 percent above the 2007 level. The estimated real GDP growth from 2014 to 2015 is 2.5 percent.

For the intermediate assumptions, the average annual growth in real GDP is 2.7 percent from 2015 to 2025, the approximate sum of component growth rates of 0.9 percent for total employment, 1.8 percent for productivity, and -0.06 percent for average hours worked. The projected average annual growth in real GDP of 2.7 percent for this period is 0.4 percentage point higher than the underlying sustainable trend rate of 2.3 percent. This

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

[2] The assumed ultimate unemployment rate is an age-sex-adjusted rate. The quarterly age-sex-adjusted unemployment rate is used to determine the calendar year when the ultimate assumption is reached within the short-range period.

[3] 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.

0.4-percentage-point above-trend component reflects a relatively rapid increase in employment as the economy recovers. After 2025, 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 2025, the annual growth in real GDP averages 2.1 percent, based on the projected average annual growth rate of 0.5 percent for total employment and the assumed ultimate growth rates of 1.7 percent for productivity and -0.05 percent for average hours worked. The assumed growth rate of real GDP is slower than the past average growth rate mainly because the working-age population is expected to grow slower than in the past.

For the low-cost assumptions, the annual growth in real GDP averages 3.3 percent over the decade ending in 2025. The relatively faster growth is due mostly to higher assumed rates of growth for employment and worker productivity. For the high-cost assumptions, the annual growth in real GDP averages 1.9 percent for the decade ending in 2025.

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 41-year period from 1966 to 2007, the real interest rate averaged 2.8 percent per year. The real interest rates averaged 1.3, -1.0, 5.2, 4.0, and 2.2 percent per year over the economic cycles 1966-73, 1973-79, 1979-89, 1989-2000, and 2000-07, respectively. The assumed ultimate real interest rates are 3.2 percent, 2.7 percent, and 2.2 percent for the low-cost, intermediate, and high-cost assumptions, respectively. These rates are 0.2 percentage point lower than the rates used in the 2015 report. The lower assumed real interest rates reflect recent lower realized rates and an expectation that low real interest rates will persist.

The actual average annual nominal interest rate was approximately 2.3 percent for 2014, which means that securities newly issued in 2014 would yield 2.3 percent if held one year. Estimated average prices fell from 2014 to 2015 by approximately 0.4 percent. The annual real interest rate for 2015 is 2.7 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 yield ultimate nominal interest rates of 6.4 percent for the low-cost assumptions, 5.3 percent for the intermediate assumptions, and 4.2 percent for the high-cost assumptions. These nominal rates for newly issued trust fund securities reach their ultimate levels by 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	5.0	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	3.4	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	2.5	4.6	2.4
2005 to 2010	6.8	.6	-.4	.8	3.8	1.8
Economic cycles:[i]						
1966 to 1973	4.6	2.4	2.0	3.6	6.1	1.3
1973 to 1979	6.8	2.7	2.4	3.0	7.7	-1.0
1979 to 1989	7.3	1.7	1.7	3.1	10.5	5.2
1989 to 2000	5.6	1.3	1.3	3.3	6.8	4.0
2000 to 2007	5.2	1.0	.9	2.4	4.6	2.2
2007 to 2015	7.6	.3	.2	1.2	2.4	1.1
Single years:						
2005	5.1	1.3	1.7	3.3	4.3	.8
2006	4.6	1.4	1.8	2.7	4.8	1.1
2007	4.6	1.1	1.1	1.8	4.7	1.9
2008	5.8	.8	-.4	-.3	3.6	.6
2009	9.3	-.1	-3.7	-2.8	2.9	4.4
2010	9.6	-.2	-.6	2.5	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	1.5	1.9	.1
2014	6.2	.3	1.6	2.4	2.3	.4
2015[j]	5.3	.8	1.6	2.5	2.0	2.7

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:						
2016	5.1	0.9	1.1	2.8	2.4	1.2
2017	5.2	1.3	1.2	3.1	3.6	-.3
2018	5.3	1.4	1.2	3.1	4.2	1.0
2019	5.4	1.3	1.2	3.0	4.5	1.6
2020	5.5	1.2	1.1	2.8	4.7	1.9
2021	5.5	1.0	1.0	2.7	4.8	2.1
2022	5.5	.8	.8	2.4	5.0	2.2
2023	5.5	.6	.6	2.2	5.2	2.4
2024	5.6	.6	.6	2.2	5.3	2.6
2025	5.6	.6	.5	2.2	5.3	2.7
2030	5.5	.5	.5	2.1	5.3	2.7
2035	5.5	.5	.5	2.1	5.3	2.7
2040	5.5	.6	.6	2.2	5.3	2.7
2045	5.5	.6	.6	2.2	5.3	2.7
2050	5.5	.5	.5	2.2	5.3	2.7
2055	5.5	.5	.5	2.1	5.3	2.7
2060	5.5	.4	.4	2.1	5.3	2.7
2065	5.5	.5	.5	2.1	5.3	2.7
2070	5.5	.5	.5	2.1	5.3	2.7
2075	5.5	.5	.5	2.1	5.3	2.7
2080	5.5	.5	.5	2.1	5.3	2.7
2085	5.5	.4	.4	2.1	5.3	2.7
2090	5.5	.4	.4	2.0	5.3	2.7
Low-cost:						
2016	4.8	1.1	1.6	3.6	3.2	.8
2017	4.7	1.8	1.9	4.2	4.9	-.4
2018	4.6	1.6	1.7	4.0	5.2	1.7
2019	4.6	1.5	1.5	3.7	5.4	2.0
2020	4.6	1.3	1.3	3.3	5.5	2.2
2021	4.6	1.0	1.0	3.0	5.7	2.3
2022	4.6	.8	.8	2.8	6.0	2.5
2023	4.6	.7	.7	2.8	6.3	2.8
2024	4.6	.7	.7	2.8	6.4	3.0
2025	4.6	.7	.7	2.7	6.4	3.2
2030	4.5	.6	.6	2.7	6.4	3.2
2035	4.5	.6	.6	2.7	6.4	3.2
2040	4.5	.8	.8	2.8	6.4	3.2
2045	4.5	.8	.8	2.8	6.4	3.2
2050	4.5	.8	.8	2.8	6.4	3.2
2055	4.5	.7	.7	2.7	6.4	3.2
2060	4.5	.7	.7	2.7	6.4	3.2
2065	4.5	.7	.7	2.8	6.4	3.2
2070	4.5	.8	.8	2.8	6.4	3.2
2075	4.5	.8	.8	2.8	6.4	3.2
2080	4.5	.8	.8	2.8	6.4	3.2
2085	4.5	.7	.7	2.8	6.4	3.2
2090	4.5	.7	.7	2.7	6.4	3.2

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]
High-cost:						
2016	5.6	0.8	0.5	1.3	1.7	2.0
2017	7.3	1.1	-.7	.6	2.3	-.7
2018	7.2	.4	.5	2.2	3.3	.2
2019	7.0	.6	.9	2.5	3.7	1.3
2020	6.8	.8	.9	2.4	3.8	1.7
2021	6.7	.7	.8	2.3	3.9	1.8
2022	6.6	.7	.8	2.2	4.1	1.9
2023	6.5	.7	.7	2.1	4.3	2.1
2024	6.5	.7	.7	2.0	4.3	2.2
2025	6.5	.6	.6	1.9	4.2	2.3
2030	6.5	.4	.4	1.6	4.2	2.2
2035	6.5	.4	.4	1.6	4.2	2.2
2040	6.5	.4	.4	1.6	4.2	2.2
2045	6.5	.3	.3	1.6	4.2	2.2
2050	6.5	.3	.3	1.5	4.2	2.2
2055	6.5	.2	.2	1.4	4.2	2.2
2060	6.5	.2	.2	1.4	4.2	2.2
2065	6.5	.2	.2	1.4	4.2	2.2
2070	6.5	.1	.1	1.4	4.2	2.2
2075	6.5	.1	.1	1.4	4.2	2.2
2080	6.5	.1	.1	1.4	4.2	2.2
2085	6.5	.1	.1	1.3	4.2	2.2
2090	6.5	.1	.1	1.3	4.2	2.2

[a] The Office of the Chief Actuary adjusts the civilian unemployment rates for 2026 and later to the age-sex distribution of the civilian labor force in 2011. For years through 2025, 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 2009 dollars.

[f] The average of the nominal interest rates, which compound 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 2025. 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 economic 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 in December 2008 was followed by no cost-of-living adjustments in December 2009 and December 2010. More recent volatility in oil prices has again affected

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

the CPI, resulting in no cost-of-living adjustment for December 2015. Under the intermediate and low-cost assumptions, annual cost-of-living adjustments resume in December 2016. Under the high-cost assumptions, there is no cost-of-living adjustment for December 2016, but annual cost-of-living adjustments resume in December 2017. After cost-of-living adjustments resume, all three sets of assumptions have automatic cost-of-living adjustments in all later 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. Under the intermediate and low-cost assumptions, the contribution and benefit base increases in all years after 2016. Under the high-cost assumptions, the contribution and benefit base remains the same in 2017 and then increases in 2018 and all later 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 in years before normal retirement age. A higher amount applies for 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 normal retirement age attainment. 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 in 2010, 2011, or 2016 because there was no cost-of-living adjustment for the immediate prior December. Under the intermediate and low-cost assumptions, the exempt amounts

increase in all years after 2016. Under the high-cost assumptions, the exempt amounts remain the same in 2017 and then increase in 2018 and all later years.

Table V.C1.—Cost-of-Living Benefit Increases, Average Wage Index, Contribution and Benefit Bases, and Retirement Earnings Test Exempt Amounts, 1975-2025

Calendar year	Cost-of-living benefit increase[a] (percent)	Average wage index (AWI)[b] Amount	Average wage index (AWI)[b] Increase (percent)	Contribution and benefit base[c]	Retirement earnings test exempt amount Under NRA[d]	Retirement earnings test exempt amount 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
Intermediate:						
2015	[g].0	47,730.20	2.7	[g]118,500	[g]15,720	[g]41,880
2016	.2	49,121.32	2.9	[g]118,500	[g]15,720	[g]41,880
2017	2.9	51,467.41	4.8	126,000	16,680	44,520
2018	2.6	53,929.00	4.8	129,900	17,160	45,840
2019	2.6	56,341.78	4.5	135,900	18,000	48,000

Table V.C1.—Cost-of-Living Benefit Increases, Average Wage Index, Contribution and Benefit Bases, and Retirement Earnings Test Exempt Amounts, 1975-2025 (Cont.)

Calendar year	Cost-of-living benefit increase[a] (percent)	Average wage index (AWI)[b] Amount	Average wage index (AWI)[b] Increase (percent)	Contribution and benefit base[c]	Retirement earnings test exempt amount Under NRA[d]	Retirement earnings test exempt amount At NRA[e]
2020	2.6	$58,754.57	4.3	$142,500	$18,960	$50,280
2021	2.6	61,237.90	4.2	148,800	19,800	52,560
2022	2.6	63,735.69	4.1	155,100	20,640	54,840
2023	2.6	66,277.05	4.0	161,700	21,480	57,120
2024	2.6	68,952.47	4.0	168,300	22,320	59,520
2025	2.6	71,668.95	3.9	175,200	23,280	61,800
Low-cost:						
2015	[g].0	47,738.57	2.7	[g]118,500	[g]15,720	[g]41,880
2016	.7	49,447.98	3.6	[g]118,500	[g]15,720	[g]41,880
2017	3.7	52,465.16	6.1	126,000	16,680	44,520
2018	3.2	55,650.39	6.1	130,800	17,280	46,080
2019	3.2	58,743.24	5.6	138,600	18,360	48,960
2020	3.2	61,849.15	5.3	147,000	19,560	51,960
2021	3.2	65,032.70	5.1	155,100	20,640	54,840
2022	3.2	68,392.20	5.2	163,500	21,720	57,720
2023	3.2	71,951.98	5.2	171,900	22,800	60,720
2024	3.2	75,746.74	5.3	180,600	24,000	63,840
2025	3.2	79,674.91	5.2	190,200	25,200	67,080
High-cost:						
2015	[g].0	47,686.76	2.6	[g]118,500	[g]15,720	[g]41,880
2016	.0	48,298.98	1.3	[g]118,500	[g]15,720	[g]41,880
2017	1.9	49,518.62	2.5	118,500	15,720	41,880
2018	2.1	51,416.70	3.8	127,500	16,920	45,120
2019	2.0	53,305.83	3.7	130,800	17,400	46,200
2020	2.0	55,122.98	3.4	135,900	18,000	48,000
2021	2.0	56,973.96	3.4	140,700	18,720	49,680
2022	2.0	58,817.79	3.2	145,500	19,320	51,480
2023	2.0	60,655.65	3.1	150,600	19,920	53,160
2024	2.0	62,523.17	3.1	155,400	20,640	54,840
2025	2.0	64,321.07	2.9	160,200	21,240	56,640

[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.

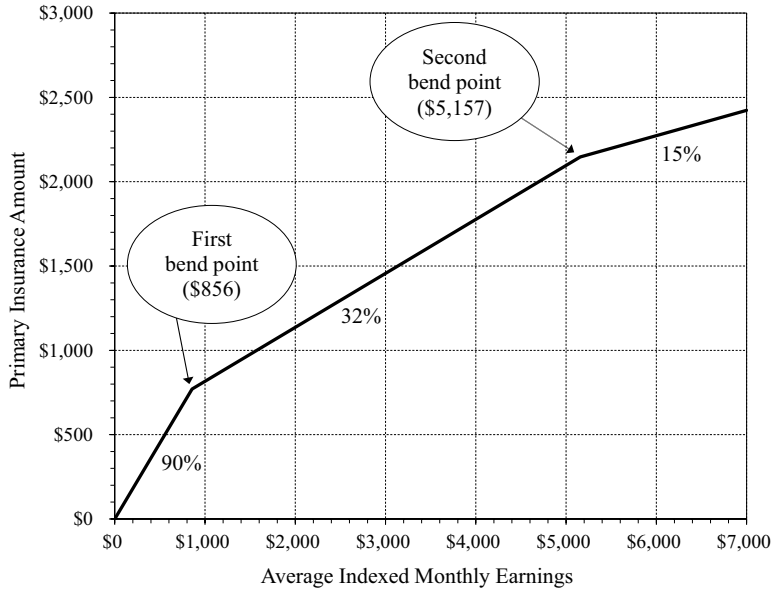
[f] Originally determined as 2.4 percent. Pursuant to Public Law 106-554, effectively 2.5 percent.

[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 2016, and also shows projected values through 2025. These other wage-indexed program parameters are:

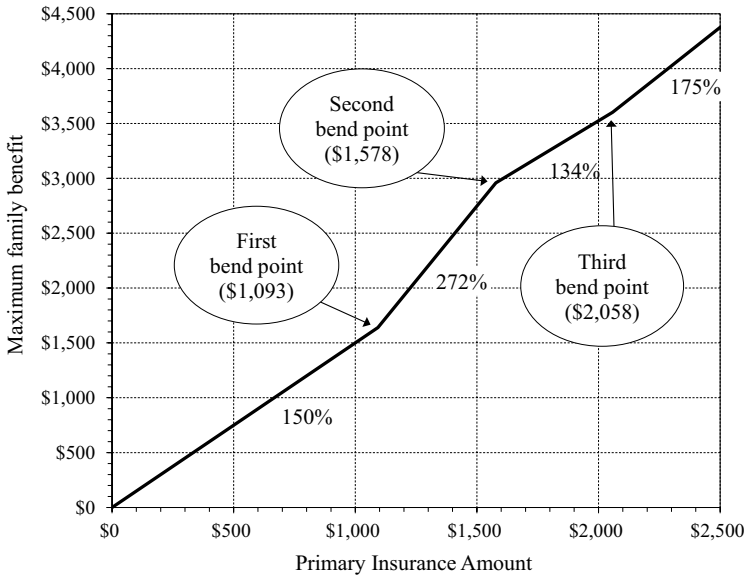
- *The bend points in the formula for computing the primary insurance amount (PIA) for workers who reach age 62, become disabled, or die in a given year.* As figure V.C1 illustrates, these two bend points define three ranges in a worker's average indexed monthly earnings (AIME). The formula for the worker's PIA multiplies a 90, 32, or 15 percent factor 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 2016



- *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 2016



- *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 1978-2025

Calendar year	AIME bend points in PIA formula[a] First	AIME bend points in PIA formula[a] Second	PIA bend points in OASI maximum-family-benefit formula[b] First	PIA bend points in OASI maximum-family-benefit formula[b] Second	PIA bend points in OASI maximum-family-benefit formula[b] Third	Earnings required for a quarter of coverage	Old-law contribution and benefit base[c]
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
Intermediate:							
2017	879	5,296	1,123	1,620	2,113	1,290	93,600
2018	904	5,450	1,155	1,668	2,175	1,330	96,300
2019	947	5,710	1,210	1,747	2,279	1,390	101,100
2020	993	5,983	1,268	1,831	2,388	1,460	105,900
2021	1,037	6,251	1,325	1,913	2,495	1,530	110,400
2022	1,081	6,519	1,382	1,995	2,601	1,590	115,200
2023	1,127	6,794	1,440	2,079	2,711	1,660	120,300
2024	1,173	7,071	1,499	2,164	2,822	1,730	125,100
2025	1,220	7,353	1,559	2,250	2,935	1,800	129,900

Table V.C2.—Values for Selected Wage-Indexed Program Parameters, Calendar Years 1978-2025 (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:							
2017	$879	$5,296	$1,123	$1,621	$2,114	$1,290	$93,600
2018	910	5,486	1,163	1,679	2,189	1,340	96,900
2019	966	5,821	1,234	1,781	2,323	1,420	102,900
2020	1,024	6,174	1,309	1,889	2,464	1,510	109,200
2021	1,081	6,517	1,382	1,994	2,601	1,590	115,200
2022	1,138	6,862	1,455	2,100	2,738	1,680	121,200
2023	1,197	7,215	1,529	2,208	2,879	1,760	127,500
2024	1,259	7,588	1,608	2,322	3,028	1,850	134,100
2025	1,324	7,983	1,692	2,443	3,186	1,950	141,300
High-cost:							
2017	878	5,291	1,122	1,619	2,111	1,290	88,200
2018	889	5,359	1,136	1,640	2,139	1,310	94,800
2019	911	5,494	1,165	1,681	2,193	1,340	97,200
2020	946	5,705	1,209	1,746	2,277	1,390	100,800
2021	981	5,914	1,254	1,810	2,360	1,440	104,700
2022	1,015	6,116	1,296	1,871	2,441	1,490	108,300
2023	1,049	6,321	1,340	1,934	2,523	1,540	111,900
2024	1,083	6,526	1,383	1,997	2,604	1,590	115,500
2025	1,116	6,730	1,427	2,059	2,686	1,640	119,100

[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 Reaching 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. 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 components, each reflecting the growth projected for the component's total U.S employment and average weeks worked per year.[1] For the short-range period, the average weeks worked for each component is assumed to increase during the economic recovery. After 2025, the average weeks worked for each component is assumed to remain constant. The pro-

[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.

jection method also accounts for changes in non-OASDI-covered employment, the increase in coverage of Federal civilian employment as a result of the 1983 Social Security Amendments, and changes in the number and employment status of other immigrants residing within the Social Security coverage area.

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 2090 are 69.1, 68.7, and 68.3 percent for the low-cost, intermediate, and high-cost assumptions, respectively. For women age 16 and over, the projected covered-worker rates for 2090 are 66.1, 64.7, and 63.2 percent for the low-cost, intermediate, and high-cost assumptions, respectively. These rates are higher than the 2014 levels of 67.6 percent for males and 61.6 percent for women, due to the assumed decreases in unemployment rates and assumed increase in labor force participation rates.

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 2016 is $1,260.

There are three types of insured status that a worker can acquire under the OASDI program. The number and recency of QCs earned determine each status. A worker acquires fully insured status 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). Once a worker has accumulated 40 QCs, he or she remains permanently fully insured. A worker acquires disability insured status 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

[1] Age-adjusted covered-worker rates are adjusted to the 2012 age distribution of the Social Security area population.

who has accumulated six QCs during the 12-quarter period ending with the current quarter. A worker acquires currently insured status 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 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 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. The model uses information on quarters of coverage earned due to employment covered by Social Security derived from tabulations of the Continuous Work History Sample. 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 immigrant population.[1] For the other 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

[1] Those given legal work authorization through the Deferred Action for Childhood Arrivals and the Deferred Action for Parents of Americans programs are included in the simulations.

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 1970. The office bases historical values on a tabulation of the disability insured population from the Continuous Work History Sample 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 Continuous Work History Sample 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 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 will increase from its estimated level of 85.2 for December 31, 2013, to 86.6, 87.3, and 88.5 for December 31, 2090, under the low-cost, intermediate, and high-cost alternatives, respectively. Over the projection period, the percentage for females increases significantly, reflecting the past substantial growth in the employment of younger cohorts of women. The percentage for males declines, reflecting, in part, increases in the percent of the population that is classified as other immigrants and is thus less likely to have earnings reported and credited to them. Under the intermediate assumptions, for example, the percentage for males decreases from 93.0 to 86.7, and the percentage for females increases from 78.7 to 87.8.

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)'s, or aged-spouse's 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 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

[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)'s benefits.

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 in noncovered employment. Due to the Bipartisan Budget Act of 2015, aged spouses will no longer be 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 will now apply to all retired workers and spouses even after initial entitlement, regardless of age. Thus, spouses who are insured will no longer be eligible to delay their retired-worker benefit while receiving an aged-spouse benefit. To calculate the estimated number of aged-spouse beneficiaries, the model applies a projected prevalence rate to the resulting number of spouses.

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)'s 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)'s 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 additional 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)'s 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 child-survivor 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 disabled-child-survivor 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 disabled-child-survivor beneficiaries already receiving benefits. The long-range model projects the number of disabled-child-survivor beneficiaries in a manner similar to that for student-child-survivor 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 mother-survivor and father-survivor beneficiaries by applying award rates to the number of awards to child-survivor beneficiaries, in cases where the children are either under age 16 or disabled, and by applying termination rates to the number of mother-survivors and father-survivors already receiving benefits. The long-range model estimates the numbers of mother-survivor and father-survivor beneficiaries, assuming they are not remarried, from the number of child-survivor beneficiaries.

The Office of the Chief Actuary projects the number of parent-survivor 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 1945-2090
[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
1996	26,905	2,971	442	5,199	242	1,898	4	37,661
1997	27,282	2,926	441	5,043	230	1,893	3	37,817
1998	27,518	2,866	439	4,981	221	1,884	3	37,911
1999	27,784	2,811	442	4,936	212	1,885	3	38,073
2000	28,505	2,798	459	4,901	203	1,878	3	38,747
2001	28,843	2,742	467	4,828	197	1,890	3	38,969
2002	29,195	2,681	477	4,771	194	1,908	2	39,227
2003	29,537	2,622	480	4,707	190	1,910	2	39,448
2004	29,952	2,569	482	4,643	184	1,901	2	39,733
2005	30,461	2,524	488	4,569	178	1,903	2	40,126
2006	30,976	2,476	490	4,494	171	1,899	2	40,508
2007	31,528	2,431	494	4,436	165	1,892	2	40,947
2008	32,274	2,370	525	4,380	160	1,915	2	41,625
2009	33,514	2,343	561	4,327	160	1,921	2	42,828
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
Intermediate:								
2016	41,497	2,336	675	4,042	137	1,897	1	50,584
2020	48,038	2,287	773	4,016	128	1,915	1	57,158
2025	56,067	2,065	863	4,055	125	1,935	1	65,112
2030	62,977	2,281	1,012	3,893	133	1,958	1	72,255
2035	67,625	2,353	1,119	3,738	141	2,019	1	76,996
2040	70,286	2,323	1,155	3,539	138	2,014	1	79,455

Table V.C4.—OASI Beneficiaries With Benefits in Current-Payment Status at the End of Calendar Years 1945-2090 (Cont.)
[In thousands]

	Retired workers and auxiliaries			Survivors				
Calendar year	Worker[a]	Spouse	Child	Widow-widower	Mother-father	Child	Parent	Total
Intermediate (Cont.):								
2045	71,904	2,330	1,155	3,369	134	1,969	1	80,862
2050	73,894	2,355	1,185	3,228	129	1,926	1	82,718
2055	76,617	2,409	1,219	3,127	125	1,882	1	85,381
2060	79,917	2,482	1,247	3,055	123	1,844	1	88,669
2065	83,112	2,557	1,261	3,023	121	1,825	1	91,900
2070	86,525	2,664	1,301	3,014	119	1,818	1	95,442
2075	89,639	2,756	1,335	3,001	116	1,806	1	98,654
2080	91,614	2,854	1,339	2,995	113	1,787	1	100,702
2085	94,075	2,975	1,366	3,009	111	1,765	1	103,301
2090	97,629	3,087	1,416	3,026	108	1,750	1	107,018
Low-cost:								
2016	41,475	2,335	675	4,038	137	1,898	1	50,559
2020	47,900	2,288	776	4,004	130	1,931	1	57,030
2025	55,671	2,074	873	4,036	129	1,992	1	64,776
2030	61,822	2,239	1,042	3,939	131	2,119	1	71,293
2035	65,757	2,289	1,173	3,812	138	2,272	1	75,443
2040	67,718	2,232	1,227	3,626	137	2,347	1	77,287
2045	68,782	2,206	1,244	3,462	135	2,355	1	78,185
2050	70,356	2,195	1,296	3,322	133	2,354	1	79,658
2055	72,806	2,220	1,357	3,214	134	2,357	1	82,090
2060	75,865	2,263	1,414	3,133	136	2,377	1	85,189
2065	78,820	2,310	1,455	3,090	140	2,432	1	88,246
2070	81,947	2,375	1,525	3,073	143	2,502	1	91,566
2075	84,650	2,428	1,586	3,055	146	2,557	1	94,423
2080	86,310	2,496	1,607	3,057	147	2,595	1	96,212
2085	88,966	2,598	1,662	3,103	149	2,630	1	99,108
2090	93,522	2,701	1,760	3,168	151	2,676	1	103,981
High-cost:								
2016	41,516	2,336	674	4,046	136	1,895	1	50,605
2020	48,172	2,285	768	4,026	127	1,893	1	57,271
2025	56,513	2,052	847	4,074	119	1,868	1	65,473
2030	64,274	2,340	982	3,820	134	1,788	1	73,338
2035	69,688	2,454	1,069	3,634	138	1,769	1	78,753
2040	73,109	2,461	1,090	3,420	131	1,705	1	81,917
2045	75,385	2,500	1,076	3,245	122	1,622	1	83,952
2050	77,892	2,550	1,078	3,107	114	1,547	1	86,289
2055	80,947	2,626	1,083	3,009	106	1,478	1	89,250
2060	84,512	2,711	1,082	2,939	99	1,409	1	92,754
2065	87,926	2,810	1,074	2,908	93	1,354	1	96,166
2070	91,657	2,934	1,090	2,894	87	1,311	1	99,975
2075	95,167	3,038	1,099	2,874	81	1,272	1	103,532
2080	97,464	3,145	1,089	2,846	76	1,233	1	105,853
2085	99,617	3,277	1,092	2,824	71	1,192	1	108,074
2090	102,035	3,396	1,105	2,798	67	1,156	1	110,557

[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 2015. 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 substantially below the age-sex-adjusted rate between 1975 and 1995 as the baby-boom generation swelled the size of the younger working-age population, where disability incidence is lower than in older populations. After 1995, the gross rate rose faster than the age-sex-adjusted rate as the baby-boom generation moved into an age range where disability incidence peaks. After 2023, the projected gross incidence rate 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 2025), incidence rates reflect several factors including: (1) aspects of program administration, such as efforts to reduce the disability backlog and recent changes to how claims are adjudicated; (2) assumed future unemployment rates; and (3) underlying trends in incidence. As described in section V.B.5, all three sets of economic assumptions reflect a continuation of the gradual economic recovery from the recession that began in December 2007. The corresponding projected unemployment rates follow near-term paths specific to the three alternative sets of economic assumptions, then gradually move toward their respective ultimate levels. 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. At the beginning of the projection period, disability incidence rates remain briefly below the general trend level for each alternative because some of the earlier additional awards would have occurred in a later year. Due to expected efforts to reduce backlogs in processing disability determinations which have developed over the last few years, incidence rates are projected to rise above the general trend level through about 2020. Over the rest of the short-range period, disability incidence rates under each alternative evolve toward their ultimate levels along trajectories consistent with the assumed unemployment rates. After 2025,

age-sex-specific incidence rates trend toward the ultimate rates assumed for the long-range projections and reach these ultimate rates in 2035. 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.

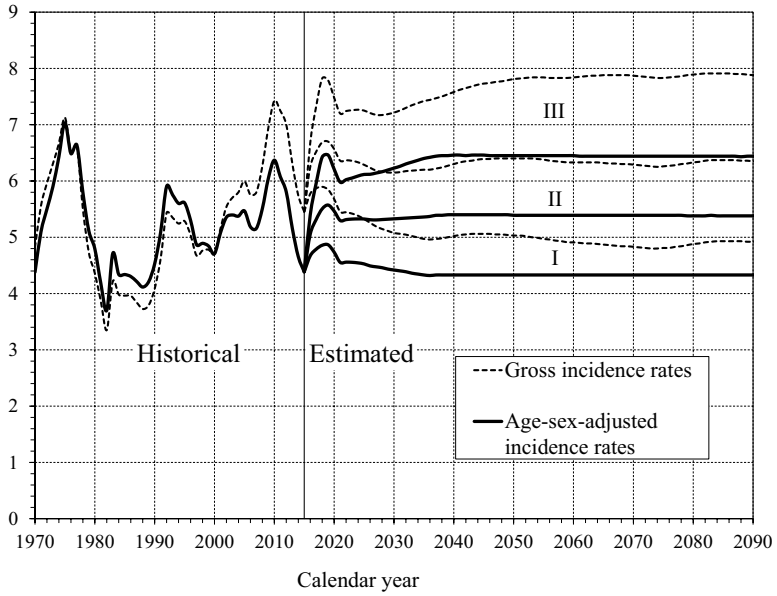
For the intermediate alternative, the Trustees assume that the ultimate age-sex-adjusted incidence rate (adjusted to the disability-exposed population for the year 2000) will be 5.4 awards per thousand exposed,[2] which is the same as in last year's report. Figure V.C3 illustrates that the estimated ultimate age-sex-adjusted incidence rate of 5.4 is slightly higher than the average rate for the historical period 1970 through 2015, reflecting the increase in female incidence rates over this period. However, a similar comparison using gross incidence rates gives a 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 4.3 and 6.4 awards per thousand exposed, or about 17 percent lower and 23 percent higher than the average for the historical period, respectively. These ultimate age-sex-adjusted incidence rates are similar to those in last year's report.

[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.

[2] The ultimate age-sex-adjusted incidence rate decreased from 5.42 in last year's report to 5.38 in this year's report due to a new physician review requirement mandated by the Bipartisan Budget Act of 2015.

Figure V.C3.—DI Disability Incidence Rates, 1970-2090
[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 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-2025).

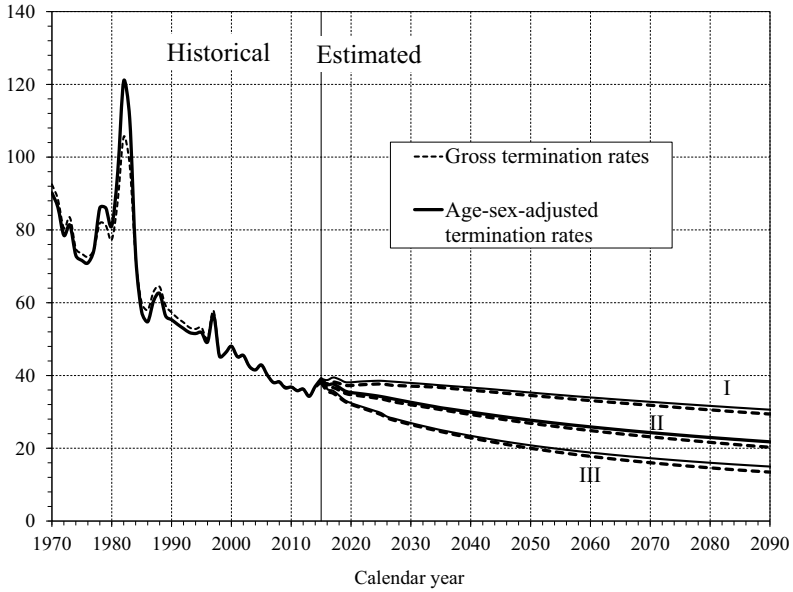
In the short-range period (through 2025), the projected age-sex-adjusted death rate (adjusted to the 2000 disabled-worker population) under the intermediate assumptions gradually declines from 25.7 deaths per thousand beneficiaries for 2015 to about 22.9 per thousand for 2025. The projected age-sex-adjusted recovery rate (medical improvement and return to work) under the intermediate assumptions evolves from a level of 13.4 per thousand beneficiaries for 2015 to 11.3 per thousand beneficiaries for 2025. 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-2025), 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 10.4 per thousand beneficiaries. The assumed ultimate age-sex-adjusted recovery rates for the low-cost and high-cost alternatives are about 12.6 and 8.3 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 (2035) 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 25.7 per thousand beneficiaries in 2015, this rate decreases to 18.1, 11.4, and 6.7 per thousand disabled-worker beneficiaries for 2090 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 2090. In the near term, through 2018, recovery terminations are projected to remain at relatively high levels, consistent with the assumption that the Social Security Administration will receive sufficient budget appropriations to reduce the pending backlog of continuing disability reviews. 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 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, 1970-2090
[Terminations per thousand disabled-worker beneficiaries]



c. Comparison of Incidence, Termination, and Conversion

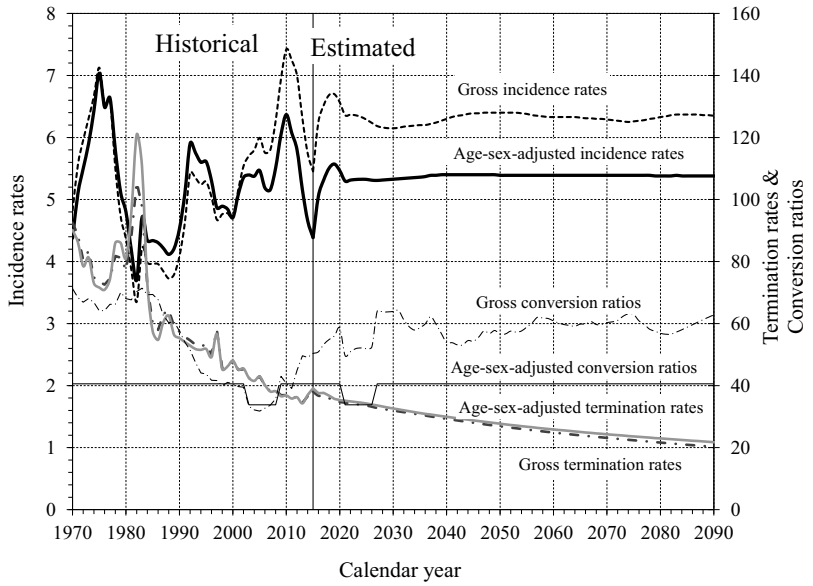
Incidence and termination rates are the foundation for projecting the number of disabled-worker beneficiaries in current-payment status. At normal retirement age, disabled-worker beneficiaries convert to retired-worker status and leave the DI rolls.

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 simply a transfer of beneficiaries at normal retirement age from the DI Trust Fund account to the OASI Trust Fund account. 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, beneficiaries 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 2002 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, 1970-2090
[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 8.9 million at the end of 2015, to 12.6 million, 14.6 million, and 15.8 million at the end of 2090, 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 1960-2090

[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
1996	4,378	224	1,463	6,065	34	36
1997	4,501	207	1,438	6,146	34	36
1998	4,691	190	1,446	6,327	35	36
1999	4,870	176	1,468	6,514	36	36
2000	5,036	165	1,466	6,667	36	36
2001	5,268	157	1,482	6,907	38	37
2002	5,539	152	1,526	7,217	39	38
2003	5,869	151	1,571	7,590	41	38
2004	6,198	153	1,599	7,950	43	39
2005	6,519	157	1,633	8,309	45	40
2006	6,807	156	1,652	8,615	46	40
2007	7,099	154	1,665	8,918	48	41
2008	7,427	155	1,692	9,273	50	41
2009	7,788	159	1,749	9,695	52	43
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
Intermediate:						
2016	8,993	139	1,739	10,871	59	45
2020	9,349	139	1,764	11,252	60	45
2025	9,790	153	1,800	11,742	62	45
2030	9,771	166	1,966	11,904	59	45
2035	9,988	184	2,208	12,381	59	45
2040	10,391	193	2,346	12,929	60	46
2045	11,078	207	2,429	13,714	62	47
2050	11,577	211	2,497	14,284	64	47
2055	12,012	220	2,556	14,788	65	48
2060	12,210	222	2,622	15,054	64	48
2065	12,547	232	2,709	15,488	65	49
2070	12,866	243	2,805	15,914	65	49
2075	13,082	245	2,884	16,210	65	49
2080	13,613	256	2,951	16,820	66	49
2085	14,246	270	3,020	17,536	67	50
2090	14,594	275	3,094	17,963	67	50

Table V.C5.—DI Beneficiaries With Benefits in Current-Payment Status at the End of Calendar Years 1960-2090 (Cont.)
[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]
Low-cost:						
2016	8,919	139	1,716	10,774	59	44
2020	8,845	136	1,653	10,634	57	42
2025	8,790	150	1,630	10,569	55	40
2030	8,386	136	1,743	10,265	50	38
2035	8,263	142	1,934	10,339	48	37
2040	8,365	140	2,040	10,545	47	37
2045	8,784	146	2,103	11,033	48	37
2050	9,117	145	2,159	11,421	48	37
2055	9,443	149	2,224	11,817	48	37
2060	9,627	150	2,314	12,091	47	37
2065	9,950	156	2,440	12,547	47	38
2070	10,303	163	2,581	13,047	47	38
2075	10,642	165	2,703	13,510	47	38
2080	11,303	175	2,810	14,289	47	38
2085	12,100	188	2,919	15,207	48	38
2090	12,642	194	3,040	15,876	49	38
High-cost:						
2016	9,060	140	1,758	10,957	60	45
2020	9,923	141	1,883	11,947	65	49
2025	10,802	154	1,940	12,896	69	50
2030	11,208	204	2,174	13,587	69	52
2035	11,786	240	2,450	14,476	71	54
2040	12,496	260	2,606	15,362	74	56
2045	13,458	285	2,692	16,435	78	57
2050	14,115	293	2,750	17,158	81	59
2055	14,642	307	2,794	17,742	83	60
2060	14,819	307	2,819	17,946	84	60
2065	15,116	318	2,848	18,282	86	61
2070	15,320	330	2,876	18,526	87	61
2075	15,283	326	2,890	18,500	86	61
2080	15,505	337	2,898	18,740	87	61
2085	15,777	350	2,910	19,037	88	61
2090	15,826	351	2,928	19,104	88	62

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

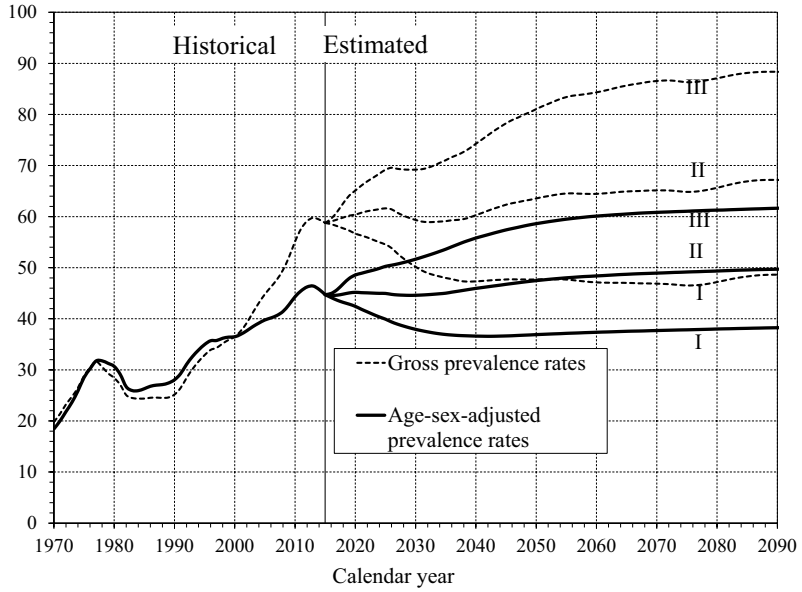
Note: Totals do not necessarily equal the sums of rounded components.

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 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 termination 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, 1970-2090
[Rate per thousand persons insured for disability benefits]



Age-sex-adjusted prevalence rates have increased primarily because: (1) termination rates have declined, (2) incidence rates at younger ages have increased relative to rates at older ages, 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 ever 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 underly-

ing 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 44.7 per thousand disability insured at the end of 2015 to 49.7 per thousand at the end of 2090. 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 38.3 per thousand and increases to 61.6 per thousand insured workers at the end of 2090, 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 (2016 through 2025), the Office of the Chief Actuary projects incidence and termination rates for each category of auxiliary beneficiary. After 2025, 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 are the sum of 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 amount 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 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 paying 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 88.3 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 83.0 percent for 2014.

For this report, the Trustees assume a level for the taxable ratio at the end of the short-range period (2025) of 82.5 percent for the intermediate assumptions, 81.0 percent for the high-cost assumptions (or 1.5 percentage points lower than the intermediate assumptions), and 84.0 percent for the low-cost assumptions (or 1.5 percentage points higher than the intermediate assumptions). These are the same assumptions that the Trustees made for the end of the short-range period (2024) for the 2015 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 of receipts.

[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.

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 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 2016.

[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
2017-18[e]	[f]	12.40	10.03	2.37	12.4000	10.0300	2.3700
2019 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 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 OASI and DI benefit payments.) Benefits are taxed for beneficiaries with adjusted income (including 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 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 2013 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 2016 and subsequent years. The illustrative benefit amounts in table V.C7 are presented in CPI-indexed 2016 dollars—that is, adjusted to 2016 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 2016 and subsequent years in CPI-indexed 2016 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 will increase 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 of pre-retirement earnings starting at age 21. The fifth pattern assumes the

[1] Actuarial Note 2016.3 has more details on scaled-earnings patterns. See www.ssa.gov/OACT/NOTES/ran3/an2016-3.pdf.

earnings history of a steady maximum earner starting at age 22. The four scaled-earnings patterns derive from earnings experienced by insured workers during 1993-2012. 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 $49,121 for 2016). 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 $12,280, $22,105, and $78,594, respectively, for 2016). 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 $118,500 for 2016).

Table V.C7.—Annual Scheduled Benefit Amounts for Retired Workers With Various Pre-Retirement Earnings Patterns Based on Intermediate Assumptions, Calendar Years 2016-2090

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 2016 dollars[h]
		Benefits in 2016 dollars[a] with retirement at normal retirement age					
2016	66:0	$9,025	$11,800	$19,455	$25,788	$31,418	$49,121
2020	66:2	9,722	12,722	20,976	27,794	34,021	52,913
2025	67:0	10,488	13,728	22,641	29,990	36,948	56,770
2030	67:0	11,255	14,733	24,284	32,171	39,661	60,429
2035	67:0	11,985	15,681	25,846	34,247	42,249	64,288
2040	67:0	12,752	16,681	27,499	36,434	44,913	68,226
2045	67:0	13,534	17,704	29,186	38,669	47,681	72,471
2050	67:0	14,376	18,811	31,001	41,076	50,593	77,033
2055	67:0	15,280	19,994	32,952	43,657	53,667	81,797
2060	67:0	16,226	21,230	34,987	46,359	56,913	86,764
2065	67:0	17,211	22,517	37,112	49,174	60,375	91,888
2070	67:0	18,229	23,848	39,302	52,077	63,945	97,169
2075	67:0	19,275	25,218	41,562	55,070	67,630	102,716
2080	67:0	20,379	26,660	43,934	58,214	71,500	108,546
2085	67:0	21,534	28,172	46,427	61,519	75,567	114,712
2090	67:0	22,757	29,773	49,065	65,012	79,871	121,296
		Benefits in 2016 dollars[a] with retirement at age 65					
2016	65:0	$8,617	$11,270	$18,579	$24,628	$29,897	$49,121
2020	65:0	8,967	11,729	19,343	25,624	31,256	52,913
2025	65:0	9,088	11,898	19,614	25,987	31,778	56,770
2030	65:0	9,753	12,768	21,039	27,883	34,134	60,429
2035	65:0	10,384	13,589	22,403	29,677	36,360	64,288
2040	65:0	11,051	14,454	23,827	31,573	38,657	68,226
2045	65:0	11,727	15,347	25,290	33,511	41,048	72,471
2050	65:0	12,461	16,302	26,867	35,598	43,550	77,033
2055	65:0	13,240	17,324	28,554	37,837	46,200	81,797
2060	65:0	14,062	18,399	30,321	40,177	48,999	86,764
2065	65:0	14,917	19,517	32,162	42,616	51,979	91,888
2070	65:0	15,798	20,668	34,062	45,133	55,054	97,169

Table V.C7.—Annual Scheduled Benefit Amounts for Retired Workers With Various Pre-Retirement Earnings Patterns Based on Intermediate Assumptions, Calendar Years 2016-2090 (Cont.)

2075	65:0	16,706	21,856	36,020	47,727	58,230	102,716
2080	65:0	17,661	23,105	38,076	50,452	61,564	108,546
2085	65:0	18,662	24,417	40,236	53,316	65,065	114,712
2090	65:0	19,723	25,803	42,522	56,343	68,770	121,296

[a] Annual amounts are the total for the 12-month period starting with the month of retirement, adjusted to be in 2016 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 2016 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 $4-$5 billion and the long-range summarized net cost for the OASI and DI Trust Funds is 0.04 percent of taxable payroll.

13. Military Service Transfers

Beginning in 1966, the General Fund of the Treasury reimbursed the OASI and DI Trust Funds annually for the cost (including administrative expenses) of providing additional benefit payments resulting from noncontributory wage credits for military service performed prior to 1957. The 1983 amendments modified the reimbursement mechanism and the timing of the reimbursements, and required a reimbursement in 1983 to include all future costs attributable to the wage credits. The amendments also require adjustments to that 1983 reimbursement every fifth year, beginning with 1985, to account for actual data. The Bipartisan Budget Act of 2015 eliminated the requirement for this adjustment every fifth year.

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 outgo. 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 receipts of these two funds are amounts appropriated 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 month 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 Law 110-246; and (6) payroll tax revenue forgone under the provisions of Public Laws 111-147, 111-312, 112-78, and 112-96.

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[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.

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 issues in the open market, Treasury redeems special issues prior to

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[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.

maturity at par value when needed to meet current operating expenses. Given this separation from market-based valuations, changes in market yield rates do not cause fluctuations in principal value. 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.

The primary annual expenditures of the OASI and DI Trust Funds are: (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 expenditures for construction, rental and lease, or purchase of office buildings and related facilities for the Social Security Administration. The Social Security Act prohibits expenditures from the OASI and DI Trust Funds for any purpose not related to the payment of benefits or administrative costs for the OASDI program.

The expenditures of the trust funds also include: (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 expenditures. As a result of this unavailability, the actuarial status of the trust funds does not take these assets into account.

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[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.

Table VI.A1.— Operations of the OASI Trust Fund, Calendar Years 1937-2015
[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[ad]	Administrative costs	RRB interchange	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

Table VI.A1.— Operations of the OASI Trust Fund, Calendar Years 1937-2015 (Cont.)
[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]
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

[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.

[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 expenditures 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 1957-2015
[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	[h]35
1985	19.3	17.0	1.2	.2	.9	19.5	18.8	.6	[f]	[g]2.4	6.3	[h]27
1986	19.4	18.2	.2	.2	.8	20.5	19.9	.6	$0.1	[g]1.5	7.8	[h]38
1987	20.3	19.5	.2	[f]	.6	21.4	20.5	.8	.1	-1.1	6.7	[h]44
1988	22.7	21.8	.2	.1	.6	22.5	21.7	.7	.1	.2	6.9	[h]38
1989	24.8	23.8	.2	.1	.7	23.8	22.9	.8	.1	1.0	7.9	[h]38
1990	28.8	28.4	-.6	.1	.9	25.6	24.8	.7	.1	3.2	11.1	[h]40
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

Table VI.A2.— Operations of the DI Trust Fund, Calendar Years 1957-2015 (Cont.)
[Dollar amounts in billions]

	Income					Cost				Asset Reserves[a]		
Calendar year	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]
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

[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.
[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 expenditures 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 1957-2015
[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	93.0	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	[h]21
1985 . .	203.5	192.1	5.2	3.4	2.7	190.6	186.1	2.2	2.4	[g]11.1	42.2	[h]24
1986 . .	216.8	207.4	1.9	3.7	3.9	201.5	196.7	2.2	2.7	[g] 4.7	46.9	[h]29
1987 . .	231.0	220.6	1.9	3.2	5.3	209.1	204.1	2.4	2.6	21.9	68.8	[h]31
1988 . .	263.5	249.5	2.3	3.4	8.2	222.5	217.1	2.5	2.9	41.0	109.8	[h]41
1989 . .	289.4	271.9	2.3	2.5	12.7	236.2	230.9	2.4	2.9	53.2	163.0	[h]57
1990 . .	315.4	294.5	-1.3	5.0	17.2	253.1	247.8	2.3	3.0	62.3	225.3	[h]75
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
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

Table VI.A3.— Operations of the Combined OASI and DI Trust Funds, Calendar Years 1957-2015 (Cont.)
[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]
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

[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.
[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 expenditures 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 2014 and 2015. The tables show reserves by interest rate and year of maturity. Bonds issued to the trust funds in 2015 had an interest rate of 2.00 percent, compared with an interest rate of 2.25 percent for bonds issued in 2014.

Table VI.A4.—OASI Trust Fund Asset Reserves, End of Calendar Years 2014 and 2015
[In thousands]

	December 31, 2014	December 31, 2015
Obligations sold only to the trust funds (special issues):		
Certificates of indebtedness:		
2.000 percent, 2015	$57,308,984	—
2.125 percent, 2016	—	$38,935,438
Bonds:		
1.375 percent, 2016	6,693,019	—
1.375 percent, 2017-25	60,237,180	60,237,180
1.375 percent, 2026	6,693,019	6,693,019
1.375 percent, 2027	173,240,401	173,240,401
1.750 percent, 2016	4,908,186	—
1.750 percent, 2017-18	9,816,372	9,816,372
1.750 percent, 2019-25	34,357,295	34,357,295
1.750 percent, 2026-27	9,816,372	9,816,372
1.750 percent, 2028	178,148,587	178,148,587
2.000 percent, 2017-19	—	10,966,887
2.000 percent, 2020-25	—	21,933,768
2.000 percent, 2026-29	—	14,622,516
2.000 percent, 2030	—	185,790,628
2.250 percent, 2016	3,986,412	—
2.250 percent, 2017-18	7,972,824	7,972,824
2.250 percent, 2019-25	27,904,891	27,904,891
2.250 percent, 2026-28	11,959,236	11,959,236
2.250 percent, 2029	182,134,999	182,134,999
2.500 percent, 2016	5,971,788	—
2.500 percent, 2017-25	53,746,083	53,746,083
2.500 percent, 2026	166,547,382	166,547,382
2.875 percent, 2016	7,264,432	—
2.875 percent, 2017-24	58,115,456	58,115,456
2.875 percent, 2025	160,575,595	160,575,595
3.250 percent, 2016	10,628,270	—
3.250 percent, 2017-23	74,397,890	74,397,890
3.250 percent, 2024	153,311,163	153,311,163
3.500 percent, 2016	9,513,752	—
3.500 percent, 2017	9,513,752	9,513,752
3.500 percent, 2018	86,900,994	86,900,994
4.000 percent, 2015	977,473	—
4.000 percent, 2016	12,075,192	—
4.000 percent, 2017-22	72,451,152	72,451,152
4.000 percent, 2023	142,682,893	142,682,893
4.125 percent, 2015	10,516,946	—
4.125 percent, 2016	10,516,946	9,936,522
4.125 percent, 2017-19	31,550,838	31,550,838
4.125 percent, 2020	106,585,700	106,585,700
4.625 percent, 2015	9,167,664	—
4.625 percent, 2016-18	27,502,989	27,502,989
4.625 percent, 2019	96,068,657	96,068,657
5.000 percent, 2015	12,454,232	—
5.000 percent, 2016-21	74,725,392	74,725,392
5.000 percent, 2022	130,607,701	130,607,701
5.125 percent, 2015	11,567,866	—
5.125 percent, 2016-19	46,271,464	46,271,464
5.125 percent, 2020	11,567,769	11,567,769
5.125 percent, 2021	118,153,469	118,153,469

Table VI.A4.—OASI Trust Fund Asset Reserves, End of Calendar Years 2014 and 2015
[In thousands]

	December 31, 2014	December 31, 2015
Bonds (Cont.):		
5.250 percent, 2015	$9,235,912	—
5.250 percent, 2016	9,235,911	$9,235,911
5.250 percent, 2017	77,387,242	77,387,242
5.625 percent, 2015	9,621,437	—
5.625 percent, 2016	68,151,331	68,151,331
6.500 percent, 2015	58,529,893	—
Total investments	2,729,270,403	2,760,517,758
Undisbursed balances[a]	-37,873	19,733,589
Total asset reserves	2,729,232,530	2,780,251,347

[a] A negative amount for each year represents a situation where actual program cash expenditures exceeded the amount of invested securities of the OASI Trust Fund that were redeemed to pay for such expenditures. In this situation, future redemption of additional invested securities will be required to pay for this shortfall. For 2015 and other calendar years where January 3 of the following year is a Sunday, a positive amount is shown on a liability basis for benefits scheduled to be paid on January 3 of the following year that were, by law, actually paid on the preceding December 31.

Note: Amounts of special issues are at par value. The trust fund purchases and redeems special issues 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 2014 and 2015
[In thousands]

	December 31, 2014	December 31, 2015
Obligations sold only to the trust funds (special issues):		
Certificates of indebtedness:		
2.000 percent, 2015	$3,493,788	—
Bonds:		
4.000 percent, 2021	622,572	—
4.000 percent, 2022	622,572	—
4.000 percent, 2023	14,675,554	$14,675,554
4.125 percent, 2020	11,649,018	—
5.000 percent, 2020	476,584	—
5.000 percent, 2021	476,584	—
5.000 percent, 2022	14,052,982	11,425,890
5.125 percent, 2020	665,115	—
5.125 percent, 2021	13,576,398	—
Total investments	60,311,167	26,101,444
Undisbursed balances[a]	-67,279	6,157,191
Total asset reserves	60,243,888	32,258,635

[a] A negative amount for each year represents a situation where actual program cash expenditures exceeded the amount of invested securities of the DI Trust Fund that were redeemed to pay for such expenditures. In this situation, future redemption of additional invested securities will be required to pay for this shortfall. For 2015 and other calendar years where January 3 of the following year is a Sunday, a positive amount is shown on a liability basis for benefits scheduled to be paid on January 3 of the following year that were, by law, actually paid on the preceding December 31.

Note: Amounts of special issues are at par value. The trust fund purchases and redeems special issues 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. The actuarial balance is the principal summary measure of long-range actuarial status. 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. Section IV.B.4 defines summarized income rate, summarized cost rate, and actuarial balance in detail. For any given period, the actuarial balance is 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 prior to 1973 used the current method of calculating the actuarial balance based on present values, but the reports of 1973-87 did not. During that period, the reports used the average-cost method, a simpler method which approximates the results of the present-value approach. 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 long-range financing of the program was more nearly on a pay-as-you-go basis. Also, the long-range demographic and economic assumptions in that report produced an annual rate of growth in taxable payroll which was about the same as the annual rate at which the trust funds earned interest. In either situation (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 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 situations still existed.

After the 1977 and 1983 Social Security Amendments, estimates showed substantial increases in the trust funds continuing well into the 21st century. These laws changed the program's financing from essentially pay-as-you-go to partial advance funding. Also, the reports from 1973 through 1987 phased in reductions in long-range fertility rates and average real-wage growth, which produced an annual rate of growth in long-range taxable earnings which was significantly lower than the assumed interest rate. 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 in the reports for 1973 through 1987 began to diverge, and by 1988 they were quite different. While the average-cost method still accounted for most of the effects of the assumed interest rate, it no longer accounted for all of the interest effects. The present-value method, by contrast, accounts for the full effect of the assumed interest rates. The 1988 report reintroduced the present-value method of calculating the actuarial balance in order to fully reflect the effects of interest.

A positive actuarial balance indicates that estimated income is more than sufficient to meet estimated trust fund obligations for the period as a whole. A negative actuarial balance indicates that estimated income is insufficient to meet estimated trust fund obligations for the entire period. An actuarial balance of zero indicates that the estimated income exactly matches estimated trust fund obligations for the 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 prior to 1991 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 1982-2016[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

[a] The reports compute 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 2016.8 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 accounted for the largest single change in recent history: 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 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. These mortality changes resulted in lower death rates for the population age 65 and over. Adding to this negative effect were near-term lower levels of net other immigration and real earnings than assumed in the 2010 report.

For the 2012 report, changes in economic assumptions and starting values accounted for about half of the decrease in actuarial balance. Updating starting economic data resulted in higher benefit levels, lower payroll taxes, and lower real interest rates in the short term than projected in the previous year. 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. The primary factors improving the actuarial balance were changes in ultimate age-sex specific unemployment rates, changes in modeling the number of workers insured, changes in average benefit levels due to the update of the sample, changes in projections of income from taxation of benefits, and other method changes and data updates.

For the 2014 report, changes in economic data and assumptions accounted for the majority of the net change in the actuarial balance. In particular, the 2014 report includes a lower projected ratio of average taxable earnings to the average wage index throughout the long-range period, resulting in lower payroll taxes relative to benefit levels. In addition, the estimated level of full-employment (potential) GDP is about 1 percent lower in the 2014 report, resulting in lower earnings and payroll taxes for the future. This change reflects the fact that GDP growth has not been as strong so far in the economic recovery as had been experienced in prior recoveries. 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. The most significant methodological changes were improvements to

the method for projecting earnings levels of newly entitled worker beneficiaries, using a 10-percent sample of actual worker beneficiaries. 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.

Section IV.B.6 describes changes affecting the actuarial balance shown for the 2016 report.

C. FISCAL YEAR HISTORICAL AND PROJECTED TRUST FUND OPERATIONS THROUGH 2025

Tables VI.C1, VI.C2, and VI.C3 contain details of the fiscal year 2015 operations of the OASI, DI, and the combined OASI and DI Trust Funds, respectively. The fiscal year for the U.S. Government is the 12-month period ending September 30. Fiscal year 2015 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 outgo.

Table VI.C1.—Operations of the OASI Trust Fund, Fiscal Year 2015
[In millions]

Total asset reserves, September 30, 2014		$2,712,699
Receipts:		
Net payroll tax contributions:		
Payroll tax contributions[a]	$674,639	
Payments from the General Fund of the Treasury for payroll tax contributions subject to refund[a]	-2,393	
Net payroll tax contributions[a]		672,246
Reimbursements from the General Fund:		
Reduction in payroll tax contributions due to P.L.s 111-312, 112-78, and 112-96[a]	205	
Reimbursements directed by P.L. 110-246	7	
Payroll tax credits due to P.L. 98-21[a]	[b]	
Net General Fund reimbursements[a]		211
Income based on taxation of benefit payments:		
Withheld from benefit payments to nonresident aliens	189	
All other, not subject to withholding[a]	29,438	
Total income from taxation of benefits[a]		29,627
Investment income and interest adjustments:		
Interest on investments	93,234	
Interest adjustments[c]	1	
Total investment income and interest adjustments		93,235
Gifts		—
Total receipts		795,319
Disbursements:		
Benefit payments:		
Monthly benefits and lump-sum death payments[d]	733,742	
Reimbursement from the General Fund for unnegotiated checks	-34	
Payment for costs of vocational rehabilitation services for disabled beneficiaries	2	
Net benefit payments[d]		733,711
Financial interchange with the Railroad Retirement "Social Security Equivalent Benefit Account"		4,258
Administrative expenses:		
Costs incurred by:		
Social Security Administration	3,003	
Department of the Treasury	502	
Offsetting miscellaneous receipts	-5	
Miscellaneous reimbursements from the General Fund [e]	-5	
Net administrative expenses		3,496
Total disbursements		741,464
Net increase in asset reserves		53,855
Total invested assets	2,766,649	
Undisbursed balances[f]	-95	
Total asset reserves, September 30, 2015		2,766,554

[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 expenditures exceeded the amount of invested securities of the OASI Trust Fund that were redeemed to pay for such expenditures. 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 2015
[In millions]

Total asset reserves, September 30, 2014		$69,925
Receipts:		
Net payroll tax contributions:		
Payroll tax contributions[a]	$114,562	
Payments from the General Fund of the Treasury for payroll tax contributions subject to refund[a]	-406	
Net payroll tax contributions[a]		114,156
Reimbursements from the General Fund:		
Reduction in payroll tax contributions due to P.L.s 111-312, 112-78, and 112-96[a]	38	
Reimbursements directed by P.L. 110-246	1	
Payroll tax credits due to P.L. 98-21[a]	[b]	
Net General Fund reimbursements[a]		39
Income based on taxation of benefit payments:		
Withheld from benefit payments to nonresident aliens	4	
All other, not subject to withholding[a]	1,032	
Total income from taxation of benefits[a]		1,036
Investment income and interest adjustments:		
Interest on investments	2,732	
Interest adjustments[c]	1	
Total investment income and interest adjustments		2,733
Total receipts		117,965
Disbursements:		
Benefit payments:		
Monthly benefits[d]	142,835	
Reimbursement from the General Fund for unnegotiated checks	-19	
Payment for costs of vocational rehabilitation services for disabled beneficiaries	108	
Net benefit payments[d]		142,923
Financial interchange with the Railroad Retirement "Social Security Equivalent Benefit Account"		419
Administrative expenses:		
Costs incurred by:		
Social Security Administration	2,793	
Department of the Treasury	88	
Demonstration projects	15	
Miscellaneous reimbursements from the General Fund[e]	-3	
Net administrative expenses		2,892
Total disbursements		146,234
Net increase in asset reserves		-28,269
Total invested assets	41,638	
Undisbursed balances[f]	18	
Total asset reserves, September 30, 2015		41,656

[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 positive balance represents a situation where more of the invested securities of the DI Trust Fund were redeemed than was needed to cover actual program cash expenditures.

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 2015
[In millions]

Total asset reserves, September 30, 2014		$2,782,624
Receipts:		
Net payroll tax contributions:		
Payroll tax contributions[a]	$789,201	
Payments from the General Fund of the Treasury for payroll tax contributions subject to refund[a]	-2,800	
Net payroll tax contributions[a]		786,402
Reimbursements from the General Fund:		
Reduction in payroll tax contributions due to P.L.s 111-312, 112-78, and 112-96[a]	243	
Reimbursements directed by P.L. 110-246	8	
Payroll tax credits due to P.L. 98-21[a]	[b]	
Net General Fund reimbursements[a]		251
Income based on taxation of benefit payments:		
Withheld from benefit payments to nonresident aliens	193	
All other, not subject to withholding[a]	30,470	
Total income from taxation of benefits[a]		30,663
Investment income and interest adjustments:		
Interest on investments	95,966	
Interest adjustments[c]	2	
Total investment income and interest adjustments		95,968
Gifts		—
Total receipts		913,284
Disbursements:		
Benefit payments:		
Monthly benefits and lump-sum death payments[d]	876,577	
Reimbursement from the General Fund for unnegotiated checks	-53	
Payment for costs of vocational rehabilitation services for disabled beneficiaries	110	
Net benefit payments[d]		876,634
Financial interchange with the Railroad Retirement "Social Security Equivalent Benefit Account"		4,677
Administrative expenses:		
Costs incurred by:		
Social Security Administration	5,796	
Department of the Treasury	590	
Offsetting miscellaneous receipts	-5	
Demonstration projects	15	
Miscellaneous reimbursements from the General Fund[e]	-8	
Net administrative expenses		6,388
Total disbursements		887,698
Net increase in asset reserves		25,586
Total invested assets	2,808,287	
Undisbursed balances[f]	-78	
Total asset reserves, September 30, 2015		2,808,210

[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 expenditures exceeded the amount of invested securities of the OASI and DI Trust Funds that were redeemed to pay for such expenditures. 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 2011 through 2025.

Table VI.C4.—Operations of the OASI Trust Fund, Fiscal Years 2011-2025
[Dollar amounts in billions]

Fiscal year	Income					Cost				Asset Reserves		
	Total	Net payroll tax contributions	GF reimbursements[a]	Taxation of benefits[b]	Net interest	Total	Scheduled benefits	Administrative costs	RRB interchange	Net increase during year	Amount at end of year	Trust fund ratio[c]
Historical data:												
2011	$692.5	$495.0	$68.9	$21.2	$107.4	$599.2	$591.5	$3.6	$4.1	$93.3	$2,491.7	400
2012	729.0	500.7	95.9	27.2	105.2	634.7	627.2	3.4	4.1	94.3	2,585.9	393
2013	739.7	590.0	26.4	23.1	100.1	670.6	663.2	3.4	3.9	69.1	2,655.0	386
2014	763.3	642.3	.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
Intermediate:												
2016	789.4	669.1	.1	31.2	89.1	770.9	763.4	3.2	4.2	18.6	2,785.1	359
2017	815.8	692.9	[d]	36.4	86.5	804.0	796.5	3.3	4.1	11.8	2,796.9	346
2018	862.7	737.4	[d]	39.9	85.4	857.8	849.9	3.3	4.5	4.9	2,801.9	326
2019	942.3	811.0	[d]	43.7	87.6	919.7	911.6	3.5	4.6	22.6	2,824.5	305
2020	999.9	863.6	[d]	47.6	88.6	985.0	976.7	3.6	4.7	14.9	2,839.4	287
2021	1,058.5	915.6	[d]	51.8	91.1	1,051.0	1,042.5	3.7	4.7	7.5	2,846.9	270
2022	1,113.6	964.4	[d]	56.4	92.9	1,123.2	1,114.4	3.9	5.0	-9.7	2,837.2	253
2023	1,161.5	1,006.5	[d]	61.3	93.7	1,201.8	1,192.7	4.0	5.1	-40.3	2,796.9	236
2024	1,216.4	1,054.3	[d]	66.7	95.4	1,285.8	1,276.5	4.1	5.2	-69.4	2,727.4	218
2025	1,269.2	1,100.9	[d]	72.4	95.8	1,372.7	1,363.2	4.2	5.2	-103.5	2,623.9	199
Low-cost:												
2016	791.8	671.2	.1	31.2	89.3	770.6	763.1	3.2	4.2	21.2	2,787.8	359
2017	836.0	710.9	[d]	36.5	88.6	805.9	798.5	3.3	4.1	30.1	2,817.9	346
2018	902.6	769.7	[d]	40.2	92.7	864.9	857.1	3.3	4.5	37.7	2,855.6	326
2019	1,002.0	860.4	[d]	44.3	97.3	932.0	923.8	3.5	4.6	70.0	2,925.6	306
2020	1,082.5	929.4	[d]	48.5	104.6	1,002.6	994.1	3.7	4.7	79.9	3,005.5	292
2021	1,162.4	997.9	[d]	52.9	111.6	1,074.5	1,065.9	3.9	4.7	88.0	3,093.5	280
2022	1,241.4	1,064.3	[d]	57.9	119.3	1,153.4	1,144.3	4.1	5.0	88.0	3,181.5	268
2023	1,319.9	1,127.0	[d]	63.3	129.6	1,239.6	1,230.2	4.3	5.2	80.2	3,261.7	257
2024	1,408.2	1,197.9	[d]	69.1	141.1	1,332.5	1,322.8	4.4	5.3	75.7	3,337.4	245
2025	1,497.6	1,269.1	[d]	75.4	153.0	1,429.7	1,419.7	4.6	5.3	67.9	3,405.3	233
High-cost:												
2016	785.9	665.6	.1	31.2	89.0	771.2	763.7	3.2	4.2	14.8	2,781.3	359
2017	779.2	659.2	[d]	36.4	83.6	803.8	796.3	3.3	4.2	-24.6	2,756.7	346
2018	805.5	686.5	[d]	39.6	79.4	851.7	843.8	3.3	4.6	-46.2	2,710.5	324
2019	869.3	748.9	[d]	43.2	77.3	908.7	900.5	3.4	4.7	-39.3	2,671.2	298
2020	908.6	786.7	[d]	46.9	75.1	968.8	960.6	3.5	4.8	-60.2	2,611.0	276
2021	946.6	823.8	[d]	50.7	72.2	1,029.0	1,020.7	3.6	4.7	-82.3	2,528.6	254
2022	981.0	857.8	[d]	54.9	68.3	1,094.6	1,085.9	3.7	5.0	-113.6	2,415.0	231
2023	1,008.8	886.6	[d]	59.5	62.7	1,165.5	1,156.6	3.8	5.1	-156.7	2,258.3	207
2024	1,041.1	919.0	[d]	64.4	57.8	1,240.5	1,231.5	3.9	5.2	-199.4	2,058.9	182
2025	1,070.4	948.7	[d]	69.5	52.2	1,317.1	1,308.1	3.9	5.1	-246.7	1,812.2	156

[a] Includes 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 of benefits to certain uninsured persons who attained age 72 before 1968; (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.

[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 2011-2025[a]
[Dollar amounts in billions]

Fiscal year	Income					Cost				Asset Reserves		
	Total	Net payroll tax contributions	GF reimbursements[b]	Taxation of benefits[c]	Net interest	Total	Scheduled benefits	Administrative costs	RRB interchange	Net increase during year	Amount at end of year	Trust fund ratio[d]
Historical data:												
2011	$106.2	$84.0	$11.7	$1.9	$8.6	$131.5	$128.0	$3.0	$0.5	-$25.3	$161.7	142
2012	108.8	85.1	16.2	.4	7.2	138.5	135.1	2.9	.5	-29.7	132.0	117
2013	111.3	100.2	4.5	1.1	5.5	142.8	139.4	2.8	.6	-31.5	100.5	92
2014	114.1	109.1	[e]	1.0	4.0	144.7	141.3	2.9	.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
Intermediate:												
2016	148.4	145.7	[e]	1.2	1.5	148.9	145.5	3.1	.3	-.5	41.2	28
2017	167.4	163.7	[e]	2.1	1.6	151.9	148.6	3.1	.2	15.5	56.7	27
2018	178.9	174.2	[e]	2.2	2.4	157.5	154.3	3.1	.1	21.3	78.0	36
2019	156.9	151.3	[e]	2.4	3.2	164.4	160.9	3.5	[e]	-7.5	70.5	47
2020	152.0	146.7	[e]	2.6	2.7	171.1	167.2	3.8	.1	-19.1	51.3	41
2021	160.2	155.5	[e]	2.8	1.9	178.5	174.3	4.1	.1	-18.3	33.0	29
2022	168.0	163.8	[e]	3.0	1.2	186.5	182.1	4.4	.1	-18.6	14.4	18
2023	[f]	170.9	[e]	3.3	[f]	194.8	190.1	4.7	[e]	[f]	[f]	7
2024	[f]	179.0	[e]	3.5	[f]	203.0	198.1	4.9	[e]	[f]	[f]	[f]
2025	[f]	186.9	[e]	3.8	[f]	212.0	206.8	5.2	[e]	[f]	[f]	[f]
Low-cost:												
2016	148.9	146.2	[e]	1.2	1.6	147.5	144.1	3.1	.3	1.5	43.1	28
2017	172.0	168.0	[e]	2.0	2.0	149.1	145.8	3.1	.2	22.9	66.0	29
2018	187.4	181.9	[e]	2.2	3.3	153.6	150.4	3.1	.1	33.8	99.8	43
2019	167.6	160.3	[e]	2.4	4.9	159.2	155.6	3.5	[e]	8.4	108.2	63
2020	165.6	157.8	[e]	2.5	5.2	164.7	160.7	3.9	.1	.9	109.1	66
2021	177.6	169.5	[e]	2.7	5.4	170.9	166.5	4.3	.1	6.7	115.8	64
2022	189.5	180.7	[e]	2.9	5.9	177.8	173.1	4.6	[e]	11.8	127.5	65
2023	201.5	191.4	[e]	3.1	7.0	185.0	180.1	5.0	[e]	16.4	144.0	69
2024	215.0	203.4	[e]	3.3	8.2	192.4	187.1	5.3	[e]	22.6	166.5	75
2025	228.9	215.5	[e]	3.5	9.8	200.6	194.9	5.7	[e]	28.3	194.8	83
High-cost:												
2016	147.6	144.8	[e]	1.2	1.5	150.2	146.8	3.1	.3	-2.6	39.0	28
2017	159.2	155.8	[e]	2.1	1.4	155.4	152.1	3.1	.2	3.8	42.9	25
2018	166.1	162.2	[e]	2.3	1.5	162.8	159.5	3.1	.1	3.3	46.1	26
2019	144.0	139.9	[e]	2.5	1.6	171.2	167.7	3.4	.1	-27.3	18.9	27
2020	[f]	133.6	[e]	2.8	[f]	178.6	174.8	3.7	.1	[f]	[f]	11
2021	[f]	139.9	[e]	3.0	[f]	186.2	182.1	3.9	.1	[f]	[f]	[f]
2022	[f]	145.7	[e]	3.2	[f]	194.4	190.1	4.2	.1	[f]	[f]	[f]
2023	[f]	150.6	[e]	3.4	[f]	202.9	198.4	4.4	.1	[f]	[f]	[f]
2024	[f]	156.1	[e]	3.6	[f]	211.3	206.7	4.6	[e]	[f]	[f]	[f]
2025	[f]	161.1	[e]	3.9	[f]	220.4	215.6	4.8	[e]	[f]	[f]	[f]

[a] The DI Trust Fund becomes depleted in fiscal years 2023 and 2020 under the intermediate and high-cost assumptions, respectively. 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 non-contributory wage credits for military service before 1957; (2) the cost of payroll tax credits provided to employees in 1984 and self-employed persons in 1984-89 by Public Law 98-21; (3) the cost in 2009-17 of excluding certain self-employment earnings from SECA taxes under Public Law 110-246; and (4) 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 2011-2025
[Dollar amounts in billions]

Fiscal year	Income					Cost				Asset Reserves		
	Total	Net payroll tax contributions	GF reimbursements[a]	Taxation of benefits[b]	Net interest	Total	Scheduled benefits	Administrative costs	RRB interchange	Net increase during year	Amount at end of year	Trust fund ratio[c]
Historical data:												
2011 . .	$798.7	$579.1	$80.6	$23.1	$116.0	$730.7	$719.5	$6.7	$4.6	$68.0	$2,653.3	354
2012 . .	837.8	585.7	112.2	27.5	112.4	773.2	762.3	6.3	4.7	64.6	2,717.9	343
2013 . .	850.9	690.1	30.9	24.2	105.7	813.3	802.6	6.2	4.5	37.6	2,755.5	334
2014 . .	877.4	751.3	.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
Intermediate:												
2016 . .	937.9	814.7	.1	32.4	90.6	919.8	908.9	6.3	4.6	18.1	2,826.3	305
2017 . .	983.2	856.6	[d]	38.5	88.1	955.9	945.2	6.4	4.3	27.3	2,853.6	296
2018 . .	1,041.5	911.6	[d]	42.1	87.8	1,015.3	1,004.2	6.4	4.6	26.2	2,879.9	281
2019 . .	1,099.2	962.3	[d]	46.1	90.8	1,084.1	1,072.5	7.0	4.7	15.1	2,894.9	266
2020 . .	1,151.9	1,010.3	[d]	50.3	91.3	1,156.1	1,143.9	7.4	4.8	-4.3	2,890.7	250
2021 . .	1,218.7	1,071.1	[d]	54.6	93.0	1,229.5	1,216.9	7.9	4.8	-10.8	2,879.9	235
2022 . .	1,281.5	1,128.1	[d]	59.4	94.0	1,309.8	1,296.5	8.3	5.1	-28.2	2,851.6	220
2023 . .	1,335.7	1,177.4	[d]	64.6	93.7	1,396.6	1,382.8	8.7	5.1	-60.9	2,790.7	204
2024 . .	1,398.0	1,233.3	[d]	70.2	94.5	1,488.8	1,474.6	9.1	5.2	-90.8	2,699.9	187
2025 . .	1,457.9	1,287.9	[d]	76.2	93.9	1,584.7	1,570.0	9.4	5.2	-126.7	2,573.2	170
Low-cost:												
2016 . .	940.7	817.3	.1	32.4	90.9	918.0	907.2	6.3	4.6	22.7	2,830.9	306
2017 . .	1,008.0	878.9	[d]	38.5	90.5	955.0	944.3	6.4	4.3	53.0	2,883.9	296
2018 . .	1,090.0	951.6	[d]	42.4	96.0	1,018.5	1,007.5	6.4	4.6	71.5	2,955.4	283
2019 . .	1,169.6	1,020.8	[d]	46.6	102.2	1,091.2	1,079.5	7.1	4.7	78.4	3,033.8	271
2020 . .	1,248.1	1,087.2	[d]	51.0	109.8	1,167.3	1,154.8	7.6	4.8	80.8	3,114.6	260
2021 . .	1,340.0	1,167.4	[d]	55.6	117.0	1,245.4	1,232.4	8.2	4.8	94.6	3,209.3	250
2022 . .	1,430.9	1,245.0	[d]	60.7	125.2	1,331.2	1,317.4	8.7	5.1	99.8	3,309.1	241
2023 . .	1,521.3	1,318.4	[d]	66.3	136.6	1,424.7	1,410.3	9.2	5.2	96.6	3,405.7	232
2024 . .	1,623.1	1,401.4	[d]	72.4	149.3	1,524.9	1,509.9	9.8	5.3	98.2	3,503.9	223
2025 . .	1,726.5	1,484.6	[d]	79.0	162.8	1,630.2	1,614.6	10.3	5.3	96.2	3,600.1	215
High-cost:												
2016 . .	933.5	810.5	.1	32.4	90.5	921.4	910.5	6.3	4.6	12.1	2,820.3	305
2017 . .	938.4	814.9	[d]	38.5	84.9	959.1	948.4	6.4	4.3	-20.8	2,799.6	294
2018 . .	971.6	848.8	[d]	41.9	80.9	1,014.5	1,003.3	6.4	4.7	-42.9	2,756.7	276
2019 . .	1,013.3	888.7	[d]	45.7	78.8	1,079.9	1,068.3	6.9	4.8	-66.6	2,690.1	255
2020 . .	1,045.1	920.3	[d]	49.6	75.2	1,147.5	1,135.4	7.2	4.9	-102.4	2,587.7	234
2021 . .	1,088.0	963.7	[d]	53.6	70.7	1,215.2	1,202.8	7.5	4.8	-127.1	2,460.6	213
2022 . .	1,126.6	1,003.4	[d]	58.1	65.1	1,289.0	1,276.1	7.8	5.1	-162.5	2,298.1	191
2023 . .	1,157.3	1,037.2	[d]	62.9	57.3	1,368.4	1,355.1	8.1	5.1	-211.0	2,087.1	168
2024 . .	1,193.0	1,075.0	[d]	68.0	50.0	1,451.8	1,438.2	8.4	5.2	-258.8	1,828.3	144
2025 . .	1,225.0	1,109.8	[d]	73.4	41.8	1,537.5	1,523.6	8.7	5.2	-312.4	1,515.8	119

[a] Includes 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 of benefits to certain uninsured persons who attained age 72 before 1968; (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.
[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 various 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 2032, 2027, and 2024 under alternatives III, II, and I, respectively.

Table VI.D1.—Sensitivity of OASDI Measures to Varying 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: 2016-40	14.66	14.67	14.67
50-year: 2016-65	14.04	14.03	14.01
75-year: 2016-90	13.88	13.84	13.80
Summarized cost rate:			
25-year: 2016-40	16.14	16.15	16.16
50-year: 2016-65	16.41	16.26	16.10
75-year: 2016-90	16.90	16.50	16.09
Actuarial balance:			
25-year: 2016-40	-1.47	-1.48	-1.50
50-year: 2016-65	-2.36	-2.23	-2.09
75-year: 2016-90	-3.02	-2.66	-2.28
Annual balance for 2090	-5.84	-4.35	-3.03
Year of combined trust fund reserve depletion	2034	2034	2034

[a] The total fertility rate for any year is the average number of children that would be born to a woman in her lifetime 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 2032, 2027, and 2024 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 16.90 to 16.09 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 -3.02 to -2.28 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 0.18 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 various assumptions about future reduc-

tions in death rates for the period from 2015 to 2090. 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 0.42 percent, 0.78 percent, and 1.16 percent for alternatives I, II, and III, respectively.

Table VI.D2.—Sensitivity of OASDI Measures to Varying Death-Rate Assumptions
[As a percentage of taxable payroll]

Valuation period	Average annual death-rate reduction[a] [b]		
	0.42 percent	0.78 percent	1.16 percent
Summarized income rate:			
25-year: 2016-40	14.67	14.67	14.66
50-year: 2016-65	14.02	14.03	14.04
75-year: 2016-90	13.83	13.84	13.86
Summarized cost rate:			
25-year: 2016-40	15.99	16.15	16.32
50-year: 2016-65	15.91	16.26	16.64
75-year: 2016-90	16.01	16.50	17.02
Actuarial balance:			
25-year: 2016-40	-1.32	-1.48	-1.66
50-year: 2016-65	-1.89	-2.23	-2.60
75-year: 2016-90	-2.18	-2.66	-3.16
Annual balance for 2090	-3.37	-4.35	-5.31
Year of combined trust fund reserve depletion	2034	2034	2033

[a] The average annual death-rate reduction is the average annual geometric rate of decline in the age-sex-adjusted death rate between 2015 and 2090. The overall age-sex-adjusted death rate decreases from 2015 to 2090 by 27 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: 0.42 percent from the alternative I assumptions, 0.78 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 15.99 percent (for an average annual death-rate reduction of 0.42 percent) to 16.32 percent (for an average annual death-rate reduction of 1.16 percent). The 75-year cost rate increases from 16.01 to 17.02 percent. The actuarial balance decreases from -1.32 to -1.66 percent for the 25-year period, and from -2.18 to -3.16 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 various assumptions about the magnitude of net immigration (immigration minus emigration). The Trustees assume annual levels of immigration and emigration, with new annual immigration averaging 961,000 persons, 1,291,000 persons, and 1,629,000 persons over the long-range period under alternatives III, II, and I, respectively.

Table VI.D3.—Sensitivity of OASDI Measures to Varying Net-Immigration Assumptions
[As a percentage of taxable payroll]

	Average annual net immigration[a] [b]		
Valuation period	961,000	1,291,000	1,629,000
Summarized income rate:			
25-year: 2016-40	14.70	14.67	14.64
50-year: 2016-65	14.06	14.03	13.99
75-year: 2016-90	13.88	13.84	13.81
Summarized cost rate:			
25-year: 2016-40	16.35	16.15	15.98
50-year: 2016-65	16.53	16.26	16.02
75-year: 2016-90	16.81	16.50	16.24
Actuarial balance:			
25-year: 2016-40	-1.65	-1.48	-1.34
50-year: 2016-65	-2.46	-2.23	-2.03
75-year: 2016-90	-2.93	-2.66	-2.43
Annual balance for 2090	-4.81	-4.35	-3.96
Year of combined trust fund reserve depletion	2033	2034	2035

[a] Net immigration per year is the annual net immigration to the Social Security area, including both legal and other immigration, averaged over the 75-year projection period.
[b] The average annual net immigration assumptions used for this analysis are: 961,000 from the alternative III assumptions, 1,291,000 from the alternative II assumptions, and 1,629,000 from the alternative I assumptions. All other assumptions used for this analysis are from alternative II.

For all three periods, when net immigration increases, the cost rate decreases. For the 25-year period, the cost rate decreases from 16.35 percent of taxable

payroll (for average annual net immigration of 961,000 persons) to 15.98 percent (for average annual net immigration of 1,629,000 persons). For the 50-year period, it decreases from 16.53 percent to 16.02 percent, and for the 75-year period, it decreases from 16.81 percent to 16.24 percent. The actuarial balance increases from -1.65 to -1.34 percent for the 25-year period, from -2.46 to -2.03 percent for the 50-year period, and from -2.93 to -2.43 percent for the 75-year period.

The cost rate decreases with an increase in 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 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 various assumptions about the real-wage differential. The Trustees assume the ultimate real-wage differential will be 0.59 percentage point, 1.21 percentage points, and 1.83 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 3.19, 3.81, and 4.43 percent.

For the 25-year period, the cost rate decreases from 16.92 percent (for a real-wage differential of 0.59 percentage point) to 15.39 percent (for a differential of 1.83 percentage points). For the 50-year period, it decreases from 17.36 to 15.18 percent, and for the 75-year period it decreases from 17.72 to 15.31 percent. The actuarial balance increases from -2.12 to -0.86 percent for the 25-year period, from -3.17 to -1.31 percent for the 50-year period, and from -3.69 to -1.64 percent for the 75-year period.

Table VI.D4.—Sensitivity of OASDI Measures to Varying Real-Wage Assumptions
[As a percentage of taxable payroll]

Valuation period	Ultimate percentage increase in wages-CPI[a b]		
	3.19-2.60	3.81-2.60	4.43-2.60
Summarized income rate:			
25-year: 2016-40	14.80	14.67	14.54
50-year: 2016-65	14.19	14.03	13.87
75-year: 2016-90	14.03	13.84	13.67
Summarized cost rate:			
25-year: 2016-40	16.92	16.15	15.39
50-year: 2016-65	17.36	16.26	15.18
75-year: 2016-90	17.72	16.50	15.31
Actuarial balance:			
25-year: 2016-40	-2.12	-1.48	-.86
50-year: 2016-65	-3.17	-2.23	-1.31
75-year: 2016-90	-3.69	-2.66	-1.64
Annual balance for 2090	-6.23	-4.35	-2.69
Year of combined trust fund reserve depletion	2032	2034	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 0.59, 1.21, and 1.83 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 0.5-percentage-point increase in the real-wage differential increases the long-range actuarial balance by about 0.83 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 various 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 Varying 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: 2016-40	14.64	14.67	14.69
50-year: 2016-65	14.01	14.03	14.04
75-year: 2016-90	13.83	13.84	13.86
Summarized cost rate:			
25-year: 2016-40	16.04	16.15	16.25
50-year: 2016-65	16.12	16.26	16.38
75-year: 2016-90	16.35	16.50	16.64
Actuarial balance:			
25-year: 2016-40	-1.40	-1.48	-1.56
50-year: 2016-65	-2.11	-2.23	-2.34
75-year: 2016-90	-2.52	-2.66	-2.78
Annual balance for 2090	-4.16	-4.35	-4.51
Year of combined trust fund reserve depletion	2034	2034	2034

[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 16.04 (for CPI increases of 3.20 percent) to 16.25 percent (for CPI increases of 2.00 percent). For the 50-year period, it increases from 16.12 to 16.38 percent, and for the 75-year period, it increases from 16.35 to 16.64 percent. The actuarial balance decreases from -1.40 to -1.56 percent for the 25-year period, from -2.11 to -2.34 percent for the 50-year period, and from -2.52 to -2.78 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 1.0-percentage-point decrease in the rate of the change in the CPI decreases the long-range actuarial balance by about 0.22 percent of taxable payroll.

6. Real Interest Rate

Table VI.D6 shows OASDI income rates, cost rates, and actuarial balances under alternative II with various 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 2.2 percent, 2.7 percent, and 3.2 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 4.9, 5.4, and 5.9 percent, respectively.

Table VI.D6.—Sensitivity of OASDI Measures to Varying Real-Interest Assumptions
[As a percentage of taxable payroll]

Valuation period	Ultimate annual real interest rate[a] [b]		
	2.2 percent	2.7 percent	3.2 percent
Summarized income rate:			
25-year: 2016-40	14.61	14.67	14.73
50-year: 2016-65	13.95	14.03	14.10
75-year: 2016-90	13.77	13.84	13.93
Summarized cost rate:			
25-year: 2016-40	16.22	16.15	16.08
50-year: 2016-65	16.34	16.26	16.18
75-year: 2016-90	16.62	16.50	16.39
Actuarial balance:			
25-year: 2016-40	-1.61	-1.48	-1.36
50-year: 2016-65	-2.39	-2.23	-2.08
75-year: 2016-90	-2.85	-2.66	-2.46
Annual balance for 2090	-4.35	-4.35	-4.35
Year of combined trust fund reserve depletion	2034	2034	2034

[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: 2.2 percent from the alternative III assumptions, 2.7 percent from the alternative II assumptions, and 3.2 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 16.22 percent (for an ultimate real interest rate of 2.2 percent) to 16.08 percent (for an ultimate real interest rate of 3.2 percent). For the 50-year period, it decreases from 16.34 to 16.18 percent and, for the 75-year period, it decreases from 16.62 to 16.39 percent. The actuarial balance increases from -1.61 to -1.36 percent for the 25-year period, from -2.39 to -2.08 percent for the 50-year period, and from -2.85 to -2.46 percent for the 75-year period. Each 0.5-percentage-point increase in the real interest rate increases the long-range actuarial balance by about 0.20 percent of taxable payroll.

7. Disability Incidence Rates

Table VI.D7 shows OASDI income rates, cost rates, and actuarial balances on the basis of alternative II with various assumptions concerning future disability incidence rates. 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. In comparison to the historical period 1970 through 2015, the ultimate age-sex-adjusted incidence rate is about 4 percent higher for alternative II, 17 percent lower for alternative I, and 23 percent higher for alternative III.

Table VI.D7.—Sensitivity of OASDI Measures to Varying Disability Incidence Assumptions
[As a percentage of taxable payroll]

Valuation period	Disability incidence rates based on alternative— I	II	III
Summarized income rate:			
25-year: 2016-40	14.66	14.67	14.67
50-year: 2016-65	14.02	14.03	14.03
75-year: 2016-90	13.84	13.84	13.85
Summarized cost rate:			
25-year: 2016-40	15.94	16.15	16.36
50-year: 2016-65	16.00	16.26	16.52
75-year: 2016-90	16.23	16.50	16.77
Actuarial balance:			
25-year: 2016-40	-1.28	-1.48	-1.69
50-year: 2016-65	-1.97	-2.23	-2.48
75-year: 2016-90	-2.39	-2.66	-2.92
Annual balance for 2090	-4.04	-4.35	-4.65
Year of combined trust fund reserve depletion	2035	2034	2033

For the 25-year period, the cost rate increases with increasing disability incidence rates, from 15.94 percent (for the relatively low rates assumed for alternative I) to 16.36 percent (for the relatively high rates assumed for alternative III). For the 50-year period, it increases from 16.00 to 16.52 percent, and for the 75-year period, it increases from 16.23 to 16.77 percent. The actuarial balance decreases from -1.28 to -1.69 percent for the 25-year period, from -1.97 to -2.48 percent for the 50-year period, and from -2.39 to -2.92 percent for the 75-year period.

8. Disability Termination Rates

Table VI.D8 shows OASDI income rates, cost rates, and actuarial balances on the basis of alternative II with various 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. For alternative II, the age-sex-adjusted[1] disability death rate declines to a level in 2090 that is about 56 percent lower than the level in 2015. For alternative I, the age-sex-adjusted disability death rate declines to a level in 2090 that is about 30 percent lower than the level in 2015. For alternative III, the age-sex-adjusted disability death rate declines to a level in 2090 that is about 74 percent lower than the level in 2015.

For all three alternatives, ultimate recovery rates by age, sex, and duration are attained in the twentieth year of the projection period. For alternative II, the age-sex-adjusted[1] recovery rate in 2035 is about 10 recoveries per thousand disabled-worker beneficiaries. For alternative I, the age-sex-adjusted recovery rate in 2035 is about 13 recoveries per thousand disabled-worker beneficiaries. For alternative III, the age-sex-adjusted recovery rate in 2035 is about 8 recoveries per thousand disabled-worker beneficiaries.

Table VI.D8.—Sensitivity of OASDI Measures to Varying Disability Termination Assumptions
[As a percentage of taxable payroll]

Valuation period	Disability termination rates based on alternative— I	II	III
Summarized income rate:			
25-year: 2016-40	14.67	14.67	14.67
50-year: 2016-65	14.03	14.03	14.03
75-year: 2016-90	13.85	13.84	13.84
Summarized cost rate:			
25-year: 2016-40	16.12	16.15	16.18
50-year: 2016-65	16.22	16.26	16.29
75-year: 2016-90	16.47	16.50	16.53
Actuarial balance:			
25-year: 2016-40	-1.45	-1.48	-1.52
50-year: 2016-65	-2.20	-2.23	-2.26
75-year: 2016-90	-2.62	-2.66	-2.68
Annual balance for 2090	-4.32	-4.35	-4.34
Year of combined trust fund reserve depletion	2034	2034	2034

For the 25-year period, the cost rate increases with decreasing disability termination rates, from 16.12 percent (for the relatively high termination rates assumed for alternative I) to 16.18 percent (for the relatively low termination rates assumed for alternative III). For the 50-year period, it increases from 16.22 to 16.29 percent, and for the 75-year period, it increases from 16.47 to

[1] Age adjusted to the total disabled workers in current-payment status as of the year 2000.

16.53 percent. The actuarial balance decreases from -1.45 to -1.52 percent for the 25-year period, from -2.20 to -2.26 percent for the 50-year period, and from -2.62 to -2.68 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 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 presence 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 subject to further development in the future, most notably by incorporating parameter uncertainty. This will allow the stochastic model to reflect persistent uncertainties that are now reflected in the low-cost and high-cost alternatives.

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 make assumptions about levels of fertility, changes in mortality, legal and other immigration levels, legal and other 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. Gener-

ally, 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 as 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 of at least 5 years and at most 112 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 the estimates. 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 current model. As a result, readers should understand that the true range of uncertainty is larger than indicated in this appendix.

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.

[1] More detail on this model, and stochastic modeling in general, is available at www.ssa.gov/OACT/stochastic/index.html.

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 extreme lines in this figure illustrate the range within which future annual cost rates are projected by the current model to occur 95 percent of the time (i.e., a 95-percent confidence interval). In other words, the current model indicates 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

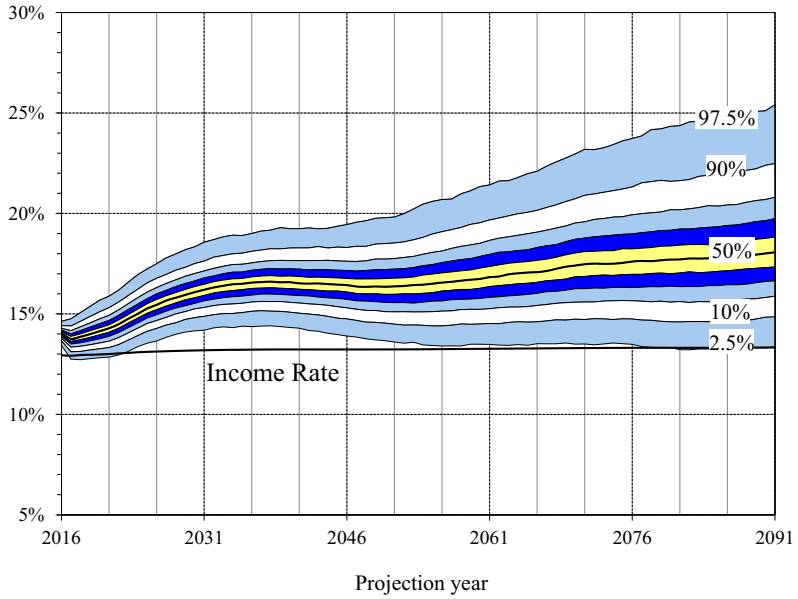
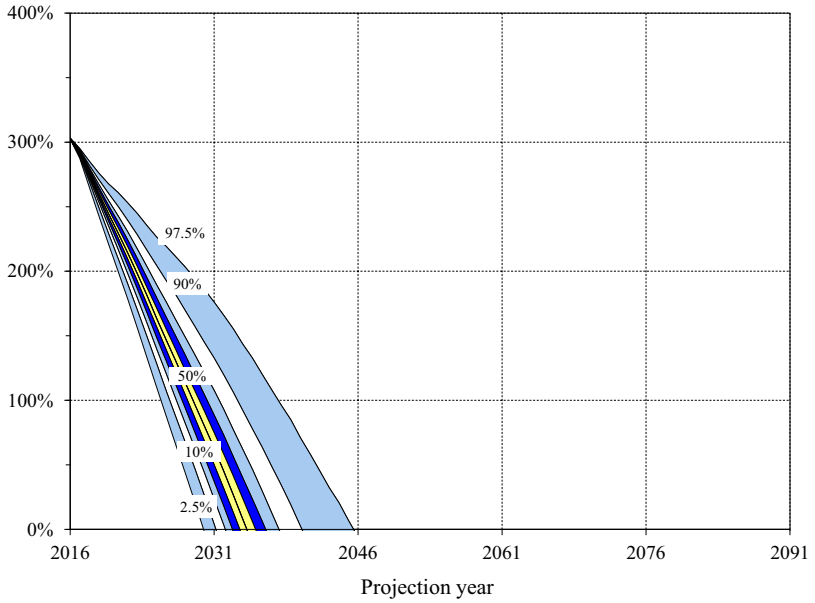


Figure VI.E2 presents the simulated probability distribution of the annual trust fund ratios for the combined OASI and DI Trust Funds. The lines in this figure display the median set (50th percentile) of estimated annual trust fund ratios and delineate the 95-percent, 80-percent, 60-percent, 40-percent, and 20-percent confidence intervals expected for future annual trust fund ratios. Again, none of these lines represents the time 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 2029 to 2045, and there is a 50-percent probability of trust fund depletion by the end of 2034 (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 in 2025 ranges from 227 to 110 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 5,000 independent stochastic simulations. Each of these approaches provides insights into uncertainty. Comparison of the results requires an understanding of fundamental differences in the approaches.

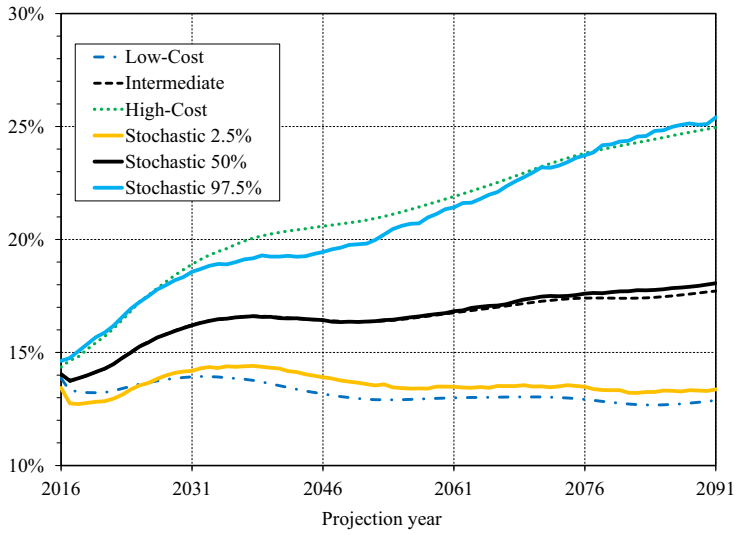
One fundamental difference relates to the presentation of distributional results. Figure VI.E3 shows projected OASDI annual cost rates for the low-cost, intermediate, and high-cost alternatives along with the annual cost rates at the 97.5th percentile, 50th percentile, and 2.5th percentile for the stochastic 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]

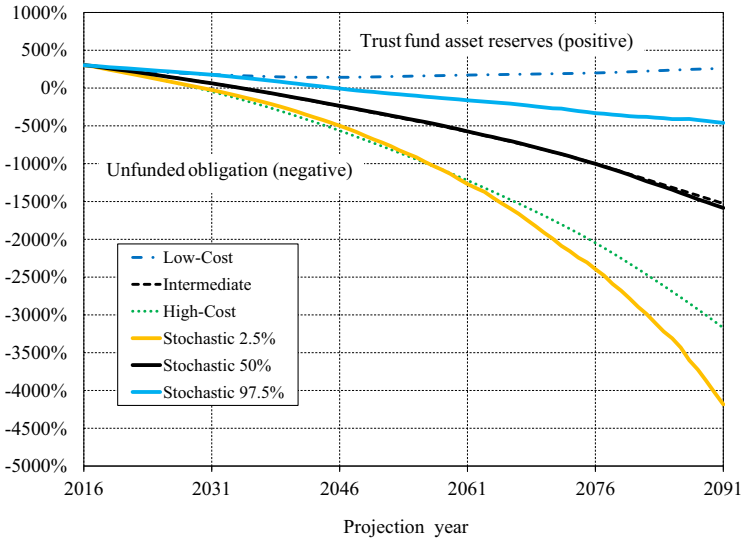


Another fundamental difference between the alternatives and the stochastic simulations is the method of assigning values for assumptions. For the alternatives, specific values are assigned for each of the key demographic and economic variables. Values for all parameters that affect annual cost or payroll are assigned to the high-cost alternative in order to raise estimated annual cost as a percent of payroll, and values are assigned to the low-cost alternative in order to reduce it. (One parameter, the interest rate, has no effect on annual cost as a percent of payroll.) 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 and 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 stochastic estimates for the median (50th percentile) and for the 95-percent and 80-percent confidence intervals. For comparison, the table shows scenario-based estimates for the intermediate, low-cost, and high-cost assumptions. 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, in general, slightly more pessimistic than the intermediate scenario-based estimates. The median estimate of the long-range actuarial balance is -2.67 percent of taxable payroll, about 0.01 percentage point lower than projected under the intermediate assumptions. The median first projected year that cost exceeds non-interest income (as it did in 2010 through 2015), and remains in excess of non-interest income throughout the remainder of the long-range period, is 2016. This is the same year as projected under the intermediate assumptions. The median year that asset reserves first become depleted is 2034, 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 18.01 percent of taxable payroll and 6.26 percent of gross domestic product (GDP). The comparable estimates under the intermediate assumptions are 17.68 percent of payroll and 6.14 percent of GDP.

For three measures in table VI.E1 (the actuarial balance, the first year cost exceeds non-interest income and remains in excess through 2090, and the first projected year asset reserves become depleted), the 95-percent stochastic confidence interval is narrower than the range defined by the low-cost and high-cost alternatives. In other words, for these measures, the range defined by the low-cost and high-cost alternatives contains the 95-percent confidence interval of the stochastic modeling projections. 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	-2.66	0.22	-6.30	-2.67	-4.08	-1.52	-4.95	-0.93
Open group unfunded obligation (in trillions)	$11.4	-$1.9	$23.3	$11.4	$5.4	$21.2	$3.2	$30.0
First projected year cost exceeds non-interest income and remains in excess through 2090[a]	2016	[b]	2016	2016	2016	2042	2016	2088
First year asset reserves become depleted[c]	2034	[d]	2029	2034	2031	2040	2029	2045
Annual cost in 75th year (percent of taxable payroll)	17.68	12.84	24.89	18.01	14.84	22.39	13.30	25.11
Annual cost in 75th year (percent of GDP)	6.14	4.85	7.96	6.26	5.19	7.71	4.67	8.62

[a] Cost also exceeded non-interest income in 2010 through 2015.
[b] The annual balance is projected to be negative for a temporary period, returning to positive levels before the end of the projection period.
[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 finances 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.

Table VI.F1 shows that the OASDI open group unfunded obligation over the infinite horizon is $32.1 trillion in present value, which is $20.7 trillion larger than for the 75-year period. The $20.7 trillion increment reflects a significant financing gap projected for OASDI for years after 2090 into perpetuity. Of course, the degree of uncertainty associated with estimates increases substantially for years further in the future.

The $32.1 trillion infinite horizon open group unfunded obligation is equivalent to 4.0 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 after 2034. The summarized shortfalls for the 75-year period, as percentages of taxable payroll and GDP, are lower than those for the infinite horizon principally because only about three-quarters of the years in the 75-year period have unfunded annual shortfalls, and annual shortfalls within the 75-year period represent a smaller share of taxable payroll and GDP than do the shortfalls in later years.

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 16.6 percent,[1] or with cost reductions equivalent to an immediate and permanent reduction in benefits for all current and future beneficiaries by about 24 percent.

[1] The indicated increase in the payroll tax rate of 4.2 percent is somewhat larger than the 4.0 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.

Table VI.F1.—Unfunded OASDI Obligations Through the Infinite Horizon, Based on Intermediate Assumptions
[Present values as of January 1, 2016; dollar amounts in trillions]

		Expressed as a percentage of future payroll and GDP	
	Present value	Taxable payroll	GDP
Unfunded obligation through the infinite horizon[a]	$32.1	4.0	1.4
Unfunded obligation through 2090[b]	11.4	2.5	0.9

[a] Present value of future cost less future non-interest income, reduced by the amount of trust fund asset reserves at the beginning of 2016. Expressed as a percentage of payroll and GDP for the period 2016 through the infinite horizon.
[b] Present value of future cost less future non-interest income through 2090, reduced by the amount of trust fund reserves at the beginning of 2016. Expressed as a percentage of payroll and GDP for the period 2016 through 2090.

Notes:
1. The present values of future taxable payroll for 2016-90 and for 2016 through the infinite horizon are $455.4 trillion and $801.4 trillion, respectively.
2. The present values of GDP for 2016-90 and for 2016 through the infinite horizon are $1,270.1 trillion and $2,361.4 trillion, respectively. Present values of GDP shown in the Medicare Trustees Report differ slightly due to the use of interest discount rates that are specific to each program's trust fund holdings.

Last year, the Trustees projected that the infinite horizon unfunded obligation was $25.8 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 $0.9 trillion, to $26.6 trillion. The net effects of changes in assumptions, methods, law, and starting values increased the infinite horizon unfunded obligation by $5.5 trillion. The major change affecting the infinite horizon unfunded obligation for this report is the reduction in the ultimate real interest rate from 2.9 percent to 2.7 percent, which provides more weight to annual shortfalls in the more distant 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 is 0.1 percentage point higher than in last year's report when expressed as a share of taxable payroll, and 0.1 percentage point higher than last year when expressed as a share of GDP. Because the reduction in the ultimate real interest rate substantially increased taxable payroll and GDP, the infinite horizon unfunded obligation as a share of either changed relatively little. 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 2016. 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 $29.7 trillion. Table VI.F2 also shows an unfunded obligation of $29.1 trillion for past and current participants, including past and future General Fund reimbursements. Future participants are scheduled to pay dedicated taxes of $3.0 trillion less into the system than the cost of their benefits ($76.2 trillion of dedicated tax income as compared to $79.2 trillion of cost). The unfunded obligation for all participants through the infinite horizon thus equals $32.1 trillion.

This accounting demonstrates that some generations are scheduled to receive benefits with a present value exceeding the present value of their dedicated tax income, while other generations are scheduled to receive benefits with a present value less than the present value of their dedicated tax income, whether past General Fund reimbursements are included or not. Making Social Security solvent over the infinite horizon requires some combination of increased revenue or reduced benefits for current and future participants amounting to $32.1 trillion in present value, 4.0 percent of future taxable payroll, or 1.4 percent of future GDP.

Table VI.F2.—Present Values of OASDI Cost Less Non-interest Income and Unfunded Obligations for Program Participants, Based on Intermediate Assumptions

[Present values as of January 1, 2016; dollar amounts in trillions]

		Expressed as a percentage of future payroll and GDP	
	Present value	Taxable payroll	GDP
Present value of past cost	$56.4	7.0	2.4
Less present value of past dedicated tax income	58.6	7.3	2.5
Plus present value of future cost for current participants	62.5	7.8	2.6
Less present value of future dedicated tax income for current participants	30.6	3.8	1.3
Equals unfunded obligation for past and current participants excluding General Fund reimbursements	29.7	3.7	1.3
Less present value of past General Fund reimbursements[a]	.6	.1	[b]
Less present value of future General Fund reimbursements over the infinite horizon[a]	[c]	[d]	[b]
Equals unfunded obligation for past and current participants including General Fund reimbursements	29.1	3.6	1.2
Plus present value of cost for future participants over the infinite horizon	79.2	9.9	3.4
Less present value of dedicated tax income for future participants over the infinite horizon	76.2	9.5	3.2
Equals unfunded obligation for all participants through the infinite horizon	32.1	4.0	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 2016 through the infinite horizon is $801.4 trillion.
2. The present value of GDP for 2016 through the infinite horizon is $2,361.4 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 2016 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) a larger proportion 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 not in the OASDI taxable payroll. (Railroad 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.

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[g]	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 $118,500 for 2016.

[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. 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. These laws require that the General Fund of the Treasury reimburse the OASI and DI Trust Funds for these temporary reductions in 2010, 2011, and 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).

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 and reve-

nue from taxation of OASDI benefits for both the OASDI and HI Trust Funds. 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; (3) monies from fraud and abuse control activities; and (4) reimbursements from the General Fund of the Treasury, if any. 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 2018 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 2090, while under the high-cost assumptions, the cost rate increases by 73 percent by 2090. For HI, cost rates increase 47 percent and 204 percent from 2016 to 2090 under the intermediate and high-cost assumptions, respectively. Under the low-cost assumptions, the OASDI and HI cost rates decrease from 2016 to 2090 by 7 percent and 29 percent, respectively.

The Trustees project annual deficits for every year of the projection period under the intermediate and high-cost assumptions for the OASDI program and for the HI program. Under the low-cost assumptions, OASDI annual balances are negative through 2047 and positive thereafter. HI annual balances are positive throughout the projection period.

Table VI.G2.—OASDI and HI Annual Income Rates, Cost Rates, and Balances, Calendar Years 2016-2090

[As a percentage of taxable payroll[a]]

	OASDI			HI		
Calendar year	Income rate	Cost rate[b]	Balance[b]	Income rate	Cost rate	Balance
Intermediate:						
2016	12.94	14.05	-1.10	3.37	3.44	-0.08
2017	12.92	13.72	-.80	3.38	3.41	-.03
2018	12.96	13.86	-.90	3.39	3.40	[c]
2019	12.97	13.99	-1.02	3.41	3.42	-.01
2020	12.98	14.13	-1.15	3.43	3.47	-.04
2021	13.00	14.27	-1.27	3.45	3.53	-.08
2022	13.03	14.49	-1.46	3.47	3.61	-.14
2023	13.06	14.76	-1.70	3.49	3.69	-.20
2024	13.09	15.02	-1.93	3.51	3.75	-.24
2025	13.11	15.29	-2.17	3.54	3.81	-.27
2030	13.18	16.10	-2.92	3.63	4.25	-.62
2035	13.22	16.50	-3.28	3.71	4.57	-.87
2040	13.23	16.59	-3.36	3.77	4.77	-1.00
2045	13.23	16.45	-3.22	3.83	4.87	-1.04
2050	13.23	16.36	-3.13	3.89	4.88	-.99
2055	13.24	16.46	-3.22	3.96	4.84	-.88
2060	13.26	16.71	-3.44	4.03	4.84	-.81
2065	13.28	16.96	-3.68	4.10	4.89	-.79
2070	13.30	17.22	-3.92	4.17	4.98	-.81
2075	13.31	17.39	-4.08	4.23	5.06	-.83
2080	13.31	17.40	-4.09	4.28	5.08	-.81
2085	13.32	17.47	-4.15	4.32	5.08	-.76
2090	13.33	17.68	-4.35	4.37	5.08	-.71
Low-cost:						
2016	12.89	13.86	-.97	3.36	3.35	.01
2017	12.89	13.31	-.42	3.37	3.22	.14
2018	12.93	13.28	-.35	3.38	3.15	.23
2019	12.93	13.23	-.30	3.39	3.11	.28
2020	12.94	13.22	-.28	3.41	3.10	.31
2021	12.95	13.23	-.28	3.42	3.09	.33
2022	12.98	13.31	-.33	3.44	3.09	.35
2023	12.99	13.41	-.42	3.46	3.10	.36
2024	13.02	13.51	-.49	3.48	3.09	.38
2025	13.03	13.60	-.58	3.50	3.08	.42
2030	13.07	13.89	-.82	3.59	3.11	.48
2035	13.09	13.88	-.79	3.67	3.03	.64
2040	13.08	13.62	-.53	3.75	2.86	.89
2045	13.07	13.23	-.16	3.81	2.66	1.16
2050	13.06	12.96	.10	3.89	2.47	1.41
2055	13.06	12.91	.15	3.96	2.34	1.62
2060	13.07	12.98	.09	4.03	2.27	1.76
2065	13.07	13.02	.05	4.10	2.28	1.82
2070	13.07	13.04	.04	4.15	2.32	1.83
2075	13.07	12.96	.11	4.19	2.36	1.84
2080	13.06	12.75	.31	4.23	2.37	1.86
2085	13.05	12.68	.37	4.26	2.37	1.89
2090	13.06	12.84	.22	4.30	2.37	1.93

Table VI.G2.—OASDI and HI Annual Income Rates, Cost Rates, and Balances, Calendar Years 2016-2090 (Cont.)
[As a percentage of taxable payroll[a]]

	OASDI			HI		
Calendar year	Income rate	Cost rate[b]	Balance[b]	Income rate	Cost rate	Balance
High-cost:						
2016	13.04	14.35	-1.32	3.37	3.58	-0.21
2017	12.97	14.65	-1.67	3.39	3.67	-.28
2018	12.99	14.82	-1.83	3.42	3.72	-.31
2019	13.02	15.15	-2.12	3.44	3.81	-.38
2020	13.04	15.44	-2.40	3.46	3.95	-.49
2021	13.07	15.71	-2.64	3.48	4.09	-.61
2022	13.11	16.06	-2.95	3.51	4.26	-.75
2023	13.14	16.44	-3.30	3.53	4.44	-.91
2024	13.18	16.83	-3.66	3.56	4.61	-1.05
2025	13.21	17.24	-4.04	3.59	4.76	-1.17
2030	13.30	18.66	-5.36	3.69	5.86	-2.17
2035	13.36	19.61	-6.24	3.77	6.95	-3.18
2040	13.41	20.24	-6.84	3.85	8.02	-4.18
2045	13.43	20.54	-7.11	3.90	8.97	-5.06
2050	13.45	20.79	-7.34	3.96	9.63	-5.68
2055	13.48	21.22	-7.74	4.02	10.05	-6.04
2060	13.52	21.78	-8.27	4.08	10.35	-6.27
2065	13.56	22.39	-8.84	4.15	10.55	-6.40
2070	13.60	23.09	-9.48	4.22	10.73	-6.50
2075	13.64	23.71	-10.07	4.29	10.89	-6.59
2080	13.67	24.14	-10.47	4.36	10.93	-6.58
2085	13.69	24.52	-10.82	4.41	10.91	-6.50
2090	13.72	24.89	-11.17	4.47	10.89	-6.43

[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.

[c] Between -0.005 and 0 percent of taxable payroll.

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 2016-2090
[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:						
2016-40	14.67	16.15	-1.48	3.67	4.24	-0.58
50-year:						
2016-65	14.03	16.26	-2.23	3.79	4.50	-.72
75-year:						
2016-90	13.84	16.50	-2.66	3.91	4.63	-.73
Low-cost:						
25-year:						
2016-40	14.44	14.20	.24	3.63	3.19	.45
50-year:						
2016-65	13.80	13.61	.19	3.77	2.83	.94
75-year:						
2016-90	13.59	13.37	.22	3.90	2.69	1.21
High-cost:						
25-year:						
2016-40	14.95	18.48	-3.53	3.72	5.77	-2.05
50-year:						
2016-65	14.31	19.53	-5.23	3.84	7.44	-3.60
75-year:						
2016-90	14.16	20.46	-6.30	3.95	8.20	-4.25

[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 contains 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 benefits, and reimbursements from the General Fund of the Treasury, if any. 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 OASDI benefits, premium revenues, monies from fraud and abuse control activities, and reimbursements from the General Fund of the Treasury, if any. 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, and to be negative through 2047 and positive thereafter under the low-cost assumptions. Under the low-cost assumptions, the OASDI annual deficit as a percentage of GDP decreases through 2021. After 2021, deficits increase to a peak in 2032, decrease through 2047, and then the annual balance becomes positive starting in 2048. The positive annual balances increase through 2054, decrease

[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.

through 2070, and fluctuate thereafter. Under the intermediate assumptions, annual deficits decrease from 2016 to 2017, increase through 2038, decrease from 2038 through 2051, and mostly increase thereafter. Under the high-cost assumptions, annual deficits increase throughout the projection period.

The Trustees project that the HI balance as a percentage of GDP will be positive throughout the projection period under the low-cost assumptions. Under the intermediate assumptions, the HI balance is negative for each year of the projection period. Annual deficits decrease from 2016 to 2018, increase through 2045, and then generally decline thereafter. Under the high-cost assumptions, the HI balance is negative for all years of the projection period. Annual deficits reach a peak in 2074 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 balance is negative from 2016 through 2018, positive from 2019 through 2023, negative from 2024 through 2034, and then positive and mostly rising thereafter. Under the intermediate assumptions, combined OASDI and HI annual deficits decline from 2016 to 2017, increase from 2017 through 2039, and decrease through 2054. After 2054, annual deficits generally rise, reaching 1.82 percent of GDP by 2090. Under the high-cost assumptions, combined annual deficits rise throughout the projection period.

By 2090, the combined OASDI and HI annual balances as percentages of GDP range from a positive balance of 0.98 percent for the low-cost assumptions to a deficit of 6.21 percent for the high-cost assumptions. Balances differ by a much smaller amount for the tenth projection year, 2025, ranging from a deficit of 0.02 percent for the low-cost assumptions to a deficit of 1.99 percent for the high-cost assumptions.

The summarized long-range (75-year) 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 balance of 0.64 percent under the low-cost assumptions to a deficit of 4.05 percent under the high-cost assumptions. The 25-year summarized balance varies by a smaller amount, from a positive balance of 0.30 percent to a deficit of 2.19 percent. Summarized rates are calculated on a present-value basis. They include the trust fund balances on January 1, 2016 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 2016-2090

	Percentage of GDP									GDP in dollars
	OASDI			HI			Combined			
Calendar year	Income[a]	Cost[b]	Balance[b]	Income[a]	Cost	Balance	Income[a]	Cost[b]	Balance[b]	(billions)
Intermediate:										
2016	4.59	4.98	-0.39	1.51	1.54	-0.03	6.09	6.52	-0.43	$18,659
2017	4.62	4.91	-.29	1.52	1.54	-.01	6.14	6.44	-.30	19,677
2018	4.65	4.98	-.32	1.54	1.54	[c]	6.19	6.52	-.32	20,745
2019	4.68	5.05	-.37	1.55	1.56	[c]	6.23	6.60	-.37	21,836
2020	4.70	5.12	-.42	1.57	1.59	-.02	6.27	6.70	-.44	22,948
2021	4.72	5.18	-.46	1.58	1.62	-.04	6.30	6.80	-.50	24,081
2022	4.75	5.28	-.53	1.59	1.65	-.06	6.34	6.93	-.59	25,204
2023	4.77	5.39	-.62	1.60	1.69	-.09	6.37	7.08	-.71	26,327
2024	4.79	5.50	-.71	1.62	1.73	-.11	6.41	7.22	-.82	27,499
2025	4.81	5.60	-.80	1.63	1.75	-.13	6.43	7.36	-.92	28,719
2030	4.81	5.87	-1.07	1.66	1.94	-.28	6.47	7.81	-1.35	35,680
2035	4.79	5.98	-1.19	1.68	2.08	-.40	6.48	8.06	-1.58	44,187
2040	4.78	5.99	-1.21	1.71	2.16	-.45	6.48	8.15	-1.67	54,881
2045	4.76	5.92	-1.16	1.73	2.20	-.47	6.49	8.12	-1.63	68,304
2050	4.75	5.87	-1.12	1.75	2.20	-.44	6.50	8.07	-1.57	84,817
2055	4.74	5.90	-1.15	1.78	2.18	-.40	6.52	8.07	-1.55	105,031
2060	4.74	5.97	-1.23	1.81	2.17	-.36	6.54	8.13	-1.59	129,808
2065	4.72	6.03	-1.31	1.83	2.18	-.35	6.55	8.21	-1.66	160,417
2070	4.71	6.09	-1.39	1.85	2.21	-.36	6.56	8.30	-1.75	198,390
2075	4.69	6.13	-1.44	1.87	2.23	-.37	6.56	8.36	-1.80	245,548
2080	4.66	6.10	-1.43	1.88	2.24	-.35	6.54	8.33	-1.79	303,911
2085	4.64	6.09	-1.45	1.89	2.22	-.33	6.54	8.32	-1.78	375,722
2090	4.63	6.14	-1.51	1.90	2.21	-.31	6.54	8.36	-1.82	463,784
Summarized rates: [d]										
25-year:										
2016-40 . .	5.32	5.86	-.54	1.67	1.94	-.26	7.00	7.80	-.80	
50-year:										
2016-65 . .	5.06	5.87	-.81	1.72	2.04	-.32	6.78	7.91	-1.13	
75-year:										
2016-90 . .	4.96	5.92	-.95	1.76	2.08	-.33	6.72	8.00	-1.28	
Low-cost:										
2016	4.57	4.92	-.34	1.51	1.50	[c]	6.08	6.42	-.34	18,843
2017	4.62	4.77	-.15	1.52	1.46	.06	6.14	6.23	-.09	20,219
2018	4.66	4.79	-.13	1.54	1.43	.10	6.20	6.22	-.02	21,655
2019	4.70	4.80	-.11	1.55	1.42	.13	6.25	6.22	.02	23,097
2020	4.73	4.83	-.10	1.56	1.42	.14	6.29	6.25	.04	24,560
2021	4.76	4.86	-.10	1.57	1.42	.15	6.33	6.28	.05	26,035
2022	4.79	4.91	-.12	1.58	1.42	.16	6.37	6.33	.04	27,550
2023	4.82	4.97	-.15	1.59	1.42	.16	6.41	6.40	.01	29,135
2024	4.85	5.03	-.18	1.60	1.42	.18	6.45	6.46	-.01	30,806
2025	4.87	5.09	-.22	1.61	1.42	.19	6.49	6.51	-.02	32,556
2030	4.88	5.19	-.31	1.65	1.43	.22	6.53	6.62	-.09	42,912
2035	4.88	5.17	-.29	1.68	1.39	.29	6.56	6.56	[c]	56,428
2040	4.88	5.08	-.20	1.72	1.31	.41	6.59	6.39	.21	74,581
2045	4.88	4.94	-.06	1.75	1.22	.53	6.63	6.16	.47	99,022
2050	4.89	4.85	.04	1.79	1.14	.65	6.68	5.99	.69	131,321
2055	4.90	4.84	.06	1.83	1.08	.75	6.73	5.92	.80	173,643
2060	4.91	4.88	.03	1.86	1.05	.82	6.78	5.93	.85	229,200
2065	4.92	4.90	.02	1.90	1.05	.84	6.81	5.95	.86	302,759
2070	4.92	4.91	.01	1.92	1.07	.85	6.85	5.98	.86	400,758
2075	4.93	4.88	.04	1.94	1.09	.85	6.87	5.98	.89	531,492
2080	4.92	4.81	.12	1.96	1.10	.86	6.88	5.91	.98	705,051
2085	4.93	4.79	.14	1.98	1.10	.88	6.90	5.89	1.02	933,466
2090	4.94	4.85	.09	2.00	1.10	.90	6.94	5.96	.98	1,232,721

Table VI.G4.—OASDI and HI Annual and Summarized Income, Cost, and Balance as a Percentage of GDP, Calendar Years 2016-2090 (Cont.)

	Percentage of GDP									GDP in dollars
	OASDI			HI			Combined			
Calendar year	Income[a]	Cost[b]	Balance[b]	Income[a]	Cost	Balance	Income[a]	Cost[b]	Balance[b]	(billions)
Low-cost (Cont.):										
Summarized rates: [d]										
25-year:										
2016-40 . .	5.35	5.26	0.09	1.67	1.46	0.21	7.02	6.72	0.30	
50-year:										
2016-65 . .	5.14	5.07	.07	1.73	1.30	.44	6.88	6.37	.51	
75-year:										
2016-90 . .	5.08	5.00	.08	1.80	1.24	.56	6.88	6.24	.64	
High-cost:										
2016	4.62	5.09	-.47	1.51	1.60	-.10	6.13	6.69	-.56	$18,299
2017	4.58	5.17	-.59	1.52	1.64	-.12	6.10	6.81	-.71	18,757
2018	4.63	5.29	-.65	1.54	1.68	-.14	6.17	6.96	-.79	19,490
2019	4.65	5.41	-.76	1.56	1.73	-.17	6.21	7.13	-.93	20,275
2020	4.67	5.53	-.86	1.57	1.79	-.22	6.24	7.32	-1.08	21,065
2021	4.69	5.64	-.95	1.59	1.87	-.28	6.28	7.51	-1.23	21,862
2022	4.71	5.77	-1.06	1.60	1.95	-.35	6.31	7.72	-1.41	22,670
2023	4.73	5.91	-1.19	1.62	2.04	-.42	6.35	7.95	-1.60	23,483
2024	4.74	6.06	-1.32	1.64	2.12	-.48	6.38	8.17	-1.80	24,309
2025	4.75	6.20	-1.45	1.65	2.19	-.54	6.40	8.39	-1.99	25,140
2030	4.74	6.66	-1.91	1.68	2.67	-.99	6.42	9.33	-2.90	29,477
2035	4.72	6.93	-2.21	1.70	3.14	-1.44	6.42	10.07	-3.64	34,409
2040	4.70	7.09	-2.40	1.72	3.59	-1.87	6.42	10.68	-4.27	40,162
2045	4.67	7.14	-2.47	1.74	3.99	-2.25	6.41	11.13	-4.72	46,875
2050	4.64	7.18	-2.54	1.75	4.25	-2.51	6.39	11.43	-5.04	54,511
2055	4.62	7.27	-2.65	1.76	4.41	-2.65	6.38	11.68	-5.30	63,148
2060	4.60	7.41	-2.81	1.78	4.50	-2.73	6.37	11.91	-5.54	72,980
2065	4.57	7.54	-2.98	1.79	4.55	-2.76	6.35	12.09	-5.73	84,250
2070	4.53	7.69	-3.16	1.80	4.58	-2.77	6.34	12.27	-5.94	97,193
2075	4.50	7.82	-3.32	1.81	4.60	-2.78	6.31	12.42	-6.10	112,090
2080	4.46	7.88	-3.42	1.82	4.57	-2.75	6.28	12.44	-6.16	129,172
2085	4.42	7.92	-3.50	1.83	4.51	-2.69	6.25	12.43	-6.18	148,733
2090	4.39	7.96	-3.57	1.83	4.47	-2.63	6.22	12.43	-6.21	171,138
Summarized rates: [d]										
25-year:										
2016-40 . .	5.32	6.58	-1.26	1.69	2.62	-.93	7.01	9.20	-2.19	
50-year:										
2016-65 . .	5.02	6.85	-1.83	1.72	3.33	-1.61	6.74	10.18	-3.44	
75-year:										
2016-90 . .	4.89	7.06	-2.18	1.74	3.61	-1.87	6.63	10.68	-4.05	

[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] Between -0.005 and 0.005 percent of GDP.

[d] Summarized rates are calculated on a present-value basis. They include the value of the trust funds on January 1, 2016 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.

To compare trust fund operations expressed as percentages of taxable payroll and those expressed as percentages of GDP, table VI.G5 displays ratios of OASDI taxable payroll to 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. 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 2016-2090

Calendar year	Intermediate	Low-cost	High-cost
2016	0.354	0.355	0.355
2017	.358	.359	.353
2018	.359	.361	.357
2019	.361	.363	.357
2020	.362	.365	.358
2021	.363	.367	.359
2022	.364	.369	.359
2023	.365	.371	.360
2024	.366	.373	.360
2025	.367	.374	.360
2030	.365	.374	.357
2035	.363	.373	.353
2040	.361	.373	.350
2045	.360	.373	.348
2050	.359	.374	.345
2055	.358	.375	.343
2060	.357	.376	.340
2065	.356	.376	.337
2070	.354	.377	.333
2075	.352	.377	.330
2080	.350	.377	.326
2085	.349	.377	.323
2090	.348	.378	.320

Projections of GDP reflect projected increases in U.S. employment, labor productivity, average hours worked, and the GDP deflator. Projections of taxable payroll reflect the components of growth in GDP along with assumed changes in the ratio of worker compensation to GDP, the ratio of earnings to worker 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 to employee compensation. Over the last five complete economic cycles, the ratio of wages to employee compensation declined at an average annual rate of 0.23 percent. Over the 65-year period ending in 2090, the ratio of wages to employee compensation is projected to decline at an average annual rate of 0.07 and 0.17 percent for the intermediate and high-cost assumptions, respectively, and to increase at an average annual rate of 0.03 percent for the low-cost assumptions.

3. Estimates in Dollars

This section contains 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. 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 2025 and 2090. Wage-indexed values indicate the level of a series relative to the changing standard of living of workers over time.

The taxable payroll index adjusts 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 index adjusts 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 explicit 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 adjusting current dollars. The compound new-issue interest factor shown in table VI.G6 increases each year by the assumed annualized 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 2015-2090
[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:						
2015	99.14	$47,730.20	$6,370	$17,956	0.9801	0.9834
2016	100.00	49,121.32	6,611	18,659	1.0000	1.0159
2017	102.76	51,467.41	7,038	19,677	1.0244	1.0479
2018	105.48	53,929.00	7,452	20,745	1.0617	1.0806
2019	108.23	56,341.78	7,876	21,836	1.1068	1.1148
2020	111.04	58,754.57	8,310	22,948	1.1567	1.1505
2021	113.93	61,237.90	8,748	24,081	1.2112	1.1879
2022	116.89	63,735.69	9,182	25,204	1.2702	1.2269
2023	119.93	66,277.05	9,614	26,327	1.3345	1.2680
2024	123.05	68,952.47	10,066	27,499	1.4043	1.3119
2025	126.25	71,668.95	10,528	28,719	1.4790	1.3587
2030	143.53	86,735.71	13,009	35,680	1.9212	1.6916
2035	163.19	104,911.08	16,021	44,187	2.4955	2.1973
2040	185.53	126,583.75	19,809	54,881	3.2416	2.8542
2045	210.94	152,870.45	24,583	68,304	4.2106	3.7074
2050	239.83	184,745.46	30,455	84,817	5.4693	4.8157
2055	272.67	223,035.42	37,622	105,031	7.1043	6.2553
2060	310.01	268,973.83	46,355	129,808	9.2280	8.1253
2065	352.46	323,866.96	57,050	160,417	11.9867	10.5542
2070	400.73	389,381.61	70,219	198,390	15.5700	13.7093
2075	455.60	467,975.33	86,490	245,548	20.2245	17.8076
2080	517.99	562,255.34	106,495	303,911	26.2704	23.1310
2085	588.92	675,560.16	131,067	375,722	34.1236	30.0457
2090	669.57	812,158.51	161,175	463,784	44.3245	39.0276
Low-cost:						
2015	98.79	47,738.57	6,370	17,960	0.9801	0.9834
2016	100.00	49,447.98	6,685	18,843	1.0000	1.0161
2017	103.63	52,465.16	7,250	20,219	1.0322	1.0489
2018	107.03	55,650.39	7,809	21,655	1.0838	1.0839
2019	110.46	58,743.24	8,388	23,097	1.1411	1.1217
2020	113.99	61,849.15	8,976	24,560	1.2030	1.1623
2021	117.64	65,032.70	9,566	26,035	1.2706	1.2061
2022	121.40	68,392.20	10,172	27,550	1.3437	1.2536
2023	125.29	71,951.98	10,805	29,135	1.4252	1.3056
2024	129.30	75,746.74	11,479	30,806	1.5157	1.3633
2025	133.43	79,674.91	12,183	32,556	1.6142	1.4270
2030	156.19	102,353.16	16,031	42,912	2.2117	1.8798
2035	182.84	131,327.31	21,040	56,428	3.0306	2.5758
2040	214.02	167,921.92	27,797	74,581	4.1526	3.5295
2045	250.53	214,861.87	36,962	99,022	5.6901	4.8362
2050	293.26	275,323.92	49,138	131,321	7.7968	6.6268
2055	343.29	352,602.26	65,137	173,643	10.6834	9.0803
2060	401.84	451,078.57	86,155	229,200	14.6389	12.4421
2065	470.39	576,054.69	113,939	302,759	20.0588	17.0487
2070	550.62	734,521.01	150,927	400,758	27.4854	23.3609
2075	644.54	936,225.61	200,313	531,492	37.6616	32.0100
2080	754.48	1,192,904.72	265,851	705,051	51.6055	43.8615
2085	883.18	1,520,008.42	352,357	933,466	70.7119	60.1008
2090	1,033.82	1,937,676.32	466,117	1,232,721	96.8924	82.3525

Table VI.G6.—Selected Economic Variables, Calendar Years 2015-2090 (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:						
2015	99.98	$47,686.76	$6,366	$17,943	0.9801	0.9834
2016	100.00	48,298.98	6,488	18,299	1.0000	1.0158
2017	102.44	49,518.62	6,617	18,757	1.0169	1.0469
2018	104.63	51,416.70	6,952	19,490	1.0404	1.0778
2019	106.72	53,305.83	7,241	20,275	1.0755	1.1091
2020	108.86	55,122.98	7,544	21,065	1.1151	1.1407
2021	111.03	56,973.96	7,845	21,862	1.1579	1.1724
2022	113.25	58,817.79	8,146	22,670	1.2039	1.2038
2023	115.52	60,655.65	8,447	23,483	1.2540	1.2349
2024	117.83	62,523.17	8,749	24,309	1.3079	1.2658
2025	120.19	64,321.07	9,042	25,140	1.3641	1.2964
2030	132.70	73,319.47	10,513	29,477	1.6791	1.5462
2035	146.51	83,570.21	12,159	34,409	2.0670	1.9034
2040	161.75	95,135.81	14,071	40,162	2.5445	2.3431
2045	178.59	108,367.47	16,302	46,875	3.1322	2.8843
2050	197.18	123,500.22	18,824	54,511	3.8557	3.5506
2055	217.70	140,558.33	21,645	63,148	4.7464	4.3707
2060	240.36	159,754.04	24,810	72,980	5.8428	5.3803
2065	265.38	181,290.58	28,370	84,250	7.1924	6.6231
2070	293.00	205,436.00	32,392	97,193	8.8538	8.1530
2075	323.49	232,710.81	36,967	112,090	10.8989	10.0363
2080	357.16	263,552.88	42,139	129,172	13.4165	12.3546
2085	394.33	298,548.17	48,028	148,733	16.5156	15.2084
2090	435.38	338,407.02	54,747	171,138	20.3306	18.7214

[a] CPI-W indexed to calendar year 2016.

[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 outgo 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 2016 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 benefits, and reimbursements from the General Fund of the Treasury, if any. 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 2016 Dollars,[a] Calendar Years 2016-2090
[In billions]

Calendar year	Non-interest income	Interest income	Total income	Cost[b]	Asset reserves at end of year[b]
Intermediate:					
2016	$855.8	$88.8	$944.6	$928.9	$2,828.2
2017	884.6	85.2	969.8	939.6	2,782.5
2018	915.3	84.6	999.9	978.9	2,731.7
2019	943.7	84.1	1,027.8	1,017.9	2,672.4
2020	971.5	83.4	1,054.8	1,057.7	2,601.8
2021	998.5	81.7	1,080.2	1,095.8	2,520.2
2022	1,023.9	80.1	1,104.0	1,138.3	2,422.0
2023	1,046.8	78.7	1,125.5	1,183.1	2,303.1
2024	1,071.0	76.8	1,147.8	1,229.0	2,163.6
2025	1,093.3	74.0	1,167.3	1,274.6	2,001.4
2030[c]	1,194.6	57.8	1,252.4	1,459.4	973.3
Low-cost:					
2016	861.6	89.7	951.4	926.3	2,837.5
2017	902.0	89.3	991.3	931.3	2,798.2
2018	943.1	92.5	1,035.6	968.8	2,776.0
2019	981.8	95.8	1,077.6	1,004.6	2,763.0
2020	1,018.6	99.3	1,117.9	1,041.0	2,754.2
2021	1,053.3	102.7	1,156.0	1,075.8	2,749.0
2022	1,087.3	107.7	1,194.9	1,114.8	2,743.9
2023	1,120.5	114.0	1,234.4	1,156.3	2,737.0
2024	1,155.7	120.7	1,276.3	1,199.1	2,729.3
2025	1,189.4	127.1	1,316.5	1,242.0	2,719.2
2030	1,341.8	169.4	1,511.2	1,426.1	2,699.9
2035	1,506.1	167.9	1,674.0	1,596.8	2,669.1
2040	1,699.3	168.7	1,868.0	1,768.6	2,686.7
2045	1,928.1	182.3	2,110.4	1,951.9	2,927.4
2050	2,188.1	213.1	2,401.2	2,172.0	3,446.9
2055	2,478.1	259.0	2,737.1	2,450.1	4,197.8
2060	2,801.7	312.5	3,114.1	2,783.3	5,060.0
2065	3,166.3	372.3	3,538.6	3,153.5	6,028.2
2070	3,583.7	441.2	4,024.9	3,573.5	7,144.7
2075	4,062.3	524.5	4,586.8	4,027.5	8,510.6
2080	4,601.6	639.2	5,240.8	4,494.0	10,412.8
2085	5,208.5	796.3	6,004.7	5,060.2	12,992.2
2090	5,890.3	979.4	6,869.7	5,788.8	15,951.5
High-cost:					
2016	845.9	87.7	933.6	931.2	2,814.9
2017	838.1	80.8	918.9	946.0	2,720.6
2018	863.0	76.5	939.5	984.7	2,618.6
2019	883.6	72.3	955.9	1,027.6	2,495.5
2020	903.8	67.2	971.0	1,069.8	2,347.8
2021	923.5	60.9	984.4	1,110.1	2,176.1
2022	942.7	53.8	996.5	1,155.0	1,975.0
2023	960.6	46.7	1,007.3	1,202.0	1,741.5
2024	978.5	39.2	1,017.7	1,249.9	1,475.1
2025[c]	993.6	31.3	1,024.9	1,297.5	1,173.6

[a] CPI-indexed 2016 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 2034 under the intermediate assumptions and in 2029 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 2016 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: (1) annual cost exceeds non-interest income in each year of the projection period; (2) total annual income, which includes interest earnings on trust fund asset reserves, is sufficient to cover annual cost for years 2016 through 2019; and (3) total annual income is not sufficient to cover annual cost for years beginning in 2020. From 2020 through 2033 (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 2016 Dollars, Based on Intermediate Assumptions
[In billions]

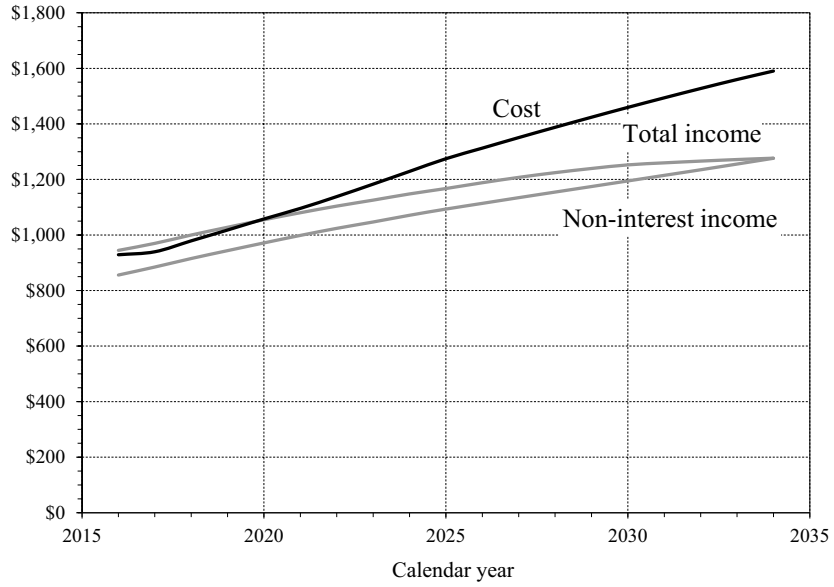


Table VI.G8 shows the operations of the combined OASI and DI Trust Funds in current, or nominal, dollars—that is, in dollars unadjusted for inflation. The following items are presented in the table: (1) non-interest income, (2) interest income, (3) total income, (4) cost, and (5) asset reserves at the end of the year. The Trustees present these estimates 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 2016-2090
[In billions]

Calendar year	Non-interest income	Interest income	Total income	Cost[a]	Asset reserves at end of year[a]
Intermediate:					
2016	$855.8	$88.8	$944.6	$928.9	$2,828.2
2017	909.1	87.6	996.6	965.5	2,859.3
2018	965.4	89.2	1,054.7	1,032.5	2,881.5
2019	1,021.3	91.1	1,112.4	1,101.6	2,892.2
2020	1,078.7	92.6	1,171.3	1,174.5	2,889.0
2021	1,137.5	93.1	1,230.6	1,248.4	2,871.2
2022	1,196.8	93.6	1,290.4	1,330.5	2,831.1
2023	1,255.4	94.4	1,349.8	1,418.8	2,762.1
2024	1,317.8	94.6	1,412.4	1,512.2	2,662.2
2025	1,380.2	93.5	1,473.7	1,609.2	2,526.7
2030[b]	1,714.7	83.0	1,797.7	2,094.8	1,397.0
Low-cost:					
2016	861.6	89.7	951.4	926.3	2,837.5
2017	934.8	92.5	1,027.3	965.1	2,899.7
2018	1,009.4	99.0	1,108.4	1,036.9	2,971.2
2019	1,084.5	105.8	1,190.2	1,109.6	3,051.9
2020	1,161.1	113.2	1,274.3	1,186.7	3,139.5
2021	1,239.1	120.8	1,359.9	1,265.5	3,233.9
2022	1,320.0	130.7	1,450.7	1,353.4	3,331.2
2023	1,403.8	142.8	1,546.6	1,448.7	3,429.1
2024	1,494.2	156.0	1,650.2	1,550.4	3,528.9
2025	1,587.1	169.6	1,756.7	1,657.3	3,628.3
2030	2,095.8	264.5	2,360.4	2,227.4	4,217.0
2035	2,753.7	307.1	3,060.8	2,919.5	4,880.1
2040	3,637.0	361.0	3,998.0	3,785.2	5,750.1
2045	4,830.6	456.7	5,287.2	4,890.1	7,334.1
2050	6,416.9	625.1	7,042.0	6,369.8	10,108.4
2055	8,506.9	889.3	9,396.2	8,410.8	14,410.4
2060	11,258.3	1,255.6	12,514.0	11,184.3	20,333.3
2065	14,893.9	1,751.2	16,645.1	14,833.6	28,355.8
2070	19,732.6	2,429.2	22,161.8	19,676.6	39,340.3
2075	26,183.3	3,380.7	29,564.0	25,959.1	54,854.5
2080	34,718.6	4,822.5	39,541.1	33,906.8	78,562.7
2085	46,000.0	7,032.6	53,032.6	44,690.8	114,744.4
2090	60,894.9	10,125.4	71,020.2	59,846.2	164,910.6
High-cost:					
2016	845.9	87.7	933.6	931.2	2,814.9
2017	858.5	82.8	941.3	969.2	2,787.1
2018	903.0	80.0	983.0	1,030.3	2,739.8
2019	943.0	77.2	1,020.2	1,096.7	2,663.3
2020	983.8	73.2	1,057.0	1,164.5	2,555.7
2021	1,025.3	67.7	1,093.0	1,232.6	2,416.2
2022	1,067.7	60.9	1,128.6	1,308.1	2,236.7
2023	1,109.7	53.9	1,163.6	1,388.6	2,011.8
2024	1,153.0	46.2	1,199.2	1,472.8	1,738.1
2025[b]	1,194.1	37.6	1,231.8	1,559.4	1,410.5

[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 2034 under the intermediate assumptions and in 2029 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 shows values in CPI-indexed 2016 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 OASDI benefits, and reimbursements from the General Fund of the Treasury, if any. 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 OASDI benefits, premium revenues, monies from fraud and abuse control activities, and reimbursements from the General Fund of the Treasury, if any. Total cost consists of outlays (scheduled 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. Table VI.G9 also shows the 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 Dollars, Calendar Years 2016-2090
[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]
Intermediate:									
2016	$856	$929	-$73	$281	$288	-$6	$1,137	$1,217	-$80
2017	885	940	-55	291	294	-3	1,176	1,234	-58
2018	915	979	-64	303	303	[b]	1,218	1,282	-64
2019	944	1,018	-74	314	314	-1	1,257	1,332	-75
2020	971	1,058	-86	324	328	-4	1,295	1,386	-90
2021	998	1,096	-97	334	342	-8	1,332	1,438	-105
2022	1,024	1,138	-114	343	357	-14	1,367	1,495	-128
2023	1,047	1,183	-136	352	372	-20	1,399	1,555	-156
2024	1,071	1,229	-158	361	386	-25	1,432	1,615	-183
2025	1,093	1,275	-181	370	399	-29	1,463	1,673	-210
2030	1,195	1,459	-265	413	483	-70	1,607	1,942	-335
2035	1,297	1,619	-322	456	563	-107	1,754	2,183	-429
2040	1,413	1,771	-359	505	639	-134	1,918	2,410	-493
2045	1,542	1,917	-375	559	712	-152	2,101	2,629	-527
2050	1,680	2,077	-397	619	776	-157	2,300	2,854	-554
2055	1,827	2,272	-444	685	838	-153	2,512	3,109	-597
2060	1,983	2,498	-515	756	908	-152	2,739	3,406	-667
2065	2,149	2,744	-595	833	993	-160	2,982	3,738	-755
2070	2,330	3,017	-687	917	1,094	-178	3,247	4,111	-865
2075	2,527	3,302	-775	1,007	1,204	-197	3,534	4,506	-972
2080	2,737	3,578	-841	1,103	1,311	-208	3,840	4,889	-1,049
2085	2,963	3,888	-924	1,206	1,418	-212	4,170	5,306	-1,136
2090	3,208	4,255	-1,047	1,319	1,534	-215	4,527	5,789	-1,261
Low-cost:									
2016	862	926	-65	284	283	1	1,145	1,210	-64
2017	902	931	-29	297	284	13	1,199	1,216	-17
2018	943	969	-26	311	290	21	1,254	1,259	-5
2019	982	1,005	-23	324	297	27	1,306	1,302	4
2020	1,019	1,041	-22	336	305	31	1,355	1,346	8
2021	1,053	1,076	-22	347	313	34	1,400	1,389	11
2022	1,087	1,115	-28	358	322	36	1,446	1,437	9
2023	1,120	1,156	-36	370	331	38	1,490	1,488	2
2024	1,156	1,199	-43	381	339	42	1,537	1,538	-1
2025	1,189	1,242	-53	393	346	47	1,583	1,588	-5
2030	1,342	1,426	-84	453	393	61	1,795	1,819	-24
2035	1,506	1,597	-91	520	429	91	2,026	2,025	[b]
2040	1,699	1,769	-69	599	457	142	2,298	2,225	73
2045	1,928	1,952	-24	692	482	210	2,620	2,434	187
2050	2,188	2,172	16	801	510	291	2,989	2,682	307
2055	2,478	2,450	28	924	546	379	3,403	2,996	407
2060	2,802	2,783	18	1,063	598	465	3,865	3,382	483
2065	3,166	3,153	13	1,220	678	542	4,386	3,831	555
2070	3,584	3,574	10	1,398	781	617	4,982	4,355	628
2075	4,062	4,028	35	1,602	900	702	5,664	4,928	737
2080	4,602	4,494	108	1,830	1,027	804	6,432	5,521	911
2085	5,208	5,060	148	2,089	1,162	927	7,297	6,222	1,075
2090	5,890	5,789	101	2,383	1,313	1,070	8,274	7,102	1,171

Table VI.G9.—OASDI and HI Annual Non-interest Income, Cost, and Balance in CPI-Indexed Dollars, Calendar Years 2016-2090 (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:									
2016	$846	$931	-$85	$276	$293	-$17	$1,122	$1,225	-$103
2017	838	946	-108	278	301	-23	1,116	1,247	-131
2018	863	985	-122	286	312	-26	1,149	1,297	-147
2019	884	1,028	-144	295	328	-32	1,179	1,355	-176
2020	904	1,070	-166	304	347	-43	1,208	1,417	-209
2021	923	1,110	-187	313	368	-55	1,236	1,478	-242
2022	943	1,155	-212	321	390	-69	1,264	1,545	-281
2023	961	1,202	-241	329	414	-85	1,290	1,616	-326
2024	978	1,250	-271	337	437	-99	1,316	1,687	-371
2025	994	1,297	-304	345	458	-113	1,339	1,756	-417
2030	1,054	1,479	-425	373	593	-220	1,427	2,072	-645
2035	1,109	1,627	-518	400	737	-337	1,509	2,364	-856
2040	1,166	1,761	-595	428	892	-464	1,594	2,653	-1,059
2045	1,226	1,875	-649	455	1,046	-591	1,681	2,921	-1,240
2050	1,284	1,985	-701	483	1,176	-693	1,767	3,161	-1,394
2055	1,340	2,110	-769	511	1,278	-768	1,851	3,388	-1,537
2060	1,395	2,249	-853	539	1,367	-828	1,935	3,615	-1,681
2065	1,449	2,394	-945	568	1,443	-875	2,017	3,837	-1,820
2070	1,504	2,552	-1,049	598	1,518	-920	2,101	4,070	-1,969
2075	1,559	2,710	-1,151	628	1,593	-964	2,187	4,303	-2,115
2080	1,613	2,849	-1,236	658	1,652	-994	2,271	4,501	-2,229
2085	1,668	2,986	-1,318	689	1,703	-1,014	2,356	4,689	-2,332
2090	1,725	3,130	-1,405	720	1,756	-1,036	2,445	4,885	-2,440

[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.
[b] Between -$500 million and $500 million.

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 contains 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 2016-2090
[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]
Intermediate:									
2016	$856	$929	-$73	$281	$288	-$6	$1,137	$1,217	-$80
2017	909	966	-56	300	302	-3	1,209	1,268	-59
2018	965	1,033	-67	320	320	[b]	1,285	1,352	-67
2019	1,021	1,102	-80	339	340	-1	1,361	1,442	-81
2020	1,079	1,175	-96	360	364	-4	1,438	1,539	-100
2021	1,138	1,248	-111	380	390	-9	1,518	1,638	-120
2022	1,197	1,331	-134	401	417	-16	1,598	1,748	-150
2023	1,255	1,419	-163	422	446	-24	1,677	1,865	-187
2024	1,318	1,512	-194	444	475	-30	1,762	1,987	-225
2025	1,380	1,609	-229	467	503	-36	1,847	2,112	-265
2030	1,715	2,095	-380	592	693	-101	2,307	2,788	-481
2035	2,117	2,643	-526	744	919	-175	2,862	3,562	-700
2040	2,621	3,286	-665	937	1,186	-249	3,558	4,472	-914
2045	3,252	4,044	-791	1,180	1,501	-321	4,432	5,545	-1,112
2050	4,030	4,982	-952	1,485	1,862	-377	5,515	6,844	-1,329
2055	4,982	6,194	-1,212	1,868	2,285	-417	6,850	8,479	-1,629
2060	6,148	7,744	-1,597	2,344	2,814	-470	8,492	10,559	-2,067
2065	7,576	9,673	-2,097	2,936	3,501	-565	10,512	13,174	-2,662
2070	9,337	12,090	-2,753	3,673	4,386	-713	13,010	16,476	-3,466
2075	11,512	15,042	-3,530	4,589	5,488	-898	16,101	20,530	-4,429
2080	14,176	18,532	-4,356	5,714	6,793	-1,079	19,890	25,324	-5,434
2085	17,452	22,896	-5,444	7,105	8,354	-1,248	24,557	31,249	-6,692
2090	21,482	28,490	-7,008	8,831	10,269	-1,438	30,313	38,759	-8,446
Low-cost:									
2016	862	926	-65	284	283	1	1,145	1,210	-64
2017	935	965	-30	308	295	13	1,242	1,260	-17
2018	1,009	1,037	-28	333	311	22	1,343	1,348	-5
2019	1,084	1,110	-25	358	328	30	1,442	1,438	5
2020	1,161	1,187	-26	383	348	35	1,544	1,535	10
2021	1,239	1,266	-26	408	369	40	1,648	1,634	13
2022	1,320	1,353	-33	435	391	44	1,755	1,745	11
2023	1,404	1,449	-45	463	415	48	1,867	1,864	3
2024	1,494	1,550	-56	493	439	54	1,987	1,989	-2
2025	1,587	1,657	-70	525	462	63	2,112	2,119	-7
2030	2,096	2,227	-132	708	613	95	2,804	2,841	-37
2035	2,754	2,919	-166	950	784	166	3,704	3,703	1
2040	3,637	3,785	-148	1,281	977	304	4,918	4,762	156
2045	4,831	4,890	-60	1,735	1,207	527	6,565	6,097	468
2050	6,417	6,370	47	2,349	1,496	853	8,766	7,866	901
2055	8,507	8,411	96	3,174	1,873	1,300	11,680	10,284	1,396
2060	11,258	11,184	74	4,273	2,405	1,868	15,531	13,589	1,942
2065	14,894	14,834	60	5,738	3,187	2,550	20,631	18,021	2,610
2070	19,733	19,677	56	7,700	4,301	3,400	27,433	23,977	3,456
2075	26,183	25,959	224	10,326	5,802	4,524	36,509	31,761	4,749
2080	34,719	33,907	812	13,810	7,745	6,064	48,528	41,652	6,876
2085	46,000	44,691	1,309	18,447	10,263	8,184	64,447	54,954	9,493
2090	60,895	59,846	1,049	24,639	13,578	11,061	85,534	73,424	12,110

Table VI.G10.—OASDI and HI Annual Non-interest Income, Cost, and Balance in Current Dollars, Calendar Years 2016-2090 (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:									
2016	$846	$931	-$85	$276	$293	-$17	$1,122	$1,225	-$103
2017	859	969	-111	285	308	-23	1,143	1,277	-134
2018	903	1,030	-127	300	326	-27	1,203	1,357	-154
2019	943	1,097	-154	315	350	-35	1,258	1,447	-188
2020	984	1,165	-181	331	378	-47	1,315	1,542	-227
2021	1,025	1,233	-207	347	408	-61	1,373	1,641	-268
2022	1,068	1,308	-240	364	442	-78	1,432	1,750	-319
2023	1,110	1,389	-279	380	478	-98	1,490	1,867	-377
2024	1,153	1,473	-320	398	514	-117	1,551	1,987	-437
2025	1,194	1,559	-365	415	551	-136	1,609	2,110	-501
2030	1,398	1,962	-564	495	787	-292	1,893	2,749	-856
2035	1,625	2,384	-759	586	1,080	-494	2,210	3,464	-1,254
2040	1,887	2,848	-962	692	1,443	-751	2,578	4,291	-1,713
2045	2,189	3,348	-1,159	813	1,868	-1,055	3,003	5,217	-2,214
2050	2,532	3,914	-1,383	952	2,319	-1,366	3,484	6,233	-2,749
2055	2,918	4,593	-1,675	1,112	2,783	-1,671	4,030	7,376	-3,346
2060	3,354	5,405	-2,051	1,296	3,285	-1,989	4,650	8,690	-4,040
2065	3,846	6,353	-2,507	1,507	3,829	-2,322	5,354	10,183	-4,829
2070	4,406	7,478	-3,072	1,751	4,448	-2,696	6,157	11,926	-5,768
2075	5,043	8,766	-3,723	2,033	5,153	-3,120	7,076	13,918	-6,842
2080	5,760	10,174	-4,414	2,351	5,900	-3,549	8,112	16,075	-7,963
2085	6,577	11,775	-5,199	2,715	6,714	-3,999	9,292	18,490	-9,197
2090	7,510	13,626	-6,116	3,135	7,644	-4,509	10,645	21,270	-10,625

[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.
[b] Between -$500 million and $0.

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

H. ANALYSIS OF BENEFIT DISBURSEMENTS 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 2015, the OASI Trust Fund was providing monthly benefit payments to about 1,096,000 people because of their disabilities or the disabilities of children. This total includes approximately 25,000 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 2015, the OASI Trust Fund paid a total of $10,736[1] million to the people described above. Table VI.H1 shows OASI scheduled benefits for disability for selected calendar years during 1960 through 2015 and estimates for 2016 through 2025 based on the intermediate set of assumptions.

[1] Benefit payments which were scheduled to be paid on January 3, 2016 were actually paid on December 31, 2015 as required by the statutory provision for early delivery of benefit payments when the normal payment delivery date is a Saturday, Sunday, or public holiday. For comparability with the values for historical years and the projections in this report, all benefit amounts in this section reflect the 12 months of benefits scheduled for payment in each year.

Table VI.H1.—Scheduled Benefit Disbursements From the OASI Trust Fund With Respect to Disabled Beneficiaries

[Beneficiaries in thousands; scheduled benefits in millions]

	Disabled beneficiaries, end of year			Amount of scheduled benefits[a] [b]		
Calendar year	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
1991	687	627	61	3,179	2,875	304
1992	715	643	72	3,459	3,079	380
1993	740	659	81	3,752	3,296	456
1994	758	671	86	3,973	3,481	492
1995	772	681	91	4,202	3,672	531
1996	782	687	94	4,410	3,846	565
1997	789	693	96	4,646	4,050	596
1998	797	698	99	4,838	4,210	627
1999	805	702	102	4,991	4,336	655
2000	811	707	104	5,203	4,523	680
2001	817	712	105	5,520	4,802	718
2002	823	717	106	5,773	5,024	749
2003	827	722	105	5,950	5,184	764
2004	828	723	105	6,099	5,316	781
2005	836	728	108	6,449	5,556	834
2006	840	732	108	6,720	5,852	864
2007	851	744	107	7,053	6,181	869
2008	922	813	109	7,688	6,776	908
2009	969	857	112	8,595	7,618	974
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

Table VI.H1.—Scheduled Benefit Disbursements From the OASI Trust Fund With Respect to Disabled Beneficiaries (Cont.)
[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]
Estimates under the intermediate assumptions:						
2016	1,113	991	121	$10,970	$9,881	$1,086
2017	1,128	1,010	118	11,220	10,162	1,055
2018	1,144	1,028	116	11,790	10,724	1,063
2019	1,159	1,046	113	12,343	11,272	1,066
2020	1,176	1,064	112	12,923	11,838	1,081
2021	1,193	1,081	112	13,544	12,430	1,110
2022	1,209	1,098	112	14,197	13,050	1,142
2023	1,226	1,114	112	14,881	13,701	1,175
2024	1,243	1,130	113	15,621	14,390	1,225
2025	1,260	1,146	114	16,383	15,110	1,268

[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 from the OASI Trust Fund with respect to disabled beneficiaries will increase from $10,970 million in calendar year 2016 to $16,383 million in calendar year 2025.

In calendar year 2015, benefit payments (including expenditures 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 $154,124 million. Of this amount, $10,736 million, or 7.0 percent, represented payments from the OASI Trust Fund. Table VI.H2 contains these and similar figures for selected calendar years during 1960 through 2015 and estimates for calendar years 2016 through 2025.

Table VI.H2.—Scheduled Benefit Disbursements[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]	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
1991	30,877	27,698	3,179	10.3
1992	34,583	31,124	3,459	10.0
1993	38,378	34,626	3,752	9.8
1994	41,730	37,757	3,973	9.5
1995	45,140	40,937	4,202	9.3
1996	48,615	44,205	4,410	9.1
1997	50,358	45,712	4,646	9.2
1998	53,062	48,224	4,838	9.1
1999	56,390	51,399	4,991	8.9
2000	60,204	55,001	5,203	8.6
2001	65,157	59,637	5,520	8.5
2002	71,493	65,721	5,773	8.1
2003	76,902	70,952	5,950	7.7
2004	84,350	78,251	6,099	7.2
2005	91,835	85,386	6,449	7.0
2006	99,165	92,446	6,720	6.8
2007	106,200	99,147	7,053	6.6
2008	114,064	106,376	7,688	6.7
2009	127,002	118,407	8,595	6.8
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
Estimates under the intermediate assumptions:				
2016	157,679	146,709	10,970	7.0
2017	160,598	149,378	11,220	7.0
2018	167,864	156,074	11,790	7.0
2019	174,860	162,517	12,343	7.1
2020	181,682	168,759	12,923	7.1
2021	189,761	176,217	13,544	7.1
2022	198,324	184,127	14,197	7.2
2023	207,097	192,215	14,881	7.2
2024	215,864	200,243	15,621	7.2
2025	225,221	208,838	16,383	7.3

[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. Treasury notes and bonds, other securities guaranteed by the Federal Government, certain Federally sponsored agency obligations, and cash, held by the trust funds for investment purposes.

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 noncovered 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 table V.C1.

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 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.

Disbursements. Actual expenditures (outgo) 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.

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. See "Disbursements."

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 which are requested after April 29, 2016 will 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. A fiscal year is the 12-month period ending September 30. For example, fiscal year 2016 began October 1, 2015, and will end September 30, 2016.

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 amortization 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 receipts 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 "Legal immigration" and "Other 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 "Quarters 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.

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."

Legal emigration. Legal emigration for a given year consists of those legal permanent residents and native-born citizens who leave the Social Security area during the year.

Legal immigration. Consistent with the definition used by the Department of Homeland Security, legal immigration for a given year consists of foreign-born individuals who are granted legal permanent resident status during the year.

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 people age 65 and over. In 1972, lawmakers extended coverage to people receiving Social Security Disability Insurance payments for 2 years and people 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, people 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.

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 emigration. Other emigration for a given year consists of individuals from the other-immigrant population who leave the Social Security area during the year or who adjust status to become legal permanent residents during the year.

Other immigration. Other immigration for a given year consists of individuals who enter the Social Security area and stay 6 months or more but without legal permanent resident status, such as undocumented immigrants and temporary workers and students.

Outgo. See "Disbursements."

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.

Payment cycling. Beneficiaries who applied for benefits before May 1, 1997, are scheduled to be paid on the third of the month. Persons applying for OASDI benefits after April 1997 generally are scheduled to be paid on the second, third, or fourth Wednesday of the month following the month for which payment is due. The particular Wednesday payment date is based on the earner's date of birth. For those born on the first through tenth, the scheduled benefit payment day is the second Wednesday of the month; for those born on the eleventh through the twentieth, the scheduled benefit payment day is the third Wednesday of the month; and for those born after the twentieth of the month, the scheduled payment day is the fourth Wednesday of the month.

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.

Quarters of coverage. Basic unit of measurement for determining insured status. In 2016, a worker receives one quarter of coverage (up to a total of four) for each $1,260 of annual covered earnings. For years after 1978, the amount of earnings required for a quarter of coverage is subject to annual automatic increases in proportion to increases in average wages. 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; in particular, two or more successive calendar quarters of negative 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.

Retirement test. See "Earnings test."

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 comprised 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.

Statutory blindness. Central visual acuity of 20/200 or less in the better eye with the use of a correcting lens or tunnel vision of 20 degrees or less.

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 noninterest 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 noninterest 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 SSI and 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 maximum 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 for a fund 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 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 in her lifetime 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 trust fund used for paying part of the costs of inpatient hospital services and related 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 expenditures that the Social Security Administration (SSA) made each month compared to security redemptions from the Trust Fund reserves made on a preliminary basis to cover such cash expenditures during the same month. On a monthly basis, 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 these expenditures. 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 expenditures through the end of the month. A net negative balance represents a situation where cumulative program cash expenditures 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 6-12 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. Services provided to disabled persons to help them to return to gainful employment. The trust funds 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.

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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 45 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 the 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, $11.4 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 $2.8 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.

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