Table III.A4 compares estimates of total income and total cost for calendar year 2022 from the intermediate projections in the 2018 through 2022 Trustees Reports to the corresponding actual amounts for 2022.

Table III.A4.—Comparison of Actual Calendar Year 2022 Trust Fund Operations With Estimates Made in Prior Reports, Based on Intermediate Assumptions[a]
[Amounts in billions]

	Total income[b]		Total cost	
	Amount	Difference from actual (percent)	Amount	Difference from actual (percent)
OASI Trust Fund:				
Estimate in 2018 report	$1,060.7	0.4	$1,106.5	0.8
Estimate in 2019 report	1,052.1	-.4	1,092.8	-.4
Estimate in 2020 report	1,034.0	-2.1	1,082.3	-1.4
Estimate in 2021 report	1,013.9	-4.1	1,072.5	-2.3
Estimate in 2022 report	1,034.4	-2.1	1,096.2	-.1
Actual amount	1,056.7		1,097.5	
DI Trust Fund:				
Estimate in 2018 report	163.1	-1.2	169.2	15.5
Estimate in 2019 report	163.0	-1.3	159.2	8.7
Estimate in 2020 report	160.8	-2.6	155.4	6.1
Estimate in 2021 report	158.2	-4.1	153.6	4.8
Estimate in 2022 report	161.5	-2.2	146.4	[c]
Actual amount	165.1		146.5	
OASI and DI Trust Funds, combined:				
Estimate in 2018 report	1,223.7	.2	1,275.7	2.6
Estimate in 2019 report	1,215.1	-.5	1,252.0	.6
Estimate in 2020 report	1,194.8	-2.2	1,237.8	-.5
Estimate in 2021 report	1,172.1	-4.1	1,226.1	-1.4
Estimate in 2022 report	1,195.8	-2.1	1,242.7	-.1
Actual amount	1,221.8		1,243.9	

[a] Percentage differences are calculated prior to rounding.
[b] "Actual" income for 2022 reflects adjustments to payroll tax contributions for prior calendar years (see appendix A for description of these adjustments). "Estimated" income also includes such adjustments, but on an estimated basis.
[c] Between -0.05 percent and 0.05 percent.

Note: Components may not sum to totals because of rounding.

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. In addition, estimates for the 2018 through 2020 Trustees Reports did not anticipate the pandemic and recession, while the actual income and cost for 2022 do reflect the pandemic, contributing to these differences as well.

At the end of calendar year 2022, the OASDI program was providing monthly benefits to about 66.0 million people. The OASI Trust Fund was

providing benefits to about 57.2 million people and the DI Trust Fund was providing benefits to about 8.8 million people. The number of people receiving benefits from the OASI Trust Fund grew by 2.0 percent while the number of people receiving DI benefits fell by 4.1 percent during calendar year 2022. These changes are in large part due to the shifting age distribution of the adult population, with the baby-boom generation (born in 1946-1965) moving increasingly above age 62 for retired worker benefits, and above normal retirement age, where DI benefits are no longer applicable. Table III.A5 shows the estimated distributions of benefit payments in calendar years 2021 and 2022, by type of beneficiary, for each trust fund separately.

Table III.A5.—Distribution of Benefit Payments by Type of Beneficiary or Payment, Calendar Years 2021 and 2022
[Amounts in millions]

	Calendar year 2021		Calendar year 2022	
	Amount	Percentage of total	Amount	Percentage of total
Total OASDI benefit payments	$1,133,164	100.0	$1,231,646	100.0
OASI benefit payments	993,167	87.6	1,088,170	88.4
DI benefit payments	139,996	12.4	143,475	11.6
OASI benefit payments, total	993,167	100.0	1,088,170	100.0
Monthly benefits:				
Retired workers and auxiliaries	861,873	86.8	947,071	87.0
Retired workers	822,440	82.8	906,826	83.3
Spouses	33,050	3.3	33,491	3.1
Children	6,384	.6	6,754	.6
Survivors of deceased workers	131,057	13.2	140,870	12.9
Aged widows and widowers	104,868	10.6	112,339	10.3
Disabled widows and widowers	2,233	.2	2,245	.2
Parents	19	[a]	19	[a]
Children	22,445	2.3	24,674	2.3
Widowed mothers and fathers caring for child beneficiaries	1,492	.2	1,593	.1
Lump-sum death payments	237	[a]	229	[a]
DI benefit payments, total	139,996	100.0	143,475	100.0
Disabled workers	132,401	94.6	135,978	94.8
Spouses	465	.3	458	.3
Children	7,131	5.1	7,039	4.9

[a] Less than 0.05 percent.

Note: Benefits are monthly benefits and lump-sum death payments. Components may not sum to totals because of rounding.

Net administrative expenses of the OASI and DI Trust Funds in calendar year 2022 totaled $6.7 billion, equal to 0.5 percent of total cost and 0.6 percent of total income. Table III.A6 shows corresponding percentages for each trust fund separately and for OASDI as a whole for the last 5 years.

Table III.A6.—Administrative Expenses as a Percentage of Total Income and of Total Cost, Calendar Years 2018-2022

	OASI Trust Fund		DI Trust Fund		OASI and DI Trust Funds, combined	
Calendar year	Total income	Total cost	Total income	Total cost	Total income	Total cost
2018	0.5	0.4	1.7	1.9	0.7	0.7
2019	.4	.4	1.9	1.8	.6	.6
2020	.4	.4	1.7	1.7	.6	.6
2021	.4	.4	1.7	1.7	.6	.6
2022	.4	.4	1.7	1.9	.6	.5

The acquisition and redemption of securities during calendar year 2022 changed the invested reserves of the OASI and DI Trust Funds. Table III.A7 presents investment transactions for each fund separately and combined.

Table III.A7.—Trust Fund Investment Transactions, Calendar Year 2022
[In millions]

	OASI Trust Fund	DI Trust Fund	OASI and DI Trust Funds, combined
Invested asset reserves, December 31, 2021[a]	$2,752,688	$99,438	$2,852,126
Acquisitions:			
Special issue securities:			
Certificates of indebtedness	1,018,446	162,972	1,181,418
Bonds[b]	189,931	26,381	216,311
Total acquisitions	1,208,377	189,352	1,397,729
Redemptions:			
Special issue securities:			
Certificates of indebtedness	884,392	150,684	1,035,076
Bonds	364,755	20,074	384,829
Total redemptions	1,249,147	170,758	1,419,905
Net increase in invested asset reserves	-40,770	18,594	-22,176
Invested asset reserves, December 31, 2022[a]	2,711,919	118,032	2,829,950

[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, 2022. The interest rate on these purchases was 3.000 percent.

Note: Investments are shown at par value. Components may not sum to totals because of rounding.

B. CHANGES IN LAW AND POLICY AFFECTING SOCIAL SECURITY SINCE THE 2022 REPORT

Since the Trustees submitted the 2022 report to Congress, there have been no changes in law, policy, or regulation that are expected to have significant financial effects on the OASDI program. However, there have been a number of notable regulatory and judicial developments related to immigration policy.

At the time of the 2022 report, the US Citizenship and Immigration Services had paused processing of first-time applications under the Deferred Action for Childhood Arrivals (DACA) policy but continued to process renewal applications. Since then, there have been several regulatory and judicial developments:

- On August 30, 2022, the Department of Homeland Security (DHS) published a final rule in the Federal Register, establishing regulations to "preserve and fortify" the DACA program in full.
- On October 5, 2022, the US Court of Appeals for the Fifth Circuit affirmed an earlier district court decision that had declared the DACA policy unlawful. The appeals court returned the case to the district court for further review of the DHS regulation.
- On October 14, 2022, the district court issued an order extending the pause in implementing the DACA final rule. As a result, DHS is currently prohibited from processing new DACA applications and related employment authorizations.

Changes in DACA policy affect OASDI program operations because those who apply for and receive deferred action status are eligible for work authorization, which leads to additional workers covered by the OASDI program, increased payroll tax revenue, and subsequently increased benefit cost. The estimates presented in last year's report reflected the assumption that the DACA program would be fully in effect by the middle of 2022, consistent with the Administration's intent. Because of the court challenges, the estimates in this year's report incorporate an additional one-year delay in the resumption of processing new applications, to the middle of 2023. This change is estimated to have negligible financial effects on the OASDI program over both the short-range and long-range projection periods.

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

IV. ACTUARIAL ESTIMATES

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

This chapter presents the estimates and measures of trust fund financial adequacy for the short-range period (2023 through 2032) first, followed by estimates and measures of actuarial status for the long-range period (2023 through 2097). 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 scheduled benefits in full on a timely basis if annual revenue were less than annual cost. Unexpected events, such as severe economic recessions, can quickly diminish reserves. In such cases, a reasonable contingency reserve can maintain the ability to pay scheduled benefits while giving lawmakers time to address possible changes to the program.

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

1. Operations of the OASI Trust Fund

This subsection presents projections, based on the assumptions described in chapter V, of the operations and financial status of the OASI Trust Fund for the period 2023 through 2032. 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 are projected to decrease in years 2023 through 2032 under all three sets of assumptions. Under the intermediate and low-cost assumptions, asset reserves remain positive through the end of the short-range period, but under the high-cost assumptions, asset reserves become depleted in the third quarter of 2031. Trust fund ratios are similarly projected to decline throughout the 10-year projection

[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.

period under all three sets of assumptions. Based on the intermediate assumptions, the reserves of the OASI Trust Fund drop below 100 percent of annual cost during 2028, to a trust fund ratio of 91 percent at the beginning of 2029, and remain below 100 percent for the remainder of the short-range period. Consequently, the OASI Trust Fund fails the test of short-range financial adequacy. See figure IV.A1 for an illustration of these results.

Table IV.A1.—Operations of the OASI Trust Fund, Calendar Years 2018-2032[a]
[Dollar amounts in billions]

	Income					Cost[b]				Asset Reserves[b]		
Calendar year	Total	Net payroll tax contributions[d]	GF reimbursements[e]	Taxation of benefits[df]	Net interest	Total	Scheduled benefits	Administrative costs	RRB interchange	Net increase during year	Amount at end of year	Trust fund ratio at start of year[c]
Historical data:												
2018	$831.0	$715.9	[g]	$34.5	$80.7	$853.5	$844.9	$3.8	$4.8	-$22.4	$2797.9	330
2019	917.9	805.1	[g]	34.9	77.9	911.4	902.8	3.7	4.9	6.5	2,804.3	307
2020	968.3	856.0	[g]	39.0	73.3	961.0	952.4	3.7	4.8	7.4	2.811.7	292
2021	942.9	838.2	[g]	37.2	67.5	1,001.9	993.1	4.0	4.8	-59.1	2,752.6	281
2022	1,056.7	945.9	$0.2	47.1	63.5	1,097.5	1,088.1	4.0	5.3	-40.7	2,711.9	251
Intermediate:												
2023	1,153.3	1,040.1	[g]	51.2	62.0	1,235.1	1,225.5	4.1	5.4	-81.7	2,630.2	220
2024	1,166.0	1,050.3	[g]	56.3	59.4	1,323.5	1,313.2	4.3	6.1	-157.5	2.472.6	199
2025	1,223.8	1,107.6	[g]	60.2	56.0	1,403.2	1,392.7	4.4	6.1	-179.4	2,293.2	176
2026	1,286.0	1.157.8	.2	74.6	53.4	1,486.1	1,475.3	4.5	6.3	-200.1	2,093.1	154
2027	1,341.3	1,209.9	[g]	80.7	50.8	1,571.1	1,560.0	4.7	6.4	-229.8	1,863.3	133
2028	1,396.6	1,263.0	[g]	86.9	46.7	1,661.5	1,650.2	4.8	6.5	-264.9	1.598.4	112
2029	1,451.4	1,316.8	[g]	93.8	40.7	1,754.5	1,742.9	5.0	6.6	-303.1	1,295.2	91
2030	1,505.5	1,370.7	[g]	101.5	33.3	1,849.3	1,837.4	5.1	6.7	-343.7	951.5	70
2031	1,560.9	1,427.4	[g]	109.6	23.8	1,945.0	1,932.9	5.3	6.8	-384.2	567.4	49
2032	1,613.2	1,482.7	[g]	118.4	12.0	2,041.5	2,029.1	5.5	6.9	-428.3	139.0	28
Low-cost:												
2023	1,161.9	1,047.2	[g]	51.2	63.5	1,234.4	1,224.8	4.1	5.4	-72.4	2,639.5	220
2024	1,210.6	1,090.8	[g]	56.1	63.6	1,318.8	1,308.5	4.3	6.0	-108.2	2.531.2	200
2025	1,297.3	1,172.9	[g]	60.3	64.2	1,404.5	1,394.0	4.4	6.1	-107.1	2.424.1	180
2026	1,391.2	1,249.3	.2	74.9	66.8	1,493.8	1,483.0	4.6	6.2	-102.6	2,321.4	162
2027	1,478.1	1,326.4	[g]	81.4	70.2	1,586.2	1,575.0	4.9	6.3	-108.1	2,213.3	146
2028	1,568.2	1,407.3	[g]	88.2	72.8	1,684.9	1,673.4	5.1	6.4	-116.7	2.096.6	131
2029	1,660.7	1,490.7	[g]	95.5	74.4	1,787.4	1,775.5	5.4	6.6	-126.8	1,969.8	117
2030	1,756.2	1,576.6	[g]	103.9	75.7	1,893.2	1,880.8	5.6	6.7	-137.0	1.832.9	104
2031	1,856.8	1,667.5	[g]	112.8	76.5	2,001.5	1,988.8	5.9	6.8	-144.7	1.688.2	92
2032	1,957.7	1,759.2	[g]	122.5	75.9	2.112.4	2,099.4	6.1	7.0	-154.7	1.533.4	80

Table IV.A1.—Operations of the OASI Trust Fund, Calendar Years 2018-2032[a] (Cont.)
[Dollar amounts in billions]

Calendar year	Income					Cost[b]				Asset Reserves[b]		Trust fund ratio at start of year[c]
	Total	Net payroll tax contributions[d]	GF reimbursements[e]	Taxation of benefits[f]	Net interest	Total	Scheduled benefits	Administrative costs	RRB interchange	Net increase during year	Amount at end of year	
High-cost:												
2023	$1,137.3	$1,024.3	[g]	$51.3	$61.7	$1,235.9	$1,226.3	$4.1	$5.4	-$98.6	$2,613.3	219
2024	1,116.7	1,003.1	[g]	56.8	56.9	1,334.8	1,324.4	4.3	6.1	-218.1	2,395.3	196
2025	1,167.7	1,056.0	[g]	60.9	50.8	1,419.9	1,409.3	4.3	6.3	-252.2	2,143.1	169
2026	1,217.1	1,096.5	$0.2	75.1	45.4	1,497.3	1,486.3	4.5	6.5	-280.1	1,863.0	143
2027	1,255.4	1,134.7	[g]	80.9	39.8	1,576.3	1,565.2	4.6	6.5	-320.9	1,542.1	118
2028	1,287.8	1,168.9	[g]	86.9	32.1	1,660.1	1,648.9	4.7	6.6	-372.3	1,169.8	93
2029	1,317.2	1,200.7	[g]	93.3	23.2	1,745.6	1,734.2	4.8	6.7	-428.4	741.4	67
2030	1,344.6	1,230.7	[g]	100.6	13.3	1,831.8	1,820.2	4.8	6.8	-487.2	254.2	40
2031	[h]	1,261.4	[g]	108.1	[h]	1,918.1	1,906.3	4.9	6.8	[h]	[h]	13
2032	[h]	1,289.7	[g]	116.3	[h]	2,004.1	1,992.2	5.0	6.9	[h]	[h]	[h]

[a] The OASI Trust Fund reserves become depleted in the third quarter of 2031 under the high-cost assumptions. For any period during which reserves would be depleted, scheduled benefits could not be paid in full on a timely basis, income from taxing benefits would be less than would apply to scheduled benefits, and interest on trust fund reserves would be negligible. Appendix A presents a detailed description of the components of income and cost, along with complete historical values.

[b] Amounts for 2020 and 2021 are adjusted to include in 2021 operations those benefit payments regularly scheduled in the law to be paid on January 3, 2021, which were actually paid on December 31, 2020 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 occur periodically 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] 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. The trust fund ratio at the beginning of 2033 is projected to be 7 percent for the intermediate, and 69 percent for the low-cost assumptions.

[d] Includes adjustments for prior calendar years. For example, in June 2021, an unusually large negative adjustment to payroll tax contributions in the amount of $30.4 billion was made because payroll tax revenue credited to the trust fund in 2020 was based on estimates that did not anticipate effects of the pandemic and recession.

[e] Includes reimbursements from the General Fund of the Treasury to the OASI Trust Fund for: (1) the cost of payroll tax credits provided to employees in 1984 and self-employed persons in 1984-89 by Public Law 98-21; and (2) payroll tax revenue forgone under the provisions of Public Laws 111-147, 111-312, 112-78, and 112-96. Also includes transfers of a portion of proceeds from repayments of loans authorized under Public Law 116-136.

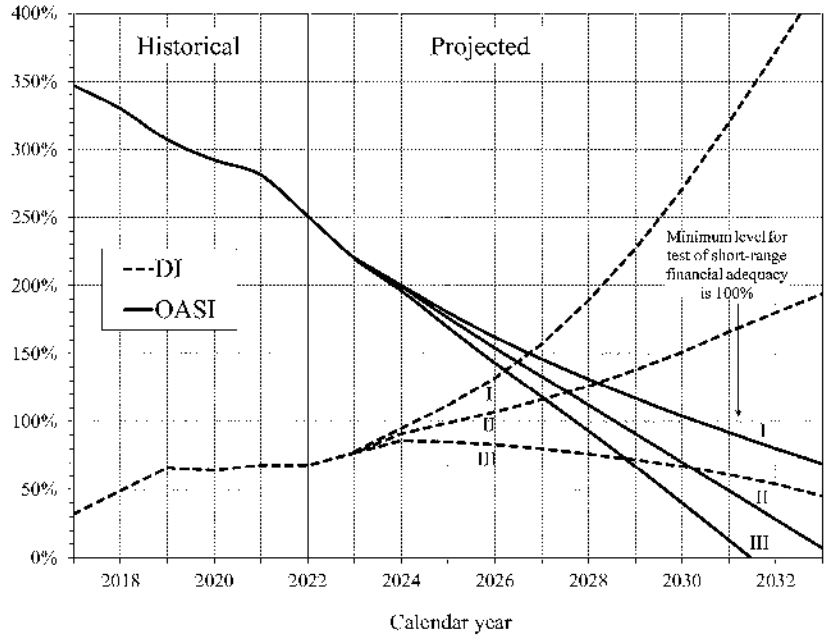
[f] Revenue from taxation of benefits is the amount that would be assessed on benefit amounts scheduled in the law.

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

[h] When the fund reserves are depleted, values under current law would reflect permissible expenditures only, which would be less than the full cost of paying scheduled benefits shown in this table.

Note: Components may not sum to totals because of rounding.

Figure IV.A1.—Short-Range OASI and DI Trust Fund Ratios
[Asset reserves as a percentage of annual cost]



The estimated income shown in table IV.A1 increases annually under each set of assumptions throughout the short-range projection period, with the exception of a small decrease in 2024 for the high-cost alternative. The estimated increases in income result primarily from the projected increases in OASDI taxable payroll. Employment increases in years 2023 through 2032 for all three alternatives, with the exception of small decreases in covered employment in 2023 and 2024 for the high-cost alternative: the number of covered workers increases under alternatives I, II, and III from 181 million during calendar year 2022 to about 192 million, 188 million, and 184 million, respectively, in 2032.[1] The total annual amount of taxable payroll increases in years 2023 through 2032 for each alternative. Total taxable payroll increases from $9,069 billion in 2022 to $16,650 billion, $14,023 billion, and $12,189 billion in 2032, on the basis of alternatives I, II, and III, respectively.[2] These increases in taxable payroll are due primarily to: (1) projected increases in employment levels as the working-age population increases; (2) trend increases in average earnings in covered employment (reflecting both real growth and price inflation); (3) increases in the contribu-

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

tion and benefit base under the automatic-adjustment provisions; and (4) growth in employment and average earnings.

Interest earnings contribute to the overall projected level of trust fund income during this period. Interest income declines generally at a slow rate under the intermediate assumptions and much faster under the high-cost assumptions, and increases generally under the low-cost assumptions, due to the net effects of changes in reserve levels and the patterns of projected interest rates. Under the intermediate assumptions, interest also declines as a share of total OASI Trust Fund income reaching 1 percent of total trust fund income for 2032, as compared to 6 percent for 2022.

Rising OASI cost from 2022 through 2032 reflects automatic benefit increases each year after initial benefit eligibility and increases each year for those becoming newly eligible based on rising average earnings levels, as well as the upward trend in the number of beneficiaries. The steady growth in the number of OASI beneficiaries in the past and the expected future growth result both from the increase in the aged population and from the increase in the proportion of the population that is insured for benefits.

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

2. Operations of the DI Trust Fund

Table IV.A2 shows the projected operations and financial status of the DI Trust Fund during calendar years 2023 through 2032 under the three sets of assumptions, together with values for actual experience during 2018 through 2022. Non-interest income for DI dropped in 2019 from its level in 2018, due to the temporary payroll tax rate reallocation from OASI to DI in 2016 through 2018. For 2022, non-interest income was higher than DI cost. Non-interest income increases generally throughout the short-range projection period under each alternative, due to most of the same factors described previously for the OASI Trust Fund beginning on page 45. DI cost grows steadily throughout the period under each alternative. Under the intermediate and low-cost assumptions, DI reserves increase through 2032. Under the high-cost assumptions, DI reserves increase through 2026 and then decline through 2032.

Table IV.A2.—Operations of the DI Trust Fund, Calendar Years 2018-2032[a]
[Dollar amounts in billions]

Calendar year	Income					Cost[b]				Asset Reserves[b]		Trust fund ratio at start of year[c]
	Total	Net payroll tax contributions[d]	GF reimbursements[e]	Taxation of benefits[d,f]	Net interest	Total	Scheduled benefits	Administrative costs	RRB interchange	Net increase during year	Amount at end of year	
Historical data:												
2018 ..	$172.3	$169.2	$0	$0.5	$2.6	$146.8	$143.7	$2.9	$0.2	$25.6	$97.1	49
2019 ..	143.9	139.4	0	1.6	2.9	147.9	145.1	2.7	.1	-4.0	93.1	66
2020 ..	149.7	145.3	0	1.7	2.8	146.3	143.6	2.6	.1	3.5	96.6	64
2021 ..	145.5	142.4	0	.5	2.6	142.6	140.1	2.5	.1	2.8	99.4	68
2022 ..	165.1	160.7	0	1.6	2.8	146.5	143.6	2.7	.2	18.6	118.0	68
Intermediate:												
2023 ..	181.4	176.6	0	1.1	3.7	152.9	149.7	3.1	0	28.5	146.5	77
2024 ..	184.7	178.4	0	1.7	4.6	161.1	158.0	3.0	0	23.6	170.2	91
2025 ..	195.5	188.1	0	1.9	5.6	171.1	168.0	3.1	0	24.4	194.5	99
2026 ..	205.5	196.6	0	2.3	6.5	181.1	177.8	3.3	0	24.4	218.9	107
2027 ..	215.5	205.4	0	2.5	7.6	189.1	185.6	3.4	0	26.5	245.4	116
2028 ..	226.1	214.5	0	2.6	9.0	194.8	191.2	3.6	0	31.3	276.7	126
2029 ..	237.0	223.6	0	2.8	10.6	200.7	196.9	3.8	0	36.4	313.1	138
2030 ..	248.3	232.8	0	2.9	12.6	206.7	202.7	4.0	0	41.6	354.7	151
2031 ..	260.4	242.4	0	3.1	14.8	214.1	209.9	4.1	.1	46.3	401.0	166
2032 ..	272.5	251.8	0	3.4	17.3	222.6	218.2	4.3	.1	49.9	450.9	180
Low-cost:												
2023 ..	182.8	177.8	0	1.0	4.0	151.6	148.5	3.1	0	31.2	149.2	78
2024 ..	192.5	185.2	0	1.7	5.5	157.3	154.2	3.0	0	35.2	184.4	95
2025 ..	208.5	199.2	0	1.8	7.5	165.1	162.0	3.1	0	43.4	227.8	112
2026 ..	224.5	212.1	0	2.2	10.2	172.9	169.6	3.3	0	51.7	279.4	132
2027 ..	241.1	225.2	0	2.3	13.5	178.3	174.8	3.5	0	62.8	342.3	157
2028 ..	259.1	239.0	0	2.4	17.7	181.3	177.6	3.7	0	77.8	420.1	189
2029 ..	278.3	253.1	0	2.6	22.6	185.0	181.1	3.9	0	93.3	513.4	227
2030 ..	298.9	267.7	0	2.7	28.4	189.1	185.0	4.1	0	109.7	623.1	271
2031 ..	321.4	283.2	0	2.8	35.4	194.7	190.3	4.4	0	126.6	749.8	320
2032 ..	345.2	298.7	0	3.1	43.4	201.6	197.0	4.6	0	143.6	893.4	372

Table IV.A2.—Operations of the DI Trust Fund, Calendar Years 2018-2032[a] (Cont.)
[Dollar amounts in billions]

Calendar year	Income					Cost[b]				Asset Reserves[b]		Trust fund ratio at start of year[c]
	Total	Net payroll tax contributions[d]	GF reimbursements[e]	Taxation of benefits[df]	Net interest	Total	Scheduled benefits	Administrative costs	RRB interchange	Net increase during year	Amount at end of year	
High-cost:												
2023	$178.7	$173.9	[g]	$1.1	$3.7	$154.1	$151.0	$3.1	[g]	$24.6	$142.6	77
2024	176.2	170.3	[g]	1.8	4.1	165.9	162.8	3.0	[g]	10.4	152.9	86
2025	185.6	179.3	[g]	2.0	4.3	179.8	176.6	3.1	[g]	5.9	158.8	85
2026	193.1	186.2	[g]	2.5	4.5	191.4	188.1	3.3	[g]	1.7	160.5	83
2027	199.8	192.7	[g]	2.6	4.5	201.7	198.3	3.4	[g]	-1.9	158.6	80
2028	205.8	198.5	[g]	2.8	4.4	209.4	205.8	3.5	[g]	-3.6	155.0	76
2029	211.3	203.9	[g]	3.0	4.4	216.4	212.7	3.7	[g]	-5.2	149.8	72
2030	216.4	209.0	[g]	3.2	4.2	224.0	220.1	3.8	$0.1	-7.5	142.3	67
2031	221.7	214.2	[g]	3.4	4.0	233.0	229.0	3.9	.1	-11.3	131.0	61
2032	226.4	219.0	[g]	3.7	3.7	242.8	238.7	4.1	.1	-16.4	114.6	54

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

[b] Amounts for 2020 and 2021 are adjusted to include in 2021 operations those benefit payments regularly scheduled in the law to be paid on January 3, 2021, which were actually paid on December 31, 2020 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 occur periodically 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] 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. The trust fund ratio at the beginning of 2033 is projected to be 194 percent for the intermediate, 425 percent for the low-cost, and 45 percent for the high-cost assumptions.

[d] Includes adjustments for prior calendar years. For example, in June 2021, an unusually large negative adjustment to payroll tax contributions in the amount of $5.2 billion was made because payroll tax revenue credited to the trust fund in 2020 was based on estimates that did not anticipate effects of the pandemic and recession.

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

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

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

Note: Components may not sum to totals because of rounding.

For the future, DI cost is projected to increase in part due to increases in average benefit levels resulting from: (1) automatic benefit increases and (2) projected increases in the amounts of average monthly earnings on which benefits are based. Future changes in DI cost also reflect changes in the number of DI beneficiaries in current-payment status. In 2022, the number of DI beneficiaries in current-payment status continued the declining trend of the prior eight years. Under the intermediate assumptions, that number of DI beneficiaries is projected to drop further through the end of 2024, then increase through the end of 2032 to a level of about 9 million. The rate of increase after 2024 is much slower than was experienced on average from 1990 to 2010, when the population with the highest disability prevalence rates was growing rapidly due to the aging of the baby-boom generation. See section V.C.5 for further details.

At the beginning of calendar year 2023, the reserves of the DI Trust Fund represented 77 percent of estimated annual cost. Under the intermediate

assumptions, DI trust fund reserves and the trust fund ratio increase throughout the short-range projection period. The trust fund ratio rises to 107 percent at the beginning of the fourth projected year, 2026, and continues to increase for the remainder of the short-range period.

Because the reserves of the DI Trust Fund at the beginning of 2023 were less than the estimated annual cost for 2023, but are projected to increase to above annual cost within five years, and then remain above annual cost throughout the rest of the short-range period under the intermediate assumptions, the DI Trust Fund satisfies the Trustees' test of short-range financial adequacy.

3. Operations of the Combined OASI and DI Trust Funds

Table IV.A3 shows the projected operations and status of the combined OASI and DI Trust Funds for calendar years 2023 through 2032 under the three alternatives, together with actual experience in 2018 through 2022. Income and cost for the OASI Trust Fund represent over 80 percent of the corresponding amounts for the combined OASI and DI Trust Funds. Under the intermediate and low-cost assumptions, 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. Under the high-cost assumptions, combined OASI and DI trust fund reserves deplete in the fourth quarter of 2031. The combined OASI and DI Trust Funds do not satisfy the test of short-range financial adequacy because under the intermediate assumptions, trust fund reserves drop below 100 percent of annual cost during 2028, to a trust fund ratio of 96 percent at the beginning of 2029, and remain below 100 percent for the remainder of the short-range period.

Table IV.A3.—Operations of the Combined OASI and DI Trust Funds, Calendar Years 2018-2032[a]

[Dollar amounts in billions]

	Income					Cost[b]				Asset Reserves[b]		
Calendar year	Total	Net payroll tax contributions[d]	GF reimbursements[c]	Taxation of benefits[d,f]	Net interest	Total	Scheduled benefits	Administrative costs	RRB interchange	Net increase during year	Amount at end of year	Trust fund ratio at start of year[c]
Historical data:												
2018...	$1,003.4	$885.1	g	$35.0	$83.3	$1,000.2	$988.6	$6.7	$4.9	$3.1	$2,894.9	289
2019...	1,061.8	944.5	g	36.5	80.8	1,059.3	1,047.9	6.4	4.9	2.5	2,897.4	273
2020...	1,118.1	1,001.3	g	40.7	76.1	1,107.2	1,095.9	6.3	5.0	10.9	2,908.3	262
2021...	1,088.3	980.6	g	37.6	70.1	1,144.6	1,133.2	6.5	4.9	-56.3	2,852.0	254
2022...	1,221.8	1,106.6	$0.2	48.6	66.4	1,243.9	1,231.7	6.7	5.5	-22.1	2,829.9	229
Intermediate:												
2023...	1,334.7	1,216.8	g	52.3	65.7	1,387.9	1,375.3	7.2	5.4	-53.2	2,776.7	204
2024...	1,350.7	1,228.7	g	58.1	64.0	1,484.6	1,471.2	7.3	6.1	-133.9	2,642.8	187
2025...	1,419.3	1,295.7	g	62.1	61.6	1,574.3	1,560.7	7.5	6.2	-155.1	2,487.7	168

Table IV.A3.—Operations of the Combined OASI and DI Trust Funds, Calendar Years 2018-2032[a] (Cont.)

[Dollar amounts in billions]

Calendar year	Income					Cost[b]				Asset Reserves[b]		Trust fund ratio at start of year[c]
	Total	Net payroll tax contributions[d]	GF reimbursements[e]	Taxation of benefits[f]	Net interest	Total	Scheduled benefits	Administrative costs	RRB interchange	Net increase during year	Amount at end of year	
Intermediate (Cont.):												
2026 . .	$1,491.5	$1,354.5	$0.2	$76.9	$60.0	$1,667.2	$1,653.1	$7.8	$6.3	-$175.7	$2,312.0	149
2027 . .	1,556.9	1,415.3	[g]	83.1	58.4	1,760.2	1,745.7	8.1	6.4	-203.3	2,108.7	131
2028 . .	1,622.7	1,477.5	[g]	89.6	55.6	1,856.3	1,841.3	8.4	6.5	-233.6	1,875.1	114
2029 . .	1,688.4	1,540.5	[g]	96.6	51.4	1,955.2	1,939.7	8.8	6.6	-266.8	1,608.3	96
2030 . .	1,753.9	1,603.5	[g]	104.5	45.9	2,056.0	2,040.1	9.1	6.8	-302.1	1,306.2	78
2031 . .	1,821.3	1,669.8	[g]	112.8	38.6	2,159.1	2,142.8	9.4	6.9	-337.9	968.3	60
2032 . .	1,885.7	1,734.5	[g]	121.8	29.3	2,264.1	2,247.3	9.8	7.0	-378.4	589.9	43
Low-cost:												
2023 . .	1,344.8	1,225.1	[g]	52.3	67.4	1,386.0	1,373.3	7.2	5.4	-41.2	2,788.7	204
2024 . .	1,403.0	1,276.1	[g]	57.8	69.1	1,476.1	1,462.8	7.3	6.1	-73.1	2,715.6	189
2025 . .	1,505.8	1,372.1	[g]	62.1	71.7	1,569.6	1,556.0	7.5	6.1	-63.7	2,651.8	173
2026 . .	1,615.7	1,461.4	.2	77.2	77.0	1,666.7	1,652.5	7.9	6.2	-51.0	2,600.9	159
2027 . .	1,719.2	1,551.7	[g]	83.8	83.8	1,764.5	1,749.8	8.4	6.3	-45.3	2,555.6	147
2028 . .	1,827.4	1,646.2	[g]	90.6	90.5	1,866.2	1,851.0	8.8	6.4	-38.9	2,516.7	137
2029 . .	1,939.0	1,743.8	[g]	98.1	97.1	1,972.4	1,956.6	9.3	6.6	-33.5	2,483.3	128
2030 . .	2,055.1	1,844.3	[g]	106.6	104.1	2,082.3	2,065.8	9.7	6.7	-27.2	2,456.0	119
2031 . .	2,178.2	1,950.7	[g]	115.7	111.8	2,196.2	2,179.2	10.2	6.8	-18.1	2,438.0	112
2032 . .	2,302.9	2,058.0	[g]	125.6	119.4	2,314.1	2,296.4	10.7	7.0	-11.1	2,426.8	105
High-cost:												
2023 . .	1,316.0	1,198.3	[g]	52.3	65.4	1,390.0	1377.3	7.2	5.4	-74.0	2,755.9	204
2024 . .	1,293.0	1,173.4	[g]	58.6	61.0	1,500.7	1487.2	7.3	6.1	-207.7	2,548.2	184
2025 . .	1,353.3	1,235.4	[g]	62.9	55.1	1,599.6	1585.9	7.5	6.3	-246.3	2,301.9	159
2026 . .	1,410.2	1,282.6	.2	77.6	49.8	1,688.7	1674.5	7.7	6.5	-278.4	2,023.5	136
2027 . .	1,455.2	1,327.4	[g]	83.6	44.2	1,778.0	1763.5	8.0	6.5	-322.8	1,700.7	114
2028 . .	1,493.6	1,367.4	[g]	89.7	36.5	1,869.5	1,854.7	8.2	6.6	-375.9	1,324.8	91
2029 . .	1,528.5	1,404.6	[g]	96.3	27.6	1,962.0	1,946.9	8.4	6.7	-433.6	891.3	68
2030 . .	1,561.1	1,439.7	[g]	103.8	17.6	2,055.8	2,040.3	8.6	6.8	-494.7	396.5	43
2031 . .	[h]	1,475.6	[g]	111.6	[h]	2,151.0	2,135.3	8.9	6.9	[h]	[h]	18
2032 . .	[h]	1,508.7	[g]	120.0	[h]	2,246.9	2,230.8	9.1	7.0	[h]	[h]	[h]

[a] The OASDI Trust Fund reserves become depleted in the fourth quarter of 2031 under the high-cost assumptions. For any period during which reserves would be depleted, scheduled benefits could not be paid in full on a timely basis. Income from taxing benefits would be less than would apply to scheduled benefits, and interest on trust fund reserves would be negligible. Appendix A presents a detailed description of the components of income and cost, along with complete historical values.

[b] Amounts for 2020 and 2021 are adjusted to include in 2021 operations those benefit payments regularly scheduled in the law to be paid on January 3, 2021, which were actually paid on December 31, 2020 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 occur periodically 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] 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. The trust fund ratio at the beginning of 2033 is projected to be 25 percent for the intermediate, and 100 percent for the low-cost assumptions.

[d] Includes adjustments for prior calendar years. For example, in June 2021, an unusually large negative adjustment to payroll tax contributions in the amount of $35.5 billion was made because payroll tax revenue credited to the trust funds in 2020 was based on estimates that did not anticipate effects of the pandemic and recession.

[e] Includes reimbursements from the General Fund of the Treasury to the OASI and DI Trust Funds for: (1) the cost of payroll tax credits provided to employees in 1984 and self-employed persons in 1984-89 by Public Law 98-21; and (2) payroll tax revenue forgone under the provisions of Public Laws 111-147, 111-312, 112-78, and 112-96. Also includes transfers of a portion of proceeds from repayments of loans authorized under Public Law 116-136.

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

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

[h] When the fund reserves are depleted, values under current law would reflect permissible expenditures only, which would be less than the full cost of paying scheduled benefits shown in this table.

Note: Components may not sum to totals because of rounding.

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

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

In the 2022 report under the intermediate assumptions, the trust fund ratio for OASI reached 66 percent at the beginning of 2031—the tenth projection year for that report. The change in the short-range valuation period alone, from 2022 through 2031 to 2023 through 2032, lowered the estimated trust fund ratio for the tenth year by 20 percentage points, to 46 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 18 percentage points. Therefore, the total change in the tenth year projected trust fund ratio from last year's report to this year's report is a reduction of 38 percentage points to 28 percent.

Legislative and regulatory changes since the 2022 report was published did not have a significant effect on the projected tenth year OASI trust fund ratio. Changes in demographic assumptions over the short-range period increased the projected tenth year trust fund ratio for OASI by 4 percentage points. Several changes in economic data and assumptions combined to cause a net reduction in the OASI trust fund ratio of 21 percentage points by the beginning of 2032. The large decrease due to economic factors is primarily due to the Trustees revising down the levels of GDP and labor productivity over the projection period. The reduced level of productivity reduces the projected growth in average earnings relative to the CPI. As a result, higher assumed growth in CPI and average benefits in the short-range period is not matched with comparable increases in average earnings underlying payroll tax collections. Incorporating recent programmatic data and assumptions, including actual average benefits and beneficiary counts for 2022, resulted in a decrease of 1 percentage point in the tenth year OASI trust fund ratio. Finally, the tenth year trust fund ratio was not affected significantly by changes in the short-range methodology for this report.

Table IV.A4 also shows corresponding estimates of the factors underlying the changes in the financial projections for the DI Trust Fund and for the combined OASI and DI Trust Funds. The 35-percentage-point increase in the DI trust fund ratio from the beginning of 2031 in last year's report to the beginning of 2032 in this year's report is the net effect of increases and decreases from the factors described above for the OASI Trust Fund, combined with other changes that are significant for DI but not OASI. The large increase of 33 points due to programmatic data and assumptions reflects

lower recent disabled-worker application and incidence rates, and a more gradual return of initial disability application rates to their ultimate levels from recent lows.

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 2031	66	145	74
Change in trust fund ratio due to changes in:			
Legislation and regulations	[a]	[a]	[a]
Valuation period	-20	12	-17
Demographic data and assumptions	4	[a]	4
Economic data and assumptions	-21	-8	-20
Programmatic data and assumptions	-1	33	2
Projection methods and data	[a]	-2	[a]
Total change in trust fund ratio	-38	35	-31
Trust fund ratio shown in this report for calendar year 2032	28	180	43

[a] Between -0.5 and 0.5 percent.

Note: Components may not sum to totals because of rounding.

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 used to assess the actuarial status of the program.

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

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

Total income and cost are summarized over valuation periods that extend through 75 years and over the infinite horizon.[1] This section presents several summarized measures, including the actuarial balance and the open- group unfunded obligation. The actuarial balance indicates the size of any surplus or shortfall as a percentage of 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 is used to assess the actuarial status of the Social Security program, including: (1) a comparison of the number of beneficiaries to the number of covered workers, (2) the test of long-range close actuarial balance, and (3) the reasons for the change in the actuarial balance from the last report.

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[1] See appendix F.

1. Annual Income Rates, Cost Rates, and Balances

The concepts of income rate and cost rate, expressed as percentages of taxable payroll, are important in the consideration of the long-range actuarial status of the trust funds. The annual income rate is the ratio of all non-interest income to the OASDI taxable payroll for the year. Non-interest income includes payroll taxes, taxes on scheduled benefits, and any General Fund transfers or reimbursements. The OASDI taxable payroll consists of the total earnings subject to OASDI taxes with some relatively small adjustments.[1] The annual cost rate is the ratio of the cost of the program to the taxable payroll for the year. The cost includes scheduled benefits, administrative expenses, net interchange with the Railroad Retirement program, and payments for vocational rehabilitation services for disabled beneficiaries. For any year, the annual income rate minus the annual cost rate is the annual "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 OASI income rate will increase from 10.95 percent of payroll for 2022 to 11.42 percent of payroll for 2023 and then decrease to 11.08 percent of payroll for 2024. The income rate for 2023 is relatively high because of an estimated large positive adjustment to payroll tax contributions to be made in June 2023. This adjustment is unusually large because payroll tax revenue credited to the trust fund in 2022 was based on estimates that did not anticipate the stronger-than-expected recovery from the pandemic-induced recession. The OASI income rate then generally gradually rises thereafter, reaching 11.57 percent of taxable payroll for 2097. Income from taxation of benefits causes this gradual increase in the OASI income rate for two main reasons: (1) total scheduled benefits are rising faster than payroll; and (2) the ratio of total income tax on benefits to total benefits increases over time for reasons discussed in detail on page 153.

The OASI cost rate rises rapidly from 2022 to about 2040. During this period, 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 continue to replace the baby-boom generation at working ages. From 2040 to 2046, the cost rate declines because the aging baby-boom generation is gradually replaced at retirement ages by the

[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.

lower-birth-rate generations that followed. The OASI cost rate then rises from 15.01 percent for 2046 to 16.65 percent for 2078, largely because of the period of reduced birth rates starting with the recession of 2007-09, and then generally declines to 15.82 percent for 2097.

Projections of income rates under the low-cost and high-cost sets of assumptions are similar to those projected for the intermediate assumptions, because income rates are largely a reflection of the payroll tax rates specified in the law, with the changes from taxation of benefits noted above. In contrast, OASI cost rates for the low-cost and high-cost assumptions are significantly different from those projected for the intermediate assumptions. For the low-cost assumptions, the OASI cost rate generally declines from 12.77 percent for 2023 to 12.03 percent for 2053, rises to 12.33 percent for 2070, and then generally declines to 11.06 percent for 2097, at which point the income rate reaches 11.27 percent. For the high-cost assumptions, the OASI cost rate rises from 13.26 percent for 2023 to 24.89 percent for 2088 and then declines gradually to 24.73 percent for 2097, at which point the income rate reaches 12.13 percent.

The pattern of the projected OASI annual balance is important in the analysis of the actuarial status of the program. Under the intermediate assumptions, the annual balance is negative throughout the projection period. The annual deficit increases from 1.15 percent of taxable payroll for 2022 to 1.50 percent for 2023 and to 2.17 percent for 2024. After 2024, the annual deficit continues to rise to 3.59 percent for 2040. It then declines to 3.53 percent of payroll for 2046, rises to 5.03 percent for 2078, and generally declines thereafter, reaching 4.25 percent of taxable payroll for 2097.

Under the low-cost assumptions, the OASI annual deficit increases from 1.41 percent of payroll for 2023 to 1.66 percent for 2024, and then generally declines to 0.72 percent of payroll for 2053. After 2053, the annual deficit rises to 0.99 percent for 2070. After 2070, the OASI annual balance generally improves, turning positive in 2089, and reaching 0.21 percent of payroll for 2097. Under the high-cost assumptions, the OASI annual deficit rises from 1.72 percent for 2023 to 12.76 percent for 2088, and then declines relatively modestly to 12.60 percent for 2097.

Table IV.B1.—Annual Income Rates, Cost Rates, and Balances, Calendar Years 1990-2100

[As a percentage of taxable payroll]

Calendar year	OASI			DI			OASDI		
	Income rate[a]	Cost rate[b]	Balance[b]	Income rate[a]	Cost rate[b]	Balance[b]	Income rate[a]	Cost rate[b]	Balance[b]
Historical data:									
1990	11.47	9.65	1.82	1.18	1.09	0.10	12.65	10.74	1.91
1995	10.65	10.23	.42	1.87	1.44	.43	12.52	11.67	.85
2000	10.85	8.98	1.87	1.78	1.42	.36	12.62	10.40	2.23
2005	10.96	9.31	1.65	1.84	1.85	-.02	12.80	11.16	1.63
2010	10.75	11.06	-.30	1.79	2.41	-.62	12.54	13.47	-.92
2015	11.02	11.64	-.62	1.81	2.27	-.47	12.82	13.91	-1.09
2016	10.70	11.69	-.99	2.39	2.20	.19	13.09	13.89	-.80
2017	10.63	11.56	-.92	2.42	2.09	.33	13.06	13.64	-.59
2018	10.27	11.68	-1.41	2.32	2.01	.31	12.59	13.68	-1.10
2019	10.97	11.90	-.93	1.84	1.93	-.09	12.81	13.83	-1.02
2020	11.60	12.45	-.85	1.91	1.90	.01	13.51	14.35	-.85
2021	10.52	12.05	-1.52	1.72	1.71	[c]	12.24	13.76	-1.52
2022	10.95	12.10	-1.15	1.79	1.62	.17	12.74	13.72	-.98
Intermediate:									
2023	11.42	12.93	-1.50	1.86	1.60	.26	13.29	14.53	-1.24
2024	11.08	13.25	-2.17	1.80	1.61	.19	12.89	14.87	-1.98
2025	11.16	13.41	-2.25	1.82	1.64	.18	12.97	15.04	-2.07
2026	11.26	13.58	-2.32	1.82	1.65	.16	13.08	15.23	-2.15
2027	11.28	13.73	-2.45	1.82	1.65	.16	13.09	15.38	-2.29
2028	11.31	13.92	-2.61	1.82	1.63	.19	13.13	15.55	-2.42
2029	11.34	14.11	-2.76	1.82	1.61	.21	13.16	15.72	-2.56
2030	11.37	14.28	-2.91	1.82	1.60	.22	13.18	15.87	-2.69
2031	11.39	14.42	-3.02	1.82	1.59	.23	13.21	16.00	-2.79
2032	11.42	14.56	-3.14	1.82	1.59	.23	13.24	16.14	-2.91
2035	11.45	14.85	-3.40	1.82	1.63	.19	13.27	16.48	-3.21
2040	11.47	15.06	-3.59	1.82	1.72	.10	13.30	16.78	-3.48
2045	11.48	15.01	-3.53	1.83	1.85	-.02	13.31	16.86	-3.55
2050	11.49	15.06	-3.57	1.83	1.92	-.09	13.32	16.99	-3.67
2055	11.51	15.27	-3.76	1.83	1.96	-.13	13.34	17.23	-3.89
2060	11.54	15.69	-4.14	1.83	1.93	-.10	13.37	17.62	-4.24
2065	11.57	16.03	-4.46	1.83	1.91	-.08	13.40	17.95	-4.54
2070	11.59	16.33	-4.74	1.83	1.90	-.07	13.42	18.23	-4.81
2075	11.61	16.59	-4.98	1.83	1.87	-.04	13.44	18.46	-5.02
2080	11.61	16.62	-5.00	1.83	1.85	-.02	13.45	18.47	-5.02
2085	11.60	16.38	-4.78	1.83	1.85	-.01	13.43	18.23	-4.79
2090	11.58	16.01	-4.43	1.83	1.89	-.05	13.41	17.89	-4.48
2095	11.57	15.82	-4.25	1.83	1.92	-.09	13.40	17.74	-4.34
2100	11.58	15.89	-4.31	1.84	1.94	-.10	13.41	17.83	-4.42
First year balance becomes negative and remains negative throughout the 75-year projection period			2010			2044			2010

Table IV.B1.—Annual Income Rates, Cost Rates, and Balances, Calendar Years 1990-2100 (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:									
2023.....	11.36	12.77	-1.41	1.85	1.57	0.28	13.22	14.34	-1.12
2024.....	11.09	12.75	-1.66	1.81	1.52	.29	12.90	14.27	-1.38
2025.....	11.12	12.67	-1.54	1.81	1.49	.32	12.93	14.15	-1.22
2026.....	11.21	12.64	-1.43	1.81	1.46	.35	13.02	14.11	-1.08
2027.....	11.21	12.63	-1.42	1.81	1.42	.39	13.03	14.05	-1.03
2028.....	11.24	12.66	-1.42	1.81	1.36	.45	13.05	14.02	-.97
2029.....	11.26	12.69	-1.43	1.81	1.31	.50	13.07	14.00	-.93
2030.....	11.27	12.70	-1.43	1.81	1.27	.55	13.09	13.97	-.88
2031.....	11.29	12.69	-1.40	1.81	1.23	.58	13.10	13.93	-.82
2032.....	11.30	12.69	-1.39	1.81	1.21	.60	13.11	13.90	-.78
2035.....	11.32	12.71	-1.39	1.81	1.20	.62	13.13	13.90	-.77
2040.....	11.32	12.58	-1.26	1.82	1.22	.59	13.14	13.80	-.66
2045.....	11.31	12.27	-.96	1.82	1.29	.53	13.13	13.56	-.43
2050.....	11.31	12.08	-.77	1.82	1.32	.50	13.13	13.39	-.27
2055.....	11.31	12.05	-.74	1.82	1.32	.50	13.13	13.38	-.25
2060.....	11.33	12.22	-.89	1.82	1.29	.53	13.15	13.51	-.36
2065.....	11.34	12.31	-.97	1.82	1.27	.55	13.16	13.58	-.42
2070.....	11.34	12.33	-.99	1.82	1.26	.56	13.16	13.58	-.42
2075.....	11.34	12.30	-.96	1.82	1.23	.59	13.16	13.53	-.37
2080.....	11.33	12.05	-.73	1.82	1.22	.60	13.14	13.27	-.12
2085.....	11.30	11.61	-.31	1.82	1.22	.60	13.12	12.83	.29
2090.....	11.27	11.15	.12	1.82	1.26	.56	13.09	12.41	.68
2095.....	11.26	11.02	.24	1.82	1.29	.54	13.08	12.30	.78
2100.....	11.27	11.17	.11	1.82	1.29	.53	13.09	12.45	.64
First year balance becomes negative and remains negative throughout the 75-year projection period.....			[d]			[c]			[d]
High-cost:									
2023.....	11.54	13.26	-1.72	1.88	1.65	.22	13.41	14.91	-1.49
2024.....	11.03	13.88	-2.86	1.79	1.73	.06	12.82	15.61	-2.79
2025.....	11.20	14.24	-3.04	1.82	1.80	.02	13.02	16.04	-3.02
2026.....	11.31	14.45	-3.14	1.82	1.85	-.03	13.13	16.30	-3.17
2027.....	11.33	14.69	-3.36	1.82	1.88	-.06	13.15	16.58	-3.42
2028.....	11.38	15.04	-3.66	1.82	1.90	-.07	13.20	16.94	-3.74
2029.....	11.42	15.40	-3.98	1.83	1.91	-.08	13.24	17.31	-4.07
2030.....	11.45	15.76	-4.31	1.83	1.93	-.10	13.28	17.69	-4.41
2031.....	11.50	16.10	-4.60	1.83	1.96	-.13	13.32	18.05	-4.73
2032.....	11.53	16.44	-4.91	1.83	1.99	-.16	13.36	18.43	-5.07

Table IV.B1.—Annual Income Rates, Cost Rates, and Balances, Calendar Years 1990-2100 (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.):									
2035	11.58	17.12	-5.54	1.83	2.12	-0.29	13.41	19.24	-5.83
2040	11.64	17.93	-6.29	1.83	2.31	-.47	13.48	20.24	-6.76
2045	11.68	18.47	-6.78	1.84	2.53	-.69	13.52	21.00	-7.48
2050	11.73	19.12	-7.39	1.84	2.69	-.84	13.58	21.81	-8.23
2055	11.79	19.90	-8.11	1.85	2.79	-.95	13.63	22.69	-9.06
2060	11.85	20.88	-9.03	1.85	2.79	-.95	13.70	23.68	-9.98
2065	11.92	21.80	-9.88	1.85	2.80	-.95	13.77	24.60	-10.83
2070	11.98	22.71	-10.73	1.85	2.81	-.96	13.83	25.52	-11.69
2075	12.04	23.66	-11.61	1.85	2.77	-.92	13.89	26.43	-12.53
2080	12.09	24.39	-12.30	1.85	2.73	-.88	13.94	27.12	-13.18
2085	12.12	24.81	-12.69	1.85	2.69	-.84	13.97	27.51	-13.53
2090	12.13	24.87	-12.74	1.85	2.69	-.84	13.98	27.56	-13.58
2095	12.13	24.76	-12.63	1.85	2.74	-.89	13.98	27.50	-13.52
2100	12.13	24.74	-12.61	1.85	2.77	-.92	13.98	27.51	-13.53
First year balance becomes negative and remains negative throughout the 75-year projection period			2010			2026			2010

[a] Income rates include certain reimbursements from the General Fund of the Treasury.
[b] Benefit payments scheduled to be paid on January 3 are actually paid on December 31 as required by the statutory provision for early delivery of benefit payments when the normal payment delivery date is a Saturday, Sunday, or legal public holiday. For comparability with the values for historical years and the projections in this report, all trust fund operations and asset reserves reflect the 12 months of benefits scheduled for payment each year.
[c] Between 0 and 0.005 percent of taxable payroll.
[d] The annual balance is projected to be negative for a temporary period and then become positive before the end of the projection period.
[e] The annual balance is projected to be positive throughout the entire 75-year projection period.

Notes:
1. The income rate excludes interest income.
2. Revisions of taxable payroll may change some historical values.
3. Components may not sum to totals because of rounding.

Under the intermediate assumptions, the projected DI cost rate is 1.60 percent for 2023. After 2023, the cost rate fluctuates, reaching 1.59 percent for 2031. Then the DI cost rate increases gradually to 1.96 percent for 2055. Thereafter, the cost rate remains relatively stable, decreasing slowly to 1.84 percent for 2083, and then increasing to 1.93 percent for 2097. The DI income rate increases from 1.79 percent for 2022 to 1.86 percent for 2023, decreases to 1.80 percent for 2024, and is relatively stable thereafter, reaching 1.83 percent for 2097. The annual balance increases from 0.17 percent of payroll for 2022 to 0.26 percent for 2023, decreases to 0.16 percent for 2026 and then increases to 0.23 percent for 2031. After 2031, the annual balance declines and becomes negative for 2044. After 2044, the annual deficit increases to 0.13 percent for 2055, decreases to 0.01 percent for 2083, and then increases to 0.10 percent of payroll for 2097.

Under the low-cost assumptions, the projected DI cost rate declines from 1.57 percent of payroll for 2023 to 1.20 percent for 2035 and then increases to 1.32 percent for 2054. The cost rate then declines through 2082 and increases slowly thereafter, reaching 1.29 percent for 2097. The annual balance is positive throughout the long-range period, reaching 0.53 percent of payroll for 2097. Under the high-cost assumptions, the DI cost rate rises from 1.65 percent of payroll for 2023 to 2.80 percent for 2057 and fluctuates thereafter, reaching 2.75 percent for 2097. The DI annual balance declines from 0.22 percent of payroll for 2023 and becomes negative for 2026, with a 0.03 percent annual deficit for 2026. After 2026, annual deficits increase to 0.96 percent of payroll for 2057 and fluctuate thereafter, reaching 0.90 percent for 2097.

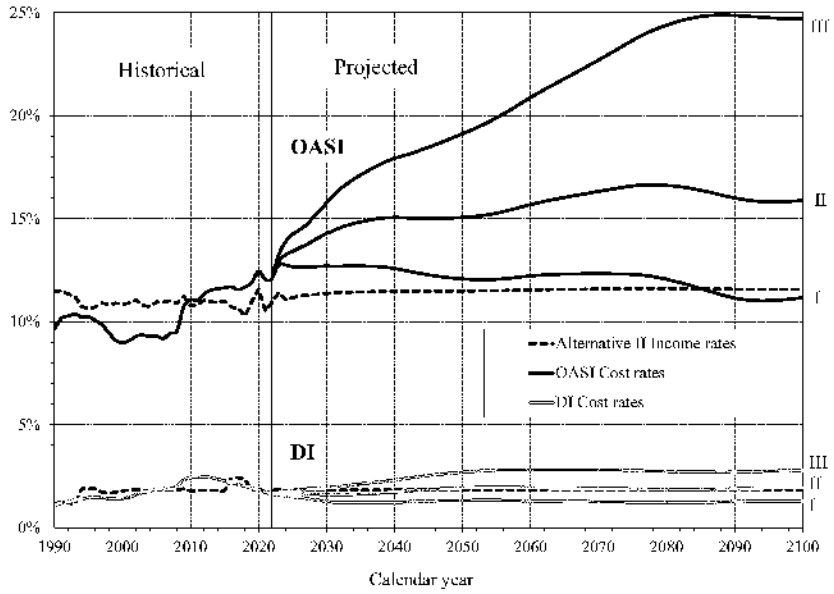
Figure IV.B1 shows the patterns of the historical and projected OASI and DI annual cost rates. The patterns in projected OASI and DI cost rates are described earlier in this chapter. Historical annual OASI cost rates shifted upward starting in 2008 and have remained at relatively high levels since then, primarily due to the changing age distribution of the adult population with the retirement of the baby-boom generation and entry of lower birth-rate generations into working ages. Historical annual DI cost rates rose substantially between 1990 and 2010 in large part due to: (1) aging of the working population as the baby-boom generation moved from ages 25-44 in 1990, where disability prevalence is low, to ages 45-64 in 2010, where disability prevalence is much higher; (2) a substantial increase in the percentage of women insured for DI benefits as a result of increased and more consistent rates of employment; and (3) increased disability incidence rates for women to a level similar to those for men by 2010. As of 2010, these three factors have largely stabilized. Other factors that are not yet fully understood, including the changing nature of work, have caused age-sex-adjusted incidence rates and cost rates to decline from 2010 to 2022. 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 small portion of income, is the main source of the increases in the income rate and the variation among the alternatives.

Table IV.B1 shows the annual balances for OASI, DI, and OASDI. The pattern of the annual balances is important to the analysis of the actuarial status of the Social Security program as a whole. As seen in figure IV.B1, the magnitude of each of the positive annual balances is the distance between the appropriate cost-rate curve and the income-rate curve above it. The magnitude of each of the annual 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

for the OASDI program has not changed and will not under current law, with only small variations in the allocation between DI and OASI except for changes due to the 1994 and the 2016-18 payroll tax rate reallocations.

In the future, the costs of OASI, DI, and the combined OASDI programs as a percentage of taxable payroll are unlikely to fall outside the range encompassed by alternatives I and III because alternatives I and III define a wide range of demographic, economic, and program-specific 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, cost and income are also presented 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 OASDI cost increases from about 5.2 percent of GDP for 2023 to about 6.0 percent for 2040. After 2040, OASDI cost as a percentage of GDP declines slightly through 2048, increases to a peak of 6.3 percent for 2076, and thereafter decreases slowly, reaching about 6.0 percent by 2097. Appendix G presents full estimates of income and cost relative to GDP.

Table IV.B2 contains historical and projected annual income rates and their components by trust fund and alternative. The annual income rates consist of

the scheduled payroll tax rates, the rates of income from taxation of scheduled benefits, and the rates of income from General Fund reimbursements. Projected income from taxation of benefits increases over time for reasons discussed on page 153.

Table IV.B2.—Components of Annual Income Rates, Calendar Years 1990-2100
[As a percentage of taxable payroll]

	OASI				DI				OASDI			
Calendar year	Payroll tax	Taxation of benefits[a]	General Fund Reimbursements[b]	Total[c]	Payroll tax	Taxation of benefits[a]	General Fund Reimbursements[b]	Total[c]	Payroll tax	Taxation of benefits[a]	General Fund Reimbursements[b]	Total[c]
Historical data:												
1990 . .	11.29	0.21	-0.03	11.47	1.21	0.01	-0.03	1.18	12.50	0.21	-0.06	12.65
1995 . .	10.46	.19	-.01	10.65	1.87	.01	-.01	1.87	12.33	.20	-.01	12.52
2000 . .	10.56	.29	[d]	10.85	1.78	.02	-.02	1.78	12.34	.31	-.02	12.62
2005 . .	10.68	.29	-.01	10.96	1.81	.02	[d]	1.84	12.49	.31	-.01	12.80
2010 . .	10.30	.42	.04	10.75	1.75	.04	.01	1.79	12.05	.45	.05	12.54
2015 . .	10.54	.47	[d]	11.02	1.79	.02	[d]	1.81	12.33	.49	.01	12.82
2016 . .	10.22	.48	[d]	10.70	2.37	.02	[d]	2.39	12.59	.49	[d]	13.09
2017 . .	10.12	.51	[d]	10.63	2.39	.03	[d]	2.42	12.51	.54	[d]	13.06
2018 . .	9.79	.47	[d]	10.27	2.31	.01	[d]	2.32	12.11	.48	[d]	12.59
2019 . .	10.51	.46	[d]	10.97	1.82	.02	[d]	1.84	12.33	.48	[d]	12.81
2020 . .	11.09	.51	[d]	11.60	1.88	.02	[d]	1.91	12.98	.53	[d]	13.51
2021 . .	10.08	.45	[d]	10.52	1.71	.01	[d]	1.72	11.79	.45	[d]	12.24
2022 . .	10.43	.52	[d]	10.95	1.77	.02	[d]	1.79	12.20	.54	[d]	12.74
Intermediate:												
2023 . .	10.89	.54	[d]	11.42	1.85	.01	[d]	1.86	12.74	.55	[d]	13.29
2024 . .	10.52	.56	[d]	11.08	1.79	.02	[d]	1.80	12.30	.58	[d]	12.89
2025 . .	10.58	.58	[d]	11.16	1.80	.02	[d]	1.82	12.38	.59	[d]	12.97
2026 . .	10.58	.68	[d]	11.26	1.80	.02	[d]	1.82	12.38	.70	[d]	13.08
2027 . .	10.57	.70	[d]	11.28	1.80	.02	[d]	1.82	12.37	.73	[d]	13.09
2028 . .	10.58	.73	[d]	11.31	1.80	.02	[d]	1.82	12.38	.75	[d]	13.13
2029 . .	10.59	.75	[d]	11.34	1.80	.02	[d]	1.82	12.38	.78	[d]	13.16
2030 . .	10.58	.78	[d]	11.37	1.80	.02	[d]	1.82	12.38	.81	[d]	13.18
2031 . .	10.58	.81	[d]	11.39	1.80	.02	[d]	1.82	12.38	.84	[d]	13.21
2032 . .	10.57	.84	[d]	11.42	1.80	.02	[d]	1.82	12.37	.87	[d]	13.24
2035 . .	10.57	.87	[d]	11.45	1.80	.03	[d]	1.82	12.37	.90	[d]	13.27
2040 . .	10.57	.90	[d]	11.47	1.80	.03	[d]	1.82	12.37	.93	[d]	13.30
2045 . .	10.57	.91	[d]	11.48	1.80	.03	[d]	1.83	12.37	.94	[d]	13.31
2050 . .	10.57	.92	[d]	11.49	1.80	.03	[d]	1.83	12.37	.95	[d]	13.32
2055 . .	10.57	.94	[d]	11.51	1.80	.04	[d]	1.83	12.37	.97	[d]	13.34
2060 . .	10.57	.97	[d]	11.54	1.80	.04	[d]	1.83	12.37	1.01	[d]	13.37
2065 . .	10.57	.99	[d]	11.57	1.80	.04	[d]	1.83	12.37	1.03	[d]	13.40
2070 . .	10.57	1.02	[d]	11.59	1.80	.04	[d]	1.83	12.37	1.05	[d]	13.42
2075 . .	10.57	1.04	[d]	11.61	1.80	.04	[d]	1.83	12.37	1.07	[d]	13.44
2080 . .	10.57	1.04	[d]	11.61	1.80	.04	[d]	1.83	12.37	1.08	[d]	13.45
2085 . .	10.57	1.03	[d]	11.60	1.80	.04	[d]	1.83	12.37	1.07	[d]	13.43
2090 . .	10.57	1.01	[d]	11.58	1.80	.04	[d]	1.83	12.37	1.05	[d]	13.41
2095 . .	10.57	1.00	[d]	11.57	1.80	.04	[d]	1.83	12.37	1.04	[d]	13.40
2100 . .	10.57	1.00	[d]	11.58	1.80	.04	[d]	1.84	12.37	1.04	[d]	13.41
Low-cost:												
2023 . .	10.83	.53	[d]	11.36	1.84	.01	[d]	1.85	12.67	.54	[d]	13.22
2024 . .	10.55	.54	[d]	11.09	1.79	.02	[d]	1.81	12.34	.56	[d]	12.90
2025 . .	10.58	.54	[d]	11.12	1.80	.02	[d]	1.81	12.37	.56	[d]	12.93
2026 . .	10.57	.63	[d]	11.21	1.80	.02	[d]	1.81	12.37	.65	[d]	13.02
2027 . .	10.57	.65	[d]	11.21	1.79	.02	[d]	1.81	12.36	.67	[d]	13.03

Table IV.B2.—Components of Annual Income Rates, Calendar Years 1990-2100 (Cont.)
[As a percentage of taxable payroll]

Calendar year	OASI				DI				OASDI			
	Payroll tax	Taxation of benefits[a]	General Fund Reimbursements[b]	Total[c]	Payroll tax	Taxation of benefits[a]	General Fund Reimbursements[b]	Total[c]	Payroll tax	Taxation of benefits[a]	General Fund Reimbursements[b]	Total[c]
Low-cost (Cont.):												
2028	10.58	0.66	[d]	11.24	1.80	0.02	[d]	1.81	12.37	0.68	[d]	13.05
2029	10.58	.68	[d]	11.26	1.80	.02	[d]	1.81	12.38	.70	[d]	13.07
2030	10.57	.70	[d]	11.27	1.80	.02	[d]	1.81	12.37	.72	[d]	13.09
2031	10.57	.72	[d]	11.29	1.80	.02	[d]	1.81	12.37	.73	[d]	13.10
2032	10.57	.74	[d]	11.30	1.79	.02	[d]	1.81	12.36	.75	[d]	13.11
2035	10.57	.75	[d]	11.32	1.79	.02	[d]	1.81	12.36	.77	[d]	13.13
2040	10.57	.76	[d]	11.32	1.79	.02	[d]	1.82	12.36	.78	[d]	13.14
2045	10.57	.75	[d]	11.31	1.79	.02	[d]	1.82	12.36	.77	[d]	13.13
2050	10.57	.74	[d]	11.31	1.79	.02	[d]	1.82	12.36	.77	[d]	13.13
2055	10.57	.75	[d]	11.31	1.79	.03	[d]	1.82	12.36	.77	[d]	13.13
2060	10.57	.76	[d]	11.33	1.79	.03	[d]	1.82	12.36	.79	[d]	13.15
2065	10.57	.77	[d]	11.34	1.79	.03	[d]	1.82	12.36	.79	[d]	13.16
2070	10.57	.77	[d]	11.34	1.79	.03	[d]	1.82	12.36	.80	[d]	13.16
2075	10.57	.77	[d]	11.34	1.79	.02	[d]	1.82	12.36	.80	[d]	13.16
2080	10.57	.76	[d]	11.33	1.79	.02	[d]	1.82	12.36	.78	[d]	13.14
2085	10.57	.73	[d]	11.30	1.79	.03	[d]	1.82	12.36	.76	[d]	13.12
2090	10.57	.70	[d]	11.27	1.79	.03	[d]	1.82	12.36	.73	[d]	13.09
2095	10.57	.70	[d]	11.26	1.79	.03	[d]	1.82	12.36	.72	[d]	13.08
2100	10.57	.71	[d]	11.27	1.79	.03	[d]	1.82	12.36	.73	[d]	13.09
High-cost:												
2023	10.99	.55	[d]	11.54	1.87	.01	[d]	1.88	12.85	.56	[d]	13.41
2024	10.43	.59	[d]	11.03	1.77	.02	[d]	1.79	12.21	.61	[d]	12.82
2025	10.59	.61	[d]	11.20	1.80	.02	[d]	1.82	12.39	.63	[d]	13.02
2026	10.59	.72	[d]	11.31	1.80	.02	[d]	1.82	12.38	.75	[d]	13.13
2027	10.58	.75	[d]	11.33	1.80	.02	[d]	1.82	12.37	.78	[d]	13.15
2028	10.59	.79	[d]	11.38	1.80	.03	[d]	1.82	12.39	.81	[d]	13.20
2029	10.59	.82	[d]	11.42	1.80	.03	[d]	1.83	12.39	.85	[d]	13.24
2030	10.59	.87	[d]	11.45	1.80	.03	[d]	1.83	12.39	.89	[d]	13.28
2031	10.59	.91	[d]	11.50	1.80	.03	[d]	1.83	12.39	.94	[d]	13.32
2032	10.58	.95	[d]	11.53	1.80	.03	[d]	1.83	12.38	.98	[d]	13.36
2035	10.58	1.00	[d]	11.58	1.80	.03	[d]	1.83	12.37	1.04	[d]	13.41
2040	10.58	1.06	[d]	11.64	1.80	.04	[d]	1.83	12.38	1.10	[d]	13.48
2045	10.58	1.10	[d]	11.68	1.80	.04	[d]	1.84	12.38	1.15	[d]	13.52
2050	10.58	1.15	[d]	11.73	1.80	.05	[d]	1.84	12.38	1.20	[d]	13.58
2055	10.58	1.21	[d]	11.79	1.80	.05	[d]	1.85	12.38	1.26	[d]	13.63
2060	10.58	1.27	[d]	11.85	1.80	.05	[d]	1.85	12.38	1.33	[d]	13.70
2065	10.58	1.34	[d]	11.92	1.80	.05	[d]	1.85	12.38	1.39	[d]	13.77
2070	10.58	1.40	[d]	11.98	1.80	.05	[d]	1.85	12.38	1.45	[d]	13.83
2075	10.58	1.46	[d]	12.04	1.80	.05	[d]	1.85	12.38	1.52	[d]	13.89
2080	10.58	1.51	[d]	12.09	1.80	.05	[d]	1.85	12.38	1.57	[d]	13.94
2085	10.58	1.54	[d]	12.12	1.80	.05	[d]	1.85	12.38	1.60	[d]	13.97
2090	10.58	1.55	[d]	12.13	1.80	.05	[d]	1.85	12.38	1.60	[d]	13.98
2095	10.58	1.55	[d]	12.13	1.80	.05	[d]	1.85	12.38	1.60	[d]	13.98
2100	10.58	1.55	[d]	12.13	1.80	.06	[d]	1.85	12.38	1.60	[d]	13.98

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

[b] Includes payroll tax revenue forgone under the provisions of Public Laws 111-147, 111-312, 112-78, and 112-96, and other miscellaneous reimbursements. Also includes transfers of a portion of the proceeds from repayments of loans authorized under Public Law 116-136.

[c] Values exclude interest income.

[d] Between 0 and 0.005 percent of taxable payroll.

Note: Components may not sum to totals because of rounding.

2. Comparison of Workers to Beneficiaries

Under the intermediate assumptions, the OASDI cost rate will rise rapidly between 2023 and about 2040, primarily because the number of beneficiaries rises much more rapidly than the number of covered workers as the baby-boom generation continues to retire and is replaced at working ages by lower birth-rate generations. 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 eligible for benefits under the DI program. 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 lower fertility rates are expected to persist for all future generations; therefore, the ratio of OASDI beneficiaries to workers will rise rapidly and reach a permanently higher level after all of the baby-boom generation has retired. 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 1945-2100

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	120,437	32,763	3,874	36,636	3.3	30
1990	133,004	35,255	4,204	39,459	3.4	30
1995	140,797	37,364	5,731	43,096	3.3	31
2000	154,701	38,556	6,606	45,162	3.4	29
2005	159,027	39,961	8,172	48,133	3.3	30
2010	157,047	43,440	9,958	53,398	2.9	34
2015	168,135	48,663	10,881	59,543	2.8	35
2016	170,640	49,811	10,728	60,539	2.8	35
2017	172,710	50,962	10,517	61,480	2.8	36
2018	175,065	52,168	10,296	62,464	2.8	36
2019	176,970	53,508	10,063	63,570	2.8	36
2020	174,938	54,843	9,844	64,686	2.7	37
2021	176,579	55,546	9,486	65,032	2.7	37
2022	180,510	56,544	9,070	65,614	2.8	36
Intermediate:						
2023	180,394	57,815	8,754	66,569	2.7	37
2025	183,051	60,666	8,580	69,247	2.6	38
2030	187,120	67,175	9,132	76,307	2.5	41
2035	189,379	71,544	9,612	81,156	2.3	43
2040	191,158	73,886	10,351	84,237	2.3	44
2045	193,564	74,985	11,320	86,305	2.2	45
2050	196,862	76,607	11,985	88,592	2.2	45

Table IV.B3.—Covered Workers and Beneficiaries, Calendar Years 1945-2100 (Cont.)

Calendar year	Covered workers[a] (in thousands)	Beneficiaries[b] (in thousands) OASI	DI	OASDI[c]	Covered workers per OASDI beneficiary	OASDI beneficiaries per 100 covered workers
Intermediate (Cont.):						
2055	200.653	78,990	12,476	91,467	2.2	46
2060	204,569	82,429	12,585	95,014	2.2	46
2065	208.232	85,673	12,736	98,409	2.1	47
2070	211.659	88,828	12,908	101,736	2.1	48
2075	215,233	91,925	12,957	104,881	2.1	49
2080	219.424	93,951	13,105	107,056	2.0	49
2085	224.505	94,841	13,414	108,254	2.1	48
2090	230,262	95,170	14,024	109,194	2.1	47
2095	236.146	96.466	14,610	111,076	2.1	47
2100	241.705	99,028	15,040	114,068	2.1	47
Low-cost:						
2023	181,468	57,801	8,736	66,537	2.7	37
2025	186.149	60,583	8,396	68,979	2.7	37
2030	191.067	66,824	8,168	74,991	2.5	39
2035	194,307	70,627	8,048	78,675	2.5	40
2040	197.257	72,281	8,362	80,643	2.4	41
2045	201.895	72,718	8,994	81,712	2.5	40
2050	208,227	73,654	9,434	83,088	2.5	40
2055	215.323	75,420	9,783	85,203	2.5	40
2060	222.535	78,298	9,879	88,177	2.5	40
2065	229,494	81,013	10,040	91,053	2.5	40
2070	236.460	83,570	10,260	93,830	2.5	40
2075	244.161	86,018	10,442	96,460	2.5	40
2080	253,253	87,396	10,753	98,149	2.6	39
2085	263.935	87,725	11,258	98,983	2.7	38
2090	275.491	88,000	12,065	100,066	2.8	36
2095	286,865	90,335	12,760	103,095	2.8	36
2100	297.638	94,544	13,281	107,825	2.8	36
High-cost:						
2023	179.078	57,833	8,771	66,604	2.7	37
2025	179,805	60,779	8,776	69,555	2.6	39
2030	183,399	67,668	10,033	77,701	2.4	42
2035	184.679	72,822	11,106	83,929	2.2	45
2040	185,419	76,135	12,220	88,356	2.1	48
2045	185,446	78,281	13,497	91,778	2.0	49
2050	185.380	80,949	14,368	95,316	1.9	51
2055	185,388	84,231	14,982	99,213	1.9	54
2060	185,467	88,444	15,059	103,503	1.8	56
2065	185.215	92,382	15,127	107,508	1.7	58
2070	184,454	96,227	15,128	111,355	1.7	60
2075	183,298	99,984	14,860	114,844	1.6	63
2080	181.986	102.661	14,592	117,252	1.6	64
2085	180,956	104,039	14,354	118,392	1.5	65
2090	180,338	104,117	14,316	118,433	1.5	66
2095	179.997	103.553	14,494	118,046	1.5	66
2100	179,732	103,318	14,624	117,942	1.5	66

[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. Components may not sum to totals because of rounding.

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 2022 level of 36 beneficiaries per 100 covered workers, this ratio is projected to rise to 44 by 2038 under the intermediate assumptions because the growth in beneficiaries greatly exceeds the growth in workers. This projected ratio continues to rise through 2078 and then generally declines, reaching 47 under the intermediate assumptions by 2100. Under the high-cost assumptions, this ratio generally rises to 66 by 2100. Under the low-cost assumptions, this ratio rises to 41 by 2038 and then generally declines, reaching 36 by 2100. 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

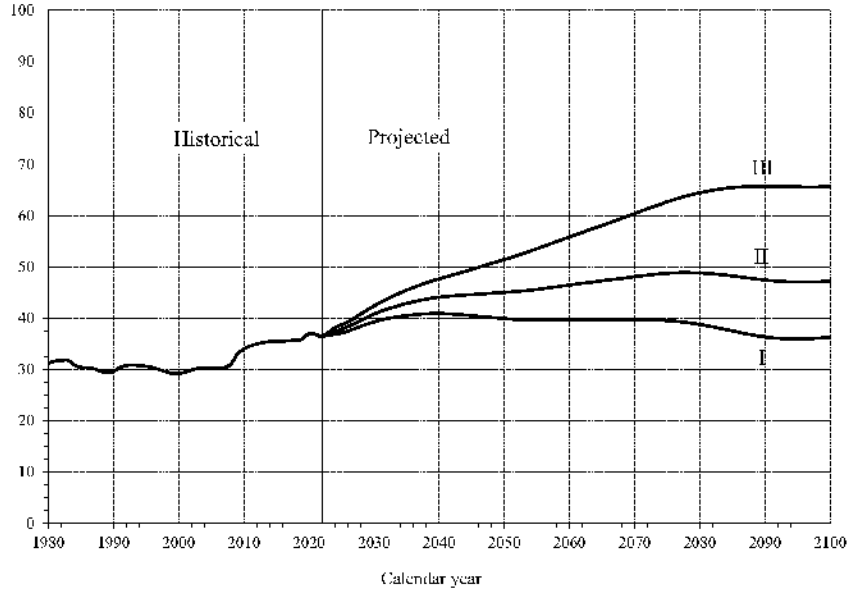


Table IV.B3 also shows the number of covered workers per OASDI beneficiary, which was about 2.8 for 2022. Under the intermediate assumptions,

this ratio declines generally throughout the long-range period, reaching 2.3 for 2038 and 2.1 by 2100. Under the low-cost assumptions, this ratio declines to 2.4 for 2038, then generally rises to 2.8 by 2100. Under the high-cost assumptions, this ratio generally decreases to 1.5 by 2100.

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 current law, the OASI and DI Trust Funds do not have the authority to borrow other than in the form of advance tax transfers. If reserves held in either trust fund become depleted during a year, and continuing revenue falls short of the cost of scheduled benefits, then full scheduled benefits would not be payable on a timely basis. For this reason, the trust fund ratio is a critical financial measure.

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

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

Under the intermediate assumptions, the OASI trust fund ratio is projected to decline from 220 percent at the beginning of 2023 until the trust fund reserves become depleted in 2033 (one year earlier than projected in last year's report), at which time 77 percent of scheduled benefits would be payable. The change in reserve depletion year to 2033, compared to 2034 in last year's report, is due primarily to changes in recent economic data and near-term assumptions.

The DI Trust Fund remains solvent throughout the long-range period under the intermediate assumptions, as in last year's report. The DI trust fund ratio increases from 77 percent at the beginning of 2023 to a peak of 267 percent for 2043. After 2043, the DI trust fund ratio generally declines throughout the remainder of the long-range period, reaching 155 percent for 2098.

Under the intermediate assumptions, the trust fund ratio for the combined OASI and DI Trust Funds declines from 204 percent at the beginning of

2023 until the combined fund reserves become depleted in 2034 (one year earlier than projected in last year's report), at which time 80 percent of scheduled benefits would be payable.

Under the low-cost assumptions, the trust fund ratio for the DI program increases from 2023 throughout the projection period, from 78 percent at the beginning of 2023 to the extremely high level of 3,574 percent for 2098. For the OASI program, the trust fund ratio declines steadily, from 220 percent for 2023 until the reserves become depleted in 2039, at which time 89 percent of scheduled benefits would be payable. For the combined OASDI program, the trust fund ratio declines from 204 percent for 2023 until the combined fund reserves become depleted in 2067. However, the trust funds would have sufficient income by the end of 2092 to permit full payment of scheduled benefits thereafter and also to pay in arrears the temporary shortfalls between 2067 and 2092. By 2093, trust fund reserves become positive and the trust fund ratio increases thereafter, to a ratio of 36 percent for 2098. Because the DI trust fund ratio is positive throughout the projection period and increasing at the end of the period, under the low-cost assumptions, only the DI program achieves sustainable solvency.

Under the high-cost assumptions, the OASI trust fund ratio declines from 219 percent for 2023 until reserves become depleted in 2031, at which time 70 percent of scheduled benefits would still be payable. The DI trust fund ratio increases from 77 percent for 2023 to 86 percent for 2024, and then declines until the reserves become depleted in 2036. At that time, 85 percent of scheduled benefits would still be payable. The combined OASI and DI trust fund ratio declines from 204 percent for 2023 until reserves become depleted in 2031, at which time 72 percent of scheduled benefits would still be payable.

Trust fund reserve depletion occurs within the 75-year projection period for the OASI Trust Fund under the low-cost, intermediate, and high-cost assumptions, and for the DI Trust Fund under the high-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 OASI Trust Fund. The stochastic projections discussed in appendix E suggest that OASI and combined OASI and DI Trust Fund reserve depletion is highly probable before mid-century.

In the 2022 report, the combined trust fund reserves were projected to become depleted in 2031 and 2035 under the high-cost and intermediate assumptions, respectively, and become temporarily depleted between 2069 and 2088 under the low-cost assumptions.

Table IV.B4.—Trust Fund Ratios, Calendar Years 2023-2100[a]
[In percent]

Calendar year	Intermediate			Low-cost			High-cost		
	OASI	DI	OASDI	OASI	DI	OASDI	OASI	DI	OASDI
2023	220	77	204	220	78	204	219	77	204
2024	199	91	187	200	95	189	196	86	184
2025	176	99	168	180	112	173	169	85	159
2026	154	107	149	162	132	159	143	83	136
2027	133	116	131	146	157	147	118	80	114
2028	112	126	114	131	189	137	93	76	91
2029	91	138	96	117	227	128	67	72	68
2030	70	151	78	104	271	119	40	67	43
2031	49	166	60	92	320	112	13	61	18
2032	28	180	43	80	372	105	[b]	54	[b]
2035	[b]	218	[b]	48	530	89	[b]	23	[b]
2040	[b]	260	[b]	[b]	781	66	[b]	[b]	[b]
2045	[b]	266	[b]	[b]	978	49	[b]	[b]	[b]
2050	[b]	253	[b]	[b]	1,174	39	[b]	[b]	[b]
2055	[b]	230	[b]	[b]	1,378	31	[b]	[b]	[b]
2060	[b]	211	[b]	[b]	1,635	22	[b]	[b]	[b]
2065	[b]	198	[b]	[b]	1,908	9	[b]	[b]	[b]
2070	[b]	187	[b]	[b]	2,190	[b]	[b]	[b]	[b]
2075	[b]	181	[b]	[b]	2,510	[b]	[b]	[b]	[b]
2080	[b]	184	[b]	[b]	2,822	[b]	[b]	[b]	[b]
2085	[b]	187	[b]	[b]	3,083	[b]	[b]	[b]	[b]
2090	[b]	182	[b]	[b]	3,242	[b]	[b]	[b]	[b]
2095	[b]	166	[b]	[b]	3,430	17	[b]	[b]	[b]
2100	[b]	146	[b]	[b]	3,680	47	[b]	[b]	[b]
Trust fund reserves permanently become depleted in	2033	[c]	2034	2039	[c]	[d]	2031	2036	2031
Payable benefits as percent of scheduled benefits:									
At the time of permanent reserve depletion	77	[c]	80	89	[c]	[d]	70	85	72
For 2097	71	[c]	74	100	[c]	[d]	46	67	48

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

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

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

[d] Trust fund reserves would be depleted for a temporary period, and return to positive levels before the end of the period.

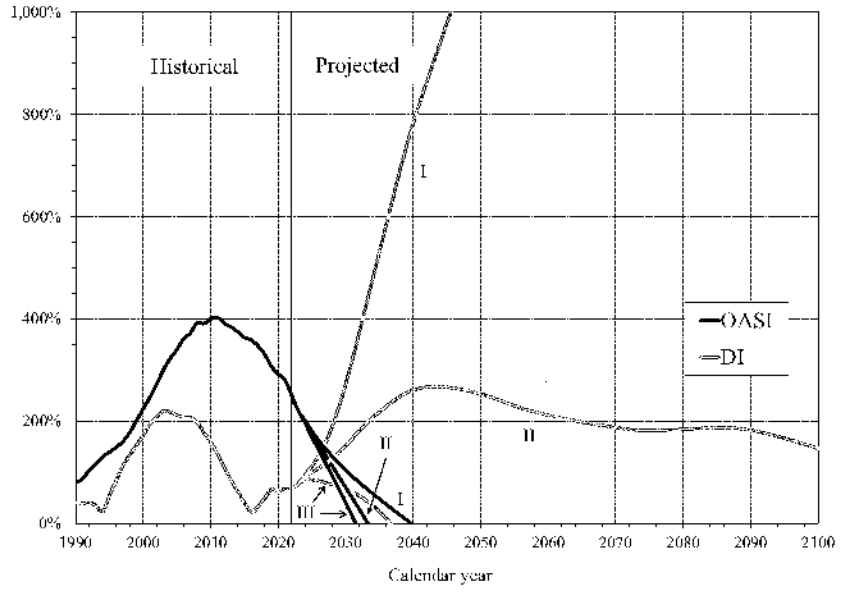
Note: The definition of trust fund ratio appears in the Glossary. The ratios shown for the combined trust funds for years after reserve depletion of either the DI or OASI Trust Fund are hypothetical.

Since 2013, when the Trustees last 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. Both the long-range test and the short-range test are applied based on

the intermediate set of assumptions. As discussed in section IV.A, the DI Trust Fund passes the test of short-range financial adequacy because the trust fund ratio, while below 100 percent at the beginning of the projection period, reaches 100 percent within 5 years and stays above 100 percent throughout the remainder of the 10-year period. The OASI and combined OASI and DI Trust Funds fail the test of short-range financial adequacy because the trust fund ratios drop below 100 percent by the end of the 10-year period. Under the intermediate assumptions, the OASI Trust Fund reserves become depleted in 2033, DI Trust Fund reserves stay positive throughout the 75-year period, and the combined OASI and DI Trust Fund reserves become depleted in 2034. Therefore, the OASI and combined OASI and DI Trust Funds fail the test of long-range close actuarial balance, and the DI program passes the test of long-range close actuarial balance.

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

Figure IV.B3.—Long-Range OASI and DI Trust Fund Ratios
[Asset reserves as a percentage of annual cost]



4. Summarized Income Rates, Summarized Cost Rates, and Actuarial Balances

Summarized values for the full 75-year period are useful in analyzing the program's long-range actuarial status over the period as a whole, both under current 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, income from taxation of benefits, expressed as a percentage of taxable payroll, is expected to increase in most years of the long-range period for the reasons discussed on page 153. Summarized cost rates are the sum of the present value of cost for a period (which includes scheduled benefits, administrative expenses, net interchange with the Railroad Retirement program, and payments for vocational rehabilitation services for disabled beneficiaries) and the present value of the cost of reaching a target trust fund of 100 percent of annual cost at the end of the period, expressed as a percentage of the present value of taxable payroll over the period.

The actuarial balance for a valuation period is equal to the difference between the summarized income rate and the summarized cost rate for the period. An actuarial balance of zero for any period indicates that cost for the period could be met for the period as a whole (but not necessarily at all points within the period), with a remaining trust fund reserve at the end of the period equal to 100 percent of the following year's cost. A negative actuarial balance for a period indicates that the present value of income to the program plus the existing trust fund is less than the present value of the cost of the program plus the cost of reaching a target trust fund reserve of one year's cost by the end of the period. Generally, a trust fund is deemed to be adequately financed for a period as a whole 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 at the end of the period 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 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 -0.31 percent of taxable payroll under the low-cost assumptions, -2.50 percent under the intermediate assumptions, and -4.89 percent under the high-cost assumptions. These balances indicate that the program is not adequately financed for the 25-year valuation period under any of these three sets of assumptions.

For the 50-year valuation period, the OASDI program has actuarial balances of -0.29 percent under the low-cost assumptions, -3.24 percent under the intermediate assumptions, and -6.97 percent under the high-cost assumptions. These actuarial balances mean that the OASDI program is not adequately financed for the 50-year valuation period under any of these three sets of assumptions.

For the entire 75-year valuation period, the combined OASDI program has actuarial balances of -0.10 percent of taxable payroll under the low-cost assumptions, -3.61 percent under the intermediate assumptions, and -8.37 percent under the high-cost assumptions. These balances indicate that the combined OASDI program is not adequately financed for the 75-year valuation period under any of these three sets of assumptions.

Assuming the intermediate assumptions accurately capture future demographic, economic, and program-specific trends, solvency for the program over the next 75 years could be restored using a variety of approaches. For example, revenue could be increased in a manner equivalent to an immediate and permanent increase in the combined Social Security payroll tax rate from 12.40 percent to 15.84 percent (a relative increase of 27.7 percent),[2] cost could be reduced in a manner equivalent to an immediate and permanent

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[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.

[2] The 3.44 percentage point increase in the payroll tax rate required to achieve 75-year solvency differs somewhat from the 3.61 percent actuarial deficit. This is primarily because the rate increase required to achieve 75-year solvency reflects a zero trust fund reserve at the end of the period, whereas the 3.61 percent actuarial deficit incorporates an ending trust fund reserve equal to one year's cost. While such an increase in the payroll tax rate would cause some behavioral changes in earnings and ensuing changes in benefit levels, such changes are not included in these calculations because they are assumed to have roughly offsetting effects on OASDI actuarial status over the 75-year long-range period as a whole.

reduction in scheduled benefits of 21.3 percent, or some combination of approaches could be used.

However, eliminating the actuarial deficit for the next 75-year valuation period requires raising payroll taxes or lowering benefits by more than is required just to achieve solvency, because the actuarial deficit includes the cost of attaining a target trust fund equal to 100 percent of annual program cost by the end of the period. The actuarial deficit could be eliminated for the 75-year period by increasing revenue in a manner equivalent to an immediate and permanent increase in the combined payroll tax from 12.40 percent to 16.01 percent (a relative increase of 29.1 percent),[1] reducing cost in a manner equivalent to an immediate reduction in scheduled benefits of 22.1 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 reach 4.35 percent of payroll for 2097 (see table IV.B1). These large deficits indicate that annual cost continues to exceed non-interest income after 2097, 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 4.6 percent of payroll under the intermediate assumptions.

Table IV.B5.—Components of Summarized Income Rates and Cost Rates, Calendar Years 2023-2097
[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:							
2023-47	11.41	1.06	12.47	14.51	0.57	15.09	-2.62
2023-72	11.48	.57	12.05	15.03	.28	15.31	-3.26
2023-97	11.51	.41	11.93	15.38	.16	15.54	-3.62
Low-cost:							
2023-47	11.30	.94	12.24	12.58	.49	13.07	-.83
2023-72	11.32	.49	11.81	12.39	.23	12.63	-.82
2023-97	11.32	.34	11.66	12.16	.14	12.30	-.64
High-cost:							
2023-47	11.53	1.18	12.72	16.60	.67	17.28	-4.56
2023-72	11.67	.67	12.35	18.40	.34	18.74	-6.39
2023-97	11.78	.51	12.29	19.82	.20	20.02	-7.73

[1] The calculation of the payroll tax rate increase required to eliminate the actuarial deficit also does not include the effects of behavioral changes, because they are assumed to have roughly offsetting effects.

Table IV.B5.—Components of Summarized Income Rates and Cost Rates, Calendar Years 2023-2097 (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:							
2023-47.....	1.82	0.05	1.87	1.69	0.07	1.76	0.11
2023-72.....	1.83	.02	1.85	1.80	.03	1.83	.02
2023-97.....	1.83	.02	1.85	1.82	.02	1.84	.01
Low-cost:							
2023-47.....	1.82	.04	1.86	1.29	.05	1.34	.51
2023-72.....	1.82	.02	1.84	1.29	.02	1.31	.53
2023-97.....	1.82	.01	1.83	1.28	.02	1.29	.54
High-cost:							
2023-47.....	1.83	.05	1.88	2.12	.09	2.22	-.33
2023-72.....	1.84	.03	1.87	2.40	.04	2.44	-.58
2023-97.....	1.84	.02	1.86	2.48	.02	2.50	-.64
OASDI:							
Intermediate:							
2023-47.....	13.24	1.10	14.34	16.20	.65	16.85	-2.50
2023-72.....	13.31	.60	13.90	16.83	.31	17.14	-3.24
2023-97.....	13.34	.43	13.78	17.20	.18	17.38	-3.61
Low-cost:							
2023-47.....	13.12	.98	14.10	13.87	.54	14.42	-.31
2023-72.....	13.14	.51	13.65	13.69	.26	13.94	-.29
2023-97.....	13.14	.35	13.49	13.44	.15	13.59	-.10
High-cost:							
2023-47.....	13.36	1.24	14.60	18.73	.77	19.49	-4.89
2023-72.....	13.51	.70	14.22	20.80	.38	21.18	-6.97
2023-97.....	13.62	.54	14.16	22.30	.22	22.52	-8.37

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

Note: Components may not sum to totals because of rounding.

5. Open-Group Unfunded Obligation

Consistent with practice since 1965, this report focuses on a 75-year open-group valuation to evaluate the long-range actuarial status of the OASDI program. The open-group valuation includes non-interest income and cost for past, current, and future participants through the year 2097. 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 2097.

The open-group unfunded obligation increased from $20.4 trillion shown in last year's report to $22.4 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 $21.2 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, 2023, rather than to January 1, 2022, which tends to increase the unfunded obligation by the annual nominal interest rate; and (2) the unfunded obligation now includes an additional year (2097). However, changes in the law, assumptions, methods, and starting values resulted in a net $1.2 trillion increase in the unfunded obligation.

The 75-year unfunded obligation is equivalent to 3.42 percent of OASDI taxable payroll and 1.2 percent of GDP for 2023-97.[1] These percentages were 3.24 and 1.1, 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 3.42 percent of payroll in last year's report, and was expected to increase to a deficit of 3.48 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 0.13 percentage point increase (worsening) in the actuarial deficit to 3.61 percent of payroll. The actuarial deficit is 1.3 percent of GDP in this year's report, 0.1 percent higher than in last year's report.

As mentioned above, the open-group unfunded obligation expressed in dollars is higher than it would have been if only the valuation period had been changed. This net increase occurred for a variety of reasons described in the next section, in particular changes in recent economic data and near-term assumptions, and changes in programmatic data and methods.

Table IV.B6 presents the components and the calculation of the long-range (75-year) actuarial balance under the intermediate assumptions. The present value of future cost less future non-interest income over the long-range period, minus the amount of trust fund asset reserves at the beginning of the projection period, is $22.4 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 -$23.6 trillion for the OASDI program.

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[1] The present value of taxable payroll for 2023-97 is $655.0 trillion. The present value of GDP for 2023-97 is $1,865.3 trillion. In last year's report, the present value of taxable payroll for 2022-96 was $631.6 trillion and the present value of GDP was $1,817.7 trillion.

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, 2023 (in billions):			
A. Payroll tax revenue	$69,343	$11,775	$81,118
B. Reimbursements from general revenue	[a]	[a]	[a]
C. Taxation of benefits revenue	6,076	214	6,290
D. Non-interest income (A + B + C)	75,419	11,989	87,408
E. Cost	100,744	11,916	112,660
F. Cost minus non-interest income (E - D)	25,325	-73	25,252
G. Trust fund asset reserves at start of period	2,712	118	2,830
H. Open-group unfunded obligation (F - G)	22,613	-191	22,422
I. Ending target trust fund[b]	1,070	131	1,201
J. Income minus cost, plus reserves at start of period, minus ending target trust fund (D - E + G - I = - H - I)	-23,683	61	-23,623
K. Taxable payroll	655,013	655,013	655,013
Percent of taxable payroll:			
Actuarial balance (100 × J ÷ K)	-3.62	.01	-3.61

[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: Components may not sum to totals because of rounding.

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 53.)

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, economic, and program-specific trends used for the 75-year projection continue indefinitely. This infinite horizon unfunded obligation is estimated to be 4.6 percent of taxable payroll or 1.4 percent of GDP. These percentages were 4.5 and 1.4, respectively, for last year's report. Of course, the degree of uncertainty associated with estimates increases substantially for years further in the future.

6. Reasons for Change in Actuarial Balance From Last Report

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

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

Item	OASI	DI	OASDI
Shown in last year's report:			
Income rate	11.93	1.85	13.78
Cost rate	15.34	1.86	17.20
Actuarial balance	**-3.41**	**-.01**	**-3.42**
Changes in actuarial balance due to changes in:			
Legislation / Regulation	[a]	[a]	[a]
Valuation period[b]	-.05	-.01	-.05
Demographic data and assumptions	-.03	[a]	-.03
Economic data and assumptions	-.04	[a]	-.04
Disability data and assumptions	[a]	.01	.01
Methods and programmatic data	-.08	.02	-.06
Total change in actuarial balance	-.21	.02	-.19
Shown in this report:			
Actuarial balance	**-3.62**	**.01**	**-3.61**
Income rate	11.93	1.85	13.78
Cost rate	15.54	1.84	17.38

[a] Between -0.005 and 0.005 percent of taxable payroll.

[b] 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 2097. 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: Components may not sum to totals because of rounding.

If the law, data, assumptions, and methods had all remained unchanged from last year's Trustees Report, the long-range OASDI actuarial balance would have decreased (worsened) by 0.05 percent of taxable payroll solely due to the change in the valuation period. However, as described below, projections in this report also reflect new data and changes in law, assumptions, and methods. These changes, including the change in the valuation period, combine to decrease (worsen) the long-range OASDI actuarial balance by 0.19 percentage point, from -3.42 percent of taxable payroll in last year's report to -3.61 percent in this report.

Legislation/Regulation

Changes in law, regulations, and policy have a negligible effect on the long-range OASDI actuarial balance.

Since the last report, there have been a number of notable regulatory and judicial developments related to immigration policy. On August 30, 2022, the Department of Homeland Security (DHS) published a final rule in the Federal Register, establishing regulations to "preserve and fortify" the Deferred Action for Childhood Arrivals (DACA) program in full. On October 5, 2022, the US Court of Appeals for the Fifth Circuit affirmed an earlier district court decision that had declared the DACA policy unlawful. The appeals court returned the case to the district court for further review of the

DHS regulation. On October 14, 2022, the district court issued an order extending the pause in implementing the DACA final rule. As a result, DHS is currently prohibited from processing new DACA applications and related employment authorizations.

Changes in DACA policy affect OASDI program operations because those who apply for and receive deferred action status are eligible for work authorization, which leads to additional workers covered by the OASDI program, increased payroll tax revenue, and subsequently increased benefit cost. The estimates presented in last year's report reflected the assumption that the DACA program would be fully in effect by the middle of 2022, consistent with the Administration's intent. Because of the court challenges, the estimates presented in this year's report incorporate an additional one-year delay in the resumption of processing new applications, to the middle of 2023. This one-year delay has a negligible effect on the actuarial balance.

Valuation Period

As mentioned above, changing the 75-year valuation period from 2022 through 2096 for last year's report to 2023 through 2097 for this report decreases the projected long-range OASDI actuarial balance by 0.05 percent of taxable payroll. This decrease occurs because (1) the annual balances after 2022 are now discounted to January 1, 2023, rather than to January 1, 2022, and (2) the relatively large negative annual balance for 2097 is now included in this year's 75-year projection period. Note that the actuarial balance calculation includes trust fund reserves at the beginning of the projection period. These reserves reflect the program's net financial flows for all past years, including 2022, up to the start of the valuation period.

Demographic Data and Assumptions

New demographic data and changes in demographic assumptions combine to decrease (worsen) the long-range OASDI actuarial balance by 0.03 percent of taxable payroll.

The ultimate demographic assumptions are unchanged for this year's report. However, updates to recent demographic data and near-term assumptions result in significant changes in the long-range actuarial balance.

First, final birth data for calendar year 2021, the base year for the fertility rate projections, indicate a total fertility rate very slightly higher than the rate assumed in last year's report for 2021. However, incorporating the updated base year data into the regression used to project birth rates during the transition to the ultimate level led to generally slightly lower birth rates during the

transition period. This change in assumed birth rates during the transition period decreases the actuarial balance by 0.01 percent of taxable payroll.

Second, updates to near-term mortality assumptions to reflect the effects of the COVID-19 pandemic increase the long-range actuarial balance by 0.02 percent of taxable payroll. Final mortality data are now available for all age groups for calendar year 2020 and for ages 65 and older for 2021. Based on preliminary data available to date, assumed death rates were increased for ages 0 to 64 for 2021 and for ages 0 to 84 for 2022, compared to the rates used for last year's report. Death rates are assumed to continue to be elevated in 2023 and 2024, above the levels that were assumed in last year's report. Projected death rates for years after 2024 are assumed to be unchanged from the levels that would have been projected in the absence of the pandemic.

Third, updates to data for the historical population, other-than-lawful permanent resident immigration, and marriage and divorce—including updates related to incorporating 2020 and 2021 data from the American Community Survey—combine to decrease the actuarial balance by 0.04 percent of taxable payroll.

Economic Data and Assumptions

New economic data and changes in economic assumptions, in combination, decrease the long-range OASDI actuarial balance by 0.04 percent of taxable payroll.

One ultimate economic assumption was updated for this year's report. The annual percentage change in the average OASDI covered wage, adjusted for inflation, is assumed to average 1.14 percentage points over the last 65 years of the 75-year projection period. This is 0.02 percentage point higher than the value assumed for last year's report. This change in the real wage growth assumption was made because the difference between the growth in earnings and employee compensation has been extraordinarily low across the last three economic cycles and is expected to remain slightly lower in the future than was assumed for last year's report. This assumption change increases the long-range actuarial balance by 0.03 percent of taxable payroll.

In addition, updates to recent economic data and near-term assumptions result in significant changes in the long-range actuarial balance.

First, in response to recent economic developments, including higher-than-expected inflation rates and lower-than-expected output growth, the Trustees revised the levels of GDP and labor productivity down by about 3.0 percent by 2026 and for all years thereafter. This change decreases the actuarial balance by roughly 0.13 percent of taxable payroll.

Second, while the ultimate real interest rate assumption remains at 2.3 percent for this year's report, the assumed real interest rates over the first 10 years of the projection period are generally higher than those assumed for last year's report, consistent with recent experience and expectations. These higher near-term real interest rates increase the actuarial balance by 0.02 percent of payroll.

Other changes to historical data and near-term economic assumptions combine for a net increase in the actuarial balance of about 0.03 percent of taxable payroll.

Disability Data and Assumptions

New disability data and changes in disability assumptions combine to increase the long-range OASDI actuarial balance by 0.01 percent of taxable payroll. This increase is due to the combined effects of actual disability data for 2022 and generally slightly lower assumed incidence rates in the first 10 years of the projection period. The ultimate disability incidence rate assumption remains at 4.8 per thousand exposed for this report.

Methods and Programmatic Data

The projections in this report also reflect several methodological improvements and updates based on new program-specific data. These methodological changes, programmatic data updates, and interactions combine to decrease the long-range OASDI actuarial balance by 0.06 percent of taxable payroll. Descriptions of four significant methodological changes and programmatic data updates follow.

First, the method for projecting the age distributions of lawful permanent resident (LPR) new arrival and adjustment-of-status immigrants was updated, reflecting recent data showing a slightly older population at the time of attaining LPR status than had previously been estimated. These updated age distributions decrease the actuarial balance by 0.02 percent of taxable payroll.

Second, the method for estimating the level of OASDI taxable wages for historical years 2000-21 was improved by adopting a more consistent approach for estimating completed values across various types of wages, including regular wages, farm wages, employer-reported tips, and self-reported wages and tips. Taxable wages are based on tabulations of wages reported to date on IRS Forms 941 (Employer's Quarterly Federal Tax Return), but because of reporting lags and corrections, the reported amounts are initially incomplete for a given tax year and additional amounts continue to arrive for sev-

eral subsequent years. This method improvement increases the actuarial balance by 0.01 percent of payroll.

Third, the sample of retired-worker and disabled-worker beneficiaries who have become newly entitled for benefits used in the long-range model for projecting average benefit levels was updated. This model uses a large sample of 10 percent of all newly entitled retired-worker beneficiaries in a recent year. The sample used in last year's report was for worker beneficiaries newly entitled in 2018, while this year's report uses the results from worker beneficiaries newly entitled in 2019. This update results in a decrease in the actuarial balance of 0.03 percent of payroll.

The fourth significant change is updating the post-entitlement benefit adjustment factors based on new programmatic data. Post-entitlement factors are used to account for changes in benefit levels, primarily due to differential mortality by benefit level and earnings after initial benefit entitlement. This data update decreases the actuarial balance by 0.03 percent of payroll.

In addition to these four methodological changes and programmatic data updates, changes in starting levels and projected levels of OASI and DI beneficiaries and benefit amounts over the first 10 years of the projection period, updating other programmatic data, other small methodological improvements, and interactions among the various method changes and updates to programmatic experience combine to increase the long-range actuarial balance by 0.01 percent of payroll.

Figure IV.B4.—OASDI Annual Balances: 2022 and 2023 Trustees Reports
[As a percentage of taxable payroll, under intermediate assumptions]

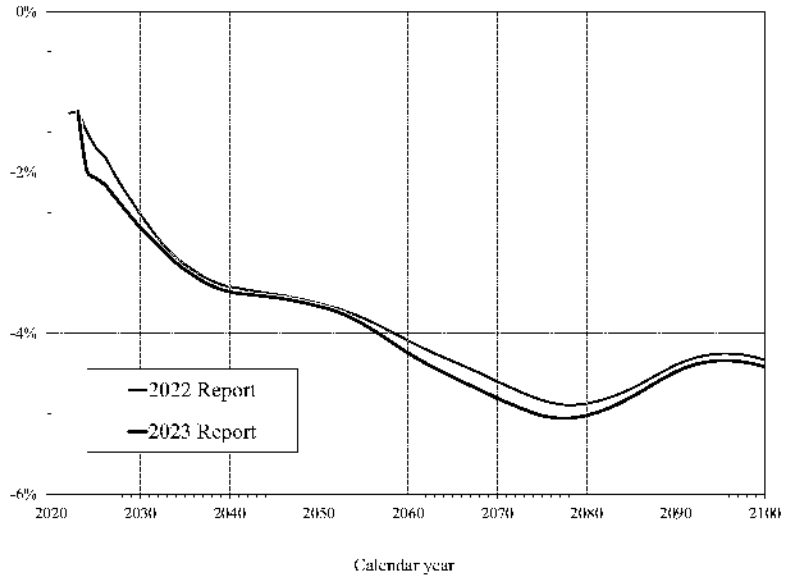

Figure IV.B4 compares the annual balances for this report and the prior year's report for the combined OASDI program over the long-range (75-year) projection period. The figure illustrates the annual effects of the changes described earlier in this section.

The annual balances in this year's report are lower (more negative) in all years after 2023, primarily due to the changes in economic factors and methodological improvements described above. For the full 75-year projection period (2023-97), the annual balances average 0.13 percentage point lower in this year's report. For 2097, the projected annual deficit is 4.35 percent of taxable payroll in this report, compared to 4.26 percent in last year's report.

V. ASSUMPTIONS AND METHODS UNDERLYING ACTUARIAL ESTIMATES

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

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

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 as of the time assumptions were set in December 2022. With regard to the net effect on the actuarial status of the OASDI program, the low-cost set is more optimistic and the high-cost set is more pessimistic. The low-cost and high-cost sets of assumptions reflect significant potential changes in the interrelationships among factors, as well as changes in the values for individual factors.

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

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

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

At this time, there is no consensus on what the lasting effects of the COVID-19 pandemic on long-term demographic, economic, and program-specific trends will be. The Trustees continue to assume that the pandemic will have no net effect on the individual long-range ultimate assumptions. However, the Trustees assume that the pandemic and other evolving international events, like the war in Ukraine, will have consequential effects on the future structure of the economy and the level of productivity.

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

A. DEMOGRAPHIC ASSUMPTIONS AND METHODS

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

1. Fertility Assumptions

Birth rates by single year of age, for girls and 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]

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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. 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/2023/.

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

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

Historically, birth rates in the United States have fluctuated widely. The total fertility rate decreased from 3.31 children per woman at the end of World War I (1918) to 2.15 during the Great Depression (1936). After 1936, the total fertility rate rose to 3.68 in 1957 and then fell to 1.74 by 1976. After 1976, the total fertility rate rose above 2.00 by 1990, where it generally remained through 2009, but it dropped below 1.90 for 2011 and has been at relatively low levels since then. It reached an all-time low of 1.64 for 2020 but went up slightly to 1.66 for 2021.

As in last year's report, the Trustees assume that the COVID-19 pandemic will not have any significant net effect on fertility rates in either the near term or the long term.

The variations in the historical total fertility rate resulted from changes in many factors, including social attitudes, economic conditions, birth-control practices, and the racial/ethnic composition of the population. Since the baby-boom era (1946-65), women have had higher educational attainment, higher labor force participation, an older average age at first marriage, and a higher propensity to be unmarried. All of these factors are consistent with continued lower total fertility rates than those experienced during the baby-boom era. It is still too early to tell whether the 2022 Supreme Court decision (Dobbs v. Jackson Women's Health Organization) and changes being made and considered in states regarding abortion policy will have a significant effect on future fertility rates. Based on consideration of these factors, the Trustees expect the ultimate total fertility rate to be relatively close to the average level since the end of the baby-boom era. The assumed ultimate total fertility rates are 2.20, 2.00, and 1.70 children per woman for the low-cost, intermediate, and high-cost assumptions, respectively. These are the same ultimate rates as those assumed for last year's report.

The 2023 Trustees Report uses a cohort-based projection approach that incorporates a gradual shift to older ages of childbearing for birth cohorts who have not yet reached age 49. The ultimate total fertility rate is reached on a cohort basis over the lifetime of girls attaining age 14 in 2021 and later. For the intermediate assumptions, the projected total fertility rate gradually increases on a period (annual) basis through the year the ultimate period value is reached (2056). The assumed low-cost and high-cost total fertility rates trend away from the intermediate path, also reaching their ultimate period values in 2056.

2. Mortality Assumptions

Mortality projections are developed by assuming ultimate average annual percentage reductions in future mortality rates by age group and cause of death. The assumptions are used to estimate future central death rates by age group, sex, and cause of death.

Adjustments were made to the assumed death rates for 2021, 2022, 2023, and 2024 to account for the effects of the pandemic period. The table below shows the multiplicative factors that were applied to the probabilities of death that would have been projected in the absence of the pandemic. Factors for 2020 are not necessary, as actual final data are available. Similarly, factors were not applied for ages 65 and over in 2021 because actual data are available for those ages.

Year	Age 0	Ages 1-14	Ages 15-64	Ages 65-84	Ages 85 and older
2021	1.00	1.08	1.33	[a] 1.18	[a] 1.08
2022	1.00	1.05	1.11	1.12	1.05
2023	1.00	1.01	1.03	1.03	1.01
2024	1.00	1.00	1.01	1.01	1.00

[a] Based on actual data.

Provisional death rates were particularly high in 2021 for those aged 15-64, relative to the rates that would have been expected in the absence of the pandemic. The factors for this age group in 2022-24 are more in line with the other age groups based on provisional death data in 2022. Compared to the death rates used for last year's report, the factors in the table above result in higher total death rates in 2021 through 2024.

From the estimated central death rates, probabilities of death by single year of age and sex were calculated. Projected death rates for years after 2024 are unchanged from the levels that would have been projected in the absence of the pandemic, under the assumption that increased deaths from the residual effects of living through the pandemic (both physiological and psychological) will be roughly offset by decreased deaths that instead happened sooner (during the pandemic).

Historical death rates were calculated for years 1900 through 2020 for ages below 65 (and for all ages for years prior to 1968) using data from the National Center for Health Statistics (NCHS).[1] For ages 65 and over, final Medicare data on deaths for years 1968 through 2019 and preliminary data

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

for 2020 and 2021 were used.[1] Death rates by cause of death were produced for all ages for years 1979-2020 using data from the NCHS. Note, however, that regressions used for the model projections do not include data for 2020 and 2021 due to the elevated death rates caused by COVID-19.

The total age-sex-adjusted death rate[2] declined at an average annual rate of 1.02 percent between 1900 and 2019. Between 1979 and 2019, 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 0.85 percent per year.

Death rates have declined substantially in the U.S. since 1900, with rapid declines over some periods and slow or no improvement over the other periods. Many factors are responsible for historical reductions in death rates, including medical advances, increased availability of health-care services, and improvements in sanitation and nutrition. Historical death rates generally declined more slowly for older ages and more rapidly for children and infants than for the rest of the population. Between 1900 and 2019, the age-sex-adjusted death rate declined at an average rate of 0.78 percent per year for ages 65 and over, and 2.97 percent per year for ages under 15.

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

The trends in the annual reductions in central death rates were calculated for the period from 2008 to 2019 for both the NCHS and Medicare data, by age group, sex, and cause of death.[3] 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 2047 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

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[1] These rates reflect Medicare data on deaths and enrollments.

[2] 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.

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

be observed. Under the intermediate assumptions, projected age-sex-adjusted death rates are very slightly higher than the rates in last year's report after 2024. These changes result from incorporating final 2019 Medicare data and a method improvement to use single-year-of-age data instead of five-year age group data.

The projected average annual rate of decline for the total age-sex-adjusted death rate is about 0.39 percent, 0.86 percent, and 1.40 percent between 2022 and 2097 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, 0.79 percent, and 1.24 percent between 2022 and 2097 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 0.54 percent, 1.54 percent, and 2.96 percent between 2022 and 2097 for alternatives I, II, and III, respectively. It should be noted that these average annual rates of decline between 2022 and 2097 are not directly comparable with the rates of decline between 2021 and 2096 in last year's report, because the 75-year period used for last year's report included the pandemic year of 2021, and the death rate assumptions for 2022-24 were revised for this year's report to better reflect the current expected course of the pandemic.

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

Table V.A1.—Fertility and Mortality Assumptions,[a] Calendar Years 1940-2100

Calendar year	Total fertility rate[b]	Age-sex-adjusted death rate[c] per 100,000		
		Total	Under 65	65 and over
Historical data:				
1940	2.23	1,919.8	750.1	9,718.8
1945	2.42	1,716.6	674.8	8,662.9
1950	3.03	1,561.9	570.2	8,173.7
1955	3.50	1,453.8	508.2	7,758.4
1960	3.61	1,454.3	503.2	7,795.6
1965	2.88	1,428.8	495.2	7,653.9
1970	2.43	1,340.0	485.7	7,036.3
1975	1.77	1,204.8	426.6	6,393.6
1980	1.82	1,136.9	384.3	6,154.3
1985	1.83	1,081.0	353.3	5,932.9
1990	2.07	1,022.9	333.6	5,618.9
1995	1.98	1,002.7	317.9	5,568.6
2000	2.05	961.5	281.0	5,498.9
2005	2.06	901.9	270.7	5,110.3
2010	1.93	820.8	248.5	4,636.1
2015	1.85	815.4	255.3	4,549.7
2016	1.82	808.7	260.9	4,461.0
2017	1.76	812.8	261.6	4,487.7
2018	1.73	803.7	258.7	4,437.4
2019	1.70	792.9	257.7	4,361.0
2020	1.64	[d]922.4	305.7	[d]5,034.2
2021	1.66	[e]937.6	[f]341.5	[e]4,912.0
2022	[f]1.69	[f]860.3	[f]285.7	[f]4,691.2
Intermediate:				
2025	1.74	768.2	254.0	4,196.9
2030	1.86	738.4	243.8	4,036.1
2035	1.92	708.5	232.6	3,881.9
2040	1.97	679.9	221.5	3,736.3
2045	2.00	652.8	210.8	3,599.6
2050	2.00	627.3	200.7	3,471.3
2055	2.00	603.3	191.2	3,350.9
2060	2.00	580.7	182.2	3,237.9
2065	2.00	559.4	173.7	3,131.6
2070	2.00	539.4	165.6	3,031.5
2075	2.00	520.5	158.0	2,937.3
2080	2.00	502.7	150.9	2,848.5
2085	2.00	485.9	144.1	2,764.6
2090	2.00	469.9	137.6	2,685.4
2095	2.00	454.9	131.6	2,610.5
2100	2.00	440.6	125.8	2,539.6

Table V.A1.—Fertility and Mortality Assumptions,[a] Calendar Years 1940-2100 (Cont.)

Calendar year	Total fertility rate[b]	Age-sex-adjusted death rate[c] per 100,000		
		Total	Under 65	65 and over
Low-cost:				
2025	1.87	794.3	263.4	4,333.9
2030	2.05	785.5	261.4	4,279.8
2035	2.12	775.0	257.7	4,223.7
2040	2.18	764.1	253.7	4,167.7
2045	2.20	753.3	249.5	4,112.6
2050	2.20	742.7	245.3	4,058.6
2055	2.20	732.2	241.2	4,005.7
2060	2.20	722.0	237.2	3,954.0
2065	2.20	712.0	233.3	3,903.4
2070	2.20	702.2	229.5	3,853.9
2075	2.20	692.6	225.7	3,805.4
2080	2.20	683.2	222.0	3,758.1
2085	2.20	674.0	218.4	3,711.7
2090	2.20	665.0	214.8	3,666.3
2095	2.20	656.1	211.3	3,621.9
2100	2.20	647.5	207.9	3,578.4
High-cost:				
2025	1.56	736.5	242.3	4,031.0
2030	1.59	680.5	221.9	3,737.8
2035	1.63	628.2	201.7	3,471.7
2040	1.67	581.2	183.2	3,235.3
2045	1.70	539.4	166.5	3,026.0
2050	1.70	502.2	151.5	2,840.5
2055	1.70	469.0	138.1	2,675.5
2060	1.70	439.4	126.1	2,528.2
2065	1.70	412.8	115.3	2,396.1
2070	1.70	388.9	105.7	2,277.3
2075	1.70	367.3	96.9	2,169.8
2080	1.70	347.7	89.1	2,072.2
2085	1.70	329.9	82.0	1,983.2
2090	1.70	313.7	75.6	1,901.7
2095	1.70	298.9	69.7	1,826.9
2100	1.70	285.3	64.4	1,757.9

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

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

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

[d] Estimated using final data for ages below 65 and preliminary data for ages 65 and older.

[e] Estimated using the intermediate assumptions for ages below 65 and preliminary data for ages 65 and older.

[f] Estimated, intermediate alternative.

3. Immigration Assumptions

Projections of the total Social Security area population reflect assumptions for the following four annual immigration flows:

- Lawful permanent resident (LPR) immigration: Persons who enter the Social Security area and are granted LPR status, or who are already in the Social Security area and adjust their status to become LPRs.[1]
- Legal emigration: LPRs and citizens who leave the Social Security area population.
- Other-than-LPR immigration: Persons who enter the Social Security area and stay to the end of the year without being granted LPR status, such as undocumented immigrants, and foreign workers and students entering with temporary visas.
- Other-than-LPR emigration: Other-than-LPR immigrants who leave the Social Security area population or who adjust their status to become LPRs.

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

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

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

LPR new arrival immigration dropped significantly in 2020 and 2021. LPR new arrival immigration levels in 2020 and 2021 are estimated to be about 280,000 persons lower and 235,000 persons lower, respectively, than would have been expected in the absence of the pandemic. For all three alternatives, the LPR new arrival immigration levels for 2022 are assumed to be the same as would have been assumed in the absence of the pandemic. LPR new arrival immigration levels for 2023 and 2024 are assumed to be higher than would have been assumed in the absence of the pandemic, fully making up for the lower levels in 2020 and 2021. These pandemic effects on LPR new arrival immigration levels are slightly larger than the assumed pandemic effects in last year's report.

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

For the intermediate alternative, the ultimate level of annual LPR immigration, which includes residents who adjust their status to become LPRs, is assumed to be 1,050,000 persons for 2025 and later. For alternative I, ultimate annual LPR immigration is assumed to be 1,250,000 persons for 2025 and later, and for alternative III, ultimate annual LPR immigration is assumed to be 850,000 persons for 2025 and later. The ultimate levels of LPR immigration are unchanged from last year's report.

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

The estimated number of other-than-LPR immigrants residing in the Social Security area and the annual level of other-than-LPR immigration were affected significantly by the economic recession of 2007-09. Although other-than-LPR immigration was greatly reduced during the economic downturn and immediate years thereafter, it returned to higher levels for most years from 2014 through 2019, reflecting a recovery from levels experienced during the recession. The COVID-19 pandemic began to affect other-than-LPR immigration in 2020; the estimated level of other-than-LPR immigration in 2020 is about 747,000, which is 453,000 lower than would have been estimated in the absence of the pandemic.

The Trustees assume that the pandemic will continue to affect other-than-LPR immigration in years 2021 through 2024. For each of the three alternatives, the assumed other-than-LPR immigration level for 2021 is 350,000 lower than would have been assumed in the absence of the pandemic. The other-than-LPR immigration levels for 2022 are assumed to be the same as would have been assumed in the absence of the pandemic. Other-than-LPR immigration levels for 2023 and 2024 are assumed to be higher than would have been assumed in the absence of the pandemic, fully making up for the lower levels in 2020 and 2021. These pandemic effects on other-than-LPR immigration levels are all smaller than the assumed pandemic effects in last year's report.

The ultimate annual levels of other-than-LPR immigration are 1,350,000 persons for alternative II, 1,850,000 persons for alternative I, and 850,000 persons for alternative III. These ultimate levels are unchanged from those used

in last year's report. The ultimate levels are attained in 2025 for all three alternatives.

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

Under the intermediate assumptions, the total annual number of other-than-LPR immigrants who leave the Social Security area averages about 426,000 through the 75-year projection period. The ultimate annual number of other-than-LPR immigrants who adjust status to become LPRs is assumed to be 450,000 for the intermediate assumptions, and is unchanged from last year's report. For the low-cost and high-cost scenarios, the total annual number of other-than-LPR emigrants averages about 585,000 and 265,000, respectively, through the 75-year projection period. The ultimate annual number of people adjusting status to LPR status is assumed to be 550,000 persons and 350,000 persons, for the low-cost and high-cost scenarios, respectively, and is unchanged from last year's report.

Under the assumptions described above, the projected size of the other-than-LPR immigrant population grows substantially, from about 15.6 million by the end of 2023 to about 35.6 million by the end of 2097. This growth reflects the excess of annual immigration over the combined annual numbers of emigrants (including adjustments of status) and deaths that occur within the other-than-LPR immigrant population.

Under the intermediate assumptions, projected net other-than-LPR immigration gradually decreases over time. Because the projected number of other-than-LPR immigrants leaving the Social Security area is based on rates of departure, an increase in the number of other-than-LPR immigrants residing in the Social Security area results in an increase in the number who emigrate out of the area. All other components of net other-than-LPR immigration are assumed to be stable after 2024, and thus do not contribute toward any change in annual net other-than-LPR immigration. Under the intermediate assumptions, the projected average annual level of net other-than-LPR immigration over the 75-year projection period is about 485,000 persons. For the low-cost and high-cost assumptions, projected average annual net other-than-LPR immigration is about 726,000 persons and 245,000 persons, respectively.

The projected average annual level of total net immigration (LPR and other-than-LPR, combined) is about 1,277,000 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 1,732,000 persons and 845,000 persons, respectively.

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

Table V.A2.—Immigration Assumptions,[a] Calendar Years 1940-2100
[In thousands]

Calendar year	LPR immigration				Other-than-LPR immigration[b]				Total net immigration
	LPR in	Legal out	Adjustments of status[c d]	Net LPR	Other-than-LPR in	Other-than-LPR out	Adjustments of status[c d]	Net other-than-LPR	
Historical data:									
1940	61	15	-	46	-	-	-	-	-
1945	73	18	-	55	-	-	-	-	-
1950	227	57	-	171	-	-	-	-	-
1955	280	70	-	210	-	-	-	-	-
1960	268	67	-	201	-	-	-	-	-
1965	261	77	49	232	-	-	49	-	-
1970	307	93	65	279	-	-	65	-	-
1975	340	98	53	294	-	-	53	-	-
1980	430	135	112	406	-	-	112	203	609
1985	458	144	118	432	-	-	118	261	693
1990	548	166	1,061	1,443	-	-	1,061	-318	1,125
1995	511	192	258	578	-	-	258	560	1,137
2000	482	224	413	672	1,358	366	413	579	1,251
2005	561	290	597	869	1,644	32	597	1,015	1,884
2010	622	262	426	786	642	199	426	17	802
2015	689	271	395	813	1,206	147	395	665	1,478
2016	763	292	407	877	1,125	710	407	8	886
2017	722	280	398	840	885	227	398	260	1,099
2018	678	270	403	810	747	483	403	-139	672
2019	508	238	443	713	1,039	893	443	-298	415
2020	320	179	396	537	747	80	396	271	808
2021	[e]365	[e]209	[e]471	[e]627	[f]950	[e]229	[e]471	[f]250	[f]877
2022	[f]600	[f]263	[f]450	[f]788	[f]1,350	[f]236	[f]450	[f]664	[f]1,452
Intermediate:									
2025	600	263	450	788	1,350	302	450	598	1,385
2030	600	263	450	788	1,350	339	450	561	1,348
2035	600	263	450	788	1,350	369	450	531	1,318
2040	600	263	450	788	1,350	396	450	504	1,291
2045	600	263	450	788	1,350	416	450	484	1,271
2050	600	263	450	788	1,350	430	450	470	1,258
2055	600	263	450	788	1,350	439	450	461	1,249
2060	600	263	450	788	1,350	446	450	454	1,241
2065	600	263	450	788	1,350	454	450	446	1,234
2070	600	263	450	788	1,350	460	450	440	1,228
2075	600	263	450	788	1,350	464	450	436	1,223
2080	600	263	450	788	1,350	468	450	432	1,220
2085	600	263	450	788	1,350	470	450	430	1,217
2090	600	263	450	788	1,350	472	450	428	1,216
2095	600	263	450	788	1,350	473	450	427	1,214
2100	600	263	450	788	1,350	474	450	426	1,214

Table V.A2.—Immigration Assumptions,[a] Calendar Years 1940-2100 (Cont.)
[In thousands]

Calendar year	LPR immigration				Other-than-LPR immigration[b]				Total net immigration
	LPR in	Legal out	Adjustments of status[c d]	Net LPR	Other-than-LPR in	Other-than-LPR out	Adjustments of status[c d]	Net other-than-LPR	
Low-cost:									
2025	700	250	550	1,000	1,850	343	550	957	1,957
2030	700	250	550	1,000	1,850	412	550	888	1,888
2035	700	250	550	1,000	1,850	470	550	830	1,830
2040	700	250	550	1,000	1,850	521	550	779	1,779
2045	700	250	550	1,000	1,850	562	550	738	1,738
2050	700	250	550	1,000	1,850	591	550	709	1,709
2055	700	250	550	1,000	1,850	612	550	688	1,688
2060	700	250	550	1,000	1,850	629	550	671	1,671
2065	700	250	550	1,000	1,850	643	550	657	1,657
2070	700	250	550	1,000	1,850	653	550	647	1,647
2075	700	250	550	1,000	1,850	661	550	639	1,639
2080	700	250	550	1,000	1,850	667	550	633	1,633
2085	700	250	550	1,000	1,850	670	550	630	1,630
2090	700	250	550	1,000	1,850	673	550	627	1,627
2095	700	250	550	1,000	1,850	674	550	626	1,626
2100	700	250	550	1,000	1,850	675	550	625	1,625
High-cost:									
2025	500	255	350	595	850	263	350	237	832
2030	500	255	350	595	850	267	350	233	828
2035	500	255	350	595	850	269	350	231	826
2040	500	255	350	595	850	271	350	229	824
2045	500	255	350	595	850	270	350	230	825
2050	500	255	350	595	850	268	350	232	827
2055	500	255	350	595	850	264	350	236	831
2060	500	255	350	595	850	262	350	238	833
2065	500	255	350	595	850	263	350	237	832
2070	500	255	350	595	850	263	350	237	832
2075	500	255	350	595	850	264	350	236	831
2080	500	255	350	595	850	265	350	235	830
2085	500	255	350	595	850	265	350	235	830
2090	500	255	350	595	850	266	350	234	829
2095	500	255	350	595	850	266	350	234	829
2100	500	255	350	595	850	267	350	233	828

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

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

[c] Estimates include persons who attained LPR status under the special one-time provisions of the Immigration Reform and Control Act of 1986.

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

[e] Estimated.

[f] Estimated, intermediate alternative.

Note: Components may not sum to totals because of rounding.

4. Total Population Estimates

The starting Social Security area population for December 31, 2020, 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 2021 through 2097 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 1945-2100

Calendar year	Population (in thousands)				Dependency ratio	
	Under 20	20-64	65 and over	Total	Aged[a]	Total[b]
Historical data:						
1945	49,107	87,891	10,886	147,883	0.124	0.683
1950	53,918	92,190	12,789	158,897	.139	.724
1955	63,337	96,003	15,161	174,501	.158	.818
1960	72,915	99,752	17,323	189,990	.174	.905
1965	80,002	104,863	19,153	204,018	.183	.946
1970	80,856	112,953	21,007	214,815	.186	.902
1975	78,577	122,594	23,370	224,541	.191	.832
1980	74,841	134,029	26,315	235,184	.196	.755
1985	72,892	144,585	29,129	246,607	.201	.706
1990	74,791	152,731	31,926	259,449	.209	.699
1995	79,287	160,735	34,294	274,317	.213	.707
2000	81,980	170,139	35,500	287,619	.209	.690
2005	83,906	180,823	37,123	301,853	.205	.669
2010	85,673	188,274	41,044	314,990	.218	.673
2015	84,427	193,533	47,768	325,727	.247	.683
2016	84,400	194,256	49,264	327,920	.254	.688
2017	84,260	194,749	50,784	329,793	.261	.693
2018	83,992	195,104	52,358	331,455	.268	.699
2019	83,653	195,036	53,982	332,671	.277	.706
2020[c]	83,298	194,877	55,493	333,667	.285	.712
2021[d]	82,893	194,834	56,852	334,578	.292	.717
2022[d]	82,723	194,907	58,367	335,997	.299	.724
Intermediate:						
2025	82,861	197,082	63,420	343,362	.322	.742
2030	82,828	200,212	70,995	354,034	.355	.768
2035	85,114	203,819	75,441	364,374	.370	.788
2040	88,689	207,392	77,896	373,977	.376	.803
2045	92,732	210,257	79,585	382,575	.379	.820
2050	95,086	213,249	81,948	390,283	.384	.830
2055	96,280	216,458	85,080	397,818	.393	.838
2060	97,298	219,807	88,922	406,027	.405	.847
2065	99,029	223,674	92,471	415,174	.413	.856
2070	101,697	226,944	96,192	424,833	.424	.872
2075	104,716	229,517	100,175	434,408	.436	.893
2080	107,286	233,759	102,562	443,607	.439	.898
2085	109,129	239,433	104,013	452,575	.434	.890
2090	110,652	246,086	104,972	461,710	.427	.876
2095	112,417	251,691	107,207	471,315	.426	.873
2100	114,662	256,318	110,479	481,459	.431	.878

Table V.A3.—Social Security Area Population on July 1 and Dependency Ratios, Calendar Years 1945-2100 (Cont.)

Calendar year	Population (in thousands)				Dependency ratio	
	Under 20	20-64	65 and over	Total	Aged[a]	Total[b]
Low-cost:						
2025	84,418	198,745	63,296	346,458	0.318	0.743
2030	87,253	203,791	70,476	361,520	.346	.774
2035	92,920	209,278	74,306	376,504	.355	.799
2040	100,023	214,663	76,000	390,686	.354	.820
2045	106,934	219,951	76,896	403,781	.350	.836
2050	111,039	226,626	78,526	416,191	.346	.836
2055	113,963	233,994	81,050	429,007	.346	.833
2060	117,406	241,543	84,410	443,359	.349	.836
2065	122,333	249,500	87,555	459,388	.351	.841
2070	128,470	257,005	90,841	476,316	.353	.853
2075	134,696	264,362	94,311	493,369	.357	.866
2080	139,946	274,208	96,193	510,347	.351	.861
2085	144,201	286,248	97,169	527,618	.339	.843
2090	148,393	299,069	98,298	545,760	.329	.825
2095	153,341	309,943	101,804	565,088	.328	.823
2100	159.119	319,668	106,719	585,506	.334	.832
High-cost:						
2025	81,094	195,509	63,586	340,189	.325	.740
2030	77,541	196,823	71,689	346,053	.364	.758
2035	75,687	198,661	76,970	351,318	.387	.768
2040	74,922	200,530	80,458	355,910	.401	.775
2045	75,517	200,820	83,231	359,568	.414	.790
2050	75,991	199,521	86,595	362,106	.434	.815
2055	75,444	197,825	90,547	363,816	.458	.839
2060	74,065	196,139	95,002	365,206	.484	.862
2065	72,628	195,037	98,988	366,654	.508	.880
2070	71,842	193,179	103,102	368,123	.534	.906
2075	71,694	190,053	107,489	369,235	.566	.943
2080	71,724	187,720	110,214	369,657	.587	.969
2085	71,443	185,982	111,904	369,329	.602	.986
2090	70,744	185,631	112,105	368,480	.604	.985
2095	69,896	185,620	111,877	367,394	.603	.979
2100	69,235	184,999	112,060	366,294	.606	.980

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

Notes:
1. Historical data are subject to revision.
2. Components may not sum to totals because of rounding.

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 at both birth and at age 65, in two different forms (period and cohort), which are useful for separate purposes.

- Period life expectancy at a selected age for a particular year incorporates the actual or expected death rates at the selected age and each older age for that year. It is a useful summary statistic for illustrating the overall level of the death rates at or above the given age experienced in a single year. Period life expectancy for a particular year provides an individual's expected average remaining lifetime at a selected age, assuming no change in death rates after that year. Table V.A4 presents historical and projected life expectancy calculated on a period basis.
- Cohort life expectancy does not incorporate death rates for a single year, but for the series of years in which the individual will actually reach each succeeding age if he or she survives. Cohort life expectancy provides the expected average remaining lifetime for an individual at a selected age in a particular year, using actual or expected future death rates for the selected age and all succeeding ages. Table V.A5 presents historical and projected life expectancy calculated on a cohort basis. Cohort life expectancy is generally greater than period life expectancy for a given year because: (1) death rates at any age generally decline over time; and (2) cohort life expectancy uses death rates for future years, while period life expectancy uses death rates only for the given year.

Life expectancy at a given age reflects death rates at that and all older ages. Period life expectancy is somewhat related to the age-sex-adjusted death rate discussed in section V.A.2. However, life expectancy places far greater weight on death rates at relatively younger ages (those at or just above the given age) than those at relatively older ages. Therefore, changes in death rates at young ages, particularly in infancy, affect life expectancy at birth to a much greater degree than changes in death rates at older ages. 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	67.1	74.9	13.1	17.1
1975	68.7	76.6	13.7	18.0
1980	69.9	77.5	14.0	18.4
1985	71.1	78.2	14.4	18.6
1990	71.8	78.9	15.0	19.0
1995	72.5	79.1	15.4	19.0
2000	74.0	79.4	15.9	19.0
2005	74.8	80.0	16.7	19.5
2010	76.1	80.9	17.5	20.2
2015	76.1	80.9	17.8	20.3
2016	76.0	81.0	17.9	20.5
2017	76.0	81.0	17.9	20.5
2018	76.1	81.1	18.0	20.5
2019	76.2	81.3	18.1	20.7
2020[b]	74.1	79.8	16.9	19.7
2021[c]	73.5	79.3	17.0	19.8
2022[d]	75.1	80.3	17.5	20.1

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
2025	76.6	81.6	18.4	21.0	76.1	81.2	18.2	20.7	77.1	82.1	18.8	21.3
2030	77.1	82.1	18.8	21.3	76.2	81.4	18.3	20.8	78.2	83.0	19.4	21.9
2035	77.6	82.5	19.1	21.6	76.4	81.5	18.4	20.9	79.2	83.8	20.0	22.4
2040	78.1	83.0	19.4	21.9	76.6	81.7	18.5	21.0	80.2	84.6	20.6	23.0
2045	78.7	83.4	19.7	22.2	76.8	81.8	18.6	21.1	81.1	85.4	21.2	23.5
2050	79.2	83.8	20.0	22.4	77.0	82.0	18.7	21.2	82.0	86.1	21.7	24.0
2055	79.7	84.3	20.3	22.7	77.2	82.2	18.8	21.3	82.9	86.8	22.2	24.4
2060	80.2	84.7	20.6	23.0	77.3	82.3	18.9	21.4	83.7	87.5	22.7	24.8
2065	80.7	85.0	20.9	23.2	77.5	82.5	19.0	21.5	84.4	88.1	23.2	25.3
2070	81.1	85.4	21.2	23.5	77.7	82.6	19.1	21.6	85.1	88.6	23.7	25.6
2075	81.6	85.8	21.4	23.7	77.9	82.8	19.3	21.7	85.8	89.1	24.1	26.0
2080	82.0	86.1	21.7	23.9	78.1	82.9	19.4	21.8	86.4	89.6	24.5	26.4
2085	82.4	86.5	22.0	24.2	78.3	83.1	19.5	21.9	87.0	90.1	24.9	26.7
2090	82.9	86.8	22.2	24.4	78.4	83.2	19.6	22.0	87.6	90.5	25.2	27.0
2095	83.3	87.1	22.5	24.6	78.6	83.4	19.7	22.1	88.1	91.0	25.6	27.3
2100	83.6	87.4	22.7	24.8	78.8	83.5	19.8	22.2	88.6	91.3	25.9	27.6

[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 using final data for ages below 65 and preliminary data for ages 65 and older.

[c] Estimated using the intermediate assumptions for ages below 65 and preliminary data for ages 65 and older.

[d] 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	70.2	76.4	12.7	14.7	70.1	76.3	12.7	14.7	70.3	76.6	12.7	14.7
1945	71.9	78.0	13.0	15.4	71.7	77.8	13.0	15.4	72.1	78.3	13.0	15.4
1950	73.0	79.4	13.1	16.2	72.7	79.0	13.1	16.2	73.4	79.9	13.1	16.2
1955	73.6	79.9	13.1	16.7	73.1	79.3	13.1	16.7	74.2	80.6	13.1	16.7
1960	74.2	80.2	13.2	17.4	73.5	79.5	13.2	17.4	75.1	81.2	13.2	17.4
1965	75.0	80.8	13.5	18.0	74.2	79.8	13.5	18.0	76.3	82.1	13.5	18.0
1970	76.2	81.6	13.8	18.5	75.1	80.5	13.8	18.5	77.8	83.2	13.8	18.5
1975	77.1	82.3	14.2	18.7	75.6	80.9	14.2	18.7	79.0	84.2	14.2	18.7
1980	77.7	83.0	14.7	18.8	76.0	81.3	14.7	18.8	80.1	85.1	14.7	18.8
1985	78.3	83.5	15.4	19.1	76.3	81.6	15.4	19.1	81.0	85.9	15.4	19.1
1990	78.9	83.9	16.0	19.3	76.6	81.8	16.0	19.3	81.9	86.6	16.0	19.3
1995	79.5	84.5	16.7	19.7	76.9	82.1	16.7	19.6	82.8	87.4	16.7	19.7
2000	80.0	84.9	17.3	20.0	77.1	82.3	17.3	19.9	83.6	88.0	17.4	20.1
2005	80.5	85.3	17.8	20.4	77.3	82.5	17.7	20.3	84.4	88.6	17.9	20.6
2010	81.0	85.7	18.2	20.8	77.6	82.7	17.9	20.5	85.2	89.1	18.5	21.2
2015	81.5	86.0	18.5	21.1	77.8	82.8	18.1	20.7	85.9	89.7	19.0	21.8
2016	81.6	86.1	18.5	21.2	77.8	82.8	18.1	20.7	86.0	89.8	19.1	21.9
2017	81.7	86.2	18.6	21.3	77.9	82.9	18.1	20.7	86.2	89.9	19.3	22.0
2018	81.8	86.3	18.6	21.3	77.9	82.9	18.1	20.8	86.3	90.0	19.4	22.1
2019	81.9	86.3	18.7	21.4	78.0	83.0	18.2	20.8	86.5	90.1	19.5	22.2
2020	82.0	86.4	18.8	21.5	78.0	83.0	18.2	20.8	86.6	90.2	19.6	22.3
2021	82.1	86.5	18.9	21.6	78.0	83.0	18.2	20.9	86.7	90.3	19.8	22.5
2022	82.2	86.5	19.0	21.7	78.1	83.0	18.3	20.9	86.9	90.4	20.0	22.7
2025	82.4	86.8	19.3	21.9	78.2	83.1	18.4	21.0	87.3	90.7	20.5	23.1
2030	82.9	87.1	19.6	22.2	78.4	83.3	18.5	21.1	87.9	91.2	21.1	23.6
2035	83.3	87.5	19.9	22.5	78.5	83.4	18.7	21.2	88.5	91.7	21.7	24.1
2040	83.7	87.8	20.2	22.7	78.7	83.6	18.8	21.3	89.1	92.1	22.2	24.6
2045	84.1	88.1	20.5	23.0	78.9	83.7	18.9	21.4	89.7	92.5	22.8	25.1
2050	84.5	88.4	20.8	23.3	79.1	83.9	19.0	21.5	90.2	92.9	23.3	25.5
2055	84.9	88.7	21.1	23.5	79.3	84.0	19.1	21.6	90.7	93.2	23.8	25.9
2060	85.3	89.0	21.4	23.8	79.4	84.2	19.2	21.7	91.1	93.6	24.2	26.3
2065	85.6	89.2	21.7	24.0	79.6	84.3	19.3	21.8	91.6	93.9	24.6	26.6
2070	86.0	89.5	22.0	24.2	79.8	84.4	19.4	21.9	92.0	94.2	25.0	27.0
2075	86.3	89.8	22.2	24.5	79.9	84.6	19.5	22.0	92.4	94.5	25.4	27.3
2080	86.6	90.0	22.5	24.7	80.1	84.7	19.6	22.1	92.8	94.8	25.8	27.6
2085	86.9	90.2	22.7	24.9	80.3	84.8	19.7	22.2	93.2	95.1	26.2	27.9
2090	87.2	90.5	23.0	25.1	80.4	85.0	19.8	22.3	93.5	95.4	26.5	28.2
2095	87.5	90.7	23.2	25.3	80.6	85.1	19.9	22.4	93.9	95.7	26.8	28.5
2100	87.8	90.9	23.4	25.5	80.7	85.2	20.0	22.5	94.2	95.9	27.2	28.7

[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 2020. For birth years after 2020, these values depend on estimated and projected death rates.

[c] Age 65 cohort life expectancy for those attaining age 65 in calendar years 1940 through 2019 is based on a combination of actual, estimated, and projected death rates. After 2019, these values depend on estimated and projected death rates.

B. ECONOMIC ASSUMPTIONS AND METHODS

The three alternative sets of economic assumptions are intended to provide a reasonable range for estimating the future financial status of the trust funds. The intermediate assumptions reflect the Trustees' consensus expectation of moderate economic growth after completion of the recovery from the pandemic-induced recession and a period of slow growth in 2023, and their best estimates for other economic parameters. The low-cost assumptions represent a more optimistic outlook with a faster recovery to a higher level of economic output, stronger long-term economic growth, and relatively optimistic levels for other parameters. The high-cost assumptions represent a more pessimistic scenario with a recession in 2023, slower economic growth in the long term, and relatively pessimistic levels for other parameters.

Actual economic data were generally available through the third quarter of 2022 at the time the assumptions for this report were set. Those data indicate that economic activity reached a peak in the fourth quarter of 2019.[1] The recession started in the first quarter of 2020 due to the precipitous decline in economic activity in March of 2020, continuing in April of 2020, leading to the gross domestic product (GDP) in the second quarter of 2020 being almost 10 percent below the peak in the fourth quarter of 2019, expressed in constant 2012 dollars. GDP recovered rapidly, surpassing the fourth quarter 2019 peak in the first quarter of 2021. In the third quarter of 2022, GDP was about 4 percent above the previous peak.

Under the intermediate assumptions, the economy is estimated to be 1 percent above its sustainable trend level of output in the third quarter of 2022 and is then projected to grow slowly, reaching a level of almost 1 percent below the sustainable trend level at the end of 2023. Stronger growth is projected thereafter, with GDP reaching and stabilizing at the sustainable trend level in the first quarter of 2027. The sustainable trend level of GDP is assumed to be 3 percent lower at the end of 2025 and thereafter than was assumed for the intermediate assumptions in the 2022 report. Under the low-cost assumptions, the economy is projected to grow at a faster rate and return to a higher sustainable trend level of output in the first quarter of 2026. Under the high-cost assumptions, the sustainable trend level is assumed to be lower, and GDP was significantly above it in 2022; GDP is projected to fall to 2.5 percent below that lower sustainable trend level in the fourth quarter of 2023 and then to recover fully by the fourth quarter of 2027. Complete eco-

[1] On a monthly basis, economic activity peaked in February 2020, but the decline in March was sharp enough that the output in the first quarter of 2020 was substantially below the output in the fourth quarter of 2019. See www.nber.org/news/business-cycle-dating-committee-announcement-june-8-2020.

nomic cycles have little effect on the long-range estimates of financial status of the trust funds, so the assumptions do not include cycles beyond the short-range period (2023 through 2032).

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

1. Productivity Assumptions

Total U.S. economy productivity is defined as the ratio of real GDP to hours worked by all workers.[1] The rate of change in total-economy productivity is a major determinant of the growth of average earnings. Over the last six complete economic cycles (1969-73, 1973-79, 1979-90, 1990-2001, 2001-07, and 2007-19, measured peak to peak), the annual increase in total-economy productivity averaged 2.64, 1.06, 1.39, 1.84, 2.15, and 1.09 percent, respectively. For the period from 1969 to 2019, covering those last six complete economic cycles, the annual increase in total-economy productivity averaged 1.57 percent.

The assumed ultimate annual increase in total-economy productivity is 1.93, 1.63, and 1.33 percent for the low-cost, intermediate, and high-cost assumptions, respectively.[2] These rates of increase are unchanged from the 2022 report.

The average annual rate of change in total-economy productivity from 2019 (the end of the last complete economic cycle) to 2022 is estimated to be 1.52 percent. For the intermediate assumptions, the annual rate of change in productivity is assumed to be 0.18 percent for 2023, 1.11 percent for 2024, averages 1.47 percent for 2025 through 2028, and reaches its ultimate value of 1.63 percent for 2029 and thereafter. For the low-cost assumptions, the annual rate of change in productivity is 0.87 percent for 2023, averages 2.00 percent for 2024 through 2027, and reaches its ultimate value of 1.93 percent for 2028 and thereafter. For the high-cost assumptions, the assumed recession lowers the annual rate of change in productivity to -1.71 percent for 2023. The growth rate rebounds to an average of 1.49 percent for 2024 through 2027, averages 1.28 percent for 2028 through 2030, and stabilizes at its ultimate value of 1.33 percent for 2031 and there-

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

[2] These assumptions for total-economy productivity are consistent with ultimate annual increases in private nonfarm business productivity of 2.36, 2.00, and 1.63 percent. Private nonfarm business productivity excludes the farm, government, nonprofit institution, and private household sectors.

after. The combined effect of data revisions, new data for 2022, and less optimistic near-term projections lowered the average productivity growth rate from 2019 to 2032 from 1.67 percent in the 2022 report to 1.40 percent for this report under the intermediate assumptions.

2. Price Inflation Assumptions

Changes in the Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI) directly affect the OASDI program through the automatic cost-of-living benefit increases. Changes in the GDP price index (GDP deflator) affect the nominal levels of GDP, wages, self-employment income, average earnings, and taxable payroll. For a given real rate of growth in average earnings, a higher price inflation rate immediately results in a higher nominal rate of growth in both earnings and revenues, while the resulting added growth in nominal benefit levels occurs with a delay, causing an overall increase (improvement) in the actuarial balance. Similarly, a lower price inflation rate causes an overall decrease in the actuarial balance.

The annual increase in the CPI averaged 4.91, 8.54, 5.30, 2.73, 2.63, and 1.73 percent over the economic cycles 1969-73, 1973-79, 1979-90, 1990-2001, 2001-07, and 2007-19, respectively.[1] The annual increase in the GDP deflator averaged 5.04, 7.54, 4.61, 2.08, 2.52, and 1.62 percent for the respective economic cycles. For the period from 1969 to 2019, covering the last six complete economic cycles, the annual increase in the CPI and the GDP deflator averaged 3.89 and 3.45 percent, respectively. The annual rate of change for 2020, which was affected by the recession, was 1.21 percent for the CPI and 1.35 percent for the GDP deflator. During the subsequent recovery, aggregate demand increased while supply was constrained, leading to a 2021 growth rate of 5.26 percent for the CPI and 4.49 percent for the GDP deflator and an estimated 2022 growth rate of 8.51 percent for the CPI and 7.03 percent for the GDP deflator.

The assumed ultimate annual increase in the CPI is 3.00, 2.40, and 1.80 percent for the low-cost, intermediate, and high-cost assumptions, respectively. These values are unchanged from the 2022 report.

For the intermediate assumptions, the annual rate of change in the CPI is 4.00 percent for 2023, 2.53 percent for 2024, and reaches the ultimate

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

growth rate of 2.40 percent for 2025 and thereafter. For the low-cost assumptions, the annual rate of change in the CPI is 3.90 percent for 2023, 3.02 percent for 2024, and reaches its ultimate growth rate of 3.00 percent for 2025 and thereafter. For the high-cost assumptions, the annual rate of change in the CPI is 4.56 percent for 2023, 2.92 percent for 2024, 1.86 percent for 2025, and reaches its ultimate growth rate of 1.80 percent for 2026 and thereafter.

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 set of goods and services used in the measurement). The difference between the rate of change in the CPI and the rate of change in the GDP deflator is called the price differential in this report. For the period including 1969 through 2019, covering the last six complete economic cycles, the average annual price differential was 0.46 percentage point. For 2020, the annual price differential was -0.13 percentage point, for 2021 it was 0.77 percentage point, and for 2022 it is estimated to be 1.49 percentage points.

The fluctuations in the price differential for 2020-22 primarily reflect a decline and subsequent increase in oil prices, as well as price increases concentrated in consumer goods categories during the economic recovery. Changes in oil prices affect the CPI much more than the GDP deflator because oil comprises a much larger share of U.S. consumption than of U.S. production. Oil prices are assumed to grow at a relatively stable rate in the future. For the intermediate assumptions, the price differential is 0.11 percentage point for 2023, 0.36 percentage point for 2024, and 0.35 percentage point for 2025 and later.

The assumed ultimate price differential is 0.25, 0.35, and 0.45 percentage point for the low-cost, intermediate, and high-cost alternative, 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 2.75 (3.00 less 0.25), 2.05 (2.40 less 0.35), and 1.35 (1.80 less 0.45) percent for the low-cost, intermediate, and high-cost alternative, respectively. The ultimate price differentials for the three alternatives are unchanged from the 2022 report.

3. Average Earnings Assumptions

The size of the taxable payroll—the main source of the OASDI program's income—for each year depends primarily on the nominal earnings in OASDI

covered employment, which is the product of covered employment[1] for the year and average covered earnings for the year. Average covered earnings also affects the future level of average benefits. In addition, the average reported annual wage in the U.S. economy determines the national average wage index (AWI). Under the automatic adjustment provisions in the law, the growth in the AWI affects the contribution and benefit base, certain parameters used in the OASDI benefit formula, and certain other program parameters.[2]

The projected growth rate in average annual covered earnings and in the AWI are derived from the projected growth rate in average U.S. earnings. Average U.S. earnings is defined as the ratio of the sum of total U.S. wages and net proprietors' income to the sum of average weekly 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 per week, the ratio of earnings to total labor compensation (which includes fringe benefits), the ratio of total labor compensation to GDP, and the GDP deflator.

The average annual change in average hours worked per week was -0.20 percent over the last six complete economic cycles covering the period from 1969 to 2019. The annual change in average hours worked averaged -0.87, -0.53, -0.09, 0.11, -0.47, and -0.05 percent over the economic cycles 1969-73, 1973-79, 1979-90, 1990-2001, 2001-07, and 2007-19, respectively. From 2019 to 2022, the first three years after the peak of the last complete cycle, the average annual change in average hours worked per week is estimated to be a decrease of 0.03 percent.

The assumed ultimate annual rate of change for average hours worked per week is 0.05, -0.05, and -0.15 percent for the low-cost, intermediate, and high-cost assumptions, respectively. These values are unchanged from the 2022 report.

The average annual change in the ratio of earnings to total labor compensation was -0.14 percent from 1969 to 2019. Data from BEA indicate that the most significant component of this change was the relative increase in the cost of employer-sponsored group health insurance (ESGHI) for wage workers, followed by the increase in employer contributions to social insurance (as statutory payroll tax rates increased between 1970 and 1990), and, to a lesser extent, an increase in employer contributions to retirement plans.

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[1] Covered employment for a 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. See section V.C.2 for a more detailed discussion of covered employment.

[2] See section V.C.1 for a discussion of the AWI and the parameters indexed to it.

Assuming that the level of total employee compensation is not affected by the amount of non-wage compensation, such as ESGHI, any increase or decrease in the cost of non-wage compensation leads to a commensurate decrease or increase in wages. Projections of future ratios of earnings to total labor compensation follow this principle.

The average annual rate of change in the ratio of wages to employee compensation was -0.17 percent from 1969 to 2019. The average annual rate of change in this ratio increased sharply to 0.40 percent for the period 2019 to 2022 due to the unusual effects of the pandemic-induced recession. The average annual rate from 2022 to 2032 is assumed to be about 0.02, -0.08, and -0.13 percent for the low-cost, intermediate, and high-cost assumptions, respectively. For the last 65 years of the long-range period, from 2032 to 2097, the average rate is assumed to be about 0.00, -0.10, and -0.20 percent for the low-cost, intermediate, and high-cost assumptions, respectively. These average rates are slightly higher (i.e., less negative) than those assumed for the 2022 report. Under the intermediate assumptions, the ratio of wages to employee compensation declines from 0.824 for 2022 to 0.767 for 2097.

Because earnings and compensation are the same for self-employed workers, the ratio of earnings to total labor compensation includes self-employment income both in the numerator and in the denominator. As a result, the rate of change in the ratio of earnings to total labor compensation (which, under the intermediate assumptions, averages -0.08 percent from 2032 to 2097) is slightly higher (i.e., less negative) than the rate of change in the ratio of wages to employee compensation.

The ratio of total labor compensation (i.e., employee compensation and net proprietors' income) to GDP varies over the economic cycle and with changes in the relative sizes of different sectors of the economy. Over the last six complete economic cycles from 1969 to 2019, this ratio has averaged 0.622. This ratio increased to 0.628 for 2020, declined to 0.613 for 2021, and is estimated to decrease to 0.605 for 2022. It is then projected to gradually rise to reach 0.628 by 2032 under the intermediate assumptions. For years after 2032, the relative sizes of different sectors of the economy are assumed to remain about constant,[1] and therefore the ratio of total labor compensation to GDP remains at about the 2032 level for each set of assumptions.

[1] The sole exception is employment in the U.S. Armed Forces, which has declined in size over the last 40 years and is assumed to remain at its 2020 level throughout the 75-year projection period.

For the intermediate assumptions, the projected average annual growth rate in average nominal U.S. earnings from 2022 to 2032 is 3.95 percent. The projected average annual growth rate from 2032 to 2097 is 3.58 percent, which reflects the assumed ultimate annual growth rates of 1.63 percent for productivity, -0.05 percent for average hours worked, 2.05 percent for the GDP deflator, and -0.08 percent for the ratio of earnings to total labor compensation. Over the same period, the projected average annual growth rate in average nominal U.S. earnings is 4.79 percent for the low-cost assumptions and 2.37 percent for the high-cost assumptions.

The average annual wage in OASDI covered employment (often referred to as the "average covered wage") is defined as the total wages and salaries paid in OASDI covered employment during the year, divided by the number of workers who worked in OASDI covered employment at any time during the year. Over long periods, the average annual growth rate in the average covered wage is expected to be very close to the average annual growth rate in average U.S. earnings. The estimated annual rate of change in the average covered wage is 4.79 percent for 2022 under the intermediate assumptions. From 2022 to 2032, the annual rate of change in the average covered wage averages 5.37, 3.99, and 2.97 percent for the low-cost, intermediate, and high-cost assumptions, respectively. The projected average annual growth rate in the average covered wage from 2032 to 2097 is 4.79, 3.56, and 2.35 percent for the low-cost, intermediate, and high-cost assumptions, respectively.

4. Assumed Real Wage Growth

For the period from 1969 to 2019, covering the last six complete economic cycles, the annual real (i.e., inflation-adjusted) growth rate in the average covered wage averaged 0.77 percent, the result of averages of 0.98, 0.03, 0.45, 1.43, 0.80, and 0.76 percent over the economic cycles 1969-73, 1973-79, 1979-90, 1990-2001, 2001-07, and 2007-19, respectively.[1]

For the period 2032 to 2097, the projected average annual real wage growth rate in OASDI covered employment is 1.74, 1.14, and 0.54 percent for the low-cost, intermediate, and high-cost assumptions, respectively. The average annual real wage growth rates are slightly higher than those in the 2022 report.[2]

The real wage increased 1.52 percent for 2020, a year which included the pandemic-induced recession and the beginning of the recovery. It then

[1] In previous Trustees Reports, the real increase in the average covered wage was expressed in the form of a real wage differential – the annual percentage change in the average wage in OASDI covered employment minus the annual percentage change in the CPI.

increased 3.89 percent for 2021, during the continuing rapid recovery from the recession, and is estimated to decrease 3.43 percent for 2022 under the intermediate assumptions, primarily due to the high inflation rate. For the intermediate assumptions, the annual real wage growth rate is projected to be 0.15 percent in 2023, increase to 1.20 percent in 2024, average 1.64 percent for 2025 through 2027, average 1.57 percent for 2028 through 2031, and average 1.14 percent from 2032 to 2097. For the low-cost assumptions, the annual real wage growth rate is 0.79 percent for 2023, averages 2.77 percent for 2024 through 2026, and gradually declines to its long-term average of 1.74 percent from 2032 to 2097. For the high-cost assumptions, the real wage growth rate is -2.58 percent for 2023 and 0.70 percent for 2024. It then averages 1.67 percent for 2025 through 2027, and gradually reaches its long-term average of 0.54 percent from 2032 to 2097.

[2] In the 2022 report, the projected average real wage differential was 1.77, 1.15, and 0.53 percentage points for the low-cost, intermediate, and high-cost assumptions, respectively. The corresponding average real growth rate was 1.72, 1.12, and 0.52 percent for the low-cost, intermediate, and high-cost assumptions, respectively.

Table V.B1.—Principal Economic Assumptions

Calendar year	Annual percentage change[a] in—						
	Productivity (Total U.S. economy)	GDP price index	Average hours worked per week	Earnings as a percent of total labor compensation	Average annual wage in covered employment		Consumer price index
					Nominal	Real	
Historical data:							
5-year periods:							
1960 to 1965 . . .	3.23	1.36	0.19	-0.18	3.22	1.95	1.24
1965 to 1970 . . .	2.04	4.02	-.66	-.30	5.84	1.55	4.23
1970 to 1975 . . .	2.07	6.61	-.87	-.49	6.58	-.17	6.76
1975 to 1980 . . .	.94	7.21	-.16	-.33	8.88	-.02	8.91
1980 to 1985 . . .	1.71	5.24	.03	-.36	6.52	1.24	5.22
1985 to 1990 . . .	1.33	3.14	-.06	-.20	4.79	.93	3.83
1990 to 1995 . . .	1.30	2.45	.34	-.11	3.54	.49	3.03
1995 to 2000 . . .	2.31	1.67	.15	.28	5.31	2.81	2.43
2000 to 2005 . . .	2.63	2.32	-.79	-.38	2.69	.19	2.49
2005 to 2010 . . .	1.88	1.91	-.51	-.03	2.51	.21	2.30
2010 to 2015 . . .	.35	1.71	.45	.16	2.93	1.30	1.61
2015 to 2020 . . .	1.58	1.69	-.16	.10	2.95	1.23	1.70
Economic cycles:[b]							
1969 to 1973 . . .	2.64	5.04	-.87	-.34	5.94	.98	4.91
1973 to 1979 . . .	1.06	7.54	-.53	-.43	8.58	.03	8.54
1979 to 1990 . . .	1.39	4.61	-.09	-.29	5.78	.46	5.30
1990 to 2001 . . .	1.84	2.08	.11	.05	4.19	1.42	2.73
2001 to 2007 . . .	2.15	2.52	-.47	-.18	3.45	.80	2.63
2007 to 2019 . . .	1.09	1.62	-.05	.04	2.50	.76	1.73
2019 to 2022[c] . .	1.52	4.26	-.03	.33	5.60	.61	4.95
Single years:							
2012.	.34	1.88	.13	.47	3.33	1.20	2.10
2013.	.52	1.77	.33	-.33	1.23	-.14	1.37
2014.	.31	1.86	.36	.27	3.60	2.07	1.50
2015.	.61	.96	.41	.05	3.38	3.81	-.41
2016.	.45	1.00	-.50	.10	1.29	.31	.98
2017.	1.04	1.93	-.05	.14	3.47	1.32	2.13
2018.	1.03	2.41	.32	-.10	3.65	1.08	2.55
2019.	1.32	1.78	-.15	.19	3.62	1.92	1.66
2020.	4.11	1.35	-.43	.17	2.76	1.52	1.21
2021.	1.49	4.49	1.11	.48	9.36	3.89	5.26
2022[c].	-.99	7.03	-.77	.34	4.79	-3.43	8.51
Intermediate:							
2023.	.18	3.89	.30	-.16	4.15	.15	4.00
2024.	1.11	2.17	-.04	-.13	3.76	1.20	2.53
2025.	1.40	2.05	-.04	-.04	4.06	1.62	2.40
2026.	1.44	2.05	-.03	[d]	4.10	1.66	2.40
2027.	1.47	2.05	-.04	[d]	4.08	1.64	2.40
2028.	1.56	2.05	-.05	-.03	4.01	1.57	2.40
2029.	1.63	2.05	-.05	-.05	4.03	1.60	2.40
2030.	1.63	2.05	-.05	-.07	4.01	1.57	2.40
2031.	1.63	2.05	-.05	-.07	3.98	1.54	2.40
2032.	1.63	2.05	-.05	-.07	3.76	1.33	2.40
2032 to 2097 . . .	1.63	2.05	-.05	-.08	3.56	1.14	2.40

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

Calendar year	Annual percentage change[a] in— Productivity (Total U.S. economy)	GDP price index	Average hours worked per week	Earnings as a percent of total labor compensation	Average annual wage in covered employment: Nominal	Average annual wage in covered employment: Real	Consumer price index
Low-cost:							
2023	0.87	3.86	0.36	-0.14	4.73	0.79	3.90
2024	1.95	2.79	.07	-.11	5.82	2.71	3.02
2025	2.16	2.75	.09	-.01	6.17	3.08	3.00
2026	1.96	2.75	.06	.03	5.61	2.53	3.00
2027	1.94	2.75	.05	.04	5.34	2.27	3.00
2028	1.93	2.75	.05	.02	5.29	2.22	3.00
2029	1.93	2.75	.05	.01	5.26	2.20	3.00
2030	1.93	2.75	.05	[d]	5.25	2.19	3.00
2031	1.93	2.75	.05	.01	5.24	2.18	3.00
2032	1.93	2.75	.05	.01	5.04	1.98	3.00
2032 to 2097	1.93	2.75	.05	[d]	4.79	1.74	3.00
High-cost:							
2023	-1.71	4.16	.20	-.16	1.86	-2.58	4.56
2024	1.53	2.28	-.12	-.13	3.63	.70	2.92
2025	1.50	1.41	-.12	-.06	3.71	1.81	1.86
2026	1.41	1.35	-.14	-.04	3.44	1.61	1.80
2027	1.51	1.35	-.15	-.05	3.43	1.60	1.80
2028	1.28	1.35	-.15	-.09	2.92	1.10	1.80
2029	1.26	1.35	-.15	-.11	2.74	.92	1.80
2030	1.30	1.35	-.15	-.14	2.72	.91	1.80
2031	1.33	1.35	-.15	-.14	2.72	.90	1.80
2032	1.33	1.35	-.15	-.16	2.50	.69	1.80
2032 to 2097	1.33	1.35	-.15	-.17	2.35	.54	1.80

[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] Economic cycles are shown from peak to peak, except for the last cycle, which is not yet complete.
[c] Estimated values for 2022 vary slightly by alternative and are shown for the intermediate assumptions.
[d] Greater than -0.005 and less than 0.005 percent.

5. Labor Force, Employment, and Unemployment Projections

Employment is a fundamental component of economic output (GDP), taxable payroll, and the determination of OASDI benefit eligibility and benefit levels. U.S. employment is projected in two components: the size of the labor force (those employed or seeking employment) and the unemployment rate (the proportion of those in the labor force who are not employed). Table V.B2 provides the historical and projected rates of change in employment, which follow from the rates of change in the labor force, adjusted for the varying unemployment rates from year to year.

The model used by the Office of the Chief Actuary projects the civilian labor force by age, sex, marital status, and presence of children. Projections of the labor force participation rates reflect changes in disability prevalence, educational attainment, marriage patterns, the average level of Social Security retirement benefits, the state of the economy, and life expectancy.

The annual rate of growth in the size of the labor force decreased from an average of about 2.6 percent during the 1969-73 economic cycle and 2.7 percent during the 1973-79 cycle to 1.7 percent during the 1979-90 cycle, 1.2 percent during the 1990-2001 cycle, 1.1 percent during the 2001-07 cycle, and 0.5 percent during the 2007-19 cycle. From 2019 to 2022, during the current (incomplete) economic cycle, labor force growth averaged 0.2 percent per year, which combines the fall in the labor force during the pandemic-induced recession of 2020 and the growth in the labor force in 2021-22. Going forward, labor force growth is projected to be 0.8 percent in 2023, rising to 1.2 percent in 2024, and then converging to the long-term trend of about 0.4 percent per year by 2032. The long-term growth rate in the labor force is expected to remain subdued due to a slowing of growth in the working-age population—a consequence of the baby-boom generation reaching retirement ages and succeeding lower-birth-rate cohorts reaching working ages. Under the intermediate assumptions, the labor force is projected to increase by an average of 0.7 percent per year from 2022 to 2032 and 0.4 percent per year from 2032 to 2097.

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

Historically, labor force participation rates reflect trends in demographics and pensions. Between the mid-1960s and the mid-1980s, labor force participation rates at ages 55 and over declined for men but were fairly stable for women. 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 over roughly stabilized for men and increased for women. Since the mid-1990s, however, participation rates for both sexes at ages 55 and over have generally risen.

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

tancy. For the intermediate projections, this adjustment increases the total labor force by 3.0 percent for 2097.

For men and boys age 16 and over, the projected age-adjusted labor force participation rate[1] for 2097 is 72.8, 72.6, and 72.1 percent for the low-cost, intermediate, and high-cost assumptions, respectively. For women and girls age 16 and over, the projected age-adjusted labor force participation rate for 2097 is 62.3, 61.9, and 61.7 percent for the low-cost, intermediate, and high-cost assumptions, respectively. These age-adjusted labor force participation rates for 2097 are higher under all three alternatives than the age-adjusted rates for 2021 of 70.3 percent for men and boys and 58.8 percent for women and girls (based on actual age-specific rates published by the Bureau of Labor Statistics), primarily due to the Trustees' projected increases in life expectancy, as well as the rise in educational attainment for women.

The total civilian unemployment rates are presented in table V.B2. For years through 2032, the table presents total civilian rates without adjustment for the changing age-sex distribution of the population. For years after 2032, the table presents age-sex-adjusted rates, using the age-sex distribution of the 2011 civilian labor force. Age-sex-adjusted rates allow for more meaningful comparisons across longer time periods.

The total civilian unemployment rate reflects the projected levels of unemployment for various age-sex groups of the population. Each group's unemployment rate gradually approaches an assumed stable value within the first ten years of the projection period for all alternatives, and thus the total age-sex-adjusted civilian unemployment rate reaches its ultimate assumed value within the first ten years of the projection period.

The assumed ultimate age-sex-adjusted unemployment rate is 3.5, 4.5, and 5.5 percent for the low-cost, intermediate, and high-cost assumptions, respectively. These values are unchanged from the 2022 report. The Trustees assume that, as economic growth slows temporarily due to anti-inflationary measures, the unemployment rate will increase from 3.7 percent for 2022 to 4.7 percent in 2024, and then gradually decline to reach the assumed 4.5 percent for 2027 under the intermediate assumptions. Under the low-cost assumptions, the unemployment rate is projected to rise to 3.8 percent in 2023 and 2024 before declining to the ultimate unemployment rate of 3.5 percent in 2026. Under the high-cost assumptions, due to the assumed economic recession, the unemployment rate increases further to 6.3 percent

[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.

in 2024, with the age-sex-adjusted rate then gradually decreasing to the ultimate unemployment rate of 5.5 percent in 2027.[1]

6. Gross Domestic Product Projections

The value of real GDP is equal to the product of three components: (1) productivity (i.e., output per hour worked), (2) average weekly total employment,[2] and (3) average hours worked per week, times 52. Consequently, the growth rate in real GDP is equal to the combined growth rates for productivity, total employment, and average hours worked. For the period from 1969 to 2019, which covers the last six complete economic cycles, the average annual growth in real GDP was 2.7 percent, combining average growth rates of 1.6 percent for productivity, 1.3 percent for total employment, and -0.2 percent for average hours worked ($1.027 = 1.016 \times 1.013 \times 0.998$). The real GDP growth rate was -2.8 percent for 2020, 5.9 percent for 2021, and is estimated to be 1.9 percent for 2022 under the intermediate assumptions.

For the intermediate assumptions, the average annual growth in real GDP is 1.9 percent from 2022 to 2032, combining the average growth rates of 1.37 percent for productivity, 0.58 percent for total employment, and -0.01 percent for average hours worked. The projected average annual growth in real GDP of 1.9 percent from 2022 to 2032 is approximately equal to the underlying sustainable trend rate, but it is slightly slower for 2023 through 2024 and slightly faster for 2025 through 2027. After 2032, the annual growth in real GDP follows the sustainable trend rate and averages 2.0 percent, which combines the projected ultimate annual growth rate of 1.63 percent for productivity, average annual growth rate of 0.40 percent for total employment, and the ultimate annual growth rate of -0.05 percent for average hours worked per week. The projected growth rate of real GDP is lower than the past average growth rate mainly because the working-age population is expected to grow more slowly than in the past.

For the low-cost assumptions, the annual growth in real GDP averages 2.9 percent from 2022 to 2032 and 2.7 percent from 2032 to 2097. For the high-cost assumptions, the annual growth in real GDP averages 1.2 percent from 2022 to 2032 and 1.2 percent from 2032 to 2097.

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[1] The assumed ultimate unemployment rates are age-sex-adjusted rates. For the intermediate assumptions, the age-sex-adjusted unemployment rate in 2027 through 2032 is 4.5, while the unadjusted rate is 4.4 for 2029 through 2032, as shown in table V.B2. For the high-cost assumptions, the age-sex-adjusted unemployment rate in 2027 through 2032 is 5.5 percent, while the unadjusted rate is 5.4 percent for 2028 through 2032.

[2] Average weekly total employment is the sum of average weekly U.S. civilian employment, which can be expressed as a product of the total civilian labor force and the complement of the unemployment rate, and U.S. Armed Forces.

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 compounded semiannually, or at redemption if sooner. 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 six complete economic cycles. For the period from 1969 to 2019, the real interest rate averaged 2.4 percent per year. The real interest rate averaged 1.6, -1.0, 5.1, 4.1, 2.0, and 0.8 percent per year over the economic cycles 1969-73, 1973-79, 1979-90, 1990-2001, 2001-07, and 2007-19, respectively. The assumed ultimate real interest rate is 2.8 percent, 2.3 percent, and 1.8 percent for the low-cost, intermediate, and high-cost assumptions, respectively. These rates are unchanged from the 2022 report.

The average annual nominal interest rate was approximately 1.4 percent for securities newly issuable in 2021, implying an effective annual yield of 1.4 percent for securities held one year. The CPI rose from 2021 to 2022 by approximately 8.5 percent. The annual real interest rate for 2022 was therefore -6.6 percent (1.014/1.085 = 0.935 = 1 – 0.0656). From 2022 to 2032, projected nominal interest rates depend on changes in the economic cycle and in the CPI. When combined with the ultimate CPI assumptions of 3.0, 2.4, and 1.8 percent, the assumed ultimate real interest rates produce an ultimate nominal interest rate of 5.8 percent for the low-cost assumptions, 4.7 percent for the intermediate assumptions, and 3.6 percent for the high-cost assumptions. These nominal rates for newly issued trust fund securities reach their ultimate levels by 2032.

Table V.B2.—Additional Economic Factors

Calendar year	Average annual unemployment rate[a]	Annual percentage change[b] in—			Average annual interest rate	
		Labor force[c]	Total employment[d]	Real GDP[e]	Nominal[f]	Real[g]
Historical data:						
5-year periods:						
1960 to 1965	5.5	1.3	1.6	5.1	4.0	2.5
1965 to 1970	3.9	2.2	2.1	3.5	5.9	1.0
1970 to 1975	6.1	2.5	1.5	2.7	6.7	[h]
1975 to 1980	6.8	2.7	2.9	3.7	8.5	-.9
1980 to 1985	8.3	1.5	1.5	3.3	12.1	6.9
1985 to 1990	5.9	1.7	2.0	3.3	8.5	5.1
1990 to 1995	6.6	1.0	.9	2.6	7.0	4.3
1995 to 2000	4.6	1.5	1.8	4.3	6.2	3.9
2000 to 2005	5.4	.9	.7	2.6	4.6	2.4
2005 to 2010	6.8	.6	-.4	1.0	3.8	1.8
2010 to 2015	7.2	.4	1.3	2.1	2.0	.5
2015 to 2020	5.0	.5	-.2	1.3	2.0	.5
Economic cycles:[i]						
1969 to 1973	5.3	2.6	1.8	3.6	6.5	1.6
1973 to 1979	6.8	2.7	2.4	3.0	7.7	-1.0
1979 to 1990	7.1	1.7	1.7	3.0	10.3	5.1
1990 to 2001	5.5	1.2	1.2	3.2	6.5	4.1
2001 to 2007	5.3	1.1	1.1	2.8	4.5	2.0
2007 to 2019	6.4	.5	.6	1.7	2.4	.8
2019 to 2022[j]	5.7	.2	.1	1.6	1.8	-3.3
Single years:						
2012	8.1	.9	1.8	2.3	1.5	.3
2013	7.4	.3	1.0	1.8	1.9	.1
2014	6.2	.3	1.6	2.3	2.3	.4
2015	5.3	.8	1.7	2.7	2.0	2.7
2016	4.9	1.3	1.7	1.7	1.8	1.0
2017	4.4	.7	1.2	2.2	2.3	-.3
2018	3.9	1.1	1.6	2.9	2.9	-.2
2019	3.7	.9	1.1	2.3	2.2	1.2
2020	8.1	-1.7	-6.2	-2.8	1.0	1.0
2021	5.4	.3	3.2	5.9	1.4	-4.1
2022[j]	3.7	1.9	3.7	1.9	3.0	-6.6

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:						
2023	4.3	0.8	0.2	0.7	3.5	-1.0
2024	4.7	1.2	.7	1.8	3.5	1.0
2025	4.6	1.0	1.0	2.4	3.6	1.1
2026	4.6	.8	.9	2.3	3.7	1.2
2027	4.5	.7	.8	2.2	3.9	1.3
2028	4.5	.5	.5	2.0	4.2	1.5
2029	4.4	.4	.4	2.0	4.4	1.8
2030	4.4	.4	.4	2.0	4.6	2.0
2031	4.4	.4	.4	2.0	4.6	2.2
2032	4.4	.4	.4	2.0	4.7	2.2
2035	4.5	.4	.4	2.0	4.7	2.3
2040	4.5	.3	.3	1.9	4.7	2.3
2045	4.5	.3	.3	1.9	4.7	2.3
2050	4.5	.4	.4	2.0	4.7	2.3
2055	4.5	.4	.4	2.0	4.7	2.3
2060	4.5	.4	.4	2.0	4.7	2.3
2065	4.5	.4	.4	2.0	4.7	2.3
2070	4.5	.3	.3	1.9	4.7	2.3
2075	4.5	.4	.4	1.9	4.7	2.3
2080	4.5	.4	.4	2.0	4.7	2.3
2085	4.5	.5	.5	2.1	4.7	2.3
2090	4.5	.5	.5	2.1	4.7	2.3
2095	4.5	.5	.5	2.1	4.7	2.3
2100	4.5	.4	.4	2.0	4.7	2.3
Low-cost:						
2023	3.8	1.1	1.0	2.2	4.2	-.9
2024	3.8	1.5	1.5	3.5	4.4	1.2
2025	3.6	1.4	1.6	3.9	4.8	1.4
2026	3.5	.9	1.0	3.0	5.1	1.8
2027	3.5	.8	.8	2.8	5.5	2.1
2028	3.5	.7	.7	2.7	5.5	2.5
2029	3.5	.6	.6	2.6	5.5	2.5
2030	3.5	.6	.6	2.6	5.5	2.5
2031	3.5	.6	.6	2.6	5.7	2.5
2032	3.5	.6	.6	2.5	5.8	2.7
2035	3.5	.6	.6	2.6	5.8	2.8
2040	3.5	.5	.5	2.5	5.8	2.8
2045	3.5	.6	.6	2.6	5.8	2.8
2050	3.5	.7	.7	2.7	5.8	2.8
2055	3.5	.7	.7	2.7	5.8	2.8
2060	3.5	.7	.7	2.7	5.8	2.8
2065	3.5	.6	.6	2.6	5.8	2.8
2070	3.5	.6	.6	2.6	5.8	2.8
2075	3.5	.7	.7	2.7	5.8	2.8
2080	3.5	.7	.7	2.7	5.8	2.8
2085	3.5	.8	.8	2.8	5.8	2.8
2090	3.5	.8	.8	2.8	5.8	2.8
2095	3.5	.7	.7	2.7	5.8	2.8
2100	3.5	.7	.7	2.7	5.8	2.8

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

Calendar year	Average annual unemployment rate[a]	Annual percentage change[b] in— Labor force[c]	Total employment[d]	Real GDP[e]	Average annual interest rate Nominal[f]	Real[g]
High-cost:						
2023	4.9	0.6	-0.7	-2.2	3.4	-1.5
2024	6.3	.8	-.6	.8	2.9	.5
2025	6.0	.8	1.1	2.5	2.8	1.0
2026	5.7	.7	1.0	2.3	3.0	1.0
2027	5.5	.5	.7	2.1	3.2	1.2
2028	5.4	.3	.4	1.5	3.2	1.4
2029	5.4	.3	.3	1.4	3.3	1.4
2030	5.4	.2	.2	1.4	3.4	1.5
2031	5.4	.2	.2	1.4	3.5	1.6
2032	5.4	.2	.2	1.4	3.6	1.7
2035	5.5	.2	.2	1.4	3.6	1.8
2040	5.5	.2	.2	1.3	3.6	1.8
2045	5.5	[h]	[h]	1.2	3.6	1.8
2050	5.5	[h]	[h]	1.2	3.6	1.8
2055	5.5	[h]	[h]	1.2	3.6	1.8
2060	5.5	[h]	[h]	1.2	3.6	1.8
2065	5.5	[h]	[h]	1.1	3.6	1.8
2070	5.5	-.1	-.1	1.1	3.6	1.8
2075	5.5	-.1	-.1	1.1	3.6	1.8
2080	5.5	-.1	-.1	1.1	3.6	1.8
2085	5.5	-.1	-.1	1.1	3.6	1.8
2090	5.5	[h]	[h]	1.1	3.6	1.8
2095	5.5	[h]	[h]	1.2	3.6	1.8
2100	5.5	[h]	[h]	1.1	3.6	1.8

[a] The Office of the Chief Actuary adjusts the civilian unemployment rates for 2033 and later to the age-sex distribution of the civilian labor force in 2011. For years through 2032, the values are the total rates without adjustment for the changing age-sex distribution.

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

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

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

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

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

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

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

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

[j] Estimated values for 2022 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 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 2032. Projected values for future years depend on the economic assumptions described in the preceding section of this report.

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

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

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

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

- *The annual levels of and percentage increases in the AWI.* Under section 215(b)(3) of the Social Security Act, Social Security benefit computations index taxable earnings (for most workers first becoming eligible for benefits in 1979 or later) using the AWI for each year after 1950. This procedure converts a worker's past earnings to approximately average-wage-indexed equivalent values near the time of his or her benefit eligibility. Other program parameters presented in this section that are subject to the automatic-adjustment provisions also rely on the AWI.
- *The wage-indexed contribution and benefit base.* For any year, the contribution and benefit base is the maximum amount of earnings subject to the OASDI payroll tax and creditable toward benefit computation. The Social Security Act defers any increase in the contribution and benefit base if there is no cost-of-living adjustment effective for December of the preceding year. There was no increase in the contribution and benefit base for 2010, 2011, or 2016 because there was no cost-of-living adjustment for the immediate prior December in each case. Under all three sets of assumptions, the contribution and benefit base is projected to increase for all future years.
- *The wage-indexed retirement earnings test exempt amounts.* The exempt amounts are the annual amount of earnings below which beneficiaries do not have benefits withheld. A lower exempt amount applies for years prior to the year of attaining normal retirement age. A higher exempt amount applies beginning with the year in which a beneficiary attains normal retirement age. Starting in 2000, the retirement earnings test no longer applies beginning with the month of attaining normal retirement age. The Social Security Act defers any increase in these exempt amounts if there is no cost-of-living adjustment effective for December of the preceding year. There was no increase in these exempt amounts for 2010, 2011, or 2016 because there was no cost-of-living adjustment for the immediate prior December. Under all three sets of assumptions, the exempt amounts increase for all future years.

Table V.C1.—Cost-of-Living Benefit Increases, Average Wage Index, Contribution and Benefit Bases, and Retirement Earnings Test Exempt Amounts, 1975-2032

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
2015	.0	48,098.63	3.5	118,500	15,720	41,880
2016	.3	48,642.15	1.1	118,500	15,720	41,880
2017	2.0	50,321.89	3.5	127,200	16,920	44,880
2018	2.8	52,145.80	3.6	128,400	17,040	45,360
2019	1.6	54,099.99	3.7	132,900	17,640	46,920
2020	1.3	55,628.60	2.8	137,700	18,240	48,600
2021	5.9	60,575.07	8.9	142,800	18,960	50,520

Table V.C1.—Cost-of-Living Benefit Increases, Average Wage Index, Contribution and Benefit Bases, and Retirement Earnings Test Exempt Amounts, 1975-2032 (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]
Intermediate:						
2022	[g]8.7	$63,467.98	4.8	[g]$147,000	[g]$19,560	[g]$51,960
2023	3.3	66,147.17	4.2	[g]160,200	[g]21,240	[g]56,520
2024	2.4	68,627.58	3.7	167,700	22,200	59,160
2025	2.4	71,411.99	4.1	174,900	23,160	61,680
2026	2.4	74,348.48	4.1	181,200	24,000	64,080
2027	2.4	77,393.67	4.1	188,700	25,080	66,600
2028	2.4	80,510.73	4.0	196,500	26,040	69,360
2029	2.4	83,757.03	4.0	204,600	27,120	72,240
2030	2.4	87,106.49	4.0	212,700	28,200	75,120
2031	2.4	90,574.48	4.0	221,400	29,400	78,120
2032	2.4	93,995.33	3.8	230,100	30,480	81,240
Low-cost:						
2022	[g]8.7	63,432.25	4.7	[g]147,000	[g]19,560	[g]51,960
2023	3.1	66,442.68	4.7	[g]160,200	[g]21,240	[g]56,520
2024	3.0	70,258.88	5.7	167,700	22,200	59,160
2025	3.0	74,575.71	6.1	175,500	23,280	62,040
2026	3.0	78,782.82	5.6	185,700	24,600	65,520
2027	3.0	83,005.63	5.4	197,100	26,160	69,600
2028	3.0	87,405.28	5.3	208,200	27,600	73,560
2029	3.0	92,010.68	5.3	219,300	29,040	77,400
2030	3.0	96,841.91	5.3	231,000	30,600	81,600
2031	3.0	101,915.61	5.2	243,000	32,280	85,800
2032	3.0	107,046.81	5.0	255,900	33,960	90,360
High-cost:						
2022	[g]8.7	63,460.05	4.8	[g]147,000	[g]19,560	[g]51,960
2023	4.0	64,726.55	2.0	[g]160,200	[g]21,240	[g]56,520
2024	2.6	67,055.34	3.6	167,700	22,200	59,160
2025	1.8	69,534.32	3.7	171,000	22,680	60,360
2026	1.8	71,952.76	3.5	177,300	23,520	62,520
2027	1.8	74,431.84	3.4	183,600	24,360	64,920
2028	1.8	76,626.52	2.9	190,200	25,200	67,080
2029	1.8	78,738.96	2.8	196,800	26,040	69,480
2030	1.8	80,892.11	2.7	202,500	26,880	71,520
2031	1.8	83,098.17	2.7	207,900	27,600	73,440
2032	1.8	85,191.64	2.5	213,600	28,320	75,480

[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.

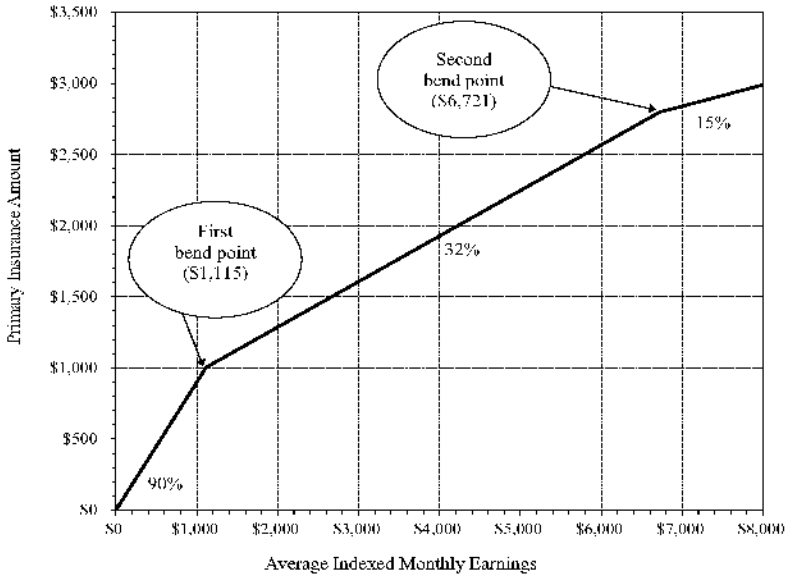
[f] Originally determined as 2.4 percent. Pursuant to Public Law 106-554, effectively 2.5 percent.

[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 2023, and also shows projected values through 2032. These other wage-indexed program parameters are:

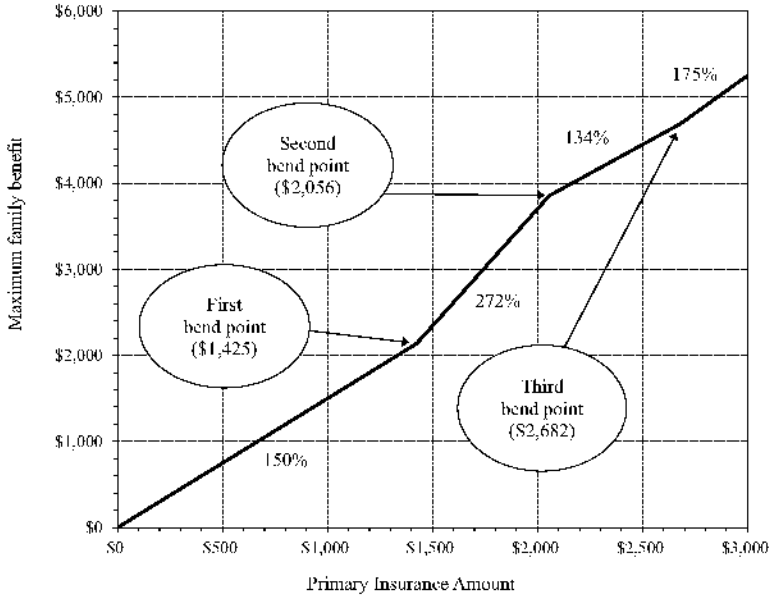
- *The bend points in the formula for computing the primary insurance amount (PIA) for workers who reach age 62, become disabled, or die in a given year.* As figure V.C1 illustrates, these two bend points define three ranges in a worker's average indexed monthly earnings (AIME). The formula for the worker's 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 2023



- *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 2023



- *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 1978-2032

Calendar year	AIME bend points in PIA formula[a]		PIA bend points in OASI maximum-family-benefit formula[b]			Earnings required for a quarter of coverage	Old-law contribution and benefit base[c]
	First	Second	First	Second	Third		
Historical data:							
1978	d	d	d	d	d	[e] $250	[e] $17,700
1979	[c] $180	[c] $1,085	[c] $230	[c] $332	[c] $433	260	18,900
1980	194	1,171	248	358	467	290	20,400
1981	211	1,274	270	390	508	310	22,200
1982	230	1,388	294	425	554	340	24,300
1983	254	1,528	324	468	610	370	26,700
1984	267	1,612	342	493	643	390	28,200
1985	280	1,691	358	517	675	410	29,700
1986	297	1,790	379	548	714	440	31,500
1987	310	1,866	396	571	745	460	32,700
1988	319	1,922	407	588	767	470	33,600
1989	339	2,044	433	626	816	500	35,700
1990	356	2,145	455	656	856	520	38,100
1991	370	2,230	473	682	890	540	39,600
1992	387	2,333	495	714	931	570	41,400
1993	401	2,420	513	740	966	590	42,900
1994	422	2,545	539	779	1,016	620	45,000
1995	426	2,567	544	785	1,024	630	45,300
1996	437	2,635	559	806	1,052	640	46,500
1997	455	2,741	581	839	1,094	670	48,600
1998	477	2,875	609	880	1,147	700	50,700
1999	505	3,043	645	931	1,214	740	53,700
2000	531	3,202	679	980	1,278	780	56,700
2001	561	3,381	717	1,034	1,349	830	59,700
2002	592	3,567	756	1,092	1,424	870	63,000
2003	606	3,653	774	1,118	1,458	890	64,500
2004	612	3,689	782	1,129	1,472	900	65,100
2005	627	3,779	801	1,156	1,508	920	66,900
2006	656	3,955	838	1,210	1,578	970	69,900
2007	680	4,100	869	1,255	1,636	1,000	72,600
2008	711	4,288	909	1,312	1,711	1,050	75,900
2009	744	4,483	950	1,372	1,789	1,090	79,200
2010	761	4,586	972	1,403	1,830	1,120	79,200
2011	749	4,517	957	1,382	1,803	1,120	79,200
2012	767	4,624	980	1,415	1,845	1,130	81,900
2013	791	4,768	1,011	1,459	1,903	1,160	84,300
2014	816	4,917	1,042	1,505	1,962	1,200	87,000
2015	826	4,980	1,056	1,524	1,987	1,220	88,200
2016	856	5,157	1,093	1,578	2,058	1,260	88,200
2017	885	5,336	1,131	1,633	2,130	1,300	94,500
2018	895	5,397	1,144	1,651	2,154	1,320	95,400
2019	926	5,583	1,184	1,708	2,228	1,360	98,700
2020	960	5,785	1,226	1,770	2,309	1,410	102,300
2021	996	6,002	1,272	1,837	2,395	1,470	106,200
2022	1,024	6,172	1,308	1,889	2,463	1,510	109,200
2023	1,115	6,721	1,425	2,056	2,682	1,640	118,800
Intermediate:							
2024	1,168	7,042	1,493	2,155	2,810	1,720	124,500
2025	1,218	7,339	1,556	2,246	2,929	1,790	129,900
2026	1,263	7,614	1,614	2,330	3,039	1,860	134,700
2027	1,314	7,923	1,680	2,424	3,162	1,930	140,100
2028	1,368	8,249	1,749	2,524	3,292	2,010	145,800
2029	1,425	8,587	1,820	2,627	3,427	2,100	151,800
2030	1,482	8,932	1,894	2,733	3,565	2,180	158,100
2031	1,542	9,293	1,970	2,843	3,708	2,270	164,400
2032	1,603	9,664	2,049	2,957	3,857	2,360	171,000

Table V.C2.—Values for Selected Wage-Indexed Program Parameters, Calendar Years 1978-2032 (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:							
2024	$1,168	$7,038	$1,492	$2,153	$2,809	$1,720	$124,500
2025	1,223	7,372	1,563	2,256	2,942	1,800	130,500
2026	1,293	7,795	1,652	2,385	3,111	1,900	138,000
2027	1,373	8,274	1,754	2,532	3,302	2,020	146,400
2028	1,450	8,741	1,853	2,675	3,488	2,130	154,500
2029	1,528	9,209	1,952	2,818	3,675	2,250	162,900
2030	1,609	9,697	2,056	2,967	3,870	2,370	171,600
2031	1,694	10,208	2,164	3,124	4,074	2,490	180,600
2032	1,782	10,744	2,278	3,288	4,288	2,620	189,900
High-cost:							
2024	1,168	7,041	1,492	2,154	2,810	1,720	124,500
2025	1,191	7,181	1,522	2,197	2,866	1,750	126,900
2026	1,234	7,440	1,577	2,276	2,969	1,820	131,700
2027	1,280	7,715	1,635	2,361	3,079	1,880	136,500
2028	1,324	7,983	1,692	2,443	3,186	1,950	141,300
2029	1,370	8,258	1,751	2,527	3,296	2,020	146,100
2030	1,410	8,501	1,802	2,601	3,393	2,080	150,300
2031	1,449	8,736	1,852	2,673	3,486	2,130	154,500
2032	1,489	8,975	1,902	2,746	3,582	2,190	158,700

[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-worker beneficiaries first eligible after 1978 and entitled before July 1980.

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

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

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

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

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

Year of birth	Year of attainment of age 62	Normal retirement age (NRA)	Credit for each year of delayed retirement after NRA (percent)	Benefit, as a percentage of PIA, beginning at age — 62	65	66	67	70
1924	1986	65	3	80	100	103	106	115
1925	1987	65	3 1/2	80	100	103 1/2	107	117 1/2
1926	1988	65	3 1/2	80	100	103 1/2	107	117 1/2
1927	1989	65	4	80	100	104	108	120
1928	1990	65	4	80	100	104	108	120
1929	1991	65	4 1/2	80	100	104 1/2	109	122 1/2
1930	1992	65	4 1/2	80	100	104 1/2	109	122 1/2
1931	1993	65	5	80	100	105	110	125
1932	1994	65	5	80	100	105	110	125
1933	1995	65	5 1/2	80	100	105 1/2	111	127 1/2
1934	1996	65	5 1/2	80	100	105 1/2	111	127 1/2
1935	1997	65	6	80	100	106	112	130
1936	1998	65	6	80	100	106	112	130
1937	1999	65	6 1/2	80	100	106 1/2	113	132 1/2
1938	2000	65. 2 mo	6 1/2	79 1/6	98 8/9	105 5/12	111 11/12	131 5/12
1939	2001	65. 4 mo	7	78 1/3	97 7/9	104 2/3	111 2/3	132 2/3
1940	2002	65, 6 mo	7	77 1/2	96 2/3	103 1/2	110 1/2	131 1/2
1941	2003	65, 8 mo	7 1/2	76 2/3	95 5/9	102 1/2	110	132 1/2
1942	2004	65, 10 mo	7 1/2	75 5/6	94 4/9	101 1/4	108 3/4	131 1/4
1943-54	2005-16	66	8	75	93 1/3	100	108	132
1955	2017	66, 2 mo	8	74 1/6	92 2/9	98 8/9	106 2/3	130 2/3
1956	2018	66, 4 mo	8	73 1/3	91 1/9	97 7/9	105 1/3	129 1/3
1957	2019	66, 6 mo	8	72 1/2	90	96 2/3	104	128
1958	2020	66. 8 mo	8	71 2/3	88 8/9	95 5/9	102 2/3	126 2/3
1959	2021	66, 10 mo	8	70 5/6	87 7/9	94 4/9	101 1/3	125 1/3
1960 & later	2022 & later	67	8	70	86 2/3	93 1/3	100	124

2. Covered Employment

Projections of the total U.S. civilian labor force and unemployment rate (see table V.B2) are based on Bureau of Labor Statistics definitions from the Current Population Survey (CPS). These projections represent the average weekly number of employed and unemployed persons, age 16 and over, in the U.S. in a calendar year. Covered employment for a calendar year is defined as the total number of persons who have any OASDI covered earnings (that is, earnings subject to the OASDI payroll tax) at any time during that year. For those age 16 and over, projected covered employment is the sum of age-sex groups, each reflecting the growth projected for the group's total U.S employment and average weeks worked per year.[1] For the short-range period, the age-sex-adjusted average weeks worked declines slightly as the age-sex-adjusted unemployment rate rises to its ultimate assumed value of 4.5 percent. After 2032, the average weeks worked for each age-sex group

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

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

The covered-worker rate is the ratio of OASDI covered workers to the Social Security area population. For men and boys age 16 and over, the projected age-adjusted covered-worker rates[1] for 2097 are 69.7, 69.8, and 69.6 percent for the low-cost, intermediate, and high-cost assumptions, respectively. For women and girls age 16 and over, the projected age-adjusted covered-worker rates for 2097 are 66.8, 66.1, and 65.7 percent for the low-cost, intermediate, and high-cost assumptions, respectively. An important factor in the variation among the projected rates for the three alternatives is the portion of the men and women in the population that is projected to be other-than-LPR immigrants. For men and boys, the intermediate projected rate for 2097 is lower than the 2021 age-adjusted rate of 71.0 percent primarily due to the projected increase in the portion of the Social Security area population that consists of other-than-LPR immigrants. For women and girls, the intermediate projected rate for 2097 is higher than the 2021 age-adjusted rate of 64.8 percent because the projected increase in the age-adjusted labor force participation rate more than offsets the projected increase in the portion of the population that will be other-than-LPR immigrants.

3. Insured Population

Eligibility for worker benefits under the OASDI program requires some threshold level of work in covered employment. A worker satisfies this requirement by his or her accumulation of quarters of coverage (QCs). Prior to 1978, a worker earned one QC for each calendar quarter in which he or she earned at least $50. In 1978, when annual earnings reporting replaced quarterly reporting, the amount required to earn a QC (up to a maximum of four per year) was set at $250. As specified in the law, the Social Security Administration has adjusted this amount each year since then according to changes in the AWI. Its value in 2023 is $1,640.

There are three types of insured status that a worker can earn under the OASDI program. The number and recency of QCs earned determine each

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

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

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

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

The long-range fully insured model uses 30,000 simulated work histories for each sex and birth cohort, representing everyone except the other-than-LPR

immigrant population.[1] For the other-than-LPR immigrant population, the model generates substantially lower percentages attaining fully insured status. The model constructs simulated work histories using past coverage rates, earnings distributions, and amounts required for crediting QCs, and develops them in a manner that replicates historical individual variations in work patterns. The probability of covered employment in any year is assumed to be higher for those who have worked more consistently in the recent past. Model parameters are selected so that simulated fully insured percentages are consistent with the fully insured percentages estimated by the short-range model for the recent historical period.

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

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

Using these insured models, the percentage of the Social Security area population aged 62 and over that is fully insured is projected to change from its estimated level of 88.5 for December 31, 2020, to 86.8, 88.6, and 90.9 for December 31, 2100, under the low-cost, intermediate, and high-cost alternatives, respectively. Over the projection period, the percentages for both men and women change significantly. The percentage for men declines, reflecting, in part, increases in the percent of the population that is classified as other-than-LPR immigrants and is thus less likely to have earnings reported and credited to them. The percentage for women increases, reflecting the past substantial growth in the employment of younger cohorts of women. Under the intermediate assumptions, for example, the percentage for men

[1] Those granted legal work authorization through the 2012 Deferred Action for Childhood Arrivals program are included in the simulations.

decreases from 94.1 to 87.7, and the percentage for women increases from 83.9 to 89.4.

4. Old-Age and Survivors Insurance Beneficiaries

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

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

The long-range model projects the number of retired-worker beneficiaries who were not previously converted from disabled-worker beneficiary status as a percentage of the exposed population.[1] For age 62, the model projects this percentage by using a linear regression based on the historical relationship between this percentage, the employment rate[2] 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 beneficia-

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

[2] The employment rate is the ratio of U.S. civilian employment to the civilian noninstitutional population.

ries 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 eligibility—that is, the probabilities that: (1) the earner is 62 or over, (2) the earner is insured, (3) the earner is receiving benefits, (4) the spouse is not receiving a benefit for the care of an entitled child, (5) the spouse is either not insured or is insured but not receiving benefits, and (6) the spouse is not eligible to receive a significant government pension based on earnings from noncovered employment. To calculate the estimated number of aged-spouse beneficiaries, the model applies a projected prevalence rate to the resulting number of spouses. Due to the Bipartisan Budget Act of 2015, for those turning age 62 in 2016 and later, deemed filing now applies to all retired workers and spouses even after initial entitlement, regardless of age. Thus, spouses who are insured are no longer eligible to delay their retired-worker benefit while receiving an aged-spouse benefit.

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

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

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

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

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

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

tional factors representing the probability that the person's former earner spouse has died and that the marriage lasted at least 10 years. The model projects the number of insured aged-widow(er) beneficiaries who are ages 60 through 71 in a manner similar to that for uninsured aged-widow(er) beneficiaries. In addition, the model assumes that some insured widow(er)s who had not applied for their retired-worker benefits will receive widow(er) benefits. The model projects insured aged-widow(er) beneficiaries over age 71 by applying termination rates to the population that started receiving such benefits prior to age 71.

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

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

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

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

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

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

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

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

Table V.C4.—OASI Beneficiaries With Benefits in Current-Payment Status at the End of Calendar Years 1945-2100
[In thousands]

	Retired workers and auxiliaries			Survivors				
Calendar year	Worker[a]	Spouse	Child	Widow-widower	Mother-father	Child	Parent	Total
Historical data:								
1945	518	159	13	94	121	377	6	1,288
1950	1,771	508	46	314	169	653	15	3,477
1955	4,474	1,192	122	701	292	1,154	25	7,961
1960	8,061	2,269	268	1,544	401	1,577	36	14,157
1965	11,101	2,614	461	2,371	472	2,074	35	19,128
1970	13,349	2,668	546	3,227	523	2,688	29	23,030
1975	16,589	2,867	643	3,888	582	2,919	21	27,509
1980	19,564	3,018	639	4,415	563	2,610	15	30,823
1985	22,435	3,069	456	4,862	372	1,918	10	33,122
1990	24,841	3,104	421	5,098	304	1,777	6	35,551
1995	26,679	3,027	441	5,213	275	1,884	4	37,522
2000	28,505	2,798	459	4,901	203	1,878	3	38,747
2005	30,461	2,524	488	4,569	178	1,903	2	40,126
2010	34,593	2,316	580	4,285	159	1,913	2	43,847
2015	40,089	2,335	648	4,050	140	1,893	1	49,155
2016	41,233	2,370	661	4,004	133	1,893	1	50,296
2017	42,447	2,375	675	3,961	128	1,904	1	51,491
2018	43,721	2,391	690	3,908	121	1,911	1	52,743
2019	45,094	2,430	701	3,878	117	1,916	1	54,137
2020	46,330	2,523	704	3,823	115	1,936	1	55,231
2021	47,293	2,165	687	3,773	114	1,976	1	56,009
2022	48,588	2,022	682	3,728	112	2,020	1	57,152
Intermediate:								
2023	50,059	1,858	712	3,695	109	2,041	1	58,476
2025	52,853	1,750	755	3,643	105	2,056	1	61,163
2030	59,486	1,626	865	3,520	95	2,111	1	67,705
2035	63,776	1,561	972	3,289	106	2,151	1	71,855
2040	66,187	1,415	1,092	3,002	127	2,194	1	74,018
2045	67,417	1,317	1,217	2,800	133	2,225	1	75,109
2050	69,190	1,287	1,308	2,664	131	2,214	1	76,796

Table V.C4.—OASI Beneficiaries With Benefits in Current-Payment Status at the End of Calendar Years 1945-2100 (Cont.)
[In thousands]

	Retired workers and auxiliaries			Survivors				
Calendar year	Worker[a]	Spouse	Child	Widow-widower	Mother-father	Child	Parent	Total
Intermediate (Cont.):								
2055	71,765	1,280	1,381	2,560	128	2,178	1	79,292
2060	75,341	1,262	1,464	2,475	123	2,115	1	82,778
2065	78,638	1,251	1,494	2,424	120	2,062	1	85,989
2070	81,810	1,252	1,521	2,405	118	2,041	1	89,149
2075	84,845	1,262	1,558	2,383	117	2,043	1	92,209
2080	86,757	1,264	1,570	2,335	116	2,041	1	94,084
2085	87,626	1,268	1,574	2,277	114	2,022	1	94,881
2090	88,032	1,288	1,573	2,236	111	1,992	1	95,233
2095	89,429	1,327	1,615	2,219	108	1,964	1	96,664
2100	92,017	1,378	1,669	2,221	106	1,942	1	99,333
Low-cost:								
2023	50,029	1,858	714	3,692	110	2,046	1	58,449
2025	52,739	1,750	760	3,637	106	2,074	1	61,066
2030	59,016	1,633	884	3,503	100	2,186	1	67,322
2035	62,533	1,545	1,005	3,336	105	2,349	1	70,874
2040	64,067	1,397	1,152	3,074	128	2,528	1	72,346
2045	64,500	1,284	1,302	2,891	137	2,662	1	72,778
2050	65,508	1,227	1,411	2,765	139	2,727	1	73,778
2055	67,423	1,187	1,502	2,659	140	2,753	1	75,664
2060	70,367	1,146	1,619	2,564	140	2,756	1	78,593
2065	73,048	1,115	1,676	2,502	143	2,789	1	81,273
2070	75,501	1,098	1,721	2,477	148	2,881	1	83,828
2075	77,747	1,090	1,785	2,452	155	3,005	1	86,234
2080	78,899	1,070	1,814	2,411	160	3,111	1	87,467
2085	79,123	1,050	1,832	2,375	163	3,180	1	87,724
2090	79,424	1,056	1,848	2,384	166	3,234	1	88,112
2095	81,729	1,096	1,952	2,436	169	3,296	1	90,680
2100	85,763	1,140	2,063	2,506	174	3,377	1	95,023
High-cost:								
2023	50,098	1,858	711	3,699	109	2,036	1	58,511
2025	52,999	1,750	751	3,652	104	2,038	1	61,294
2030	60,109	1,621	847	3,544	90	2,029	1	68,243
2035	65,450	1,594	930	3,224	101	1,923	1	73,223
2040	69,088	1,450	1,010	2,889	114	1,815	1	76,366
2045	71,537	1,373	1,098	2,645	116	1,744	1	78,514
2050	74,439	1,370	1,169	2,477	109	1,671	1	81,236
2055	77,950	1,394	1,224	2,352	101	1,592	1	84,613
2060	82,358	1,405	1,265	2,252	92	1,493	1	88,865
2065	86,407	1,416	1,258	2,201	83	1,398	1	92,764
2070	90,340	1,446	1,253	2,178	76	1,322	1	96,616
2075	94,108	1,485	1,250	2,158	71	1,265	1	100,338
2080	96,708	1,516	1,234	2,111	66	1,217	1	102,851
2085	98,097	1,528	1,216	2,036	61	1,167	1	104,105
2090	98,223	1,537	1,189	1,953	56	1,115	1	104,073
2095	97,792	1,545	1,170	1,875	51	1,065	1	103,498
2100	97,694	1,567	1,165	1,833	47	1,017	1	103,323

[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. Components may not sum to totals because of rounding.