G. LONG-RANGE SENSITIVITY ANALYSIS

This section presents estimates which illustrate the sensitivity of the long-range actuarial balance of the OASDI program to changes in selected individual assumptions. The estimates based on the three alternative sets of assumptions (see sections II.D and II.F.2) illustrate the effects of varying all of the principal assumptions simultaneously in order to portray a generally more optimistic or pessimistic future, in terms of the financial status of the OASDI program. In the sensitivity analysis presented in this section, the intermediate alternative II is used as the reference point, and one assumption at a time is varied within that alternative. Similar variations in the selected assumptions within the other alternatives would result in similar relative variations in the long-range estimates.

Each table that follows shows the effects of changing a particular assumption on the OASDI summarized income rates, summarized cost rates, and actuarial balances (as defined earlier in this report) for 25-year, 50-year, and 75-year valuation periods. Because the income rate varies only slightly with changes in assumptions, it is not considered in the discussion of the tables. The change in each of the actuarial balances is approximately equal to the change in the corresponding cost rate, but in the opposite direction.

1. Total Fertility Rate

Table II.G1 shows the estimated OASDI income rates, cost rates, and actuarial balances, on the basis of alternative II with various assumptions about the ultimate total fertility rate. These assumptions are that the ultimate total fertility rate will be 1.6 children per woman (as assumed for alternative III), 1.9 (as assumed for alternative II), and 2.2 (as assumed for alternative I). The rate is assumed to change gradually from its current level and to reach the various ultimate values in 2018.

TABLE II.G1.—ESTIMATED OASDI INCOME RATES, COST RATES, AND ACTUARIAL BALANCES, BASED ON INTERMEDIATE ESTIMATES WITH VARIOUS FERTILITY ASSUMPTIONS

[As a percentage of taxable payroll]

Valuation period	Ultimate total fertility rate[1]		
	1.6	1.9	2.2
Summarized income rate:			
25-year: 1994-2018	13.35	13.35	13.35
50-year: 1994-2043	13.25	13.24	13.23
75-year: 1994-2068	13.27	13.24	13.22
Summarized cost rate:			
25-year: 1994-2018	12.81	12.85	12.89
50-year: 1994-2043	14.63	14.53	14.43
75-year: 1994-2068	15.84	15.37	14.91
Balance:			
25-year: 1994-2018	+.53	+.50	+.47
50-year: 1994-2043	−1.39	−1.29	−1.20
75-year: 1994-2068	−2.57	−2.13	−1.70

[1]The total fertility rate for any year is the average number of children who would be born to a woman in her lifetime if she were to experience the birth rates by age observed in, or assumed for, the selected year, and if she were to survive the entire child-bearing period. The ultimate total fertility rate is assumed to be reached in 2018.

For the 25-year period, the cost rate for the three fertility assumptions varies by only 0.08 percent of taxable payroll. In contrast, the 75-year cost rate varies over a wide range, decreasing from 15.84 to 14.91 percent, as the assumed ultimate total fertility rate increases from 1.6 to 2.2. Similarly, while the 25-year actuarial balance varies by only 0.06 percent of taxable payroll, the 75-year actuarial balance varies over a much wider range, from −2.57 to −1.70 percent.

During the 25-year period, changes in fertility affect the working population only slightly and result in relatively minor changes in the number of child beneficiaries. Hence, the program cost is affected only slightly. For the 75-year long-range period, however, changes in fertility have a relatively greater impact on the labor force than on the beneficiary population. As a result, an increase in fertility significantly reduces the cost rate. Each increase of 0.1 in the ultimate total fertility rate increases the long-range actuarial balance by about 0.15 percent of taxable payroll.

2. Death Rates

Table II.G2 shows the estimated OASDI income rates, cost rates, and actuarial balances, on the basis of alternative II with various assumptions about future reductions in death rates. The analysis was developed by varying the percentage decrease assumed to occur during 1993-2068 in the death rates by age, sex, and cause of death.

Actuarial Analysis

The decreases assumed for this period, summarized as changes in the age-sex-adjusted death rate, are about 16 percent (as assumed for alternative I), 35 percent (as assumed for alternative II), and 54 percent (as assumed for alternative III). It should be noted that these reductions do not apply uniformly to all ages, as some variation by age was assumed (see section II.H.1) consistent with the objective of selecting assumptions for alternatives I and III that are relatively more optimistic and more pessimistic, respectively, in terms of the financing of the OASDI program.

TABLE II.G2.—ESTIMATED OASDI INCOME RATES, COST RATES, AND ACTUARIAL BALANCES, BASED ON INTERMEDIATE ESTIMATES WITH VARIOUS DEATH-RATE ASSUMPTIONS

[As a percentage of taxable payroll]

Valuation period	Reduction in death rates[1]		
	16 percent	35 percent	54 percent
Summarized income rate:			
25-year: 1994-2018	13.34	13.35	13.36
50-year: 1994-2043	13.22	13.24	13.26
75-year: 1994-2068	13.21	13.24	13.28
Summarized cost rate:			
25-year: 1994-2018	12.63	12.85	13.07
50-year: 1994-2043	14.03	14.53	15.04
75-year: 1994-2068	14.63	15.37	16.20
Balance:			
25-year: 1994-2018	+.72	+.50	+.29
50-year: 1994-2043	−.81	−1.29	−1.78
75-year: 1994-2068	−1.42	−2.13	−2.92

[1]The measure of the reduction in death rates is the decrease in the age-sex-adjusted death rate during 1993-2068.

The variation in cost for the 25-year period is less pronounced than the variation for the 75-year period because the decreases in death rates are assumed to occur gradually and because of the specific changes in the age composition of the population that are projected to occur. The 25-year cost rate increases from 12.63 percent (for 16-percent lower ultimate death rates) to 13.07 percent (for 54-percent lower ultimate rates). The 75-year cost rate increases from 14.63 to 16.20 percent. The actuarial balance decreases from +0.72 to +0.29 percent for the 25-year period, and from −1.42 to −2.92 percent for the 75-year period.

Lower death rates cause both the income (as well as taxable payroll) and the outgo of the OASDI program to be higher than they would otherwise be. The relative increase in outgo, however, exceeds the relative increase in taxable payroll. For any given year, reductions in the death rates for people who have attained the retirement el-

igibility age of 62 (people whose death rates are the highest) increase the number of retired-worker beneficiaries (and, therefore, the amount of retirement benefits paid) without adding significantly to the number of covered workers (and, therefore, to the taxable payroll). Although reductions for people aged 50 to retirement eligibility age do result in significant increases to the taxable payroll, those increases are not large enough to offset the sum of the additional retirement benefits mentioned above and the disability benefits paid to additional beneficiaries in this pre-retirement age group. At ages under 50, death rates are so low that even substantial reductions would not result in significant increases in the numbers of covered workers or beneficiaries. Consequently, if death rates for all ages are lowered by about the same relative amount, outgo increases at a rate greater than the rate of growth in payroll, thereby resulting in higher cost rates. Each additional 10-percentage-point reduction in the age-sex-adjusted death rate assumed to occur in 1993-2068, relative to the 35-percent reduction assumed for alternative II, decreases the long-range actuarial balance by about 0.39 percent of taxable payroll.

3. Net Immigration

Table II.G3 shows the estimated OASDI income rates, cost rates, and actuarial balances, under alternative II with various assumptions about the magnitude of net immigration. These assumptions are that the annual net immigration will be 700,000 persons (as assumed for alternative III), 850,000 persons (as assumed for alternative II), and 1,100,000 persons (as assumed for alternative I).

TABLE II.G3.—ESTIMATED OASDI INCOME RATES, COST RATES, AND ACTUARIAL BALANCES, BASED ON INTERMEDIATE ESTIMATES WITH VARIOUS NET-IMMIGRATION ASSUMPTIONS

[As a percentage of taxable payroll]

Valuation period	Net immigration per year		
	700,000	850,000	1,100,000
Summarized income rate:			
25-year: 1994-2018	13.36	13.35	13.34
50-year: 1994-2043	13.25	13.24	13.23
75-year: 1994-2068	13.25	13.24	13.23
Summarized cost rate:			
25-year: 1994-2018	12.90	12.85	12.78
50-year: 1994-2043	14.63	14.53	14.39
75-year: 1994-2068	15.49	15.37	15.20
Balance:			
25-year: 1994-2018	+.46	+.50	+.57
50-year: 1994-2043	−1.38	−1.29	−1.16
75-year: 1994-2068	−2.23	−2.13	−1.97

For all three periods, the cost rate decreases with increasing rates of net immigration. For the 25-year period, the cost rate decreases from 12.90 percent of taxable payroll (for annual net immigration of 700,000 persons) to 12.78 percent (for annual net immigration of 1,100,000 persons). For the 50-year period, it decreases from 14.63 percent to 14.39 percent, and for the 75-year period, it decreases from 15.49 percent to 15.20 percent. The actuarial balance increases from +0.46 to +0.57 percent for the 25-year period, from –1.38 to –1.16 for the 50-year period, and from –2.23 to –1.97 percent for the 75-year period.

The cost rate decreases with increasing rates of net immigration because immigration occurs at relatively young ages, thereby increasing the numbers of covered workers earlier than the numbers of beneficiaries. Each additional group of 100,000 immigrants relative to the 850,000 net immigration assumed for alternative II, increases the long-range actuarial balance by about 0.07 percent of taxable payroll.

4. Real-Wage Differential

Table II.G4 shows the estimated OASDI income rates, cost rates, and actuarial balances, on the basis of alternative II with various assumptions about the real-wage differential. These assumptions are that the ultimate real-wage differential will be 0.5 percentage point (as assumed for alternative III), 1.0 percentage points (as assumed for alternative II), and 1.5 percentage points (as assumed for alternative I). In each case, the ultimate annual increase in the CPI is assumed to be 4.0 percent (as assumed for alternative II), yielding ultimate percentage increases in average annual wages in covered employment of 4.5, 5.0, and 5.5 percent under alternatives III, II, and I, respectively.

For the 25-year period, the cost rate decreases from 13.25 percent (for a real-wage differential of 0.5 percentage point) to 12.45 percent (for a differential of 1.5 percentage points). For the 50-year period, it decreases from 15.09 to 13.97 percent, and for the 75-year period it decreases from 15.97 to 14.77 percent. The actuarial balance increases from +0.14 to +0.86 percent for the 25-year period, from –1.80 to –0.79 for the 50-year period, and from –2.67 to –1.58 percent for the 75-year period.

TABLE II.G4.—ESTIMATED OASDI INCOME RATES, COST RATES, AND ACTUARIAL BALANCES, BASED ON INTERMEDIATE ESTIMATES WITH VARIOUS REAL-WAGE ASSUMPTIONS

[As a percentage of taxable payroll]

Valuation period	Ultimate percentage increase in wages-CPI[1]		
	4.5-4.0	5.0-4.0	5.5-4.0
Summarized income rate:			
25-year: 1994-2018	13.39	13.35	13.31
50-year: 1994-2043	13.29	13.24	13.19
75-year: 1994-2068	13.30	13.24	13.19
Summarized cost rate:			
25-year: 1994-2018	13.25	12.85	12.45
50-year: 1994-2043	15.09	14.53	13.97
75-year: 1994-2068	15.97	15.37	14.77
Balance:			
25-year: 1994-2018	+.14	+.50	+.86
50-year: 1994-2043	−1.80	−1.29	−.79
75-year: 1994-2068	−2.67	−2.13	−1.58

[1]The first value in each pair is the assumed ultimate annual percentage increase in average wages in covered employment. The second value is the assumed ultimate annual percentage increase in the Consumer Price Index. The difference between the two values is the real-wage differential.

The cost rate decreases with increasing real-wage differentials, because the higher real-wage levels increase the taxable payroll, while benefit increases are not affected. Although the initial benefit levels are higher because of the higher wages, these increases are more than offset by the increases in the taxable payroll of future workers. Each 0.5-percentage-point increase in the assumed real-wage differential increases the long-range actuarial balance by about 0.54 percent of taxable payroll.

5. Consumer Price Index

Table II.G5 shows the estimated OASDI income rates, cost rates, and actuarial balances, on the basis of alternative II with various assumptions about the rate of increase for the Consumer Price Index (CPI). These assumptions are that the ultimate annual increase in the CPI will be 3.0 percent (as assumed for alternative I), 4.0 percent (as assumed for alternative II), and 5.0 percent (as assumed for alternative III). In each case, the ultimate real-wage differential is assumed to be 1.0 percentage points (as assumed for alternative II), yielding ultimate percentage increases in average annual wages in covered employment of 4.0, 5.0, and 6.0 percent under alternatives I, II, and III, respectively.

TABLE II.G5.—ESTIMATED OASDI INCOME RATES, COST RATES, AND ACTUARIAL BALANCES, BASED ON INTERMEDIATE ESTIMATES WITH VARIOUS CPI-INCREASE ASSUMPTIONS

[As a percentage of taxable payroll]

Valuation period	Ultimate percentage increase in wages-CPI[1]		
	4.0-3.0	5.0-4.0	6.0-5.0
Summarized income rate:			
25-year: 1994-2018	13.37	13.35	13.33
50-year: 1994-2043	13.26	13.24	13.22
75-year: 1994-2068	13.26	13.24	13.23
Summarized cost rate:			
25-year: 1994-2018	12.99	12.85	12.71
50-year: 1994-2043	14.74	14.53	14.33
75-year: 1994-2068	15.61	15.37	15.14
Balance:			
25-year: 1994-2018	+.37	+.50	+.62
50-year: 1994-2043	−1.48	−1.29	−1.10
75-year: 1994-2068	−2.34	−2.13	−1.91

[1]The first value in each pair is the assumed ultimate annual percentage increase in average wages in covered employment. The second value is the assumed ultimate annual percentage increase in the Consumer Price Index.

For all three periods, the cost rate decreases with greater assumed rates of increase in the CPI. For the 25-year period, the cost rate decreases from 12.99 (for CPI increases of 3.0 percent) to 12.71 percent (for CPI increases of 5.0 percent). For the 50-year period, it decreases from 14.74 to 14.33 percent, and for the 75-year period, it decreases from 15.61 to 15.14 percent. The actuarial balance increases from +0.37 to +0.62 percent for the 25-year period, from −1.48 to −1.10 for the 50-year period, and from −2.34 to −1.91 percent for the 75-year period.

The patterns described above result primarily from the time lag between the effects of the CPI changes on taxable payroll and on benefit payments. When assuming a greater rate of increase in the CPI (in conjunction with a constant real-wage differential), the effect on taxable payroll of the implied greater rate of increase in average wages is experienced immediately, while the effect on benefits of the greater rate of increase in the CPI is experienced with a lag of about 1 year. In addition, the effect on benefits of the greater rate of increase in average wages is experienced no sooner than 2 years later. Thus, the higher taxable payrolls have a stronger effect than the higher benefits, thereby resulting in lower cost rates. The effect of each 1.0-percentage-point increase in the rate of change assumed for the CPI is an increase in the long-range actuarial balance of about 0.22 percent of taxable payroll.

6. Real Interest Rate

Table II.G6 shows the estimated OASDI income rates, cost rates, and actuarial balances, on the basis of alternative II with various assumptions about the annual nominal real interest rate for special public-debt obligations issuable to the trust funds, which are compounded semiannually. These assumptions are that the ultimate annual real interest rate will be 1.5 percent (as assumed for alternative III), 2.3 percent (as assumed for alternative II), and 3.0 percent (as assumed for alternative I). In each case, the ultimate annual increase in the CPI is assumed to be 4.0 percent (as assumed for alternative II), resulting in ultimate annual yields of 5.6, 6.4, and 7.1 percent under alternatives III, II, and I, respectively.

TABLE II.G6.—ESTIMATED OASDI INCOME RATES, COST RATES, AND ACTUARIAL BALANCES, BASED ON INTERMEDIATE ESTIMATES WITH VARIOUS REAL INTEREST ASSUMPTIONS

[As a percentage of taxable payroll]

Valuation period	Ultimate annual real interest rate		
	1.5 percent	2.3 percent	3.0 percent
Summarized income rate:			
25-year: 1994-2018	13.31	13.35	13.38
50-year: 1994-2043	13.21	13.24	13.27
75-year: 1994-2068	13.23	13.24	13.27
Summarized cost rate:			
25-year: 1994-2018	12.93	12.85	12.78
50-year: 1994-2043	14.84	14.53	14.28
75-year: 1994-2068	15.84	15.37	14.98
Balance:			
25-year: 1994-2018	+.38	+.50	+.60
50-year: 1994-2043	−1.63	−1.29	−1.01
75-year: 1994-2068	−2.61	−2.13	−1.71

For the 25-year period, the cost rate decreases slightly with increasing real interest rates from 12.93 percent (for an ultimate real interest rate of 1.5 percent) to 12.78 percent (for an ultimate real interest rate of 3.0 percent). For the 50-year period, it decreases from 14.84 to 14.28 percent, and for the 75-year period, it decreases from 15.84 to 14.98 percent. The actuarial balance increases from +0.38 to +0.60 percent for the 25-year period, from −1.63 to −1.01 percent for the 50-year period, and from −2.61 to −1.71 percent for the 75-year period. Each 0.5-percentage-point increase in the assumed real interest rate increases the long-range actuarial balance by about 0.30 percent of taxable payroll.

7. Disability Incidence Rates

Table II.G7 shows the estimated OASDI income rates, cost rates, and actuarial balances, on the basis of alternative II with various assumptions concerning future disability incidence rates. For all three alternatives, incidence rates by age and sex are assumed to increase during the early years of the projection period before declining to ultimate levels, which are attained in 2008. At that time they reach levels that, in comparison to the corresponding annual rates experienced during the base period, 1984-86, are higher by about 8 percent for alternative I, 35 percent for alternative II, and 62 percent for alternative III.

TABLE II.G7.—ESTIMATED OASDI INCOME RATES, COST RATES, AND ACTUARIAL BALANCES, BASED ON INTERMEDIATE ESTIMATES WITH VARIOUS DISABILITY INCIDENCE ASSUMPTIONS

[As a percentage of taxable payroll]

Valuation period	Disability incidence rates based on alternative—		
	I	II	III
Summarized income rate:			
25-year: 1994-2018	13.35	13.35	13.35
50-year: 1994-2043	13.24	13.24	13.24
75-year: 1994-2068	13.24	13.24	13.25
Summarized cost rate:			
25-year: 1994-2018	12.65	12.85	13.04
50-year: 1994-2043	14.26	14.53	14.79
75-year: 1994-2068	15.07	15.37	15.66
Balance:			
25-year: 1994-2018	+.70	+.50	+.31
50-year: 1994-2043	−1.03	−1.29	−1.55
75-year: 1994-2068	−1.83	−2.13	−2.41

For the 25-year period, the cost rate increases with increasing disability incidence rates from 12.65 percent (for the relatively low rates assumed for alternative I) to 13.04 percent (for the relatively high rates assumed for alternative III). For the 50-year period, it increases from 14.26 to 14.79 percent, and for the 75-year period, it increases from 15.07 to 15.66 percent. The actuarial balance decreases from +0.70 to +0.31 percent for the 25-year period, from −1.03 to −1.55 percent for the 50-year period, and from −1.83 to −2.41 percent for the 75-year period. Each 10-percentage point increase from the base period in the ultimate assumed gross incidence rate decreases the long-range OASDI actuarial balance by about 0.11 percent of taxable payroll.

8. Disability Termination Rates

Table II.G8 shows the estimated OASDI income rates, cost rates, and actuarial balances, on the basis of alternative II with various assumptions about future disability termination rates.

For alternative II, death-termination rates by age and sex are assumed to decline until they reach levels by the end of the 75-year period that, in comparison to the corresponding annual rates experienced during the base period, 1977-80, are lower by about 15 percent for men and 10 percent for women. For the other alternatives, the rates are assumed to spread gradually from the rates for alternative II. By the end of the projection period, for men the rates are about 28 percent higher for alternative I and lower for alternative III, and for women they are about 33 percent higher and lower, respectively.

For alternative II, ultimate recovery-termination rates by age and sex are assumed to be attained in 2008; such rates are assumed to be about 35 percent lower than those experienced in the base period, 1977-80. For the other alternatives, the rates are assumed to spread gradually from the rates for alternative II; from that year until the end of the projection period the rates under alternative I and III are 20 percent higher and lower, respectively, than the rates for alternative II.

TABLE II.G8.—ESTIMATED OASDI INCOME RATES, COST RATES, AND ACTUARIAL BALANCES, BASED ON INTERMEDIATE ESTIMATES WITH VARIOUS DISABILITY TERMINATION ASSUMPTIONS

[As a percentage of taxable payroll]

Valuation period	Disability termination rates based on alternative—		
	I	II	III
Summarized income rate:			
25-year: 1994-2018	13.35	13.35	13.35
50-year: 1994-2043	13.24	13.24	13.24
75-year: 1994-2068	13.24	13.24	13.25
Summarized cost rate:			
25-year: 1994-2018	12.82	12.85	12.88
50-year: 1994-2043	14.47	14.53	14.59
75-year: 1994-2068	15.29	15.37	15.45
Balance:			
25-year: 1994-2018	+.53	+.50	+.47
50-year: 1994-2043	−1.23	−1.29	−1.35
75-year: 1994-2068	−2.05	−2.13	−2.21

For the 25-year period, the cost rate increases with decreasing disability termination rates from 12.82 percent (for the relatively high

rates assumed for alternative I) to 12.88 percent (for the relatively low rates assumed for alternative III). For the 50-year period, it increases from 14.47 to 14.59 percent, and for the 75-year period, it increases from 15.29 to 15.45 percent. The actuarial balance decreases from +0.53 to +0.47 percent for the 25-year period, from –1.23 to –1.35 percent for the 50-year period, and from –2.05 to –2.21 percent for the 75-year period.

H. ASSUMPTIONS AND METHODS UNDERLYING THE ACTUARIAL ESTIMATES

This section describes the assumptions and methods which underlie the actuarial estimates in this report. Unless specifically stated otherwise, the assumptions and methods were used for each of the three alternatives and for both the short-range and long-range periods. Some of the principal economic and demographic assumptions which vary by alternative are summarized in section II.D. Further details about the assumptions, methods, and actuarial estimates are contained in Actuarial Studies published by the Office of the Actuary, Social Security Administration, which are available upon request.

1. Total Population

Projections were made of the population in the Social Security Area by age, sex, and marital status as of January 1 of each year 1993 through 2080. The starting Social Security Area population for January 1, 1992 was developed from the estimated United States population, including armed forces overseas, based on data from the Bureau of the Census, adjusted for net census undercount and increased for other U.S. citizens living abroad and for populations in the geographic areas covered by the OASDI program but not included in the U.S. population. This starting population was then projected using assumed rates of birth, death, marriage, and divorce and assumed levels of migration.

Historically, fertility rates in the United States have fluctuated widely. The total fertility rate is defined to be the average number of children that would be born to a woman in her lifetime if she were to experience the birth rates by age observed in, or assumed for, the selected year, and if she were to survive the entire child-bearing period. The total fertility rate decreased from 3.3 children per woman after World War I to 2.1 during the Great Depression, rose to 3.7 in 1957, and then fell to 1.7 in 1976. After 1976, the total fertility rate began to rise again, reaching a level of 2.07 for 1991. Since then, it has declined slightly to a level currently estimated at 2.05 for 1992 and 1993.

These variations in fertility rates have resulted from changes in many factors, including social attitudes, economic conditions, and the use of birth-control methods. Future fertility rates may be expected to

remain close to recent levels. The recent historical and projected trends in certain population characteristics are consistent with a continued relatively low fertility rate. These trends include the rising percentages of women who have never married, of women who are divorced, and of young women who are in the labor force. Based on consideration of these factors, ultimate total fertility rates of 2.2, 1.9, and 1.6 children per woman were selected for alternatives I, II, and III, respectively. For each alternative, the total fertility rate is assumed to reach its ultimate level in 2018. A rate of 2.1 would ultimately result in a nearly constant population if net immigration were zero and if death rates were constant.

Historically, death rates in the United States, calculated using final data for 1900-91 and provisional data for 1992, show a steady declining trend. The age-sex-adjusted death rate—which is calculated here as the crude rate that would occur in the enumerated total population as of April 1, 1980, if that population were to experience the death rates by age and sex for the selected year—declined at an average rate of 1.2 percent per year between 1900 and 1991. These reductions in death rates have resulted from many factors, including increased medical knowledge and availability of health-care services, and improvements in personal health-care practices such as diet and exercise. Based on consideration of the likelihood of continued progress in these and other areas, three alternative sets of ultimate annual percentage reductions in central death rates by age, sex, and cause of death were selected for 2018 and later. The intermediate set, which is used for alternative II, is considered to be the one closest to average expectations. Except for those causes of death which primarily affect workers and children, the average annual percentage reductions used for alternative I are smaller than those for alternative II, while those used for alternative III are greater. Between 1992 and 2018, the reductions in central death rates for alternative II are assumed to change gradually from the average annual reductions by age, sex, and cause of death observed between 1968 and 1991, to the ultimate annual percentage reductions by age, sex, and cause of death assumed for 2018 and later. Alternative I reductions are assumed to change gradually from 50 percent of the average annual reductions observed between 1968 and 1991, while alternative III reductions are assumed to change gradually from 150 percent of the average annual reductions observed between 1968 and 1991. The age-sex-adjusted death rate (for all causes combined) declined at an

average rate of 1.4 percent per year between 1968 and 1991.

After adjustment for changes in the age-sex distribution of the population, the resulting death rates were projected to decline at an average annual rate of about 0.3 percent, 0.6 percent, and 1.0 percent between 1991 and 2068 for alternatives I, II, and III, respectively.

For calendar years 1992 and 1993, the net legal immigration is assumed to be 608,000 and 630,000 persons per year, respectively. In addition, for these years the net other-than-legal immigration assumption is 200,000 persons per year, which is consistent with the estimates of net other-than-legal immigration made by the Bureau of the Census based on the 1990 Census. The Immigration Act of 1990 increased substantially the number of legal immigrants permitted starting in 1992. For calendar year 1994, net immigration is assumed to be 1,110,000, 845,000, and 675,000 persons per year for alternatives I, II, and III, respectively. Of these net numbers of immigrants, 760,000, 645,000, and 575,000, respectively, are assumed to be legal, and the remainders are assumed to be other-than-legal. Based on changes in immigration categories and limits specified in the 1990 legislation, the estimated level of net legal immigration varies for years through 2000, reaching an assumed ultimate level for 2001 and later. Net immigration for 1995 is assumed to be 1,130,000, 860,000, and 700,000 persons per year for alternatives I, II, and III, respectively. Of these net numbers of immigrants, 780,000, 660,000, and 600,000, respectively, are assumed to be legal, and the remainders are assumed to be other-than-legal. Net immigration for 1996 through 2000 is assumed to be 1,150,000, 875,000, and 700,000 persons per year for alternatives I, II, and III, respectively. Of these net numbers of immigrants, 800,000, 675,000, and 600,000, respectively, are assumed to be legal, and the remainders are assumed to be other-than-legal. Net immigration for 2001 and later is assumed to be 1,100,000, 850,000, and 700,000 persons per year for alternatives I, II, and III, respectively. Of these net numbers of immigrants, 750,000, 650,000, and 600,000, respectively, are assumed to be legal, and the remainders are assumed to be other-than-legal.

Table II.H1 shows the projected population as of July 1 by broad age group, for the three alternatives. Also shown are tabulated aged dependency ratios (see table footnotes for definitions). Because eligibility for many types of OASDI benefits depends on marital status, the population was projected by marital status, as well as by age

and sex. Marriage and divorce rates were based on recent data from the National Center for Health Statistics.

TABLE II.H1.—SOCIAL SECURITY AREA POPULATION AS OF JULY 1 AND DEPENDENCY RATIOS, BY ALTERNATIVE AND BROAD AGE GROUP, CALENDAR YEARS 1950-2070

	Population (in thousands)				Dependency ratio	
Calendar year	Under 20	20-64	65 and over	Total	Aged[1]	Total[2]
Historical data:						
1950	53,895	92,739	12,752	159,386	0.138	0.719
1960	72,989	99,842	17,250	190,081	.173	.904
1970	80,672	113,184	20,920	214,776	.185	.898
1975	78,428	122,852	23,265	224,545	.189	.828
1980	74,549	134,393	26,143	235,085	.195	.749
1985	73,213	144,548	28,996	246,757	.201	.707
1990	74,914	152,525	31,918	259,357	.209	.700
Intermediate:						
1995	78,887	160,203	34,363	273,453	.214	.707
2000	81,001	168,547	35,476	285,025	.210	.691
2005	81,288	177,532	36,843	295,662	.208	.665
2010	80,760	185,261	39,945	305,965	.216	.652
2015	80,210	189,778	45,957	315,946	.242	.665
2020	80,657	191,111	53,322	325,090	.279	.701
2025	81,352	190,077	61,619	333,047	.324	.752
2030	81,639	189,628	68,282	339,549	.360	.791
2035	81,519	191,467	71,636	344,623	.374	.800
2040	81,464	194,585	72,456	348,505	.372	.791
2045	81,602	197,001	72,935	351,538	.370	.784
2050	81,890	197,924	74,276	354,090	.375	.789
2055	82,153	197,863	76,494	356,509	.387	.802
2060	82,298	197,571	79,148	359,017	.401	.817
2065	82,378	198,219	81,017	361,614	.409	.824
2070	82,496	199,164	82,458	364,119	.414	.828
Low Cost:						
1995	79,068	160,525	34,320	273,914	.214	.706
2000	82,158	169,919	35,179	287,255	.207	.691
2005	84,051	179,919	36,127	300,097	.201	.668
2010	85,806	188,619	38,757	313,181	.205	.660
2015	88,231	194,200	44,275	326,706	.228	.682
2020	91,934	197,146	51,093	340,173	.259	.725
2025	95,731	198,383	58,733	352,847	.296	.779
2030	98,978	200,871	64,632	364,481	.322	.815
2035	101,762	206,282	67,250	375,293	.326	.819
2040	104,593	213,587	67,517	385,697	.316	.806
2045	107,879	220,583	67,626	396,087	.307	.796
2050	111,450	226,615	68,723	406,788	.303	.795
2055	114,959	232,323	70,777	418,059	.305	.799
2060	118,274	238,474	73,277	430,026	.307	.803
2065	121,546	245,765	75,293	442,604	.306	.801
2070	124,957	253,385	77,224	455,566	.305	.798

TABLE II.H1.—SOCIAL SECURITY AREA POPULATION AS OF JULY 1 AND DEPENDENCY RATIOS, BY ALTERNATIVE AND BROAD AGE GROUP, CALENDAR YEARS 1950-2070 (Cont.)

Calendar year	Population (in thousands)				Dependency ratio	
	Under 20	20-64	65 and over	Total	Aged[1]	Total[2]
High Cost:						
1995	78,752	160,015	34,411	273,179	0.215	0.707
2000	80,035	167,645	35,781	283,460	.213	.691
2005	78,870	175,770	37,537	292,178	.214	.662
2010	76,263	182,821	41,085	300,168	.225	.642
2015	73,013	186,752	47,603	307,368	.255	.646
2020	70,585	187,029	55,583	313,198	.297	.675
2025	68,679	184,332	64,653	317,665	.351	.723
2030	66,644	181,569	72,290	320,502	.398	.765
2035	64,423	180,428	76,732	321,583	.425	.782
2040	62,454	179,962	78,580	320,996	.437	.784
2045	60,572	178,478	79,972	319,021	.448	.787
2050	58,822	175,121	82,103	316,046	.469	.805
2055	57,179	170,329	84,993	312,501	.499	.835
2060	55,594	164,875	88,248	308,718	.535	.872
2065	54,053	160,445	90,317	304,815	.563	.900
2070	52,586	156,553	91,548	300,687	.585	.921

[1]Population aged 65 and over, divided by population aged 20-64.

[2]Sum of population aged 65 and over, and population under age 20, divided by population aged 20-64.

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

2. Covered Population

The number of covered workers in a year is defined as the number of persons who, at any time during the year, have OASDI taxable earnings. Projections of the number of covered workers were made by applying projected coverage rates to the projected Social Security Area population. The coverage rates—i.e., the number of covered workers in the year, as a percentage of the population as of July 1—were determined by age and sex using projected labor force participation rates and unemployment rates, and their historical relationships to coverage rates. In addition, the coverage rates were adjusted to reflect the increase in coverage of (1) State and local government employment that will result from the Omnibus Budget Reconciliation Act of 1990 and (2) Federal civilian employment that will result from the 1983 Social Security Amendments.

Labor force participation rates were projected by age and sex, taking into account projections of the percentage of the population that is married, the percentage of the population that is disabled, the number of children in the population, the level of retirement benefits, and the state of the economy. All of these factors vary by alternative. For men, the projected age-adjusted labor force participation rates for the year 2070 for alternatives I, II, and III are 0.9, 1.5, and 2.3

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percentage points lower, respectively, than the 1993 level of 75.6 percent. For women, the projected age-adjusted labor force participation rates increase for alternatives I and II and decrease for alternative III. The projected rates for 2070 are 2.1, 0.8, and –1.2 percentage points, respectively, different from the 1993 level of 57.9 percent.

The total age-sex-adjusted unemployment rate averaged 5.7 percent for the last 30 years 1964-93 and 6.2 percent for the last 10 years 1984-93. The ultimate total age-sex-adjusted unemployment rate is assumed to be 5, 6, and 7 percent for alternatives I, II, and III, respectively. Because the unemployment rate depends on the state of the economy, cyclical trends are reflected in the short-range period. Unemployment levels off to the assumed ultimate age-sex-adjusted rate by the year 2004, for each of the three alternatives.

The projected age-adjusted coverage rate for men changes from its 1993 level of 72.9 percent to 73.3, 72.4, and 71.4 percent in 2070 on the basis of alternatives I, II, and III, respectively. For women, it changes from its 1993 level of 59.5 percent to 61.4, 59.7, and 57.4 percent for alternatives I, II, and III, respectively.

3. Average Earnings, Inflation, and Real Interest Rate

Future increases in average earnings and in the Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W, hereinafter denoted as "CPI") will directly affect the OASDI program. Increases in the CPI directly affect the automatic cost-of-living benefit increases, while inflation, in general, affects the nominal levels of average earnings, GDP, and taxable payroll. Average earnings in covered employment for each year have a direct effect on the size of the taxable payroll and on the future level of average benefits. In addition, increases in average wages in the U.S. economy directly affect the indexation, under the automatic-adjustment provisions in the law, of the benefit formulas, the contribution and benefit base, the exempt amounts under the retirement earnings test, the amount of earnings required for a quarter of coverage, and under certain circumstances, the automatic cost-of-living benefit increases.

Increases in average earnings were projected in two components—average earnings of wage-and-salary workers, usually referred to as average wages (and shown for OASDI covered employment in table

II.D1 of this report), and average net earnings of self-employed persons. Each of these was subdivided into increases in real average earnings and increases in the CPI. For simplicity, real increases in the average covered wage are sometimes expressed in the form of real-wage differentials—i.e., the percentage increase in the average nominal wage minus the percentage increase in the CPI.

The assumed ultimate increases in average real earnings are based on analysis of trends in productivity gains and the factors linking productivity gains with increases in average real earnings. For the 40 years 1953-92, annual increases in productivity for the total U.S. economy averaged 1.7 percent, the result of average annual increases of 2.4, 2.4, 0.8, and 1.2 percent for the 10-year periods 1953-62, 1963-72, 1973-82 and 1983-92, respectively. Meanwhile, the average annual rate of change in average real earnings for the total U.S. economy was an increase of 1.0 percent for the 40 years 1953-92, the result of average annual increases of 2.2, 2.1, –1.5, and 1.3 percent, respectively, for the aforementioned 10-year periods. The change in the linkage between annual increases in productivity and real earnings averaged –0.7 percent for the 40 years 1953-92, and –0.2, –0.3, –2.2, and 0.1 percent, respectively, for the aforementioned 10-year periods. The change in the linkage reflects changes in such factors as the average number of hours worked per year, labor's share of total output, the proportion of employee compensation paid as wages, and price adjustment reflecting the ratio of the GDP implicit price deflator to the CPI.

The average annual rate of change in the average real wage in OASDI covered employment was nearly 1.2 percent over the 40 years 1953-92. However this rate of change varied considerably over this period. The average annual rates of change for the 10 year-periods 1953-62, 1963-72, 1973-82, and 1983-92 were 2.5 percent, 1.8 percent, –0.8 percent and 1.3 percent, respectively.

The ultimate annual increases in productivity for all sectors—wage-and-salary workers, self-employed persons, and the total economy—are assumed to be about 1.7, 1.4, and 1.1 percent for alternatives I, II, and III, respectively. The corresponding ultimate annual rates of change in the linkage for wage-and-salary workers are assumed to be declines of 0.2, 0.4, and 0.6 percent for alternatives I, II, and III, respectively. This linkage is made up of assumed annual decreases of 0.1, 0.2, and 0.3 percent in average hours worked per

year, and 0.1, 0.2, and 0.3 percent annual declines in wages as a share of compensation, for alternatives I, II, and III, respectively. No ultimate change is assumed for the historically relatively stable ratio of employee compensation to GDP. The resulting ultimate real-wage differentials are 1.5, 1.0, and 0.5 percent for alternatives I, II, and III, respectively. Ultimate annual declines in the linkage for self-employed persons are smaller because the proportion of reported compensation that is considered earnings remains constant. As a result, ultimate average real-earnings growth rates for the self-employed are assumed to be higher than for wage-and-salary workers. The corresponding ultimate average real-earnings for wage-and-salary workers and self-employed persons, combined, are slightly higher than those assumed for wage-and-salary workers only.

Historically, the CPI has increased, on average, by 4.2 percent for the last 40 years 1954-93, 5.2 percent for the last 30 years 1964-93, 6.0 percent for the last 20 years 1974-93, and 3.6 percent for the last 10 years 1984-93. The 6.0 percent increase during 1974-93 reflects sharp increases in oil prices and their subsequent effect on the overall economy. The ultimate average annual CPI increases of 3.0, 4.0, and 5.0 percent for alternatives I, II, III, respectively, were chosen to include a reasonable range of possible future experience. The GDP implicit price deflator has increased by 4.4 percent annually for the last 40 years 1954-93, 5.2 percent annually for the last 30 years 1964-93, 5.7 percent annually for the last 20 years 1974-93, and 3.6 percent annually for the last 10 years 1984-93. For this Trustees Report, increases in the GDP implicit price deflator are assumed to be slower by about 0.2 percent, 0.3 percent, and 0.5 percent annually than increases in the CPI-W for alternatives I, II, and III, respectively, for the first 10 projection years 1994-2003. The assumed differential between the increase in the GDP implicit price deflator and the increase in the CPI-W reflects the anticipation of three trends for the first 10 projection years 1994-2003. These are: (1) relatively slower increases in computer prices, which are weighted more heavily in the implicit price deflator, (2) relatively faster increases in energy prices which are weighted more heavily in the CPI, and (3) relatively faster increases in health service prices, which are a larger component of the CPI. However, ultimate annual rates of increase in the

GDP implicit price deflator are assumed to be the same, for each alternative, as for the CPI-W.

The ultimate increases in average annual wages in covered employment are assumed to be 4.5, 5.0, and 5.5 percent, for alternatives I, II, and III, respectively. These were obtained, for each alternative, by adding the assumed annual percentage increase in the CPI to the assumed real-wage differential. Ultimate increases in average wages and earnings for the U.S. economy are very similar to those assumed for average wages in covered employment.

The interest rate considered in this report is the nominal interest rate, which is compounded semiannually, for special U.S. government obligations issuable to the trust funds in each of 12 months of the year. The real interest rate is defined to be the annual (compounded) yield rate for investments in these securities less growth in the CPI-W.

In developing a reasonable range of assumed future real interest rates for the three alternatives, historical experience was examined for the last 40 years, 1953-92, and for each of the 10-year subperiods, 1953-62, 1963-72, 1973-82, and 1983-92. For the 40-year period, the real interest rate averaged 2.3 percent per year. For the four 10-year subperiods, the real interest rates averaged 1.3, 1.8, –0.2, and 6.1 percent per year, respectively. The assumed ultimate real interest rates are 3.0 percent, 2.3 percent, and 1.5 percent for alternatives I, II, and III, respectively. The projected interest rates are assumed to trend toward these ultimate interest rates by attaining the ultimate values after the tenth projection year.

4. Taxable Payroll and Taxes

The taxable payroll for any period is that amount which, when multiplied by the combined employee-employer tax rate, yields the total amount of taxes paid by employees, employers, and the self-employed for work during the period. The taxable payroll is important not just in estimating OASDI income, but also in determining income and cost rates, and actuarial balances. These terms are defined in the introduction to the section entitled "Actuarial Estimates."

In practice, the taxable payroll is calculated as a weighted average of the earnings on which employees, employers, and self-employed

persons make contributions to the OASDI program. The weighting takes into account the lower tax rates, as compared to the combined employee-employer rate, which apply to multiple-employer "excess wages," and which did apply, before 1984, to net earnings from self-employment and, before 1988, to tips. For 1983 and later, taxable payroll also includes deemed wage credits for military service. Estimates of taxable earnings for employees, employers, and the self-employed were developed from corresponding estimates of earnings in the U.S. economy, by means of factors which adjust for various differences in these measures. The factors adjust total U.S. earnings by removing earnings from noncovered employment, adding earnings from various outlying areas which are covered by Social Security but are not included in published "U.S." data, and removing earnings above the taxable earnings base.

Decreases in the ratio of taxable earnings to earnings in OASDI covered employment since 1984, due to the higher proportion of total covered earnings earned by very high wage earners, are projected to continue through the first ten years of the projection. This ratio is projected to decline from a level of 0.875 for 1993 to ultimate levels of 0.873, 0.860, and 0.848, by the end of the tenth projection year for alternatives I, II, and III, respectively. These ultimate ratios of taxable earnings to OASDI covered earnings are each about one percentage point lower than was assumed last year and thus tend to decrease the projected level of taxable payroll as compared with estimates in the 1993 Trustees' Report.

Estimates of taxes collected were developed from the estimates of taxable earnings by applying the employee, employer, or self-employed tax rate, and by taking into account the lag time from the incurrence of tax liability to the collection of taxes.

5. Insured Population

There are three basic types of insured status under the OASDI program: fully insured, currently insured, and disability insured. Fully insured status is required of an aged worker for eligibility to a primary retirement benefit and for the eligibility of that worker's spouse and children to auxiliary benefits. Fully insured status is also required of a deceased worker for the eligibility of the worker's survivors to benefits (with the exception of child survivors and parents

of eligible child survivors, in which cases the deceased worker is required to have had either currently insured status or fully insured status). Disability insured status, which is more restrictive than fully insured status, is required of a disabled worker for eligibility to a primary disability benefit and for the eligibility of the worker's spouse and children to auxiliary benefits.

Projections of the percentage of the population that is fully insured were made by age and sex, from estimated distributions of workers by accumulated quarters of coverage based on past and projected coverage rates and amounts of earnings required for quarters of coverage. Currently insured status was disregarded for purposes of these estimates, because the number of cases in which eligibility for benefits is based solely on currently insured status is relatively small. Projections of the percentage of fully insured persons who are also disability insured were made by age and sex based on past and projected coverage rates, the requirement for disability insured status, and their historical relationships. Finally, the fully insured and disability insured populations were developed from the projected total population by applying the appropriate percentages.

Under this procedure, the percentage of the Social Security Area population aged 62 and over that is fully insured is projected to increase from 77.1 on January 1, 1993, to 90.9, 90.6, and 90.1 on January 1, 2069, based on alternatives I, II, and III, respectively. The increase for females is projected to be significant, while the increase for males is slight. Based on alternative II, for example, the percentage for males is projected to increase during this period from 92.2 to 92.6, while that for females is projected to increase from 66.2 to 89.1.

The fully insured population by age and sex was further subdivided by marital status, using the variation in labor force participation rates by marital status to estimate the variation in coverage rates by marital status. These coverage rates were then used to estimate the variation in the fully insured rates by marital status.

6. Old-Age and Survivors Insurance Beneficiaries

The number of OASI beneficiaries was projected 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 selected

types of benefits, the number of beneficiaries was also projected by marital status.

For the short-range period, the number of retired-worker beneficiaries was developed by applying award rates to the aged fully insured population less those persons entitled to retired-worker, disabled-worker, or widow(er)'s benefits, and by applying termination rates to the number of persons already receiving retired-worker benefits.

For the long range, the number of retired-worker beneficiaries who were not previously converted from disabled-worker beneficiary status was projected as a percentage of the "exposed population," i.e., the aged fully insured population less those persons entitled to or converted from disability benefits and those insured persons entitled to widow(er)'s benefits. The percentage for ages 70 and over was assumed to be nearly 100, because the retirement earnings test and delayed retirement credit do not apply after age 70. The percentage for each age 62 through 69 was projected in accordance with observed historical and projected short-range trends, with an adjustment to reflect changes in the ratio of the monthly benefit amount payable at each age of entitlement to the amount payable at age-70 entitlement. As the increases in the delayed retirement credit become effective and, beginning in 2000, the normal retirement age increases, the number of retired workers as a percentage of the exposed population is gradually adjusted downward at each age 62 through 69, reaching an ultimate value, in 2030.

An additional adjustment to the projected number of retired worker beneficiaries was made during the long-range period to reflect projected changes in the number of other-than-legal aliens as a percentage of the population. This resulted in a downward adjustment in the percentage of the population that is receiving retired worker benefits starting in year 2004 and continuing until the end of the projection period. For the long-range period, the number of retired-worker beneficiaries who are converted from disabled-worker beneficiaries was calculated separately in a manner consistent with the calculation of disabled-worker beneficiaries.

The number of aged-spouse beneficiaries was estimated from the population projected by age and sex. The benefits of aged-spouse beneficiaries are based on the earnings records of their husbands or

wives, who are referred to as "wage earners." In the short-range period, a regression equation was used to project the number of aged-spouse beneficiaries, as a proportion of the aged uninsured female or male population. In the long-range period, aged-spouse beneficiaries were estimated from the population projected by age, sex, and marital status. To the number of spouses aged 62 and over in the population, a series of factors were applied, representing the probabilities that the spouse and the wage earner meet all of the conditions of eligibility—i.e., the probabilities that (1) the wage earner is 62 or over, (2) the wage earner is insured, (3) the wage earner is receiving benefits, (4) the spouse is not receiving a benefit for the care of an entitled child, (5) the spouse is not insured, (6) the spouse is not eligible to receive a significant government pension based on earnings in noncovered employment, and (7) a residual factor.

In addition, the same factors were applied to the number of divorced persons aged 62 and over in the population, with three differences. First, an additional factor is required to reflect the probability that the person's former wage-earner spouse is still alive (otherwise, the person may be entitled to a divorced widow(er)'s benefit). Second, a factor is required to reflect the probability that the marriage to the wage-earner spouse was at least 10 years in duration. Third, factor (3) was not applied because, effective for January 1985, a divorced person generally need not wait to receive benefits until the former wage-earner spouse is receiving benefits.

The projected numbers of children under age 18, and students aged 18, who are eligible for benefits as children of retired-worker beneficiaries, were based on the projected number of children in the population. In the short-range period, the number of entitled children was developed by applying award rates to the number of children in the population where both parents are alive, and by applying termination rates to the number of children already receiving benefits. In the long-range period, entitled children were projected separately by sex of the wage-earner parent. To the number of children in the population, factors were applied representing the probabilities that the parent is alive, aged 62 or over, insured, and receiving a retired-worker benefit. Another factor was applied representing the probability that the child is not entitled to a benefit based on the other parent's earnings. For children aged 18, a factor was applied

representing the probability that the child is attending a secondary school.

The number of disabled children aged 18 and over of retired-worker beneficiaries was projected from the adult population. In the short-range period, award rates were applied to the uninsured population, and termination rates were applied to the number of disabled children already receiving benefits. In the long-range period, disabled children were projected in a manner similar to that for children under 18, with the inclusion of a factor representing the probability of being disabled since childhood.

In the short-range period, the number of young-spouse beneficiaries was projected as a proportion of the projected number of child beneficiaries who are either under age 16 or disabled. In the long-range period, young-spouse beneficiaries were projected as a proportion of the projected number of child beneficiaries of retired workers, taking into account projected changes in average family size.

The number of aged-widow(er) beneficiaries was projected from the population by age and sex. In the short-range period, insured aged-widow(er) beneficiaries were projected concurrently with the retired-worker beneficiaries. A regression equation projected the number of uninsured aged-widow(er) beneficiaries, as a proportion of the uninsured aged female or male population not receiving any type of benefit. In the long-range period, aged-widow(er) beneficiaries were projected from the population by age, sex, and marital status. Four factors were applied to the number of widow(er)s in the population aged 60 and over. These factors represent the probabilities that (1) the deceased wage earner was fully insured at death, (2) the widow(er) is not receiving a benefit for the care of an entitled child, (3) the widow(er) is not fully insured, and (4) the widow(er)'s benefits are not withheld because of receipt of a significant government pension based on earnings in noncovered employment. In addition, some insured widow(er)s who had not applied for their retired-worker benefits are assumed to receive widow(er) benefits. Also, the same factors were applied to the number of divorced persons aged 60 and over in the population, with additional factors representing the probability that the person's former wage-earner spouse is deceased and that the marriage was at least 10 years in duration.

In the short-range period, the number of disabled-widow(er) ben-

eficiaries was estimated as a proportion of the uninsured female or male population aged 50-64. In the long-range period, the number was projected for each age 50 through 64 as a percentage of the widowed and divorced populations, adjusted for the insured status of the deceased spouse and the prevalence of disability.

The projected numbers of children under age 18, and students aged 18, who are eligible for benefits as survivors of deceased workers, were based on the projected number of children in the population whose mothers or fathers are deceased. In the short-range period, the number of entitled children was developed by applying award rates to the number of orphaned children, and by applying termination rates to the number of children already receiving benefits. In the long-range period, the number of child-survivor beneficiaries was projected in a manner analogous to that for child beneficiaries of retired workers, with the factor representing the probability that the parent is aged 62 or over being replaced by a factor that represented the probability that the parent is deceased.

In the short-range period, the numbers of mother-survivor and father-survivor beneficiaries were projected from the number of child-survivor beneficiaries who are either under age 16 or disabled. In the long-range period, mother-survivor and father-survivor beneficiaries were estimated from the number of child-survivor beneficiaries, taking into account projected changes in average family size.

The number of parent-survivor beneficiaries was projected based on the historical pattern of the number of such beneficiaries.

Table II.H2 shows the projected number of beneficiaries under the OASI program by type of benefit. Included among the beneficiaries who receive retired-worker benefits are some persons who also receive a residual benefit consisting of the excess of an auxiliary benefit over their retired-worker benefit. Estimates of the number of such residual payments were made separately for spouses and widow(er)s.

TABLE II.H2.—OASI BENEFICIARIES WITH MONTHLY BENEFITS IN CURRENT-PAYMENT STATUS AS OF DECEMBER 31 BY ALTERNATIVE, CALENDAR YEARS 1945-2070

[In thousands]

	Retired workers and auxiliaries			Survivors				
Calendar year	Worker	Wife-husband	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	16,588	2,867	643	3,889	582	2,919	21	27,509
1980	19,562	3,016	639	4,411	562	2,610	15	30,814
1985	22,432	3,069	457	4,863	372	1,917	10	33,120
1986	22,987	3,088	450	4,931	350	1,875	9	33,690
1987	23,440	3,090	440	4,984	329	1,836	8	34,126
1988	23,858	3,086	432	5,029	318	1,810	7	34,539
1989	24,327	3,093	423	5,071	312	1,780	6	35,012
1990	24,838	3,101	422	5,111	304	1,776	6	35,559
1991	25,289	3,104	426	5,158	301	1,791	5	36,074
1992	25,758	3,112	432	5,205	294	1,808	5	36,614
1993	26,104	3,094	437	5,224	289	1,839	5	36,993
Intermediate:								
1995	26,811	3,064	461	5,319	296	1,918	4	37,873
2000	28,241	2,989	504	5,479	306	2,070	3	39,592
2005	30,107	2,888	562	5,619	304	2,124	3	41,607
2010	33,704	2,779	619	5,723	284	2,043	3	45,155
2015	39,718	2,651	687	5,854	272	1,974	3	51,160
2020	46,926	2,604	752	5,964	269	1,945	3	58,461
2025	53,512	2,609	791	6,071	271	1,944	3	65,202
2030	58,541	2,559	815	6,119	271	1,948	3	70,255
2035	61,495	2,480	832	6,122	267	1,943	3	73,143
2040	62,477	2,375	835	6,111	262	1,929	3	73,991
2045	63,214	2,335	840	6,118	257	1,911	3	74,678
2050	64,530	2,354	848	6,128	253	1,895	3	76,010
2055	66,600	2,447	869	6,135	249	1,879	3	78,182
2060	68,723	2,541	885	6,128	246	1,862	3	80,388
2065	70,333	2,607	893	6,147	242	1,843	3	82,067
2070	71,636	2,651	897	6,200	237	1,824	3	83,448
Low Cost:								
1995	26,789	3,062	461	5,316	295	1,914	4	37,842
2000	28,032	2,967	507	5,444	306	2,068	3	39,325
2005	29,574	2,804	564	5,599	301	2,201	3	41,047
2010	32,856	2,647	625	5,705	286	2,207	3	44,329
2015	38,517	2,470	702	5,846	273	2,231	3	50,043
2020	45,285	2,383	780	5,975	265	2,282	3	56,973
2025	51,397	2,354	838	6,091	268	2,360	3	63,311
2030	55,797	2,270	881	6,125	273	2,438	3	67,788
2035	58,135	2,170	919	6,083	276	2,499	3	70,085
2040	58,597	2,058	941	6,002	279	2,542	3	70,423
2045	59,009	2,011	972	5,934	282	2,588	3	70,798
2050	60,069	2,018	1,007	5,881	288	2,644	3	71,910
2055	61,956	2,087	1,054	5,855	295	2,704	3	73,954
2060	63,958	2,154	1,096	5,860	301	2,761	3	76,134
2065	65,707	2,208	1,129	5,921	307	2,815	3	78,089
2070	67,491	2,259	1,159	6,035	311	2,869	3	80,128

TABLE II.H2.—OASI BENEFICIARIES WITH MONTHLY BENEFITS IN CURRENT-PAYMENT STATUS AS OF DECEMBER 31 BY ALTERNATIVE, CALENDAR YEARS 1945-2070 (Cont.)

[In thousands]

Calendar year	Retired workers and auxiliaries			Survivors				Total
	Worker	Wife-husband	Child	Widow-widower	Mother-father	Child	Parent	
High Cost:								
1995	26,842	3,067	461	5,324	296	1,918	4	37,910
2000	28,453	3,011	503	5,516	306	2,066	3	39,859
2005	30,612	2,971	562	5,645	319	2,095	3	42,206
2010	34,489	2,915	615	5,750	293	1,937	3	46,003
2015	40,871	2,842	674	5,864	268	1,763	3	52,286
2020	48,576	2,844	725	5,937	254	1,643	3	59,982
2025	55,735	2,902	747	6,018	247	1,572	3	67,225
2030	61,585	2,919	752	6,056	237	1,522	3	73,075
2035	65,469	2,901	751	6,082	226	1,479	3	76,910
2040	67,375	2,837	737	6,120	212	1,434	3	78,718
2045	68,878	2,837	721	6,180	199	1,382	3	80,201
2050	70,896	2,897	707	6,226	187	1,330	3	82,247
2055	73,568	3,046	707	6,237	176	1,280	3	85,017
2060	76,199	3,196	705	6,189	166	1,229	3	87,688
2065	78,014	3,297	697	6,135	156	1,179	3	89,482
2070	79,133	3,347	685	6,104	147	1,132	3	90,552

Note: The number of beneficiaries does not include certain uninsured persons, most of whom both attained age 72 before 1968 and have fewer than 3 quarters of coverage, in which case the costs are reimbursed by the general fund of the Treasury. The number of such uninsured persons was 2,448 as of December 31, 1993, and is estimated to be fewer than 500 by the turn of the century. Totals do not necessarily equal the sums of rounded components.

7. Disability Insurance Beneficiaries

The number of DI beneficiaries was projected for each type of benefit separately, by the sex of the worker on whose earnings the benefits are based, and the age of the beneficiary. The number of disabled-worker beneficiaries was projected from the estimated number of such beneficiaries entitled on December 31, 1992, by adding new entitlements and subtracting terminations. The starting number of entitled disabled-worker beneficiaries was estimated by age, sex, and duration of entitlement, from the tabulated number of disabled-worker beneficiaries in current-payment status on December 31, 1992. The number of new entitlements during each year was projected by applying assumed disability incidence rates. Incidence rates by age and sex were applied to the projected disability insured population (excluding those already entitled to disabled-worker benefits) to obtain new entitlements.

The number of terminations was projected by applying assumed termination rates to the disabled-worker population. In the short-range period, the number of terminations was projected by applying assumed termination rates by reason—death, recovery, and all oth-